

THE T. & R.

BULLETIN

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RADIO SOCIETY
OF GT. BRITAIN

AND THE
BRITISH EMPIRE
RADIO UNION

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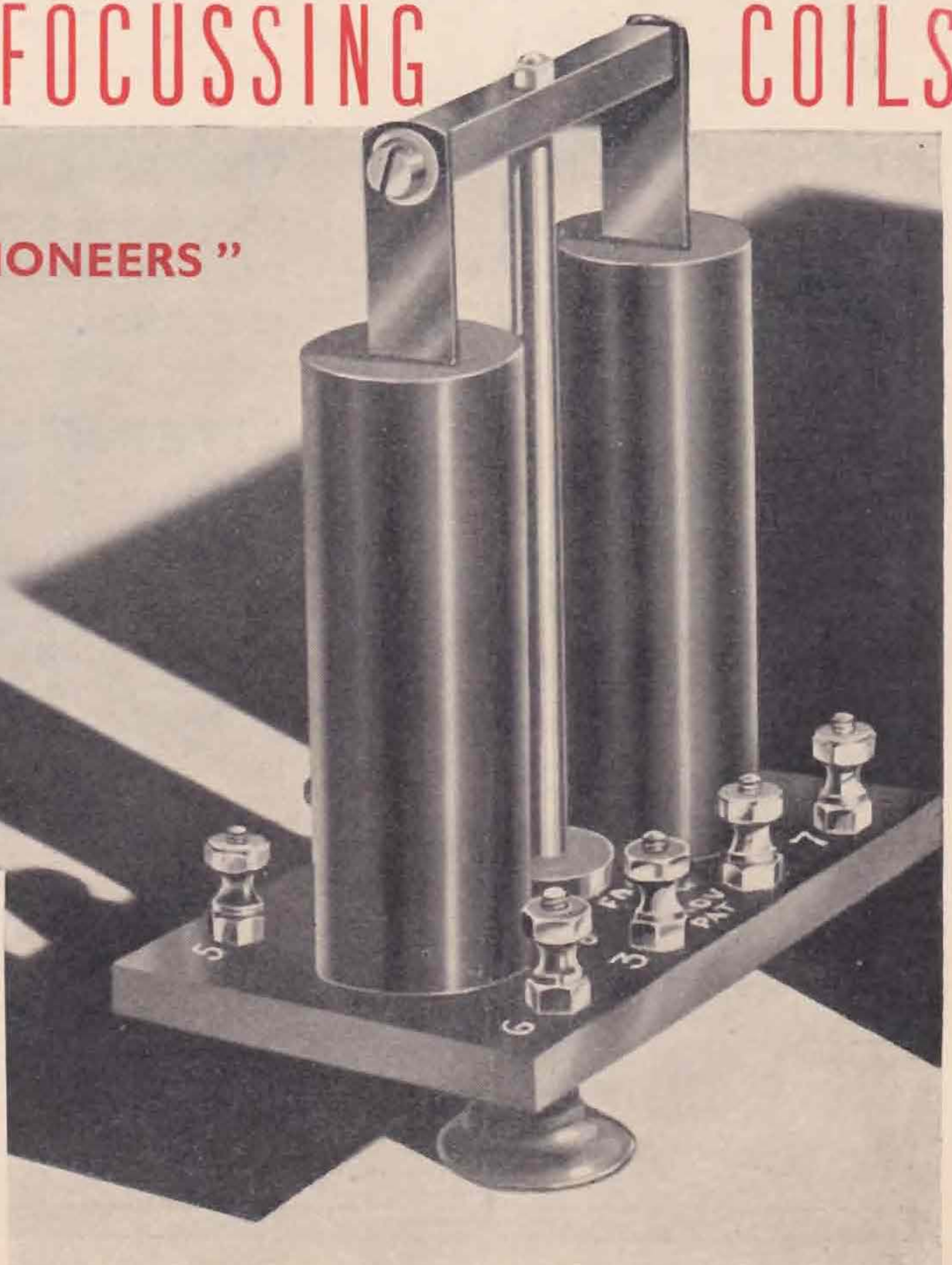
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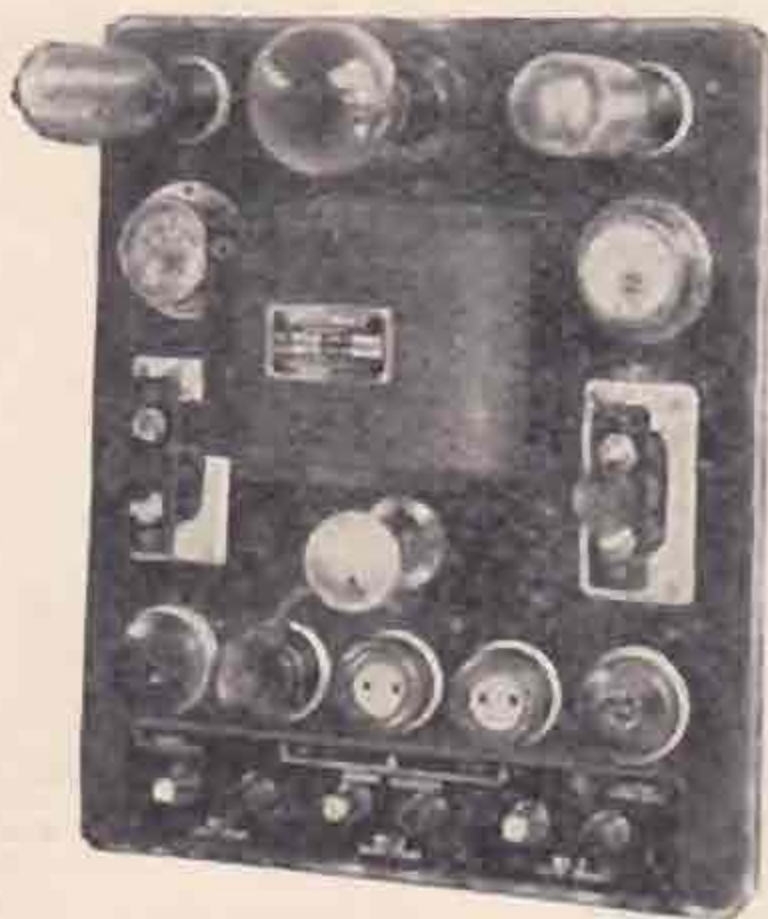


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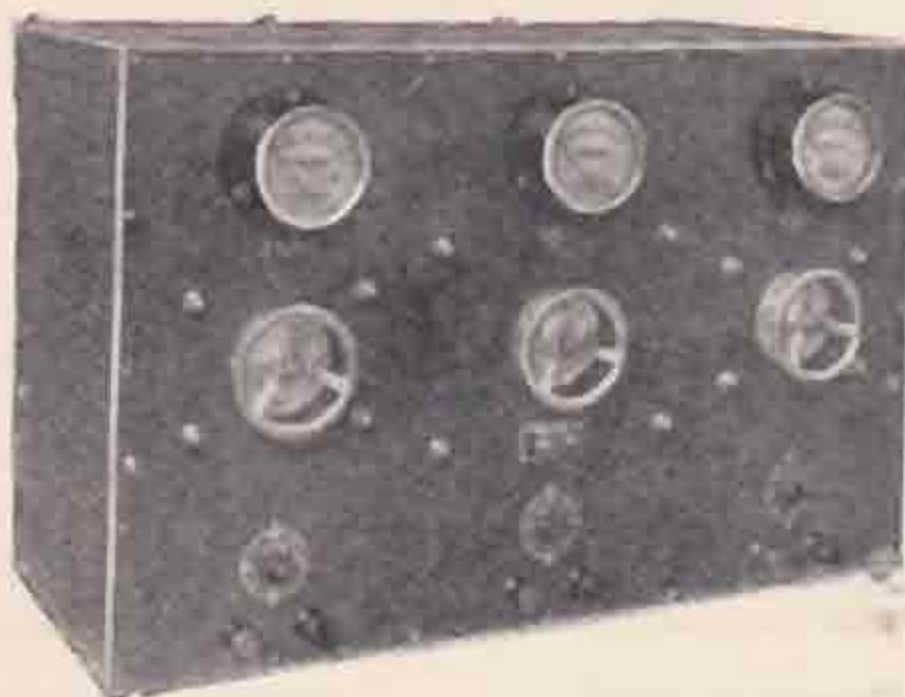
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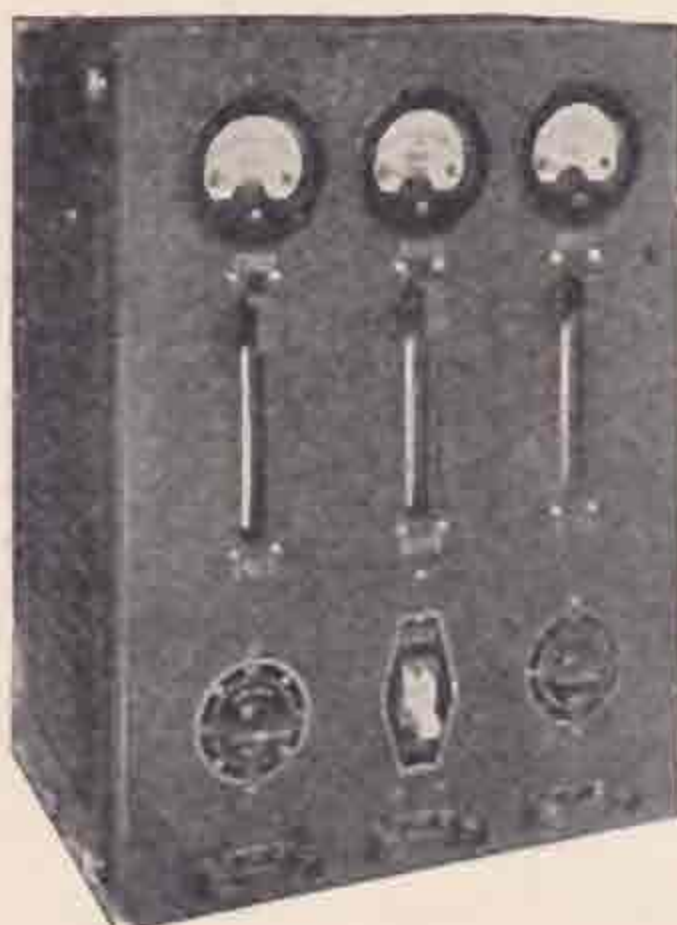
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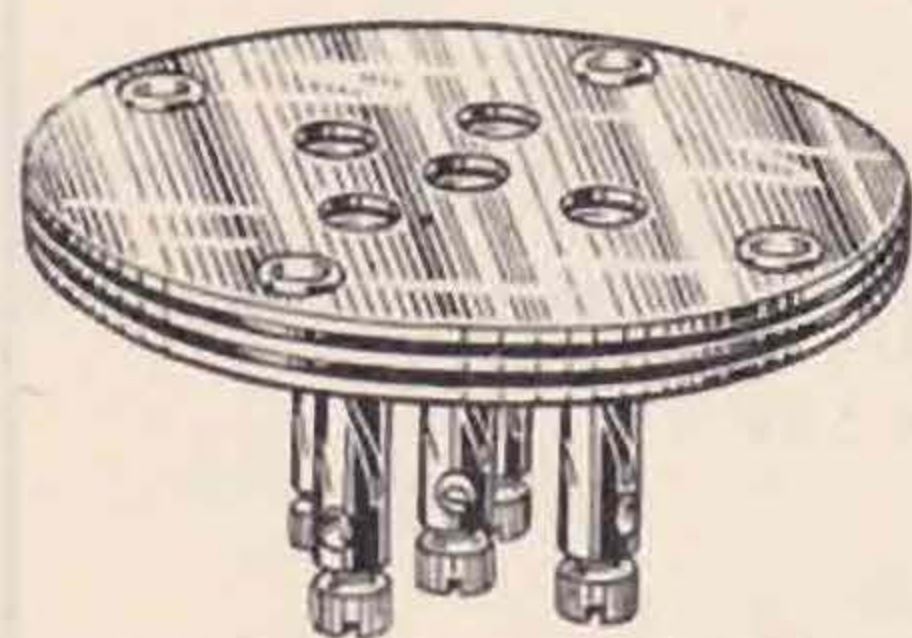
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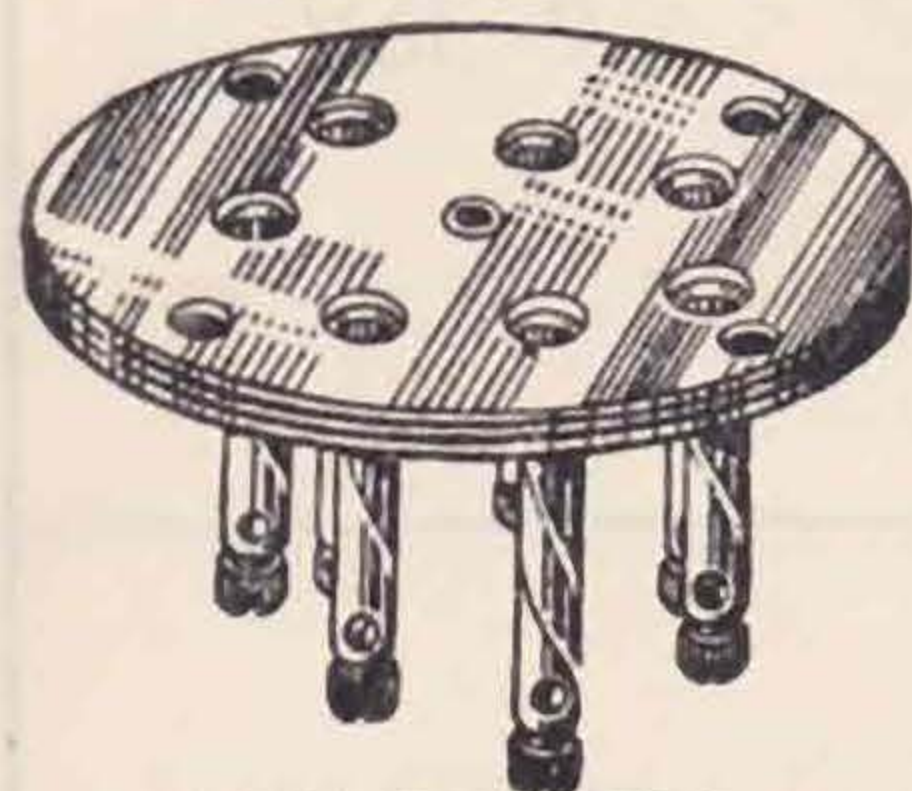
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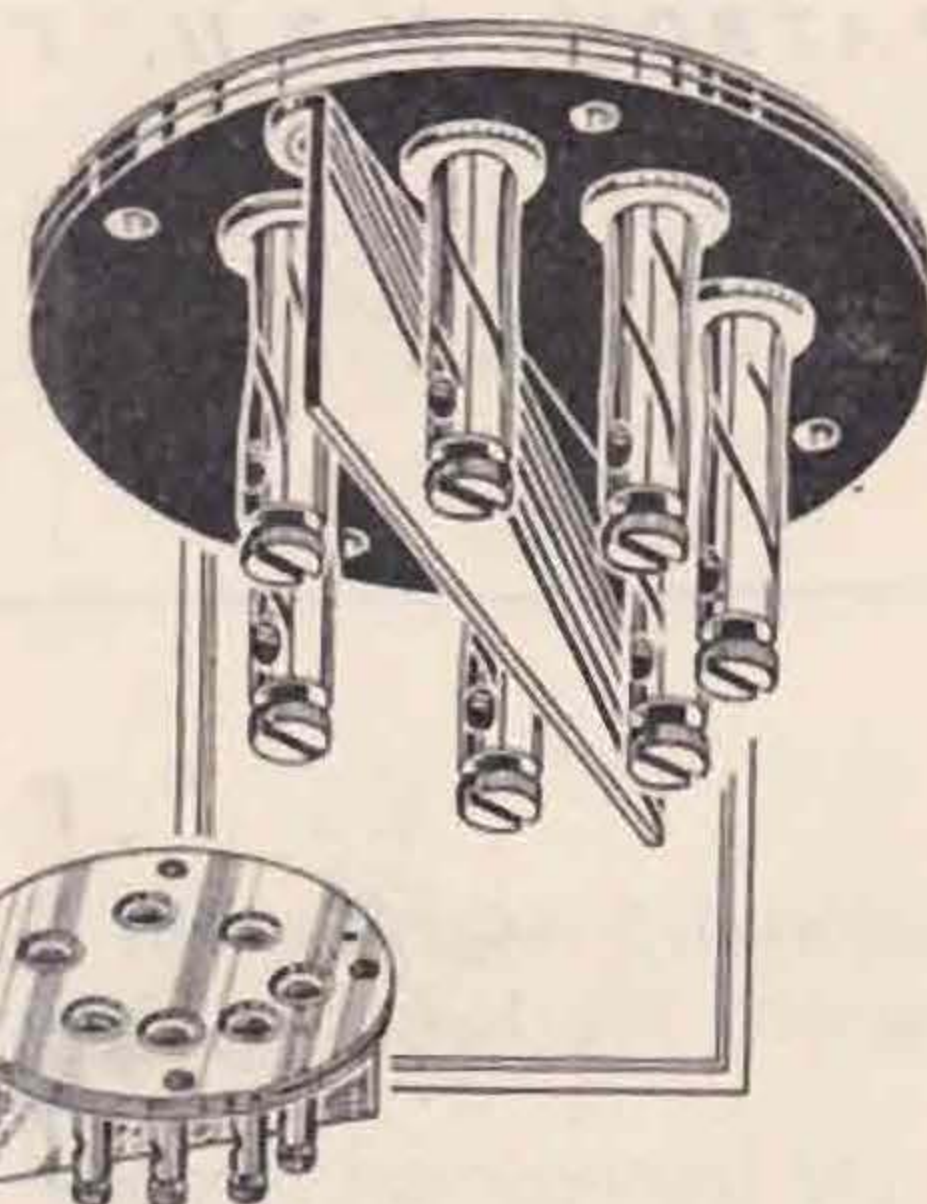
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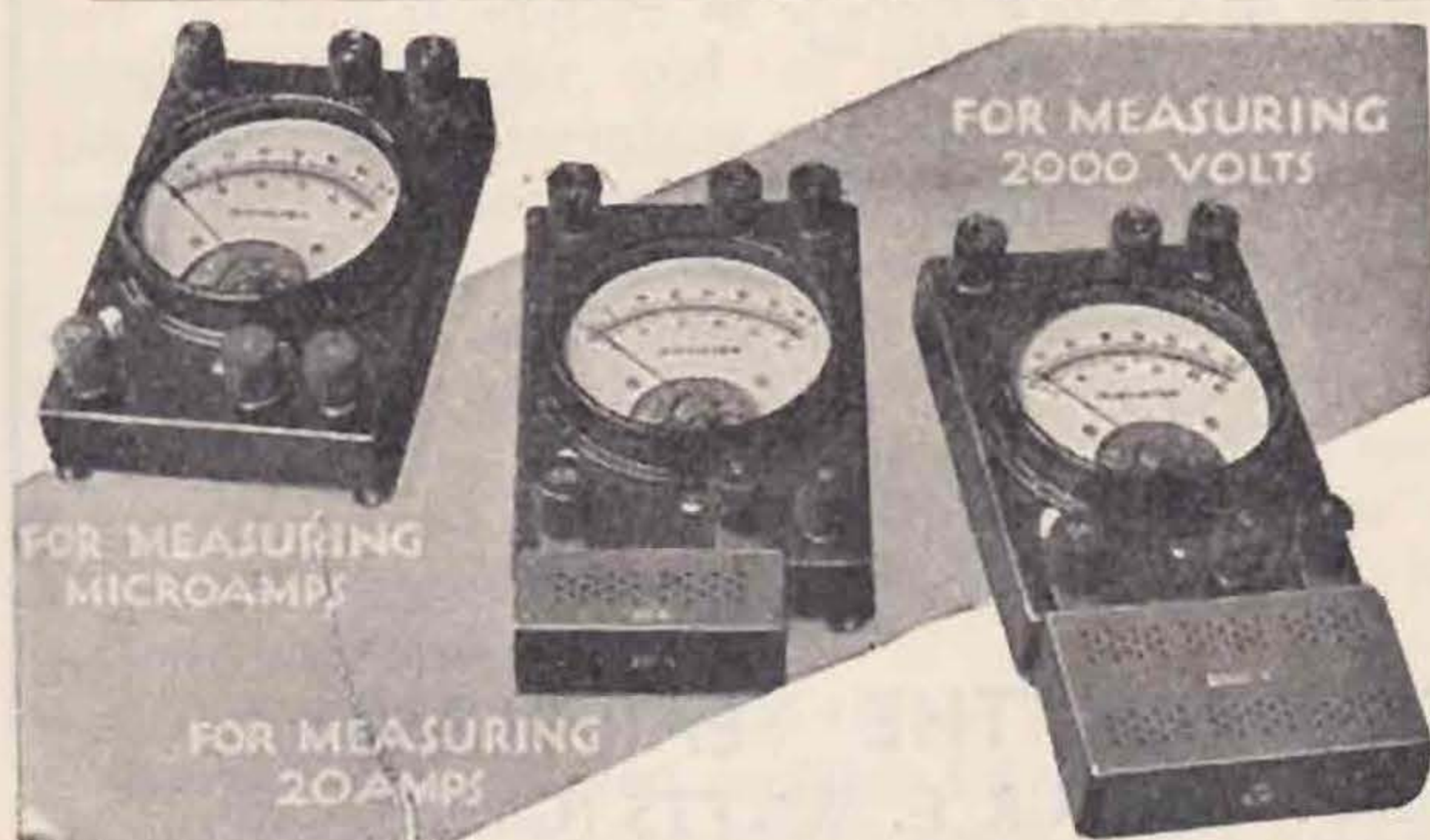
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*Unless otherwise announced, all meetings are held at the
Institution of Electrical Engineers, Savoy Place, W.C.2
commencing at 6.15 p.m. Tea is served at 5.30 p.m.*

March 28. "*Modulation Systems*,"
by H. Larnder, Esq. (Ex-C1DT.).

April 20. "*Some New Ideas on
Master Oscillators*," by G. W.
Thomas, Esq. (G5YK), and H. C.
Page, Esq. (G6PA).

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THE T. & R. BULLETIN

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H. Bevan Swift (G2TI)

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No. 9

R.E.S.

It is seldom that the Editorial columns of this Journal are used for the purpose of drawing attention to a specific section of the Society, but on this occasion, as an important change of policy is involved, we feel justified in breaking this self-imposed rule.

The Society's experimental section familiarly known as Contact Bureau has effected very good work during the past few years, but it has now become apparent that some more progressive scheme is required in order to cater for modern conditions. It will be remembered that the R.S.G.B. led the way in 1928 by offering participation in C.B. as an important privilege of membership, and in the years that followed many useful and important contributions were made by its members. Recently, however, it has been realised that certain of the groups were tending to engage in studies which had already been covered by earlier workers. Our Calibration Manager, and one or two others, have produced original circuits, but we believe that if *groups* of members can be formed who will devote their time to the development of new ideas, a better rate of progress will be possible.

In this issue an announcement appears regarding the future policy of our Experimental Section, and we would urge every member to give serious consideration to the scheme outlined. In discontinuing the name of Contact Bureau we are replacing it with a title which will be more descriptive of the work to be undertaken by the section, and all who are genuine experimenters will welcome the changes to be made and will see in them a desire to improve and to provide opportunities which will place this new section, to be known as the Research and Experimental Section, to the fore.

Group Managers will in future be appointed annually and every endeavour will be made to obtain the best men possible for the supervision of the various groups. It is confidently anticipated that the monthly notes which appear in this Journal will become a record of continuous scientific progress.

Our present C.B. Manager has accepted Council's invitation to act as Manager of the new section, whilst other well-known members of Council have undertaken to assist as Group Managers. Under such leadership good headway is assured, providing the fullest possible support is given by the membership. Two important features of the new scheme which should do much to achieve this object are to be found in the fact that arrangements have been made to cater for individual as well as group members, and further that awards and premiums will be granted annually when the standard of contributions is considered by Council to warrant such recognition. The offering of awards and premiums will be recognised as a method of providing the incentive for members to give publicity to the results of their experiments, and

(Continued on page 279.)

SCREENED GRID VALVES IN THE MODERN TRANSMITTER.

By B. G. WARDMAN (G5GQ).

SINCE the Washington Convention became effective, it has become almost essential for British amateurs to use some form of crystal control for obtaining frequency stability. This has resulted in two schools of thought, one in favour of "locked oscillators" and the other in favour of "neutralised power amplifiers."

Locked Oscillators.

This system has advantages in economy of parts required, in the amount of H.T. supply required for a given output, and of flexibility in rapidly changing from band to band. Its main disadvantages are that keying must take place in the last stage; that 100 per cent. modulated telephony cannot be used; and the fact that it can very readily go out of "lock," resulting in signals being emitted on frequencies outside the amateur bands.

Neutralised Power Amplifiers.

This system has the merits of being extremely reliable, and can be 100 per cent. modulated, whilst keying or modulation may be carried out in a sub-stage, thus solving many keying interference problems. Furthermore, should one of the stages develop trouble it automatically prevents the last valve supplying power to the aerial. Against these advantages is the fact that it is comparatively expensive and tricky to put into operation, while it is definitely inflexible by virtue of the fact that the system must be neutralised afresh each time the frequency band is changed.

Screen Grid Amplifiers.

It is the purpose of this article to give some information on a third system of transmission, namely, that which employs screen grid valves as power amplifiers.

Although such valves have been used in America for some years (the 860 and 861 are perhaps the two best known types), it is only recently that production has commenced in Great Britain. Unfortunately prejudice has grown up around this method of obtaining amplification, based mainly on misleading statements made by persons who in many cases have never seen a valve of this type in operation.

These objections, as far as can be discovered, are:—

- (1) They will not work properly on short wavelengths.
- (2) When they do their poor efficiency makes them useless.
- (3) Very high anode voltages of the order of 2,000 volts are required.

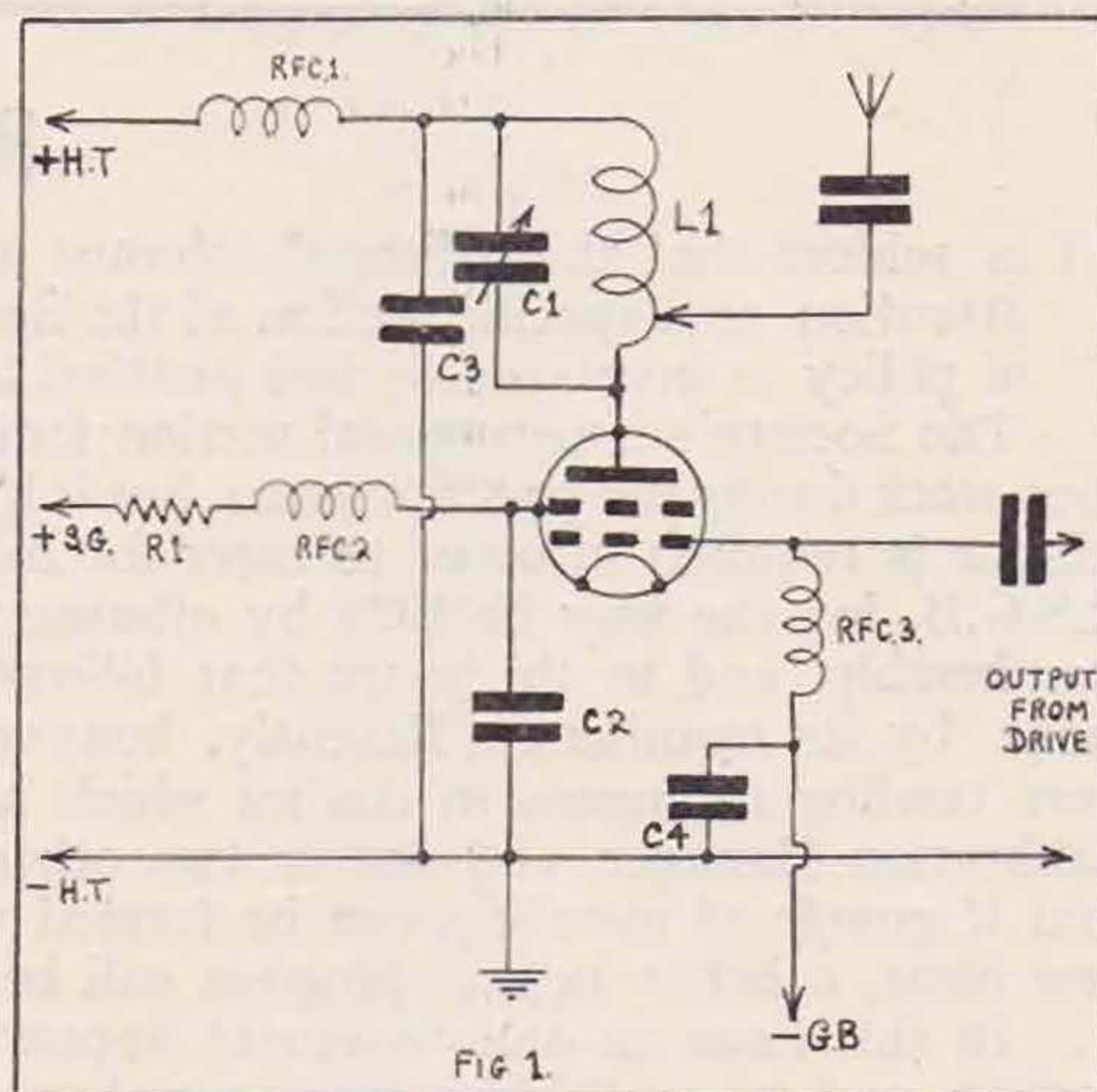
There are also suggestions that a drive of 5 watts is sufficient to control a screened grid valve operating at 250 watts, but such a statement is incorrect. Actually the average drive required is slightly less than that for a triode of corresponding power.

Then, too, we hear that American amateurs have discarded them on the ground that they found it necessary to neutralise them when working on the DX bands. It is hoped to disprove these statements later in the article.

Practical Work with the S.G.I.

For the past year a good deal of experimental work has been carried out with an S.G.I. at the writer's station, using the 7 and 14 mc. bands, and it may be of interest to those who worked with or heard G5GQ during May or June of 1933 to know that this valve was employed for all transmissions where high power was used.

The transmitter used a conventional CO-FD circuit followed by a T25D valve, as a neutralised sub-amplifier with an input up to 80 m.a. at 550 volts. With this arrangement it was found possible to obtain efficiencies up to approximately 70 per cent. from the S.G.I. valve following it, when working on both bands.

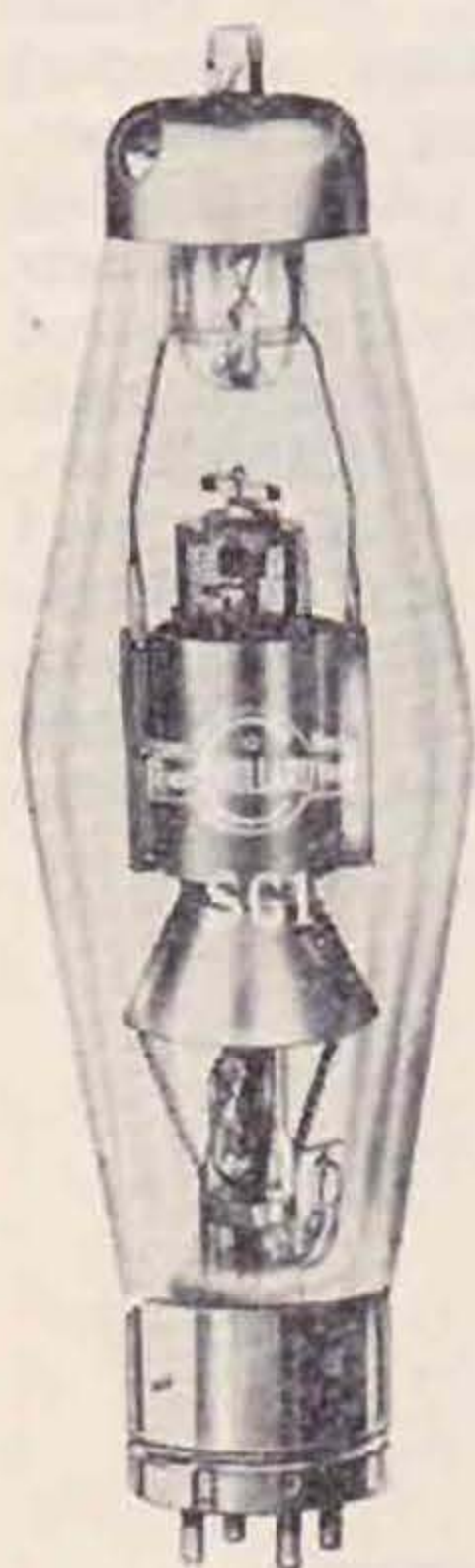


The circuit of the last stage is shown in Fig. 1. The first point to notice is that, as the valve has a high impedance, the output circuit L1 C1 should also have a high impedance. Tests were carried out using a constant input of 1,900 volts at 80 m.a., the current in the feeder (of about 500 ohms) being measured simultaneously at three different parts of its length, to make certain that there were no standing waves. On 14 mc. with L1 consisting of a coil of five turns 2½-in. diameter ⅜-in. copper tube, tuned by a large capacity, the readings were 0.15 amps., but when L1 was changed to 14 turns of similar dimensions, the readings increased to 0.46 amps., indicating a tremendous increase in efficiency. Thus the first consideration to be born in mind is the fact that as many turns as possible should be used for L1. C1 should be kept correspondingly small.

Whilst dealing with the output circuit it should be mentioned that trouble may be experienced with the choke RFC1. Particular care should be taken in designing this choke, as it can be an unsuspected source of power loss.

With an aerial of the single wire feeder type, it will be found that the feeder must be coupled nearer to the dead end of the output than is usual with triodes.

The screen grid must be kept at zero R.F. potential, which is accomplished by means of the condenser C2. This should be fairly large, at least 0.001 microfarads, and preferably larger; whilst a choke RFC2 should be inserted to prevent R.F. passing back into the screened grid supply. A pressure of 350 volts will be found suitable for the screened grid when anode voltages in the neighbourhood of 2,000 volts are used, but a variable S.G. voltage is a decided advantage. There is an interesting feature to be noticed in this connection, if the transmitter is switched on with no volts on the screen grid and anode, it will be found that the moment the former supply is connected the screen current rises to 50 m.a., but drops instantly to zero or becomes negative when the anode voltage is applied.



As the maximum screen dissipation is only 20 watts it is desirable to place a resistance R1 in the screen lead to limit these surges; this may have a value of 25,000 ohms, although this figure is not critical.

It is also found that if the screen volts are switched off before the anode volts, the anode current will take from 2 to 5 seconds to return to zero according to the size of C2.

For this reason it is imperative to key in a sub-stage. The writer keys the sub-stage H.T. and screen grid volts simultaneously without a filter, and with this method clickless keying is obtained. The leads to C2 and C3 must be kept as short as possible.

The ratio of drive required for the S.G.1 is about 7 : 1; on test 25 watts input to a sub-stage was found sufficient to drive the valve to 175 watts at about 2,000 volts when the latter was used as a Class C. amplifier, with 90 volts grid bias. This ratio of drive is necessary owing to the large input capacity common to this type of valve.

No trouble should be experienced with stability, although when a neutralised sub-stage is used, this should be neutralised properly, otherwise oscillation may be looked for in the screen grid amplifier instead of at the correct source.

Screening may be used, but this is not necessary for frequencies below 15 megacycles providing the amplifier is properly designed. Tests show that with 550 volts at 50 m.a. to the anode of the S.G.1 the output is roughly the same as that obtained from a DET.1 with the same input.

In conclusion, the writer considers that with a CO FD S.G. transmitter built on the lines suggested to give an output of 200 watts, the constructor will possess a stable, extremely flexible, and easily

keyed equipment combining the advantages of both locked and neutralised amplifier systems, without the disadvantages of either. It will be found a real pleasure to change from 7 to 14 mc. by simply changing coils and swinging the output condenser until the aerial ammeter indicates resonance, without having to bother about background noises or neutralisation.

The writer is indebted to *Messrs. The Mullard Wireless Service Co.* for their assistance in many directions and for supplying data and loaning blocks.

British Made Screen Grid Power Amplifier Valves.

Two valves of the type under discussion have recently been developed and marketed by the *Mullard Company*, viz., S.G.1 and S.G.3. The screening of both tubes is so good that they can be relied upon to give excellent service for amateur needs. The technical data for the two tubes is as follows:—

	S.G.3.	S.G.1.
Filament volts ...	4 volts	6 volts
Filament current ...	1 amp	3.5 amps
Max. anode volts...	500 volts	2,000 volts
Max. screen volts...	125 volts	500 volts
Total emission ...	400 m.a.	1.25 amps
Amplification factor	225	575
Max. anode dissipation ...	15 watts	60 watts
Max. screen dissipation ...	3 watts	25 watts
Mutual conductance	1.4 ma/v.	1.8 ma/v.
Anode impedance (average) ...	160,000 ohms	320,000 ohms
Mean anode current not to exceed ...	70 m.a.	200 m.a.

The following screen grid valves are made by the *Ediswan Company*:—

	ESG.75	ESG.250
Fil. Volts ...	6.0	11.0
Fil. Curr. ...	3.0	4.0
Max. Anode Volts	2,000	2,000
Screen Volts ...	500	500
Impedance ...	50,000	62,500
Ampl. Factor ...	95	125

The types 860 and 861 are valves of 100 and 500 watt ratings respectively, made by the R.C.A. and other American companies.

EDITORIAL—concluded.

will, we hope, help to bring many new contributors to these pages. We believe that in the past some members have hesitated to come forward with contributions for fear of criticism, therefore to overcome this difficulty a member may, if he so wishes, forward an article for publication under a *non de plume*.

The new section begins its activities on April 1; may we anticipate receiving an early application for enrolment from every member who is interested in Research and Experimental problems?

KEYING A HIGH-POWER TRANSMITTER WITHOUT KEY CLICKS.

BY W. A. AND J. S. CLARK (G5FV).

It is appropriate at this time that two of our members should have contributed some comments regarding a method of eliminating broadcast interference. The absorption method has been well known for some years, but has never been looked upon favourably owing to the difficulty of eradicating a spacer wave. Messrs. W. A. and J. S. Clarke have, however, devised a method which we understand has all the advantages of a perfect interference eliminator.

IN response to a request made recently for a description of a keying system suitable for high-power transmitters, the following arrangement may be of interest to those who are still finding difficulty in keying high-power transmitters without causing interference to nearby B.C.L.S.

The transmitter in use at G5FV is a three-stage set consisting of a crystal oscillator and two stages of push-pull power amplification, and as fundamental crystals are used, all these stages operate at the same frequency. All known keying systems have been tried with this type of transmitter, but only one, utilising the absorption principle, has been found to be effective enough to key 100 watts

devise a method which would break the absorption circuit more smoothly, and after much experiment the present system was evolved. The circuit consists of a coil and two condensers connected in series as shown in Fig. 2, C_2 being an ordinary .0005 mfd. variable condenser, its presence being for adjustable purposes only, while C_1 is a condenser which is made up of two aluminium plates separated by a glass or mica dielectric, the size of each plate being $3\frac{1}{2}$ ins. by $2\frac{1}{4}$ ins. and $1/16$ th in. in thickness. An ordinary photographer's negative can be used for the dielectric, and should be $3\frac{1}{4}$ ins. by $3\frac{1}{4}$ ins. in size. The bottom plate is fixed, but the top one is so arranged that when the key is pressed one end lifts about an $\frac{1}{8}$ in., and so causes a compara-

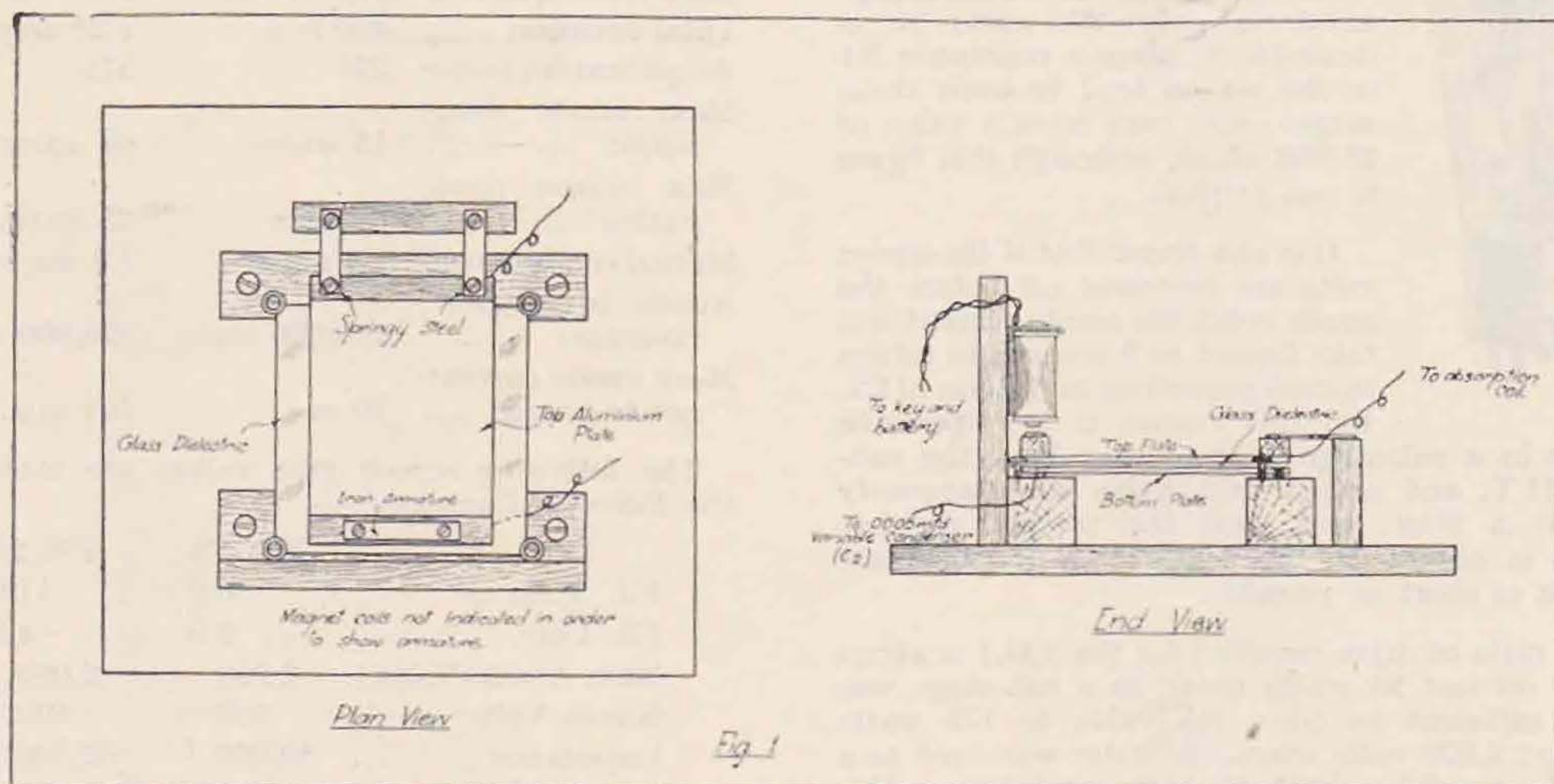


Fig. 1.
Constructional details of Absorption Keying Device, used by G5FV.

input without causing clicks via supply mains or direct radiation.

It will be seen from Fig. 2 that the absorption circuit is introduced at the sub-power amplifier plate tank circuit, this being a much superior method than absorbing from the output stage, where one has the valves and power-pack running at full load the whole time the transmitter is in operation. As the sub-amplifier operates only at a comparatively low input power, the constant load of this circuit does not cause any overheating. It will be obvious that the system is only applicable to those who employ the driven system of crystal control.

At first the absorption circuit was keyed directly, but clicks still persisted, and so the writers had to

tively large change of capacity quite sufficient to completely throw the absorption circuit out of resonance. As the top plate takes an appreciable time to rise and fall, all sudden surges are eliminated, resulting in clickless keying.

With regard to the constructional details of the system, the diagrams should enable the reader to grasp most points. The magnet coils and armature can be obtained from an old electric bell, 2 volts being quite sufficient to excite the coils. The inductance can be wound on a cardboard former 2 ins. diameter, the number of turns being left to the reader to determine by experiment, and should be such that the coil is in resonance with the .0005 mfd. condenser in a midway position.

The absorption coil should not be placed too

near the plate coil, as the drive will be somewhat reduced when the key is down. It should be in such a position as just to cut off the excitation when the key is raised. When the coil is tuned to resonance and the key pressed, it may be found that the sub-stage P.A. tank condenser requires a little retuning to obtain maximum output.

often than not from parts as far distant as Japan and Australia. Should anyone have any difficulty in obtaining satisfaction from the method, the writers will be pleased to give helpful suggestions as to the cause of the trouble.

(Note.—The drawings and circuit illustrating this article were drawn by the authors—ED.)

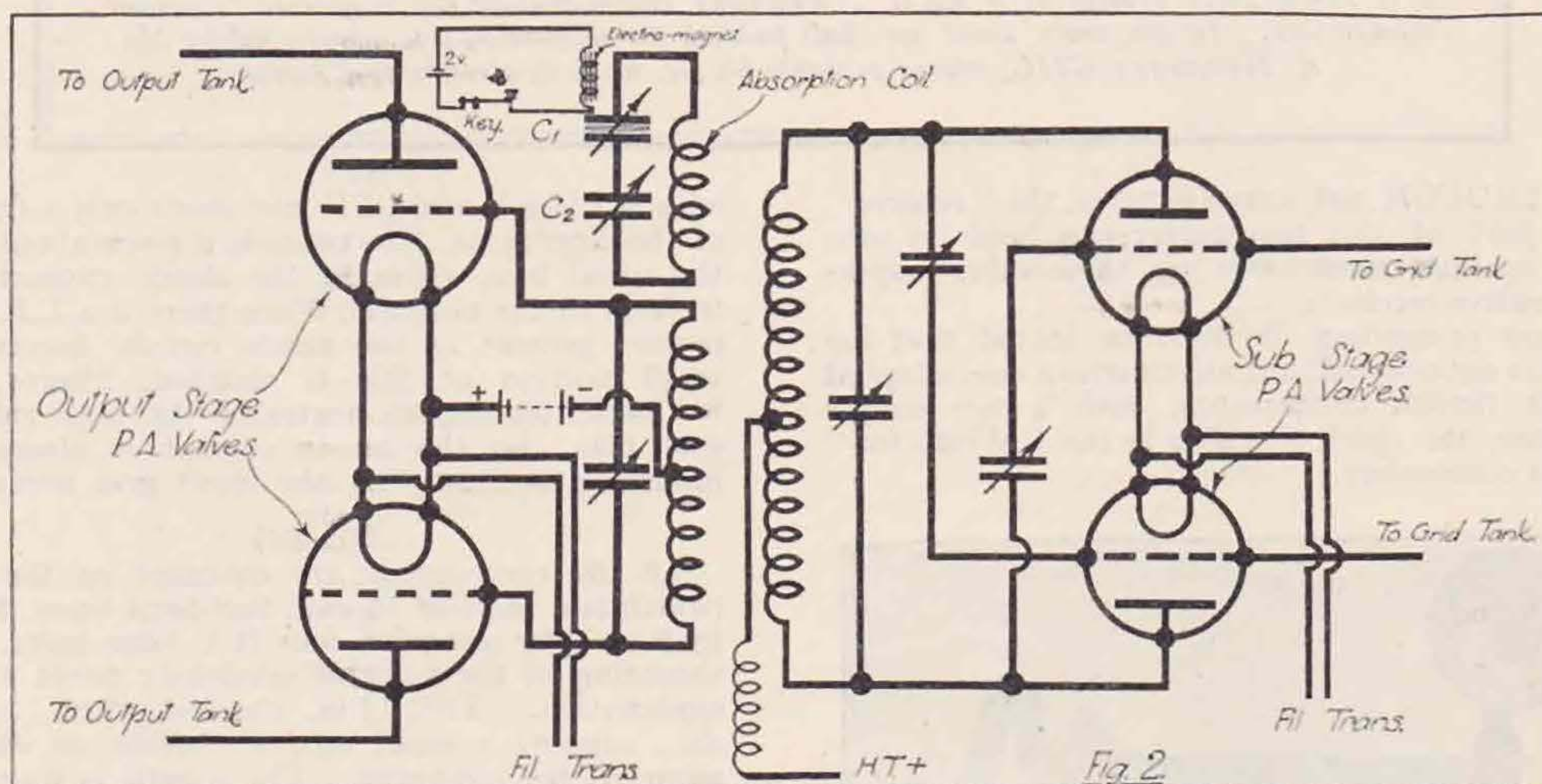


Fig. 2.
Circuit Diagram of Sub-amplifier Stage in use at G5FV, showing connections to Absorption Keying Device.

The reader may at first be a little dubious as to whether this system gives chirpy signals, but an assurance can be given that no report of a chirp has been received at G5FV when using this method of keying, and QSA5 reports are received more

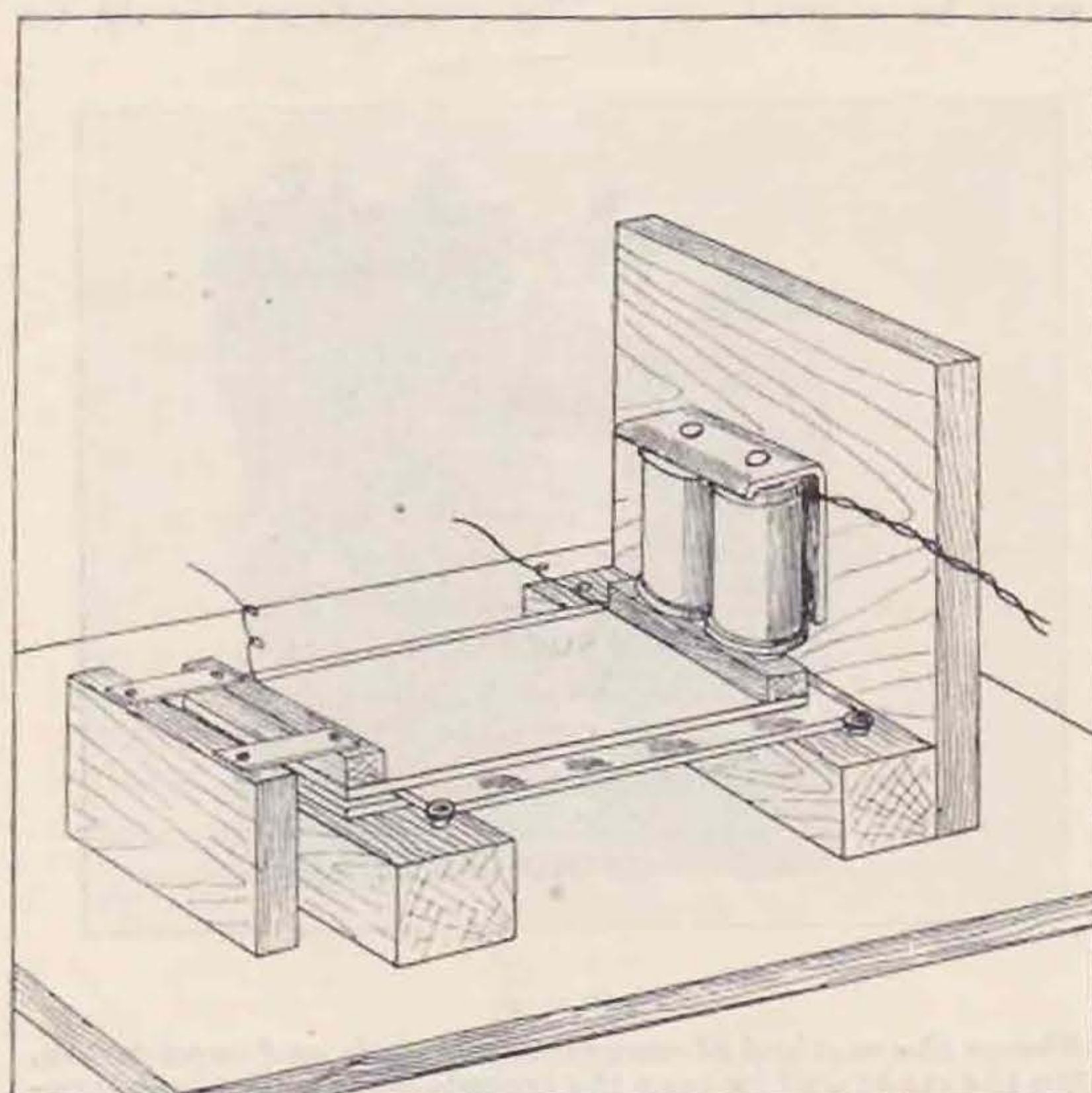


Fig. 3.
Side view of Device, showing method of construction.

SOLILOQUIES—continued from p. 288.

It's only worth 5 at the most, if South Africa and Hong Kong count 6.

Any British station who happens to be favourably placed for the Antipodes can simply romp away piling up 10's and not bothering about the much more difficult contacts with VP6, ZS, VS6, and so on.

Mind you, I'm not airing a grudge against the leaders. Jolly good luck to 'em, and I think if we all substituted 5's for 10's in VK-G contacts, the order would probably be unchanged. But it ought to be worth thinking of before next year. What do my brethren in VK think about it, please?

The fairest system of scoring that I have been able to think out is that of taking one point for every QSO, independent of distance. There, again, I think you would probably find the order more or less unchanged; but with a test fought out from the start on that principle, things might be different. It would give the persevering low-power man more of a chance, anyway.

This is all theorising on my part. I would like to see a really successful and fair scoring system evolved and adhered to for three or four consecutive years. If it is the general view that this year's system was fair, then that's the strongest possible reason for leaving it unchanged and giving it another run next year.

In principle, I hate these contests. In practice, I enjoy them just as much as any other ham in the country.

A 56 MC. TRANSCEIVER.

By E. T. L. HARE (2BAW).

In this article, which was placed second in the recent 56 mc. Receiver competition, Mr. Hare gives details of a novel Transceiver incorporating a "Westector" current economiser. In an early issue we shall publish an account of tests conducted by Mr. R. Hammans, G2IG, whose portable 56 mc. work is already well known.

ALTHOUGH not a true receiver, the "receive" part of this transceiver can hold its own against most two or three-valve super-regenerative receivers.

Before proceeding, it must be stated that the circuit is not original, but an American one, adapted to suit British components, with a few simple additions, the chief of which is the "Westector" current economiser.

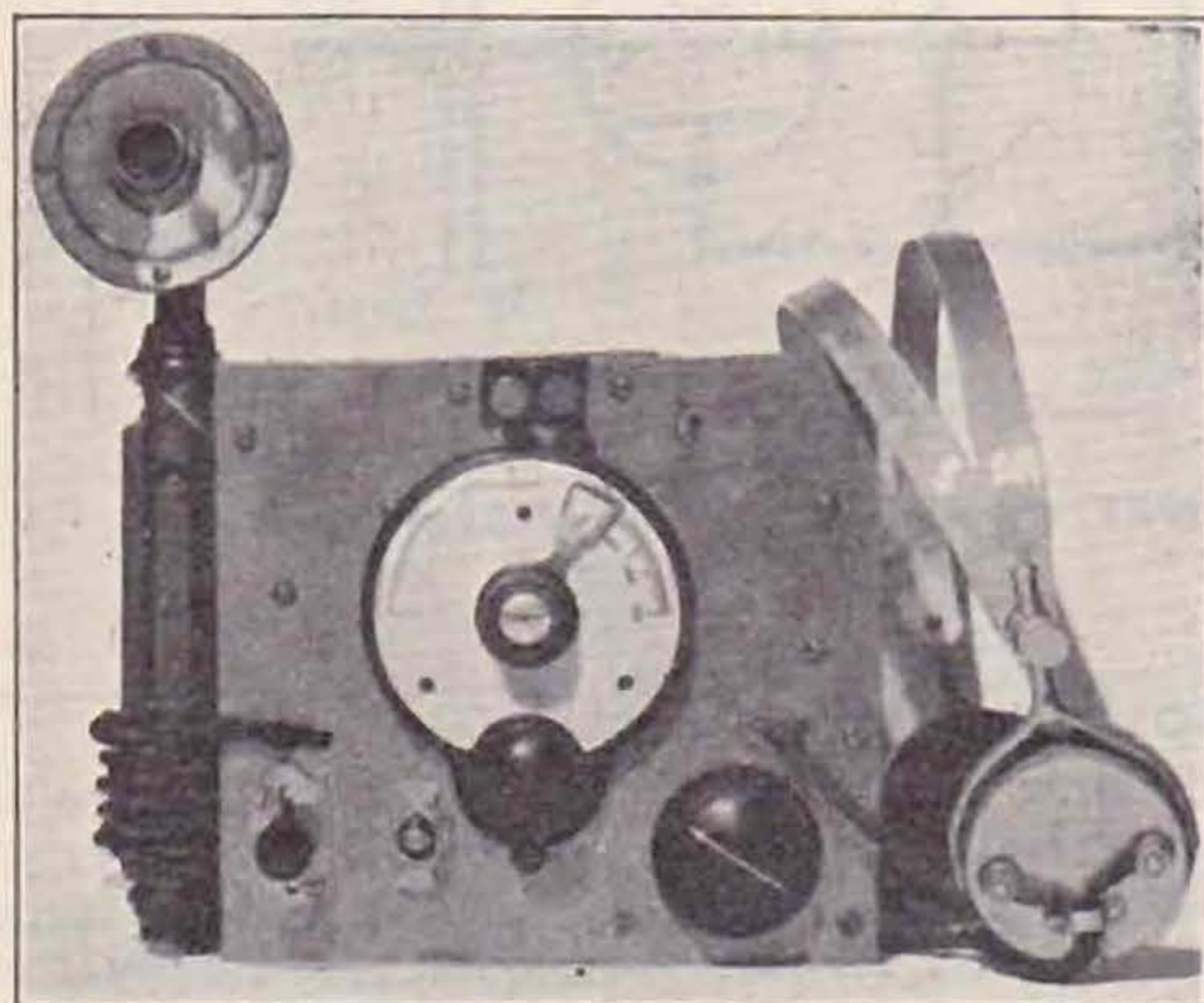


Fig. 1.

Shows the front panel of the Transceiver. The size of the set can be judged by comparing it with the telephones. The method of fixing the antenna terminals can clearly be seen at the top centre. Volume control is knob at the bottom right-hand side and the three-pole change-over switch is at the left.

Circuit.

The circuit itself is very simple. When transmitting, the oscillator, an LP2, is anode modulated by the pentode, a PT2; while when receiving, the modulator is connected as the L.F. valve: the change-over being carried out by one three-pole switch. No super-regeneration coils are used, but by using suitable values of grid-leak and L.C. ratio of the tuned circuit, the detector valve is made to produce super-regenerations in itself. The inter-valve transformer serves the additional purpose of microphone transformer, this being obtained by the use of an extra winding. The 'phones are used as the modulation choke; and although this method may not be quite so efficient electrically, it saves space and weight, while also providing an easy method of monitoring transmissions.

The only part of the circuit, which will be new to most members, is the "Westector" current economiser. This circuit possesses most of the advant-

ages of Class B and QPP, but needs only a fraction of the apparatus. The pentode is given about twice the usual bias, reducing the anode current to a fraction of the normal. When there is a L.F. component present in the anode circuit, however, a small portion of this is rectified, filtered, and fed back, tending to neutralise the high value of grid bias. So the anode current is always the minimum necessary for the input grid swing.

Assembly.

All the components are mounted on the panel (which is a piece of 18 swg. half-hard brass, 5½ ins. by 6 ins.), by means of four B.A. brass bolts. The mounting of the variable condenser needs a little explanation. Two 1¼-in. ebonite pillars, 1½ ins. dia., support a small strip of ebonite, on which is mounted the condenser. The spindle is connected to the tuning dial by means of a short piece of semi-flexible ebonite tube.

The coils are bolted to a thin strip of ebonite which goes between the two valve holders, being held down by the same bolts. The antenna coil is mounted on a separate piece of ebonite bolted to the metal panel, which is cut away to make room for the two terminals. As the coils are about half an inch above the panel, the fixed condenser C can be mounted flat directly underneath L1 and L3.

The .004 mfd. condenser is very important, and must be a good one. The connections should be

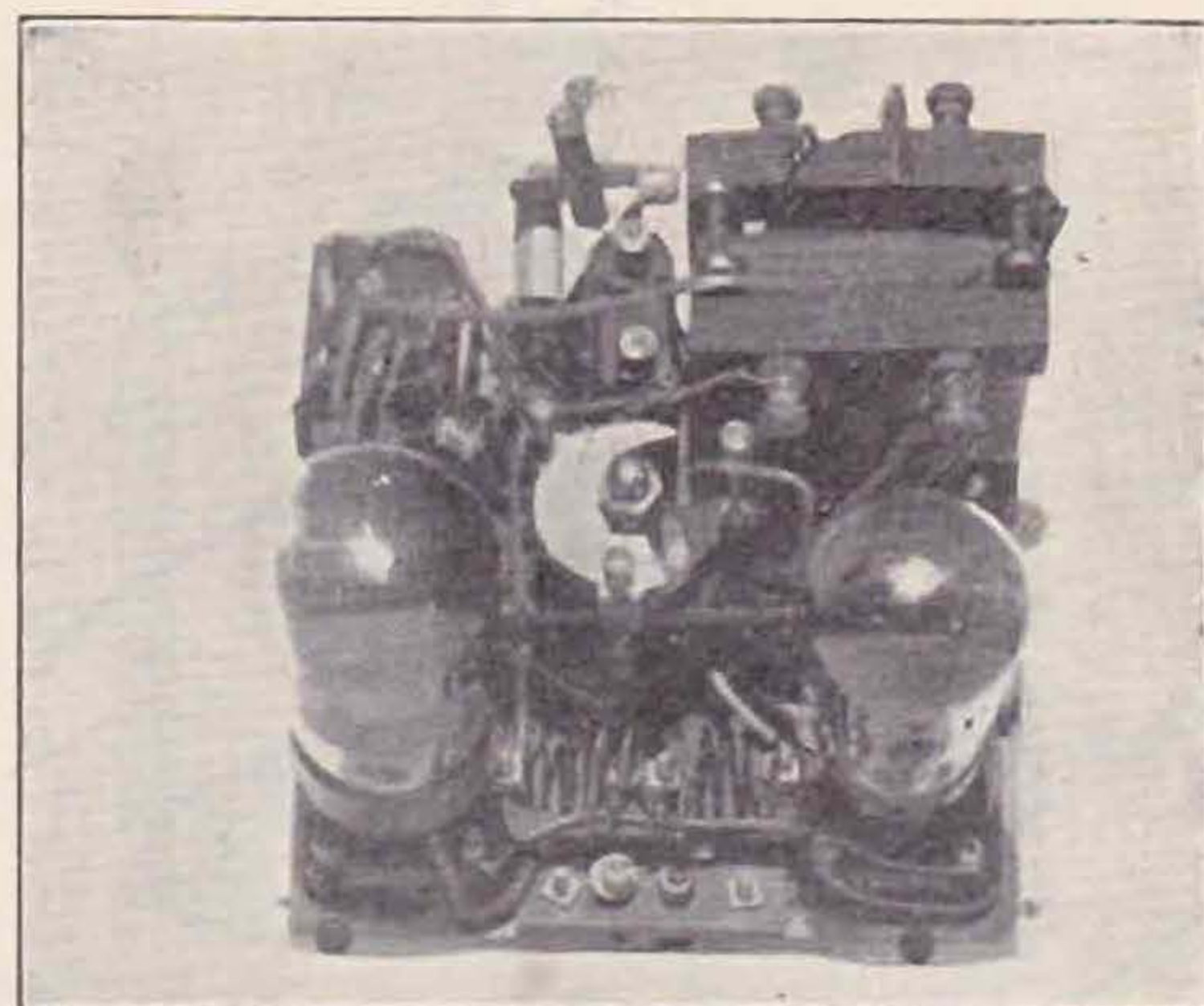


Fig. 2.

Shows the method of mounting the coils and condensers. On the right will be seen the transformer with the microphone leads coming from terminal blocks. On the left are the "Westector" and switch. The R.F.C. is behind the PT2 valve.

soldered; the writer found two .002 *Dubilier* mica condensers in parallel to be the most satisfactory.

The intervalve transformer is mounted directly above the volume control on four wooden pillars, 1 in. by $\frac{1}{2}$ in. diam. The microphone winding consists of some 250 turns of 28 s.w.g. enamelled wire wound outside the secondary. This is only possible when there is plenty of room between former and core, as in most of the older types.

The resistances are supported in wiring, the other condensers being stuck onto the panel with seccotine; while the "Westector" is held steady by means of a small clip.

It will be noticed that the microphone, which is an adapted room-to-room telephone, needs no

separate battery, being sufficiently sensitive to fully load the pentode when worked off the L.T. accumulator. As insulated plugs and sockets are both big and expensive, the "mike" and 'phone leads are brought directly through holes in the panel.

Valves.

As regards the valves, the writer has not found that any valve will work as well as the LP2 for the det.-oscillator, but almost any pentode or even another LP2 is an efficient modulator. The voltages are not critical, but about 100 volts seems the best; for a valve much in excess of this prevents the super-regenerative effect. Grid bias is obtained from the first 9-12 volts of the H.T. battery. A very convenient L.T. accumulator is the *Halford* "torch battery" accumulator, which is $2\frac{1}{2}$ ins. by $2\frac{1}{2}$ ins. by 1 in., and only costs 2s. 3d.; yet is capable of working for four or five hours on end, and can be charged by a big 4-volt accumulator. No details of a case for the transceiver have been given, as the size depends on shape and size of H.T. and L.T. batteries.

Results.

While the writer himself has, for obvious reason, not been able to actually transmit with the transceiver, it has had several practical tests, thanks to the help of some transmitting friends; and results were above all expectation. The carrier, although very small, was very fully modulated, without a sign of distortion; in fact, at a few miles distant the signals were of better quality than those of a big mains-driven job.

The signals are best received with another transceiver or similar circuit, i.e.: one which needs only a small carrier to quieten it. As would be expected, the receiver part is rather noisy at first, but the smallest carrier quietens it, making the finding of stations very easy indeed. Both receiver and transmitter function over nearly the whole of the 180° dial, there being only a slight falling off at one end. By adjusting the coils, it has been possible to get the centre of the 56 mc. band to come about 100° on the dial. It being then possible to work at any place in the band. The tuning of the receiver is quite broad, but it is possible to listen when near a transmitter on a neighbouring frequency without the slightest interference.

Conclusion.

In conclusion, it must be remembered that this transceiver, which only weighs 4 lb. (without H.T. and L.T.), is essentially a portable low-powered job, and high-power results, such as lighting bulbs in the antenna, cannot be expected of it; at the same time, some surprisingly good results can be obtained with the minimum of gear.

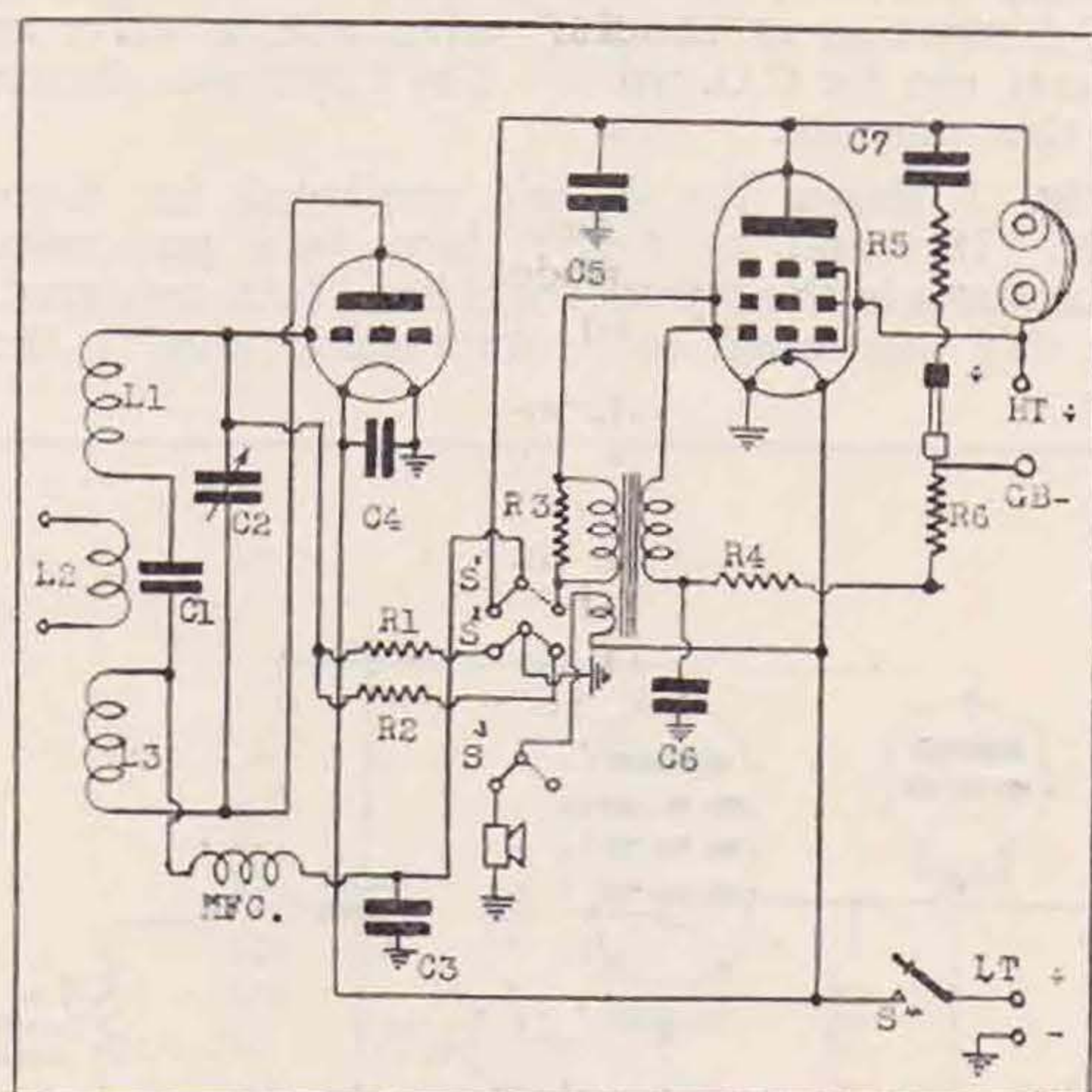


Fig. 3.

Circuit for Transceiver.

- L1, L3 4 turns 18 swg. $\frac{3}{4}$ in. diameter, spaced $\frac{1}{8}$ in.
- L2 3 turns 18 swg. $\frac{3}{4}$ in. diameter, spaced $\frac{1}{8}$ in.
- C1 .0001 mfd. *Dubilier* Type 600A Mica.
- C2 15 mfd. *Eddystone* Microdenser.
- C3 2 .002 mfd. *Dubilier* Type 600 in parallel.
- C4, C5 .002 mfd. T.C.C. Type 665.
- C6 .01 mfd. T.C.C. Type 665.
- C7 .5 mfd. *Dubilier* upright.
- R1 100,000w. *Dubilier* Metalised Grid Leak.
- R2 10,000w. *Dubilier* Metalised Resistance.
- R3 25,000w. *Sovereign* (Variable).
- R4 250,000w. *Dubilier* Metalised Resistance.
- R5 100,000w. *Dubilier* Metalised Resistance.
- R6 50,000w. *Dubilier* Metalised Resistance.
- HFC 5-metre *Eddystone* Choke.
- S123 3-pole *Wearite* Switch.
- S4 1-pole *Bulgin* Switch.
- W4 *Westector*—*Westinghouse*.
- V1 LP2 *Marconi* Valve.
- V2 PT2 *Osram* Valve.

Empire Calls Heard.

W. D. Lockerby (BERS38), H.M. Wireless Station, Khormaksar, Aden. January on 7 mc. :—

G2ig, 2mi, 2ov, 2vr, 2wd, 5ml, 5vm, 5yh, 5yy, 5zg, 5xt, 6qk, 6rb, 6vv, velbv, vk2nr, 3ml, 5wj, vp5pz, vu2fy, sulec, lju, zd2a, 2c, zn2c, zslq, 2d, 6c, 6m, zt6n, zule, 5w, 6e.

J. MacIntosh (VS2AF), Kuala Lumpur, F.M.S., January to February :—

G5ml, 2ao, 5cu, 6py, 5la, 6if, vu2jb, 2lz, 2bg.

Stray.

G6RH will appreciate members' views regarding the National "FBX," the Hammerlund "Comet Pro" and the Silver Marshall "Ham Pro" single-signal superhets.

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

THE UBIQUITOUS 247.

By ADRIAN ROSARIO (VS6AN).

IN the August, 1933, issue of this Journal, Mr. J. Davies (G2OA) contributed some useful remarks regarding the use of the American power pentode valve, type 247, as a crystal oscillator in short-wave transmitting circuits, and in view of the wide interest which is being shown in this class of valve, the writer makes no apology for giving further information on the subject.

It is a well-known fact that the average low-power tube does not furnish a great deal of radio frequency output when worked as a frequency doubler, although when larger tubes up to say 50 watts are employed, satisfactory results are obtained when the output is taken direct to an aerial. It is the purpose of this article to show that this valve may be used to advantage not only as a crystal oscillator, but as both a frequency doubler and an R.F. amplifier.

Radio Frequency Amplifiers.

When employed in a conventional circuit as an R.F. amplifier with 350 volts on the plate, the output was found to be greater than that obtained from a valve of the UX210 type, working at 600 volts. On raising the voltage to 500 volts, the output increased considerably, with no sign of distress on the part of the tube. During these tests it was observed that the pentode required much less excitation than the triode. A screen voltage of 250 volts was found to be the most suitable value.

Frequency Doublers.

When used as a frequency doubler, the output was almost as great as when operated as a straight amplifier. The following experiment helped to prove this point. Two 247's were connected up to work as crystal oscillator and power amplifier, using a 14 mc. crystal in the former circuit. The output from this combination was then noted and a 7 mc. crystal substituted. The second valve then became a frequency doubler, and it was found that the output was slightly greater under that condition, than that formerly obtained, indicating that the 247 is eminently suited for doubling purposes. Using a 3.5 mc. crystal, the output on 7 mcs. was found to be slightly less than when a 7 mc. crystal was in use.

Crystal Oscillators.

The fact that the 247 is a good crystal oscillator is due in a large measure to the fact that the grid swing required is relatively small compared to ordinary triodes. A further point in its favour is the fact that it is possible to key such a valve directly with no perceptible lag when the crystal starts oscillating. During tests a key was inserted in series with the screen-grid lead, and a half-wave voltage fed Hertz was connected to the transmitter. With the key up a current of 5 milliamps flowed and the crystal was noticed to be oscillating very feebly, but with the key depressed the output was sufficient to create an R7 disturbance in Australia!! The reports on the signals from this midget outfit were at least comparable with those

obtained from the regular 100 watt set, during good DX conditions.

Power Dissipation Tests on C.O. Valves.

It is a well-known fact that heating is one of the primary causes of crystal cracking, and therefore, a major problem in all crystal oscillator design work is that of providing a tube which will give the largest possible output without endangering the crystal. With this knowledge in mind, it was decided to evolve some simple method of comparing the dissipation of the 247 valve with a valve in general use for C.O. work. The LS5B was chosen for this purpose.

Fig. 1 shows the circuit employed for these tests. It would, of course, have been preferable if the stress in the crystal could have been measured, but this was found to be impractical, due to the

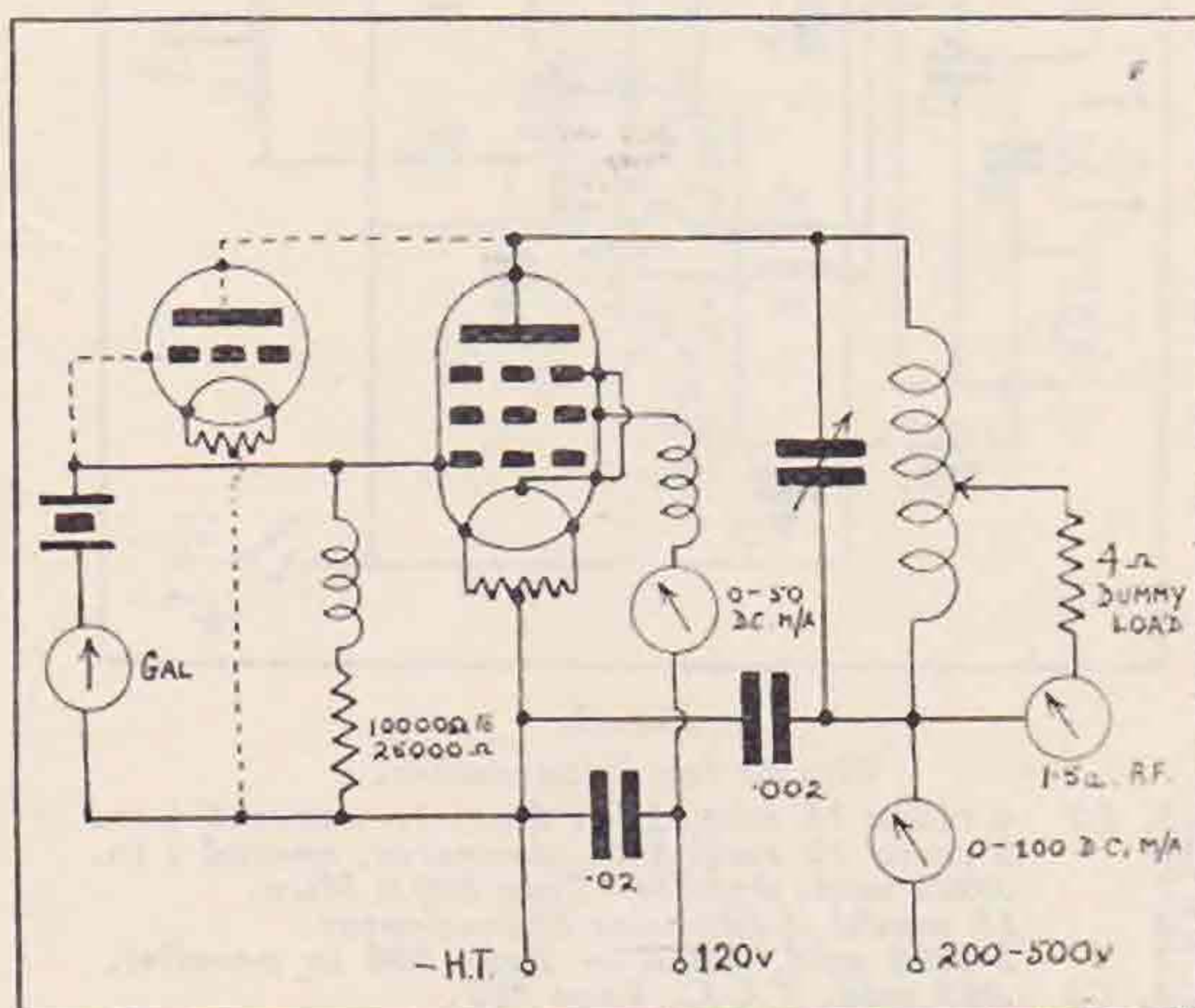


Fig. 1.

Test Circuit used for comparing power dissipation. Dotted lines show connections to LS5B.

fact that we can neither measure the R.F. voltage across it nor its temperature change under load. The compromise method, however, enables us to measure the R.F. current flowing through the crystal, and whilst this may not be highly accurate, due to the fact that we are measuring the power dissipated when its resistance is changing rapidly with frequency, it affords a fair test.

The graph Fig. 2 shows the comparison in terms of power output against R.F. crystal current, using four values of plate voltage ranging from 200 to 500 volts.

It was found in the case of the LS5B that when the voltage was increased to 400 volts, the crystal frequency started to change rather rapidly, therefore this valve was not tested to finality. From the graph we can readily see that for a given power output the 247 imposes less strain on the crystal than the LS5B; furthermore, for a given degree

of crystal heating, much greater power can be obtained than with other valves of about the same rating.

For these tests a current squared galvanometer, Weston type 425, giving 115 milliamps full-scale reading, was used. As the power dissipated by the crystal is proportionate to the square of the current (assuming a fixed crystal resistance), galvanometer readings are more significant.

In making these tests, the maximum crystal current was observed when the load was removed. There is, of course, less tendency towards the crystal heating up when the circuit is adjusted to give maximum output than when no power is being delivered by the oscillator. Incidentally, when the load was removed from the LS5B working at 300 volts, the crystal current immediately exceeded 115 milliamps, whereas this value was not reached with 400 volts on the pentode.

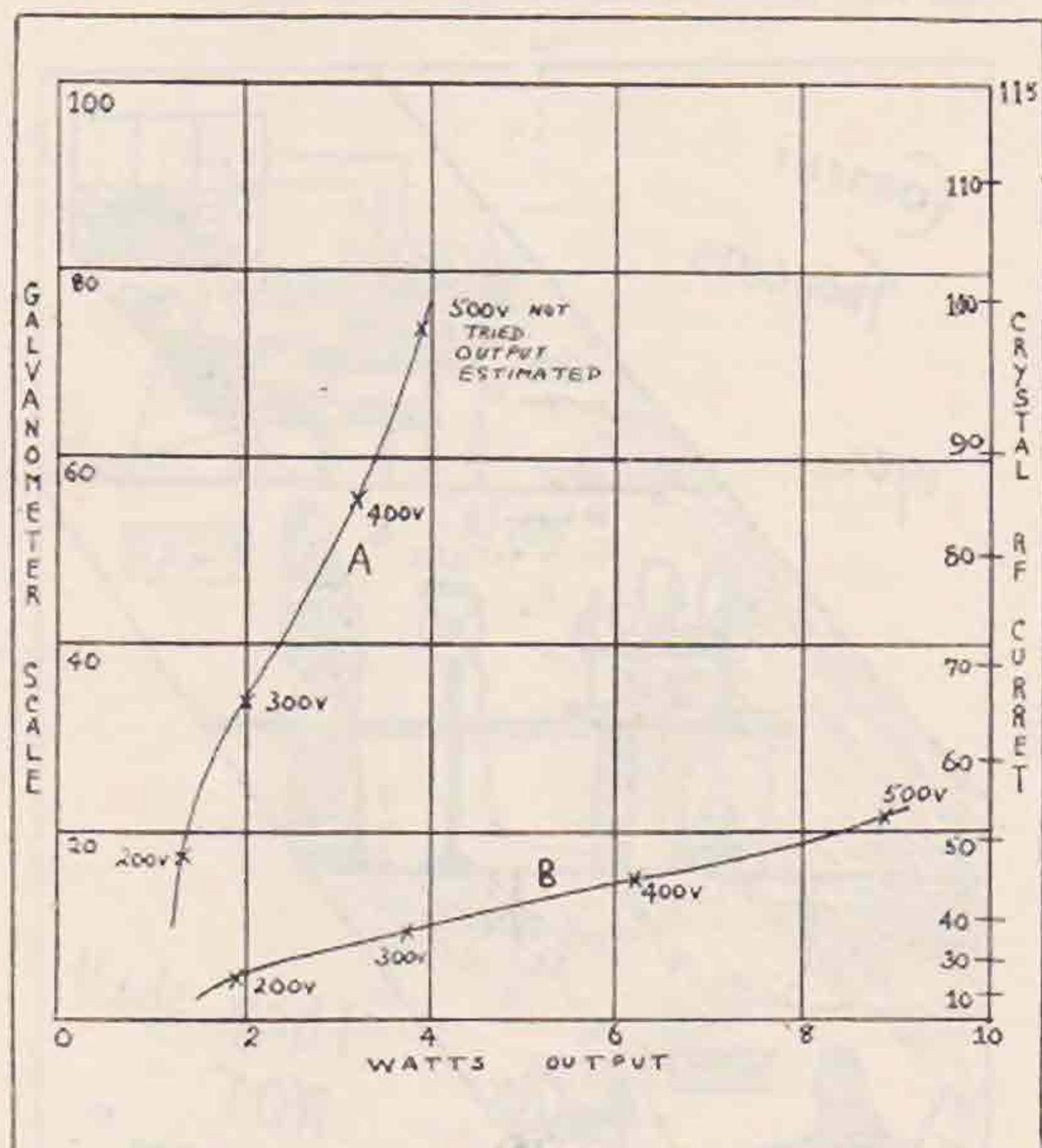


Fig. 2.

Graph showing comparison between Crystal Current and Output Power using Type 247 and LS5B Valves in the Circuit illustrated in Fig. 1.

General Advice When Using 247's.

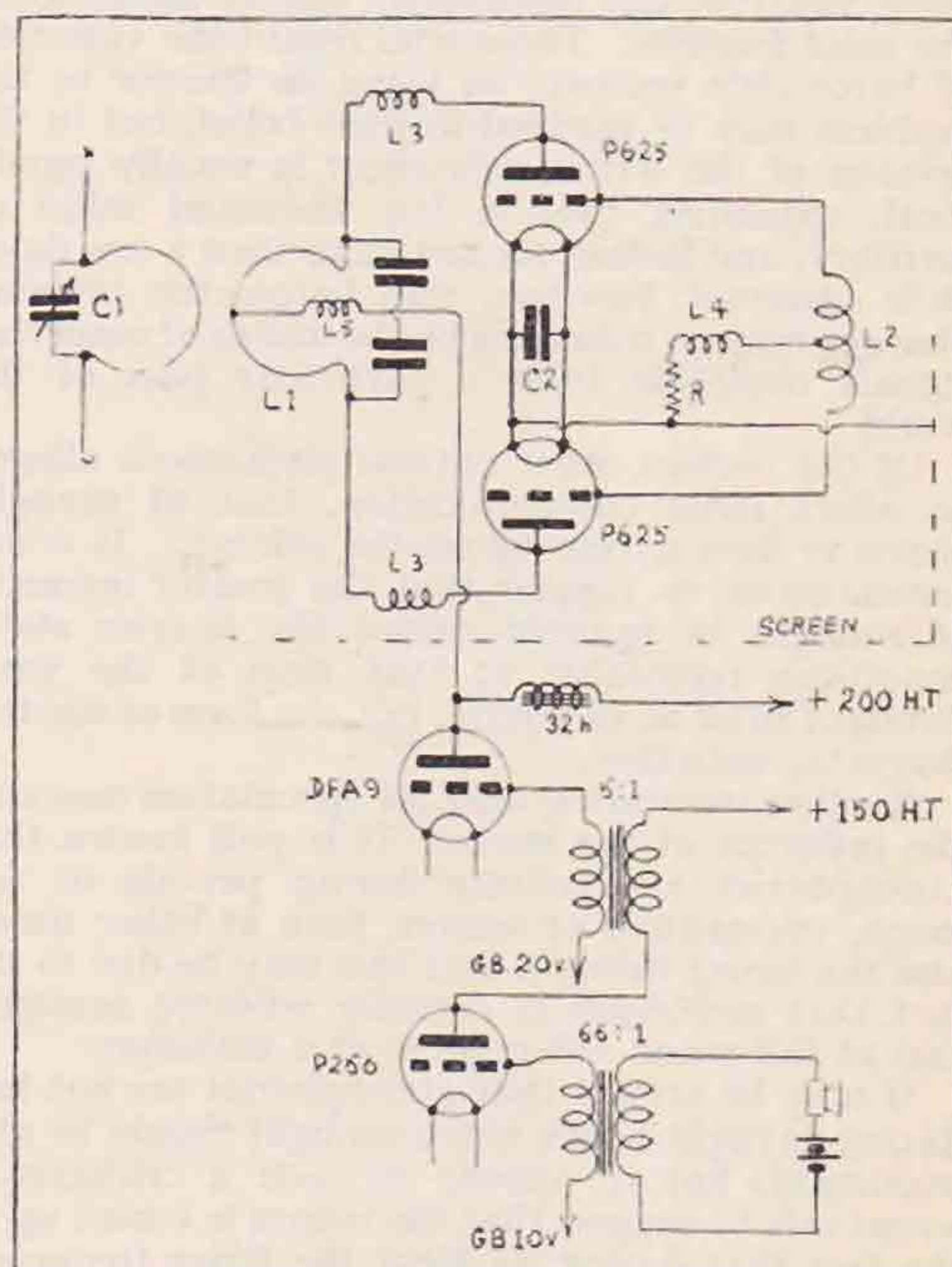
When used as a crystal oscillator, the grid bias resistance should be between 10,000 and 25,000 ohms, or about 22 volts, if battery bias is employed. The screen-grid current should run from between 7 and 12 milliamps, whilst 120 volts will be found a satisfactory screen voltage. Values in excess of this figure will produce no appreciable gain in efficiency. High L/C ratio gives best results, and the tank coil should be tapped at the centre for feeding the amplifier, as this facilitates neutralisation.

When used as either a doubler or an R.F. amplifier, a bias of about 45 volts is suitable. Automatic bias may be obtained by connecting a 1,000-ohm resistance between the centre tap of the filament and earth. The grid R.F. chokes must be earthed.

If a push-pull final-stage amplifier, employing 247 valves is used, the bias resistance should be reduced to 500 ohms, but care must be taken in selecting resistances which will withstand the full plate current at the maximum working voltage. Should a resistance break down, damaging current will flow through the tube.

Midland Activities on 56 MC.

We have received from Major J. Timbrell, B.Sc., A.I.C. (G6OI), an interesting description of a Field Day, held in Staffordshire recently. This event, which was the first of its type held in that county, was attended by G6WF (who acted as host), 2NO, 5VF, 6HD, 6NQ, 6OI, 6PC, 6UI, and 2AZQ.



The arrangement of transmitting apparatus used by G6WF will be seen from the accompanying diagram.

Data concerning range, effect of screening, and modulation, was collected by the two mobile stations, G2NO and G6PC, whilst G2NV and G6WF operated their home and portable stations respectively. Telephony was used exclusively for the three hours of the test, and the power employed by all stations was in the neighbourhood of ten watts. The effective range for QSA5 signals was found to be about four miles.

Since these tests took place, G2NO has rebuilt his station and is now using a dipole with the set mounted in the middle, fed with modulated H.T. G5VF and G6HD have carried out tests on a vertical half-wave antenna with half-wave reflector, and with this arrangement considerably increased ranges in the direction of the reflected beam have been obtained.

EIGHTY AND ONE-SIXTY.

By J. HUM (G5UM).

FORECASTS that the present winter would witness a spell of remarkably good conditions on the lower frequency amateur bands have been amply borne out, and not for quite a number of years have so many long distance contacts been possible on 80 and 160 metres.

Sunspots and Other Effects.

The theory held by many amateurs that sunspot cycles affect radio communications has been accepted and proved to be correct by many professional workers. True, numerous other hypotheses have been put forward in explanation of these vagaries, but the sunspot theory seems to be the most feasible. Those who regard the variation of barometric pressure as being an answer to the problem may be justified in their belief, but in the opinion of the writer this effect is usually purely local, extending over a few thousand miles of territory, and lasting for not more than a few days. It is admitted, however, that barometric pressure changes may on occasions be the means of rendering signals inaudible from a particular part of the world.

Of the various other natural phenomena alleged to affect radio communication, that of sunlight seems to have a bearing on the subject. It is not unreasonable to suggest that the greater intensity of sunlight in summer causes the heavier static conditions noticeable at that time of the year. Sunlight itself is, of course, but one form of electromagnetic radiation.

Another interesting field for speculation concerns the influence of the moon. It is well known that atmospherics are heavier during periods of full moon, irrespective of season, than at other times, and the writer submits that this may be due to the fact that moonlight is actually reflected sunlight, and at full moon reflection is at a maximum.

It may be argued that atmospherics are not bad during daylight hours, when sunlight should be at a maximum, but in answer to such a criticism it seems safe to suggest that the reason is bound up in the fact that during daylight the lower frequency amateur bands are in a much less sensitive condition than during darkness; consequently the static range during day may be only one-tenth or less of the static range at night. In other words, when darkness falls a band becomes sensitive to static storms occurring, perhaps, several hundreds of miles from a specific point, whereas during the day such storms would be inaudible.

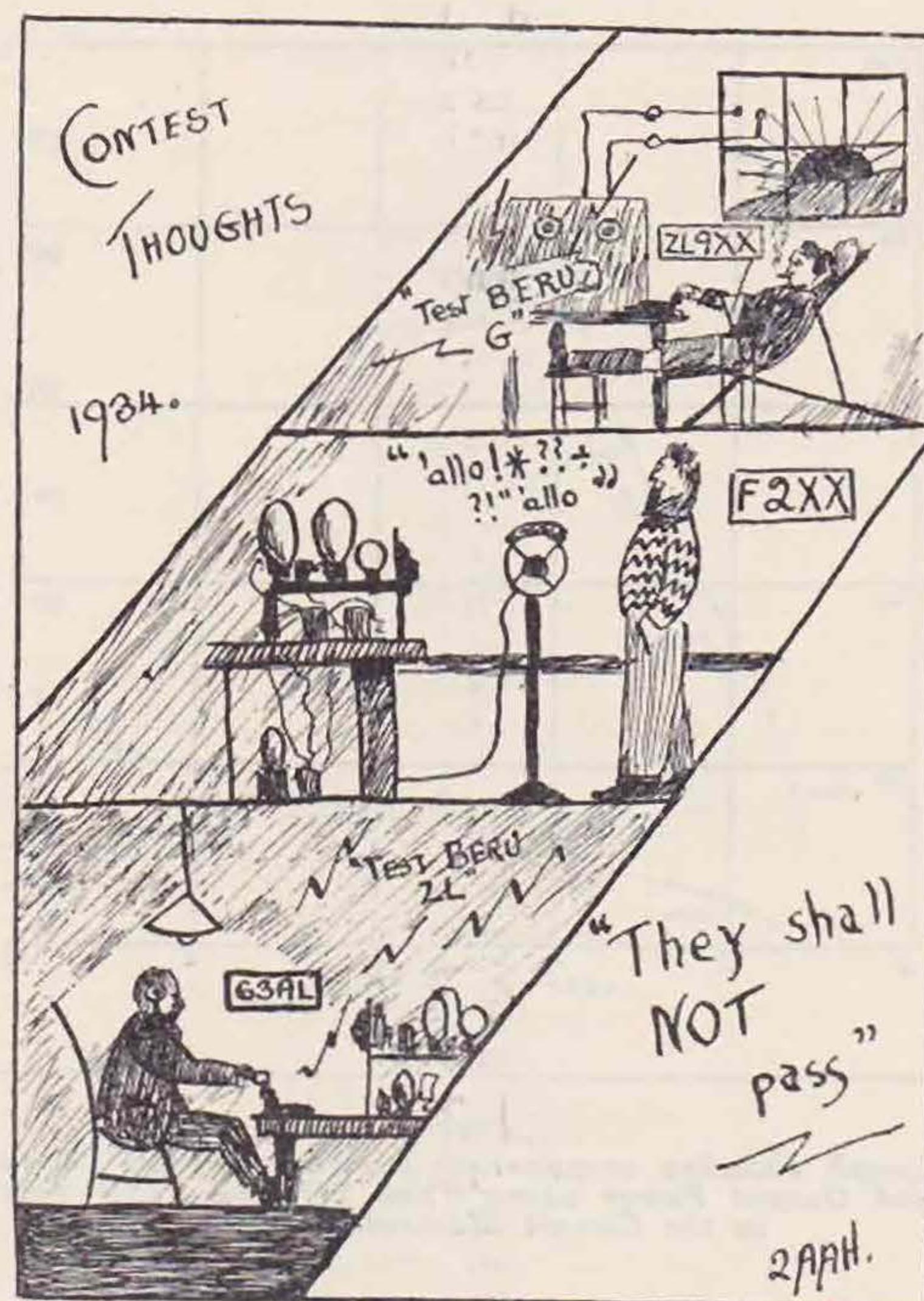
It would seem, therefore, that the moon could quite conceivably cause atmospheric disturbances from reflected sunlight, due to the increased sensitivity of the band of frequencies under discussion.

The Eleven-Year Cycle Theory.

Much of the foregoing is but a personal view leading up to a discussion on the eleven-year cycle theory. It has now been recognised that radio conditions on various bands rise and fall in regular cycles, the time between maximum and minimum being approximately 11 years, and it is because of this change that the 1.7 and 3.5 mc. bands have again come into their own for long-distance work.

Tracing back our knowledge of short wave phenomena, we find from old records that during the years 1922-24 regular two-way communication with the Antipodes and America was effected on wave-lengths between 200 and 90 metres. As a point of interest it seems fortunate that (no doubt fortuitously) our pioneers, Marcuse, Partridge, Goyder, Simmonds and Hogg, to mention but a few, chose a peak period of good conditions for their initial tests on the then short waves below 200 metres.

From about 1924 conditions on the top bands gradually deteriorated, until in about 1929 they were at their worst. In fact, communication over even very short distances became difficult.



During this period, however, the higher frequencies were becoming more sensitive, and it is now history that during the years from 1924 to 1927 remarkable DX was accomplished on the old 45, 32 and 21-metre bands.

Gradually from 1928 conditions on the H.F. bands have fallen off; first 28 mc. went, then 14 mc., and in a year or so it is conceivable that 7 mc. which now (March, 1934) is the best DX band we possess, may lose its DX properties.

The writer is of the opinion that the eleven-year cycle appears, so to speak, to work gradually through each band in turn. In other words, when 14 mc. conditions were at a peak, 7 mc. was only giving medium DX and 3.5 mc. was poor, while 1.7 mc. definitely bad. Now that 7 mc. is at a

peak, 14 mc. is mediocre and erratic, 3.5 mc. is becoming useful for DX work, and 1.7 mc. is decidedly more promising than a year or two back. It seems logical to assume that in, say, two years 7 and 14 mc. will become almost useless for long distance work, and 3.5 mc. will come back into its own as *the* band.

This general "shift-up" has probably been noticed by many amateur and professional workers, and the writer will be grateful to receive other views which will lend force to the argument.

Critical Wave-length

This leads to a question which has often been raised in amateur circles. "Is there a critical wave-length?"

The writer is of the opinion that somewhere around 7 mc. there is a particular frequency which produces almost identical results at all times. Frequencies above this point are adversely affected by the magnetic storm minimum, while those below it are favourably affected. If 7 mc. should be the critical frequency, this band will probably not become useless for DX, as suggested above.

Information on this point is also solicited.

Practical Experience Recommended.

Summing up these views, it is suggested that those who wish to obtain experience of conditions at their best on 3.5 mc., and later on 1.7 mc., should begin serious experimental work at once. The construction of a suitable 10-watt c.c. transmitter should present no difficulties, and providing a reasonably efficient aerial can be erected, contacts with Europe, North Africa, nearer Asia, and even America can be achieved. In connection with the latter it is an acknowledged fact that many more G-U.S.A. QSO's would be effected on this band if the local QRM on the American side were diminished. Personally, one thinks that the high-power craze is carried too far in U.S.A.

For protracted experimental work 3.5 mc. has much to recommend it, and only on really "dud" evenings does fading spoil consecutive observations. At the moment a "blanketing" effect occurs for an hour or two after dark—a phenomenon noticeable a year or so ago on the 7 mc. band. Unfortun-

nately, commercial stations (most of them Russians) are slowly creeping into the upper frequency portion of this band, while the peculiarly French product now known universally as "spitch" is troublesome at times, although a pure c.w. note can usually be read through the latter if a low-frequency filter or a stage of peaked-audio is used in the receiver.

The 1.7 mc. band duplicates most of the characteristics of 3.5 mc., except that fading, when it occurs, is not so deep. The counterpart of the "spitch" on the latter band is to be found in interference from transmitters installed on small boats, but fortunately these possess such mushy carrier waves that any good quality c.w. signal can be read through them providing the signal intensity is reasonably good.

Daylight communication on this band is easy up to about 200 miles; in fact, two-way communication between London and Edinburgh (twice that distance) has been made at midday on many occasions. This band is the most suitable for serious telephony work, and as it is exceptionally wide there is plenty of room for telephony and telegraphy stations to work in peace side by side.

Aerial System.

The aerial problem is one which exercises the minds of many newcomers to 1.7 mc. Half-wave arrays are available only to those fortunate folk with acres of backyard. Therefore an A.O.G. is generally the only possible solution. A wire measuring 130 ft. from its far end to the transmitter will, when used with an earth connection as a Marconi antenna, have a fundamental wave-length at the middle of the band. If this length cannot be obtained the system should be loaded in order to obtain resonance by adding a coil to the loose-coupled aerial circuit, or by dispensing with the earth, and using a counterpoise large enough to bring the entire antenna system within the band.

Little more remains to be said except to give a word of advice to those who are struggling to make themselves heard in the 7 mc. welter. Why not come up to the great open spaces of 80 and 160 and have a breather?

Technical Topics.

Conducted by "LITTLE TOM."

No. 2.

This is more in the nature of a discussion than a set problem. But opinion in this country is so much divided about the subject of Goyder-Lock *versus* Neutralised P.A. that it should be aired in public, finally, if possible.

I will publish the best, most logical and least bigoted statement of the following: "The advantages and disadvantages of a "locked" oscillator for the final stage, as compared with a properly neutralised power amplifier." It is to be assumed that the "locked" oscillator is provided with enough frequency-stabilised R.F. to keep it properly in lock, and that the operator knows what he is doing.

I know that by making this stipulation I have prohibited one of the most powerful arguments against the use of Goyder-Lock; but it is an argument against the operator rather than against the system.

I will attempt to produce an unbiased summary of all the replies received, and will publish the best in full.

Closing date, April 15.

Don't forget that a prize is promised to the contributor who supplies most useful and interesting replies to the first twelve problems set under the heading of "Technical Topics."

REPORTS WANTED

G2IZ (Gravesend), 7,125 and 14,250 kc.
G2PN (Northumberland), 7 and 14 mc.
G2PS (Winchester), 7,107 and 14,214 kc.
G5BB (London), 1,972.7 kc. telephony.
G5KG (Mansfield), 7,040 kc.
D4BPF (Berlin), 3.5, 7 and 14 mc.

Members are requested to state frequencies used when requesting publication of the above information.

"SOLILOQUIES FROM THE SHACK."

By UNCLE TOM.

(After two week-ends of confinement within his Cabin, our avuncular friend, beaming behind his spornrimmed spectacles, looks at life again.)

WHAT'S all this about Beru? Why do so many people want to meet him all at once? And why the Heck don't some of 'em get receivers on the job, just in case he happens to reply to them?

I've been hearing bitter complaints from B.R.S. men about the receiving side of the contest. Bear in mind the fact that they had to log a distant station, together with the report that he handed to whatever other station he happened to be working.

Then consider what *your* feelings, as a BRS, would be if you heard a VK or ZL incessantly calling British stations, but couldn't claim a bean for him because none of them heard him!

If some of the more ardent BRS's were provided, free of charge, with a transmitter of proved efficiency—provided they knew how to operate it thoroughly well—they would simply walk away from most of the existing hams purely by virtue of their good receivers.

For further views on this subject, refer back to excellent Editorial last month.

That's Criticism No. 1. Criticism No. 2 concerns all this senseless business of calling "Test" *ad lib*. Looking back through my log for the Senior Contest, I find that out of 67 QSO's I only raised eight on test calls. The greater number of my DX QSO's were raised by calling VK's or ZL's who suddenly showed their noses while all the local G's were safely out of the way calling "Test." Many thanks to them for the opportunities they gave me in this way.

Now, to save anyone who has pierced my veil of anonymity from the trouble of writing to the Editor saying that he personally heard *me* calling "Test" quite a lot, let me say that I don't condemn it as a general principle. What I *do* hate is the practice of calling "Test" whenever one feels bored, just for something to do.

The most pathetic memory of the contest that remains with me is that of VK6FO calling his heart out in a "Test G," while three different G's were all sitting on top of him calling "Test BERU." That made it very difficult for me to get my bonus points for the VK6 district, but I eventually managed it.

By the time I had finished with VK6FO and he called another test, all the G's were likewise calling "Test" again, having found the first call fruitless. Surely people have discovered by now that it is more or less the accepted practice during the contest for the distant stations to call "Test" for our benefit, assuming that we are spending just a *little* time looking for them, instead of calling test after test ourselves.

Criticism No. 3: Russian commercials and general undesirables on the 7 mc. band. Can't we do *anything* to get rid of these parasites? What a pity we haven't a couple of 50-kw. ether police stations who could sit firmly on the Russians until

they were forced to clear out. It makes my blood boil to hear these blighters sitting in our band, while at least 200 kc., from 7,300 to 7,500, is practically unoccupied. I think it might even be worth while approaching the authorities about this blank space at the top (frequency) end of the 7 mc. band.

Now, having got all that off me wheezy ole chest, let me say that the contest, as a whole, was quite the best ever. Who has ever heard so many VK's and ZL's before? But what a pity it is that they don't come on a little more regularly when there isn't a contest on. It almost makes one think that amateur radio is a perennial affair.



Uncle Tom's Cabin.

Most people, I think, showed a creditable amount of skill in the times they chose for swopping over from 7 to 14 mc. I wonder whether anyone snaffled a few extra points by working Canadians on 3.5 mc. in the early mornings, before VK and ZL were really good on 7 mc.? They deserved more than the 2 points if they did (and so did the Canadians!).

I should like to appeal, here and now, to the Powers that Be to thrash out the system of scoring thoroughly before next year. The only point I can really pick to pieces is that 10 points for VK.

(Continued on page 281.)

AMATEUR AID TO THE LIFEBOAT SERVICE

It is with a sense of deep appreciation that we publish a first-hand account of the part played by three of our members, Messrs. Elmer (G2GD), Mainprise (G5MP), and Chapman (G2IC), in connection with the design, construction, and installation of radio equipment on the Hythe lifeboat.

The work they have achieved so successfully is but a further example of the co-operation which amateurs are at all times ready to render national services.

THE rescue of the crew of the coastal motor vessel *Grit* in the Channel during an almost impenetrable fog is an example of the excellent service that can be, and is being, rendered to the public by radio amateurs.

The Sandgate coastguards, hearing a distress call sounded in morse on the siren of a steamer, called out the Hythe lifeboat with instructions to "search the channel off Sandgate." The launch was immediately effected, and it was not until the boat was out that the coastguards were able to obtain the exact bearings of the wreck. These were immediately telephoned to the coastguard radio station at Ramsgate, which called up the Hythe lifeboat, knowing that they would be listening on their receiver, with the result that the lifeboat was able to make straight for the position given and rescue the six members of the crew of the stricken vessel. When the lifeboat arrived the *Grit* had already sunk and the crew were huddled in a small dinghy, the chances of finding which, in the dense fog, would have been negligible with the instructions with which the lifeboat had been launched.

Many readers will be astounded to hear that the receiver is not part of the standard equipment of the Hythe lifeboat nor of any of the "open" or non-cabin type of lifeboat.

The Rye lifeboat disaster would never have occurred had the vessel been equipped with radio. Five minutes after she had been launched a message came through to the boathouse that her assistance was no longer required, but owing to the haze it was impossible to recall her from the shore, and after searching for many hours in a driving south-west gale, she made her way back to Rye, her crew so worn out with the long struggle that they were unable to keep her round when approaching the shore in the strong wind, with the result that she got broadside on and rolled, and not one of the crew was saved.

After this tragedy, Mr. G. S. Woodman, the joint hon. secretary of the Hythe lifeboat, set out to do everything in his power to prevent a similar disaster occurring to his men. He realised that the one safeguard was radio, and feeling unqualified to cope with the technical and constructional side of the task, he called to his aid three members of the Society—Mr. J. C. Elmer (G2GD), Mr. B. W. F. Mainprise (G5MP), and Mr. Anthony Chapman (G2IC). These gentlemen set to work, and after many weeks of labour, occupying practically the whole of their spare time, they eventually designed, built and perfected the receiver which is at present installed in *The City of Nottingham*, the Hythe lifeboat.

The receiver circuit is the standard I-V-1, with ganged tuning and wavechange switch covering the 180 and 900-metre bands, which are used for coast-guard and aircraft work respectively, and is nothing really wonderful, but the construction is a work of art. The whole is contained in a watertight teak cabinet, the tuning scale being read through a 1-in. square glass window in the top and illuminated by a pilot light. All moving controls are brought out through watertight glands and fitted with large wheels so that they can be used when the operator's hands are numbed with cold. The interior is well screened with copper, and there is no sign of interference from the engine ignition. The 'phones are fitted with heavy leads of rubber cable and stood a 24-hour underwater test before being put into service. They have a plug and socket connection hanging just below the operator's head, and this, which is perfectly watertight, can be broken by a slight jerk to free him in case of emergency.

An 8-ft. vertical aerial is used, consisting of a piece of rubber cable threaded up the centre of a bamboo pole. In fact the whole outfit is perfectly sea-proof and carries on sweetly even when the vessel, after the habit of lifeboats, passes through a wave, instead of going over it.

The receiver has proved so satisfactory in practice that one has already been supplied to the Guernsey lifeboat, and an experimental model transmitter is already well under way. The funds for the receiver were supplied by personal friends of Mr. Woodman.

Seafaring nation as we are, the work of the Royal National Lifeboat Institute is one in which we must all, of necessity, have a personal interest, and we can realise the satisfaction that our friends must feel to know that their past labours have been rewarded by the saving of six lives, although we know that their joy would have been as great had it been but one.

2016

It is with much pleasure we record the fact that our ambition to raise the membership total above the two thousand mark has been realised. The figure of 2016 was reached on March 6th, 1934. This opportunity is taken of thanking all members for their support.

AN AUTOMATIC MORSE SENDER.

BY A. O. MILNE (G2MI).

THE idea for an automatic sender on more ambitious lines than the plain "Test de G—once only" variety, originated with G2IG, who constructed a most ingenious device using a length of cinema film in the form of an endless belt over a series of rollers, which caused two contacts to make when slots cut in the film passed between them. This had the serious disadvantage, however, that cutting the film weakened it and as a result it quickly became torn.

Recently a number of automatic telephone "uniselectors," surplus from dismantled totalisators, have been for sale at a ridiculously low price. These switches are in perfect mechanical condition, and the idea of utilising them as Morse senders occurred to both Mr. Hammans and the writer independently.

Before describing the circuit, a short explanation of the mechanical features of the switches and their method of operation will be necessary. Fig. 1 is a three-quarter front view, and shows that the switch consists of a metal framework upon which is mounted a semi-circular bank of contacts consisting of eight arcs with 25 contacts to each arc. Eight pairs of double-ended wipers are arranged to rotate over the contacts by means of a pawl 8 pt. and ratchet which is operated by an electro-magnet. Each wiper is connected by a brush contact, sprung against the grooved spindle which is attached to each and insulated from its fellows; these brushes are brought out to terminals on the frame.

When the magnet is energised, the armature is attracted, and moves the pawl over one tooth of the ratchet. A small arm on the armature assembly is arranged to break two contacts in series with the current supply to the magnet. The magnet is de-energised and the wipers are pulled over one step due to the force exerted by the powerful armature restoring springs. The armature at rest remakes the contacts, and the magnet is re-energised, thus repeating the cycle *ad infinitum*.

It is clear, therefore that by commoning the contacts round one arc we can make the switch step continuously via its own bank contacts and wiper, leaving the other seven banks free for anything we may require.

Two switches are required for the machine sender. One as the sender and one as a preselector control to ensure that the arcs of the sender are brought into circuit in correct sequence. It was decided that "Test Beru de G2MI," "Test de G2MI," and "Test 56 de G2MI" were the calls most likely to be used. The machine being arranged also to send out a continuous series of V's if required.

On the switches obtained, seven out of the eight wipers were of the "bridging" type, that is, they make on the forward contact before leaving the previous one when stepping. The eighth is non-bridging, and is used as the rotary drive control. It should be noted that as the wipers are double ended, when one end leaves contact 25, the other end enters the band at contact 1.

The bank wiring is shown in Fig. 2. The left-hand column of arcs are the sender and those on

the right the control switch. The wipers are normally arranged so that all eight stand on the same number contact in their respective arcs. The wiring is arranged to give perfect Morse spacing.

The sender switch driving magnet (D.M.) is supplied via a dropping resistance with approximately 30 volts, and a little juggling with the adjustment of the armature restoring springs will slow the stepping down, so that Morse at about 12 w.p.m. is transmitted.

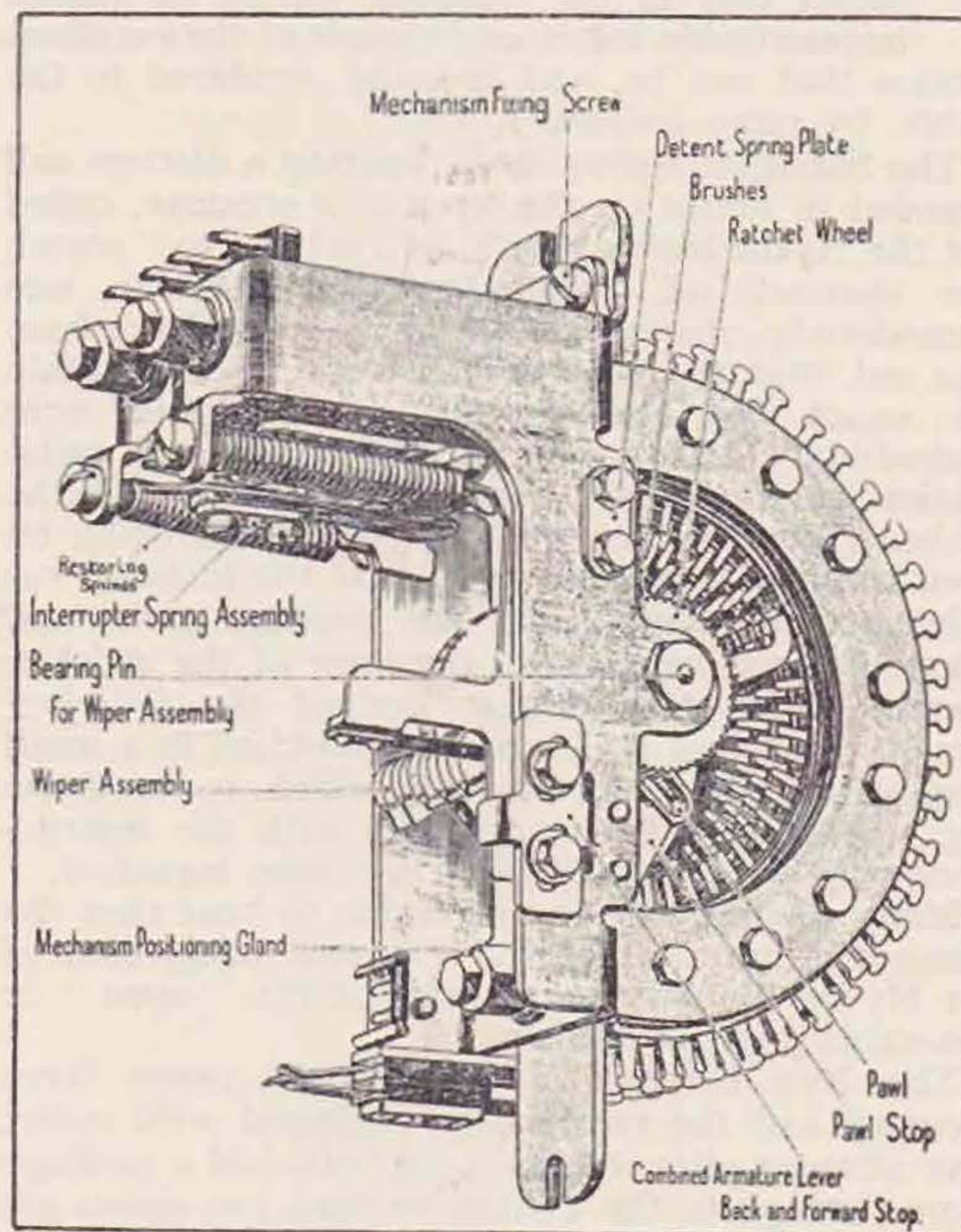


Fig. 1.
General Electric Co. Unisector, height 5½ in.,
length, front to back of contact arcs, 5½ in.

The other switch is operated from 40-60 volts., the total current at any one time being about 0.4 amp. The magnet windings total 75 ohms. but if difficulty is found in obtaining a suitable supply, the magnets may be rewound to work at a higher voltage. The condenser and resistance shown attached to each driving magnet is a spark quench to avoid sparking at the interrupted contacts.

Considering now the case of "Test Beru de G2MI," the banks of the control switch are wired so that "Test" is sent four times, "Beru de" once, and "G2MI" three times. The battery start switch in the appropriate arc is operated and completes the circuit for the control DM via the wiper and contact 1, to earth via the interrupter springs. The switch steps once, and in so doing, the circuit for the sender drive magnet is completed from the

earth on wiper 5 of the control switch via DM, interrupter, wiper and arc of sender drive control to battery and earth.

The sender now revolves round its bank and the battery through the control DM is extended via control arc 1 contact 2 to the high resistance keying relay, which operates when the sender wipers pass a marked contact, insufficient current being passed to energise the DM. The word "Test" is sent out. When the sender wipers come to position 24 the marked earth is passed to the DM

which steps one. The break in the DM circuit which completes the step is caused by the sender stepping past the earthed contact. Contacts 2, 3, 4 and 5 are connected together, therefore "Test" is sent out four times; on stepping from 5 to 6, the DM battery is offered to the "Beru de" arc and the letters "Ber" go out. The wipers of "Ber" and "ude" are joined together, and one half of each set cut short, therefore when wiper "Ber" leaves the arc, wiper "ude," which is at 180° to it, enters its own arc and so "Beru de" is sent out without any pause for stepping the control switch. On the completion of one revolution of the sender, the stepping earth is again encountered at the end of the "U-de" arc, and the control steps to G2MI which goes out three times. The wiper being cut as in the case of Beru, and two arcs used. On stepping from 9 to 10, the drive circuit for the sender is broken and an automatic homing circuit completed for the control switch via its own interrupter when the call cycle is repeated until the start key is returned to normal.

The sending of other combinations will be readily understood from the above.

If V's are required, the sender switch is not used, and the operation of the "V" start switch disconnects its drive circuit. This switch is a three pole, making two and breaking one. The control arc No. 6 connects the DM via a slowing resistance to earth on the interrupters, and so the wipers rotate continuously and the make and break of the letter V is applied to the keying relay.

This outfit banishes the tedium of "Test Beru," etc., during ordinary working or the more exacting conditions of a contest.

In concluding these notes the writer wishes to acknowledge his indebtedness to Mr. C. W. Brown, head of the Post Office Engineering Department Training Schools, for his courtesy in allowing him to reproduce Fig. 1 from the official literature on mechanical adjustments of automatic telephone plant.

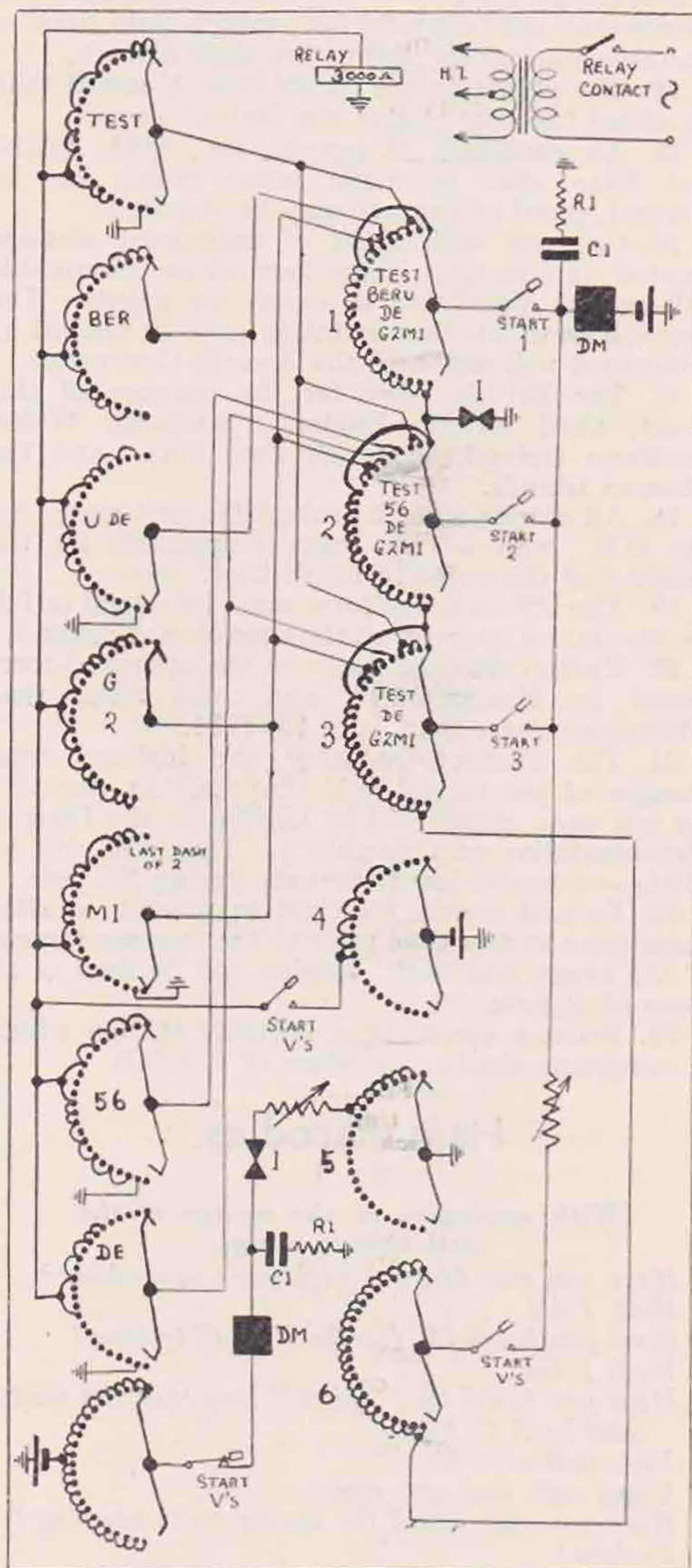


Fig. 2.

Wiring diagram of Automatic Morse Sender. All connections are marked with a large spot. Wires crossing without this mark are not connected. The three keys marked V are in one unit. DM represents the driving magnet coils, and I the interrupters in magnet circuit.

More
Technical
Articles
Are
Required

NATIONAL FIELD DAY, 1934.

In publishing the rules for this event, we wish to mention that the Awards Committee have made every endeavour to meet the wishes of D.R.'s and others who gave their views on a preliminary draft. It is realised that certain conflicting viewpoints cannot be entirely met, but it is confidently hoped that all who take part in this event will abide by the spirit, as well as the letter, of the rules as here set out.

D.R.'s are requested to note that their application for permission to operate stations during this event must reach Headquarters by April 30. This will enable us to publish in the May BULLETIN details of all portable calls, and thereby prevent confusion. In forwarding this information, the call sign to be used and the location of each station must be stated.

Overseas amateurs are invited to co-operate with the R.S.G.B. in this event, and providing details are given us prior to April 30, a list of portable calls to be used by such stations will be published in this Journal.

RULES

1. The event will commence at 16.00 G.M.T. (17.00 B.S.T.), June 9, and conclude at 19.00 G.M.T. (20.00 B.S.T.), June 10, 1934.

2. The event is confined to the English, Welsh and Scottish Districts, and to Northern Ireland, the latter ranking as one District.

3. Each district taking part will be permitted to place into operation two portable stations, A and B, which may be located at any point or points within the District. An exception to this rule will be permitted in the case of the four London districts, who may erect their stations in counties adjacent to their district.

4. Station A will be permitted to operate on the 1.7 and 3.5 mc. band. Station B will be permitted to operate on the 7 and 14 mc. band.

5. In the event of a district being unable to erect two stations, the district station will be permitted to use any of the four bands mentioned in Rule 4.

6. No station may be operated on more than one band at any one time.

7. Stations A and B must be licenced to use different call signs, the D.R. is responsible for forwarding to Headquarters an application for such permission, together with exact location of each station, not later than April 30, 1934.

8. The input to the valve delivering power to the aerial must not exceed 10 watts on 1.7 mc. and 25 watts on the other three bands.

9. The power supply must not be derived from either public or private supply mains.

10. The height of the aerial at any point must not exceed 45 ft. above ground level.

11. Stations must not be operated from a normally occupied dwelling-house.

12. No apparatus may be erected on site prior to 12.00 G.M.T. (13.00 B.S.T.), June 9, 1934. This rule includes aerials and aerial fittings.

13. Points will be scored for established contacts on the following basis:—

With fixed stations outside the district,	
but within the British Isles	1

With portable stations outside the district,	
but within the British Isles	3
With fixed stations in Europe	2
With portable stations in Europe	6
With fixed stations outside Europe	4
With portable stations outside Europe	8
With B.E.R.U. stations	8
With B.E.R.U. portable stations	16

NOTE.—In the case of the four London districts, points may not be scored for contacts with fixed or portable stations located within their district.

14. The points scored by stations A and B shall be added together to give the District's score.

15. An exchange of reports, viz., QSA, QRK, and Tone, shall be made before points can be claimed, proof of contact may be required.

16. Contacts with ships or unlicensed stations located in countries where licences are obtainable will not be permitted to count for points. The decision as to whether a station is to be classed as unlicensed will rest with the Awards Committee.

17. The British Isles, for the purpose of this event, shall include England, Scotland, Wales, Northern Ireland, the Irish Free State and the Channel Islands.

18. All entries must be submitted and signed by the D.R., who will be solely responsible for the conduct of the event in his district.

19. The official entry form must be signed in full by the station operator at the time of each contact.

20. Entries must be made on the approved form issued by Headquarters, and must reach that address not later than June 25, 1934.

21. The District securing the highest total number of points will hold the "N.F.D. Award" for one year, which will be handed to the District Representative at Convention. The D.R. will be solely responsible for its custody during the year.

22. Council reserve the right to amend or alter these rules at any time prior to the commencement of the event, and their decision will be final in all cases of dispute.

23. Persons operating a portable station which is competing shall be members of R.S.G.B.

Ham Parodies.

No. 1.

(With apologies to the writer of the well-known song).

Have you ever heard a nightmare squawking?
Well, I did.
Have you heard the row the F's call talking?
Well, I did.
Have you heard the "spitch" they turn out modulated by A.C. hum?
Fists that were bum,
Using calls that were rum?
Have you ever heard the spring birds tweeting?
Tralala!
RPK and DHE both bleating?
Bah! Bah! Bah!
If you want to hear this whole darned lot of eerie noises on the air,
Just tune in to 7 megacycles.
They're all there!

"PIPS."

STATION DESCRIPTION No. 40.

VQ4KTA

By E. T. SOMERSET (ex G2DT).

THE writer recently had the pleasure of visiting Mr. Hoey, VQ4KTA, whose station must surely be regarded as one of the most beautiful and unique in the British Empire. Situated 8,000 feet up on Mount Elgon in Lat. 1° North, Long. $34^{\circ} 40'$ East, it is roughly 550 miles N.W. from Mombasa. The house is in a large clearing surrounded by almost impenetrable mountain forest frequented by herds of elephant and buffalo, and to reach this spot from the coast is indeed an adventure. The car route lies through the Kenya Southern Game Reserve and follows a course around Mount Kilimanjaro and through the Masai territory, wherein vast herds of gazelle, lion, giraffe, wildebeeste, eland, zebra, kongoni, etc., roam at peace with the world! From this point one commences to climb in real earnest crossing the equator at about 9,150 ft. The low tem-



The Home of VQ4KTA

perature at this altitude makes the climber glad of the cardigan and raincoat, he rather reluctantly packed when leaving the warmth of the coastal region. A set of chains on all four wheels of the car is a further necessity, as the gradients are steep and the road none too good when wet. Hereafter is a long and gradual descent into Kitale, 6,250 ft., the nearest town to VQ4KTA and 26 miles distant therefrom. Arrival at VQ4KTA opened our eyes to the wonders of "ham radio" in the outposts of the Empire. Gorgeous flowers growing to perfection along mountain streams and a perfectly good 9-hole golf course left memories which will live for many years. From "Chepchoina" (the name of the house) a superb distant view is obtained of the mountains dividing Kenya and Uganda, whilst high above the house slung between denizens of the forest, is the familiar Zeppelin aerial giving one the impression of being somewhat out of place in this part of "darkest Africa."

VQ4KTA arrived in Kenya during 1909 and was hunting until the war when he served in the German East Africa campaign. Subsequently he was farming coffee, maize, flax, and cattle at Hoey's Bridge until 1926, when he moved to the slopes of Mount Elgon. He gives as a reason for this move, an interest in radio, a wise man, for his present QRA is indeed in a fine position. Here it was he built his first short wave receiver and obtained much employment from the Eindhoven station PCJJ. Later G5SW commenced operations which greatly added to the attraction of short wave work, with the result that when he came to England in 1929 he decided to take up interest in the transmitting side. Early in 1930 a Hartley took the air on the 7 mc. band, and great was the thrill when contact was established with George Ball, then VQ4MSB at Mombasa.

VQ4KTA started off with a master oscillator and power amplifier obtaining very gratifying results; later a buffer stage was added and a separate transmitter built for c.w. work on 14 mc. It is hoped to use this outfit for fone work shortly as good telephony reports were received on the old 7 mc. set from England, Holland and South Africa.

Power supply has throughout proved a great difficulty. Originally the house lighting was run by a Pelton wheel driving a 110 volt 3 kw. generator, the wheel being fed from a furrow four miles long running through thick forest, but owing to damage from elephant this was in constant need for repair! Furthermore, lack of water to drive the wheel frequently resulted in the loss of a QSO. At a later date the wheel was scrapped and a Kohler installed. This was found to be quite satisfactory, but QRM was bad in spite of numerous attempts to eliminate it. Eventually owing to the excessive cost of petrol and the difficulty of getting it up the side of the mountain from Kitale, it was decided to use steam and batteries. As masses of wood are available almost outside the front door this has proved to be the best and cheapest method.

The boiler is a vertical model, and during the writer's visit he was much impressed with the sight of a stalwart native firing it from vast stacks of wood.

"Chepchoina" is 300 miles from Nairobi, the nearest source of supply for radio gear, and has an amazing equable climate 52° and 75° being the minimum and maximum temperatures respectively. The photograph here reproduced gives but a vague idea of its entrancing beauty.

STRAY.

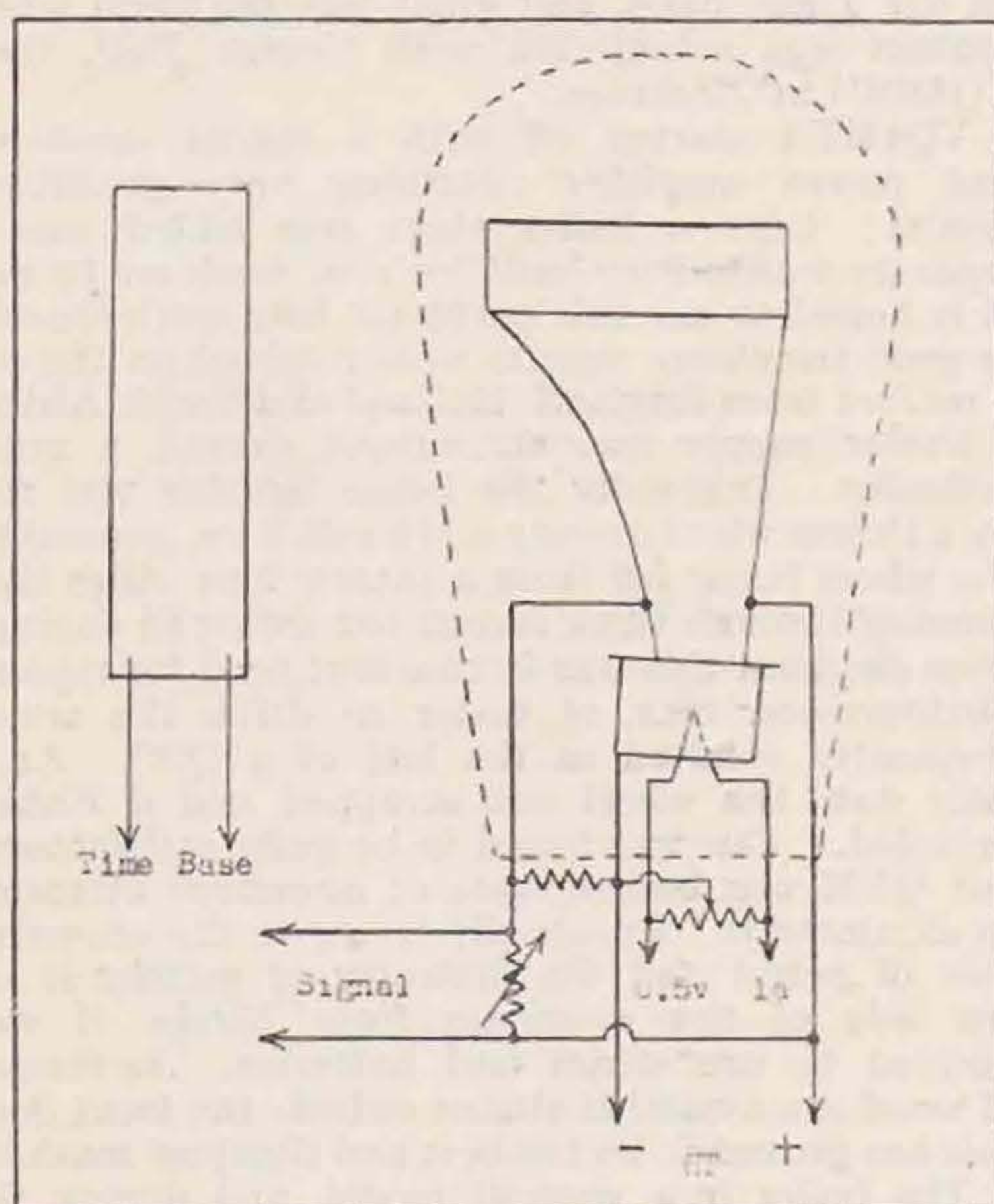
G6AI will be transmitting on 56 mc. every morning for the next two months between 09.00 and 10.30 G.M.T. Input 10 watts. Co-operation is requested.

MICROMESH TUNOGRAPH EXPERIMENTS.

By H. C. SPENCER (G6NA).

MOST amateurs, when confronted with the results of experiments carried out with the aid of a Cathode Ray Tube Oscillograph, conjure up visions of expensive apparatus, and consequently do not give their whole attention to any problems arising from them. The object of this article, therefore, is to bring to the notice of those interested an account of some experiments carried out with the aid of a tube costing only 17s. 6d.

The tube in question is marketed by *Messrs. Standard Telephones & Cables, Ltd.*, under the name "Micromesh Tunograph." This tube has one major disadvantage affecting experimental work, in that only one pair of deflectors are available, but this can be overcome if care and patience is exercised. The pair of deflectors in the tube are used to deflect the ray according to the amplitude of the signal to be analysed, and the ray is deflected magnetically for the time base from an external coil.



The static sensitivity of this tube is 13 volts per cm., so that about 30 volts are needed to give almost a full sweep of the screen. By reducing the anode voltage, the tube is rendered more sensitive, but the image then suffers from poor illumination. In order to obtain the best image, an anode voltage of between 250 and 300 volts is necessary, although maximum sensitivity is obtained with 200 volts. It is desirable to connect a filament current ammeter permanently in the circuit.

The coil used as a time base reflector should be of large diameter, and short length; the coils used by the writer are 3 ins. in diameter, and 1 in. deep. For low-frequency work up to 10 kcs., the coil consists of 300 turns of No. 30 swg. D.S.C. copper, wound honeycomb fashion; whilst the H.F. coils

are wound with No. 24 swg., enamelled on a cardboard former 3 ins. in diameter, and tuned with a condenser to the frequency being used. These are mounted about $\frac{3}{4}$ in. from the tube, and the axis is more or less parallel to the centres of the deflectors in the tube. The writer found the exact position by applying the output of the time signal generator to the coil, and moving it about while the tube was running, with no signal across the deflectors other than the steady bias required to keep the spot along the centre of the screen. At first, figure 8's and ellipses were obtained, but by gentle manoeuvring, a straight line showed itself, and all was now ready for a.c. to be analysed. The writer has experimented with screened coils for the time base, but these only resulted in very bad distortion.

Bias is applied to the deflectors by means of the voltage drop across an anode supply shunt resistance. Any value will do, but it must be remembered that the smallest part is across the signal, so it should be fairly high. The writer uses a 100,000 ohm. potentiometer across the deflectors, and 1 megohm. to earth. The focusing screen can generally be connected to the cathode as shown in the diagram, but if for any reason bias is required, this can be obtained either from a battery or another variable resistance in series with the one already in use for the deflectors.

Any generator giving a sawtooth wave form is suitable for the time signal generator, but it must be borne in mind that a fairly large output is needed. For low frequencies a condenser is charged through a resistance, and then discharged through three neons in parallel. The frequency is varied by altering the value of either the condenser or the resistance. For high frequencies, a Hartley oscillator with a high leak and small condenser is used, but this is not very satisfactory in its present state. It is hoped to eventually carry out some tests with a Thyratron oscillator.

Using a fairly low frequency time base, and feeding the deflectors with the output from the receiver, many interesting wave forms can be traced. Under certain conditions it should be possible to observe the direct ray from a certain station followed by the reflector ray, but so far this has not been obtained.

W.A.C. in Two Hours.

Our No. 6 District representative, Mr. W. B. Sydenham (G5SY), recently W.A.C. in two hours on 14 mc. The times and contacts were as follows: 10.30 G.M.T., ZL3FG; 10.35 G.M.T., LU9DT; 11.06 G.M.T., OH1NU; 12.17 G.M.T., CN8YBQ; 12.25 G.M.T., WIDJV; 12.30 G.M.T., XZC6GF. He enquires "is this a record for single-band work?"

* * *

During Mr. W. E. Lane's absence from Kenya on leave, Mr. R. O. Davidson (VQ4CRL) will act as official B.E.R.U. Representative. Mr. Lane's English address will be 101, The Cross, Tewkesbury, Gloucester.

RESEARCH AND EXPERIMENTAL SECTION.

AS mentioned in our Editorial, it has been decided to completely reorganise the experimental activities of the Society.

As a result of this decision, Contact Bureau will be disbanded as from March 31, 1934, being replaced by the Research and Experimental Section.

The rules and method of procedure are set out below, whilst an enrolment form will be found inside each copy of the current issue of the BULLETIN.

In order to prevent a break in the continuity of experimental work, all members desirous of joining R.E.S. are urged to make application to the Manager immediately. This request applies equally to those who are or were members of Contact Bureau.

Council have been fortunate in securing the assistance of Mr. H. C. Page (G6PA), as Manager of R.E.S., who will be assisted by Group Managers appointed by Council.

The full list of Groups, with the names of the Managers so far appointed, is as follows:—

General Groups.

No. 1. 1.7 and 3.5 mc., J. B. Hum (G5UM).

No. 2. 56 mc., E. A. Dedman (G2NH).

Special Groups.

No. 3. Artificial Aerials, J. K. Todd (G2KV).

No. 4. Atmosphere and Fading, J. C. Elmer (G2GD).

No. 5. Television, C. W. Sands (G5JZ).

No. 6. Contemporary Literature, R. A. Fereday (PA0FY).

Technical Development Groups.

No. 7. Receiver Design, E. N. Adcock (G2DV).

No. 8. Transmitter Design. (Appointment to be made later.)

No. 9. Aerial Design. (Appointment to be made later.)

No. 10. Valve Research, D. N. Corfield (G5CD).

Council have authorised the production of a distinctive badge for R.E.S. members, which will be available from Headquarters early in April, at a price of 1s. 6d. each.

Certificates will be issued at an early date by the R.E.S. Manager.

Organisation.

1. The Section shall be controlled by a member of Council, who shall be known as the R.E.S. Manager.

Membership.

2. The R.E.S. shall consist of Group and Individual members of the Radio Society of Great Britain, and the British Empire Radio Union.

3. Group members shall be those who apply for enrolment in one of the regularly constituted R.E.S. groups.

4. Individual members shall be those interested in problems of a general research or experimental nature, but who do not desire to contribute to the regular monthly R.E.S. Group reports.

Enrolment.

5. All applicants for membership of the Section must apply in writing to the R.E.S. Manager, who will furnish an application form, which must be filled in and returned.

6. Members, on being accepted, will receive a certificate which will remain the property of the Society. A receipt for the certificate must be given to the R.E.S. Manager.

7. On a member ceasing his association with the Section he shall return the certificate.

Groups.

8. Groups shall be controlled by a Group Manager, who shall be appointed annually by Council on the recommendation of the Section Manager.

9. Certificates of appointment will be issued annually, or at the time of their appointment, to Group Managers.

10. Where more than one group is operated, Group Centres shall be appointed by the Group Manager in consultation with the Section Manager.

11. A member may contribute to the activities of more than one Group.

Letter Budgets.

12. A monthly Letter Budget shall be circulated by each Group Centre, or when only one group is in operation, by the Group Manager.

13. Letter Budgets shall be routed to the following, in order:—

- (a) Group Manager.
- (b) R.E.S. Manager.
- (c) Group Members.
- (d) Group Centre (originator).

Monthly Reports.

14. A monthly activity report shall be sent to the Group Centre by each member in his group. Such reports must arrive not later than the 15th of each month.

15. Group Managers will base their monthly reports to the R.E.S. Manager on information received from their Group Centres, or when only one group is in operation, from their Group Members.

16. Reports to the R.E.S. Manager must in all cases reach him by the 22nd of each month, but when circuits or drawings are required for publication, such information must be sent not later than the 20th.

17. Reports to the R.E.S. Manager must be typed (double spacing), or written legibly, and in a form which will permit publication with a minimum of Editorial attention. Slang, radioese, and exaggerated contractions, must be deleted. The reports must be regarded as scientific contributions.

Activity.

18. Failure to take an active interest in the work of the Group to which a member has been assigned, for a period of three months, automatically nullifies his claim to be listed as a member of the Group in question.

19. An Individual Member must report active at least once in every six months. Failure to do so automatically nullifies his claim to be listed as a member of the Section.

Identification Numbers.

20. For record purposes, each Group Member will receive a special number in the series R.E.S. 1 onwards, and each individual member will receive a similar number in the series R.E.S.I. 1 onwards.

21. These numbers may be used in correspondence or BULLETIN reports.

22. Immediately a member fails to report as laid down in Rules 18 and 19, his number will be cancelled.

Awards.

23. Annually, in December, the Council of the Society will award special premiums and/or certificates to such R.E.S. members as they consider have contributed some useful information of general interest.

24. The awards will be based on contributions published in the T. & R. BULLETIN. All contributions must be forwarded to the R.E.S. Manager, who will submit them for examination to the

Technical Committee appointed by the Council. Publication, which will be made anonymously if desired, will not automatically ensure a Council award.

25. The decision as to which members shall be granted awards, will rest entirely with the Council, who will be guided in their judgment by advice from the R.E.S. Manager, and the Technical Committee.

Contributions.

26. Contributions must in all cases be typed (double spaced), or legibly written in good English; drawings must be submitted on separate sheets.

CONTACT BUREAU NOTES.

BY H. C. PAGE (G6PA).

This is the last time I shall address you under the heading of Contact Bureau, for in the course of a few days the new Research and Experimental Section will come into being. It will be realised from details elsewhere in this issue that R.E.S. is to be something different, and far greater in its scope than Contact Bureau. I do not propose to say more about it here, but would ask everyone to study the enrolment form and rules closely.

I would like to take this opportunity of thanking all those who have co-operated so loyally with me in the past three years, and to assure them that I shall endeavour, as Manager of the new Section, to do my very best at all times.

28 MC. Groups (No. 1).

G6VP (Manager).

As one could expect, practically no work has been done on 28 mc. this month. The B.E.R.U. Tests claiming everyone's undivided attention.

Yet one person, and a very busy one at that, had a search round, viz. G6QB, and was rewarded by the best DX heard this year, NY1AB calling W5RZ. This was at 16.30 G.M.T., February 18.

One is again struck by the possibilities and hopes that conditions are on the turn, that once more 28 mcs. will behave as a DX wave.

Apart from this report, G5SY has been working on an Ultraudion receiver, and comments on the enormous tuning inductance one can use with that circuit, a coil of 9 turns, 2 inches in diameter, being required.

G6BC has done some more work in connection with Harmonic Output from crystals by the use of Pentodes, but so far considers the power output disappointing. He wishes to state that by the time these notes are printed, W2CZ will be active and searching for G signals.

Atmosphere and Fading Groups (No. 2).

G2GD (Manager).

In view of the Editor's remarks at the foot of the last 28 mc. notes (the sentiment of which I heartily endorse), I immediately wrote a letter to G6VP explaining the phenomena referred to, so, no doubt, he will pass that on, if he deems it worth while.

Reference is probably being made elsewhere to the reorganisation of C.B., and I understand that all members are to be invited to re-enrol. I hope

that as a result of this, the "Twos" will shake down into a compact body of steady research workers.

The G.C.'s Letter Budget has unavoidably been delayed and at the time of writing has not returned from its wanderings; consequently, no comments are possible at the moment.

Reports from the sections contain little of general interest, except, perhaps, 2E, for mass collection of observations obviously requires time to extract the essence.

Group 2C have discussed many interesting theories, and I am hoping that they will be able to get down to observations in the near future to put some of the theories to the test.

Group 2E reports have been received from G6HA, G5OQ, and BRS1151, on the Isobar Theory. The most striking results in support of the theory come from G5OQ on 7 mc. The shorter waves, as reported by the other two, do not appear to satisfy the theory to anything like the same extent. The G.C. includes a long extract from the M.O. "Weather Map" on the formation of depressions according to the Norwegian Polar Front theory.

Ultra High Frequency Groups (No. 7).

G6XN (Manager).

Group 7A.—G5MG and G5VY have progressed to a state where QSA5 R7 'phone can be relied upon between them. G6XN has conducted further mobile tests around Welwyn, obtaining results supporting previous conclusions. There is nothing of interest to report, however, and there is no sign of general activity in Groups 7A and B.

Group 7C.—G6MF has been forced to become inactive on 56 mc., as G6SR, who was co-operating with him, has given up 56 mc. work. (If any transmitting or receiving member in the neighbourhood of Edinburgh would like to co-operate with G6MF, please write him or GI6TK). G6MF would like to know if anyone has tried Electron Oscillators for 56 mc. work. (Wavelength too high for these, except the magnetron type.—G.M.)

BRS1082 has now got his 1 valve Quenched Hartley receiver going well, the main improvements being the using of a very low value grid condenser (.00005) and connecting the aerial direct to grid without coupling condenser.

GI6TK intends trying various types of large aerials on his 56 mc. transmitter. Scottish and

N.W. England stations are invited to co-operate for 56 mc. Ireland-England tests during the coming summer.

A.A. Group (No. 8).

G2KV (Manager).

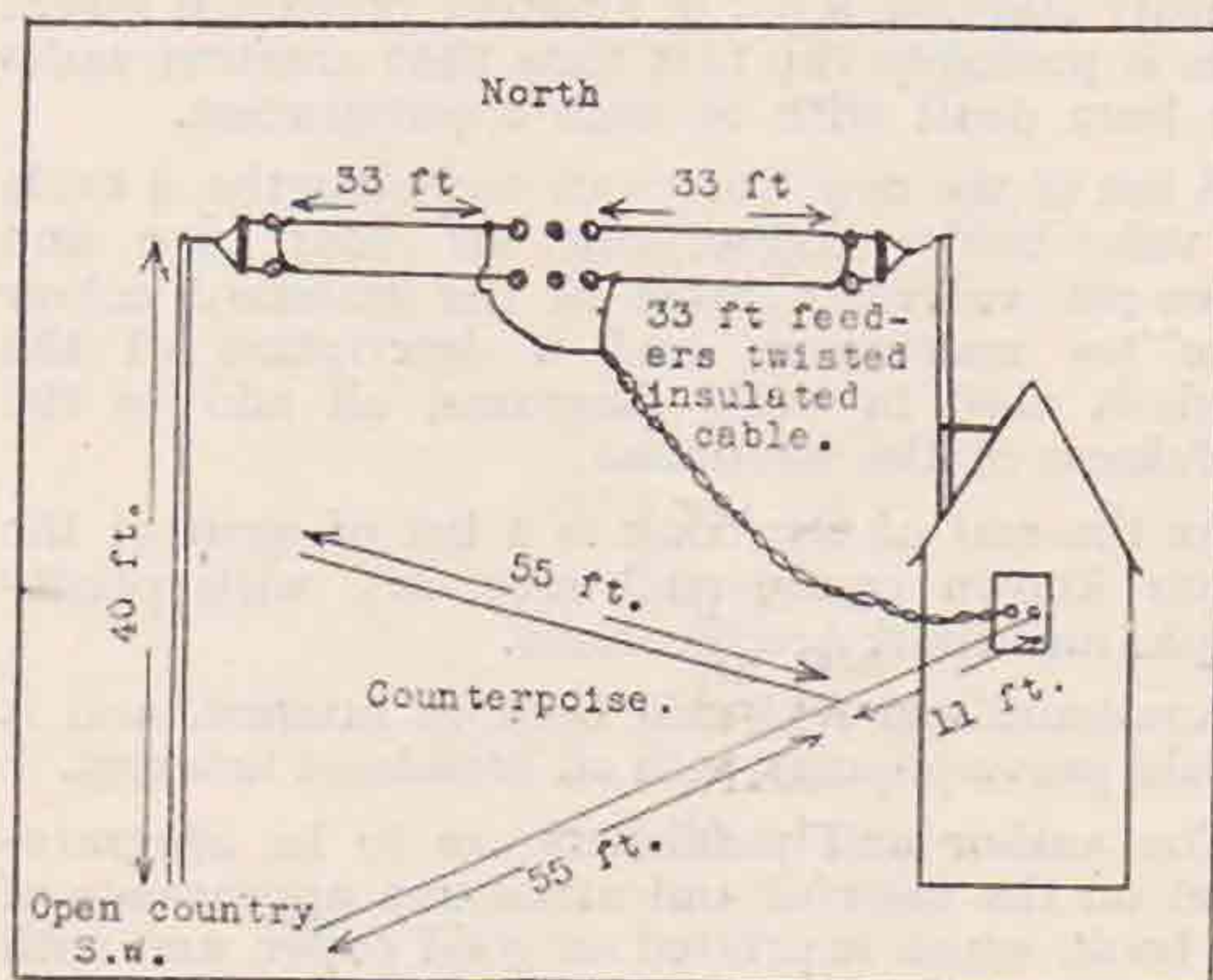
A letter budget is circulating among 2BXC, G2AZ and G5SO. Unfortunately it has not been returned to the G.M., who therefore does not know what articles have appeared additional to his own. It is hoped that some useful information will soon be obtained.

1.7 MC. Groups (No. 10).

G5UM (Manager).

Group 10A.—Attempts to repeat last winter's successful experiment of effecting transatlantic contact on 1.7 mc. have been carried out during the past few weeks.

All six members of Group 10A co-operated in the effort, and have kept watch on 1.7 mc. from 05.00 G.M.T. every Saturday and Sunday morning. The first two week-ends were fruitless (January 20-21 and 27-28), but on February 3 and 4, G5WU performed the magnificent feat of working WIDBM on each morning. On February 3 contact was made at 06.00 G.M.T., G5WU, with 10 watts, being QSA3 R4, and WIDBM R5 QSA4. On the next morning, however, conditions were not so good, and G5WU was QSA2 R2, while WIDBM was at the same strength over here. (It should be mentioned that WIDBM uses a 560-foot aerial on both transmitter and receiver, the latter being a particularly powerful instrument.)



Aerial System at G5WU showing dimensions and local topography.

WICCX was also heard during this week-end.

The week-end, February 10-11 gave the best conditions so far experienced, and WIDBM came over at QSA5 R7. He was heard remarking to another U.S. station that interference was exceptionally bad, in fact, except for the QRM over there, contact would certainly have been made on these two days, as the band was "alive" with weak W signals. Stations identified were WICBK, W8BFN, W2DVY, and W1ATE. Unfortunately numerous American stations were sending snapshot "CQ G" calls, thus causing unnecessary interference to WIDBM and other serious participants in the tests.

February 17-18 was another fruitless week-end.

Throughout the tests the barometer was consistently high, around 30.4, while temperature was low.

So much for general results; now for some details of the equipment at G5WU. This station, situated at Penarth, Glam., was using a push-pull TPTG, with a crystal across the grid coil. Very loose coupling was employed, and it was therefore possible to tune the aerial practically to dead resonance—which, no doubt, was a contributory cause to G5WU's success.

The aerial itself is of exceptional interest by reason of its unorthodox nature. Commenting on it, G5WU says: "The aerial system is one of many opposed to theory which have been tried out. Usual types of aerial were found to be very directional. This system was conceived to overcome the difficulty, and although only used for a month, has so far proved less directional and equally as efficient."

Our sketch gives full details. The aerial and counterpoise, by the way, terminate in the usual split inductance, which is parallel tuned.

Owing to lack of space, more information cannot be given now about some exceptionally interesting 1.7 mc. aeriels being tested Group 10A, all members being engaged on this branch of investigation. A flexible all-band antenna is in use at G5RX, and we hope to describe it fully next month.

During the transatlantic tests, G5RX collected reports on 1.7 mc. of the results experienced by the British participants, and relayed them each week-end to WIDBM on 14 mc.

G2WS drops out of 10A, and G6YJ takes his place.

Group 10B.—Aerial work is also being investigated by this group. G.C. G6OO now has the "G2BI" system in operation, used with a 90-foot counterpoise for 1.7 mc. Series aerial tuning is employed. G6OF, also of Bridlington, has a 66-foot aerial with .003 mfd. in series. He is very anxious to have reports on his 8.5 watt signals on 1880 kc.

A T6ID run at 10 watts (suitably biased) is an unusual feature at G6UJ. Both he and G6FJ will be glad to hear from other 1.7 mc. stations who require schedules.

Group 10D has just been formed by G6GG, who has already enrolled BRS1245, 1211, 1060 and 1156 for some special 165 metre tests with him, to observe moon and weather effects. The assistance of more BRS men situated 50 miles or more north of the Tyne is elicited. G6GC (Mr. J. G. Carlson, 116, Ashgrove Avenue, Cleadon Park, South Shields) will be glad to hear from them.

Aerial Group (No. 12).

G2YU (Manager).

Only two reports are to hand this month from this group, which consists of G5FI, G5ML, G2YX, G2CJ, G6GV and G2YU.

G5FI has put up a half-wave Hertz, 264 feet long, for 1.75 mc. band, VF $\frac{1}{4}$ -wave, 70 feet high (free end), 40 feet at shack end, counterpoise not yet working and wants information from other members.

BOOK REVIEWS.

INDUSTRIAL ELECTRICAL MEASURING INSTRUMENTS.

By Kenelm Edgcumbe, M.Inst.C.E., M.I.E.E.,
F.Inst.P., and F. E. J. Ockenden, A.M.I.E.E.
553 pages and 392 illustrations. Published
by Sir Isaac Pitman & Sons, Ltd. Price 25s. net.

As its name implies, this book deals with workaday instruments and not the special laboratory types. The intelligent use of measuring instruments, which means the intelligent control of electrical circuits, must depend upon a knowledge of the principles, limitations and performance of instruments. It is the writer's experience that many radio amateurs and quite a few electrical engineers know far too little of these things, and their faith in any good-looking instrument is touching.

In this third edition of an authoritative book, the work has been completely revised and re-written, and now presents the reader with the latest information on a wide range of instruments. In this edition the authors have supplemented the diagrams by photographs of instruments or their parts; this adds much to the value and interest of the text.

Early chapters deal with accuracy of measurement, sources of error, and constructional details. Design and overload conditions are then treated, and, in passing, it is interesting to notice that a fuse-protected instrument is more likely to be damaged by a moderate overload than by a direct short circuit.

A chapter is devoted to measurement of resistance and insulation, and various applications of direct-reading instruments. Moving iron and moving coil ammeters and voltmeters, including multi-range instruments, receive a chapter each. Then rectifier-operated ammeters and voltmeters are described. This is one of the most recent developments in the measurement of A.C., and is particularly useful in the measurement of low alternating voltages. The rectifier used is the familiar copper-oxide type. Wave-form, temperature, and frequency errors are discussed, and this chapter will be of interest to radio engineers, to whom these instruments are particularly useful.

The chapter on thermal instruments deals with the expansion and thermo-couple types, both of vital interest to radio men, and the particular application of these instruments to radio frequencies is treated in some detail.

Fault and leakage indicators for live mains, electrical speed indicators, graphic instruments, distant indication or telemetering, instrument transformers, and measurements at extra high voltages, are the subjects of chapters.

There are many foot-note references to original papers throughout the book, and the diagrams are exceptionally clear.

This book is recommended to readers as a most valuable and interesting publication, produced in a high-grade way, and one which every electrical man should read.

T. P. A.

DAILY HERALD WIRELESS HANDBOOK, 1934.

By Douglas Walters. 116 pp., photographs, tables, and 36 diagrams. Published by the *Daily Herald* (1929), Ltd., 68, Long Acre, London, W.C.2. Price 6d. net.

This very useful little book is of special interest to amateurs, as its author is G5CV, of 5-metre fame. Mr. Walters is Technical Radio Correspondent to the *Daily Herald*, and as such is in an excellent position to judge the requirements of the broadcast listener who, home-constructor or not, has an intelligent interest in the how, why and wherefore of his set.

Under 52 headings, the subjects range from aerials to Empire broadcasting: from batteries to television: from Q.P.P. to visual tuning devices: from distortion to short-wave work: from "troubles" to cross-modulation. It is not possible in this short review to mention all the subjects that the author has treated, but in all of them he has given a clear and concise explanation which will be readily grasped by the untechnical reader. The treatment, though simple, is sound, and devoid of the peculiarities of most "popular" books on technical subjects.

An unusual subject for a book of this sort is mention of amateur radio; after a short section on the attractiveness of short waves and how to identify stations, a list of amateur prefixes is given. This is probably the first time that amateur radio has been dealt with in such a publication.

A list of the new European wave-lengths, a table of valve-holder connections for four, five and seven-pin valves, a table of the standard colour code for resistances, and a description of the symbols used in radio diagrams, all add to the usefulness of the handbook.

At the end of the book is a list of most of the better known commercial receivers, with photographs and short specifications.

Amateurs will find this book of interest, and it should prove popular with all broadcast listeners.

The author and publishers are to be congratulated on the tasteful and attractive appearance of the book, which is printed on good paper, and with a pleasing cover.

T. P. A.

Stray.

Mr. F. T. Wilson (G2XX) reports that unauthorised transmissions have again been recorded from a station using his call on 7 mc. Any information regarding its whereabouts should be sent to Headquarters. G2XX has only been operated on 1.7 and 56 mc. for the past twelve months.

Mr. Eburne (G2DK) wishes us to mention that his call is being pirated on the 1.7 mc. band, by a person using a poor quality telephony system. He does not use the 1.7 mc. for his own experiments.

HIC ET UBIQUE.

Trans-Ocean Records—W.B.E. Certificates—R.S.G.B. Reception Tests. —Slow Morse Practice—Calibration Section

G6CL—Change of Address.

As from March 25, our Secretary will be residing at 16, Ashridge Gardens, Arnos Grove, London, N.14. Telephone Number, Palmers Green 3255. Provincial members wishing to visit his station, are requested to ring Headquarters or the above number in advance. Ashridge Gardens is five minutes walk from Arnos Grove Station (Piccadilly Tube).

Field Strength Measurements.

The Editor will be pleased to consider for publication contributions from members dealing with Field Strength measurements. Information is also required regarding aerial current readings obtained at various points and with various input powers using single wire and zeppelin types of aerials.

Trans-Ocean Records.

We have pleasure in announcing that two R.S.G.B. members recently established a unique record for trans-ocean working. The members concerned are Mr. L. M. Mellars (ZL1AR) and Mr. C. Anderson (W6FFP), who have contacted each other across the Pacific Ocean on four amateur bands, viz., 1.7, 3.5, 7 and 14 mc. These stations have been in two-way communication over 300 times on various bands.

Another interesting triple band trans-ocean achievement stands to the credit of Mr. C. S. Taylor (VE1BV) who has recently worked Mr. Drewery (G6OY), of Hull, on 3.5, 7 and 14 mc. It is understood that the input used at the latter station did not exceed 25 watts during any of the QSO's. VE1BV and G6RB were already T.B.T.O.B.'s.

W.B.E. Certificates.

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

Name.	Call-sign.	Date (1934).
Z. H. Elsney ...	W6ENV ...	Jan. 2
H. Y. Sasaki ...	W6CXW ...	" 2
N. F. Ollivier ...	VK6FO ...	" 5
A. N. J. Ley ...	G5DM ...	" 5
H. Hodgins ...	EI5F ...	" 16
R. Heiges ...	W6EXQ ...	" 26
H. D. Newland ...	G5ND ...	" 26
J. Drudge Coates ...	G2DC ...	" 31
C. H. L. Askham ...	G6TT ...	Feb. 6
C. W. Shillam ...	G2XU ...	" 9
K. F. Iwata ...	W6FZY ...	" 22
R. G. Drewery ...	G6OY ...	" 26
J. Mahieu ...	ON4AU ...	" 26

G5AW on 56 mc.

Commencing Monday, March 19, G5AW will transmit from 22.45 G.M.T. to 23.15 G.M.T., as per schedule below. To assist in the identification of these transmissions at a distance, a distinctive tone will be used. The frequency of this tone will vary between 800 and 1,200 cycles, i.e., in one second the frequency will change gradually from 800 to 1,200 cycles, and then back to 800 cycles. When the call sign is being sent in morse (modulated C.W.) the tone will remain steady at 1,000 cycles.

Schedule.

22.45–22.55. Call sign in tone, followed by the frequency modulated tone for eight minutes, then an announcement in telephony.

22.55–23.00. Listening period for replies.

23.00–23.10. QSO any station heard replying; when no reply is received, the frequency modulated tone will be repeated until 23.07, when a gramophone record will be played, followed by an announcement in telephony, and the call sign in morse.

23.10–23.15. Listening period for replies.

The frequency used will be 57.1 mc., and the input power will be approximately 30 watts modulated to about 90 per cent.

The schedule will be followed every Monday evening until further notice.

All reports will be welcomed, especially those from distances exceeding eight miles.

G5AW is situated on very high ground at Streat-ham, S.W. London, and from the station a clear view is obtained to the North, East and West, consequently the field strength should remain high for a considerable distance.

By means of these tests it should be possible to collect valuable data regarding absorption in and around London, and at the same time it is hoped they will assist 56 mc. enthusiasts who are at present deterred by having no definite station with which to co-operate.

R.S.G.B. Reception Tests.

The next series of Reception Tests arranged for March-April are given below. For rules governing these tests, members should refer to page 84 of the September, 1933, issue of the BULLETIN. Logs for the series below should reach Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4, by April 18, when they will be circulated as a Budget to all participating.

SERIES 26.

Test Letter.	Date, 1934.	Period, G.M.T.	Band, mc.
A	Sun. Mar. 18	00.00–01.00	7
B	" " 18	10.00–11.00	56
C	" " 18	11.30–12.30	28
D	Wed. " 21	20.30–21.30	3.5
E	Sun. " 25	00.00–01.00	1.7

Test Letter.	Date, 1934.	Period, G.M.T.	Band, mc.
F	" " 25	09.00-10.00	14
G	Fri. " 30	07.00-08.00	7
H	Sat. " 31	07.30-08.30	14
I	Sun. Apr. 1	10.30-11.30	56
J	" " 1	22.30-23.30	3.5
K	Mon. " 2	09.00-10.00	1.7
L	" " 2	20.00-21.00	28
M	Thur. " 5	21.00-22.00	7
N	Sat. " 7	18.00-19.00	14
O	Sun. " 8	10.00-11.00	1.7
P	" " 8	11.00-12.00	56
Q	" " 8	17.00-18.00	28
R	Wed. " 11	21.30-22.30	3.5

Slow Morse Practices

Below will be found a schedule covering the March-April period. Slow Morse practices will be given for periods of ten minutes commencing from the times shown. Actual Test matter will be taken from past issues of the BULLETIN, and to enable checks to be made easier the page and issue will be given after the end of each test. Reports on this service are requested in order to ascertain areas covered by the various frequency bands. Will those members interested or willing to help communicate with Mr. T. A. St. Johnston, 28, Douglas Road, Chingford, E.4?

SCHEDULE OF MORSE PRACTICE TRANSMISSIONS.

Date.	1934.	G.M.T.	Frequency.	Station.
March	17	...	15.00	7,190.2 kc. G2CY
"	17	...	15.30	1,854 kc. G6FJ
"	17	...	22.50	7,110 kc. G6RN
"	18	...	10.00	1,828.3 kc. G2II
"	21	...	22.50	7,110 kc. G6RN
"	24	...	15.00	7,190.2 kc. G2CY
"	24	...	15.30	1,854 kc. G6FJ
"	24	...	22.50	7,110 kc. G6RN
"	25	...	10.00	1,828.3 kc. G2II
"	28	...	22.50	7,110 kc. G6RN
"	31	...	15.30	1,854 kc. G6FJ
April	4	...	22.50	7,110 kc. G6RN
"	7	...	15.00	7,190.2 kc. G2CY
"	7	...	15.30	1,854 kc. G6FJ
"	7	...	22.50	7,110 kc. G6RN
"	11	...	22.50	7,110 kc. G6RN
"	14	...	15.00	7,190.2 kc. G2CY
"	14	...	15.30	1,854 kc. G6FJ
"	14	...	22.50	7,110 kc. G6RN

Calibration Section.

MANAGER: A. D. GAY (G6NF).

N.P.L. 1,780 kcs. Standard Frequency Transmissions.

In order that experimenters may have a more convenient figure for the checking of their 100 kc. frequency standards, we are advised by the P.M.G. that the Director of the N.P.L. has agreed to change the above transmission from 1,785 kc. to 1,780 kc. This will enable those who possess the equipment described in the T. & R. BULLETIN for January, 1933, to make a direct frequency comparison, and more easily adjust their apparatus. This change was effected on March 6, 1934.

R.S.G.B. Standard Frequency Transmissions.

On payment of a fee to the G.P.O., check measurements on two of our calibration transmissions were carried out at St. Albans. These figures are given

below for the benefit of those members who make use of the transmissions. It will be seen that the greatest divergence from the nominal frequency is 100 cycles, which amounts to 27 parts in a million and is well within our expectations of 0.01 per cent

December 31, 1933.

January 28, 1934.

Error.		Error.
3524.96 — 40 cycles.		3525.01 + 10 cycles.
3624.96 — 40 "		3625.01 + 10 "
3724.98 — 20 "		3725.10 + 100 "

CALIBRATION SECTION FEES.

CRYSTALS, 1s. 6d. each; FREQUENCY METERS, 2s. 6d. for five points, plus 6d. for each additional point. These prices do not cover cost of return postage, which must in all cases be remitted as a separate amount.

Crystals and frequency meters should be sent for calibration, at owner's risk, to Mr. A. D. Gay, 49, Thornlaw Road, West Norwood, London, S.E.27.

QRA Section.

Manager: M. W. PILPEL (G6PP).

NEW QRA'S.

- G2OC.—L. SEAL, 140, Wollaton Road, Beeston, Nottingham.
- G5BB.—A. H. BRUCE, 15, Oldhill Street, Stamford Hill, London, N.16.
- G5BO.—A. BOA, 4, Tewkesbury Terrace, London, N.11.
- G5CF.—J. CRAWFORD, 129, Buccleuch Street, Glasgow, C.3.
- G5CH.—C. HAMPSON, 73, Smedley Road, Cheetham, Manchester, 8.
- G5CT.—A. C. TAYLOR, 12, Selborne Terrace, Shipley, Yorks.
- G5DV.—C. A. REID, 35, Courthouse Gardens, London, N.3.
- G5KG.—G. W. SLACK, "Inglenook," Racecourse Road, Mansfield, Notts.
- G5LT.—E. S. ELLIOT, 21, Oswestry Road, Firth Park, Sheffield, Yorks.
- G5MH.—D. P. McNEISH, 14, Sunningdale Drive, Skegness.
- G5QS.—G. H. S. BRADLEY, "Rosamunde," Blackhorse Lane, Clyst Honiton, Exeter, Devon.
- G5QU.—C. S. BROWN, 16, Canterbury Road, Redcar, Yorks.
- G5SL.—W. H. SLOUGH, 3, Abbots Gardens, London, N.2.
- G5WI.—L. HILL, 53, Ravenhill Road, Lower Knowle, Bristol.
- G5ZD.—C. K. DREW, 27, Ravensbourne Park Crescent, Catford, London, S.E.6.
- G6CL.—J. CLARRICOATS, "Ciel," 16, Ashridge Gardens, Arncliffe, N.14.
- G6CY.—A. S. CLACY, "Winwood," 490, Portland Road, West Hove, Sussex.
- G6FO.—A. J. E. FORSYTH, 4, Buckingham Place, Clifton, Bristol, 8.
- G6MB.—A. J. BUTTRESS, 101, Manor Lane, Sunbury-on-Thames, Middlesex.

G6MS.—A. H. MASON, 109, Crofton Avenue, Croftfoot, Glasgow, S.4.
 G6XR.—H. V. COOK, "Karingal," 16, Fletchamstead Highway, Coventry.
 2AAM.—J. S. GINGELL, 22, Derby Road, Swanwick, Derby.
 2ACP.—H. WHALLEY, 3, St. Alban's Road, Darwen, Lancs.
 2AZG.—M. L. HOOKER, "Blair Athol," Prestwood Road, Wednesfield, Staffs.
 2BCM.—L. C. HODGE, 2, New York Villas, Robin Hood's Walk, Boston, Lincs.
 2BFQ.—M. E. EDWARDS, 34, Lavender Vale, Wallington, Surrey.
 2BGD.—F. J. CATON, 2, East Acton Lane, London, W.3.
 2BUA.—R. H. GILL, Grand Bœuet, Guernsey, Channel Islands.
 2BXL.—H. J. WESTON, 276, Lodge Causeway, Fishponds, Bristol.
 EI7C.—J. B. SCOTT, "Kilmalcolm," Fortfield Road, Terenure, Dublin.
 The following are cancelled: G5YN, G6SK, G6VR, 2AFM, 2ANH, 2AOU, 2AXA, 2BFF, 2BPC, 2BQL.

QSL Section.

Manager, J. D. CHISHOLM (G2CX).

We have not as yet received a reply from the Post Office concerning the query raised in these notes last month. Information as to the correct amount of postage payable on QSL cards will be published in these columns as soon as a ruling has been obtained.

Stop Press

In a letter just received from the Post Office we are informed that QSL cards as normally filled in by amateurs acknowledging QSO's or reports are NOT admissible at the postage rate of ½d. There are nine conditions under which they would be acceptable at this rate, but as these conditions would render the card valueless from an amateur point of view it is not necessary to go into details.

Further to the matter of unclaimed cards commented on in the February issue, we note that the N.R.R.L. of Norway has suggested the recognition of a new Q abbreviation meaning "I shall NOT QSL and I do not want a card from you." It is to be hoped that this will come into general use, for it should mean a great reduction in the number of cards which stagnate in the files of the Section.

NEW MEMBERS.

HOME CORIOKATES

G. SYKES (G2JC), 13, Longford Street, Gorton, Manchester.
 T. F. HALL (G2TH), Oak View, Colney Heath Lane, St. Albans, Herts.
 A. C. DUNN (2ALC), 4, Edgecliff Villas, Flamborough Road, Bridlington.

N. THOMAS (2BUN), Pen-y-Groesford, Old Highway, Colwyn Bay.
 W. T. EYTON (BRS1325), Plas-yn-cwm, St. Asaph, Flintshire (elected January).
 F. O. DRAPER (BRS1343), 42, Gatis Strett, Wolverhampton, Staffs.
 T. W. POLLARD (BRS1344), 14, Cranage Crescent, Wellington, Salop.
 G. NUTTER (BRS1345), 196, Dickson Road, N.S., Blackpool, Lancs.
 J. BUTCHER (BRS1346), Kentaun, Hookwood, Horley, Surrey.
 D. S. PATTON (BRS1348), Lifford, Co. Donegal, I.F.S.
 H. LEISHMAN (BRS1349), Ashbank, Old Polmont, Stirlingshire.
 F. BANHAM (BRS1350), 27, Cowper Road, Bromley, Kent.
 P. C. MORTIMORE (BRS1351), Burnworthy, South Nutfield, Surrey.
 C. E. WILLINGHAM (BRS1352), 6, Hale Road, Tottenham, N.17.
 S. BRADBURY (BRS1353), 15, Hollingwood Mount, Lidget Green, Bradford.
 W. H. WAITING (BRS1354), 3, Alderville Road, Walton, Liverpool, 4.
 H. J. JENKINS (BRS1355), Rectory Lane, Brasted, Kent.
 H. W. FISHER (BRS1356), 12, Rawlings Road, Bearwood, Smethwick.
 L. A. YOUNG (BRS1357), 39, Reverdy Road, S.E.1.
 L. L. NEAVEVERSON (BRS1358), Radio House, Peterborough.
 R. N. MORTIMER (BRS1359), Castle Hedingham, Essex.
 N. A. L. TIMBERS (BRS1360), 10, Parramatta Street, Rawtenstall, Lancs.
 G. H. BILLISON (BRS1361), 84, High Street, Hampton, Middlesex.
 W. COLLINS (BRS1362), 1, Maude Road, Walthamstow, E.17.
 J. V. WAINE (BRS1363), Compton, Wolverhampton, Staffs.
 K. M. C. EVANS (BRS1364), Hillside, Llanelli, S. Wales.
 S. CLARK (BRS1365), 8, Clumber Street, Melton Mowbray, Leics.
 J. J. MALING (BRS1366), 6, Mount Pleasant, Diss, Norfolk, and Wireless College, Colwyn Bay.
 W. J. RIDLEY (BRS1367), Ivy Cottage, Brodick, Arran.
 D. ROSS (A), 8, Victoria Place, Haverfordwest, Pem.
 DOMINION AND FOREIGN.
 J. C. DAVISON (ZD2D), c/o P.W.D., Lagos, Nigeria.
 ANDRE J. SERVE (F3FB), 105, Rue Sadi-Carnot, Alger, Algeria.
 H. B. CHALLACOMBE (HL1SA), c/o I. & L.C., The Briars, St. Helena.
 C. M. CORINALDI (VP5CC), Port Antonio, Jamaica, B.W.I.
 W. L. HARSTON (VK4RY), 72, Riverton Street, Clayfield, Brisbane.
 K. F. IWATA (W6FZY), 129, S. Mathews Street, Los Angeles, California, U.S.A.
 R. G. F. BLAKE (ZL3AJ), 66, South Belt, Rangiora, New Zealand.
 N. T. REYNOLDS (BERS214), Apartado 2138, Bogota, Colombia, S. America.
 A. B. RUCK (BERS215), Egypt Signals, Abbassia, Cairo.
 J. H. DAVIES (BERS216), Curra Gundi, Weemelah, N.S.W., Australia.
 C. H. GRAVES (BERS217), H.M.S. Royal Sovereign, c/o G.P.O.
 C. J. MADDEN (BERS218), Woodlands Estate, Peermade P.O., S. India.
 P. W. MOORES (BERS219), Beam Wireless Station, N. Petherton, Som. (until May).
 P. C. DAS (FRS31), 130, Hrishikesh Das Road, Ekramapore, Dacca, India.
 O. L. WEINGARTH (FRS32), 1940, Broadway, Denver, Colorado, U.S.A.

Silent Keys.

News has reached us from Mr. T. P. Allen (GI6YW) that Dr. J. H. Gillespie (ex-GI5GH) was killed recently in a motor accident. Dr. Gillespie was well known to many older members of the Society, and his tragic death will come as a shock to those who remember him for his attractive personality and intellectual abilities. Dr. Gillespie obtained his B.Sc. degree, with honours, and won a gold medal at the time of taking his M.D. degree. He also won the British Medical Association prize essay in 1930. Our sympathies are extended to his parents and many friends.

* * *

It is also with deep regret we have to announce the death of Mr. Harold Vernon Reynolds. Mr. Reynolds was the Wireless Officer attached to the British Guiana Boundary Commission, and would within the next few months have been on the air as VRIHR, using a crystal controlled transmitter similar to the one described in the July and August, 1933, BULLETINS.

His untimely death occurred in the Essequibo River, when a boat capsized in the Kuyaliwak Falls. Our sympathies are extended to his parents, relatives and many friends.

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.

GRID MODULATION.

To the Editor of THE T. & R. BULLETIN.

DEAR SIR,—Having read Messrs. Livesay Bros. excellent article on Grid Modulation in the January BULLETIN, and noted their "challenging" commencement and finale, I hesitated to take up my pen. Having waited until the arrival of the February issue and finding not a single reply or comment, I am constrained to reply to their provoking challenge, even though it may be only on the behalf of one who was once a brother amateur.

As long ago as 1925 or '26, I was engaged on some shortwave experiments with G6AI, Mr. Collings, who was then living in Croxted Road, Dulwich, and one of the circuits he used was identical with the method used by the authors of the article. The valve used was an LS5 with 1,000 volts on the anode. The drive was supplied by crystal controlled frequency doublers. Mr. Collings' opinion of the method was expressed to me as follows: That so long as the final valve did not draw grid current the quality was excellent, but the output was small for the high anode voltage.

As Mr. Collings is now in South Africa, it is not likely that the BULLETIN containing the article will be seen by him.

If I may be permitted a mild criticism, I would like to say that I am of the opinion that, so far as efficiency (H.F.) is concerned, watts input to H.F. watts output, the circuit is not as good as Class C, though economy may be effected in that it demands much less drive and, of course, much less power to the modulation arrangement than choke control or other methods. The input and H.F. output for a given H.T. anode voltage are very limited in comparison with Class C.

In Fig. 11 the authors show the final valve as a T61D handling 100 watts with an anode voltage of 1,200. I am personally rather sceptical that this input can be obtained with the valve worked in the condition described in the article. Further, why is the previous stage described as a buffer? Surely it would be better to work this stage Class C and get the utmost H.F. output for its input. As the last stage does not run into grid current it will not throw back a varying load to the DO24, and in consequence, this stage should look like a continuous steady load to the C.O. Possibly it is an error of nomenclature to call it a buffer. I believe I am right in saying that the last stage is operating in the conditions commonly employed in a buffer stage except that it is not followed by a stage to which it might act as a buffer.

Yours faithfully,

P. JOHNSON (G5IS).

To the Editor of THE T. & R. BULLETIN.

DEAR SIR,—In reply to Mr. Johnson (G5IS), I am sorry to have misled him by the loose expressional employment of the term "buffer." I should have termed the middle amplifier of the chain a "Class C amplifier"—which it is.

The reader will notice that I do not tabulate electrical efficiency as one of the virtues of grid modulation. The modulating apparatus concerned is the attractive feature.

My figure (11) is rather misleading, as it is only meant to show the inputs used for the particular form of "spurious" grid modulation employed under full power conditions, and Fig. 12 goes with it—neither refer to pure bias modulation. Actually, my description of pure bias modulation bears upon no especial transmitter chain arrangement, but is purely a general thesis.

I note that the original experiments of G6AI made use of a long grid base, and I infer that they would have modulating and drive travel of about 200 volts peak which is many times more than that required for operation of a T61D at 1,200 volts on the anode, so that the ratio Normal Output/Average modulated Output would be much smaller.

The disadvantage of modulating the grid of an intermediate stage is that loss of drive to the subsequent Class B amplifier becomes apparent in the aerial circuit! In spite of this, pure grid modulation is definitely more efficient when practised in an early stage, except perhaps in the case of push pull. We regret that we have not yet had the opportunity to test this circuit arrangement and are open to corrections upon this point. We included it in our article for the sake of fullness and on account of the mention of harmonic elimination.

Yours faithfully,

A. E. LIVESEY, D.F.H. (G6LI).

INTERFERENCE TO B.C.L.'s.

To the Editor of THE T. & R. BULLETIN.

DEAR SIR,—I have read with interest the first two articles in the series "The Elimination of Interference," and would like to congratulate the Interference Committee on their production. Interference with broadcast, affects not only the listener in the narrow sense but to a greater degree the transmitter himself, and it would be the worst possible service to our cause if amateurs neglect to take the precautions which are laid down in the articles. One hears so much of the "high-hat" talk amongst amateurs when speaking of B.C.L. interference, and I feel that it should be brought home to these transmitters that if any of our privileges are lost it will be due in no small measure to the building up of a hostile public opinion by those who will not take the trouble to treat the B.C.L. as a human being. It is criminal for any amateur to neglect to take steps to reduce interference from his transmitter after the publishing of the articles in question.

There is no necessity to knuckle under to the B.C.L. for it is up to him to make his contribution to the clearing up of the trouble as well, but we can well do without the dogmatic attitude of a (fortunately small) minority of transmitters.

I am, etc.,

"100 WATTER."

NOTES and NEWS



BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).

(Cumberland, Westmorland, Cheshire, Lancashire.)

MR. J. NODEN (G6TW), Fern Villa, Coppice Road, Willaston, near Nantwich, Cheshire.

DISTRICT 2 (North-Eastern).

(Yorkshire (West Riding, and part of North Riding), Durham, and Northumberland (Middlesbrough is in this district.)

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.)

MR. W. W. STORER (G6JQ), 28, Blanklyn Avenue, Leicester.

DISTRICT 5 (Western).

(Hereford, Oxford, Wiltshire, Gloucester.)

MR. W. B. WEBER (G6QW), 2, Balmoral Road, St. Andrews, Bristol.

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.)

(To be appointed later.)

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 (G6IA), "Malincourt," Grosvenor Ave., Rhyl, Flintshire.

DISTRICT 12 (London North).

MR. S. BUCKINGHAM (G5QF), 19, Oakleigh Road, Whetstone, N.20.

DISTRICT 13 (London South).

MR. H. D. PRICE (G6HP), 12, Hillcrest Road, Sydenham, S.E.26

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. A. O. MILNE (G2MI), "Southcot," Larkfield, Kent.

DISTRICT 17 (Mid-East).

(Lincolnshire and Rutland.)

MR. A. E. LIVESY (G6LI), Stourton Hall, Horncastle, Lincs.

DISTRICT 18 (East Yorkshire).

(East Riding and part of North Riding.)

MR. T. WOODCOCK (G6OO), 8, George Street, Bridlington.

SCOTLAND.

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

NORTHERN IRELAND.

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

Notice to D.R.s.

We wish to draw attention to the fact that District Notes should contain only items of general interest. Several D.R.s continue to report upon the individual activities of members, whereas this type of information is not required except when outstanding achievements have been recorded. District notes will in future be drastically cut to conform to this notice.

D.R.s are requested to observe the arrangement of their notes in this issue for future reference.

DISTRICT 1 (North-Western).

THERE is considerable activity in the Liverpool area, as was evidenced by an attendance of 26 members at the February meeting, when National Field Day and Conventionette plans were discussed. In connection with the former event, arrangements have been made for the Manchester group to

operate the A station, and for the Liverpool group to take charge of the B station. At the Annual Convention, to be held in June, members from No. 11 District will be especially welcomed.

An attendance of 18 was recorded at the last Manchester meeting when G2OI delivered a talk on Interference Elimination. BRS1212, 1270, and 2BZY were welcomed as new members to this meeting.

G2RA and G2OI have now succeeded in working duplex fone on the 1.7 mc. band with only a 60-kc. separation between carriers. G2HL is using series modulation, and particularly asks for reports from A.A. or B.R.S. members living more than 60 miles distant. He is using the 1.7 mc. band.

The following report active:—Liverpool Area: G2IF, 2KZ, 2OA, 2QV, 2RF, 2XR, 5JD, 5GY, 5XD, 6CX, 6DO, 6FA, 6GL, 6JT, 6OM, 6QR, 6TT, and 2BPU. Manchester Area: G2BK, G2DH, 2HL, 2HM, 2RA, 2DF, 2WQ, 2OI, 5MB, 5OZ, 5VN, 5WR, 5XJ, 5XM, 5YD, 5ZT, 6AX, 6GV, 6QA, 6ZS, 6ZU, 2AZT, 2BZY, BRS1114, 1212, and 1270.

DISTRICT 2 (North-Eastern).

Nine members were present at the last meeting held in Sheffield when N.F.D. was discussed. G5HK will operate the B station. A 56 mc. field day will be held in March. The usual group of stations report active from Newcastle and district. A field day will be held by the N.E.A.T.S. on June 3.

DISTRICT CALENDAR**March/April, 1934.**

March 16. District 2, Sheffield Group Meeting.

* **March 18.** District 3, Conventionette, Hope and Anchor Hotel, Edmund Street, Birmingham. Assemble 11.45 a.m. Tickets from G5VM.

March 21. District 15, at G6OC, 59, Bramley Road, Ealing (next to Northfields District Station), 7.30 p.m.

March 21. District 5, at Talbot Inn, Gloucester, 7.30 p.m.

March 22. District 4, Leicester Amateur Radio Society Dance, Waterloo Hall, Leicester. Tickets 2s. from G6JQ.

March 24. District 12, at Ark Café, Temple Fortune, Golders Green, N.W., 7.30 p.m.

March 25. District 4, Derby Radio Society Meeting. Lecture by G2SD, "Frequency Doublers."

March 27. District 4, Leicester Amateur Radio Society. General Meeting.

March 27. District 14, at G6UT, 28, Douglas Road, Chingford, 7.30 p.m.

April 1. District 9, Meeting at Cromer or Norwich. Full particulars from G2XS.

April 4. District 5, at Talbot Inn, Gloucester, 7.30 p.m.

April 5. District 5, at Full Moon Hotel, Bristol, 7.30 p.m.

April 5. District 13, South London and District Transmitters' Society, at West Norwood Brotherhood Hall, 7.30 p.m.

April 8. District 4, Derby Radio Society Lecture, "Modulating Systems."

April 8. District 7, at G6GS, Bermuda Cottage, Warren Road, Guildford, 2.30 p.m.

April 8. District 2, Newcastle Group Meeting, 7.30 p.m.

* **April 8.** District 10, Conventionette, Queen's Hotel, Newport. Assemble 11.30 a.m. Tickets 4s. 6d. from G2XX.

* **April 10.** District 4, Leicester Amateur Radio Society. Dinner, Turkey Café, Leicester, at 7.15 p.m.

* The Secretary will represent Headquarters at these functions.

DISTRICT 4 (East Midlands).

B.E.R.U. contests claimed the attention of many members, including G5YP, who made his initial VK and ZL contacts. G6MN continues to assist the Doncaster Police during week-ends.

G2SD reports the Derby group active, whilst G5YF, C.R. for Northants, informs us that the Kettering Radio Society held a very successful dinner and dance on the 25th ult.

From Leicester, G5VH reports that the local society is well supported, but activity reports are scarce.

G2IO states that the Nottingham monthly meetings will be resumed on the 24th inst. at the Reform Club, Victoria Street. The meetings will commence with tea at 5 p.m. Members are requested to advise G2IO if they intend to be present, so that accommodation may be booked.

DISTRICT 5 (Western).

The February meeting of the Bristol section was well attended, but the C.R. expresses the hope that those who have not yet supported these gatherings will do so in future. The meetings are held on the first Thursday of each month at the Full Moon Hotel, at 7.30 p.m. At the last meeting, 2AMS, of Penzance, was welcomed; a similar welcome will be extended to other R.S.G.B. members who are in the Bristol area at the time of meetings. Commercial interference and unlicensed local transmissions were discussed. Information regarding the latter will be welcomed by the C.R.

Congratulations are extended to Mr. Leslie Hill on obtaining his full call, G5WI. Mr. Hill (ex-2AGM) is responsible for the Society's B.O.C. work.

The Gloucester section meetings held every first and third Wednesday at the Talbot Inn, Gloucester, are well attended. This section will be taking an active interest in N.F.D. and other field-day events.

The Wiltshire section keep in close touch through their letter budget, contributions to which should reach G2BI by the last day in each month.

The Oxfordshire group are active and many station visits are arranged. Congratulations to G2DU, who has qualified for a W.B.E., and also to BRS1267, who is now 2BYC.

The D.R. wishes to thank all members who have reported to their C.R., and asks that good support be given to N.F.D.

DISTRICT 6 (Western).

Most of the stations in the District seem to be active and the Budget is still going well. Indeed, the way in which this has been maintained by the members during the last couple of years is a source of great satisfaction to the D.R. The contributing members are certainly doing their part of the job well.

The chief interest of the month was naturally the B.E.R.U. tests, the QRM on 7 mc. was at all times bad, and in connection with this point the D.R. would like to know what form it took elsewhere, as in this District it seemed to come more from British stations 100 to 300 miles away than from further afield. In London, for example, most of the QRM caused by locals would be

BRS1098 (Leeds) is obtaining excellent results with the O-V-O receiver described in the August, 1932, BULLETIN, and has also built a two-way "send and receive" oscillator for morse practices. [Short article, please.—Ed.]

immediately skipped over when searching, merely because their strength would give them away, but here much time was wasted through holding a "test Beru" at R4 or 5, only to find repeatedly that it was from a G. And weren't some of those calls lengthy!!!

The following stations are known to be active: G5GD, 5QA, 5WY, 5QS, 5YR, 6RP, 2BL, 6II, 2HF, 5VL, 6QH, 2FN, 5YB, 6KC, 6XD, 2CI, 5SY, BRS836 and BRS1089. [Please arrange in order next time, it looks better!—Ed.]

DISTRICT 7 (Southern).

Activity in the B.E.R.U. contests has been very marked in the district, and although no really outstanding scores have been made, some useful totals have accrued, and we hope to figure well up in the results!

The Farnborough meeting was the best attended "provincial" meeting we have had, and we were pleased to welcome so many new members. It has been suggested that a definite agenda is fast becoming necessary now that the attendance at

STANDARD FREQUENCY TRANSMISSIONS.

SUNDAY, MARCH 25th, from G6NF
London.

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

Accuracy within 0.01 per cent.

meetings is so much larger than when we started, therefore this will be discussed at the next meeting, which is to be held in Guildford on Sunday, April 8, 1934.

DISTRICT 8 (Home Counties).

This District held its first meeting in the Watford area on February 7. There was an excellent attendance and arrangements were made to continue these meetings every fortnight. The C.R. reports that there was a poor attendance at the second meeting, but in spite of this he fully intends to continue and asks for more support.

The D.R. accepts sole responsibility for cancelling the provisional arrangements for the Cambridge conventionette. In so doing he had in view the interests of the majority of the members of the District and arrangements are now being discussed for a joint conventionette with District 12, to be held during the summer, possibly at St. Albans.

Reports received from all the C.R.'s show that the usual stations are active and give no item of outstanding interest for these notes.

DISTRICT 9 (Eastern).

G5UK, C.R. for Essex, reports that a dozen members were present at the February meeting held at G5VQ. G5UK has found the new Marconi MPT.42 ideal for 3.5 and 7 mc. CO and doubler stages, but has not succeeded in obtaining doubling effects on 14 mc. using a 7 mc. crystal. Suggestions will be welcomed. G2DQ is engaged on tests with an E.C.O. G2WG is testing speech amplifiers fed from A.C. G5VQ and 6IF are piling up DX. G6QX returned to the air and worked VK.

Portable G5UK will be operating on 56 mc. at Westcliff during March [suggest co-operation with the new R.E.S. 56 mc. groups.—Ed.]. The C.R. is anxious to arrange a field day on this band, and asks for assistance. G6WQ, 2XP and 2BWP are still interested in this work.

A volunteer is required in West Essex to offer his QRA for the April meeting.

DISTRICT 10 (South Wales and Momouth)

The item of most importance this month is our Conventionette on April 8. At the time of writing all arrangements have been completed and it now rests with members to give their utmost support to make the event a great success. It is also hoped that full advantage will be taken of the excellent opportunity to visit the Post Office Repeater Station. A hearty invitation is extended to all R.S.G.B. members within reach of Newport.

Of the very few reports to hand it is noted that G5GW has had further success with QRP work on 1.75 mc. having worked OZ with only 1.4 watts. On the same band under Group schedules, G5WU was fortunate in working WIDBM on both February 3 and 4; his signals were also received R4 by VE1AO. Reference to this contact, together with remarks on the aerial system used will be found under Group 10A C.B. Notes. Members are invited to submit reports of this latter character for inclusion in these Notes.

Practically all members are active, amongst whom we have G2JL, 2PA, 2SN, 2UL, 2XX, 5BI, 5FI, 5KK, 6PF, 6YJ and 2BPG, and all were present except our Swansea colleagues, at a successful meeting on February 15.

BRS727 reports receiving five W. Fone stations on 1.75 mc. on the morning of February 25.

We were pleased to welcome Mr. Pond (chairman) and Mr. Mudford (secretary) of the Blackwood Radio Society, at our last meeting, and it is hoped they will join us on future occasions.

DISTRICT 11 (North Wales).

Owing to business, it has not been possible to draw up detailed notes this month; this omission will, however, be rectified in April. Messrs. Mitchell and Spillane have been appointed C.R.s for Denbighshire and Flintshire respectively; members in these counties are asked to report to their representatives.

DISTRICT 12 (London North).

The experiment of holding the February District meeting on a weekday evening at the Ark Café, Golders Green, proved a success, 24 members being present. Following a short business session, Mr. D. N. Corfield (G5CD) gave an interesting talk

on the progressive stages in the development of his station from 1922. Historical photographs of early gear were examined with critical eyes by the "new school" whose experience does not go back to the old days of "1000 and 440."

Arrangements were made to hold future meetings on Saturday evenings one month, and weekday evenings the next; by this means it is hoped to cater for all members. The March meeting will be held at the Ark Café on Saturday, 24th inst., at 7.30 p.m., when Dr. Bloomfield (G5MG) and Mr. T. Vickery (G5VY) will discuss 56 mc. problems.

It is anticipated that the District's N.F.D. "A" station will, as last year, be located at Welwyn, but the "B" station may "take root" in the Barnet, Potters Bar area. A specially designed portable superhet is being constructed by G5CD for the former station.

Fifteen members have promised to attend a Conventionette at St. Albans to be arranged by No. 8 District.

The B.E.R.U. Transmitting Contests were supported by G2IM, 5BO, 6CL, 6WU and the D.R. Several BRS did well in the receiving event. G2SX has recently worked his first W, whilst G5BO and 5DV are raising good DX on low power. G6WU with 25 watts obtained a W.B.E. during the Junior Contest working ZL, VK, VU, YI, SU, VE.

The District Letter Budget continues to be well supported by a regular dozen contributors. The D.R. again draws attention to the fact that reports for inclusion should reach him by the 1st of each month.

DISTRICT 13 (London South).

G6HP wishes to thank Council for appointing him Representative and assures the members in his District that he will make every endeavour to carry out the duties to the best of his ability.

From various sources it is learnt that new transmitting and BRS members are joining the Society. The D.R. and Mrs. G6HP will be pleased to see these members any evening, but please ring Sydenham 3677 first.

South London was well represented in the recent B.E.R.U. Contests, but, as usual, no direct reports have been received.

Attention is drawn to the fact that the South London D.T.S. meetings are held at 8 p.m. on the first Thursday in each month at the West Norwood Brotherhood Hall. A cordial welcome awaits all newcomers.

DISTRICT 14 (London, East).

Amongst the topics discussed at our February meeting, held at Chingford, were N.F.D., "Piracy" and attendance at District meetings. With regard to the latter it was pointed out that members who geographically reside outside the confines of the District (Eastern Postal Area) are always welcome to attend.

At our next meeting, to be held on Tuesday, March 27, an interesting film will be shown by 2APS.

DISTRICT 15 (London, West and Middlesex).

A dozen members and visitors attended the last district meeting, including several from the Thames Valley. It is to be hoped we shall have the pleasure of seeing them at other gatherings. The details for

the next meeting will be found under the District Calendar.

Several stations took an active interest in the B.E.R.U. tests.

The National Field Day arrangements are well in hand, and every endeavour will be made to make an even better showing than last year.

So far only one letter—from G6LJ—has arrived for the budget, and is the most interesting letter we have had for many a long day. Congratulations to G2KI, who worked five W's on 14 mc. in one afternoon, with an input of 7 watts. G6CJ spent 40 hours at the key during the tests and can show quite a good score in both events. G6WN did not do too well in spite of many hours and sore ears.

DISTRICT 16 (South-Eastern).

With, at the most, half a dozen exceptions, every active station in Kent has reported this month.

The North Kent Club held their usual monthly meeting at G2HG when nine were present. The next meeting is at G5OJ on March 17.

Tunbridge Wells is active, 2BAV recently demonstrated Television to the Press. The possibility of local meetings is getting nearer.

Folkestone is a hive of activity, and the local members meet every Monday. G6XB's new transmitter is nearly complete and looks very "Commurrrshal"!

G2IC has a completely new portable 56 mc. outfit working, and sensational developments are expected shortly.

It is intended to run N.F.D. efficiently this year, and with this in view it has been arranged that the D.R. will take charge of 1.7 mc. and 3.5 mc., whilst G2IC (C.R. for Kent) will see to the other two bands. Everyone in the district is expected to help, and members are asked to write to one of the above. Last year there were only two operators for the first 18 hours, and then a third came along! The list of stations who have reported is too long for publication, although it is worthy of a frame!

From Sussex, only G5JZ reports active. He recently had a visit from the county press, and had an excellent write up of his station published.

G6AI, of Broadstairs, will be working regularly on 56 mc. (See Stray elsewhere.)

Members will be sorry to know that G5MP is very seriously ill, and although he seems now to have turned the corner, his condition is very grave; we all wish him a speedy recovery to health and strength.

DISTRICT 17 (Mid-East).

"The Battle of B.E.R.U." has been the item of chief interest, and it is known that G5BD, G6AK, G6LI and 1317 have been contestants.

It is thought that one or two stations did not compete because they did not feel that their apparatus was doing its best. I am reminded of the Boy Scouts' motto, and greatly regret that more members do not realise the severe demands upon the efficiency of equipment which the B.E.R.U. Contests impose. Too many attribute results to luck or power, the scores of last year's Junior Test should give them courage!

In the Grimsby area the transmitting members are in continual touch over the air, and all meet regularly in person.

Conditions in No. 17 during the Senior Contest were not good owing to severe static at night time. G6LI was utilising a vertical aerial for 14 mc. transmission and 7 mc. reception, those who have never used one have a surprise in store.

There is no news from the Southern half of the District, but general activity is good.

DISTRICT 18 (East Yorkshire).

Mr. Woodcock reported activity from over 20 members, but in few cases was the information of sufficient general interest to warrant publication, as most of the reports were to the effect that members were taking part in the B.E.R.U. Contests. G5FV is planning more micro-wave and polar curve experiments. He stated that the new Hull Short-Wave Radio Society held their first meeting in February, when 15 members attended.

G5CU is making a meter for measuring field strengths in order to investigate directional properties of aërials. The Scarborough Short-Wave Club is making good progress, and its non-transmitting members are learning morse.

SCOTLAND.

The annual B.E.R.U. Contests make February one of the most interesting months of the year. In view of this, it is to be regretted that there were so few entries from Scotland for the two Contests. G5YG, G6IZ and G6RV, representing Scotland in the Senior Contest, scored 328, 105 and 253 points respectively, not cutting much ice, it is true, but at least doing as well as local conditions would permit.

At the time of writing the Junior Contest is in progress, but DX conditions have not been so favourable as in the case of the Senior Contest.

Mr. Hardie, G5FP, has been elected District Officer of "B" District for 1934. Under the control of Mr. Ingram, G6IZ, this district in the past few years has made excellent progress and Scottish Headquarters take this opportunity of expressing thanks to Mr. Ingram for the good work for which he has been largely responsible.

Three new crystals have been added to the Register this month. These are: G6MF, 3,586 kc.; 2AHD, 7,109 kc.; and 2BYP, 7,120 kc.

Of late, the fortnightly meetings in "D" District have been very poorly attended. This is rather surprising, in view of the large membership in and around Edinburgh, and is hardly the way to encourage enthusiasm in the new District Officer.

Mr. Crawford, of Glasgow, who operated an "A.A." licence, under the call of 2ANH, has now received his full permit from the G.P.O. under the call G5CF.

A 50 watt permit has been granted to Mr. Hunter, G6ZV, but as his Zepp. aerial was destroyed by the recent gales, he will be unable to make use of the extra facilities for some little time.

"B" District members appear to have been rather badly smitten with the harmonic oscillator craze, and both G5FP and G6IZ report excellent results. An oscillator of this type was used by G6IZ during the B.E.R.U. Contest.

The latest Scottish member to qualify for W.A.C. Club membership is G6JX, of Aberdeen, who has just received the final card necessary for his claim.

"B" District report a visit from Mr. McIntosh, VU2LJ, who, it will be remembered, visited Scottish Headquarters last month. Mr. McIntosh returns shortly to Assam, and we hope will take with him pleasant recollections of the visits he has made while in Scotland.

It is hoped to resume the 56 mc. Sunday morning transmissions from G6ZX and G5YG some time in March. Meanwhile G6ZX is producing very excellent telephony on the 1.7 mc. band each Sunday after 23.00 G.M.T. He will welcome contacts and reports from the south.

BRS1264 has requested special mention to be made of the fact that he is willing and anxious to co-operate with and stand by for any tests of any amateur station. If anyone desires his services, a line to him care of Scottish Headquarters will be forwarded. His QRA is Greenock.

NORTHERN IRELAND.

The recent meeting in connection with N.F.D. was a great success. It was decided that station A shall be situate at Islandmagee, Co. Antrim, and use the call sign Gi5MO. The personnel will be 5MO, 5UR, 5QX, 5HV, 5DU, 5WD, 2AYA and B.R.S. 877. Station B will use the call sign Gi6YW and be operated by 6YW, 2CN, 6TK, 2SP, 5SQ, 5GV, 2AFO and 2BAB. This station will be located at Killinchy, Co. Down.

As mentioned in the last notes, those who did not state their desire to take part by the 20th ult. have been excluded from the arrangements. It is hoped to commence the construction of the transmitters in the near future.

6YW has again been unfortunate; his H.T. supply failed during the second B.E.R.U. Senior week-end. 2AYA and 2BAB have been granted transmitting permits subject to morse tests, while 2ABT has surmounted the morse obstacle, but is waiting for the licence and call sign. Gi2SP, who has only 110v. mains, has been in contact with PK and W1 on 14 mc., and FM and I on 7 mc., using under 5 watts, he hopes to erect a V.F. hertz shortly to overcome directional effects which he at present experiences with his half-wave Zepp. BRS877 has been experimenting with a single-valve pentode receiver, and finds that noise/signal ratio is much less than usual. 5UR has contacted three new countries, ES, ST3 and VE1, but is not satisfied that his present aerial is pulling its weight. 5HV is using a new aerial system, and would appreciate reports. 5SQ is about to shift his abode, and is on the look-out for a 66" garden and A.C. mains.

6VG is aboard the *Rizwani* in Indian waters, and is not expected home for some while.

Just two reminders: (1) the crystal register is not yet complete; and (2) notes should reach the D.R. by the 26th of each month. Gird up thy loins, slackers!

ARE YOU JOINING
R.E.S.?

Empire



News.

B.E.R.U. REPRESENTATIVES.

Australia.—H. R. Carter (VK2HC), Yarraman North Station, via 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.—Capt. A. M. Houston Fergus (G2ZC), La Cotte, La Moye, St. Brelades, Jersey.

Egypt, Sudan and Transjordan.—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 (EI2B), 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.—R. O. Davidson (VQ4CRL), P.O. Box 31, Nairobi.

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.—E. S. Holden (VO8H), Box 650, St. John's, Newfoundland.

New Zealand.—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.

During the Senior Contest, conditions were not disappointing considering results prior to tests. Both 14 mc. and 7 mc. peak periods were approximately an hour earlier the second week-end, and both Saturdays eclipsed the results obtained on the Sundays. The VK stations came on well, and particularly to the fore were VK2OC, 2XU, 4GK, 3MR and 2NR.

The Annual Convention of the W.I.A. was held in Adelaide last month. Those present were VK3ML for VK3, VK5LD (proxy for VK4), VK5YK for VK5, VK6KR for VK6, VK5GR (proxy for VK7). Federal Headquarters remain in Adelaide, and the only change in officers is that Mr. H. N. Boman (VK5FM) becomes Federal President. The A.R.A. (N.S.W.) has now been affiliated with W.I.A., and is the representative body of W.I.A. in VK2.

Canada (Fourth District).

By VE2CX.

We are very glad to see that the recent tariff on radio parts from England has been cancelled, for as a result there are now many products for sale at considerably lower prices than goods from across the border.

Proposals have recently been made in connection

with licence facilities, these affect the use of telephony, and also the high-frequency bands.

Two VE2 stations have received reports from New Zealand on their 3.9 mc. telephony transmissions.

Iraq.

By YI5KM via G6NJ.

During the B.E.R.U. Contest YI5GL and 5KL were co-operating on 7 mc., the former transmitting and the latter receiving. Conditions were, however, not good. YI5GL reports that much interest was shown by the Bagdad group.

Congrats are offered to Mr. S. A. Rance, ex YI2DS, on winning his W.B.E. under a YI call.

New Zealand.

By ZL1CK via ZL4AO AND G2ZQ.

The great event of February has been the B.E.R.U. Contest, and it is pleasant to record that the number of New Zealand entrants has increased appreciably. In view of the fact that it was N.Z.A.R.T. who first suggested some kind of Empire contest, it is gratifying that our amateurs are playing their part in cementing the bond of Empire at this appropriate time.

The news that Jack Calender, ZL4BT, is the probable winner of the senior event, has caused much jubilation, and New Zealanders are naturally

proud of his excellent achievement. Every entrant spoken to has expressed a definite pleasure derived from participation in the test, no matter how few the points scored. It is not everyone who can score high points even with an efficient transmitter, since the test resolves itself into something of an endurance contest with a premium on the amateur physically fit enough to pass 48 hours with practically no sleep, and with such an occupation that a Monday tiredness does not matter! Further, the reception of G stations (contacts with whom boost the points total considerably) varies widely over the Dominion so that a certain element of luck in location plays an important part. However, it would be an obvious impossibility to arrange a British Empire test not suffering from these defects. The test will always be valuable so long as the entrants participate.

The 7 mc. band, when atmospherics are not too bad, is giving consistent DX, but 14 mc. is extremely erratic. There is no activity to report on 28 mc. It seems a pity that the only real means of investigating the DX possibilities of this band has not been seriously exploited, for it should not be an unduly difficult matter for one of our major amateur associations to organise a series of world-wide tests over a continuous twenty-four period every week-end for a year. In spite of probable repeated failures to make DX contacts, the utility of the band would surely be discovered.

[The suggestion was made in a recent B.E.R.U. Circular that a world-wide 28 mc. contest should be arranged, but no concrete proposals or suggestions were received, probably because the present period is regarded as being unsuitable for DX work on this frequency. The R.S.G.B. is willing to organise an International 28 mc. event, providing evidence of support is forthcoming.—Ed.]

Northern India.

By VU2BM.

Conditions on 14 mc. were good at times during the Contest, especially between 10.30 and 13.00 G.M.T. QRM on the 7 mc. band was bad at all times, but KA and J stations were easily read. South Americans were logged in the early morning at good strengths. The following VU's are active: 2AR, 2BG, 2BL, 2BN, 2BZ, 2DX, 2FP, 2FY, 2JA, 2JP, 2JT, 2LZ, 2MR, 2RE.

Trade Notices.

Following up their recent line of special valve-holders suitable for continental valves, *LectroLinx* have now produced a nine-pin chassis mounting holder with terminals, which follows their normal construction for this class of job. These holders should have a ready sale amongst amateurs using multi-electrode valves. The nine sockets are arranged symmetrically around a 1-in. diameter circle, five being spaced at $\frac{1}{8}$ in. and four at $\frac{9}{32}$ in. Retailing at 1s. 3d. each, delivery can be met against orders.

Details have been received of a new and interesting moving coil speaker manufactured by *Whiteley Electric Radio Co., Ltd.*, which has been designed especially for extension purposes.

A single switch arm is used to adjust the impedance to the required value. Suitable adjustment of this arm also provides a volume control effect independent of the volume control in the set itself. These speakers, known as "Equilodes," are retailed at 33s. 6d. in chassis form and 48s. 6d. in a walnut finish cabinet.

* * *

We are advised by the *General Electric Company, Ltd.*, that the general purpose magnetron for metre and decimetre waves described by Mr. Megaw in his recent lecture is now available at a price of £5. These valves have a maximum output of 30 watts at 3 metres and 2 watts at 25 centimetres, and are listed as Type CW 10 (formerly E.396A).

The special magnetron for metre waves giving an output of 50 watts at 3 metres is also available at the same price, and is listed as Type CW.11 (formerly E.396).

R.S.G.B. NOTEPAPER.

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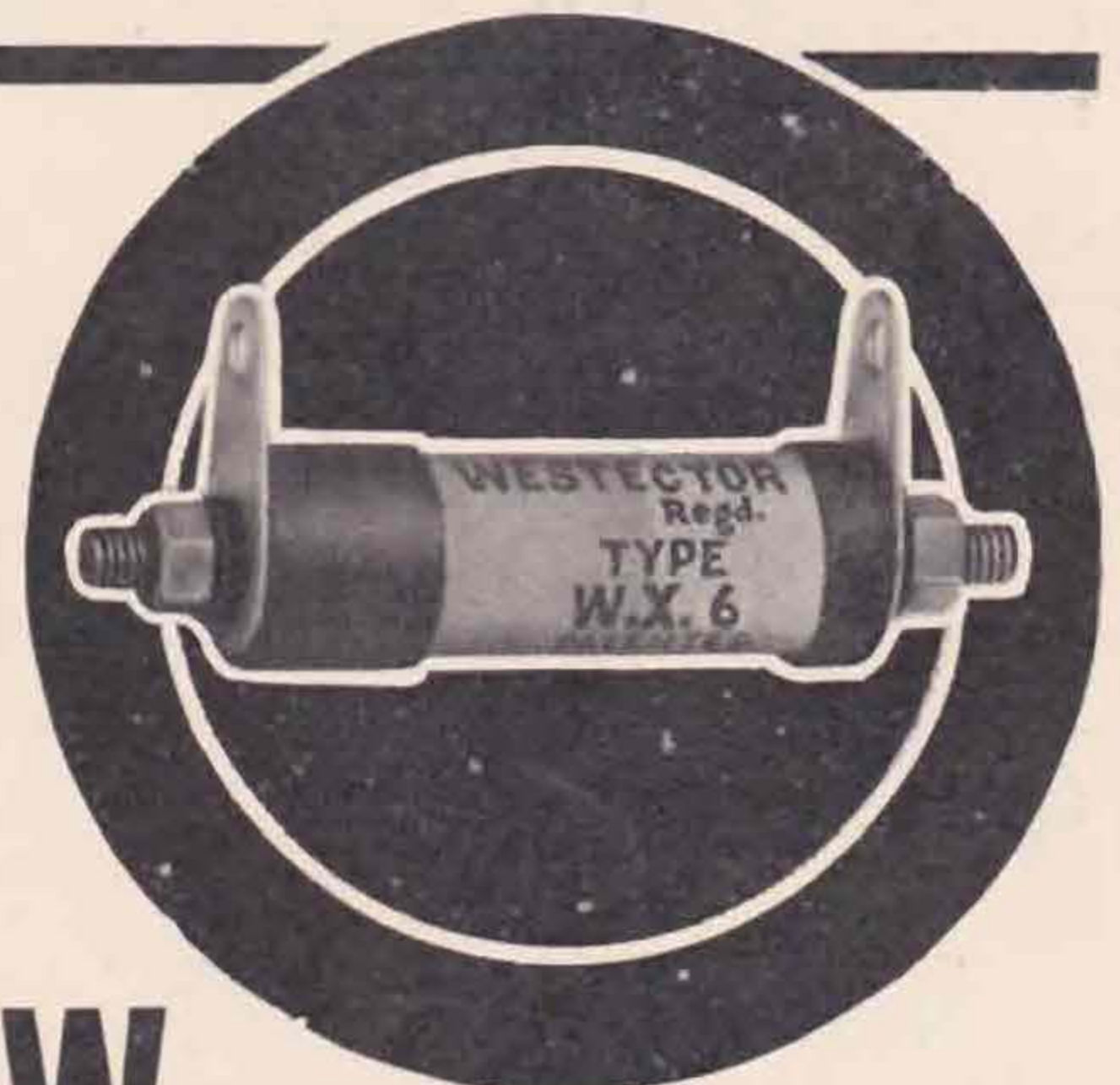
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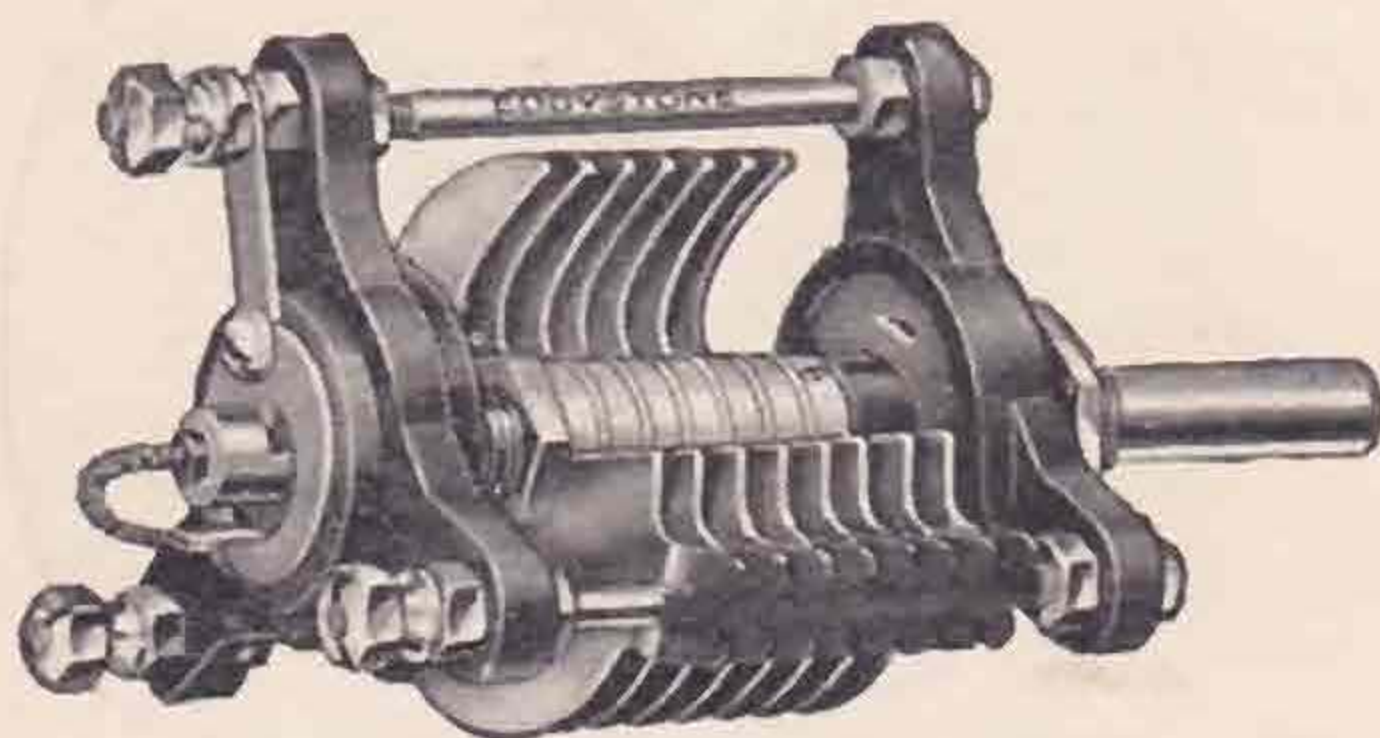
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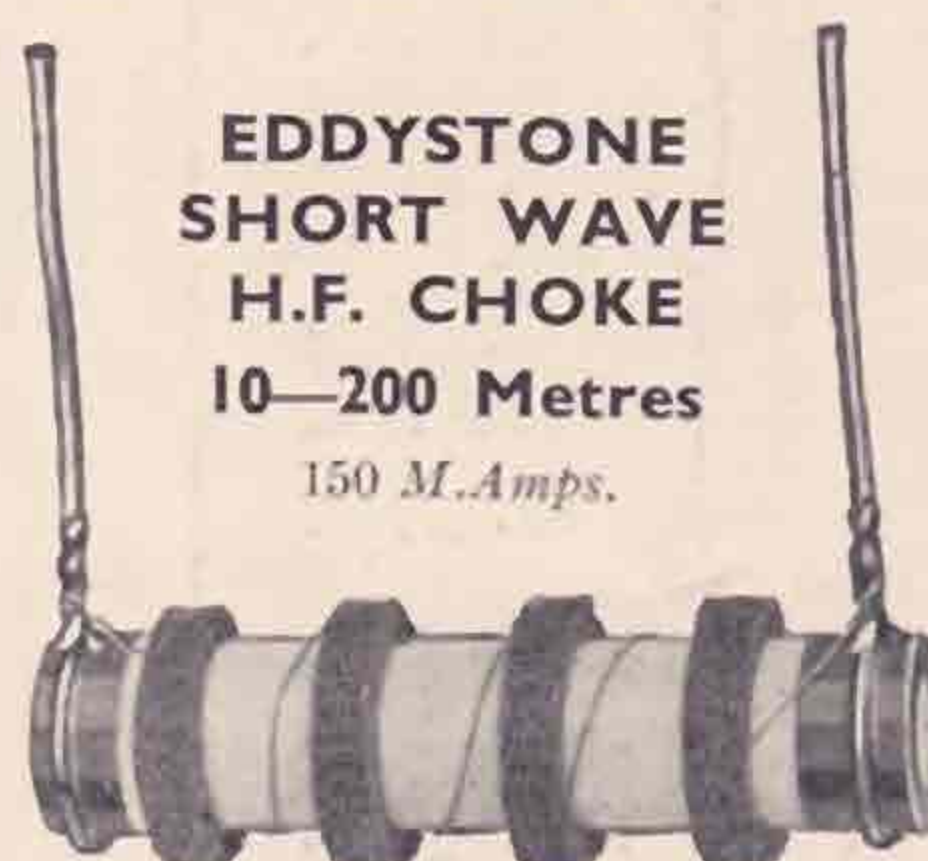
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