THE T. & R.

BULLETIN

THE INC. RADIO SOCIETY OF GT. BRITAIN

AND THE BRITISH EMPIRE RADIO UNION

Vol. 9 No. 6 DECEMBER, 1933 (Copyright) Price 1/6

THE INCORPORATED

RADIO SOCIETY OF GREAT BRITAIN

AND THE

BRITISH EMPIRE RADIO UNION

53, *VICTORIA STREET, LONDON, S.W.1.* ('PHONE: VICTORIA 4412)

PATRON: H.R.H. THE PRINCE OF WALES, K.G.

R.S.G.B. CALENDAR.

Unless otherwise announced, all meetings are held at the Institution of Electrical Engineers, Savoy Place, W.C.2 commencing at 6.15 p.m. Tea is served at 5.30 p.m.

December 29. Annual General Meeting, followed by a lecture "*Transmitting Valves for Amateur Needs*," by L. Grinstead, Esq., (Transmitting Division Mullard Wireless Service Co.).

January 26. Presidential Address, followed by a lecture "*Electrolytic Condensers*" by N. C. Moore, Esq. (British N.S.F.)

February 23. "*Radio Communications with the* 1933 *Mount Everest Expedition*," by David S. Richards, Esq.

OFFICERS FOR THE YEAR 1933

President: H. BEVAN SWIFT (G2TI)

Vice-President - - - - - - - - A. E. Watts (G6UN)
Honorary Treasurer - - - - - E. Dawson Ostermeyer (G5AR)

COUNCIL

A. W. Alliston (G5LA), J. D. Chisholm, (G2CX), J. J. Curnow (G6CW), E. A. Dedman (G2NH), A. D. Gay (G6NF), J. W. Mathews (G6LL), H. C. Page (G6PA), Capt. G. C. Price (G2OP), T. A. St. Johnston (G6UT), G. W. Thomas (G5YK), J. C. Watts (BRS246), H. V. Wilkins (G6WN).

Secretary: J. CLARRICOATS (G6CL).

All correspondence should be addressed to The Secretary (or other officer concerned), The Radio Society of Great Britain, 53, Victoria Street, London, S.W.1. Insufficiently addressed letters may be considerably delayed.

THE T. & R. BULLETIN

Honorary Editor :—
H. Bevan Swift (G2TI)

Advertising Manager :—
Horace Freeman, Esq.

Vol. 9

No. 6

CONTENTS.

A PRESIDENTIAL MESSAGE

BY the time this issue reaches the majority of our members they will be thinking of the passing of the Old Year and, maybe, wonderiug what lies before them in 1934. It seems appropriate, therefore, that our December Editorial should view in retrospect the work of the past, and direct our thoughts to the future.

For the writer this Editorial is of greater importance than usual, for it is the last which he will contribute in his dual capacity as President and Editor. The time has now arrived for him to vacate the Presidential Chair, and it is highly gratifying to him to know that in a few days time he will be handing over to one who besides showing himself to be capable of carrying on the onerous duties demanded of the office, has also won the complete confidence of those who know him.

During the eleven years that your retiring President has served the Society, in various capacities, he has witnessed many important events and developments. One of the first was the well-remembered "fusion" whereby the old T. & R. Section, rapidly increasing in numbers, found it necessary to take over the government of the parent body. The consequent reorganisation is now past history, but the work achieved in those days will live long in the memories of those who participated. Lack of finance and the overcoming of prejudices were but two of the difficulties confronting those responsible for sponsoring the work of the Society, but in spite of all this, the year 1925 saw the launching of the T. & R. BULLETIN, and following rapidly in its wake we recorded our first Annual Convention, the inauguration of the B.E.R.U., the reorganisation of our Provincial Districts, and a host of other progressive movements which have brought the Society to its present highly satisfactory state.

Few will deny that extraordinary progress has been made, and those of our earlier workers who are still associated with us must feel gratified that to-day we number just on 2,000 members, a figure which illustrates clearly the interest which is being taken in a project we have made an important part of our life work.

Such a retrospect must, however, only be regarded as a halt for breath, for if we relax our efforts in but a small measure, the foundation upon which our present strength is built will be in danger of destruction. Officers may change and policies vary, but the task of upholding all that is best in amateur radio must be continued. That task does not rest with the officers alone, but must be borne by every individual member who is desirous of safeguarding our privileges and benefits. The Society has earned the high prestige it now enjoys, and we are justly proud of our position as the premier amateur radio Organisation in the Empire. Let every member, therefore, take a pride in protecting that tradition as his personal service.

In taking my Presidential farewell, I desire to express my grateful thanks to those who have so loyally assisted me in my duties, duties which have been rendered easier by the devotion which has been shown to me from every quarter. I sincerely trust that the same goodwill and comradeship will be tendered to my successor, and I hope that I may long be spared to render assistance in a humble way to the Society and its Officers.

To all members, both at home and abroad, I desire to express my personal good wishes for a Happy Christmas and a Prosperous New Year. May 1934 and the years to follow bring fresh successes to the Society and to the Amateur Cause in general.

H. BEVAN SWIFT.

INTERFERENCE ELIMINATION.

Part I—The Transmitting Side.

The Interference Committee have pleasure in submitting the first part of an article dealing with Interference Elimination. It is realised that this is not fully comprehensive, and members at home and overseas are invited to send in suggestions.

THE announcement that an Interference Sub-Committee had been appointed by Council appeared in the September, 1933, issue of this Journal. The two primary reasons for its formation were :—

1. To collect useful information and evidence from transmitting members regarding the kind and number of complaints they were receiving from Broadcast listeners, and their methods of overcoming the attendant difficulties.

2. To obtain a closer working with the G.P.O. on the subject of Interference from Amateurs.

The Committee have been able to obtain much useful information from a number of members heard operating on the lower frequency bands, during the main programme hours of the B.B.C., and they have also had the opportunity of learning how this problem has been treated in America, where the position has already reached a state requiring careful investigation from all angles. The Committee have found in general that the difficulties encountered in the two countries have been similar, and they are also satisfied that the treatment of the problem here is being carried out in the best possible manner.

In these articles the Committee will deal with the subject from three angles: (1) the transmitter, (2) the broadcast receiving set, and (3) the broadcast listener.

It should be emphasised that the transmitter must be dealt with first as being the specific cause of interference, though not necessarily to blame for it. Everything possible must be done at that end before the broadcast receiver side is dealt with, for it is obviously better to cure the trouble in one transmitter, than, say, in six receivers.

THE TRANSMITTER.

It will be realised that the case of the telephony transmitter commences where that of the C.W. transmitter finishes. Having produced a carrier wave that has no A.C. modulation on it, and keyed it without causing instantaneous changes in aerial power, the telephony transmitter immediately modulates the carrier and deliberately causes changes in aerial power. It will be seen later that precautions can be taken on telephony transmitters, though the case of the C.W. transmitter will first be discussed at some length.

Frequency Stabilisation.

It is strongly recommended that frequency stabilisation be used in its conventional form of crystal oscillator, doubler or buffer stages, and power amplifier.

Power Supplies.

As it is generally known that even crystal oscillators can generate modulated waves, it may be worth while to emphasise the fact that the H.T. supply to this stage should be as free from ripple as possible; less elaborate smoothing is permissible elsewhere for C.W. working.

Whilst on the subject of the power supply, it should be mentioned that a peculiar form of trouble has been recorded when using mercury vapour rectifiers of the GU1 type. Although the transmitter appeared to have an output free from modulation, severe trouble was experienced in neighbouring broadcast sets due, apaprently, to feed back through the A.C. mains. The trouble was in the form of a hum and was cured by adding choke L1 to the smoothing circuit shown in Fig. 1. Such a choke should have a high initial inductance, but may be so constructed that its inductance falls to a very low value when the full rectified current is flowing. Any form of cheap LF choke wlll be suitable, providing it has a small D.C. resistance and will carry the current. It is not part of the conventional filter C1, C2, L2.

As an alternative cure the condensers C3 may be fitted; a capacity of, say 0.01 microfarad at a high working voltage will suffice. Another cure would be the insertion of H.F. chokes next to the anodes of the rectifiers. The inclusion of L1 is, however, definitely advised by the valve makers as a means of preventing excessive surges.

R.F. Amplifiers.

The question of the R.F. power amplifier is liable to raise criticism in some quarters. While there is no doubt that the neutralised amplifier is the theoretically perfect amplifier, it is appreciated that many amateurs use locked oscillators in their power stage. There is nothing to choose between the final results on the air of a perfectly locked or a perfectly neutralised stage, for both can be very annoying when out of adjustment, though with the latter type the chance of this happening is remote. Furthermore, numerous types of keying and modulating methods are available to the user of this type.

Aerial Coupling.

The question of aerial coupling deserves consideration. The advice here is "*keep the coupling loose and avoid all forms of direct coupling.*" Owners of aerials with twin feeders or aerials working in conjunction with a counterpoise or earth invariably use separate tuned coupling circuits, but those using forms of end-on Hertz or Windom aerials tap the aerial (or single feeder) direct on to the anode coil. A form of loose coupling to give less local interference may be obtained by connecting the aerial (or feeder) on to a coupled tuned circuit.

Keying Methods.

There are numerous methods of keying, but from an investigation it appears that the majority of amateurs either key the primary of the power amplifier H.T. transformer (essential for locked amplifiers), or an H.T. feed to (preferably) a low power stage with a thump filter.

Primary Keying.

Dealing with primary keying first, a suitable filter circuit to prevent local interference from the inevitable disturbance at make or break is shown

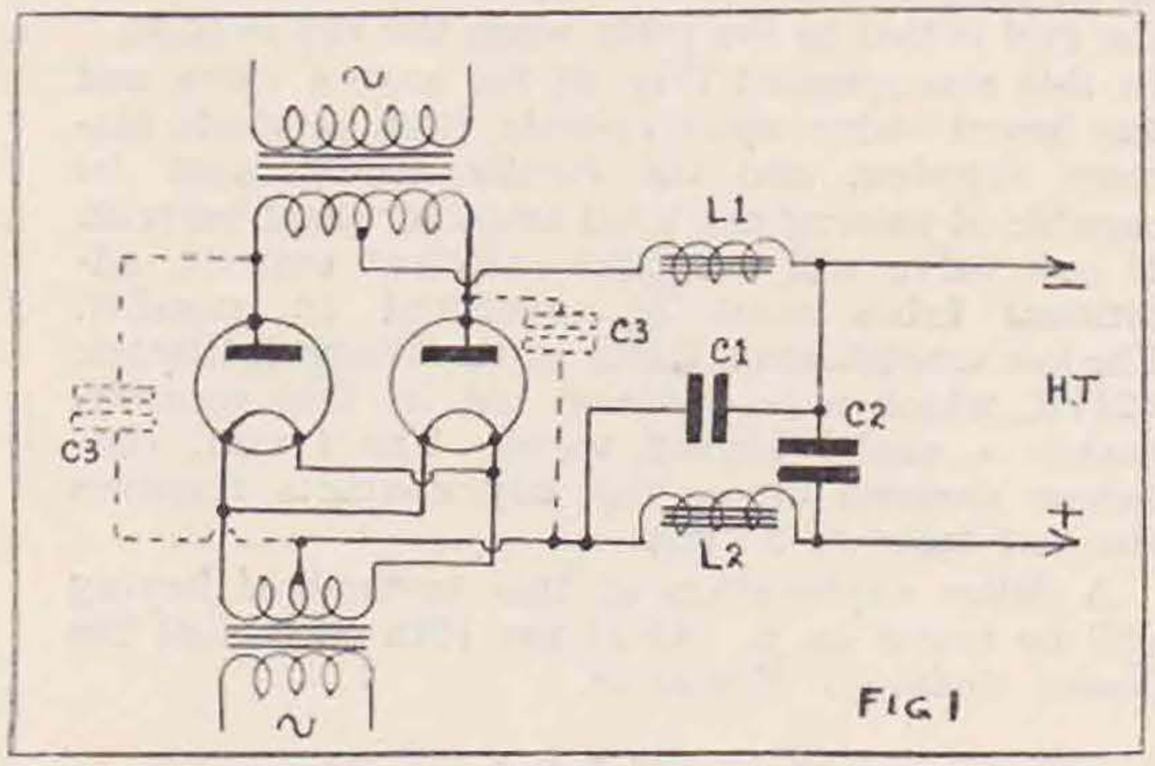


Fig. 1.
Methods of suppressing Interference when using Mercury Vapour Rectifiers for H.T. supply.

in Fig. 2. The value of C2 appears to be very indefinite. As the chokes H.F.C. are not choking at the radio frequency of the power amplifier, it seems that any large choke would be suitable, as they are intended to prevent the H.F. oscillations caused by the *spark* at the keying contacts from radiating. Such H.F. oscillations would have a very indefinable frequency. The size of these chokes is, however, definitely limited by the current flowing and the attendant voltage drop. If a filter is not found to be necessary, keying may then be affected across points AB.

Thump Filters.

It is known from experience that a key click is produced in neighbouring receivers when the key is pressed and the power suddenly switched on. A smaller click is produced on break. Before discussing types of thump filters it is desirable to explain briefly why a click is produced on broadcast waves when a transmission is commenced on, say, 40 metres. The sudden starting of oscillations produces transient side bands covering a large part of the spectrum, as it is known to us, and although the duration of these side band transmissions is short—almost instantaneous in fact—their amplitude is great. Further, the most super-selective receiver will be unable to eliminate them, as they are transmissions not confined to one wavelength, but cover all wavelengths. It is necessary, therefore, to arrange for the oscillations to commence and finish slowly as the key is pressed and released. By slowly is meant a " lag " of say 1/10th to 1/20th of a second, but this is necessarily very vague.

Fig. 3 shows a conventional thump filter for keying in any D.C. feed as, for instance, in the H.T. supply to a frequency doubling stage. It is immaterial, so far as the effectiveness of the filter is concerned, whether the positive or negative H.T. lead is broken (i.e., the lead carrying H.T. to the anode through the tuned circuit or choke, or the connection between H.T. supply and filament centre tap).

It is frequently more convenient to key in the former position.

The condenser C may be 0.25 mfd. and the resistance R 25 ohms; the choke L requires a fairly high inductance with no D.C. flowing, 50 to 100 henrys, but this may drop to a low value, say, 10 henrys when the full current is flowing. This point will be realised better when it is mentioned that the condenser-resistance combination is responsible for removal of thump at " break " and the choke for removal of thump at " make." It is not usually practicable to key high power stages by this means, and it is therefore recommended that it be used on as low a power stage as possible. When, for instance, a 10-watt frequency doubling stage is keyed by this means, and is followed by 100-watt neutralised amplifier, the use of a further choke similar to L may be found necessary in the H.T. lead to the amplifier, in order to remove traces of thump at " make."

Keying Relays.

Before dealing with other keying systems a few words about relays will not be out of place. There are two main advantages associated with relay keying: (1) it is not always convenient to have the key near the transmitter or power supply if the receiving table is elsewhere in the room, and (2) a well-made relay gives a much firmer and quicker make and break than is usually possible with hand-operated keys.

In Fig. 4 the relay will be seen to be operated from a key and local battery; the condenser C, 0.25 mfd., across the coil of the relay prevents any

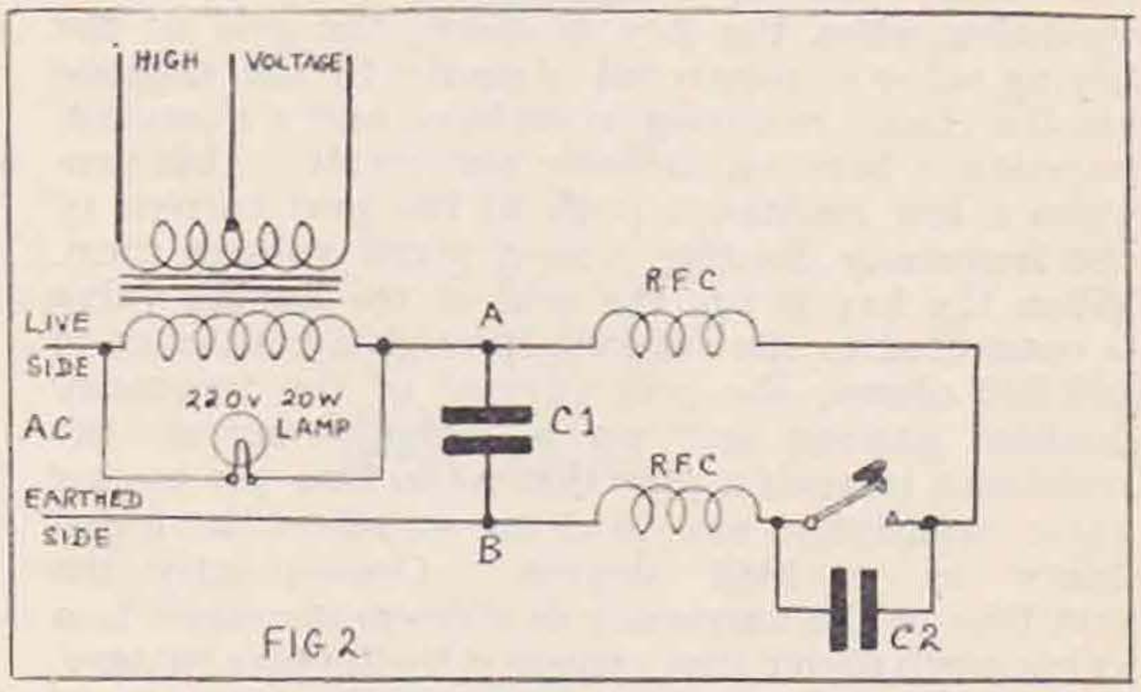


Fig. 2.
A filter for use with primary keying C1—0.05 mfd. C2—0.001 mfd. or larger, H.F.C. each 10 metres of wire on ½ in. to 1 in. diameter former.

disturbance being generated by breaking an inductive circuit. The chokes R.F.C. in the secondary circuit of the relay may be compared with the chokes shown in Fig. 2. Such chokes might with advantage be used next to the key in Fig. 3. Where the current through the chokes is small and probably less than 50 milliamps, larger chokes may be used than mentioned in connection with Fig. 2, and old slab tuning coils, 1,000 metres types, have been found satisfactory. The points marked " XY "

on Figs. 3 and 4 show the points of connection between the two circuits, and the connection for the relay to the primary keying circuit will present no difficulty.

Valve Keying Methods.

A method developed by one of our members and shown in Fig. 5 deserves mention, as this has proved successful when installed at many high-power stations.

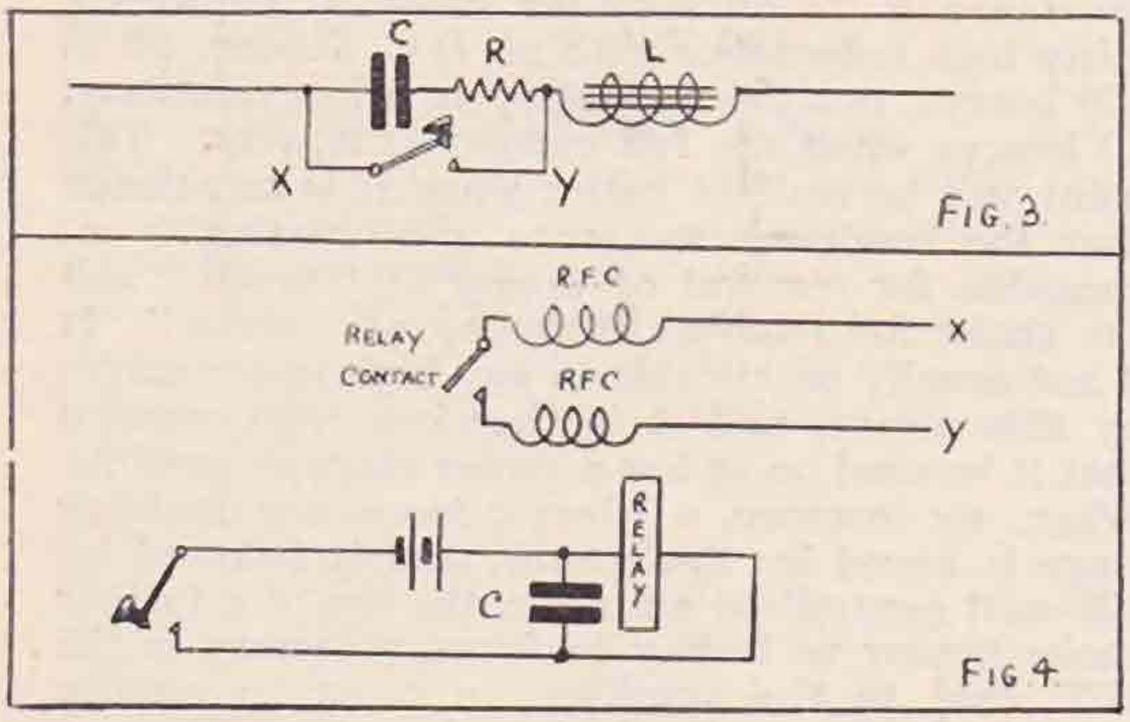


Fig. 3.
A thump filter for keying in D.C. leads.

Fig. 4.
Interference suppressors in a relay keying circuit.

This system can be described as an automatic bias or grid current method of keying. The principle of operation being that the grid current flowing via the R.F. choke, keying valve, and battery, to earth due to the drive on the frequency doubler, causes a voltage to be dropped across the keying valve. This voltage is in such a direction as to make the anode positive and the cathode negative despite the steady bias from the battery. Hence in the condition when the key is down, the grid of the keying valve is connected directly to the cathode via the choke, resulting in no bias, and a minimum impedance between cathode and anode. This provides a low resistance path to the grid current of the frequency doubler, and a small voltage drop. When the key is up, the grid of the keying valve is connected to the cathode through a resistance of 100,000 ohms; the grid current of the frequency doubler passing sets up a voltage across the resistance in such a direction as to bias the keying valve negatively, and in doing so raises the impedance to a high degree. Consequently the grid bias to the frequency doubler is increased to a value much above that provided by the bias battery. The choke and condenser is for the purpose of slowing up the changes of bias to the keying valve, thereby preventing surges and clicks.

It should be realised that this system does not give complete suppression of the carrier when the key is up, unless the following power amplifier is biassed to cut off by a battery or d.c. source (not resistance bias), as there will still be a small drive from the F.D.

In the *Radio Amateurs Handbook* a rather similar device is described in which the resistance across the key and condenser is variable; adjustment is then made until the plate current drops to zero with the key open. In this condition high negative bias is placed on the grid of the keying valve so that the plate current is completely cut off. On pressing the key, the grid of the keying valve is connected to its filament, and the valve acts like a resistance of low value, thus allowing plate current to flow to the valve being keyed. A further valve keying method, which we believe is entirely new, is described in the November issue of *Radio*. "It represents a combination of automatic bias, blocked grid keying, and centre tap keying, and is one of the most efficient valve keying circuits possible, in that the plate resistance of the keying valve is reduced to an exceptionally low value due to the fact that the grid is tied to the plate when the key is down." In this arrangement (Fig. 6) the keying valve and the keyed valve must operate from separate filament supplies, and the former valve must be capable of passing the total amplifier plate current. If one valve will not pass sufficient current, additional tubes must be connected in parallel. The low amplification factor of the Western Electric 421IE, which is in common use in this country, makes a useful keying valve. The 1 mfd. condenser shunted across the key contacts removes the last trace of a click.

A fuller explanation of this method of keying will be found on p. 148 of the 10th edition of the *Radio Amateurs Handbook*.

Types of Interference.

In the foregoing an attempt has been made to point out some difficulties experienced in setting up and keying a transmitter, and before mentioning modulation, some reference should be given to the types of interference that may trouble the broadcast listener, though it may be necessary to again refer to them later.

Briefly, there are three kinds of interference that

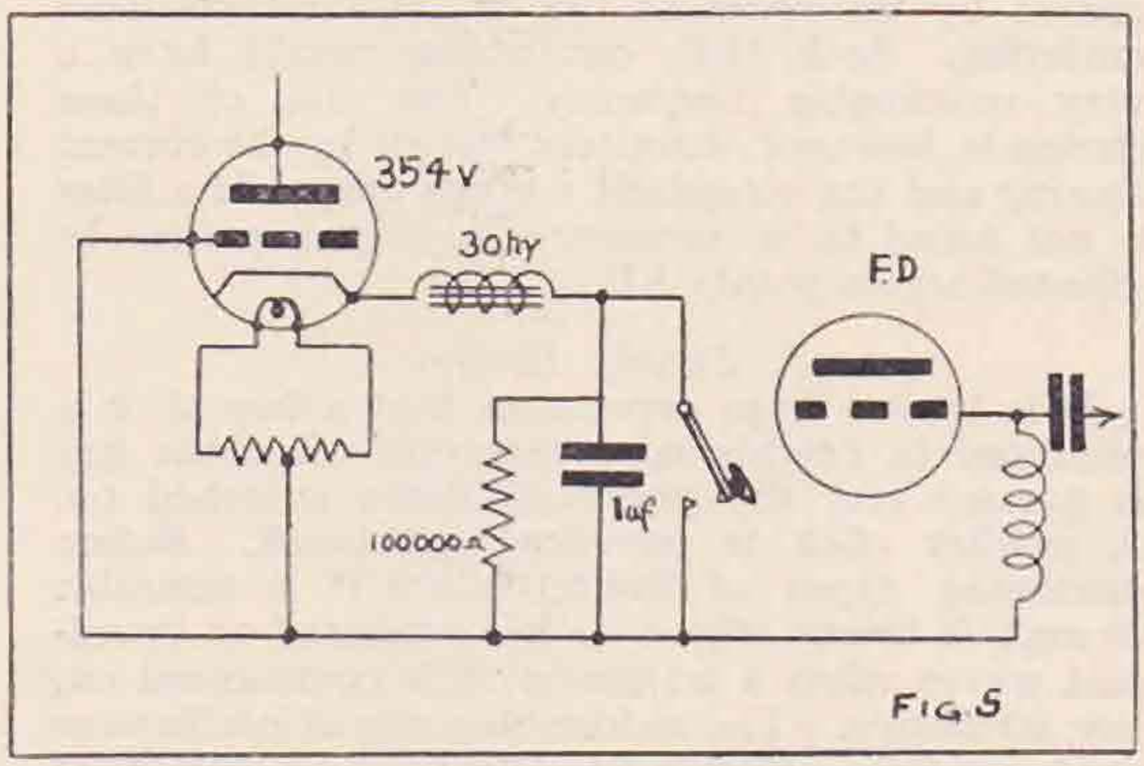


Fig. 5.
A method of valve keying developed in this country.

may be caused by an amateur C.W. transmitter in a neighbouring receiver working on broadcast waves. First, there is the "wipe-out" effect where the signal from the transmitter blocks the receiver due to (*a*) the excessive field strength of the transmitter, and (*b*) the inselectivity of the receiver. This effect may be accompanied by bad hum due to insufficient smoothing in the transmitter. Second, there are "key clicks" caused by the sharp change in aerial power from zero to

normal and *vice versa*, when the set is keyed. Third, there is the " hum " effect which may not be accompanied by blocking of the H.F. stages of the receiver.

The " wipe out " effect will be fully dealt with under the Broadcast Receiver section, and it only remains here to draw attention to the benefits of *loose aerial coupling*, with the resultant more sharply tuned signal. The second effect must

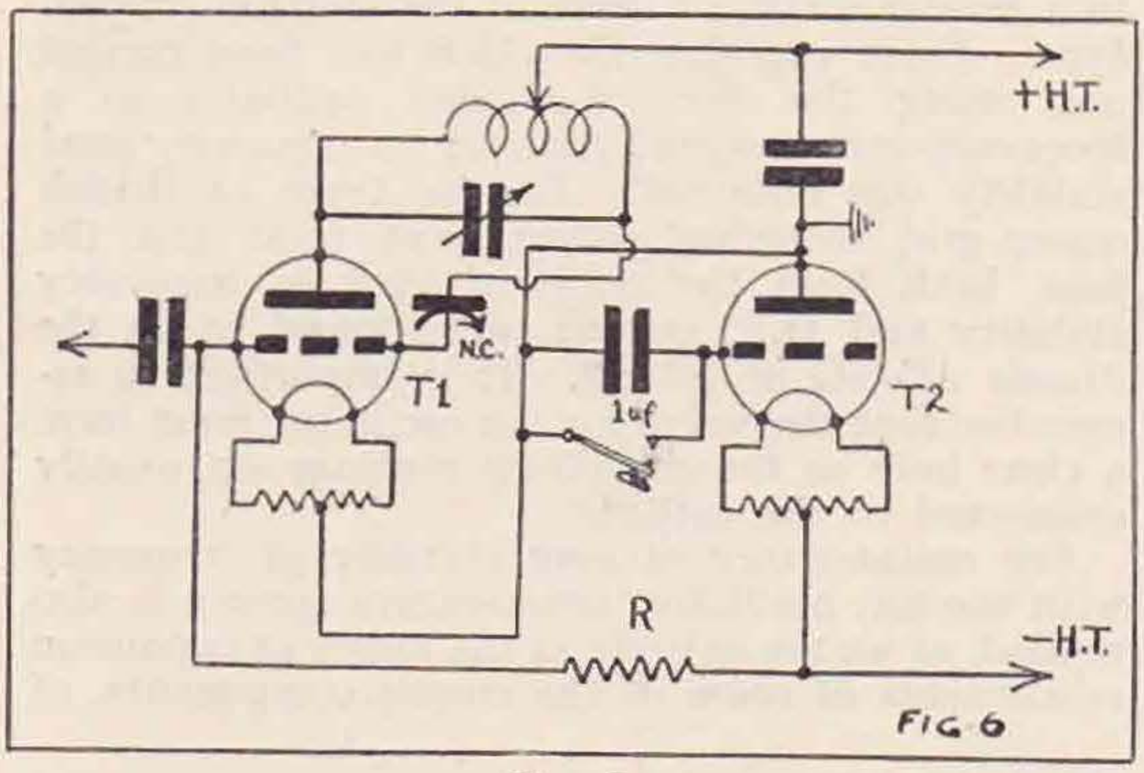


Fig. 6.
Another valve keying method combining the effects of automatic bias, blocked grid and centre tapped keying. One 4211E valve will suffice to key a 50 ma. stage.

invariably be overcome at the transmitting end by one or more of the keying methods already discussed. Very frequently the third effect is the most troublesome, as it may be a form of interference that does not pass through the ether with the wave but through the mains wiring. As a test, remove the aerial from the broadcast receiver, and keep it at least 5 ft. away; if the hum still persists it is probably being conveyed through the mains wiring. The form of trouble referred to in connection with GU1 rectifiers is of this type, but is not only associated with mercury vapour rectifiers. As a precaution keep a good " earth " (through a suitable condenser), on to some part of the transmitter—the power amplifier filaments is a good place. The final cure for such trouble appears to be the insertion of radio frequency filters in the main leads to either transmitter or receiver. The construction of such a filter will be discussed here and referred to later.

Fig. 7 shows a form of filter suitable for inserting in the mains supply leads. It has been noticed that the form taken by this filter varies considerably the earth points on the double condensers are sometimes omitted (in which case only one condenser each side of the chokes will be required) and frequently only one side of the chokes is shunted with a condenser. It must therefore be left to individual experiment to determine which arrangement is required.

In some cases a pair of condensers across the line with their centre point earthed will cure the trouble. The chokes must, of course, be wound with due reference to the power carried, and the permissible voltage drop across them. It has been suggested that 50 to 250 turns on a 1-in. diameter former is suitable. The condensers may be 0.1 mfd., but their value is not very critical.

Shielded Leads.

Little information is available on the advisability of using shielded leads for power supply wiring, keying wires or any other supposedly zero H.F. potential wires, but if the point concerning a good " earth " on the transmitter be remembered, less attention need be paid to shielding.

Telephony Interference Elimination.

It has been mentioned that key clicks are produced by side band transmissions covering a large wave-band. This point should be remembered when operating a telephony transmitter. Here side bands are intentionally produced, but these side bands extend for only a few kilo-cycles either side of the fundamental frequency transmitted. If, however, frequency modulation or over modulation results from a badly operated transmitter, there will be produced side bands analogous to those produced by a transmitter operating without a key thump filter. Severe interference to broadcast reception will be experienced, and it is therefore very necessary that during the hours of broadcasting the modulation side of the transmitter receives every attention.

Apart from the interference caused by misadjusted transmitters the remedies for interference from telephony appear to lie in the broadcast set, and this will be fully dealt with in that section.

It is not within the scope of this article to explain modulating systems, though some can be recommended and some condemned. The use of the common forms of choke or grid control are in every way satisfactory, but care should be taken to see that modulation does not affect the crystal drive either by feed back between H.F. circuits or

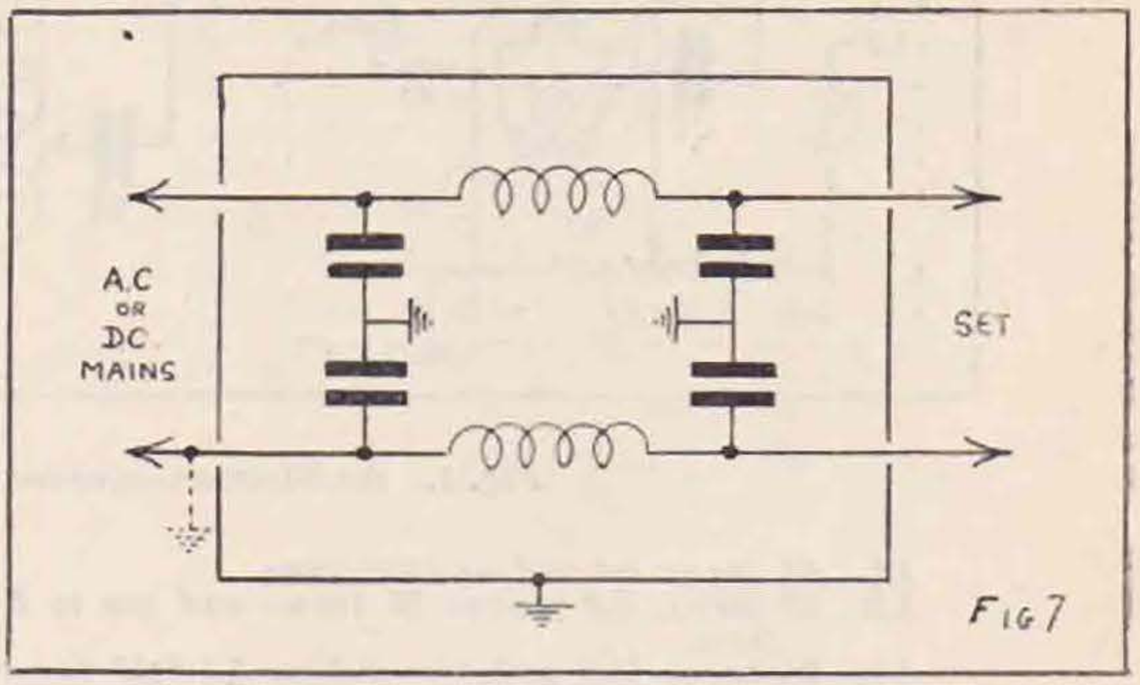


Fig. 7.
Interference suppressors in the mains lead to transmitter or receiver. The earthed metal box containing the filter is a precaution against direct pick-up or radiation by the chokes, and would probably be insisted on by the supply or insurance companies.

regulation of power supply. Frequency modulation will be likely to result if attention is not paid to these points. Every endeavour should be made to use at least one stage between the driving valve (crystal oscillator) and the valve being modulated. It should be remembered that the modulator valve, either anode or grid control, is an L.F. amplifier, and unless Class B is used here the anode feed should be practically constant. Finally, do not modulate by absorption control or by inserting the microphone in the aerial or earth lead.

(*To be continued.*)

AN ELECTRON-COUPLED MASTER OSCILLATOR DRIVE CIRCUIT.

By A. D. Gay (G6NF).

INTRODUCTION.

HAVING spent the best part of twelve months studying the behaviour of quartz crystals under the influence of temperature control, in the region of 30° C., the writer has arrived at the conclusion that there is something distinctly effeminate about their constitution. Crystals, providing they are properly cut and ground, behave quite rationally at temperatures up to about 28° C.; above this temperature almost anything may happen. They may show two or even three modes of oscillation or simply jump two or three kilocycles. This is particularly prominent with Y-cut plates, the X-cut only exhibiting small jumps in frequency. Nevertheless, this phenomenon is very discouraging to anyone who is trying to adjust crystals to exact frequencies and it leaves him a little uncertain as to their ultimate behaviour.

when temperature control is employed. These difficulties necessitated the writer having recourse to a master oscillator drive of the electron-coupled type. From experiments which had been carried out, using the electron-coupled oscillator as a frequency-meter circuit, data on its extremely good stability was obtained. Various types of British screen-grid receiving valves were tried and the best, both from the point of view of frequency stability and H.F. output, were found to be the *Mazda* AC/SG or AC/S2. It is important to remember that the valve for the oscillator must have a clear bulb as the metallised coatings are usually connected to the cathode.

For maintenance of long stability of frequency with the e.c. oscillator, temperature control is also needed, as we are entirely at the mercy of expansion co-efficients of some of the circuit components, of

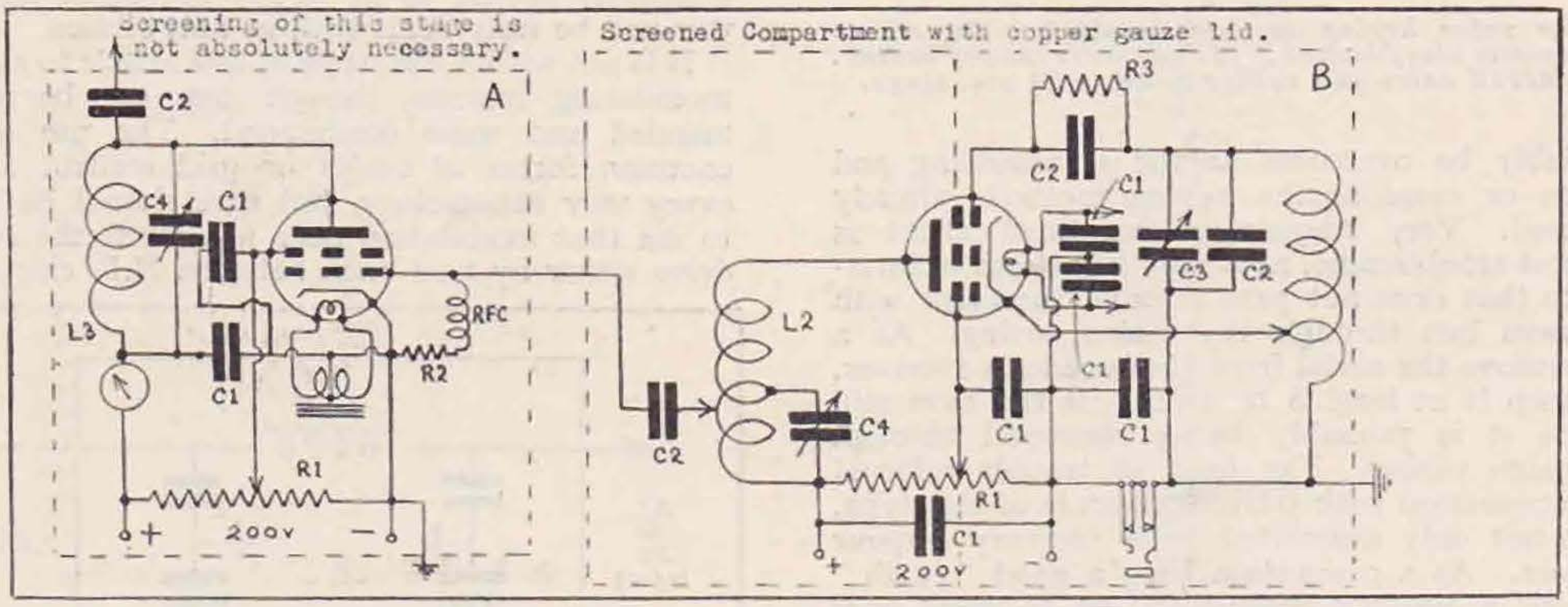


Fig. 1. An Electron-coupled Master Oscillator Drive Circuit.

L1. 41 turns tapped at 14th turn.
L2. 88 turns, C4 across 40 turns and tap to FD at 16th turn.
L3. 24 turns (all coils wound on 2.1 8th" formers).
C1. .01 mfd.
C2. .0003 mfd.
C3. .0002 mfd variable.
C4. .0003 mfd variable.
R1. 20,000 ohm potential dividers.
R2. 1,500 ohm bias resistance.
R3. 50,000 ohm grid leak.
J. Jack for m a meter.
K. 0-20 m a meter.
HFC. 200 turns on 1" tube.

For frequency stabilities in the region of 0.01 per cent., temperature control is necessary and the oven temperature must be in excess of the maximum day temperature experienced. Many commercial stations operate their crystal ovens at 50° C., and their crystals are specially selected in relation to their crevasse exploration test, which means, briefly, that the crystals are explored with an H.F. generator and their response curves carefully plotted; this enables the troublesome crystals to be detected and the best to be selected for transmitter control.

The foregoing remarks need not cause concern in those who operate their crystals at normal room temperatures, but merely serve to indicate the difficulties to be expected with certain crystals

which the inductance is the chief offender. Also, valve heating may cause as much as 0.05 per cent. frequency drift with the usual type of 4 volt, 1 amp. mains valve, and this takes as much as 30 minutes to settle down. This heating also raises the internal temperature of a screening compartment by at least 10° C., above the ambient temperature, which causes further temperature drift. Temperature control of the e.c. oscillator is quite unnecessary for those considering the employment of these oscillators for amateur short-wave transmitters, and providing adequate ventilation of the screening compartment is given, after 30 minutes no frequency drift takes place. The only necessary proviso is to continuously maintain the filament supply to the

oscillator to avoid frequency creep each time the transmitter is switched on. The fifteen or twenty seconds taken for independently heated filaments to rise to operating temperature renders this necessary in any case. The circuit arrangements to be described have been well tried out on all bands, and reports have all been T9 or pure D.C. crystal control on 1.7, 3.5, 7 and 14 mc.

The Electron-Coupled Oscillator Circuit.

This circuit is now so well known in the U.S.A. that it is surprising that it is not used more in Europe. J. B. Dow described the circuit in the *Proc. I.R.E.* for December, 1931, and *QST* has published several articles since then on its adaption to amateur transmitter control. Admittedly the cost of screen grid valves in America is very much less than it is here in England, nevertheless, the value lies in the variability of frequency available, with a note indistinguishable from crystal control.

The action of the circuit is not difficult to understand; oscillations are set up in L1 when H.T. is applied to the screening grid and are due to the resultant differences in potential between the filament, cathode and control grid which, to increase efficiency, is biassed with the usual grid leak and condenser. Although 80V positive in respect to the filament, the screened grid is at earth potential, through the by-pass condenser C1, therefore the anode is effectively screened from the oscillatory circuit, but some of the electrons will pass through the screening grid to the anode due to the latter's higher potential, *i.e.*, 200 V. The anode current averages around 1 ma., and consists of electrons which have been modulated by the oscillations built up around L1. The output circuit can either be tuned to resonance to obtain the greatest output at a given frequency or, in the case of a frequency meter, made aperiodic with a 100,000 ohm resistance. When the anode circuit is tuned to the same frequency as the generating portion, very little pull or interaction takes place as long as adequate screening is provided. It is best to select a harmonic either 2 x f or 3 x f, which will be found almost as strong as the fundamental.

In addition to this freedom from frequency pull, the circuit possesses the valuable feature of being practically independent of changes in applied voltages. For instance, if the filament circuit is broken, the hetrodyned oscillations can be heard to stop when the cathode has cooled, similarly to the way a crystal stops oscillating, and almost without any frequency drift. The H.T. can be changed 10-20 per cent. with little perceptible alteration in frequency. This condition is ensured by the provision of the screen-grid voltage from the centre of a 20,000 ohm potential divider, which is connected across the H.T. supply.

We were fortunate in having available a number of different makes of screen-grid valves, which were all tried in turn. The calibration of the circuit is practically independent of changes in valves of the same type and make, and as mentioned previously, the *Mazda* AC/SG or AC/S2 gave the best results.

The *Mazda* AC/SG, which has its grid, cathode and filament connected in the Hartley type of circuit, is tuned to the 850-1000 kc. range by means of a coil L_1 of 42 turns on a $2\frac{1}{8}$" *Keramot* former (see Fig. 1), the cathode being connected $\frac{1}{8}$ of the way up this coil from the earthed end. A variable condenser of 200 mmf. tunes the coil, while a lumped capacity of 300 mmf. is utilised to swamp temperature capacity changes in components. A centre-tapped coil may be used for this circuit if desired, as the cathode tapping is not critical, but generally speaking the position of $\frac{1}{3}$ of the coil is more satisfactory. A grid leak of 50,000 ohms across a 300 mmf. condenser with the usual by-pass condensers completes this circuit. The selection of 850-1000 kc. range for this coil enables the output circuit to be tuned to 1.7 mc., which is preferable in order to obviate any frequency pull. This feature also enables the constructor to calibrate the oscillator accurately from the frequencies of broadcast stations—a curve for all the condenser settings can then be plotted.

The output circuit consists of a coil L_2 of 88 turns wound on the same size former; 48 of these turns consist of anode tap and greatly increase the efficiency of the oscillator. With 200 anode volts and 75 volts on screen, the total H.T. consumption is only 5.5 m/a and it has been found possible to light

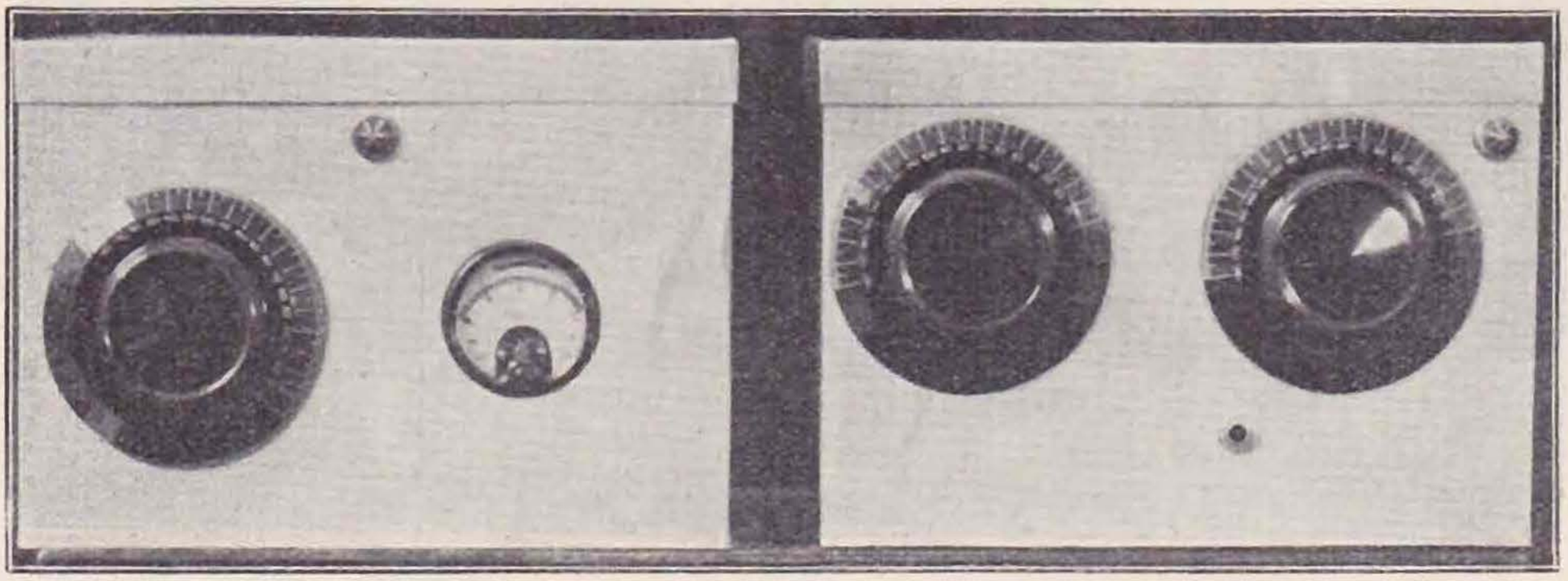


Fig. 2.
FRONT VIEW OF THE TWO UNITS.
On the right is the E.C. oscillator, on the left the F.D. stage. Small indicating lamps show when the filaments are alight. The E.C. oscillator unit can be slipped into a temperature controlled box (which will be described later) for maintaining frequency stability over protracted periods. The jack for measuring E.C. valve emission can be seen near centre of box.

a flash-lamp bulb (3.5 volts, 0.3. amp.) to half brilliancy when coupled by means of a single loop to this circuit. The screen-grid voltage is obtained from the centre tapping of a 20,000 ohm potential divider and makes the oscillator practically independent of fluctuations in supply voltages.

First Frequency Doubler.

Pentodes are becoming the fashion for frequency doublers and in accordance with modern requirements one of these valves, a PM 24A, was given a trial. The results were no better than those obtained with a second AC/SG screen-grid valve, and as the latter valve has several advantages over the Pentode for H.F. work, it was finally adopted.

The sensitivity of the AC/SG or AC/S2 as a frequency doubler is such that the tapping from the electron, coupled output coil is only 16 turns from the +H.T. end of that coil. This degree of coupling is sufficient to drive the valve hard and bias is provided by means of a 1500 ohm resistance in series with an H.F. choke. The output circuit consists of a 24-turn coil wound on a $2\frac{1}{8}$" former and is tuned with a 300 mmf. condenser. This circuit can be tuned to 1.7 mc. for operation on 1.7 and 3.5 mc. and neutralisation is not necessary as it would be in the case of a Pentode. This tuning will be found to be near the maximum of the condenser and near the minimum will be found the 3.5 mc. harmonic which is used to drive the usual 7 mc. F.D.

At the writer's station, the output from this valve, which will light a flash-lamp bulb brilliantly, suffices to replace the 1.7 mc. crystal stage in the 3.5 mc. transmitter driving the 3.5 mc. F.D., and this in turn driving a P.A. stage up at a full 100 watts. The same applies to the higher frequency transmitters, the 3.5 mc. output driving the 7 and 14 mc. F.D.'s practically as well as the 3.5 mc. crystal, with the additional advantage that the frequency is adjustable to whatever position of the band it is desired to operate.

Where a 3.5 mc. crystal stage already exists, the connection from the grid, which normally goes to the top plate of the crystal holder, can be fed with the 1.7 mc. output from the S.G.F.D. The grid bias to the 3.5 mc. stage will then have to be trebled to allow for the increased excitation.

Adjustment of Oscillator and Frequency Doubler.

The oscillator and F.D. cover a frequency range of all the amateur channels. The greatest is the 1700-2000 kc. band, which occupies nearly 180° of the oscillator tuning condenser. When the e.c. oscillator output stage is tuned to resonance, the H.T. feed to this stage, of 5.5 m/a measured at the negative connection, will be found to dip slightly, and the H.T. feed to the F.D. will be found to rise to about 11 m/a and when the F.D. anode coil is tuned to resonance this will dip to about 5 m/a.

No difficulty is likely to be experienced in making the oscillator and output circuit work and the frequencies can be checked by means of an absorption frequency-meter. The harmonics of an e.c. oscillator are quite strong up to the 4th or 5th, and the same applies to the S.G. frequency doubler stage, so that an absorption meter must be used to make sure which harmonic is being selected. It was found that when the e.c. oscillator coil was changed to cover the frequency range of 560-667 kc., the output coil being kept at 1.7 mc., the harmonics on 3.5 and 1.7 mc. from the F.D. were practically as strong as they were before. A mistake of this kind would not matter, but should the wrong harmonic from the F.D. (for instance, the second on 2550 kc. instead of the third on 3500 kc.) be selected, some puzzling effects might be produced.

(*Continued on page* 182.)

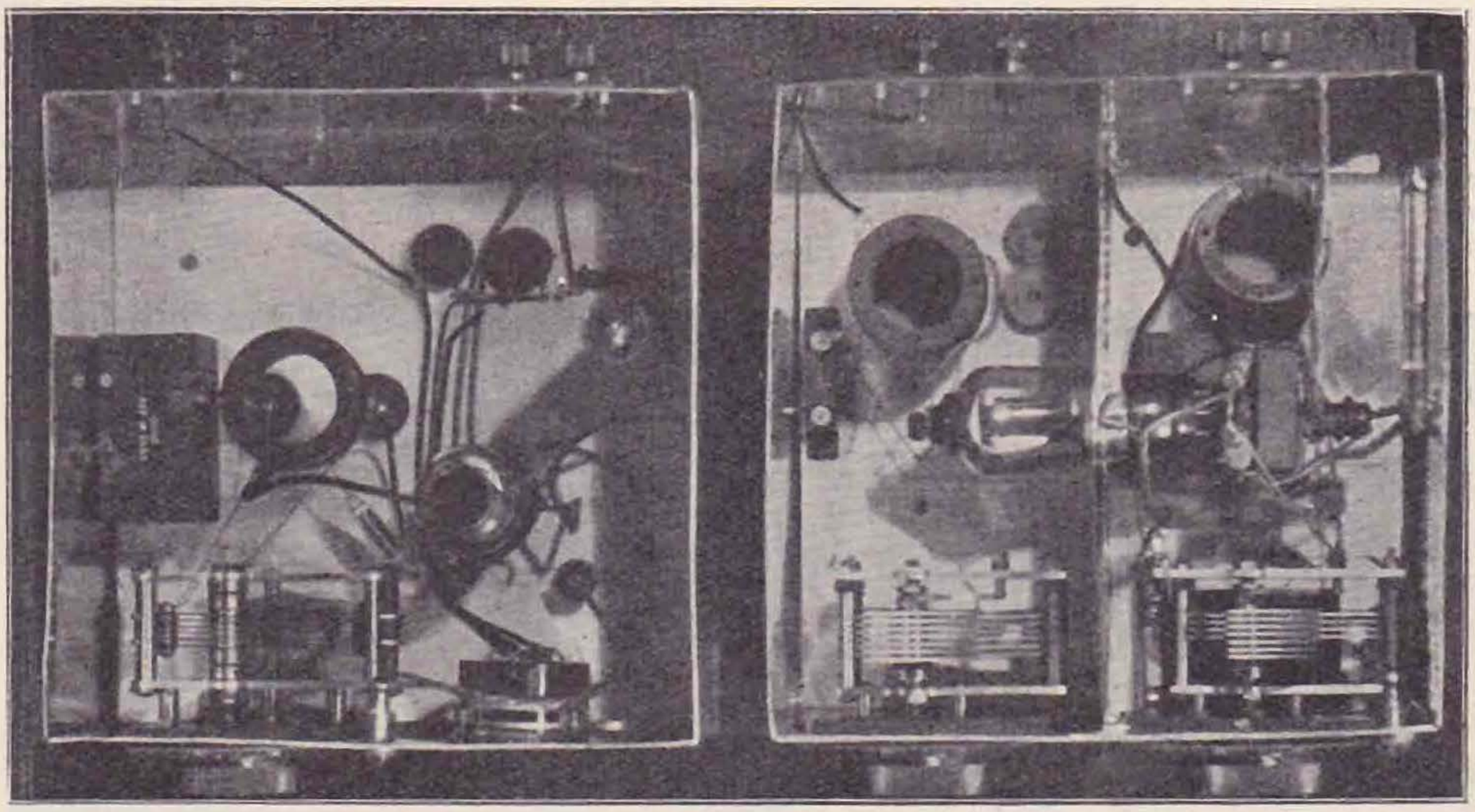


Fig. 3.
INTERIOR VIEW OF UNITS.
The shielding boxes consist of 10-in. square biscuit-tins which have been cut to 7 ins. in height, and painted with grey lacquer. The E.C. oscillator on right with shielded output stage and grid condenser similar to Dubilier Type 577 mounted beneath the valve. Band-spread condenser of same type, beneath the variable condenser.

A 56 MC. SUPER-REGENERATIVE RECEIVER WITH S.G. DETECTOR VALVE.

By W. C. V. Parker (G6WJ).

We have pleasure in publishing the winning article in the recent 56 *mc. Receiver Design competition. Several novel features are described which, we believe, will interest those members who are engaged in* 56 *mc. problems.*

THE receiver described and illustrated in this article was designed after noting the superior results that a S.G. detector gave over an ordinary triode valve in the author's 7 and 14 mc. receiver. It suggested that a S.G. detector valve in a 56 mc. receiver would be worth trying, as similar results might be expected. In addition, an added advantage would be a constant anode voltage on the S.G. detector valve obtained by controlling reaction by varying the screen voltage. As is well known, a detector valve requires a somewhat critical plate voltage, and any great variation from this optimum value is bound to have a serious effect on the valve's sensitivity and efficiency. In the majority of 56 mc. receivers reaction is controlled by varying the anode voltage, and although this method apparently works quite well, losses are inevitable when the valve is operating off this optimum voltage. As the point when the valve commences to oscillate is governed by the coils, coupling and capacity, it is more than likely that oscillation will begin with the valve working at an anode voltage entirely unsuitable for proper detection, and it appears to the writer a poor method to damp the valve down by lowering the voltage to control reaction.

With a S.G. detector valve reaction can be controlled by varying the screen voltage and fairly large variations in this voltage have little effect on the valve's sensitivity, and this fact, coupled with its admitted superiority as a detector, led the writer to conduct some experiments.

Preliminary Tests.

As several types of receivers were being tested, it was decided that it would be very useful to have a constant signal by which to make comparisons, so a very low power transmitter was constructed. This consisted of an ultraudion circuit with a Mazda L210 valve as oscillator drawing 2 m.a., modulated by a crystal receiver built in one unit with the transmitter and tuned to the local B.B.C. programme. This miniature transmitter was so placed in the house as to give a very weak signal in the receiver, and proved very useful indeed.

It was found that a receiver with one valve working as combined detector and quencher was the least sensitive, a receiver with a separate detector valve and quencher valve was better, and a receiver with a S.G. detector and separate quencher was better still, and justified the added cost of extra components.

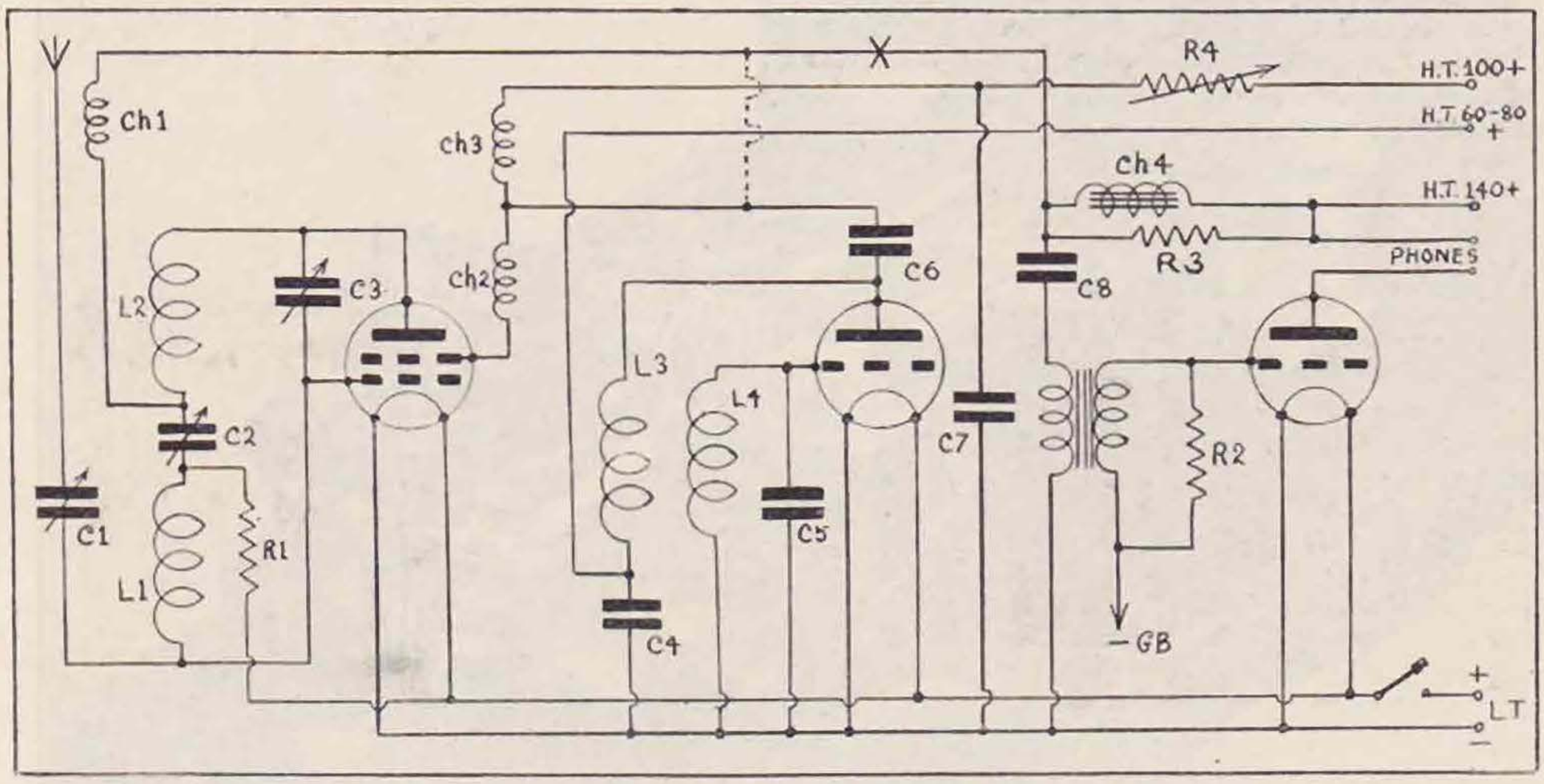


Fig. 1.
Circuit Diagram of 56 mc. Super-Regenerative Receiver using S.G. Valve as Detector.

C1, Formodensor, .0001 max. (Formo Co.).
C2, 0.001 Baseboard Trimmer (Jackson Bros.).
C3, Midget Reaction Condenser, R 149 (Ormond).
C4 and C7, 2 mfd. Non-inductive, type 50/61 (T.C.C.).
C5, 0.01 Fixed Condenser, type 34 (T.C.C.).
C6, 0.1 Fixed Condenser, type 34 (T.C.C.).
C8, 0.25 Fixed Condenser, type 80 (T.C.C.).
L1, L2, five turns each ½in. diam., 16 gauge wire.
L3, L4, Set Quench Coils, No. 958 (Eddystone).
Ch1 and Ch2, 5-metre Chokes, type 947 (Eddystone).
Ch3, Binocular H.F. Choke (McMichael).
Ch4, 300H L.F. Choke, D.P.16 (Varley).
R1, 2 meg., with wire ends (Dubilier).
R2, 100,000 ohms 1 watt wire ends (Dubilier).
R3, ½ meg., with wire ends (Dubilier).
L.F. Transformer, Ni-core II (Varley).
One 4-pin Valve-holder, type 949 (Eddystone).
R4, 50,000 ohms Wire-wound Potentiometer, type 62 (Lewcos).
Two Slow-motion Dials, type 943 (Eddystone).

Quenching Frequency.

In the receiver about to be described another departure is the method of applying the quenching frequency. This is fed to the screen of the valve ***via*** condenser C6. Another method of applying the quenching frequency which also works very well is to disconnect the wire which couples the two chokes ch 2 and ch 3, and connect this to the wire feeding the anode, as shown dotted in the diagram. Then choke ch 3 should be cut out and connected at point X in Fig. 1.

The detector valve is choke-transformer coupled to the power valve, as a S.G. detector valve requires a very high impedance in the anode circuit a 300 henry Varley L.F. choke was used. The signal then passes through a 0.5 mfd. condenser to the L.F. transformer, a 100,000 ohms resistance being connected across the secondary winding, which cuts out any trace of instability.

Construction.

The actual construction of the receiver is very simple, and the two photographs show the layout of the components. The baseboard is 10¾ ins. wide by 14½ ins. deep, and mounted on 1-in. battens, and part of the wiring is carried under the baseboard. It will be seen that the tuning condenser and reaction control are mounted on a sub-panel, and in front of these a piece of paxolin, 4½ ins. by 2½ ins., supports the coils and *J.B.* balancing condenser. The *Eddystone* valveholder is also mounted on an ebonite strip, which is screwed to the baseboard with a block of wood at the back. The series aerial condenser is supported by a length of 4 B.A. screwed rod above the valve holder. The *Ormond* tuning condenser has two sets of fixed and one set of moving vanes, the connections from the two outer ends of the coils each going to a set of fixed vanes, no connection being made to the moving vanes. With this arrangement a form of series gap tuning is achieved. Any other type of midget tuning condenser would do quite well.

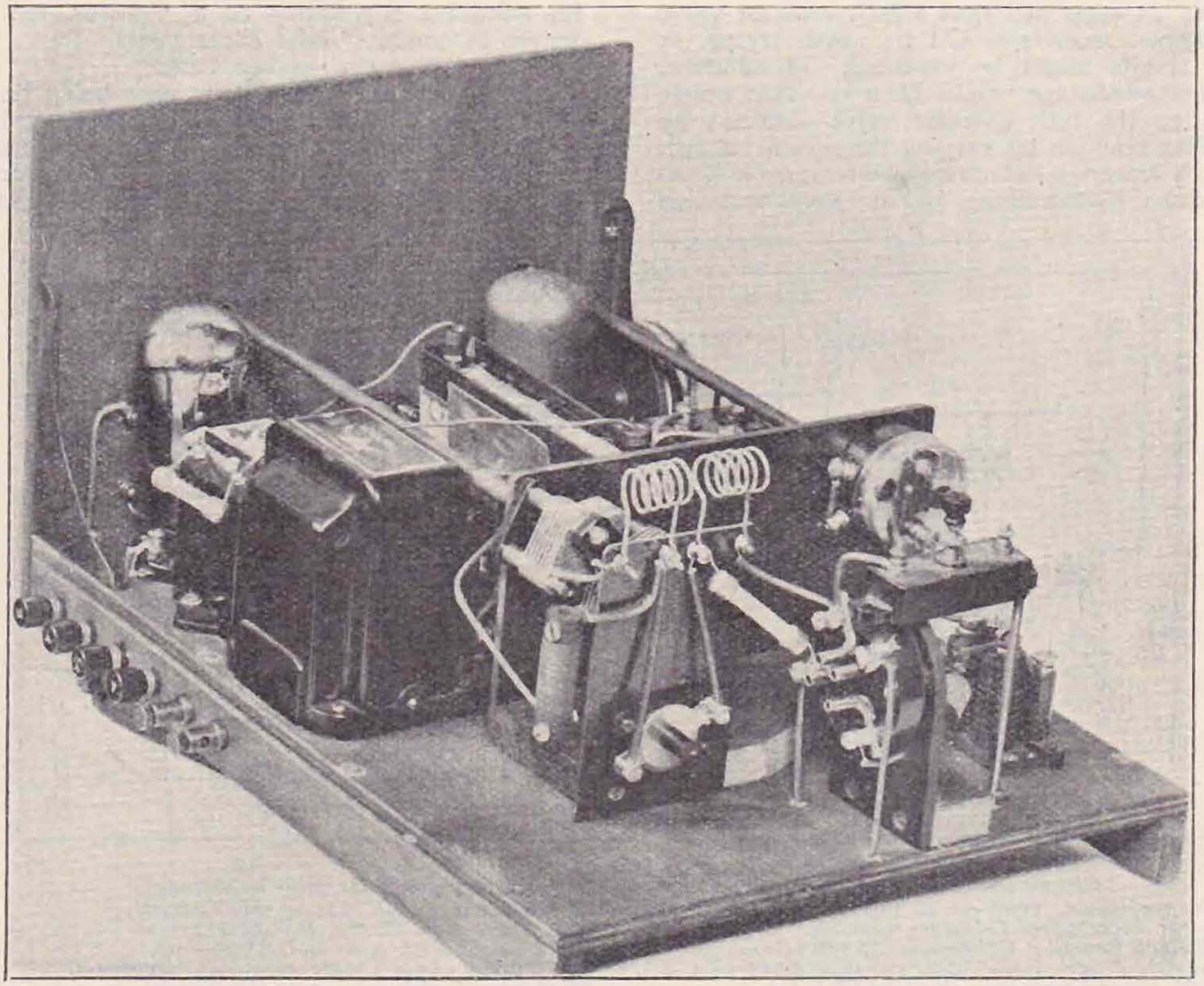


Fig. 2.
Rear view of 56 mc. Receiver, showing assembly of Screen-grid Detector Circuit.

Extension spindles consisting of ¼-in. ebonite rods are fitted to the tuning and reaction controls, and slow-motion dials are also fitted.

Phone terminals are fitted on the panel and L.T. and H.T. terminals at the side, the grid-bias battery being mounted in a clip in the centre of the baseboard.

Valves.

The choice of valves, apart from the S.G. detector, is not very critical, any good power or pentode valve works quite well. A *Mullard* P.M.2A has given very good results, but the grid bias should be 4½ volts negative, and not 9 volts, as shown in the photograph. A *Mullard* P.M.2DX was used as quenching valve, and a *Mazda* S.G.215 as the detector.

Operating Data.

The screen and quenching voltages are fairly critical, and it was found that a higher screen voltage than normal was wanted (about 80-100 volts). When quenching on the screen the H.T. supply to the anode was 140 volts.

When the receiver is working properly the characteristic rushing sound should be heard ; regeneration should then be controlled by the variable resistance.

The background noise appears to be less with this receiver, but this may have been caused by the receiver delivering a stronger signal and suppressing the background.

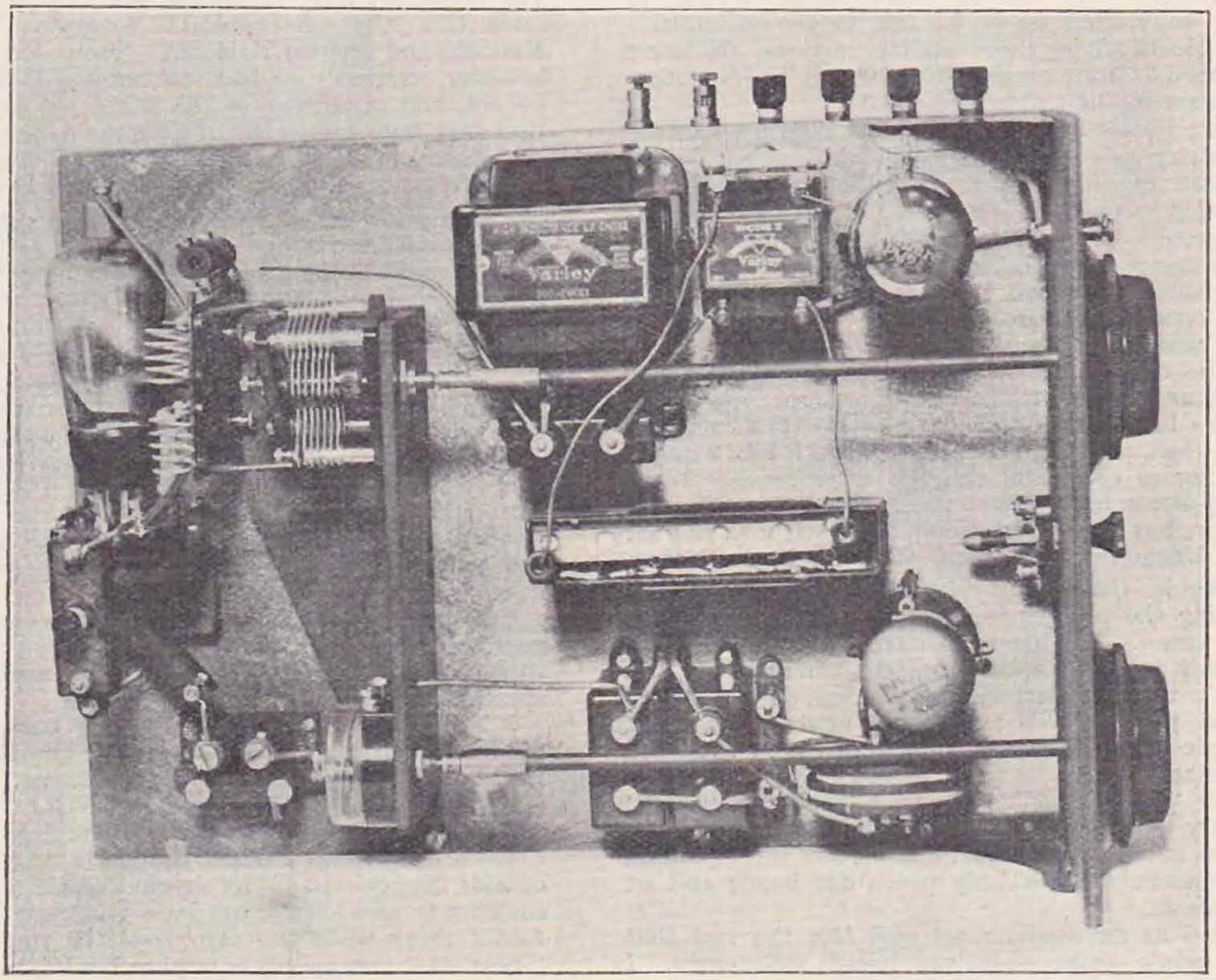


Fig. 3.
Plan view of 56 mc. Receiver, showing assembly and wiring of components.

STRAYS

Mr. W. Walker (BRS836) has forwarded us a letter from Mr. Wust (ON4AG), in which he mentions that he has received a large number of BRS reports referring to alleged telephony transmissions from his station. ON4AG has not been on the air for the past two years, and suggests that confusion may have been caused by listeners misreading the call of another active Belgian station, ON4EJ. It will be remembered that the letter E, when pronounced in French, sounds like the English A, while J in French can easily be mistaken for the English letter G.

* * *

Mr. W. Maycock (G5SK) reports that his call has been pirated by a station using telephony on the 7 mc. band.

PY4AC complains that over 30 well-known G's owe him QSL cards. If this should meet the eye of those who have worked him, but not QSL'd, perhaps they will make amends.

* * *

Mr. D. L. Martin (ex YI2DC) has left Iraq and is now stationed in India. His new call-sign is VU2BL, and his address is Room 3, W.I.R.S., R.A.F. Depot, Drigh Road, Sind, India.

* * *

Dr. R. A. Fereday (G6FY) advises us that he has taken up residence at Reinkenstratt 40, The Hague. He is operating under the official Dutch call, PA0FY, and hopes to work many British stations during his stay abroad.

"SOLILOQUIES FROM THE SHACK."

By Uncle Tom.

(Dropping his 'phones on the floor with a resounding crash, our crazy correspondent dashes to the typewriter.)

PHEW! I'm out of breath after trying to copy a station on 3.5 mc. to the accompaniment of (*a*) three similar stations, (*b*) some "spitch" from abroad, and (*c*) all the vacuum-cleaners in the neighbourhood.

Our Editor said something last month about the necessity for occupying the full width of our bands, instead of crowding together in the "harmonic relation" portions of them. In this excellent suggestion he is undoubtedly backed up by those who manufacture, sell or give away quartz crystals. But surely it's worth while to have, for instance, a 3.5 crystal that is out of the crowded part of the band. (That's our point too.—Ed.)

The only band that is not in a really terrible state as regards QRM is 14 mc., and goodness knows that's bad enough sometimes! But one *can*, now and then, pick out a station and work him without having to copy him through three locals. What we propose to do about the mess on 7 mc. I don't know, but it takes a stronger man than your poor old Uncle to stand more than an hour of that.

We in this country, and in the Empire, are paying the penalty for being a little bit ahead of the times. We have educated ourselves and our friends in the art of operating transmitters that don't make a darned nuisance of themselves to other people. What we want next is the other people to make transmitters that aren't a darned nuisance to *us*.

By "other people" I mean "spitch" experts, partly - but - not - quite - rectified A.C. fiends, those nondescript I.C.W. fellows, *and* the adjectival commercials who calmly pinch our bands and sit in them.

We, as amateurs, must still face the fact that we don't make ourselves heard sufficiently. I don't mean that literally, but with reference to our mere existence and our rights. We have no means of *compelling* such stations as HAT2 and HAS2 to use apparatus that doesn't interfere with our work on our bands, for instance. Mutual agreements between amateurs are easy, but a crowd of amateurs trying to settle matters with a commercial looks rather like a Pekinese having an argument with a Borzoi or a St. Bernard. We just can't reach 'em!

I have been told that there is just a possibility that a string of caustic remarks from myself in the "Bull" might have the effect of making one or two people improve their operating. I even flatter myself that that *is* so. What we are up against now is the old, old trouble—that however much we improve *our* operating, *our* transmitters, *our* receivers, we are still up against it from sources that we can't control.

That being so, I suppose we have to do what minorities always do, *i.e.*, go on grumbling and put up with it.

G2IC's anecdote, last month, has brought a lovely one from G2LZ. LZ was called round by someone who was upset by his 'phone transmissions. The broadcast receiver causing the trouble was so inselective that it couldn't separate London National and London Regional. The proud owner, however, averred that this was nothing to do with his set, and is writing to the B.B.C. to tell them that they *must* remember to close the door between the studios! The reply has not yet arrived.

You'll all be disappointed if I don't find a good old thump for the tub this month, so it's going to be a comprehensive one. I'm going to tell all my particular pet aversions just what I think of them—well, nearly!

Here goes. To all people who call "test" for more than ten minutes—may you be QRM'd out of existence for eight of them; *I* don't want to hear you, neither does anyone else except the poor mutt that's listening to it in the monitor at the other end.

To everyone with a chirp—may you be transformed into a canary for evermore. People will stop and listen to it then. To everyone with a punk receiver—I hope DX stations answer every call you put out; you won't hear them, so it doesn't matter.

To everybody that does things on the ether that good manners tell him not to do—you've still got time to mend your ways, and don't let me have to speak to you again about it.

I have had a letter from a reader complaining of the unsporting spirit shown by some R.S.G.B. members towards non-members. He says "Everyone can't be a member, sometimes for financial reasons, sometimes for others." Well, dear reader, *I* have no feelings against amateurs who remain outside the Society. Why should I have? Joining societies is, and always will be, a voluntary matter. And I think what you say about the way people "boycott" non-members is pure bunk.

Amateur transmitters, for me, fall into two classes: not "members" and "non-members," but "hams I like" and "hams I don't like." There are some of each, both inside the Society and outside. If you make a third class—"hams that don't like me"—I've no doubt you'll find a lot more.

But as for "prejudices," "boycotts," "class distinction," and the rest, I can only think of one word for them, and the Editor won't let me tell you that. And please don't forget that this page is a well-meaning attempt to write something in lighter vein. If it doesn't strike you as funny, that probably is my fault, but it *may* reflect on you. Think that one out.

To everyone that I have not cursed herein; a Merry Christmas and a prosperous New Year.

Stray.

Mr. Jeapes (G2XV), of Cambridge, asks who holds the record for the lowest power contact between G and U.S.A.? We shall be pleased to receive information on this point.

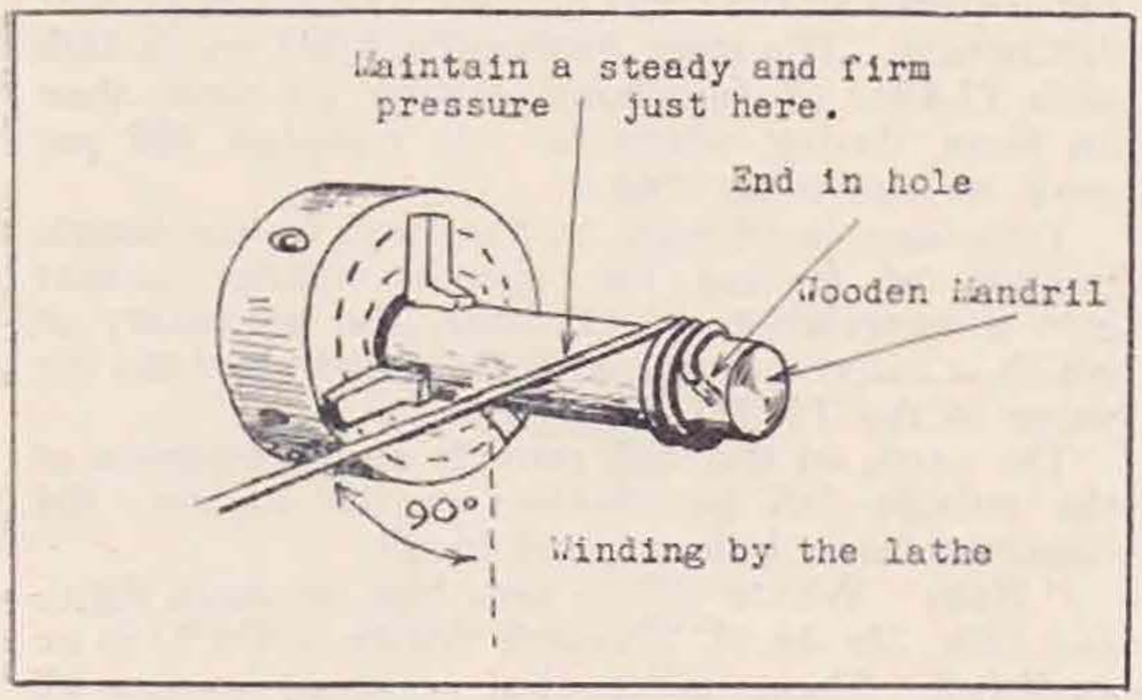
HELPFUL HINTS.—No. 4.

CONSTRUCTION AND CLEANING OF COPPER COILS.

IT is a known fact that high-frequency currents prefer to travel upon the outside of a conductor in preference to the centre, and that currents flowing in the *opposite* direction to these on the surface can be set up within the core of the conductor. It is for this reason that all well-informed amateurs use copper-tube coils for the higher powered stages of transmitters.

Many of our stations take a considerable pride in the preservation of the polish on the outside of their coils, but experience difficulty in preserving it for more than a year. Others, full of good intentions, find that they never get quite as far as this desirable condition, because they encounter so much difficulty with the winding and spacing of the coil in the initial instance as to make especial preservation rather beside the point!

Let us get together and avoid these troubles in the future. Here are some of the "secrets."



Winding.

(*a*) By hand. (*b*) By lathe.

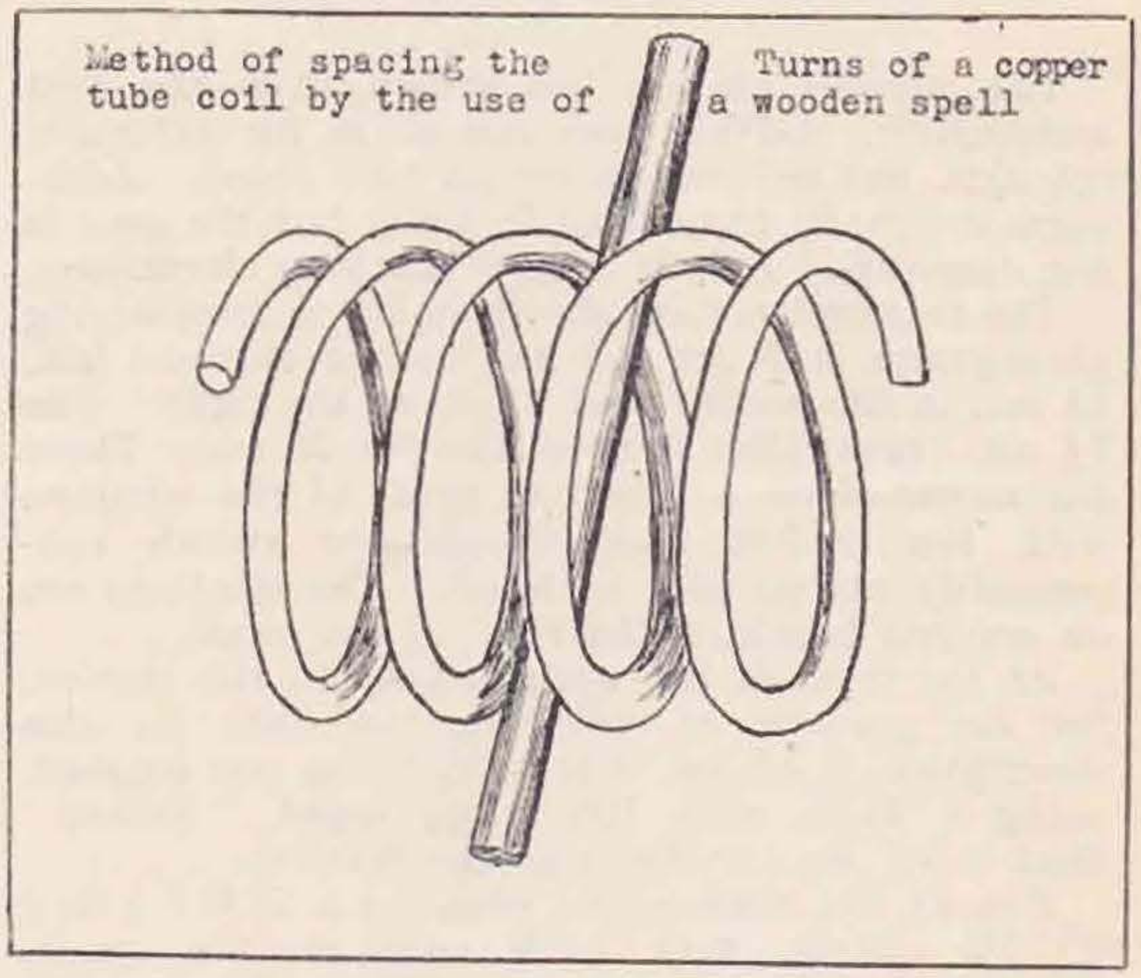
(*a*) The first thing is to select a hard wooden mandril or former for the winding. Oak is quite good. Its diameter may be about ¾ in. less than the inside diameter of the finished coil, depending upon the resilience of the copper and the amount of drawing which it may have had. Into the side at one end is drilled a hole about an inch or more deep, the same size as the tube to be used. The end of the long copper tube is fixed in a vice and the other end stuck into the hole in the mandril, which is gripped by a hand at each end and then turned. This starts the end of the winding fixedly. To continue, pull as hard as possible on the mandril and keep turning until the end of the rod is reached, but never let it go slack until the whole coil is wound on. Always wind on more turns than needed, since the coil springs open when released. Also, don't release it suddenly.

(*b*) By lathe, the performance is easier and better. Use the same winding mandril chucked in the machine, and engage the back gear. This gives a super-reduction gearing to the drive. Without a back gear, the operation cannot very well be performed.

Rotate machine until the hole in the mandril faces the operator, slip in the end of the tube, drive the chuck *away* from operator a little, then bend down the tube to start the winding at a tangent to the mandril, continue the same rotation holding the tube with one hand firmly down at a tangent to the wood. It tends to rise up and make the winding loose. Continue like this to the end, then gently release the spring tension of the coil.

Spacing.

No matter whether hand or machine wound coils, the turns should come off with each one touching its neighbours. If it does not, a bad winding has been made. If all turns touch, one is in the envious position of being able to adjust the gap between turns from zero upwards. The best spacer is a wooden stick of round section—a spell—smooth and strong. It is slipped in between the turns at the end of the coil and passed along until it comes out at the other end. All turns will then be found to be spaced exactly the same distance apart. The diameter of the spell must be determined by experiment, according to the hardness of the copper. When the desired spacing is attained, the two ends are drawn away from the rest of the turns and the tips flattened out and drilled, so that they will sit on the pins of stand-off insulators. In a transmitter using this mounting, the two insulators are set at a distance conveniently accommodating the largest coil to be used, and then the coils are made to fit the space between pins. In the case of the anode coil of the last stage, don't forget that the winding at one end, next the aerial, must start right up against the insulator, otherwise you will not be able to get a close degree of coupling.



Cleaning and Polishing.

Before the tube is wound into a coil, polish well with good metal polish and then finish off with "Silvo" polish. After winding it will be dirty, and should be washed in alcohol, or better still, carbon tetrachloride. Without touching it at all, let it dry and then paint on cellulose, colourless varnish, with a soft brush in a still, warm room. Allow to dry fully before handling.

(*Continued on next page.*)

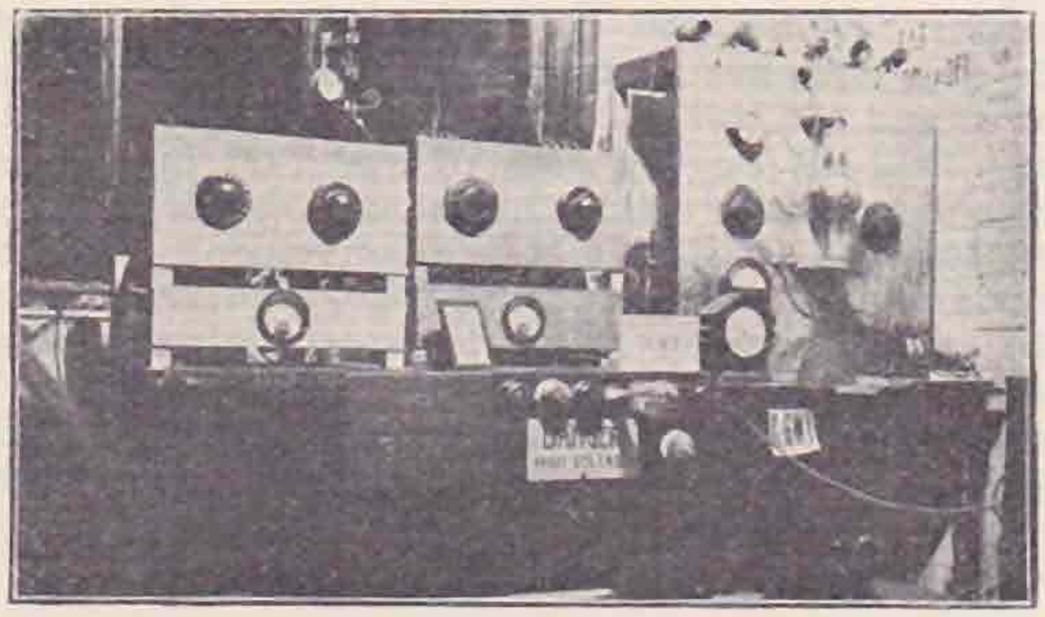
STATION DESCRIPTION No. 39.

G6WY

By H. T. Plus.

IT is almost true to say that G6WY started life in December, 1927, and has never been off the air since! The station was then situated at Forest Hill, London, and, as always, the first tests were made with dry batteries. Before long the DX-bug began to bite and chemical rectifiers were installed.

In 1929 the station was moved to the present location at Beckenham. Self-excited circuits were first used, but were replaced in the winter of 1929 by Goyder-Lock crystal-control, which is still used at the station. After the initial difficulties that everyone went through in those days with getting the gear to stay in lock, the transmitter settled down nicely and "T9" was the order of the day.



The present station has grown from the first transmitter. G6WY does not go in for extensive rebuilds, but believes in letting well alone. Additions are made from time to time, but the gear is not dismantled for the sake of making alterations.

The transmitters are shown in the accompanying photograph, and are 3.5 mc. on the extreme left, 14 mc. in the middle and 7 mc. on the right. The 14 mc. transmitter is used also for 28 mc. These are mounted on a bench in front of the window, with the lead-in and change-over switch conveniently placed near at hand. The receivers are on another bench on the right of the room.

At the time of the writer's visit to the station, for the purpose of collecting the data for this description, a 3.5 mc. transmitter was just finished, using a 211E with 100 watts input, "locked" from a 1.7 mc. crystal and one doubler.

The 14 mc. transmitter employs a D.E.T.1 in a TP-TG circuit, with 1,750 volts on the anode. The 7 mc. gear uses a veteran S.W.1, likewise with 1,750 volts. The three transmitters are driven-cum-locked from the same crystal oscillator, with one or two frequency-doublers according to requirements.

Various aerial systems have been tried, but the end-fed variety seems to be the only type that has been successfully used for any length of time. G6WY has the advantage of an open situation with a very long garden, and accordingly a 40-metre end-fed aerial is used. This has always been productive of the best results.

The short-wave receiver uses a screened-grid detector and a pentode, with a volume control that is very liberally used to cut down the background. It undoubtedly does improve the signal-mush ratio. Reaction is controlled by a potentiometer varying the screen volts on the detector.

Side-by-side with this is a broadcast receiver and amplifier, together with gramophone turntable and pick-up, which suggests that "Ham" has his moments of recreation occasionally, when not piling up DX.

It seems almost superfluous to say anything about results nowadays in station descriptions, but it might be mentioned that G6WY has worked all continents on telephony, although he has not yet acquired all the cards necessary for claiming that distinction. His most memorable QSO was a talk with ZL4AO on telephony, lasting for more than an hour, during which he was reported 100 per cent. at the other end.

Telephony is worked, by the way, by the simple method of feeding the speech-amplifier output into a modulation transformer, the secondary of which is wired in series with the grid-leak of the big valve in the TP-TG circuit.

The cards on the wall provide ample evidence of the reliable DX possibilities of the station—104 countries have been worked in all.

"Ham" Whyte (or, to give him his more dignified title, Mr. H. A. Maxwell Whyte, G6WY) is an ex-E.L.S. The usual cordial welcome awaits all visiting amateurs, who will find much to interest them at his station.

Helpful Hints—*continued*.

The polish may last a year or more, depending upon how clean the copper was made before varnishing.

When it starts to tarnish, the amateur is usually very upset, and cannot clean it properly again. Here is the way to restore the original lustre or even a better one.

Purchase from the chemist a bottle of amyl-acetate (about the size of a small medicine bottle will do for four or five coils), also a couple of ounces of oxalic acid—a crystal powder. Get a flat dish and an old toothbrush and wash the coils in the amylacetate, which will remove the cellulose rapidly. Dissolve the oxalic acid in about a pint of water and plunge the coil into it. If all the cellulose has been removed, the coil will rapidly lose its dull appearance and turn to a mauve-copper hue, showing deposition of the oxide. After all trace of the oxide has gone, remove coil and wash under the tap. Allow to dry, polish with "Silvo" metal polish, clean and then wash in alcohol. Finally dry and re-apply cellulose varnish.

A. E. L.

THE ART OF CRYSTAL GRINDING.

By D. Low (G5WU).

THE information which follows is intended primarily for those who are beginners in the art of crystal grinding. It is not intended to convey knowledge of scientific value, but is simply a personal record of results obtained by practical experience in connection with pebble lenses.

The word "pebble" has very little meaning to the uninitiated, and they are perhaps best introduced by recalling the fact that most of the old-fashioned type spectacles had small oval shape lenses which were either ground from quartz or glass. It is the former in which we are interested, and their usefulness from an amateur standpoint is readily detected in two ways. First by touch, quartz being quite cold as compared to glass; and, second, by hardness, when rubbed with a fine file no impression is made if the lens is of quartz. In making the first test the tongue will be found more sensitive than the fingers. An infallible test is to draw the pebble along a sheet of glass, a cut will result if the material is quartz.

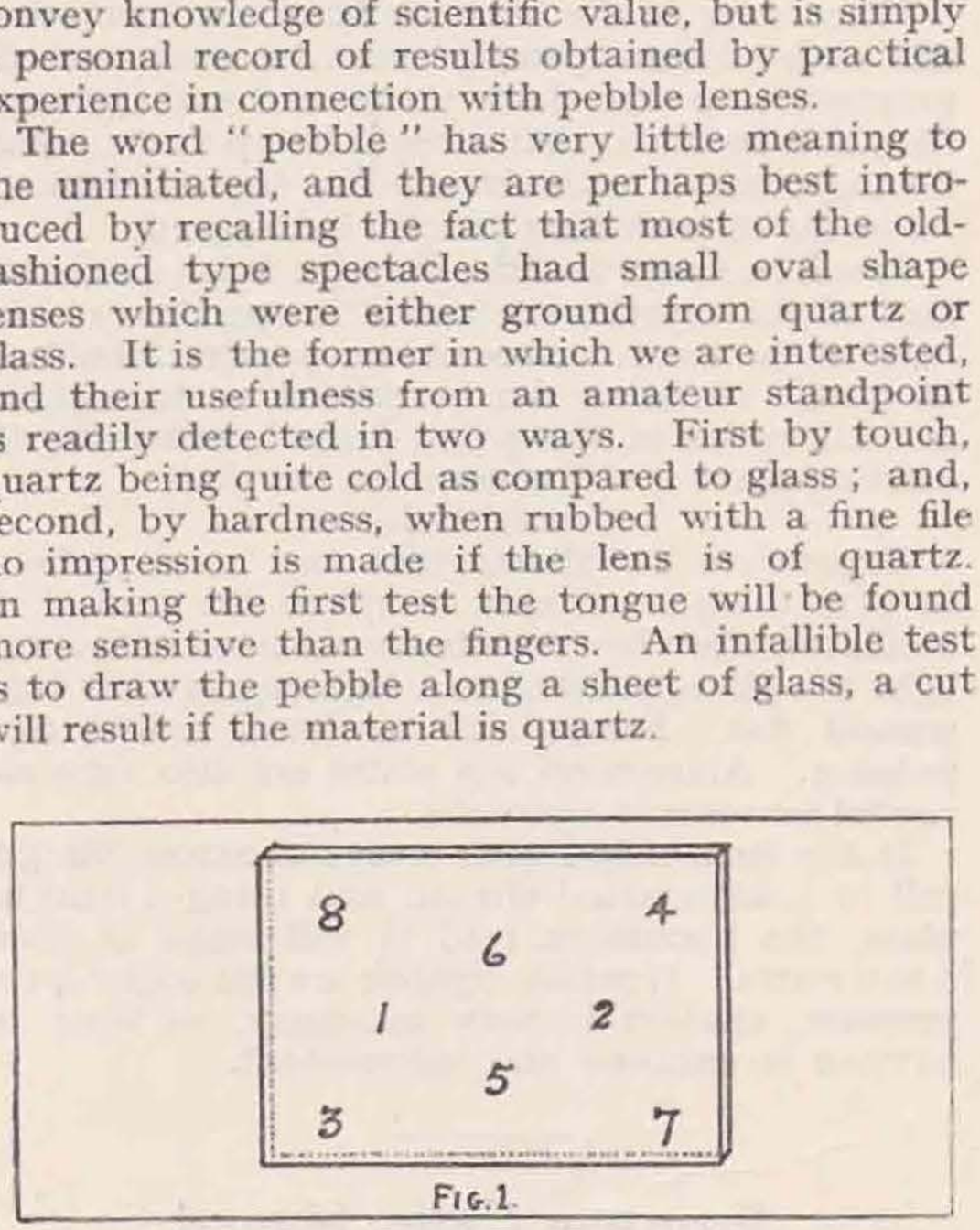


FIG. 1.

Cuts.

Reference to the Radio Amateurs' Handbook will supply information regarding the various types of cuts, but for those not in possession of a copy it should be mentioned that there are three major axes designated: "x," "y" and "z." The "x" or electrical axis, and the "y" or mechanical axis, are known to oscillate at a definite frequency in proportion to their thickness. Crystals purchased from commercial firms should be cut to either the "x" or "y" axis, according to requirements, but the comments which follow do not concern either of these types, but refer to the lens pebble which is ground to the optical axis.

Selecting Specimens.

Assuming that one has been fortunate enough to secure half a dozen selected thin specimens ground convex or fairly flat (leave concave lenses severely alone), test them for defined clicks by placing them on the 1.7 mc. grid coil of the receiver. Tune over the full range of the main condenser, and choose a sample which has the loudest click at a point above the amateur band.

Unfortunately, it is almost impossible to calculate the thickness that a pebble crystal will be when finished for work in the amateur bands. This is due to the fact that the lenses are originally cut at an indefinite angle that usually lies about midway between the "x" and "y" axes. Therefore the finished thickness does not follow the theoretical thickness of either of these two cuts, but comes out at a figure in between. As a general rule, it will be found that the thickness of a pebble lens finished for the 3.5 mc. band will be between .016 in. and .027 in.

Materials Required.

The following will be found necessary in order to produce finished specimens:—

One piece plate glass, ¼ in. thick, 3½ ins. diameter.
One 4-in. square steel face plate.
One fine carborundum stone.
Small quantity No. 90,120, and 180 or 220 carborundum powder.
Supply of thin machine oil.

In addition a scythe stone will be found extremely useful for quick trimming, but this is not essential. It should be particularly noted that the plate glass **must** be round, and roughly of the size recommended. This, together with the stone, is the means by which convex grinding is overcome.

Preliminary Operations.

Take the selected pebble, having first noted the position of the clicks in the receiver, and with a pair of pliers carefully snip off small fragments, until a suitable rectangular shape similar to Fig. 1 is obtained. The edges should then be finished off by the carborundum or scythe stone. A re-check in the receiver is desirable at this stage.

A small amount of No. 90 carborundum powder is now spread on the steel face plate, and machine oil added to make a paste. Take the crystal and continue grinding one side by a circular movement until a frosted appearance covers the whole lens. If the lens happens to be convex, it can very easily be seen whether the grinding is being done parallel with the other side. Turn the crystal over, and repeat the process, and again check for clicks.

Test Circuit.

A crystal oscillator circuit should be available at this stage. Such a circuit is easily constructed, and will be found useful in many ways at a later date. With the aid of a milliammeter in the plate circuit oscillation can be immediately observed, as the current through the meter drops almost to zero when this condition occurs. In the event of the crystal failing to oscillate, it will be found, as a general rule, that slight humps are present on the surface, due to the faces not being quite parallel to one another. It is advisable to mention that the crystal must be thoroughly cleaned before making these checks, pure wood alcohol, or carbon tetrachloride, being suitable for this purpose. It will also be found that by warming the crystal after each cleaning operation it will oscillate quite easily, whereas without this small attention it would in many cases appear to be "dud." Another useful tip, if the above fails, is to use a highly-polished light top plate in the oscillator about half the size of the crystal, and whilst tuning the condenser move the top plate into various positions with the aid of a piece of wood. If the crystal can be made to oscillate in this manner, it can be taken as proof

that a hump exists, or that the flats are not parallel.

Grinding.

The whole secret of ultimate success lies in the method of grinding, and as the average amateur appears to experience considerable difficulty in overcoming the slight convex result usually obtained by hand grinding, the following method is recommended as a solution of this trouble. Assuming that the crystal is reasonably near to the amateur 1.7 mc. band by calculation, number 120 carborundum with oil should be applied to the circular piece of glass. Fig. 2 represents this plate. It is very important to note that the edges of the circle must be rounded off, otherwise they will act as a scraper each time the crystal extends beyond the edge, thus removing the grinding material. The arrowed line indicates the form of motion, and also represents fairly accurately the position of the centre of the crystal while grinding. In practice about 20 to 25 circular motions complete once around the glass.

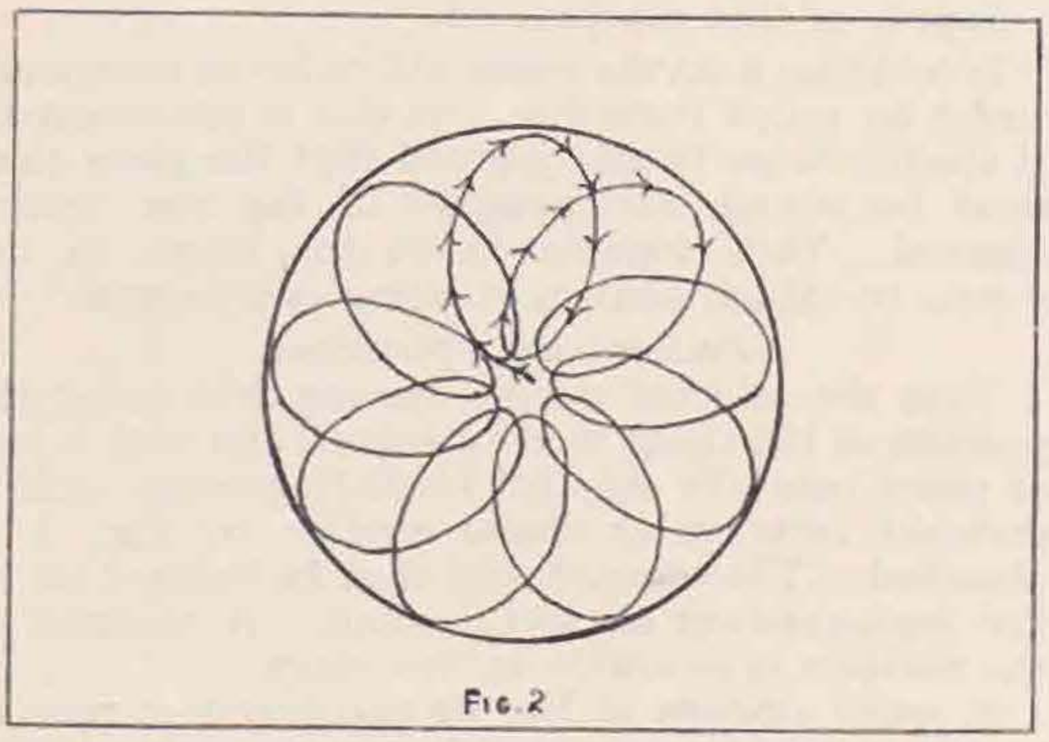


FIG. 2

Referring back to Fig. 1, it will be noticed that a series of numbers are shown, the reason for these will now be explained. With the first and second fingers firmly planted on the crystal in position 1 and 2, rotate clockwise, the movement passing towards the centre of the circular glass, and being carried on so that it passes slightly beyond the edge of the crystal. Continue round in this manner, and having completed the full circle, reverse the process in an anti-clockwise direction. On completion move the fingers to positions 3 and 4, and continue on until all the positions on the crystal have been covered. It will be found that having arrived at positions 7 and 8, the crystal has only made half a turn, and it is necessary to continue grinding from 1 to 8 a second time, before a complete turn has been made.

It should be mentioned that this method will grind the crystal concave if the overlapping of the edge of the circle is carried too far. Those who have had experience of grinding will appreciate that when using any piece of plate glass the glass is ground as well as the crystal, and as the rotating motion centres on a given point, it will soon be found that the glass is actually concave, and this in itself obviously tends to grind the lens convex. Furthermore, where the material to be ground is rotating in more or less a circle, the outer edges actually cover more ground than the centre, with the same result. Where the grinding medium is also movable this effect is more prominent. It follows, therefore, that by using a circular piece of plate glass, and carrying the rotating crystal beyond the edge, the glass itself is ground perfectly flat, further, for a period a portion of the crystal is actually not being ground at all. By continually changing the positions of the fingers, and therefore the portion which passes over the edge of the glass, the crystal is ground evenly throughout. There is of course a limit to the amount of overlapping, but this cannot be properly explained in writing. After each effort the crystal should be checked in the receiver or oscillator.

When near to the amateur band, number 180 or 220 carborundum powder must be used, and the greatest care exercised under reduced pressure. Should it be found that a slight hump exists, a good honing stone is undoubtedly the best medium for removing it, providing caution is observed.

It will be found that the finer the finish on the surface of the crystal, the easier it operates, so that once in the band, carborundum powder should not be used. Grinding can be carried on to within a few kilocycles of the point desired, providing the existing paste is still present on the glass.

Crystal Holders.

Experience has shown that any brass plate up to $\frac{1}{8}$-in. thick is suitable except in the case of the oscillator, when best results are obtained with a very light top plate, polished to a high degree after being ground flat. Brasso will be found useful as a polisher. Aluminium top plates are also very successful for resonator circuits.

It has been noted with a crystal across the grid coil in a self-excited circuit, and using a light top plate, the maximum load it will stand is about 5 to 6 watts. If pebble crystals are put under spring pressure, caution is very necessary, as their behaviour is uncanny and inconsistent.

Empire Calls Heard.

G6YL, Felton, Northumberland, September, 1933

14 mc. band: su1aa, mm, 2ga, np, 3ab, 6hl, ve1bv, bw, co, cv, dr, el, ep, et, 2ay, bb, ca, cq, cu, ee, ew, fg, fi, hg, 3no, wa, wb, wv, 9be, vk2nr, vp4cf, tb, 5pz, 6mr, vq4crl, vs7gt, vu2bm, dx, fp, jt, lt, 1x, yi7rh, zc6cn, zd2a, 2c, zs1h, 2a, 5x, vpu2, xzn2b, xzn2c.

October, 1933.—7 mc. band: su1mm, sg, vk2u, 3hm, 4my, 4ry, zl1cd, hy, 2bz, ci, 1b, 1p, 3aj, dc, ar, ax, az, 4ap, cx.

14 mc. band: su1ec, 2ga, 2np, 3rx, 6hl, ve1cx, dc, fg, 2ac, bd, ca, fi, jz, 3hf, pz, si, wa, wv, 5eh, vk2ba, gw, hx, hy, nr, xq, xu, 3cw, jj, vu2bm, bn, lx, yi7rk, zc6cn, zd2a, 2c, zs1b, 1h, 2j, 4a, 4m, 5a, vpu2, zt1f, xzn2b, xzn2c.

G6IH (J. C. Kealy, on board m.v. Highland Patriot, Vigo Harbour, Spain), October 3, *between* 06.00 *and* 06.32 *G.M.T. QTH* 41*N* 10*W* :—

7 mc.: zl2bz (R6), 2go (R6), 2mr (R5), 2nq (R6), 3ar (R9), 3ax (R6), 3az (R9), 3dc (R5), 3fl (R6), 3gm (R7), 3gn (R6), 4bq (R5).

F. Cole, B.E.R.S. 175, *P.O. Box*, 40, *Nairobi, Kenya (August and September)* :—

14 mc.: g2zq, 5fu, fv, 6bd, dl, ow, rq, us, vp, eI5f, ve2ca, vq2xd, 3msn, 4crh, crl, zs4u, 5x.

GI6TK (F. A. Robb, Belfast), during September and October :—

st3mt, su1mm, 2np, 2gs, 3rx, ve3jz, 5fy, vk2nr, 3kx, 4gk, 7jb, vo8y, vq4cro, vu2fp, 2jb, zl2au, 3aj, 4fo, 4ap, zs1h, 2b, 4m, 5a, zt2h, 6d.

Is your subscription due?

HIC ET UBIQUE.

New Vice-Presidents—Junior (low power) B.E.R.U. Contest 25 watt Permits—W.B.E. Certificates—B.E.R.U. T.B.T.O.B.'s—Prefix Zone Chart.

New Vice-Presidents.

We have to announce that Mr. E. Dawson Ostermyer (G5AR), honorary treasurer of the Society for the past five years, has been elected senior vice-president, whilst Mr. G. F. Gregory (honorary secretary, 1929) has been elected an honorary vice-president.

Junior (Low Power) B.E.R.U. Contest 25 watt Permits.

Home members holding 10-watt transmitting permits who wish to obtain permission to operate during the Junior B.E.R.U. Contest with inputs up to 25 watts are requested to make an application to the Secretary not later than January 20, 1934.

I.E.E. Interference Committee.

We have pleasure in announcing that an R.S.G.B. Delegate has been invited to serve on the recently formed Radio Interference Committee, set up by the Institution of Electrical Engineers.

W.B.E. Certificates.

The following W.B.E. Certificates have been awarded :—

Name.	*Call Sign.*	*Date* (1933).
A. M. Braaten ...	W2BSR ...	September 20
W. E. Lane ...	VQ4CRH ...	October 11
C. H. Young ...	G2AK ...	,, 19
A. E. Dyson ...	G6NJ ...	,, 25
R. Loomes ...	G6RL ...	November 2
R. J. Keir ...	G6JX ...	,, 6
J. F. Grinan ...	VP5PZ ...	,, 6
G. A. Shoyer ...	ZS1H ...	,, 10
M. Griffen ...	G2XA ...	,, 14
J. P. Coveney ...	G2JX ...	,, 15
W. E. Russell ...	G5WP ...	,, 23

In checking up our records of W.B.E. Certificate holders, we find that Mr. H. H. Bridgman (ZT1Z) has been omitted from published lists. He was awarded the certificate on November 7, 1932.

The Celebrations on December 8.

Late news reached us that reciprocal arrangements to commemorate the tenth anniversary of the first Anglo-American amateur contact had been put in hand by the A.R.R.L. It is hoped that all who heard the special messages from WIMK will have handed them in to Headquarters.

Mr. F. E. Handy, in advising us of the A.R.R.L. plans, mentioned that arrangements are being made to organise an informal celebration of the 10th season of Trans-Ocean DX work on high frequencies during the period January 1 to 15, 1934.

We gather from Mr. Handy's letter that he is endeavouring to get as many early trans-oceanic workers as possible to come on the air during this period for the express purpose of contacting those amateurs across the ocean who gave them their first DX QSO's.

We can but hope that on this side Messrs. Marcuse, Simmonds, Partridge, Hogg, and others will endeavour to follow suit.

As further news may arrive from the A.R.R.L. after we go to press, members who are interested in these celebrations are invited to communicate with Headquarters, in order that late information may be forwarded.

B.E.R.U. T.B.T.O.B.'s

Mr. R. A. Bartlett (G6RB) and Mr. C. S. Taylor (VE1BV) join the select group of amateurs who have established trans-oceanic contacts on three bands.

They completed the series with a QSO on 3.5 mc. during our recent tests, having worked one another several times in the past on 7 and 14 mc. This is believed to be the first instance of B.E.R.U. triple trans-ocean working ; any challengers ?

Prefix Zone Chart.

One of our lynx-eyed North London members unearthed a small error in the B.E.R.U. Prefix Zone Chart published last month. It will be noticed that one point was allotted for a contact between Kenya and Rhodesia ; this should have read 0.

Mr. Livesey, part author of the Chart, advises us that points for contacts with Malta will be reckoned the same as contacts with Egypt. Bahrein Island will rank the same as Iraq.

N.Z.A.R.T. Official Call Book.

Miss Kathleen Kirby (ZL4DT), Hon. Secretary, N.Z.A.R.T., has sent us a copy of the new official call book issued by her association. This progressive effort deserves universal support, and to further that end we shall be glad to accept orders for copies at a price of 1s. 6d. each. The book contains a very complete list of Medium and Short Wave B.C. stations, besides much useful data of amateur interest.

Electron-Coupled Oscillator Circuits.

A radio message has been received from Mr. Samson (ZL4AI), *via* G2ZQ, to the effect that Fig. 4 in his article, which appeared in our October issue, is incorrect in three places. First, the condensers by-passing the filament to earth should be omitted as the filament must be above ground potential. Second, the circuit should have indicated that the lead marked " centre tap " is connected to the centre tap of a resistor across the filaments. Third, the inner leads from the bottom end of the coil. ABC, should have beeen designated C1 and C2 and not B1 and B2.

Recognition for Band Occupancy Checking Stations.

Council have pleasure in announcing that a special certificate of appointment has been issued to those B.O.C. stations who have collaborated with the Organiser, Mr. L. Hill (2AGM), on at least three occasions.

The members who have qualified are as follows :—

Mr. A. T. Mathews (G5AM), London.
Mr. J. P. Stove (G5ZX), Glasgow.
Mr. R. W. B. Parsons (G6RP), Tiverton.
Mr. F. A. Robb (Gi6TK), Belfast.
Mr. H. D. Bramwell (2ACK), Liverpool.
Mr. L. Hill (2AGM), Bristol.
Mr. C. E. Jefferies (2AMN), Burton-on-Trent.
Mr. G. A. H. Eckles (2ATK), Hull.
Mr. T. C. Clark (BRS565), London.
Mr. T. F. Gleed (BRS689), Bristol.
Mr. C. A. Bradbury (BRS1066), Burton-on-Trent.

Where possible, arrangements will be made to have the certificates presented publicly at local meetings.

The Kenya Cup Competition.

Council have pleasure in announcing that Mr. E. T. Somerset, of Nairobi (ex G2DT) has offered the sum of £2 2s., which may be used to purchase a small trophy (to be known as the Kenya Cup), or radio goods to that value.

The rules governing the competition, which will decide the winner, are as set out below :—

1. This cup, or an equivalent monetary award, will be presented to the member who, in the opinion of a Technical Committee set up by Council, has contributed to the T. & R. Bulletin the best description of a self-made chassis built A.C. receiver employing modern components.
2. The power supply must be incorporated in the set.
3. The tuning range must cover the amateur bands from 1.7 to 28 mc.
4. Articles, together with photographs, must reach Headquarters not later than June 30, 1934.
5. Members directly connected with the radio trade are not permitted to make an entry, unless a written guarantee is given that the constructional work has been carried out by them in their own time and with their own apparatus.
6. The award may be withheld if the technical level reached is below the standard fixed by the Council, and its sub-committee.

The 56 MC. Receiver Article Competition.

It is with pleasure we record that this competition has been won by Mr. W. E. Parker (G6WJ), of Wakefield, with Mr. Hare (2BAW) as runner-up.

The two judges were Mr. T. P. Allen (GI6YW) and Mr. F. Charman (G6CJ). Commenting on the winning entry, Mr. Allan said : " I have no hesitation in saying that I consider the article by G6WJ much the best. Next to this, I put 2BAW. I do not like Mr. Parker's method of matching up his screen-grid valve with a choke and parallel circuit, as the choke is always across the parallel circuit. I can see no reason in this case for such a high value." Mr. Charman's opinion was as follows : " I must place G6WJ first because the circuit is quite original : the introduction of the quench at the screen allows of adjustment of just the right quench without upsetting the oscillatory circuit. I put 2BAW second, because the circuit includes several cunning devices."

We hope to publish Mr. Hare's article in an early issue.

Other contributions were received from Messrs. Sharp (G6KU), Walker (G5JU) and Vickery (G5VY), all of whom are thanked for their interest in this competition.

Printers' Errors.

Two serious printers' errors occurred in our last issue. In Mr. Exeter's article " A Modern H.F. Receiver," page 134, the condensers C1 and C2 were stated to have capacities of 150 and 15 mfds., whereas the values should have been given in mmfds.

Under Mr. Gay's notes the accuracy of his new calibration service transmissions should have read 0.01 per cent. instead of 0.10 per cent. (Foreign journals please note.)

STANDARD FREQUENCY TRANSMISSIONS.

SUNDAY, DECEMBER 31st, from G6NF London.

0930 *GMT.*	3525 *KC.*
0940 *GMT.*	3625 *KC.*
0950 *GMT.*	3725 *KC.*

Accuracy within 0.01 per cent.

Obituary.

It is with deep regret that we have to record the passing of Mr. F. T. Carter, who was for many years the European representative of the Radio Call Book Co. Many of our present members owe their introduction to the Society to Mr. Carter, who was ever ready to put prospective members in touch with us.

His death will be mourned by all who knew him—a charming English gentleman who seemed to breathe the atmosphere of pre-war days.

* * *

We have also to record the death of Mr. T. P. Allen's (Gi6YW) father, who passed away on Armistice Day. Our deepest sympathies are extended to Mr. Allen and his family.

STRAY.

Mr. Smith (CT2BK) asks the following G stations to QSL recent QSO's : G2OC, 2OA, 5FV, 5LQ, 5MP, 5PQ, 5QV, 5ZA, 6DH, 6KQ, 6UT, 6XQ.

Calibration Section.

Manager: A. D. Gay, (G6NF).

Both G2MR and G6PF have succeeded in receiving WWV in this country. Owing to the inconvenient hour at which these transmissions take place, we are not surprised that others have failed to make use of these transmissions.

The frequency of the Scottish National transmitter is 1040.008 kc. ± 2 cycles per second, and the accuracy of this transmission should make it of great value for those who wish to calibrate frequency meters and monitors, as it can be relied upon to remain perfectly constant. The frequency will be changed on January 15 to 1,050 kc. With a 50 kc. electron-coupled oscillator synchronised with this transmission by means of its twenty-first harmonic, powerful calibration points of great accuracy, 50 kc. apart, are available up to 28 mc. The first harmonic of this station on 2,100 kc. will be very useful for Scottish amateurs for comparing the frequency of 100 kc. substandards. For those too far remote to receive this harmonic, an oscillating valve on 1,050 kc. and tuned to silent point will provide the necessary harmonic.

New members are reminded that frequency meters and crystals may be sent for calibration, at owner's risk, to 49, Thornlaw Road, London, S.E.27. The Society's charge for this service is 2s. 6d. for frequency meters for five points on any band; extra points can be given at 6d. per point at whatever interval desired. Crystals 1s. 6d., postage extra. Accuracy of all calibration measurements is within 0.01 per cent.

QSL Section.

Manager: J. D. Chisholm (G2CX).

From time to time the Section receives an odd card or two addressed to stations with unusual call signs and prefixes not included in the Washington list, and it is often a matter of some difficulty to ensure that the cards are correctly forwarded. It would greatly assist both this Bureau and those of other Societies if members would write the QRA of the station in question, where it is known, on the back of the card, so that there will be no delay in searching for an address. It is not necessary for the exact QRA to be stated, as this is often difficult to obtain on the air, but if some indication can be given of the approximate whereabouts, it will save many cards fruitless journeys half over the globe.

This matter has been recently raised by the Secretary of the S.A.R.R.L., who asks that British amateurs shall be careful to note on VP cards especially as there are stations using this prefix in several quite different parts of the world, and he is constantly receiving those not intended for VP's situated in Africa.

Bound up with the question of "paper-bag" envelopes mentioned in last month's notes is the problem of outsize QSL cards now becoming popular. Some of these are reaching preposterous dimensions, and are becoming quite a nuisance to everyone. It is a mystery why these have been adopted at all, as they do not seem to please anyone. The recipient of the card is not anxious to have the arrangement of his cards upset by the inclusion of an odd-sized card on the wall—the QSL Section certainly do not welcome it, as it means each card must be folded to get it into the envelope, or if the card is for abroad, it protrudes out in all directions from the batches sent out. One thing is certain—if the owners of these giant cards could see the condition of similar cards arriving from abroad, they would order the next lot in a more reasonable size!

QRA Section.

Manager: M. W. Pilpel (G6PP).

NEW QRA's.

G2AZ.—L. Grech, 5, Polwarth Crescent, Edinburgh.
G2LU.—H. J. Chater, 175, Alderman's Green, Coventry.
G2OR.—C. H. Ollett, 41, Harvey Goodwin Avenue, Cambridge.
G2QQ.—J. C. Walton, 140, Albert Road, Stechford, Birmingham, 9.
G2RF.—H. D. Bramwell, 53, Druids Cross Gardens, Liverpool, 18.
G2RP.—E. D. Dunn, 1, St. Helen Street, Derby.
G2SP.—J. W. B. Baker, c/o Halliday, 19, Brisbane Street, Greenock, Scotland.
G5CN.—F. M. Caine, 11, Stoneby Drive, Wallasey, Cheshire.
G5DS.—J. L. Danks, 41, Castle Street, Farnham, Surrey.
G5MS.—H. M. Swann, 32, Central Drive, Ansdell, Lytham, Lancs.
G5OU.—H. J. Ahier, 4, Roseville Street, St. Heliers, Jersey, C.I.
G5YV.—H. Beaumont, 58, Soothill Terrace, Ward Street, Crackenedge, Dewsbury, Yorks.
G6HA.—J. Haigh, 2, Greenock Terrace, Leeds, 12, Yorks.
G6HC.—A. H. Campbell, Flowers Court, Pangbourne, Reading, Berks.
2AMY.—D. M. J. Tyre, 71, Waverley Street, Glasgow, S.1.
2AWN.—W. K. Walker, "Brown Gates," Hendrefoilan Road, Swansea, Glam.
2AYZ.—C. J. H. Harding, 21, Ulcot New Road, Keynsham, Bristol.
2BHD.—J. le Cornu, 1, Les Vaux Villas, Town Mills, Jersey, C.I.
2BIH.—W. Burgess, 252, Durban Road, Grimsby, Lincs.
2BNV.—H. S. Vidler, 31, Lewis Road, Chichester, Sussex.
2BOW.—G. White, 55, Clarence Road, Derby.

The following are cancelled: 2ACK, 2AUR, 2BLR.

A Merry Christmas and a Happy New Year to everybody!

R.S.G.B. Reception Tests.

Bands and periods for the next series of reception tests will be found below. For members who have not previously participated we would refer them to the September issue of the Bulletin, page 84. At the conclusion of Tests Series 23 all logs should be forwarded to Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4, when they will be sent round to all those participating, in budget form.

List of Bands and Periods.
Series 23.

Test Letter.	Date, 1933.	Period, G.M.T.	Band, M.C.
A	Sun, Dec. 17	00.00-01.00	7
B	,, ,, 17	09.00-10.00	3.5
C	,, ,, 17	11.00-12.00	56
D	,, ,, 17	22.30-23.30	1.7
E	Sat., ,, 23	06.30-07.30	14
F	Sun., ,, 24	00.00-01.00	28
G	,, ,, 24	06.30-07.30	7
H	,, ,, 24	09.30-10.30	56
I	Mon., ,, 25	09.30-10.30	14
J	Tues., ,, 26	09.00-10.00	1.7
K	Sun., ,, 31	10.00-11.00	3.5
L	,, ,, 31	11.30-12.30	28
M	,, ,, 31	22.30-23-30	3.5
	1934.		
N	Sun., Jan. 7	00.00-01.00	14
O	,, ,, 7	10.00-11.00	1.7
P	,, ,, 14	07.00-08.00	7
Q	,, ,, 14	10.00-11.00	56
R	,, ,, 14	19.00-20.00	28

Those Missed DX Calls.

It has often occurred to us that our B.R.S. members could render a useful service by logging the calls of DX stations heard replying to test transmissions sent by local amateurs.

Very often we have casually jotted down as a matter of interest the call of a long-distance station heard calling a Britisher, only to find at some later date that the G in question did not effect contact.

During the last B.E.R.U. Contest, to quote an outstanding example, literally dozens of Empire calls were missed by both British and overseas contestants, and we believe that the majority of these members would have been grateful, although perhaps disappointed, if they had received a list of stations who had called them.

In many instances calls are unavoidably missed due to several stations replying to the original test or CQ call, but even in these cases we suggest transmitting members would appreciate details of the calls they have missed.

On other occasions replies are lost through the vagaries of skip or local QRM. We will say nothing about poor location or poor receivers!

Viscount Carlow, G6XX, has prompted us to draw attention to this matter, as he is desirous of obtaining a large number of reports from all parts of the world regarding the effectiveness of his new high-power transmitter. He suggests that all B.R.S. or A.A. members who hear his station being called should send him a report. All reports will, of course, be acknowledged.

We trust that these suggestions will be followed up in a rational manner by those non-transmitting members who are anxious to do a useful job of work.

NEW MEMBERS.

Home Corporates.

J. H. Payton (G2JB), 39, Penton Place, S.E.17.
G. M. Whitehouse (G2YV), Allport House, Cannock, Stafford.
C. W. Crook (G5BT), 67, Tunstall Road, Croydon, Surrey.
J. S. Clark (G5FV), Lynton, Hull Road, Keyingham, Hull, Yorks.
J. Dale (2AXU), 20, Bromley Road, Birkby, Huddersfield, Yorks.
E. W. L. Brownjohn (BRS1273), Post Office, Lower Froyle, Alton, Hants.
P. Jones (BRS1274), 2, Crosland Terrace, Helsby, Nr. Warrington, Lancs.
C. E. Gregg (BRS1275), 46, Highbury Road, Nottingham.
R. F. Ellis (BRS1276), 51, Winifred Road, Bedford.
W. H. Myers (BRS1277), 47, High Street, Yeadon, Yorks.
W. J. J. Wyse (BRS1278), Gorelands, Gore Road, Burnham, Bucks.
R. N. Wellington, (BRS1279) Sound Sales, Ltd., Tremlett Grove, Highgate, N.
W. H. Rawlings (BRS1280), 47, Randolph Street, Oxford.
C. R. S. Moon (BRS1281), 51, Belvoir Street, Hull, Yorks.
H. A. Larnder (BRS1282), 45, Lawrence Avenue, Mill Hill, N.W.7.
S. T. G. Weston (BRS1283), 2. Outram Road, Southsea, Hants.
W. C. Meachem (BRS1284), 21, Harwood Street, New Bradwell, Bletchley, Bucks.
M. S. Shareef (BRS1285), 33, Sinclair Road, Kensington, W.14.
M. McLennan (BRS1286), 15, Merryton Avenue, Giffnock, Renfrew, Scotland.
F. G. Sadler (BRS1287), 154, The Guinness Trust, Stamford Hill, N.16.
D. C. Jardine (BRS1288), 7, Colne Road, Winchmore Hill, N.21.
D. A. Beamish (BRS1289), 115, Church Road, Richmond, Surrey.
K. A. Stroud, B.Sc. (BRS1290), 11, Clydesdale Gardens, Richmond, Surrey.
G. Bell (BRS1291), Lady Drove, Barroway Drove, Nr. Downham, Market, Norfolk.
J. M. Hogg (BRS1292), Churchill House, St. Johns Road, Dudley, Worcs.
E. F. Hughes, (BRS1293), 26, Pembroke Road, Bootle, Liverpool 20.
W. F. Dale, B.A., F.R.G.S., (BRS1294), St. Andrews, Liss, Hants.
J. H. Preston (BRS1295), Muirkirk, Ayrshire, Scotland.
R. J. Wilkin (BRS1296), 40, Promenade, Castletown, I.O.M.
W. J. Macnab, (BRS1297), "Bingartree," Leslie, Fife, Scotland.

Dominion and Foreign.

P. Blanchon (F8WC), La Rochette par Fourneaux, Creuse, France.
T. Marshall (SU1TM), Sayda-El-Amina, Sidi Gaber, Egypt.
H. W. Blue (VK2YI), "Eurobla Station," Warren, N.S.W., Australia.
P. R. Douthwaite (VPU2), Wireless Office, Cable Company Mess, Freetown, Sierra Leone.
M. J. Thorpe, J.P. (VS1AC), Municipal Offices, Penang, S.S.
J. H. Knowles (YI7RK), W/T Section, 70 (BT) Squadron, R.A.F., Hinaidi, Iraq.
G. A. Webber (BERS197), H.M.S. *Shropshire*, c/o G.P.O., London.
P. W. K. Crisp (BERS198) 20 (AC) Squadron, R.A.F., Peshawar, N.W.F.P., India.
A. Ward (BERS199) No. 447 Flight, R.A.F., Hal Far, Malta.
N. E. Petty (BRS200), Whitworth, Sandown Road, Rondebosch, S. Africa.
Dr. T. L. R. Ayres (BRS202), M.A., M.Sc., B.A., B.Sc., Professor Physics Dept., Egyptian University, Abbassia, Cairo.

STRAY.

Mr. E. W. Osborn, ZT1H, asks us to mention that he is working on 14104 kc. most evenings from 16.30 G.M.T., and would like reports from B.R.S. who log his signals. He also asks for QSO's or fixed schedules with G stations.

An Electron-Coupled Master Oscillator Drive Circuit—(*continued from p.* 170).

The lines to be followed are practically identical with any crystal control circuit, but one thing of paramount importance must always be remembered; that is to have some means of continually verifying the calibration accuracy of your oscillator. Either a good transverse crystal oscillator on 1.7 or 3.5 mc. or a 100 kc. bar will be found invaluable for this purpose. Although the initial calibration may be effected through the Society's calibration section, or from broadcast stations, it is most essential to be able to check the calibration each time the transmitter is put into operation. It may remain stable for years, but due to some faulty component its calibration may go astray at any time and this might result in off-frequency operation.

For the R.S.G.B. calibration transmissions the writer makes use of a sub-standard 100 kc. crystal and its associated frequency-dividing circuits, which were described in the January, 1933, T. & R. Bulletin, and which can be made to give harmonics 10, 20, 25 or 50 kc. apart on the 3.5 mc. band at will; the e.c. oscillator being synchronised with the selected harmonics.

CONTACT BUREAU NOTES.

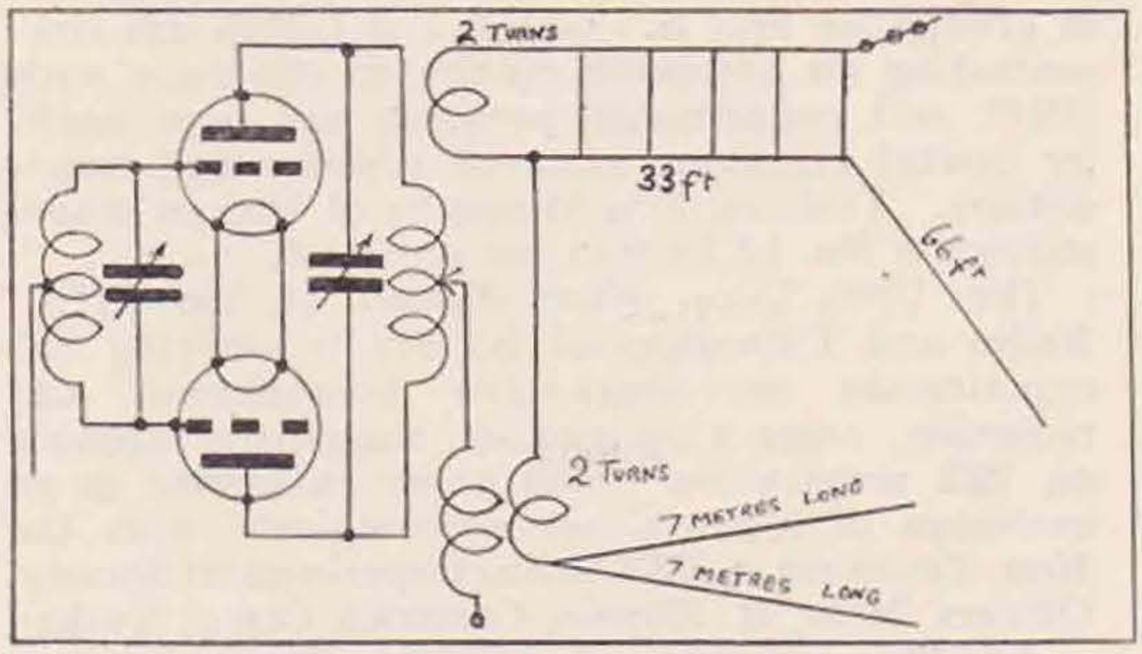
By H. C. Page (G6PA).

THIS month I am glad to be able to announc that Mr. A. E. J. Cooper (G5VT), of Bishop's Stortford, has taken over the control of the 1.75 mc. Groups as Manager. In future all reports and applications for Group membership should be sent direct to him at Halfacres, Bishop's Stortford, Herts.

My appeal for members for a group to study Artificial Aerial Systems has had the expected result. I have had four applications from A.A. men, but not a single enquiry from a licensed transmitter.

"Uncle Tom" remarked in the November Bulletin that his original remarks on the subject of apathy were refused by the Editor; mine would never even reach him, for there is no paper made which could record them without burning! He remarked on the apathy of *some* members. He was wrong; he should have said *most* members. However, let us leave these facts for the moment. There are still more members needed for the group, and I propose waiting a full week after these notes appear before forming the group.

G6GV sends me an interesting diagram of his 56 mc. transmitter and aerial system. The transmitter, as will be seen from the diagram, is conventional, but the aerial system seems to be quite original.



The 56 mc. Aerial System used by G6GV.

28 M.C. Groups (No. 1).

G6VP (Manager).

Very little can be said about 28 mcs. work this month, as conditions seem to have been impossible for anything but purely local work.

It is considered that in future members should contribute more concrete details of their research, together with interesting circuit diagrams. Please note that in future no details will be published of European stations heard unless accompanied by details or particulars that made the event of unusual interest.

G2FN very ably epitomised recent conditions in the November issue, but it seems a pity that no logical conclusion could be extracted from his notes, nor could any connection be made between his observations and the behaviour of other frequencies during the period under review.

Has any member data that would point to a theory? If so, it would be worth publication.

The groups have nothing of interest to report, most members are quasi active, one or two local contacts have been made, but nothing has been done that merits publication.

Atmosphere and Fading Groups (No. 2).

G2GD (Manager).

Since the publication of the November notes, letters have been received which show that there is certainly interest in the subjects discussed by members of this group. I should, however, be glad to hear from other members who would care to take up this work. They can either join existing groups, most of which have vacancies, or if the need arises, I am prepared to consider the formation of fresh groups to study other aspects of the subject. Especially I should like to see groups studying the question of Atmospheric Electrical Potential, and Ionisation. With regard to the latter, may I call the attention of all readers to the notes contributed under 2*F*, which seem to be of the greatest interest to all. The existing groups and their lines of research are as follows:—

2*A*.—G.C. (G6MB): "An investigation of wave propagation with particular reference to effects, if any, of the Troposphere."

2*B*.—G.C. (G2GD): "Isobar Theory."

2*C*.—G.C. (G5JH): "Fading, with special reference to Sunspots, Atmospheric Pressure, and Clouds."

2*D*.—Reforming.

2*E*.—G.C. (2BCM): "Isobar Theory."

2*F*.—G.C. (G5AM): "Ionisation and Propagation of 28 and 56 mc. waves, and Isobar Theory."

The following are the activity reports from each group:—

2*A*.—Recent investigations have shown that there may be some form of reflection from both cold and warm "fronts," but in the case of the former the limit of influence is considerably less than in the case of the latter. The evidence is somewhat conflicting, owing to the number of possible variables involved. There is definitely no indication that barometric pressure alone has any influence on wave propagation. (This must not be taken as contradicting the Isobar Theory, which deals with *pressure gradient* along a horizontal line, or

$$\frac{dp}{dx}$$

.—G.M.)

2*B*.—An interesting report has been received from ZC6CN, who points out that DX conditions changed from summer to winter very abruptly in Palestine on September 14. Before this date, fade-out on 14 mc. coincided very closely with the diurnal maximum of barometric pressure, but after this date no such relation seemed to exist. As soon as meteorological conditions settle down to the winter type, observations will again become possible. BERS165, in a report, confirms the Isobar Theory.

2*C*.—This group is discussing various aspects of the main subject, and the G.C. will be glad to

hear from interested new members. With regard to Sunspots, the following extracts from the report are worthy of note, especially in view of the notes from 2*F* :—

"The appearance of spots did not *coincide* with an improvement in reception conditions, the improvement was found to take place a few days *after* the spots became visible. Small spots had little effect, especially at time of full moon ; moreover the effect usually lasted two or three days after the spot had disappeared."

The group suggests that a passing cloud may have an effect on signals, owing to its change on atmospheric potential. They emphasise the belief that the primary cause of fading is in the vicinity of the receiver.

2*D*.—G6HR points out that the conditions obtaining in 1930 for the 28 mc. tests were in strong support of the Isobar Theory ; at that time pressure was uniformly high.

2*E*.—Routine observations have been continued by G.C., G6HA, G5OQ, BRS1151, and again confirmation has emerged for the Isobar Theory. The aeroplane tests with G2LR have not yet taken place, but it is hoped that these will soon be accomplished.

2*F*.—The G.C. contributes a most interesting resumé of a recent lecture by Prof. Appleton at the Royal Institution. The conclusions given are the results of experiments carried out by the British Polar Year Expedition to Tromso, Norway. The purpose of the expedition was to endeavour to settle the vexed question as to whether ultra-violet light or particle bombardment is the cause of ionisation in the H.L. Both are vindicated. It appears that the main cause of ionisation is ultra-violet light, for the experiments proved that normally ionisation is less in Arctic regions than in England where the angle of incidence of the sun's rays is more vertical ; but during magnetic disturbances, which are due to particles shot off from the sun at times of sun spot activity, the ionisation may be increased enormously. One result of this is that ionisation may be produced at such low levels that the waves are rapidly absorbed owing to the higher pressure of air. This is suggested as being the probable cause of the breakdown of radio communication from the ill-fated airship *Italia*. Experiments demonstrating miniature aurora, were conducted by the lecturer, which in a striking manner illustrated the variable principles described.

3.5 M.C. Groups (No. 4).

G6OM (Manager).

G6LI reports further aerial tests, using the split hertz variety, but owing to conditions he has not been able to make a decision as to its effectiveness.

By arrangement with a number of W4 stations, certain of the group made a determined effort to span "the pond" during the four week-ends of November, between 05.00 and 09.00 G.M.T., each Sunday, but no reports of contacts have yet been received by the G.C. These tests were arranged by one of our most enthusiastic members, Mr. Crisp (BRS207), of London, and I am only sorry that no tangible results were achieved to justify his efforts.

Can anyone tell the G.M. whether it should be necessary to re-neutralise a PP.PA when changing wave ? I find that it is not, or appears not to be so, anyway.

It is hoped to publish more aerial data next month, as this appears to be the line on which most work can be done on 3.5 mc.

Receiver Design Group (No. 5).

BRS981 (Manager).

Detector methods are still being tested, and it is hoped to give results shortly. Experiments with Class B valves and valves in push-pull promise well, as both arrangements definitely give improved results.

To overcome the coil difficulties reported earlier, two methods are to be employed : first the use of an all-wave tuner, which will be used to determine over what frequency range trouble occurs ; and second, an iron-cored coil.

Diode detectors and the use of indirectly-heated valves operated from batteries are also under discussion. The latter when used alone, i.e. with no RF or AF amplification, is very sensitive, but "ponging" is troublesome.

BRS865 has joined the Group.

Ultra High-Frequency Groups (No. 7).

G6XN (Manager).

Only two members have been active this month in groups 7*A* and *B*. G5VY and G5MG are concentrating on obtaining maximum efficiency with QRP, and considerable progress has been made by careful attention to aerial systems and transmitters. Tests on field strengths of various transmitters in No. 12 District are proposed.

The Ultra-Short Wave Group of the S.T.C. Radio and Experimental Society is carrying out experiments on short-wave transmission and reception, using a split-anode magnetron working on 222 megacycles. Will those interested in an exchange of ideas please communicate with the Hon. Treasurer, S.T.C. Radio Experimental Society, Officers' Mess, R. Signals, Catterick Camp, Yorks ?

As the outcome of correspondence between OZ2P and the G.M., an international ultra high-frequency letter budget is now in circulation, and it is hoped to effect a useful exchange of ideas in this manner.

7*C*.—G6MF is inactive. G6XM is trying a T25D on 56 mc. as he finds it a good valve on 14 mc.; he asks for a circuit for a 56 mc. Tx (see October Bulletin G.C.). BRS686 (Bristol), who is in co-operation with 2AGM, joins the group. BRS1082 has some new ideas about CC on 56 mc., and is interested in a system called "Infradyne." Information required. BRS877 has been co-operating with G.C. and hopes to visit London 56 mc. stations shortly. GI6TK has tested a new one-valve, but finds push-pull better. A new modulator is being constructed. A schedule has been kept every Sunday from 14.00 to 15.00 G.M.T., but so far no reports have been received. The Y.M.C.A. Radio Club station GI6YM has now been licensed for 56 mc. and two-way duplex fone work with GI6TK will shortly commence. Group reports are requested by the 14th of each month.

They ALL make SURE

and use

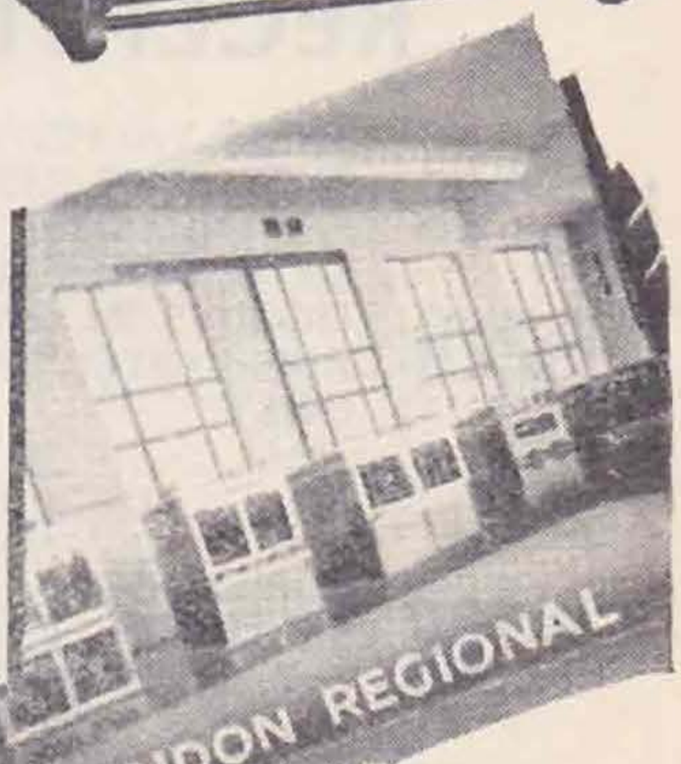
T.C.C.

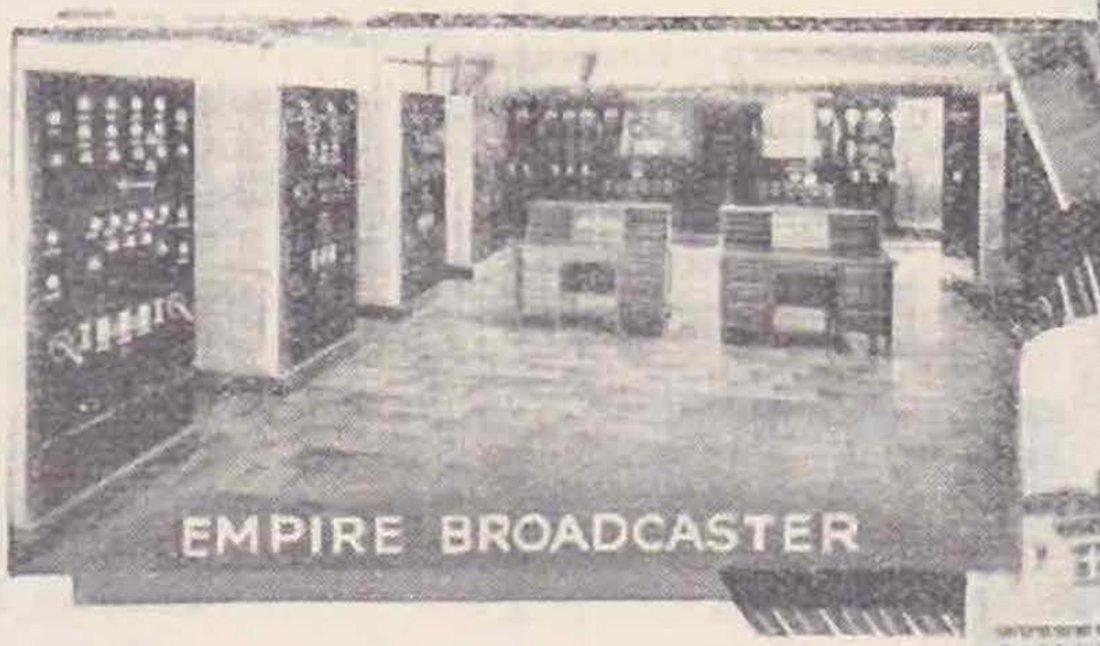
ALL-BRITISH CONDENSERS

CONSIDER this when condensers are under discussion—The Midland, North and Scottish Regional Stations—Prague, Buenos Aires, Motala and many more are the transmitters depending on T.C.C. efficiency. The Post Office, War Office, Admiralty and the leading cable companies all use T.C.C. *Your* demands are just as critical—meet them the same way—use T.C.C. and be SURE!

The Telegraph Condenser Co. Ltd., Wales Farm Road, N. Acton, London, W.3

A typical T.C.C. High Frequency Condenser for transmitting purposes. Whatever you need consult the T.C.C. range first.





NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)

DISTRICT 2 (North-Eastern).
(West Riding, Durham, Northumberland.)
MR. L. W. PARRY (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

DISTRICT 3 (West Midlands).
(Warwick, Worcester, Staffordshire, Shropshire.)
MR. V. M. DESMOND (G5VM), 199, Russell Road, Moseley, Birmingham.

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts.)

DISTRICT 5 (Western).
(Hereford, Oxford, Wiltshire, Gloucester.)
CAPT. G. C. PRICE (G2OP), 2, St. Anne's Villas, Hewlett Road, Cheltenham, Glos.

DISTRICT 6 (South-Western).
(Cornwall, Devon, Dorset, Somerset.)
MR. W. B. SYDENHAM (G5SY), "Sherrington," Cleveland Road Torquay.

DISTRICT 7 (Southern).
(Berkshire, Hampshire, Surrey.)
Mr. E. A. DEDMAN (G2NH), 63a, Kingston Rd., New Malden, Surrey.

DISTRICT 8 (Home Counties).
(Beds., Bucks., Cambs., Herts. and Hunts.)
Mr. G. FEATHERBY (G5FB), 30 Lindsey Road, Bishops Stortford, Herts.

DISTRICT 9 (Eastern).
(Essex, Norfolk and Suffolk.)
MR. F. L. STOLLERY (G2QV), Beaumont Hall Hotel, Clacton-on-Sea, Essex.

DISTRICT 10 (South Wales and Monmouth).
MR. D. Low (G5WU), "Nantissa," Westbourne Road, Penarth, Glamorgan.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
Mr. T. Vaughan Williams (G6LV), "Malincourt," Grosvenor Ave., Rhyl, Flintshire.

DISTRICT 12 (London North).
Mr. S. BUCKINGHAM (G5QF), 19, Oakleigh Road, Whetstone, N.20.

DISTRICT 13 (London South).
MR. A. D. GAY (G6NF), 49, Thornlaw Road, West Norwood, S.E.27.

DISTRICT 14 (London East).
MR. T. A. ST. JOHNSTON (G6UT), 28, Douglas Road, Chingford, E.4.

DISTRICT 15 (London West and Middlesex).
MR. H. V. WILKINS (G6WN), 81, Studland Road, Hanwell, W.7.

DISTRICT 16 (South-Eastern).
(Kent and Sussex).
MR. H. A. M. WHYTE (G6WY), Killiney, Worsley Bridge Road Beckenham, Kent.

DISTRICT 17 (Mid-East).
(Rutland, Lincoln and E. Riding.)
MR. A. E. LIVESEY (G6LI), Stourton Hall, Horncastle, Lincs.

SCOTLAND.
MR. J. WYLLIE (G5YG), 31, Lubnaig Road, Newlands, Glasgow.

NORTHERN IRELAND.
MR. W. GRAHAM (GI5GV), 5 Ratcliffe Street, Donegal Pass, Belfast.

District Notes for publication should be written as concisely as possible and should be in the Editor's hands by the 25th of the month preceding publication. They should be of a general rather than personal nature. Individual reports from County Representatives will not be accepted for publication.

DISTRICT 1 (North-Western).

MR. J. Davies (G2OA), C.R. for Cheshire, advises us that the first monthly meeting of the winter session was held on November 15 at 56, Whitechapel, Liverpool, when a total of 14 members were present. These meetings will, in future, take place on the third Wednesday in each month, when all members and interested friends living in the Liverpool area will be welcomed.

Several new calls have recently been issued, including: 2ACK, now G2RF; 2ARY, now G2KZ; BRS1195, now 2BPU; and 2BNA, 2AYY is awaiting his full call.

A fair amount of local work continues on the 1.7 mc. band, competition in phone quality being particularly keen. Interference from trawlers and pilot boats is reported by 2AWV.

G2OA and 6TT are active on 7 and 14 mc., the latter having effected QSO's with W5 and 6, while the former has worked a number of VK's. G2OA is also active on 28 mc., but finds that conditions had fallen off badly recently. G2IF is using telephony on 7 mc., and 6JT is active on the same band, using an input of only 3 watts.

DISTRICT 2 (North Eastern).

Bradford Area.—A meeting was held at Cambridge House on November 22, under the auspices of the Bradford Experimental Society. During the course of the evening Mr. J. Clarricoats delivered an address on past and present amateur activities and drew attention to the fact that the modern amateur is too much inclined to take everything for granted as being the best, instead of looking for new ideas of his own. The meeting was attended by over 60 persons, and it is anticipated that as a result many new members will be obtained.

Middlesbrough Area.—At the November meeting, held at the Royal Hotel, a discussion took place on various types of receivers. It was decided to rebuild the Club transmitter, converting it from T.P.T.G. to CO PA. G6CV has been experimenting on 56 mc., and would be interested to know why it is when changing from 2-type 10 valves to 2 LS5B's in push-pull, there is an increase in blind spots with the aerial coupling remaining the same.

Leeds Area.—Very little activity is reported from this group although monthly meetings are

now in operation. The next is to be held on December 18, at G5WQ.

Sheffield Area.—Little or no activity is taking place in Sheffield, but social gatherings are held monthly at the Angel Hotel, the next meeting being fixed for December 15. A visit to the North Regional station has been arranged for next year.

Newcastle Area.—Most stations report active. Particular attention is drawn towards the extraordinary DX achieved recently by G6YL, who, with an input of only 9 watts, has been QSO with ZS, W1, 2, 3, 4, 5, 6, 8, and 9, VE and VK. The usual monthly meeting of the N.E.A.T.S. was held at 14a, Pilgrim Street, Newcastle, when 23 members and friends were present. A lecture on the subject of " Detection " was delivered by Mr. Dobson.

Late news has just come to hand to the effect that G5CT has been QSO ZL2BK on 7 mc. with an input of less than 10 watts.

DISTRICT 4 (East Midands).

From Northants, G5YF reports all Kettering members to be resting after their efforts in connection with the local exhibition, and welcomes as a new member Mr. Hutchen, who is the chairman of the Kettering Radio Society. 2ATV and 2APT are learning the code ; BRS1018 and G5YF are active.

In Nottinghamshire, G2JR, 2VX, 2BFF and BRS1009 are active on 56 mc. G5VU, 6DS and 6KQ are busy rebuilding, and G2GU, 5YP and 6PZ are active on most bands. G2HD has now an O.W. and will soon be heard again. The C.R. wishes all members a very happy Christmas and good luck in the New Year, and thanks them for their support during the year.

Mr. Storer (G6JQ), advises that the Leicester Amateur Radio Society continues to make good and satisfactory progress. Mr. W. A. Roberts (BRS 1191) and Mr. Stimpson were elected secretary and treasurer respectively, in succession to Mr. S. H. Whitley (2ADC) who has left the town to take up an appointment in Manchester.

The Society propose building a portable transmitter in the near future for field day use, etc. At the meeting held on November 28 a junk sale helped the fund started for this purpose.

As usual, no individual reports have been received, but most of the members are active. G6JQ will appreciate a few lines from Leicestershire members by the 20th of the month, and sends best wishes for Christmas and good luck for the New Year to all members.

DISTRICT 5 (Western).

Thirty-seven members of the Bristol section attended the November meeting held at their new Headquarters, the Full Moon Hotel, North Street, Bristol, when arrangements were made to hold the Annual County Dinner during January. Plans are afoot to visit the Post Office Short Wave Station near Bristol in the near future, and members who are interested are invited to write to G6QW. Now that private Headquarters are available, it is expected that a series of lectures of general interest will be arranged.

The Gloucester section continue to hold fortnightly meetings at the Wessex Hotel, Gloucester, but a change of Headquarters is in anticipation.

The Wiltshire Letter Budget has started with renewed activity and gets more interesting each month.

Oxfordshire have made a most excellent choice in their new C.R., Mr. Long (G5LO), and we congratulate him on his appointment.

Mr. H. W. Cox (VQ4CRF) is on leave from Nairobi and is living at Stonehouse, near Stroud. Members who wish to get in touch with him may do so via G2OP. It is hoped that Mr. Cox will be present at the County Dinner.

In concluding these notes, the D.R. wishes everyone the compliments of the season, a Happy Christmas and a Bright and Prosperous New Year, with plenty of DX and good luck.

DISTRICT CALENDAR
December/January, 1933/4.

December 16. District 12, 7.30 p.m., at G6FI, 48, Grasmere Road, Muswell Hill, N.10.

December 16. District 16, 8 p.m., at G2QR, 88, Kent House Road, Beckenham.

December 19. District 14, 7.30 p.m., at G6UT, 28, Douglas Road, Chingford.

December 19. District 3, 8 p.m., at Hope & Anchour, Edmund Street, Birmingham.

December 20. District 1, 7.30 p.m., at 56, Whitechapel, Liverpool.

January, 4 District 13, 7.30 p.m., at West Norwood, Brotherhood Hall.

January, 7 District 7, 2.30 p.m., at G2YL, "Redholm," Walton on the Hill, Surrey.

January 12. District 9, 7.30 p.m., at G2YI, " The Rosary," Nevendon Road, Wickford.

DISTRICT 6 (South-Western).

The book Budget is now going strong and appears definitely to have established itself, and it is hoped at some future date to set up an exchange of Budgets with the Channel Islands.

The D.R. was somewhat disappointed to find that only one nomination for C.R. had been sent in from the District. However, steps are now being taken to fix up the remaining positions, and it is fairly certain that next year, for the first time, we shall be fully equipped in this respect. The idea of " rag-chewing teas " seems to have taken on so well that the D.R. would like to fix up meetings in Taunton, Exeter, Torquay, Plymouth, and Bodmin. Any suggestions as to dates would be thankfully received.

The District is already seriously considering the possibilities of the next National Field Day, and many offers of help have been received. Will members who do not contribute to the Budget

and who would like to help in any way, particularly in the way of spare gear, please communicate with the D.R. ?

The Budget members are at present pooling experiences on the question of key-click interference, and it is hoped that the results obtained will be of sufficient interest to warrant a BULLETIN article as a District affair. (Excellent idea.—ED.) It is now considered necessary to compile a register of crystal frequencies. This will in most cases be done through the Budget, but all non-contributing members are asked to let the D.R. have their frequencies so that they may be entered in the register. The morning DX conditions for VK and ZL seem definitely to have arrived, and it is noticed that a number of members appear to be on the warpath. G5SY has seized the opportunity to try out some experiments in aerial dimensions and their effect on DX, but even with chopping about the aerial, he has worked about two dozen ZL's o'mornings during the last three weeks. G5QA also seems to be doing quite well. The following stations are known to be active : G 5QA, 5WY, 5YR, 6RP, 2BL, 6II, 2HF, 5VL, 6QH, 2FN, 2ZP, 5YB, 6KC, 5GD, 5SY, BRS 836, 638, 1089.

DISTRICT 7 (Southern).

Twenty-nine members and friends attended the November meeting held at Mr. R. Weston's home in Croydon. Mr. Weston gave a most interesting demonstration of Cathode Ray work, illustrating the results obtained with different systems of time base. Following tea an inspection of the valve museum was made. Mr. Weston's collection includes a number of valves of valuable historic interest and an example of nearly every type that has been manufactured during the past ten years. The meeting closed with a short business discussion.

The Sunday morning 1.7 mc. District tests started on November 5, with a great burst of enthusiasm, but unfortunately this does not seem to have been maintained, as the number of district stations heard on this band got smaller as the month progressed. Will all who have 1.7 mc. transmitters please make an effort to be on this band at least one Sunday a month ? It is suggested that the morning of the District Meeting Sunday will be most suitable.

A number of letters in the current budget are of considerable technical interest, including one from G6NA, describing some experiments he has carried out with the *Standard* Tunograph, which is really a form of simplified cathode ray tube. The D.R. feels that articles of this character are of more than local interest, and hopes that the writers will arrange the subject-matter in article form for reproduction in the BULLETIN. We welcome several new members this month, and hope they will make arrangements to attend as many of the district meetings as possible.

Activity on the air continues much as usual, with most of the stations concentrating on 7 mc. Several members have been in touch with VK and ZL, and some are now only waiting confirmation from these stations before applying for W.B.E. and W.A.C. certificates.

The January district meeting will be held at G2YL (" Redholm," Walton-on-the-Hill, Surrey. Nearest station, Tadworth, S.R.). On Sunday, January 7, 1934, 14.30 G.M.T.

In conclusion the D.R. wishes to thank all members for their fine support during the past year, and hopes they will continue the good work during 1934. A Merry Christmas to all.

DISTRICT 8 (Home Counties).

Owing to the re-arrangement of this district and consequent disruption of the C.R. machinery, it is impossible for these notes to fulfil their normal purpose. As a result, the new D.R. is taking this opportunity of putting some of his views before members of the district, being thoroughly personal in so doing.

My first duty, therefore, is to offer each of you my 73's.

In the capacity of C.R. for Herts, I had a list of 28 members, of whom only one reported to me regularly. Now, Herts, that's not good enough, and I do ask you to see to it that your new C.R. is supported better. A large percentage of the membership of this county is drawn from the Watford area and as the new C.R. is to be appointed from there, it should be easier for you to keep in touch with him.

The Cambridge letter budget, circulating as it does only once every three months, is almost valueless, and must be " hotted up." Please help G6BS to achieve this OMs.

A second budget is to be started for the benefit of Herts and Bucks members. This is to be managed by G2HJ, E. K. Brian Jay, " The Quinta," Elm Close, Amersham. I have a small list of recruits for him to start on, but we can do with some more contributors. Any members of District 8 who would like to come in and help, please write to G2HJ or myself.

G6GZ has kindly loaned me a copy of the District 7 letter budget, a very F.B. affair, which will be sent to all contributors in order to show them " how." I hope it will also go a long way towards dispelling the idea that technical " dope " is essential. It very definitely is *not*, however much it is appreciated when it does materialise, and remember, this applies not only to letter budgets but to the monthly report to your C.R.

It has just occurred to me that this is the last BULLETIN of 1933 ; therefore the compliments of the season to you all, and do not forget that 1934 sees District 8 right on the map, that is if you *write regularly*.

STOP PRESS.

We have a real live pirate in the district ! When captured I am handing him over to G5QV to be put in irons in the fo'c'sle. Hi !

DISTRICT 9 (Eastern).

Congratulations are extended to Mr. Collin, G2DQ, upon his excellent performance in the 3.5 mc. contest.

The first of the Essex monthly meetings was held during November at G5UK, when the following were welcomed :—G2DQ, 2KT, 2LZ, 2WG, 2YI, 5VQ, 6CT, 6IF, 6KV, 6NW, 6OA, and BRS1011. The January meeting will be held on the 12th of that month at G2YI, Wickford, when all Essex members will be assured of a cordial reception.

Reports from Essex should be sent to G5UK by the 25th of each month (the 28th is early enough

for reports from C.R.s to D.R.s providing the latter reach headquarters not later than the 1st of each month.—ED.)

DISTRICT 10 (South Wales and Monmouth).

There seems to be lack of effort on the part of members in sending monthly reports. The C.R.'s and D.R. are ready and willing to assist in every way possible to bring about closer local co-operation, but this cannot be successful without contact in the form of monthly reports. Please note that your C.R. would appreciate a few lines before the 15th of each month.

A successful meeting was held at G5WU on November 15, when it was decided to carry on 56 mc. tests between 20.00 and 21.00 G.M.T. each Wednesday evening from individual stations. The members active on these tests are G6YJ, 2BPG G5WU, G2PA, G2XX, BRS727 and 1128. Will other members interested please get in touch with G5WU ?

It is satisfactory to report that continued activity is being shown by the majority of members, G5PH having recently rebuilt his transmitter is still seeking VK's. G5TW hopes to get going shortly on 14 mc., G2UL having erected an outside shack is settling down to some solid winter work. 2AWN will be applying for his licence shortly. 2AHN should be on the air before these notes are printed. G5KK is still active on 7 mc. It would be in the interests of the district if other stations would co-operate with G5FI, 6PF, 5BI, 2PA, 6YJ, 5WU, 2JL and 2XX on the 1.75 mc. band. BRS727, 1128 and 1131 are also active.

We welcome a new member, G2UL, Mr. E. Dell, of Swansea.

DISTRICT 12 (London, North).

Another highly successful District meeting took place at G5VY during November, when 22 members were present. A cordial welcome was extended to Mr. W. E. G. Brigden, G6WU, late of Leicester, now of Barnet, and to Mr. A. E. Groom, G2QX, who was in London on a visit from Luton.

In order to more adequately cater for the needs of the District two representatives were appointed for the London North and London North-West postal areas. Mr. D. N. Corfield, G5CD, will act as sub D.R. for the N.W. and Mr. E. R. Radford, G2IM, for the N. Monthly activity reports should be sent either to the D.R. or to the local sub D.R. The November letter budget had ten contributors, a big improvement over Vol. 1, No. 1, but more letters are required. Remember, New Year's Eve is Budget Day, an appropriate day to make that Ham Resolution, " Every month I will report to the D.R. ! "

N.F.D. is interesting the members of No. 12, and at the November meeting Messrs. Buckingham, Radford, Corfield, Vickery and Brigden were appointed to serve on the District N.F.D. Committee. It is understood that Klu Klax Klan is not in it when it comes to secret conclaves in connection with plans for this event.

The December meeting is to be held at Mr. Ingleton's QRA, 48, Grasmere Road, Muswell Hill, on Saturday next, December 16. A line to mine host will be appreciated if you are attending. During this meeting a junk sale will be sponsored by the District Auctioneer (!), whose motto is " the more you put down the less you pick up."

A proportion of the proceeds will be given to a deserving Christmas charity. Those who cannot support this project practically may forward a small contribution via the D.R. All apparatus brought along for disposal must *work* !

In concluding this report the D.R. extends to all members at home and abroad Seasonal Greetings, and thanks those in No. 12 who have contributed in any way to a successful year of District activity.

DISTRICT 13 (London South).

It is with great regret that the members of the District learn of the resignation of Mr. Gay (G6NF) from the post of No. 13 District Representative, and they take this opportunity of thanking him for the work he has done on their behalf during his term of office.

The question of a successor is being considered by Council, but as it may be some time before the matter is settled, it was felt that South London should not go right off the Society map in the meantime so that these few notes are written to keep the District in the public eye.

Forthcoming Contests

January 6 *and* 7.
1.7 mc Transmitting

February 3, 4, 10 *and* 11.
Senior B.E.R.U.

February 17, 18, 24, *and* 25.
Junior B.E.R.U.

March 3, 4, 10 *and* 11.
Low Power.

The S.L.D.R.T.S. is flourishing even in the face of an intensive drive for outstanding subscriptions, and it will not be long before this local society will be able to muster 50 members. The meetings are held at the West Norwood Brotherhood Hall, at 8 p.m., on the first Thursday in each month. All visitors are welcome.

The November meeting, which took the form of a lantern lecture by Mr. Gwynne, of Messrs. T.C.C., was well attended. This proved a great success, and particular interest was displayed in the various electrolytic condensers described. The next talk was to be given on December 7 by Mr. R. Weston, on the subject of Cathode Ray Oscillographs, with practical demonstrations.

Mr. Phil. Johnson (G5IS) is to be congratulated on being nominated by Council as a candidate for the forthcoming elections.

Activity in the district is quite up to the usual mark for this time of the year, and we have several new transmitters amongst us. G2PT recently licensed, has made a flying start on the air by working several W's.

Early in January it is understood that G6HP and Rita, of G6VP, will be running a joint station under the call G6HP, and the District is anxious to offer them its heartiest felicitations, and every good wish for their health and happiness.

Let your DR hear from you.

DISTRICT 14 (London East).

The District staged another Field Day at the end of October, when, at Rookwood Hall, Abbess Roothing, a week-end was spent by a number of members. Gear was in operation on the 1.7 and 3.5 mc. bands, and on the latter band some very interesting 'phone experiments were conducted in co-operation with Dutch and Belgian stations. Our last meeting was held at the QRA of G5AR, Woodford, and was attended by a good number of members, including several BRS. At this meeting the D.R., on behalf of Council, presented to Mr. T. C. Clarke BRS565 a certificate for his very excellent work on "Occupancy Check." It was with much regret that BRS members had to be informed that further slow Morse transmissions have been banned by the authorities. At our next District meeting, to be held at 28 Douglas Road, Chingford, E.4, at 7.30 p.m., on Tuesday, December 19, the District will be "at home" to members of District 12, London North, all of whom will be specially welcome.

DISTRICT 15 (London West and Middlesex).

It was very pleasing to see 18 members present at the November District meeting held at G6VP; during the evening Mr. C. H. Starr delivered a most interesting chat on his early experiences in connection with Arctic expeditions. Very few of those present were aware that Mr. Starr had taken part in pioneer work of this description. It is hoped that other members will contribute similar talks in the future.

If this District does not wake up and forward a few notes for inclusion in the BULLETIN, the D.R. will shortly be forced to follow the example set by the D.R. for No. 13 District in the November issue! G6RS forwards a long report and deplores the apathy of members in contributing to the Letter Budget. G6CJ tells us that an input of 15 watts will work anywhere in the world with the same type of aerial as used on National Field Day—but only 40 ft. high and not too well adjusted at that! G6VP has been busy with sub-modulators and asks us to state that he will be pleased to see visitors, especially on Saturday and Sunday evenings. G5NV will be working shortly with a c.c. outfit. G6RS, the secretary of the newly-formed Thames Valley Amateur Short-wave Radio and Television Society, will be pleased to hear from members living in that neighbourhood. The Society is making excellent progress. G6WN has had little time recently for experimental work.

Members who are not yet contributing to the District Letter Budget are invited to apply to the D.R. or to G6YK for a copy of a past and the current issue of the budget.

The C.R.'s and D.R. take this opportunity of conveying seasonal greetings to members of the District and to their many friends around the country and overseas.

DISTRICT 16 (South-Eastern).

Twelve members were present at the November North Kent meeting held at G6WY. The next meeting will take place on Saturday next, December 16, when Mr. C. H. Roddis, G2QR, 88, Kent House Road, Beckenham, will act as host. Members from outside the District will be cordially welcomed.

No individual activity reports are to hand from Kent or Sussex. It is suggested that more local meetings be arranged around the District. At present societies are in operation in Folkestone under the able direction of G2IC, and in the Medway towns. The D.R. suggests that arrangements be made for individual members to hand in their monthly reports at these meetings, so that the member in charge of the meeting can forward them to the D.R. in time for insertion in these notes.

The D.R. hopes that there will be good activity on 28 mc. during his December and January tests; these tests will extend from 12.00 to 13.00 G.M.T. every Saturday. Local reports and details of other stations heard will be appreciated.

Please do not forget to send in your voting papers for Council this year.

DISTRICT 17 (Mid-East).

At a meeting of the East Riding members held at Hull on November 19, a motion to apply for alteration of the boundaries of the District was approved.

Owing to the difficulty of giving proper attention to the collection of District Notes, G6AK of Cleethorpes, has been appointed a sub-County representative, and the D.R. would be obliged if Lincolnshire members will get in touch with him in the matter of reporting monthly. G6AK will also attempt to pick up some of the threads which have slipped away recently, and will be glad to keep members posted as to their respective activities.

In the event of Yorkshire breaking away from No. 17 District, the D.R. would like to call a final meeting at Hull at the appropriate time, so that he may hand over the ropes and bid farewell to the county.

2ATK is to be congratulated upon his splendid work in connection with the band occupancy checks, for which a certificate will shortly be awarded to him.

During October the D.R. made a 7 mc. contact with Mozambique, CR7AM, and asks if this is a first contact.

During the same month telephone contact was established with India on 7 mc. and 14 mc. This station was being operated by Mr. Carr, who was G2XG, and one of our active members at Cranwell. A new call sign, G2LR, is finding a strong gathering of S.W. enthusiasts at the Cranwell Wireless School.

It is expected that 2BCM, of Boston, will be the first call sign in that town before many weeks are past.

SCOTLAND.

The 3.5. mc. contest has come and gone. It was ill-supported from Scotland, only G6IZ and G5YG entering.

Since last notes were written, no fewer than six BRS and AA men have metamorphosed. G2OX is issued to 2BDF of Aberdeen, G2SB to 2AUR of Greenock, G5HL to 2AWJ of Loanhead. 2APL of Edinburgh has passed his test and awaits his call, and the AA calls 2BLN and 2BPI have been issued to BRS1026 of Glasgow and BRS1200 of Edinburgh, respectively.

From reports which reach me, "A," "B" and "D" Districts appear to be pretty lively, but "C" seems to be as dead as the Great Auk. I have not heard from the D.O. for nearly three months, and presume that he has "thrown in the

sponge " in disgust. In a district containing 12 transmitting licences, not to speak of a flock of BRS, it seems a little odd, doesn't it ?

G5ZX has been appointed by Council to the Band Occupancy Group and G2MA has been appointed an Empire Link Station.

Owing to the number of calls on my time due to the rapidly increasing membership, I may find it necessary to allocate to an assistant the duty of compiling these Bulletin notes, so look for a fresh and, I hope, more lively style next month.

NORTHERN IRELAND

We regret to record the death of Mr. T. P. Allen's father, who passed away on Armistice day. Sympathy is extended to 6YW in his bereavement.

Gi5HV has constructed a SG SG1 receiver, with which he is at present experimenting. R.N.W.A.R. work claims most of his time as the 14 mc. band is almost dead. 6YM has now received permission to use the 28 and 56 mc. bands, but at present experiments are being conducted on 7 mc. and 14 mc. with a G2BI type aerial, reports and QSO's would be welcome. 6TK sends a list of stations worked, including VE3 and W9, which are new districts. 2ABT has been working and has now applied for a radiating licence. 6YW is at present inactive, his last DX being PK. Rumour has it that 2ANV took a morse test recently, and that he is now Gi2BS —what about a report, O.M. ? 5QX has received a 50-watt licence and is reported to be radiating a fine signal. 5SQ is inactive at present owing to business. 2KN can be heard occasionally, but as his crystal is " down among the dead men "—*i.e.*, at the kc. " top " of the band he finds it extremely difficult to effect QSO through the QRM. This month we welcome a new member, 2AFO, who is also practising morse. BRS701 has joined the R.N.W.A.R. and hopes to apply for his two-letter call shortly.

It is pleasing to record that amateur radio in Northern Ireland is very popular at present, and we hope that members will keep up this enthusiasm during the New Year. The D.R. would again remind you that *your* report would be appreciated.

CORRESPONDENCE.

The Editor does not hold himself responsible for opinions expressed by correspondents. All correspondence must be accompanied by the writer's name and address, though not necessarily for publication.

AN APPRECIATION

To the Editor of The T. & R. Bulletin.

Dear Sir,—As a comparatively new member of the Society, I should like to express the very great interest and pleasure which I derived from Mr. E. Megaw's lecture given at the meeting held on November 24.

Bearing in mind the very technical nature of the subject and the (to me, at all events) new ideas involved, I think that the lecturer put over the results of his research in a remarkably clear manner.

I am now, doubtless in common with many others, looking forward to the publication of the subject matter in the Bulletin.

There can be no doubt of the great interest and scope for research in the field covering the generation, propagation, and detection of very high frequencies, and if Mr. Megaw's lecture has done no more than to stimulate this interest, it should have done much toward increasing our future knowledge of radio phenomena.

Yours sincerely,

Frederick Halden.

[Mr. Megaw's lecture will appear in the January and February issues of the Bulletin.—Ed.]

OSCILLATOR DESIGN.

To the Editor of The T. & R. Bulletin.

Dear Sir,—Having been keenly interested in the problem of obtaining high efficiency from crystal-controlled transmitters, I read with interest the article " Oscillator Design " in the November Bulletin. Having worked on similar lines to " Anon," perhaps one or two points, met with and cleared, might be of interest.

When using the double-tuned plate system it was found that maximum second harmonic output was obtained when the 3.5 mcs. tank circuit was tuned to a higher frequency than that of the crystal; the difference is quite considerable and the valve runs at much higher plate current than " maximum dip." In order to reduce the anode current and to obtain an increase of output the grid resistor was increased to 50,000 ohms and the screened-grid potential reduced to a working minimum; this latter point is a great factor in the successful operation of pentodes as H.F. oscillators.

It might interest present-day 28 mc. enthusiasts to know that W2JN, of old-time fame, used this method of trapping the second harmonic from the irregular plate current, in the oscillator of his original crystal-controlled transmitter for 28 mc.

Although various valves have been tried and extensive experiments carried out, the writer finds the LS5b to be the best straight doubler valve. Regarding the system which incorporates the screened-grid in the circuit, it is difficult to see how the following stage can receive any excitation when there is an alternative low impedance path such as that offered by the by-pass condenser C4.

Yours faithfully,

J. Davies (G2OA).

HIGH ANGLE RADIATION ON HIGH FREQUENCIES.

To the Editor of The T. & R. Bulletin.

Dear Sir,—Amongst the Contact Bureau Notes in the September issue of The Bulletin the manager of the 28 mc. group, G6VP, has made some remarks about high-angle radiation which greatly interest me. In *QST* for January, 1929, there appeared an article on 28 mc. work, by Ross Hull, in which the theory of short-wave propagation is given briefly, and the difficulty of reconciling it to the success of high-angle radiation on 28 mc. is pointed out. It is generally accepted that the best DX on the ordinary short-wave bands results from using aerials that give a high proportion of low-

angle radiation, whilst the high-angle rays exceeding a certain angle are lost in space. As far as I know, nobody has yet put forward a satisfactory explanation of the apparent superiority of high-angle radiation for waves in the vicinity of the short-wave limit. I have a suggestion that may be of interest concerning this effect.

There is no doubt that the F region is responsible for all rays that are returned to earth on this frequency, since the ionisation density of the E region (the ordinary Kennelly-Heaviside layer) is never sufficient to bend them back again. If the rays travelled in straight lines to the lower boundary of the F region, they would strike it at an angle of at least 13 degrees, and only those of very low radiation angle, if any, could be returned to earth. All other rays would strike the layer at angles exceeding the critical angle for refraction back to earth. But all rays must first pass through the E region, and under daylight conditions this layer possesses sufficient ionisation to make the wave deviate from its course in such a way that it meets the F region at a smaller angle, and at a greater distance than would otherwise be the case.

Now, according to the theory of refraction of short waves in the Kennelly-Heaviside layer (see *QST*, July and August, 1927), the tangent-ray, and other low-angle rays, which are generally the best for DX, return to earth at the greatest distance. For higher angles, the rays return to earth nearer the transmitter, until a first critical angle to the horizontal is reached. The ray sent out at this angle, called the skip-distance-ray, returns to earth at the nearest distance to the transmitter. The rays of still higher angle return progressively further away, until finally a second critical angle is reached, beyond which no ray gets back. It is my opinion that the importance of these high-angle rays has been rather overlooked, and that they are particularly important when we are dealing with 28 mc. signals. Of course, with ordinary waves, such as the 7 mc. band in daylight, the range of rays lying between the skip-distance and the tangent always return at a reasonable distance, and those higher rays probably come down somewhere in between and don't matter much.

Let us consider what happens to the radiation from a 28 mc. aerial. The behaviour of these waves will not be quite the same as those just described, because none are deflected from the E region, but all of them will be somewhat refracted on passing through it, as pointed out above. Under night-time conditions, the ionisation of the E region will not be dense enough to be of much value in this respect. There will be a bunch of low-angle rays which will be refracted in the E region, in daylight, to an extent which makes them strike the F region at a great distance, possibly a quarter of the way round the world. At this place it might well be night-time, and the F region ionisation, which was hardly enough at the best of times, will then probably have sunk to a value too low for the wave to be deflected back. In these circumstances the low-angle rays will depart from this cruel world for ever! Consider now those rays of higher angle which are affected by the E region so that they impinge on the F region at a low angle. Only the highest of these rays will come down at a convenient distance; the others will have a very large skip. The E region will again affect the down-coming waves.

To sum up, it appears that high-angle radiation can at times reach the F region at a low angle, and be refracted back to earth within a few thousand miles. The low-angle rays either return at an enormous distance, or not at all.

Complications would be introduced by considering the effect of at least two other ionisation maxima which lie between the E and F regions. Also daylight conditions will be necessary in all refracting regions on the path of the wave, and a slight diminution in solar activity may upset everything and lose the waves for us. Another upsetting possibility is that the upper transition layer of the E region may possess a steeper ionisation gradient than that of the lower portion. Still, there are other layers in between which may do the job. Some of these short-wave problems are very intricate, and there always seems to be a lot of queer business going on in the ionosphere, and all sorts of possibilities arise. However, the above is what appears to me to be a fair solution of the 28 mc. riddle.

In spite of the success that has attended experimentation with high-angles of radiation on 28 mc., I think that the usefulness of low-angle radiation, under the right conditions, for covering large distances on one skip, should not be forgotten.

Yours faithfully,

H. W. Wheeler (VK5HW).

Empire Calls Heard.

N. L. Carpenter (S.S. "Preserver," off Cape Guardafui, Italian Somaliland, October 22 to 28, 1933) :—

7 mc.: g2zq, 5hb, 6rb, 6xx, su2sg, su6sw, vk2bp, 2dr, 2ev, 2pk, 2yl, 3es, 3hq, 4el, 5ln, 5ml, 5mu, 5my, 5pk, 5xk, 5zy, 6fm, 6rl, vq4crl, vs3ae, 7gj, 7gt, vu2bn, 2dn, 2dx, 2lx, 2lz, 2ww, yi7rk, zc6cn, zl1cd, 1dg, 1ft, 1gx, 2ha, 3dt, 3fg, zs2a, 2j, 5k, 5x, 6c, 6v, zt1f, 1r, 1t, 2c, 2f, 2h, 2l, 5o, 5r, 5z, 6d, zu1e, 5b, 5n, 5w, 5y, 6a, 6b, 6p.

14 mc.: g2ak, 2bj, 2dv, 2ih, 2im, 2kb, 2ma, 2oi, 2zj, 2zq, 5bj, 5by, 5dn, 5gd, 5hb, 5ph, 5qy, 5vq, 5wp, 5wy, 5yh, 6ac, 6cw, 6oo, 6rb, 6sr, 6xn, 6yl, 6yw, gi5ur, st3wt, su1aq, 1ec, 2ga, 2np, ve1ea, 2ca, 2dw, ve4mv, 5eh, vk2hw, 2hx, 2hy, 2xu, 4gk, 4je, 5mu, vpu2, vq4crl, 4crm, 4cro, 4kta, vs7gt, vu2bl, 2bm, 2bn, 2fp, 2lx, 2zz, yi7rk, zd2c, ze1jf, zl1gx, zs1h, 2j, 4u, 5a, 5x, zt1f, 4m, 5v.

EI5C, H. Hodgens (The Bungalow, Clonasleigh, Shankill, Co. Dublin, I.F.S., October-November) :—

14 mc.: vk5fm, 5wr, vq4crm, zd2c, 2d, zs1h, 4m, ve1bv, 3ro, su1ec, 2ga, 3ab.

7 mc.: vk2pz, 2ev, 3dm, 3dt, 3hq, 3je, 5fm, 5ml, 6fo, zl3fg, zs4m, zt1r, zu6e, vq3bal, vq4kta, 4crh, 4crl, yi7rk, vp6mr, su1ec, 1sg, zx2d, zt6t.

By BRS822, 63, Tennyson Road, Small Heath, Birmingham. September 12 to November 4 :—

7 mc.: ve2hk, vk2bp, 2nr, 2pt, 2vg, 3bq, 3hl, 3je, 4ha, 5md, 7nc, zl1cn, 2fi, 2ku, 2mm, 3aj, 3ap, 3ax, 3az, 3bj, 3dj, 3fg, 3fl, 4ap, 4bq, 4bt, 4fk, zt2l.

14 mc.: ve1ep, 1ea, 3wa, vp4cf, 6mr, vu2dx, 2bm, 2fp, 2jt, zd2c.

Empire B.E.R.U. News.

B.E.R.U. REPRESENTATIVES.

Australia.—H. R. Carter (VK2HC), Yarraman North, Quirindi, N.S.W.

Bahamas, Bermuda and the Eastern Part of the West Indies.—P. H. B. Trasler, (VP4TA) No. 2 Mess, Pointe à Pierre, Trinidad, B.W.I.

Burma.—W. G. F. Wedderspoon (VU2JB), Government High School, Akyab, Burma.

Canada.—C. S. Taylor (VE1BV), Stewiacke, Nova Scotia; R. Prissick (VE2CX), 27, Bellevue Avenue, Westmount, Montreal, P.Q.; S. B. Trainer (VE3GT), 4, Shorncliffe Ave., Toronto, 5, Ont.; A. E. Howard (VE4CJ), 2401, 25th St. West, Calgary, Alberta; and A. L. Cusden, (VE5HJ), 1465, 17th Avenue, New Westminster, British Columbia.

Ceylon and South India.—G. H. Jolliffe (VS7GJ), Frocester, Govinna, Ceylon.

Channel Islands.—H. J. Ahier (G5OU), 4, Roseville Street, St. Helier, Jersey, C.I.

Egypt, Sudan and Transjordania.—Lt. E. S. Cole (SU1EC), Haking House, Abbassia, Cairo, Egypt.

Hong Kong.—A P. Rosario (VS6AN), P.O. Box 391, Hong Kong.

Iraq.—M. Goodinson (YI5KM), "A" Bungalow, 203 Squadron, R.A.F., Basra.

Irish Free State.—Col. M. J. C. Dennis (E12B), Fortgranite, Baltinglass, Co. Wicklow.

Jamaica, British Honduras, Turks Island and Cayman Island.—C. M. Lyons, (VP5MK), P.O. Box 36, 12, Port Royal Street, Kingston.

Kenya, Uganda and Tanganyika.—W. E. Lane (VQ4CRH), Box 570, Nairobi, Kenya Colony.

Malaya.—T. G. Laver (VS3AC), Government Electrical Power Station, Johore Bharu, Johore.

Malta.—H. G. Cunningham (BERS.161), H.M.S. "Royal Sovereign," c/o G.P.O., London.

Newfoundland.—James Moore (VO8AW), Carbonear.

New Zealand.—D. W. Buchanan 74, Willis Street, Ashburton; and C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

Nigeria.—Capt. G. C. Wilmot (ZD2A), Depot Nigeria Regt., Zaria, Nigeria.

North and South Rhodesia.—J. W. Mavis (ZE1JE), P.O. Box 160, Umtali, South Rhodesia.

North India.—2nd Lt. T. H. Beaumont (VU2FP) 1st Batt. Beds & Herts Regt. Jhansi, India.

South Africa.—W. H. Heathcote (ZT6X), 3, North Avenue, Bezuidenhout Valley, Johannesburg.

Australia.

By VK2HC via ZL4AO and G2ZQ.

It is with deep regret that we have to record the passing of VK3BG, one of Australia's earliest amateur workers. Our sympathies are extended to his relatives and many friends.

General conditions for DX work showed a marked improvement during November on both 7 and 14 mc. The period 12.00 to 14.00 G.M.T. was found a good time for Empire contacts on 14 mc., while on 7 mc. good periods occurred from 09.00 to 21.00, with a particularly good European and North African spell between 19.00 and 21.00. QRN has been excessive on 3.5 mc.

The all-VK 5-point contest was enthusiastically supported and some excellent scores obtained, VK6SA and 7CH being well to the fore. Ninety persons took part in the recent A.R.A. Field Day Contest, which was won by a group of non-transmitting amateurs. The R.A.A.F. Wireless Reserve has now been reorganised.

On behalf of all Australian members of B.E.R.U., the writer takes this opportunity of wishing everyone A Happy Christmas and a Prosperous New Year.

Canada.

First District.

By VE1BV *via* G5VM.

On behalf of the amateurs of Nova Scotia I extend Christmas greetings to all members of R.S.G.B. and wish them every success in the New Year. On 14 mc. conditions have been irregular, but many good contacts have been made with G stations. ZS stations have been coming through about 18.00 G.M.T., and a few contacts are reported. The 7 mc. band is really good at periods, but heavy QRM is usually present. A few contacts with G were made on 3.5 mc. during the R.S.G.B. tests. VE1 stations are looking for G's around 05.00 G.M.T. every Sunday. Stations requiring VE for W.B.E. please advise and a sked will be arranged.

Canada.

Second District.

By VE2CX.

Conditions on 14 mc. have been fair to good, but very erratic on 7 mc. European signals break through the W QRM on occasions, but in general they are weak and practically impossible to hold for any length of time. On 3.5 mc. conditions have been in general good, except for heavy QRN at times. VE stations can be heard regularly on the Band 3,500-3,550 kc. between 23.00 and 01.30 G.M.T. (During the 3.5 mc. contest several G stations contacted VE.—Ed.)

Canada.

Third District-

By VE3GT.

Conditions this month have been very fair. Many G and European stations have been heard and worked on 14 mc. between 12.00 and 18.00 G.M.T. ZS1H is heard consistently around 19.00, and the

writer was able to work him on 14 mc. ZS2A is heard almost every day from 22.00 to 24.00 G.M.T., and other South Africans around 05.00 on 7 mc. The VK's and ZL's come through regularly from 08.00 to 13.00, and are worked consistently. The most interesting thing to report is the return of DX on 3.5 mc. The writer heard G2DQ and G6NB (? G6RB) on this band between 06.00 and 07.00, November 12, both a good R5. This band should nicely take the place of 14 mc. this winter. Please listen between 3500 and 3575 KC for many VE3's every Sunday morning this winter, 05.00 to 08.00 G.M.T.

Canada.

FIFTH DISTRICT.

By VE5HJ.

At the New Westminster Amateur Radio Club annual general meeting attention was drawn to the B.E.R.U. and it is anticipated that the Club will shortly apply for Honorary B.E.R.U. Affiliation. Several members will be joining up early in the New Year, and it is confidently hoped that VE5 will be well represented in the B.E.R.U. Contest.

Mr. S. A. Warne (VE5HS) and Mr. F. B. Hughes (VE5IA) are the new President and Vice-President, respectively, of the N.W.A.R.C., whilst VE5HJ continues as Secretary-Treasurer.

Steps are being taken to interest the members of the British Columbia A.R.A. at Vancouver in the work of the B.E.R.U. Mr. C. E. Yip (VE5GO) is already a member and more are promised. (We hope to grant Honorary Affiliation to this Association in the near future.—ED.) The N.W.A.R.C. is already affiliated to the Vancouver organisation, which ranks as the Provincial club for VE5.

The Victoria Short Wave Club on Vancouver Island have also been approached with a view to their members supporting the B.E.R.U.

The new tone code proposals submitted by B.E.R.U. Headquarters were discussed at the N.W.A.R.C. meeting, and it was generally agreed that they were an improvement, but it is felt that, unless the A.R.R.L. support these suggestions, their general adoption here is unlikely. (It is intended to circulate these proposals to the A.R.R.L. after all B.E.R.U. Representatives have given their views.—J. C.)

An article for the BULLETIN setting out general conditions in this part of VE is being prepared.

Ceylon and South India.

By VS7GJ.

VU2FY reports that conditions during the month of October were appalling, QRN on all bands making DX impossible. The transition period between the two monsoons is always bad for radio reception in the tropics, but the year 1933 will long be remembered as a year of static of unusual severity.

The 3.5 mc. band was entirely dead, whilst 7 mc. was subject to very severe QRN, and DX contacts were few and far between. Conditions generally were very patchy.

General conditions on 14 mc. were, on the whole, very fair, and it was the only band of any use for DX; G, VK, ZU, ZL, all being heard fairly well. It is hoped that with the dissipation of the N.E. Monsoon, general conditions will improve.

VU2FY was QRT for the latter half of the month owing to the burning out of his main transformer, which it is not proposed to renew, as he will shortly be taking the air on his new c.c. c.w. and fone rig.

VS7RP and VS7IM are welcomed as new B.E.R.U. members, and we wish them the best of luck and DX.

Station Description

VU2LZ

THE station is situated on a small peninsula on the Rangoon river, at sea level and is practically surrounded by water. The shack occupies a small room in the bungalow, which is built of wood and stands on stilts ten feet above the ground; 250 yards away is the Indian Telegraph Commercial station, VTR, which handles all traffic in the Bay of Bengal and works on 600 and 1200 meters with a power of 2½ kw.! This station used spark until about two weeks before the B.E.R.U. tests, when amid general rejoicing the change was made to C.W.

A wave trap entirely eliminates harmonics and, but for occasional key clicks, no trouble is experienced.

The transmitter at VU2LZ is a simple self-excited T.P.T.G. using Philips TCO4/10 valves. Both the plate and grid coils are copper tube ¼" diameter wound on 3" formers. On both 7 and 14 mc. series tuning is employed, and the aerial consists of a half-wave zepp. The power supply is rectified A.C., and after being smoothed through two 50 henry chokes, 490 volts is applied to the valves. Condensers of 4, 8 and 4 Mfd. are connected between the chokes across the H.T. This smoothing has been found to be very efficient, reports of crystal d.c. often being received. The maximum efficient plate current is 50 m/a and with this input of 24.5 watts, an aerial current of .75 amp is obtainable. This power was maintained throughout both Senior and Junior B.E.R.U. contests.

It is hoped shortly to build a more ambitious outfit, using COPA, but during transition the old transmitter will be kept in service until the new one satisfactorily passes its tests.

Mr. Dunkley is a very keen amateur and like most other B.E.R.U. members, enjoys to the full QSO's with other Britishers. His full address is Post Box 1058, Rangoon. VU2LZ is with Philips Radio, to which company he is attached in an engineering capacity.

The Mysore State, Southern India, have allotted VU6 with two letters following for broadcasting, and VU7 with two letters following for amateurs.

VU7AB, Mr. W. E. Scott, of Hoscottay, Somwarpet P.O. N. Coorg, S. India, a newcomer, is to be heard doing good work.

Will all members of the B.E.R.U. in Ceylon and South India please send in their QRA to VS7GJ, Mr. G. H. Jolliffe, Frocester, Govinna, Ceylon, who has been appointed B.E.R.U. representative? Monthly reports, too, will be welcomed.

B.E.R.S. members are also asked to join in.

Egypt.

By SU1EC *via* G2ZQ.

Conditions are improving on both 7 and 14 mc. From 13.00 to 15.00 G.M.T. on 14 mc. VK's and Eastern DX come in well, while W's and Western DX are appearing at the same time, though not so strongly. On 7 mc. a few W6 stations have been heard between 15.00 and 16.00. An early morning mist occasionally appears over the cultivation in Lower Egypt (the Nile Delta) at this time of the year; when this is present the Eastern W stations can be worked at a much later hour than when the mist is absent. They commence to fade out at about 06.30 instead of at 05.00 G.M.T. In the early evenings QRN is fairly strong on this band from dusk (15.00) until about 20.00 G.M.T.

Of the Alexandrian amateurs only SU1SG is active. SU1CH, SU1WEM and SU1TM are rebuilding their transmitters and hope to be working by the new year. SU1MM is closing preparatory to moving to England. In Cairo SU2GA, SU1AQ, SU7VR and SU1EC are active. SU1AQ is using MOPA. SU1AA is attempting to condense even more an already very compact outfit.

Iraq.

Service duties have recently been responsible for a general upheaval in the movements of our group of members located in Iraq. Early in December, Mr. S. A. Rance (YI2DS), our representative, and Mr. W. Cragg (YI6WG), QSL manager, were both transferred to the Malta station, where they expect to remain for the next few years. Mr. Hamblin (YI6HT) and Mr. Chamberlain (YI5TC) have returned to England, whilst Mr. Jones (YI1EJ) is now located in Egypt, leaving only YI5KM (M. Goodinson, "A" Bungalow, 203 Squadron, R.A.F., Basra), YI5GL (L. A. C. Lewis, I.A.C.C., Hinaidi) and YI7RK (J. H. Knowles, W/T Section, 70 (BT) Squadron) active in Iraq.

We take this opportunity of thanking Messrs. Rance and Cragg for the excellent work they carried out on our behalf during the time they were located in Iraq, and wish them and their colleagues a successful stay in their new quarters.

Acting on the suggestion made by Mr. Rance, YI5KM has been appointed new B.E.R.U. representative, whilst YI7RK is now QSL manager.

Jamaica.

By VP5MK.

There is little to report this month, except that conditions are now at their worst for this year. We have recently experienced very bad weather which has smashed up roads and bridges.

The few active amateurs are mainly keeping schedules with each other and passing along weather reports; working occasional DX when possible.

VP5PA expects to be transferred to another part of the island shortly. VP5LF (Montego Bay) has started up and VP5IS has returned to England.

Kenya, Uganda and Tanganyika.

By VQ4CRH.

Conditions on 14 mc. during October continued to be erratic, but on 7 mc. there were signs of improvement. European stations have been very weak, with South Africans at good strength.

This month we have the pleasure of extending a hearty welcome to two new members, OM Hoey, VQ4KTA, and OM Walker, BERS191. The former is well known in these territories through his excellent telephony transmissions on 7 mc.

November was a busy month for our members. The Davidson Trophy was contested for during the week-ends 11th-12th and 18th-19th, and on November 25th the First Annual Convention in East Africa was held, when the question of forming a Radio Society of East Africa was discussed. The Convention was opened by OM Somerset, ex-G2DT.

Radio Society of East Africa Formed.

Just as we go to press we learn (in a message from VQ4CRL *via* G5ML) that the first East African B.E.R.U. Zone Convention held in Nairobi on November 25, was a great success, and that as a result of decisions made a Radio Society of East Africa has been formed.

The originator of this latter project was Mr. E. T. Somert, ex G2DT, who was invited to open the convention. Just prior to this event Mr. Somerset was married to Mrs. Gwen Catlin, thereby receiving our congratulations and best wishes.

A full report of the Convention will appear in our next issue.

VQ3BAL has received his converter and is now on the air. VQ3MSN is QRT at present, owing to business activities. This is the first time he has been off the air for any length of time since 1928. VQ4KTA is now using CW on both 14 and 7 mc. He was successful recently in obtaining an R5 report from G with fone on 7 mc., using 24 watts input. This would appear to be the first DX report on VQ telephony. VQ4LMA, who has been QRT for some considerable time, has been bitten with the QRP bug out in the "blue," and has managed to contact VQ4CRL on 7 mc., using a 120-volt dry battery as power supply. The distance was approximately 100 miles. VQ4CRL is now operating a brand new CC outfit with 50 watts input, but having to move his QRA, he will not be able to keep up his usual activity for a week or two. VQ4CRM has now made his appearance on 14 mc. and has been collecting a few QSO's, despite the poor conditions.

Malaya.

By VS3AC.

Although there are only three active B.E.R.U. members in this country, the enthusiasm shown makes up for the small numbers. Regular "rag chews" are held at VS3AC, but to attend these VS3AE has to motor 120 miles from Muar, while VS1AD comes from Singapore.

In response to an invitation from Mr. Van Heusden (PK1VK), of Bandoeng, Java, VS3AC visited his home for a short holiday recently. During his stay he met PK1CF and 1LP at Batavia, who did much to expedite his passage through the Customs!

The rail journey from Batavia to Bandoeng is very picturesque as the train climbs 5,000 ft. into the mountains. Under the wing of 1VK ten days were spent sightseeing. The volcano of Tungkuban

Phree, 7,000 ft. above sea level, would make an ideal site for a 56 mc. transmitter! The Malaba Radio Station and Laboratories were visited under the guidance of Mr. Van de Verde (chief engineer.) The transmitting gear used at Malaba is designed in Java by the Dutch engineers. The " high spot " is the pioneer 24,000-volt spark set which linked Java with Holland during the Great War. Java itself is a beautiful and fertile country with a population of some fifty million people. The Dutch have brought high civilisation, peace and prosperity to the natives and foreigners alike, and electricity is to be found all over the country, even in the poorest native dwellings. Bandoeng is a fine example of the manner in which European influence has been at work in the East.

VS3AC had the opportunity of meeting many PK amateurs during his visit, and was impressed with the fine spirit shown by all.

During his visit, Mr. Laver discussed licence matters with Mr. Van de Verde, and it is understood he was able to give some useful advice which will benefit the Java amateurs next year when official licences are issued.

Malta.

Mr. Cunningham (BERS161), who has succeeded Mr. Haskell as B.E.R.U. representative in Malta, advises us that arrangements have been made for all local members of the Society to meet regularly at 29, Porto Salvo, Senglea, Malta. He also mentions that steps are being taken to obtain licences in Malta, and it is expected that the call signs used will be in the series VP3 followed by a single letter.

With the transfer of several of our Iraq members to this station, we anticipate considerable activity in Malta during the coming year.

New Zealand.

By ZL4AO and ZL4DT *via* G2ZQ.

Conditions on 14 mc. are steadily improving. Two periods for European and English contacts have been observed on 14 mc., the first period coinciding with the 7 mc. peak period from 08.00 to 09.30 G.M.T., and the second from about 11.00 to 14.00 G.M.T. A contact with G2LZ lasting till 10.00 G.M.T. is reported. VK reports indicate this latter period as being particularly favourable for Empire contacts. On 7 mc. VS6 stations have been consistent.

The ballot for N.Z.A.R.T. office bearers resulted as follows :—President, W. G. Collett (ZL4BP) ; Vice-Presidents (Auckland), E. K. McKay (ZL1BE) ; (Wellington), W. M. Hall (ZL2BH) ; (Canterbury), R. T. Stanton (ZL3AZ) ; (Otago), Dr. R. B. Dobbs (ZL4FK). Headquarters for 1934 will be located at Auckland.

The P. & T. Department have granted permission to ZL amateurs to use telephony on a channel from 28,000 to 28,500 kc. Type A2 (modulated tone) signals may now be used on all amateur frequencies above 28 mc.

Northern India.

By VU2FP.

There is little to report this month. Conditions are improving on 7 mc., but there is a lack of signals from the West. The 14 mc. band has been very erratic, and all signals usually disappear by 14.30 G.M.T. Many stations are rebuilding at present, which probably accounts for the lack of VU signals on the air. The Letter Budget is now very well supported, and particular interest is being shown by the B.E.R.U. stations. VU2FP is at present in hospital, so the letter budget, etc., will necessarily have to be held up for this month. He hopes to resume E.L.S. schedules again before Christmas. Many new B.E.R.U. members are contemplated as the result of extensive propaganda in a local magazine.

Northern and Southern Rhodesia.

By ZE1JE.

Although conditions on the 7 mc. band are infinitely worse than reported during October, DX signals seem to be forcing their way through the terriffic QRN which is being experienced in Southern Rhodesia at present. Our rainy season has commenced with the usual thunderstorms, and it is anticipated that the ether will soon clear and conditions return to normal. It is worthy of note that the majority of readable DX signals coming in here at present are either DC or CC.

There is a marked improvement on the 14 mc. band, but few stations are heard which is regretted, as this band appears to be most suitable for Rhodesia at this time of the year.

ZE1JF reports QRN very bad on 7 mc, and only when conditions permitted has he been able to sneak in a QSO. He has been operating on 14 mc., and despite very adverse conditions and lack of activity on that band, he managed to work the following DX during the first two weeks in November : FB8VX, PK4BO, 4AZ, VS3AE, SU2GA, OK1AA and VS7GT. W6 stations are still heard on the 7 mc. band, but owing to heavy QRN no attempt has been made to contact.

As reported last month, ZE1JF was QSO W6QD on 'phone, using an input of 9.57 watts! This is believed to be a world record for low-power 'phone. (Any comments, please ?)

Understand VQ2XD is moving very shortly from Livingstone, Northern Rhodesia, to Salisbury, Southern Rhodesia, from where he will operate with a ZE1 call-sign.

Brief monthly reports from ZE1JH, 1JJ and BERS128, all active stations, would be greatly appreciated.

ZE1JM is again on the air on 7 and 14 mc., using an experimental self-excited outfit and very low power (3 watts).

ZE1JE is off the air temporarily, pending arrival of grid bias batteries for C.C. transmitter. In the interim he has constructed the " R.S.G.B. Short-Wave Two," and it has proved all that is claimed for it.

The festive season will soon be with us again, and this opportunity is taken to convey greetings and best wishes for a Merry Christmas and a Happy and Prosperous New Year to all members of the R.S.G.B. and B.E.R.U. from members in Northern and Southern Rhodesia.

South Africa

By ZT6X.

Activity reports from South Africa are as scarce as DX contacts on 56 mc., therefore these comments

refer only to conditions in Johannesburg, as there is a possibility some of our B.E.R.U. members in other parts of the Union may disagree with the writer's observations!

The present DX season indicates a return of conditions similar to those we experienced some five or six years ago, for on 7 mc. it is quite an easy matter to contact practically every part of the world, with the exception of Canada. North American stations are being received at good strength, while Japanese and Australian stations follow them very closely. On 14 mc. conditions have also improved with South American signals being in the ascendant.

A number of S.A.R.R.L. members have been active on 56 mc., but contacts have been confined in most cases to a distance of about 30 miles. With a few exceptions all S.A. amateurs are now using crystal control, thanks to the low prices at which British manufacturers are now able to sell their crystals. The days of the " buzz saw " notes have, we hope, gone for good.

St. Helena.

We have been advised by Mr. H. B. Challacombe (E.T.C. Staff Mess, I. & I. Co., The Briars, St. Helena) that he is operating an amateur station in the island, under the call HLSA. Mr. Challacombe at the time of writing, early in October, had not established contact with Great Britain, but hoped to do so in the near future.

Strays.

Mr. R. H. Jackson pithily points out that certain HAF amateurs sign off their transmissions with the phrase " Justice for Hungary." He enquires, is this an invitation to do to HAT and his partner HAS just what so many of us wish? He suggests a bomb!!!

* * *

Mr. R. V. Allbright (G2JL), will be pleased to receive reports from B.R.S. and overseas stations. He is working on 1.7, 7 and 14 mc. All reports will be acknowledged.

* * *

Mr. E. Dunkley (VU2LZ) asks us to state that he is not carrying out regular broadcasts on the 7 mc. band, as was suggested in the October issue. Experimental telephony tests were carried out by him on this band " for about six weeks in July and August, which is the Indian monsoon season, when QRN is R5 to R9, and such tests could have caused little QRM to other amateurs using this band. These tests ceased on August 28, since when telephony has only been used on two occasions for 'phone QSO's. VU2LZ never had or has any intention of using the 7 mc. band for regular broadcasts or for any undue use of telephony."

* * *

Mr. Arthur Braaten (W2BSR) asks that African and Asian stations taking part in the next B.E.R.U. Contest give him a short QSO if circumstances permit. American contacts with Empire stations in these continents are rarities, and many of our American members are awaiting such QSO's for W.A.C. and W.B.E.

* * *

Mr. Kempton (G2AI) would appreciate reports from BERS or BERU members on his 7 or 14 mc. transmissions.

* * *

G2OR (ex-BRS895) is working on 7 and 14 mc. between 10.00 and 12.00 and 14.30 and 17.00 G.M.T. on Saturdays, and from 14.30 to 17.00 on Sundays. He will be pleased to co-operate in tests with anyone on the bands mentioned.

* * *

Mr. C. A. Jamblin tells us that Chief Radio Electrician J. R. Fallon, late of U.S.S. *Pittsburg*, is retiring from service. Many old transmitting members will remember working Mr. Fallon under the call sign NOT during the time *Pittsburg* was showing the flag here in 1925. Mr. Fallon asks to be remembered to all old friends of the air.

News from Europe.

Mr. Metzelaar (PA0MM), the traffic manager of N.V.I.R., sends us details of activity in his country. He mentions that most of the PA stations are now going over to crystal control, whilst a few are employing electron-coupled oscillators.

Much interest was shown in the R.S.G.B. 3.5 mc. contest, as contests generally have a great appeal for Dutch amateurs. An interesting event arranged between the Dutch amateurs and their colleagues in the Dutch East Indies resulted in some good QSOs in spite of poor conditions.

During the 28 mc. revival many useful DX contacts were established from Holland, whilst on 56 mc. plans are afoot to organise a relay chain between the principal towns. Dutch amateurs are encouraged to use this band for all local work in order to avoid congestion on the lower frequencies; a suggestion we might with advantage follow up.

The " fox-hunting " type of field day is popular, and this has resulted in the development of a rather unorthodox type of super-regenerative direction-finding receiver. The use of bicycles for field-day work has led to the adaptation and construction of diminutive transceivers.

The N.V.I.R. registers its non-transmitting members in the same way that we register B.R.S. members. These members are known by R numbers. A limited number of O.R.S. (Official Report Stations) have been appointed and their duty is to report anything of value they hear in the amateur band, including wandering commercials. Each month an excerpt of these reports is published, and the official stations which have been jamming the amateur bands are notified to the Post Office which in this, as in other matters, co-operates in a friendly way with the amateurs.

In concluding his report, Mr. Metzelaar expresses the hope that the friendly spirit of co-operation which has always existed between Dutch and British amateurs will continue through the ages, an expression we appreciate and reciprocate.

WITH OUR CONTEMPORARIES.

The September-October issue of *The Marconi Review* contains a comprehensive article on the Kerr cell, and its application to television. The theory and construction of these cells is dealt with at length, while details of Kerr cell optical systems, and operating data, go to make up an article which should be of interest to all television experimenters.

The glow gap divider, a new device whereby battery eliminators, or any kind of current supply can be made to deliver a constant voltage, is described for the first time. The glow gap divider is inserted between the power supply, and the load circuit in much the same way as when employing a floating battery. Power supplies, when stabilised by this device, deliver voltages which vary only 1 or 2 per cent. at any condition of load between full and no load, and fluctuate by only ± 0.1 per cent. on supply voltage variations of ± 10 per cent.

The device provides an efficient substitute for batteries, inasmuch as the voltage drop which occurs on discharge of batteries is completely eliminated.

The divider is an integral part of the Marconi Stabilvolt current supply system, and is similar in construction to an ordinary radio vacuum tube. They are marketed as types STV 280/40, STV 80/80, STV 280/80A, STV 600/200.

Radio for November is full of good things including a description of the Farnworth cathode ray television system, and an article by W6WB, entitled "Putting Power into the Antenna, Where it Belongs." The latter article is one of the best seen for some while, giving as it does the reason and *the cure* for lost efficiency. Fred Schnell describes a frequency meter monitor with real vernier turning control, while a subject which should interest many members is treated by Lieut. Denstaedt under the title "Simplified Frequency Monitoring."

"Sky Wave Propagation" is contributed by W6BY, a leading authority on problems appertaining to the upper atmosphere.

Tube Queries, Ham Hints and Practical Data sheets are regular features which are always worth perusal.

Technical data regarding the new *Sylvania* graphite plate valves is published. These valves have, as their name suggests, a graphite anode which permits high plate dissipation without overloading; further lower operating temperature at the anode is possible, resulting in lower operating temperatures of the other electrodes, thus preventing primary and secondary emission. Uniformity of characteristics and long life are also claimed.

Q.T.C. for October contains an article by Mr. Oscar Egenes (ZT5R), in which he outlines the observations made by the "Stellar Group" of S.A.R.R.L. members. Many interesting views are expounded which should interest our Atmosphere C.B. Group.

Strays.

W7PX requires a schedule with G stations. He works on 14,008 kc.

Mr. H. J. Ahier (G5OU) wishes to thank the many B.R.S. and A.A. members who responded to his request in the September issue of the BULLETIN for reports on transmissions made from his new address. He will appreciate further co-operation during December, when he will be working on 3,625 kc. at week-ends.

* * *

Mr. E. Black (G5IM), thanks the "pirate" who has been using his call with a C.C. note, but as he is tired of receiving his QSL's, he suggests the practice ceases.

* * *

Mr. Gordon Ragless (VK5GR) states that several VK5 stations will operate on 28 mc., between 00.00 and 10.00 G.M.T. each Sunday during December. Schedules are sought.

* * *

Mr. J. N. Roe (G2VV) has obtained permission to operate his station from either Minydon, Ridgway Road, Farnham, Surrey, or at 27, Baronsfield Road, St. Margarets-on-Thames, Middlesex. He usually works from the former address at week-ends and during holidays.

* * *

Mr. V. H. Mittendorf, former operator of W2XV, now living at Itzehoe i/Holst, Germany, wishes to get in touch with a member in this country on amateur problems. Communications should be sent direct to the above address.

EXCHANGE AND MART.

RATES.

Private members' advertisements 1d. per word, minimum 1s. 6d. Trade advertisements 2d. per word, minimum 3s. First line, if desired, will be printed in capitals. Copy to reach 53, Victoria Street, or the Advertising Manager, not later than the 1st of the month preceding date of publication.

G6DS. For neat and snappy QSL Cards, Log Books and Pads. Send for samples. QRA, "Inglenook," Orlando Drive, Carlton, Nottingham.

G6VP.—'Phones, Transformers Rewound; Brown's "A" a speciality; any resistance; 24-hour service. Lowest terms in the trade.

MORTLEY SPRAGUE H.T. GENERATOR, Type C.F.147; output, 1,100 volts at 80 milliamps., direct-coupled to Higgs' .4 h.p. motor, running from D.C. 220-volt mains. Only reason for sale is on account of change in local mains from D.C. to A.C. Also 200-volt H.T. Accumulators, and almost new 6-volt L.T. Accumulator. Also Electro-dynamic Rotary Converter; input, 220 volts D.C.; output, 230 volts A.C.; 180-watt type; cost £18, and almost new.—Offers for any or all of above to: F. R. NEILL (G15NJ), "Chesterfield," Whitehead, Belfast.

QUARTZ LENSES, 2s. 6d. Guaranteed to oscillate without reaction.—SMITH, Bryn Rodyn, Colwyn Bay.

AUTOPLEX BUG KEYS, 10s. 6d., c.w.o.; money returned if not satisfied.—MARSHALL (G2MA), 8, Boclair Gardens, Hillfoot, Bearsden, Glasgow.

TANTALUM AND LIONIUM.—Make your own Battery Chargers for alternating current. Simple, reliable. Lionium Rectifying Electrodes, 2-4 amps., 10/-, 4-10 amps, 15/-. Also Transformers, Blue Prints, 1/- each, and complete Chargers.—BLACKWELL'S METALLURGICAL WORKS, LTD., Liverpool.

TELEVISION. — Members experimenting, send for list of components supplied by JOHN SALTER, 13, Featherstone Buildings, High Holborn, W.C. Pioneer maker since 1927 of Television Apparatus.

UNUSED VALVES.—Mullard VO/350; 2 Mullard VU/150's; 3 Mullard Supports for above. This lot originally cost £32 10s. Best offer over £6 secures.—2AKW., 53, Church Road, S.E.19.

WHAT OFFERS? 10-watt W.A.C.; C.C. TX, with power, etc. Also Ferranti 0-150 ma., bottles, P.O. mike, etc.—G6BB, 31, Court Lane, Dulwich, S.E.

18/9 GOODMAN-RIVERSDALE, 1933-4, P.M. Speaker, as used by many Members as Standard for Testing their Receivers, etc. Handles 5 Watts; 8-in. Cone. Weight 8 lb. Also Magnets for Ribbon Microphones, Poles Drilled, Highest Cobalt Content, 12/6 Pair. 7 days approval against cash.—STREETE, 84, Riversdale Road, Highbury, N.5.

Patents and Trade Marks.

GEE & CO. (H. T. P. Gee, Patent Agent for Gt. Britain, U.S.A., Canada, etc., Members R.S.G.B., A.M.I.Rad.E.), 51-52, Chancery Lane, London, W.C.2 (2 doors from Govt. Patent Office). 'Phone: Holborn 1525. Handbook free.

A. MATHISEN, B.Sc., Registered Patent Agent. Specialist: Television and Radio Engineering Invention Patents.—FIRST AVENUE HOUSE, High Holborn, London, W.C.1. Holborn 8950.

Printed for the Inc. Radio Society of Great Britain, 53, Victoria Street, London, S.W.1, by Loxley Brothers Ltd., 50, Southwark Bridge Road, London, S.E.1.