EXHIBITION APPARATUS

THE T. & R.

BULLETIN

RADIO SOCIETY OF GT. BRITAIN INC.

BRITISH EMPIRE RADIO UNION

Vol. 7 No. 3 SEPTEMBER, 1931 (Copyright) Price 1/6

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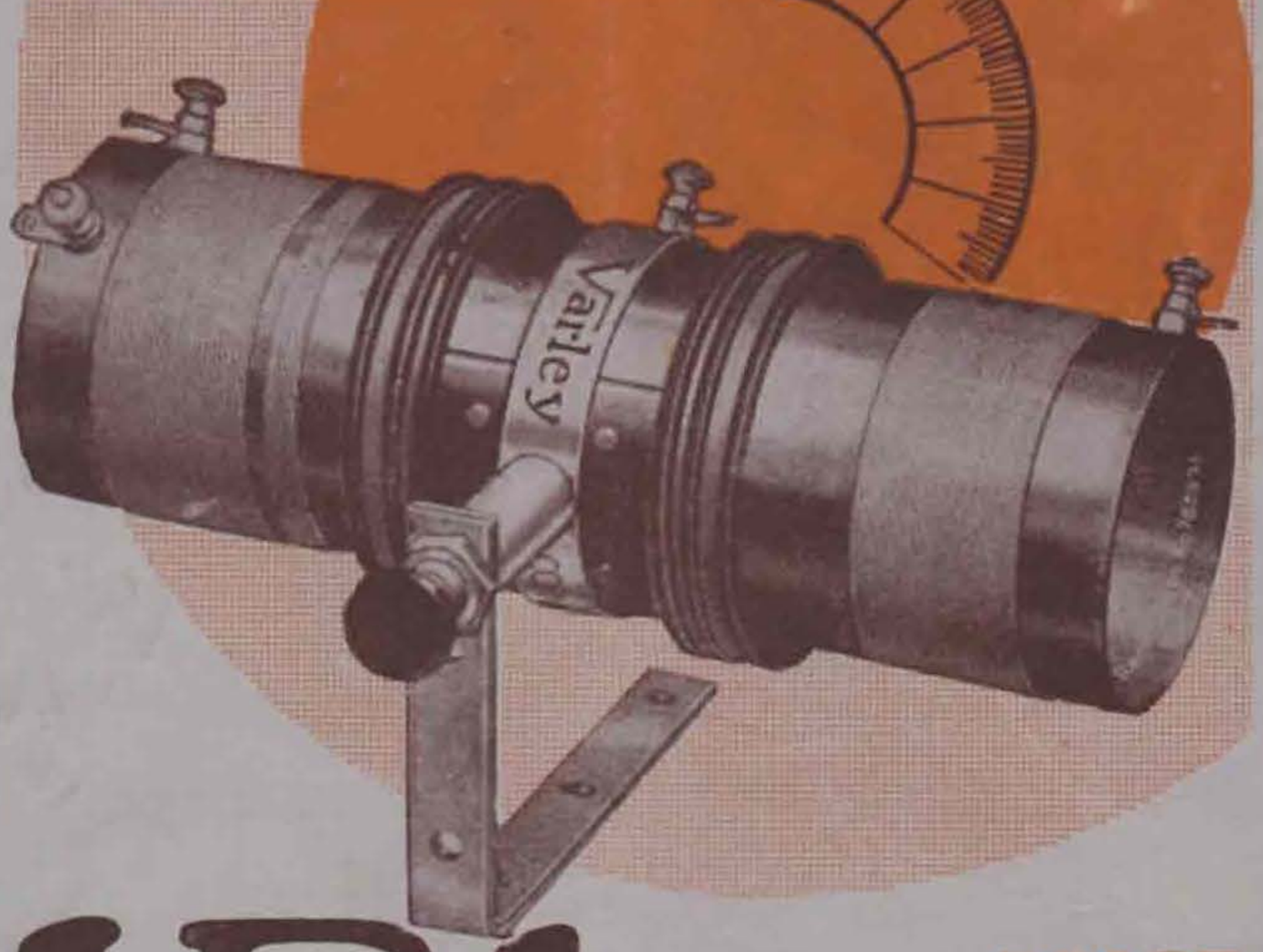

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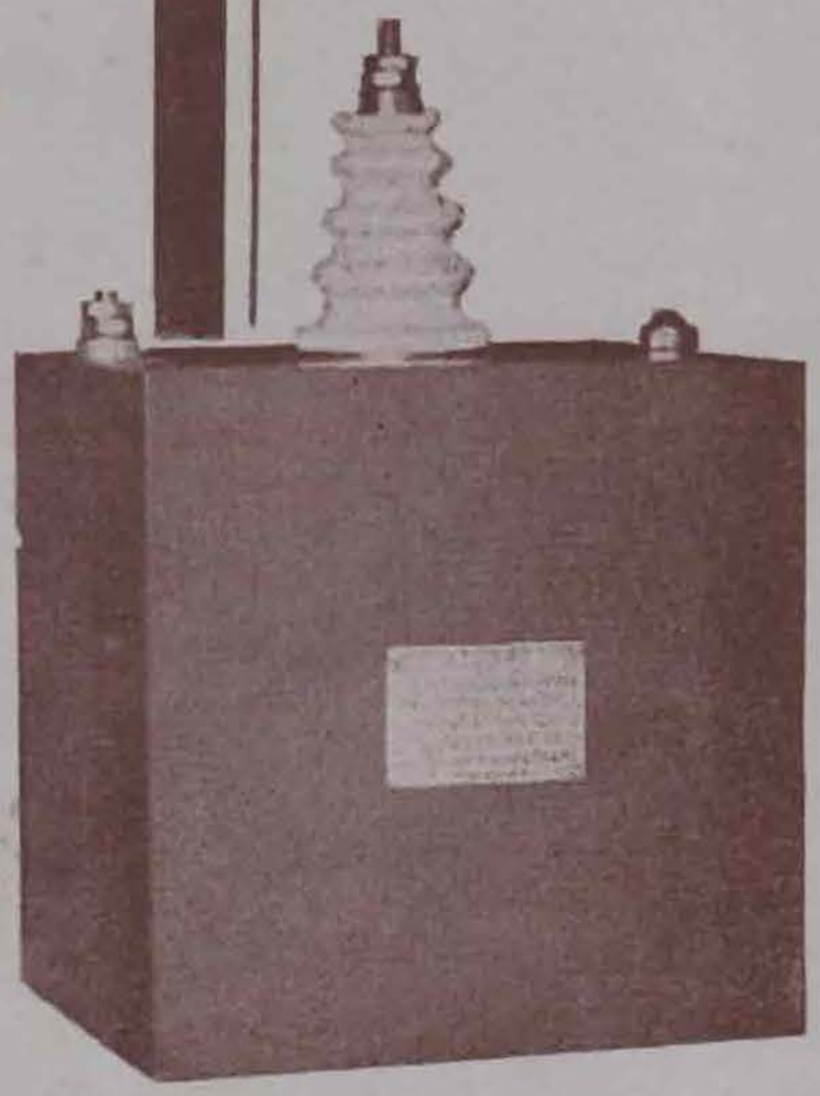

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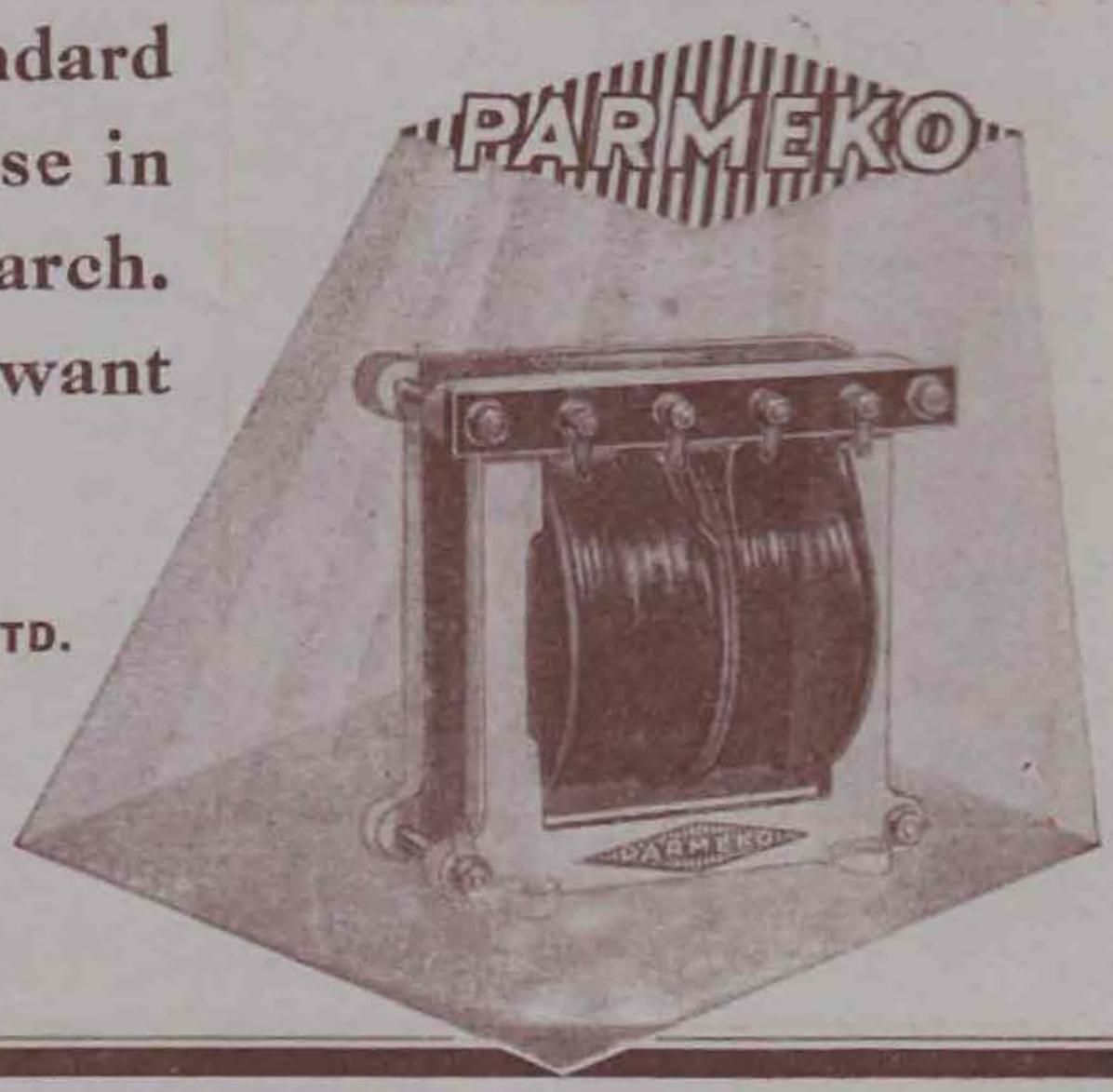

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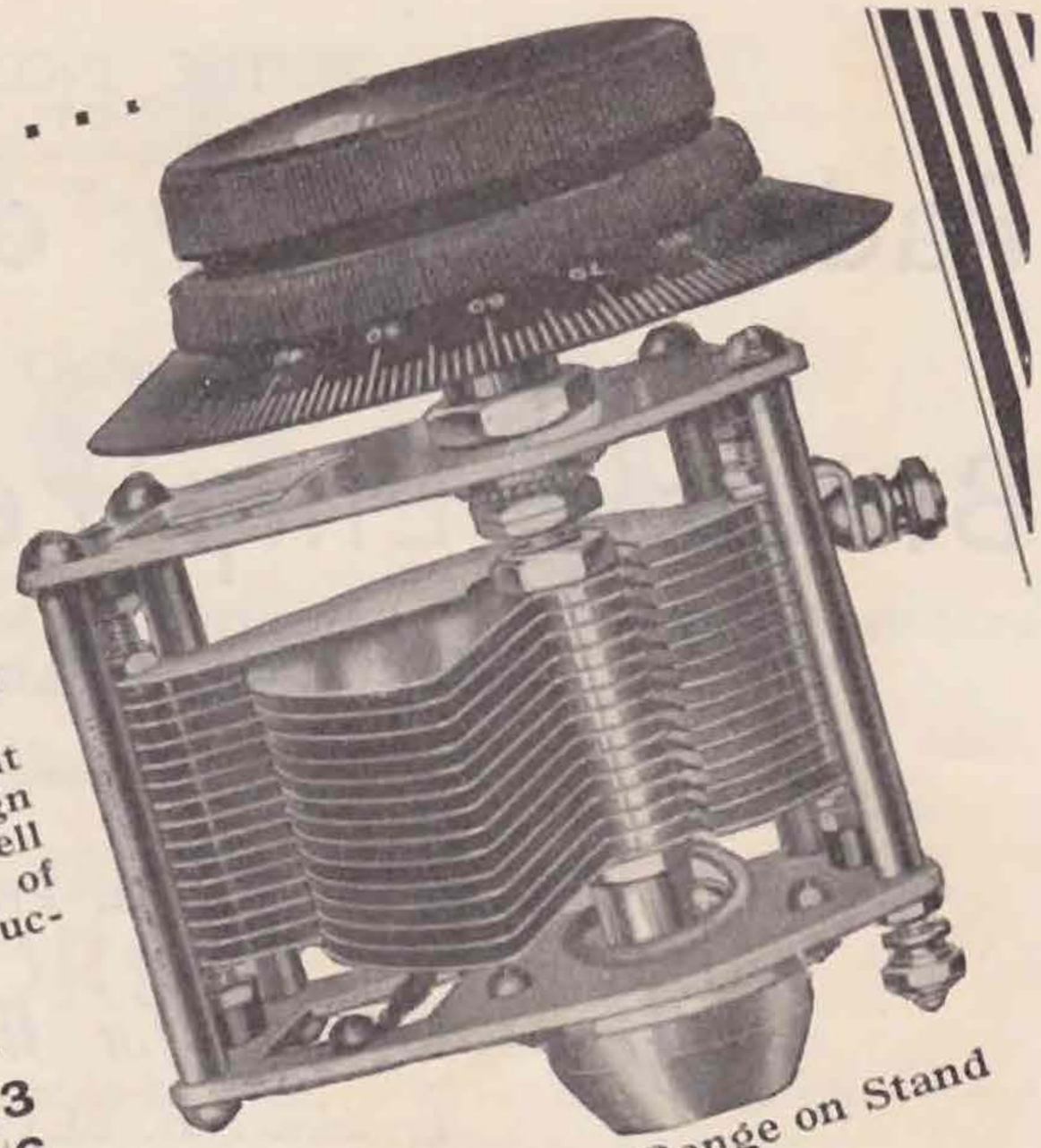

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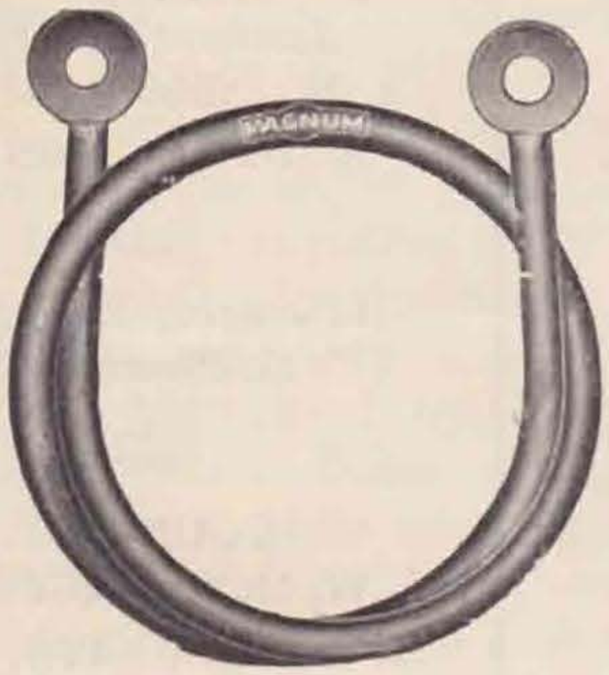

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ANNUAL CONVENTION

September 25 and 26

The following dates have been reserved for meetings at the Institution of Electrical Engineers:—

October 23	January 22, 1932
November 27	February 19
December 22 (Annual General Meeting)	March 30
	April 22

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

T&R

Bulletin

The only Wireless Journal Published by Amateur Radio Experimenters in Great Britain

SEPTEMBER 1931. Vol. 7. No. 3

EDITORIAL

AT this time of the year our thoughts will probably turn from outdoor recreations and well-earned holidays to what, in our opinion, is the greatest of all hobbies. There are some who this season will twist the dials of their first short-wave receiver ; others who, having worn out the bearings of their condensers last year, will be the proud possessors of a two-letter call sign and have the thrills of their first two-way contact—their transmitter being but a single valve set, constructed from apparatus salved from the junk-box and operated from a dry battery " pinched " from the broadcast receiver ; still a third class will have the supreme satisfaction of realising that their masterpiece of construction, a 50-watt crystal controlled set, is producing signals second to none in quality and is making itself heard throughout the Empire. It is to the first and second classes that we desire to address a few remarks.

This may be the first copy of the T. & R. BULLETIN that some of you have seen ; it may be the first time that you have heard of our Society, or of the great brotherhood of Radio Amateurs throughout the world. If this is the case, we hasten to tell you something of ourselves and to show in what manner of ways we may be of service if you wish to delve further into the interests of short wave experimenting.

We are a Society of Radio Amateurs obtaining our membership mainly from the British Isles and from the Empire, though we also have representation in nearly every country in the world which can boast of radio amateurs. Our members are primarily interested in the Art of Radio as applied to short-wave working, both receiving and transmitting, and to that end our BULLETIN is published every month. Should your interests be similar, we are confident that much benefit would be derived from membership of our Society.

There are two aspects of short-wave reception ; first, that allied to the usual form of broadcast reception (the interest here being derived from programmes of a musical nature—though possibly of slightly greater passing interest on account of the distance between transmitter and receiver) ; and second, the reception of the many hundreds of amateur stations working with one another at every hour of the day and night. The former phase of short-wave listening is, we contend, a cul-de-sac : it is pure fireside enjoyment, though, of course, carries with it the necessity of requiring a receiver perfect in every detail. The other phase of this reception is progressive and is pursued by the real experimenter. This does not mean that a B.Sc. degree is required or that the would-be amateur requires a fully-equipped laboratory, but really that he is a seeker for information, always desiring to progress and never feeling satisfied with his results.

The fields of Short-wave Radio are so vast that they afford endless opportunities for a scientific hobby. The short-wave broadcasting stations provide a thrill on account of their novelty. A half-hour's listening on one of the amateur wave-bands at a suitable time will provide still more interest in " eavesdropping-in " to the two-way conversations—some in Morse,

(*Continued on page* 104.)

THE set described and illustrated is one that has been designed to cover the needs of both the transmitting amateur who requires simplicity of control for quick searching over a limited band of frequencies and equally for the short wave listener who wishes to hear stations scattered over a far greater band than that included in the amateur frequency allocations. Both classes of users require good amplification with a minimum of background noise.

By means of the " Polar " short wave tuning condenser, incorporating a variable " tank " portion with a separately controlled vernier portion, the frequency bands are divided into sections by the divisions of the tank condenser and each section can be minutely sub-divided by the vernier plates.

In the design it was decided to limit the number of valves used to two. With the improvement and multiplication of manufactured parts, such a set is within the scope of a novice to short wave working and if, as is often the case, some experience has been had of " adapted " broadcast sets, the improvement in results obtained by using a set built for the job will be very noticeable. For the experienced amateur worker the set will be found to meet all demands, whether at a listening or transmitting station.

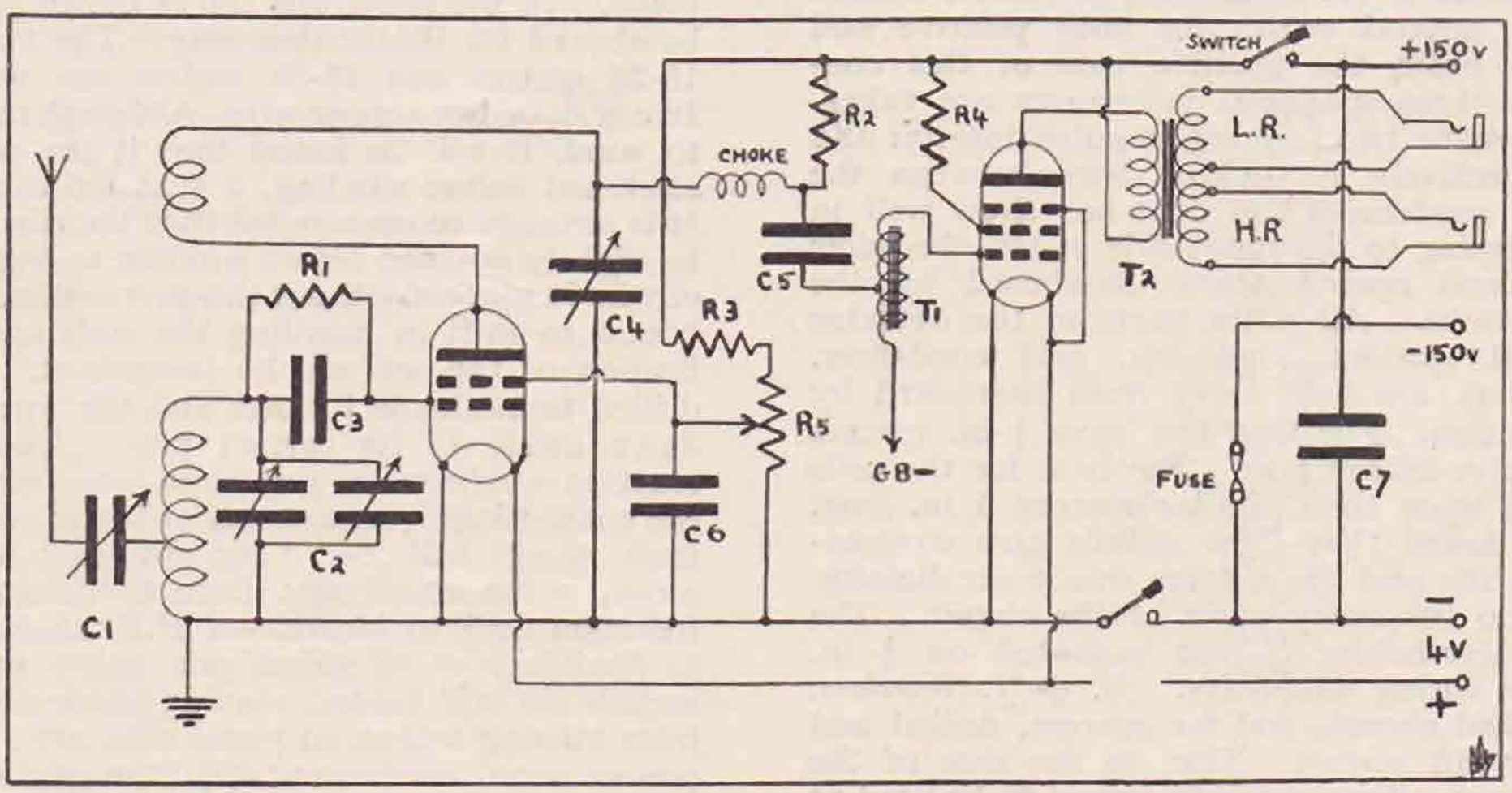
In the present days of unlimited—or nearly so—H.T. voltages from mains, it is thought that the voltage of 150 specified is available to most users. For those using accumulators, or even batteries, the set drain is not excessive, 10 ma. being the current required. One is apt to associate a pentode low frequency amplifier with large current demands, but, in this case, the pentode auxiliary grid has an external resistance inserted to keep current demands to a low figure. As this pentode stage is working after a detector valve only, small types of loud-speaker can be expected to work and the reduced auxiliary grid voltage will supply ample strength for such conditions. The use of indirectly heated type, A.C., valves is possible, but, in the case of the detector valve, the resistance in the anode circuit (R2) will have to be increased to at least 200,000 ohms. With the resistance shown for D.C. valves, oscillation will be found to be uncontrollable and the valve will be working into too low a resistance for effective results.

A Receiver employing a Screened Grid valve as Detector and followed by a Pentode as L.F. amplifier is described in this article. With such a combination it is possible to obtain signal strengths comparable with those from a three-valve set.

Apparatus.

Before describing the assembly it will be better to run through the parts required. The baseboard, 12 in. by 16 in., of wood, should be thick enough to give stiffness and to take the wood screws holding the lower edge of panel without splitting the wood. The panel is an aluminium one, 16 in. by 7 in. (*Burne-Jones & Co., Ltd.*) held by two " Magnum " brackets. Six terminals are used, mounted in pairs on special terminal mounts which keep leads well away from baseboard and from each other. Both the terminals and mounts are specialities of *Belling & Lee, Ltd.*, and the mounts lend themselves specially to such sets as the present—they can be placed anywhere on the baseboard or even on the aluminium panel with perfect insulation safety and so avoid long bunched leads to a central terminal slip carrying all connections. Variable condensers required are a *Polar* short wave, type " A " (already mentioned) and one .00025 mf. *Polar* " Volcon " for reaction. The latter has brass vanes, though, if required, a similar model with aluminium vanes, specially built for reaction use, can be substituted at slightly less cost by the same firm. A *Polar* " Preset " condenser, capacity .0001mf., is used for aerial coupling. Fixed condensers are two of 2 mf. each (*T.C.C.*) and grid condenser of .0001 mf. (*T.C.C.*). A .5 mf. of

the same make is used to couple the L.F. transformer to detector. Grid leak is a 3 megohm (*Mullard*). The fixed resistances are "Spaghetti" type. Two of 100,000 ohms each and one of 50,000 ohms (*Burne-Jones*) are required. The potentiometer across the H.T. for screen grid control is of 50,000 ohms. Much of the satisfactory working of the set depends upon this component and, on the principle that it is better to be safe than sorry, a 25 watt type potentiometer (*Varley*) is used. The high frequency choke, inserted after the detector valve to filter out R.F. has to work over a very large range of frequencies, the one used is a *McMichael*, and proves satisfactory. A *Varley* "Ni-Core" auto-transformer is used to feed the L.F. valve. This instrument has a high step-up ratio (1-7) and gives the necessary voltage to the pentode without introducing noise or threshold howl. Output from the pentode stage is taken through a pentode output transformer (*Varley*). This transformer has two sets of output terminals, for low and high resistance telephone



C_1. .0001 mfd. Preset type. (POLAR)
C_2. Tank Vernier, Short wave, type "A." (POLAR)
C_3. .0001 mfd. fixed. (T.C.C.)
C_4. .00025 mfd. reaction. Volcon. (POLAR)
C_5. .5 mfd. fixed. (T.C.C.)
C_6. and C_7. 2 mfd. each, fixed. (T.C.C.)
R_1. 3 meg. Grid Leak. (MULLARD)
R_2. and R_3. 100,000 ohms each, fixed, "Spaghetti" type. (BURNE-JONES)
R_4. 50,000 ohms fixed "Spaghetti" type. (BURNE-JONES
R_5. 50,000 ohm potentiometer. 25 watts type. (VARLEY)
CH. High frequency choke. (McMICHAEL)
T_1. "NI-CORE" Auto-transformer. (VARLEY)
T_2. Double ratio Pentode, output transformer. (VARLEY)
S. Jack Type, single throw, double pole switch. (LOTUS, No. 8.)
F. H.T. Fuse, baseboard type. (BELLING & LEE, LTD.)

windings, a handy arrangement when headphones and loud speaker are both used. The output leads are taken to two separate jacks (*Lotus*) mounted through panel. With the use of a potentiometer across H.T. battery, it will be found necessary to break both the common negative and the L.T. positive leads when switching the set off. A *Lotus* No. 8 jack switch on panel achieves this. In view of the trouble liable to occur if alterations are made to the grid bias of pentode valve without first switching off, such a switch is advisable. A fuse is also incorporated in the H.T. circuit. As possible insurance for the two valves, it is a wise precaution. The one used is a baseboard pattern from *Belling & Lee, Ltd.* The panel front carries two "Utility" micro-vernier dials (*Wilkins and Wright*). Black finished dials suit the aluminium panel best. Although possibly such a dial is an extravagance for reaction control, its use for fine tuning the detector grid circuit is a boon and on reaction, control can be held for telephony to the last fraction. It should be especially noted that an adaptor from 3/16 in. spindle to ¼ in. dial will be required for the reaction condenser. This was obtained from the makers of the "Utility" dials.

Coils and valves have been left to last. The valves used in this case were *Mullard* PM14 as detector and PM24 pentode. Other filament voltages with corresponding types of valves are, of course, suitable. The valve-holders are *Clix*, having low capacities.

The coils were wound to our specification (see below) by *B. & J. Wireless, Ltd.* The formers are 3 in. length and 2¼ in. diameter. They carry five spring pins for connections which fit into sockets on a base supplied with the formers. Soldering tags are fitted to each pin and coil connections taken through the formers and run down inside to these tags. The pins correspond with five of the six former ribs, the missing pin forming a locating point when inserting coils.

A grid battery and clips for this will complete the parts required. The pentode will require at least 10 volts of grid bias and an 18-volt *Drydex* has been used here.

Construction.

The panel will require drilling for condenser mounting. The condensers are mounted at centre line horizontally (3½ in.), and spaced at one- and two-thirds of the panel length. The potentiometer is at centre line of panel (8 in.), 2⅜ in. from lower edge. Two ¾ in. holes will be required for 'phone jacks. As these jacks are connected to two windings of the output transformer, it is better that they

be first mounted upon an ebonite slip which is screwed behind panel. The hexagonal nuts holding jacks will come through the ¾ in. holes with enough clearance to avoid touching panel itself. The jacks and plugs are thus insulated from panel and possible troubles from interaction of the two windings on transformer and from audio frequency currents straying through panel itself are avoided. The centres of holes are 1⅜ in. from lower edge and 1¼ in. and 3¼ in. respectively from right-hand edge of panel. The filament switch is centred above the jacks, 2⅜ in. from lower edge and 2¼ in. from right-hand edge. Panel brackets will be fixed at extreme ends to suit the holes in brackets. Fine, round-headed wood screws are used to hold the lower edge of panel to edge of baseboard for stiffness. All set wiring, with exception of phone and positive L.T. leads, is of 18 s.w.g. wire. The wiring and lay-out is seen clearly in photo. It may seem that some of the leads could be shortened or omitted, but the wiring has been arranged so that practically no leads carry both direct and high frequency currents. The right-hand 2 mf. condenser, in centre, is used to form a neutral return for both positive and negative. From the positive side of this condenser the three spaghetti resistances are taken. The slack of the two running to potentiometer and choke respectively is tucked away between the two 2 mf. condensers and does not show well in photo. Turning to the input side of set, the wires are kept well spaced above baseboard by the terminal blocks. All other parts in the detector grid circuit (pre-set condenser, grid condenser, valve holder), are held away from baseboard by ebonite spacers. The first two have ¼ in. spacers and the valve-holder ½ in. The base for the coils is mounted upon three similar spacers, 1 in. long. It will be found that these details give straightforward wiring and the spacers ensure air dieletric to the radio frequency parts of the circuit. The pentode valve-holder is also mounted on ½ in. spacers for wiring simplicity. *B. & J. Wireless, Ltd.*, supplied ebonite rod for spacers, drilled and tapped for BA screws. This, in the case of the longer spacers, allows separate screws to be used at each end, leaving an air space between the screw ends inside the spacer.

When mounting the potentiometer it is important to note that the spindle *must* be insulated from the metal panel. The hole for fixing can be drilled over-size and an ebonite bush inserted to carry spindle through panel and extend over the front of the panel sufficiently to carry the fixing nut of potientiometer.

In the photo, valves and coils have been removed. A flexible lead from coil holder will be seen which goes to the anode terminal on top of the screen grid valve, and the spaghetti lead from the 2 mf. H.T. condenser, also shown loose, will go to the auxiliary grid terminal on the base of the pentode valve. There is a short lead from the set side of the negative pole of the *Lotus* on and off switch running to a panel bracket screw. This lead serves to keep the panel at earth potential, irrespective of the variable condenser spindle connections.

The lead from L.T. positive terminal is run across the baseboard by twin flexible wire. One wire goes through to switch and the other acts as return from the switch and is shortened to reach only to the filament terminal of pentode valve holder. The wire is secured by two small clips placed under screws holding output transformer. The connectors on the telephone jacks will require bending back at right angles to take flexible leads from output transformer, twin flexible wire serving to feed each jack. Two of the connectors on the switch will require similar bending, the switch being spaced back from the panel enough to fit snugly between the two jacks when the latter are set in " V " formation.

An earth terminal is provided, but for the higher frequencies it will be found a matter for trial whether results are better with or without an earth connection. For 150 metres and broadcast wave-lengths, an earth connection will probably be required. If mains eliminator H.T. is used, the usual care must be taken to see that a condenser is inserted in the earth lead to prevent mains leakage to earth. No condenser for this purpose is incorporated in set.

Coils.

A mention of the coil formers has already been made. In the photo one coil is shown lying on the baseboard for illustration only. The two coils for 15-28 metres and 28-53 metres are wound with 16 s.w.g. tinned copper wire. Although rather heavy to wind, it will be found that if the wire is well stretched before winding, a neat job can be made. It is strongly recommended that the ribs of formers be slightly notched before winding to hold the turns of wire in place. Without this precaution, the wire is bound to shift in handling the coils and the calibration of the set will be inconstant. Holes are drilled through the formers and the wire is carried down inside to its correct pins. The grid and reaction windings are put on in same direction and the connections, commencing at top of coil (furthest from pins) will be: Top to grid condenser; second is the aerial tap; third to filament; fourth (reaction coil) to McMichael H.F. choke; bottom to flexible lead to screen grid valve anode. The sockets on coil holder, reading clockwise in photo from missing socket on panel side, are: (1) From pre-set aerial condenser; (2) from grid condenser/variable condenser lead, *via* a short vertical length of wire which does not show in photo; (3) from screen grid valve anode connection; (4) from H.F. choke (this lead crosses above the other two shown in photo); (5) from filament/variable condenser lead. The reaction windings are wound with 24 s.w.g. enamelled wire, close wound. The ribs of formers have a shallow slot filed of a width just to take this winding and depth of the wire diameter, keeping the windings firm and in place. It will be seen from the table below that five coils will nearly cover the range of wave-lengths from 15 to 430 metres. Only a small band between 50 and 60 metres is missed and all the amateur bands are comfortably placed well inside condenser capacity.

Approx. range of coil (metres)	Turns.	Wire.	Spacing (centres of wire).	Overall length of windings.	Aerial tap (from lower-end turns up).
15-28	5	16 s.w.g. bare	3/16″	1″	1
28-53	11	,,	⅛″	1 7/16″	2⅛
65-125	21	24 s.w.g. enamelled	close wound	7/16″	7
120-240	46	,,	,,	15/16″	14
230-430	112	,,	,,	2⅜″	34

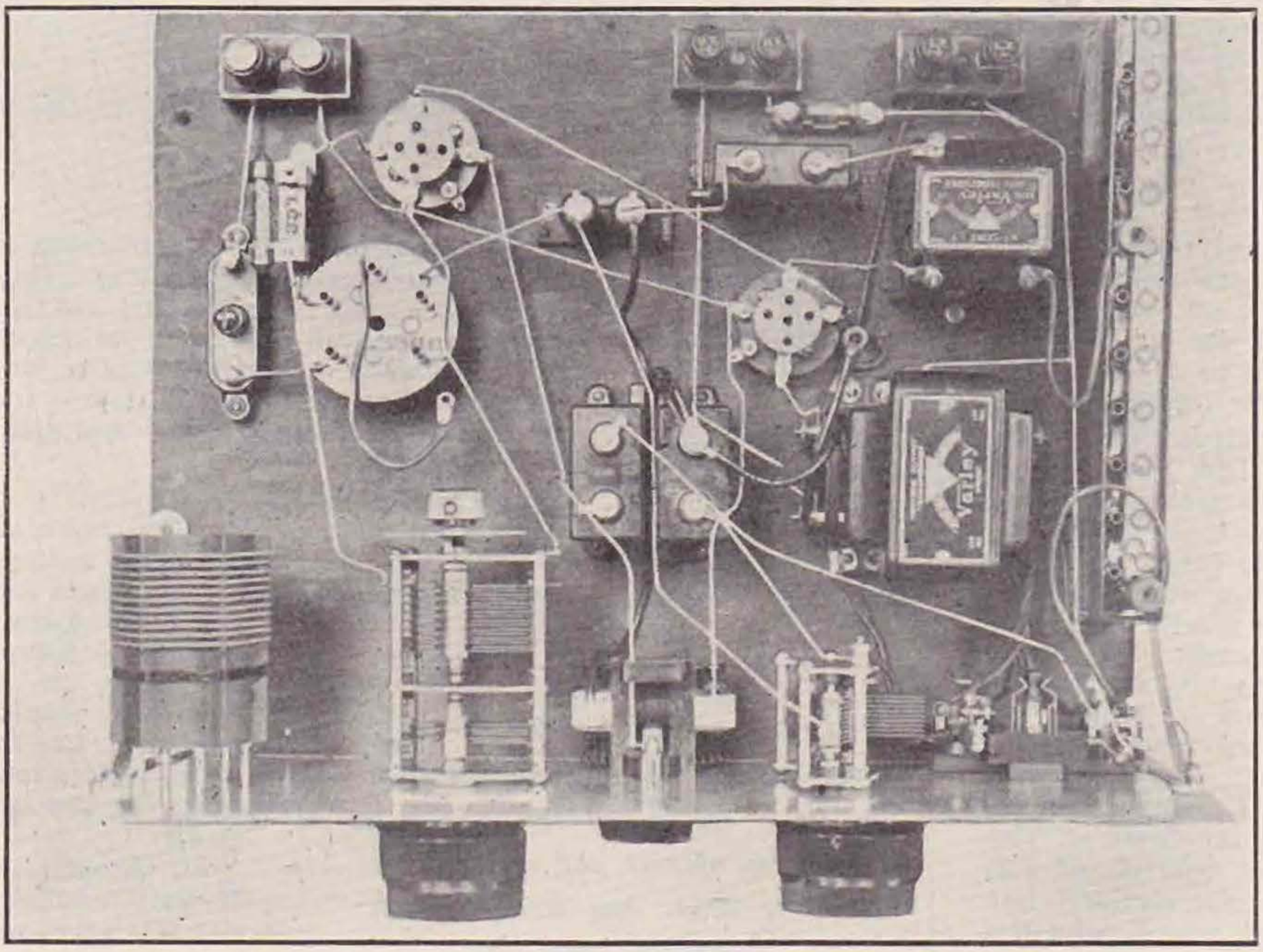
Reaction windings, for the first four coils above,

5, 7, 7 and 9 turns respectively of 24 s.w.g. enamelled wire, close wound, the winding starting at ¼" from end of grid coils. For the last coil, 14 turns as before, but starting only ⅛ in. from grid winding.

Taking the amateur bands, these will fall, roughly, at the following positions of tank portion of variable condenser: 20 metre band at position 6 on first coil; 40 metre band at position 6 on second coil; 80 metre band between 3 and 5 positions on third coil and 150 metre band between positions 4 and 6 on fourth coil. With probably variations in coil windings, these positions must be considered as approximate only—as must the limits of the coil ranges.

If any flat spots, where oscillation is difficult, are found, these will probably be due to aerial harmonics and a very slight readjustment of the aerial preset condenser should cure the trouble. Here, again, it is better to find a setting which will serve for the whole range of the set and to lock the condenser at such. Alterations will affect wavelength and, if the coils are made as suggested with turns securely placed on formers, the set will be stable enough for approximate wave-length calibration providing the aerial condenser is set once and for all.

It may be found difficult at first to be certain when oscillation commences—the detector valve



Operation.

Presuming that the components specified are used and that the H.T. voltage of 150 is also used, it is advisable to check up on the total current consumption of the set. This should be from 9 to 10 ma. if all is well. A word of reminder is advisable that the grid bias for pentode valve *must* be adjusted with filament switch off, no alterations with set switched on are permissible. The H.T. potentiometer will give a range of 50 volt variation to the screen grid valve control grid. This will give heavy oscillation if worked to positive side. It appears best to adjust its position on weak telephony, adjusting for smooth reaction control with maximum strength. Once adjusted, it can be left unless it is found desirable to boost up a signal after this has been tuned in. This can be done to a slight extent without furious oscillation, although it is not advisable to overdo the matter. The position of the potentiometer control regulates largely the easy handling of the set and constant variation should be avoided once the best position is found. The set should oscillate freely over each range with reaction condenser below 90 degrees. giving little noise to indicate the change from non-oscillating conditions. Some use will enable this point to be judged. Hand capacity is negligible, the use of insulation for phone jacks appears to wipe out any trace that might be present. It is possible to touch the metal panel without affecting weak telephony.

Although the set is described as "Short Wave," broadcast band transmissions can be received well. A coil for the lower broadcast band has, therefore, been described. It should be pointed out, however, that where a large output is required from the pentode valve, the auxiliary grid voltage must be increased commensurate with the anode voltage. The substitution of a 10,000 ohm resistance in place of the 50,000 ohm one, in this circuit will have the required effect, but the total current consumption of the receiver will be about 25 ma.

Results.

Both Morse and telephony over the whole of the bands come in easily and without background. For those with experience of the short waves, little

(*Continued on page* 79.)

A Single Valve Short Wave Transmitter

IT is hoped that the following description of a simple transmitter for use on high frequencies, capable of handling low and medium power, will be of use to beginners in transmitting and assist them to design their apparatus to give good results with a minimum of trouble.

The circuit is that known as "The Tuned-Plate Resonant-Grid," and is chosen chiefly on account of its extreme simplicity. It is an excellent circuit to commence with, and is reasonably efficient on most of our bands, though for very high frequency work certain other circuits may be relied on to give better results. Omitting for a moment the aerial coupling circuit, a glance at the diagram (Fig. 1) will show but one tuning control, condenser C_1, which, together with coil L_1 comprises the plate tuning circuit. The grid circuit consists of coil L_2; this is not untuned, but fixed-tuned, and is adjusted to function correctly on whatever waveband is desired. The two circuits (the plate and grid circuits) are not inductively coupled, and we rely on the capacity in the valve to provide sufficient coupling between the two circuits to maintain vigorous oscillation.

This transmitter has been produced primarily for the newcomer to transmitting. It is inexpensive to build, simple to operate and may be relied upon to cover long distances under favourable conditions.

It will probably be realised that this circuit differs in no fundamental respect from an ordinary single valve receiver, with the exception that the plate coil in a receiver is usually coupled and untuned, whereas here the reverse is the case. The grid coil of the transmitter may be compared with the plate (or reaction) coil of a receiver; in the receiver energy is led *from* the aerial *to* the grid, and in the transmitter from the plate to the aerial. One is an absorber and the other a generator.

R and C_4 may be regarded as the grid leak and condenser, respectively, though here their function is rather different from that in a receiver. C_4 acts as a by-pass condenser for H.F. currents which would otherwise tend to be held up by the choking effect of the resistance R, with probable damage to the resistance. The condenser C_5 is also a by-pass condenser across the H.T. supply, and condensers C_3 are connected across the filament of the valve. These have the effect of creating a very low resistance path for H.F. currents that find their way on to the filament, and also tend to smooth out any ripple from the use of A.C. supply for heating the filament. Further, when keying a transmitter of this type, the filament may flicker and C_3 will help to eliminate this.

Choice of Apparatus.

We must next consider the choice of apparatus, and this is bound up very much in the power to be used. The set is primarily designed for low power, and the apparatus specified is suitable for power up to 10 watts or thereabouts. Members should have no difficulty in making any small alterations if they desire to use much greater power.

An *Osram* LS5 valve as a 10-watt oscillator is used, and this valve was chosen as being one of the most suitable and reliable valves for this purpose. A standard *Clix* valveholder is used, and this may be mounted flush on the baseboard or, better, on insulated legs.

C_1 is a *Cyldon* .0002 mfd. transmitting condenser.* This is mounted on a standard mounting bracket, and fitted with a short extension handle in order to minimise any possible capacity effects when tuning.

C_4 is a standard mica .005 mfd. *T.C.C.*, and C_5 a *T.C.C.* 500-volt working, .005 mfd. Condensers C_3 are *T.C.C.* 2 mfd. non-inductive.

This set was designed for, and operated from, an H.T. supply of 450 volts (R.M.S.). It was not intended to draw a high feed current, and the grid leak was accordingly one of 40,000 ohms: this is a *Burne-Jones* Spaghetti resistance. By using a high resistance leak, the efficiency can be kept high and the signal emitted from the transmitter will be as pure as possible. If, however, the H.T. supply has, for some reason, to be on the low side, and it is

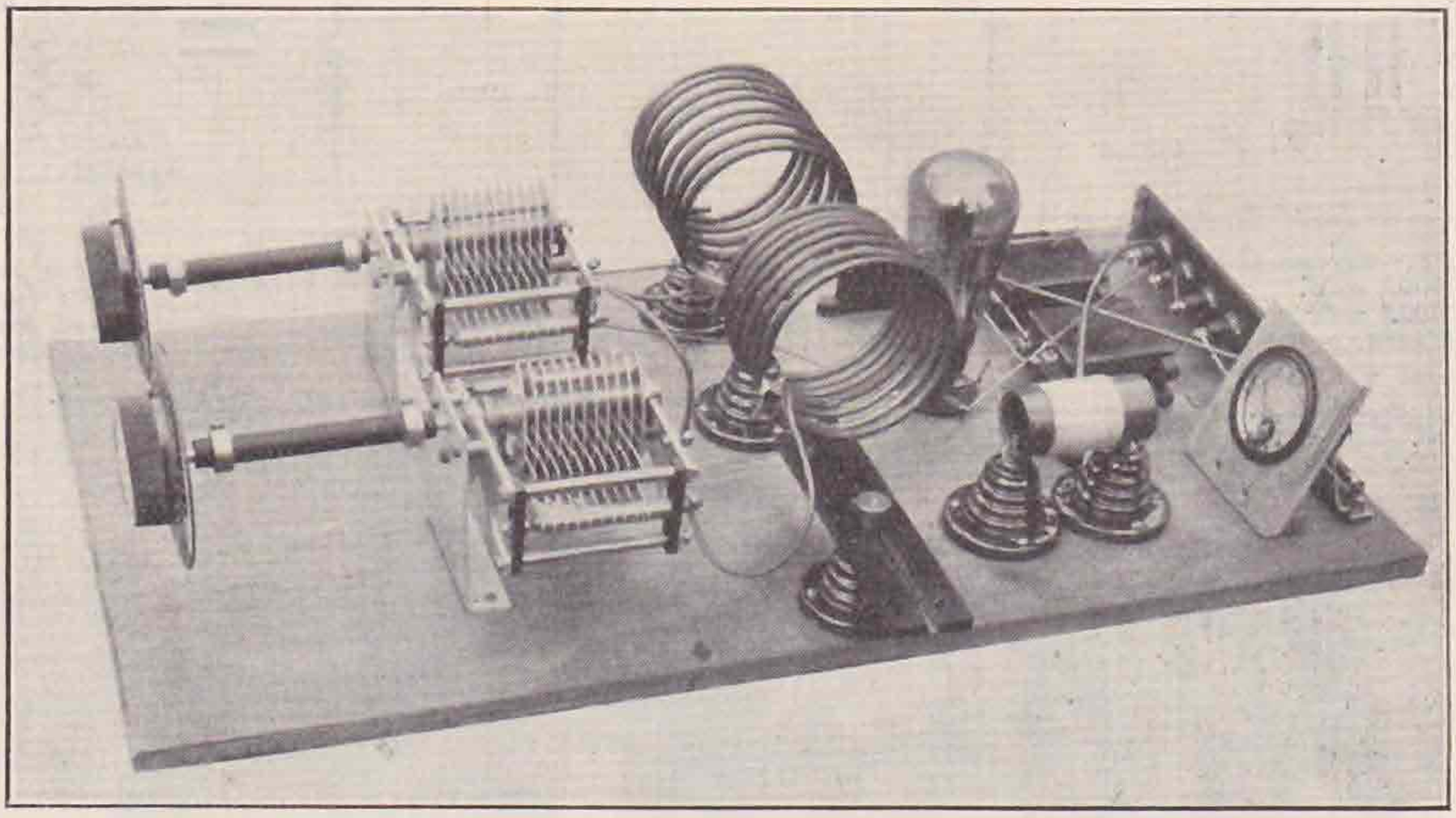
* These are suitable for voltages in excess of 1,000, and if only a hundred volts, or so, from batteries are to be used may safely be replaced by Cyldon receiving condensers.

IF IT'S WORTH ADVERTISING, IT'S IN THE "BULLETIN."

desired to keep the input up, the grid leak may be reduced to 20,000 ohms, or even lower.

The placing of the apparatus and the connections should be easily followed with the aid of the photograph and diagram. Four connections, two L.T. and two H.T., are taken to four *Clix* all-in terminals at the back of the set. A *Weston* 0/50 milliammeter, type 506, can be seen, and is connected in the H.T. + lead. A *Microfuse* to blow at 150 milliamperes is placed just behind the meter. The grid coil, wound in the form of a choke, can be seen to the right of the valve, and to the left is the plate coil and tuning condenser. The other coil and condenser are for purposes of aerial coupling.

The wiring of a set of this type should be carried out with care. It is best to solder connections where possible, though a badly soldered connection will give more trouble than a screwed one. The wire used should be 16 S.W.G. or thicker. From the point of view of heavy wiring, the connections from the plate coil to the plate tuning condenser



are the most important, as they will be carrying an H.F. current of considerable density. To be consistent these connections should be as thick as the stoutest material used in the coils (see below). It is well to remember that the connections from the tuned circuits to the fixed condensers on the transmitter also carry H.F. current, and should therefore be made with care.

For purposes of stabilisation, an earth may be connected to the mid-point of C_4 and C_5 through a large fixed condenser for safety.

Coils.

Both grid and plate coils are fitted with valve pins to facilitate changing the wave-length. *Eddystone* stand-off porcelain insulators will be seen in the photograph supporting the coils. These insulators are fitted with valve sockets. The sockets for the plate coil are 4 in. apart, and those for the grid coil 2¼ in. apart.

This set may be relied upon to give excellent results on 20, 40 and 80 metres, and fair results on 10 and 160 metres. Coil sizes for all five wavebands are given below.

(*a*) 10 METRES (28,000 k.c.).

Plate Coil.—Two turns, 2 in. diameter, spaced 1 in. apart; 3/16 in. copper tube.

Grid Coil.—Five turns, 20 S.W.G. D.C.C. wire spaced the diameter of the wire (see below). The exact spacing for this coil may need slight adjustment when the set has been built.

(*b*) 20 METRES (14,000 k.c.).

Plate Coil.—Four turns, 3 ins. diameter, spaced ¾ in. apart; 3/16 in. copper tube.

Grid Coil.—Thirteen turns, 20 S.W.G. D.C.C. wire, close wound.

(*c*) 40 METRES (7,000 k.c.).

Plate Coil.—Eight turns, 3 ins. diameter, spaced ½ in. apart; 3/16 in. copper tube.

Grid Coil.—Thirty-three turns, 20 S.W.G. D.C.C. wire, close wound.

(*d*) 80 METRES (3,500 k.c.).

Plate Coil.—Fifteen turns, 3 in. diameter, spaced eight turns to the inch; 16 S.W.G. wire.

Grid Coil.—Seventy turns, 26 S.W.G. D.W.S. wire, close wound.

(*e*) 160 METRES (1,750 k.c.).

Plate Coil.—Thirty turns, 4 in. diameter. Wound with heavy wire: if D.C.C. wound close; if bare wire, slight spacing must be used and a few more turns added. No. 16 or 18 S.W.G.

Grid Coil.—Seventy turns, 26 S.W.G. D.W.S. wire, close wound.

The grid coils for bands (*a*) to (*d*) are wound on paxolin formers, outside diameter 1¼ in.: the grid coil for the 160-metre band is wound on similar former, outside diameter 2½ in.

It is convenient to make the plate coils for bands (*a*) to (*c*) of copper tubing for purposes of rigidity. For low power, however, they may be wound with heavy gauge wire on low-loss formers if desired; the losses of a coil wound on a former increase with increase of frequency, and copper tube coils are the most efficient.

The size of aerial coil varies so much with the type and dimensions of aerial used that exact figures are not possible. Probable sizes might range

YOUR SUBSCRIPTION MAY BE DUE—IS IT?

from three turns on 10 metres up to fifteen turns on 160 metres. The aerial coil in the set is fitted to the top of a 1-in. ebonite pillar secured to a strip of ebonite 6 in. × 1½ in. This ebonite has a slot cut down the centre for three-quarters of its length, through which passes the terminal of a further stand-off

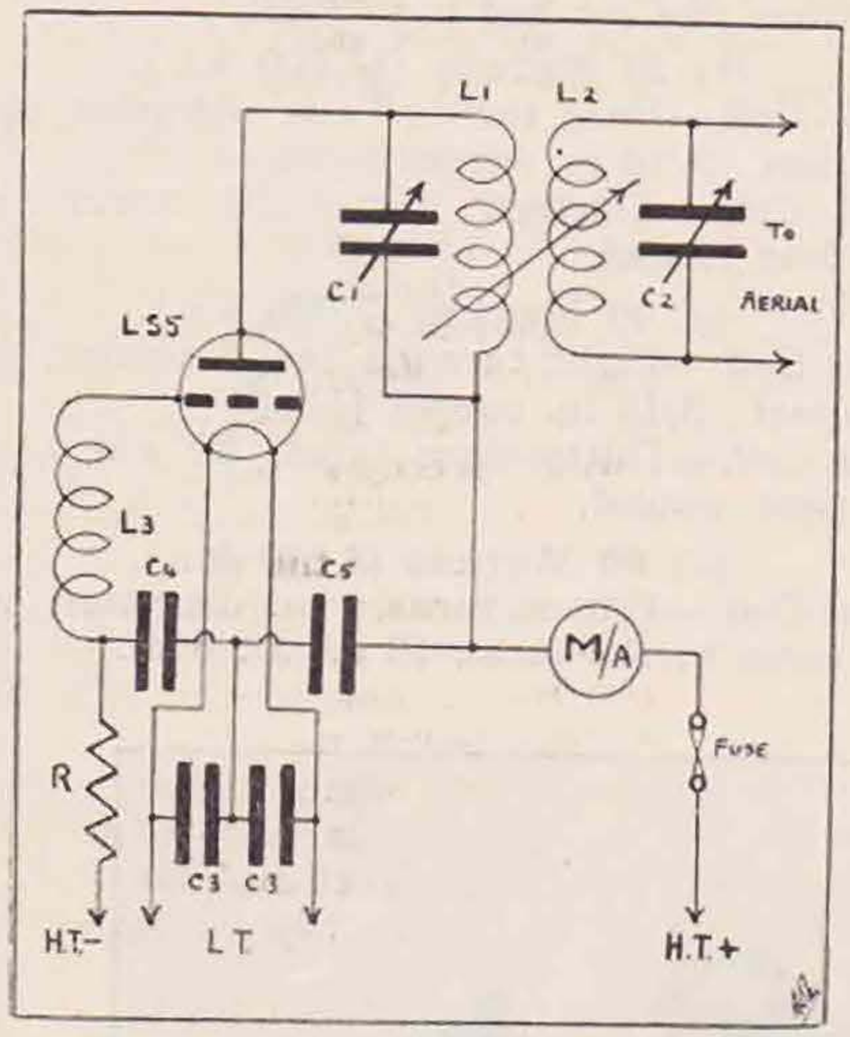


Fig. 1.—Circuit Diagram of Transmitter.
C_1—·0002 mfd. C_4—·005 mfd.
C_2—·0002 mfd. C_5—·005 mfd.
C_3—2 mfd. each. R—40,000 ohms.
L_1, L_2 and L_3—see text.

insulator. By this means the coil may be moved towards, or away from, the plate coil. The photograph should make this clear. Connections from condenser C_2 to coil L_2 are taken by loose wires terminating in clips.

Tuning and Final Remarks.

Where a low impedance three-electrode valve is connected in the circuit shown, oscillations are strongest when the grid and plate circuits are in tune with each other, and at that point the feed to the anode of the valve is a minimum. The details for the grid coil, L_3, have already been given, so

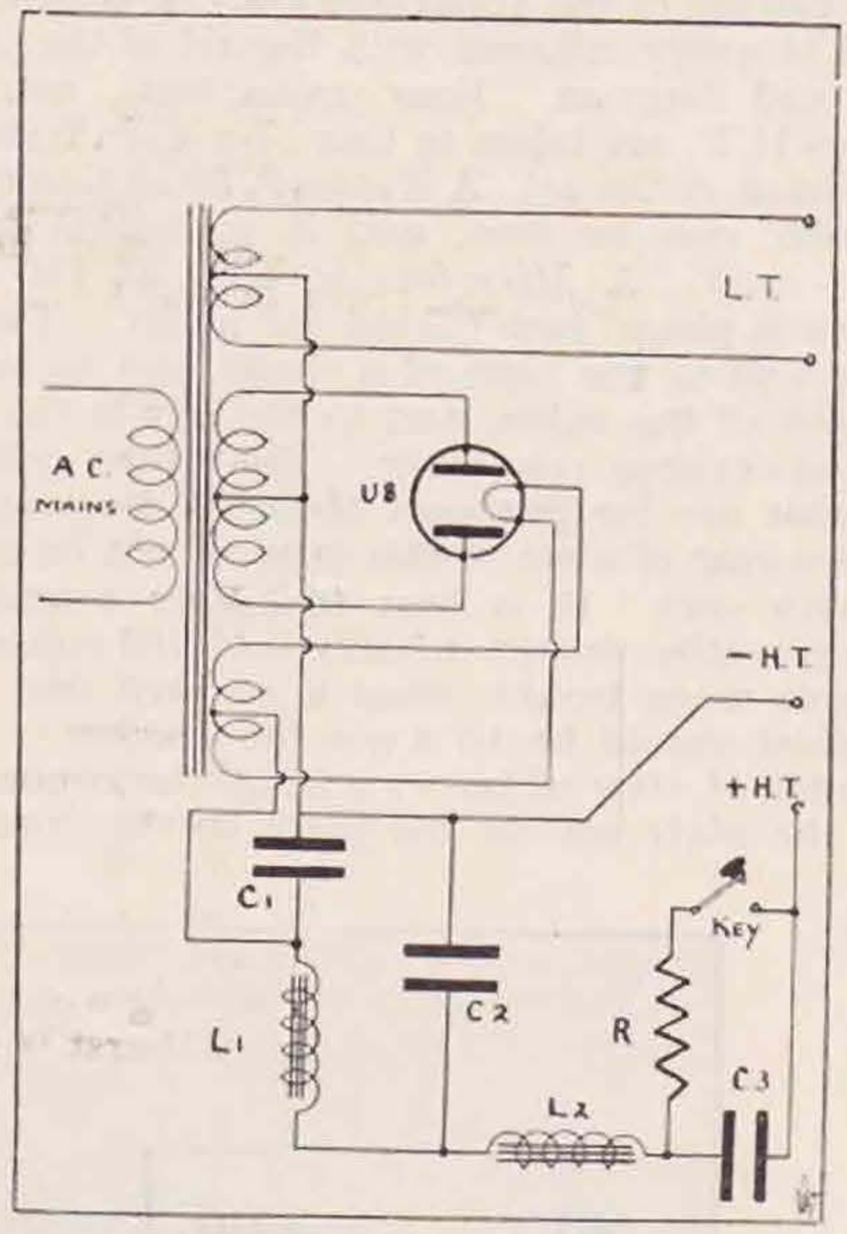
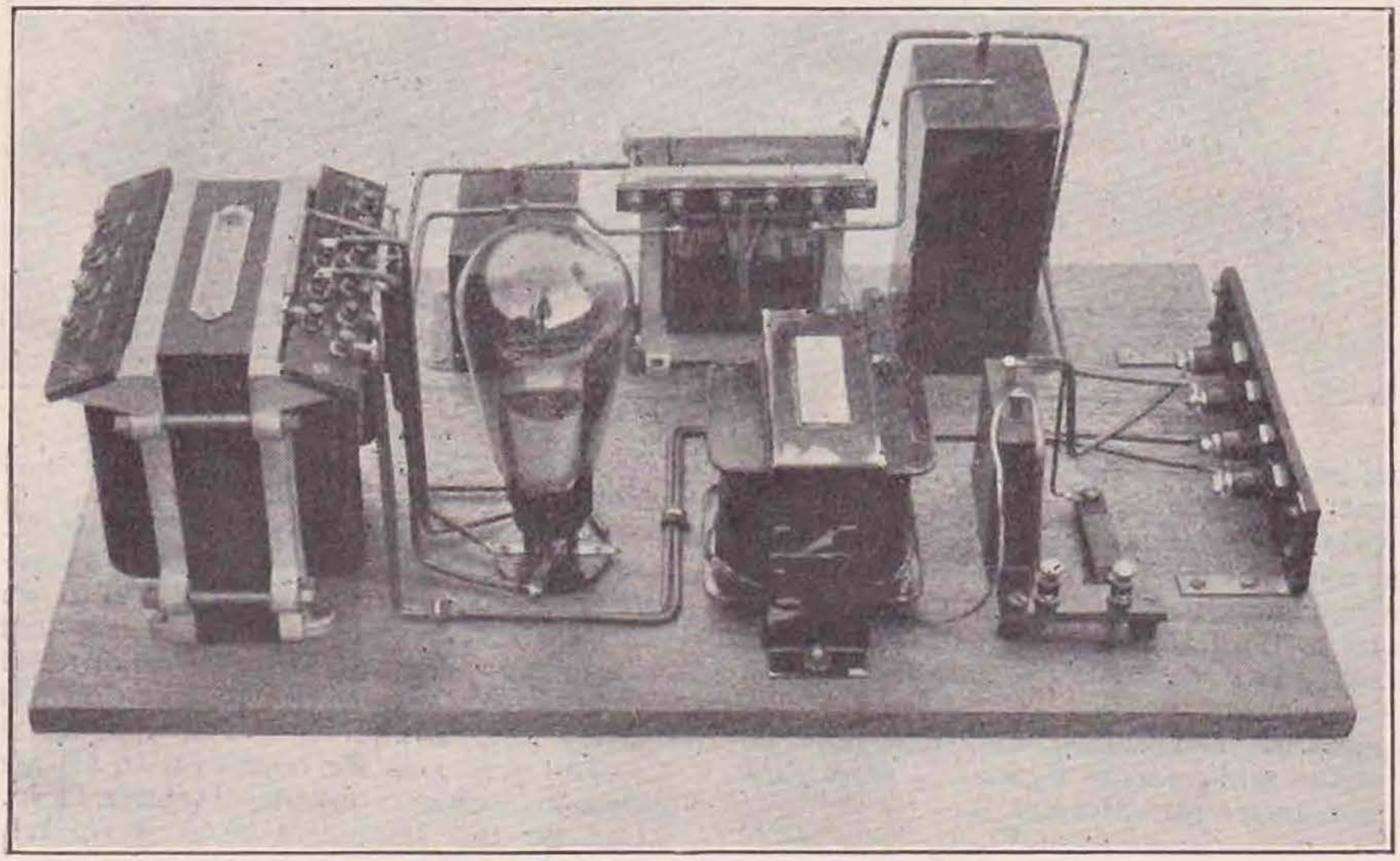


Fig. 2.—Circuit Diagram of Power Supply.
C_1—2 mfd. L_1—25 henries
C_2—4 mfd. L_2—25 henries
C_3—·25 mfd. R—25 ohms.



that if the L.T. and H.T. are switched on, the condenser C_1 will be approximately correct when the anode feed current, as shown in the milliammeter, is seen to fall. This minimum should be 10 milliamperes or lower. * The set is now ready to be coupled to an aerial.

* Note: when using much power it is dangerous to the valve to have the set so adjusted with no aerial coupled for any length of time.

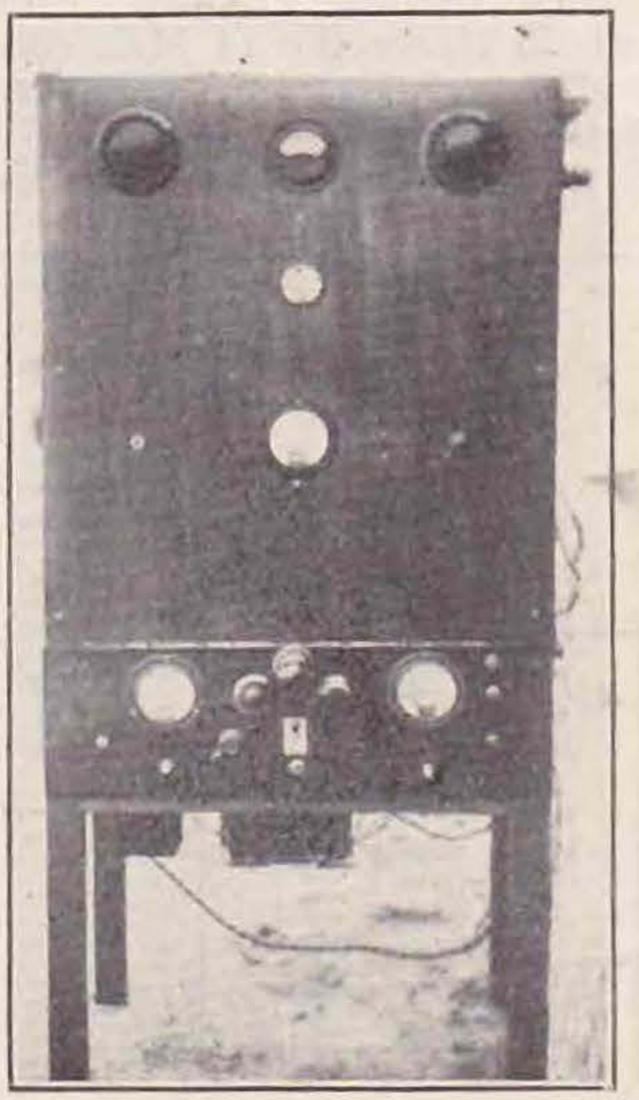
(*Continued on page* 81.)

SEE YOU AT CONVENTION.

THE WINNING B.E.R.W. STATION

It is with considerable pleasure that we present a description of VK2NS owned and operated by Mr. Trevor Evans. Mr. Evans had the honour to win the B.E.R.U. Challenge Trophy this year and from his own story we are able to judge that he has the distinction of being one of the oldest amateurs in the Empire.

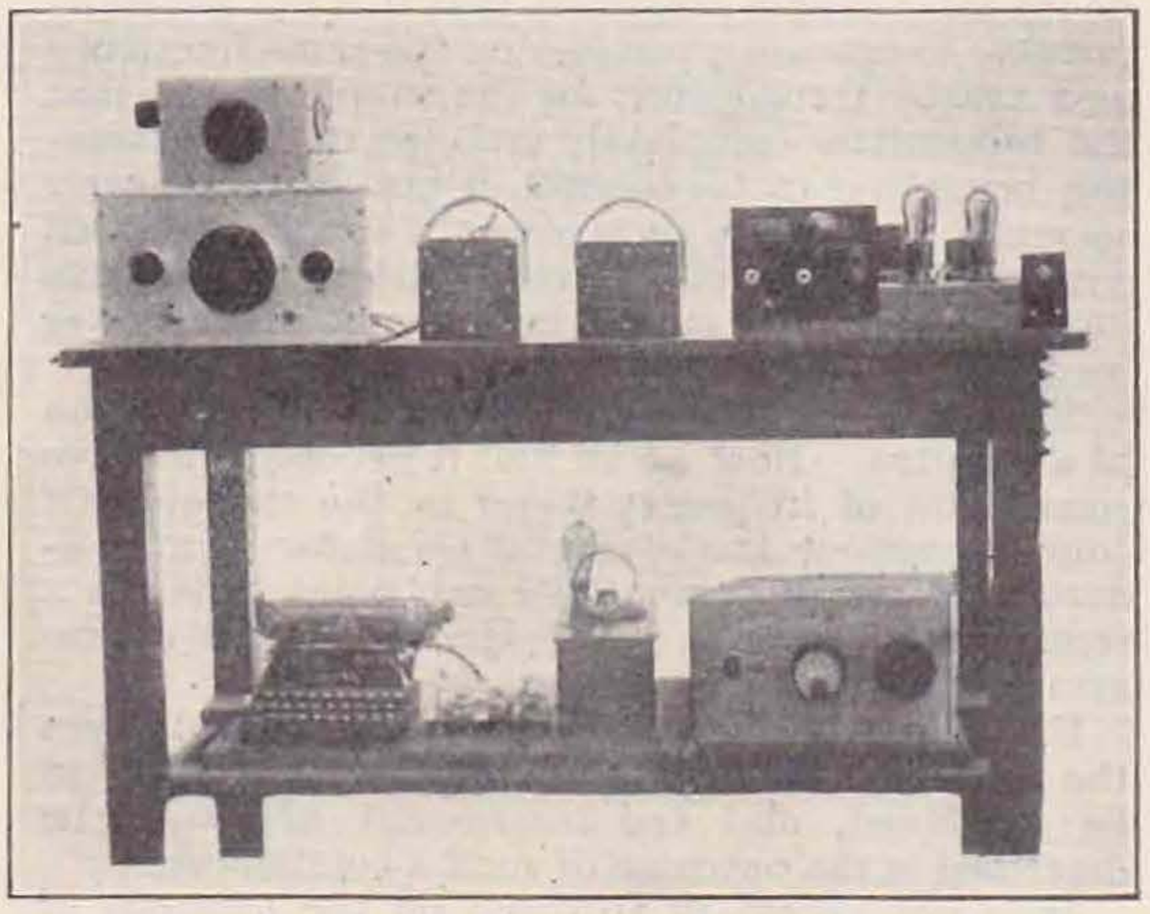
VK2NS first came on the air in 1925; at this time the station was situated at Charles Street, Blayney, but the only H.T. power obtainable was that derived from a couple of B batteries and a Ford spark coil; these were used singly and collectively with fair results until the local council saw fit to instal a power plant. Unfortunately this turned out to be a 240-volt D.C. outfit, much to the chagrin of the operator at VK2NS. The frequencies mostly used at that time were 3.5 and 9 M.C. Blayney is 120 miles west of Sydney, and is three thousand feet above sea level. In 1926 the writer moved to Bathurst to operate a broadcasting station, so at last the long-wished-for A.C. power supply was available. Bathurst is some



Main Transmitter: Power Supply at bottom, Crystal Oscillator and buffer in middle, third stage and P.A. on top.

twenty miles closer to Sydney, and approximately 800 feet lower. Many hams seem to be under the impression that a country town is a ham's paradise —unfortunately this one has an outsize in power-leaks, which seems to improve with age.

There are three transmitters at this station, so I will only describe the main one. This is a four-stage affair, employing a W.E.205d tube as C.O., followed by a 210 as buffer. These two stages have a plate supply of their own, and are running all the time, following stages only are keyed so that the C.O. is running with constant load, whether phone or C.W. is being used. The next stage is a further 210 tube, followed by two more 210's in parallel. When working on 3.5 M.C., only three stages are used, all of which are on the same frequency. It is hardly necessary to describe the various frequencies of each stage for all the different bands, but it will suffice to say that they are so arranged that the final stage is always preceded by at least one neutralised stage, which ensures good efficiency of the P.A. All tank coils are of the plug-in variety. A number of crystals, whose fundamentals range from the 7 to 1.7 M.C. band, are used; these are all grown on the premises, so numbers are no object. For phone work, high-power modulation is used, with the popular Heising method, with either a W.E. or Philips 50-watt tube as modulator. This is preceded by a three-stage speech amplifier, which in turn is either fed by a Reiss type microphone or B.T.H. pick-up.



This photograph shows (from left to right) Receiver Frequency.meter, Two Reiso Type Microphones and Speech Amplifier. Bottom right shows C.O. Unit for checking Frequency-meters.

Both power supplies use full-wave tube rectifiers, that supplying the first two stages has a UX280 and the other employs a pair of 281's. A big percentage of the gear is home-made; this includes transformers, crystals, crystal holders, microphone, speech amplifier, plug-in helices, frequency meters, etc. The antenna mostly used is a Zeppelin, with either $\frac{1}{4}$ or $\frac{3}{4}$-wave feeders, and half or full-wave flat top depending on what band the station is being operated.

Some of the auxiliary gear consists of a Dynatron frequency meter, a radio and audio frequency oscillator, and two absorption type frequency meters. The transmitter is keyed in the centre tap of fila-

(*Continued on page* 79.)

A MONITOR-WAVEMETER

The Monitor is to the Transmitter what the Insurance Policy is to the Motorist.

We present herewith the detailed description of a monitor-wavemeter, the first to appear in the pages of the "T. & R. Bulletin." Built by one of our most prominent members especially for publication in the "Bulletin" and for exhibition at Olympia, we feel that it fills a gap hitherto left in our series of constructive articles.

ALTHOUGH, to-day, there are a considerable number of crystal controlled stations in operation, there are still numerous stations which do not make use of this method of frequency stabilisation. It is for these principally that this article is intended, though the crystal controlled transmitter can also make very good use of the instrument.

For the benefit of the newcomer it will be as well, perhaps, to outline the functions of a monitor-wavemeter. First, then, the monitor is an instrument which enables us to listen to our own transmissions without having to make use of a receiver some distance away. No doubt most people are aware that it is not generally possible to operate a receiver on the same frequency as a nearby transmitter, for the simple reason that the transmitter completely swamps it. The monitor, being in a metal cabinet, is not affected nearly so much, in fact, in most cases it can be operated within a few feet of the transmitter, though this depends to a great extent on the amount of power used.

The above will give you some idea of the action of a monitor. Now we all find it necessary to have some form of frequency-meter in the station. Of course everyone has a crystal oscillator as a standard, but this will give only one point, whereas a frequency-meter can be designed to cover a prearranged band of frequencies.

Experience has shown that for practical purposes the functions of a monitor and frequency-meter can be combined, and the instrument about to be described is the outcome of such a combination.

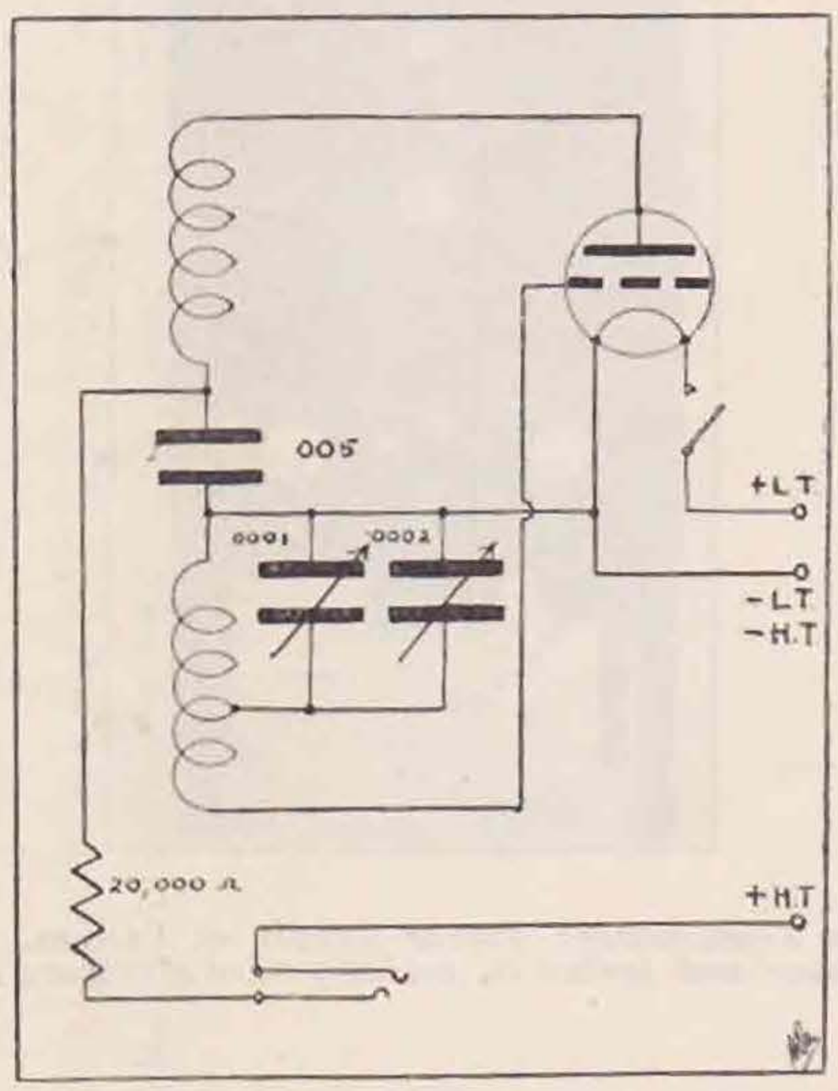
It is not necessary to dwell on the methods of calibration as these have been given fully elsewhere. It will suffice to say that a graph can be drawn up from readings obtained from heterodyning the monitor against stations of a known frequency, or, if preferred, the frequencies may be marked straight on the dial. The former method is preferable, however, as it will be possible to make much more accurate readings by this method.

Perhaps it would be as well to say that when taking readings for calibration of the instrument the signal of known frequency should be tuned in on the receiver, and the monitor heterodyned against this. It is not generally possible to heterodyne the monitor directly against the distant signal. The lid of the cabinet should be removed for this operation, so that a louder signal may be obtained. This will not affect the calibration to any appreciable extent.

The constructional work is very simple. The cabinet is supplied ready drilled by *Messrs. Burne-Jones & Co., Ltd.* The dimensions are as follows :— 12 inches deep by 7 inches wide, and 7 inches high. For ease of construction, *i.e.*, wiring, the right-hand side should be removed, this allowing the easy use of the soldering iron. All joints are soldered, as this is preferable.

A glance at the illustration will show the exact position of the components, but as the cabinet is ready drilled it is not necessary to give their exact positions. It is absolutely essential that the choice of components should be exactly the same, or the data for winding the coils will vary considerably, especially for the higher frequency coils. Probably any alteration would throw the 14 M.C. coil right out, as a very slight change on that frequency has marked results.

The L.T. accumulator is an *Exide* Gel-Cel, and



with the *Osram* HL2 valve used should last quite a month without recharging. The H.T. battery is also an *Exide* product, a Drydex 60-volt battery. This is placed on its side in the cabinet as it takes up less room.

The valve holder is a *Clix* type B for baseboard mounting. The 20,000 ohm *Colverstat* is placed in series with the phones to lessen the effect of withdrawing the phones from the plate circuit. This is necessary, as without it a considerable change in calibration would result. Both the fixed condensers employed are *T.C.C.*; the by-pass condenser being a type S.005 mfd., while the

condenser across the tuning condenser is of the ordinary T.C.C. manufacture and has a capacity of .0002 mfd.

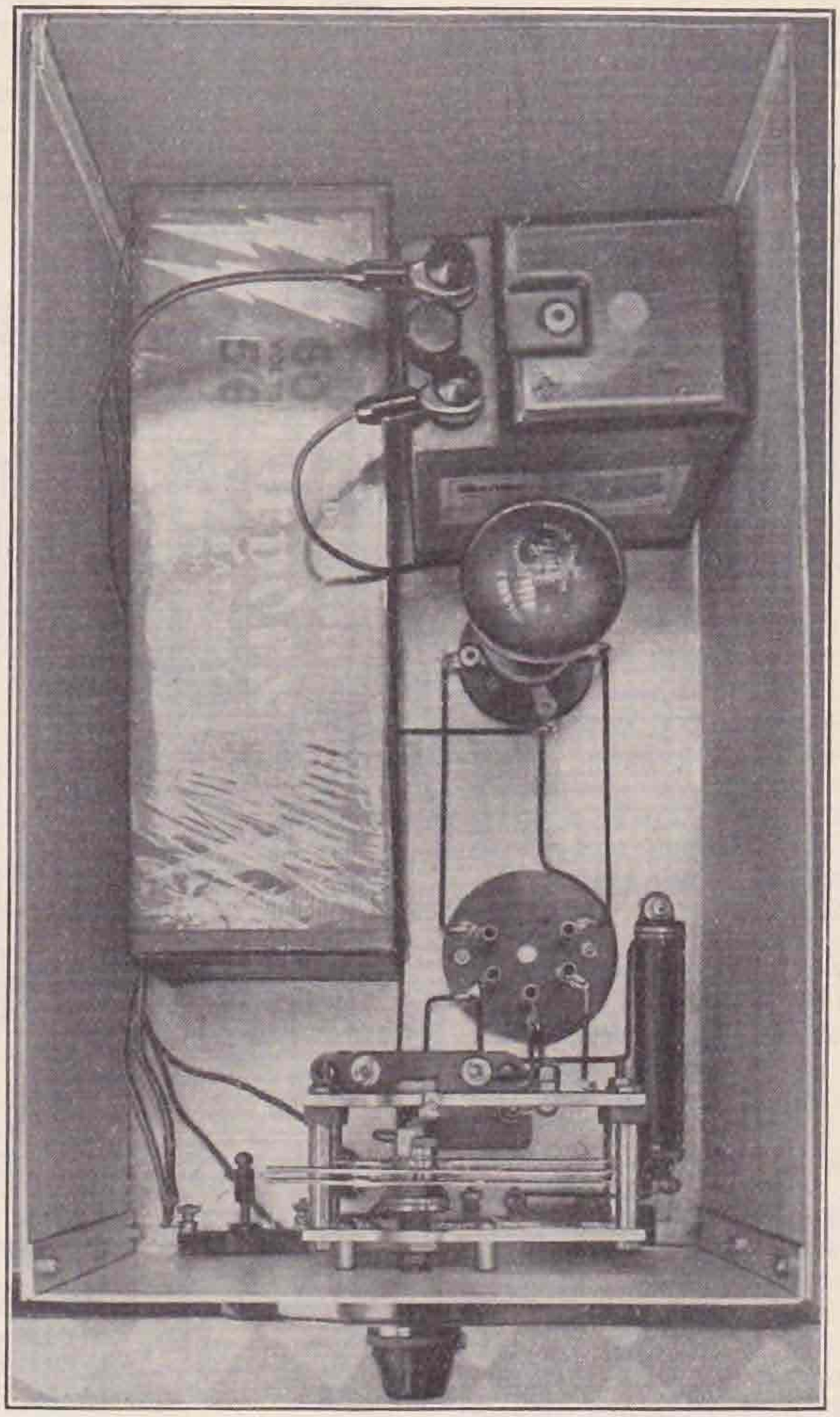
The tuning condenser is a *Cyldon* .0001 mfd. Log Mid Line. It is essential in an instrument of this nature that the tuning condenser should be of first-class construction, otherwise the instrument will not hold its calibration. This also applies to all the components used. Of course it is possible to build a monitor similar to this from junk apparatus, but the results would not be nearly so good, and it would be very little use calibrating such an instrument, while reliance on such calibration would very probably lead to much sorrow later.

On the front of the instrument will be seen, on the left, the filament switch, and on the right a No. 2 phone jack. These are *Lotus* products, and are both insulated from the panel.

It is essential that the dial should have good clear marking, and this condition is fulfilled by the *Igranic* Indigraph dial. This should be fixed as firmly to the spindle of the tuning condenser as possible, as any shift will alter the calibration. The movement of this dial is very smooth, and tuning is very easily accomplished, even on the 14 M.C. band.

All the component parts are fixed to the base by means of 6 B.A. nuts and bolts. The holes in the bottom of the cabinet are countersunk to take the heads of these.

The question of the coils has been left until last on purpose. On the accurate and careful construction of these depends the success of the instrument. Provided that the following details are followed carefully there should be very little difficulty experienced in their construction.



The coil formers and base are supplied by *B. and J. Wireless, Ltd.* The formers are made of ebonite tube 2 ins. long and 1½ ins. external diameter. The walls, being ⅛ in. thick, take 5 valve pins set 60 deg. apart round one end; the distance between one pair of pins will therefore be 120 deg., and this allows the coil to be put only one way in the base. The necessary valve sockets are clearly shown on the base in the photograph. The wire used is No. 26 D.S.C., and this must necessarily be adhered to if the winding data given is to be followed.

The grid coil is the winding nearest to the pins. For the 1.7 M.C. band coil drill a smallhole half an inch from the bottom of the former, and directly in a line with the right-hand pin. (This is with the ends of the horse-shoe formed by the five pins facing you.) Pass the wire through the base and solder it to the pin. Wind on 24 turns, winding the former away from you, and with the pins to the right. At the end of the winding drill another small hole and pass the wire through this to the third pin from the right, *i.e.*, the centre pin. The right-hand pin, and the pin the first from the right should be connected together for this band. Now for the plate coil. An eighth of an inch from the grid coil drill a small hole in line with the first pin from the *left* and start the plate, winding in the same direction as the grid winding. Wind on five turns, and bring the end of the winding down to the left-hand pin. Having done this you next proceed to shellac the windings, putting on a good thick coat.

Now place the coil in the monitor, and with the phones in position touch the grid side of the tuning condenser. If a plop is heard both on placing and removing your finger there, you may be sure the monitor is oscillating. Next beat the receiver against it. You will know roughly where the ends of the band come on the receiver, and will have no difficulty in deciding if the coil is the right size or not. If you decide that it is not, then a turn more or less on the grid coil will no doubt do the trick.

The same directions apply for the 3.5 M.C. coil as well, the turns being ten for the grid coil and three for the plate coil; the distance between the two windings being only a sixteenth of an inch in this case.

For the 7 M.C. and 14 M.C. coils the procedure is slightly different. Owing to the fact that a .0001 condenser rather crowds the bands into a few degrees it has been found necessary to arrange

(*Concluded on page* 90.)

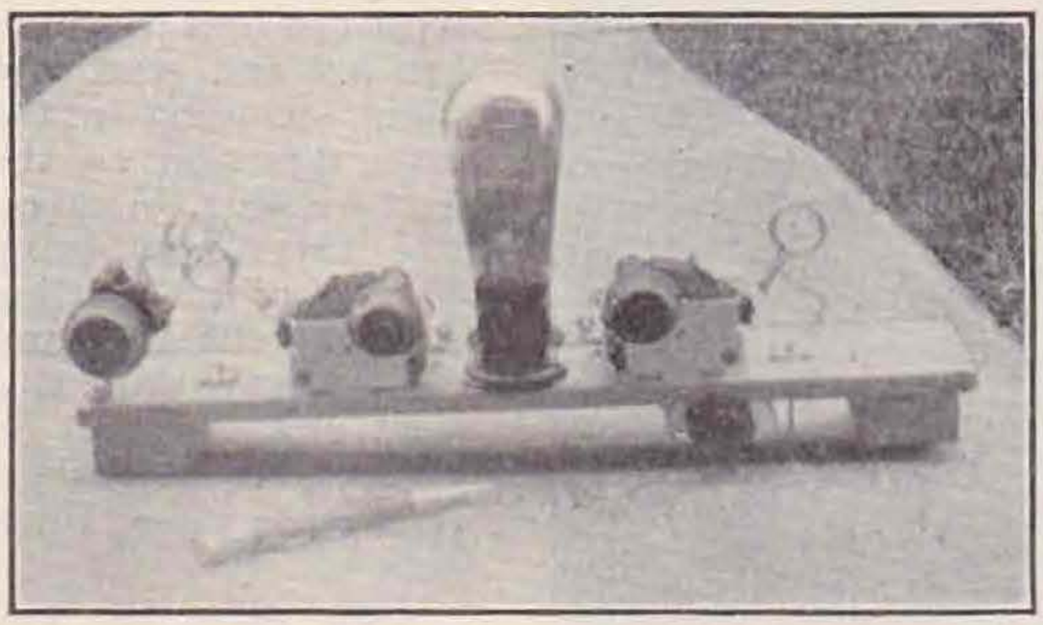
MAKE CONVENTION A SUCCESS.

56 M.C. EXPERIMENTS.

By C. G. Meyers (W3BHY-W3CCF) and R. M. Spengler (W3UR).

THE circuit used for recent 56 M.C. experiments is shown in the diagram, and employed two UX245 valves * in push-pull. There are a few novelties in the construction of the set, the tuning condensers, for instance, being made of two similar .0005 mfd. variable condensers altered by sawing the stator supports in half on each side of the centre stator plate. In the view of the transmitter the missing plate can just be seen.

The next thing of importance is the complete elimination of grid-filament and plate blocking condensers. In this circuit the plate and grid



tuning condensers serve that purpose. The grid leak, mounted under the baseboard, is a compression type having a maximum value of 50,000 ohms of which about 40,000 ohms were used. R.F. chokes were also eliminated as a safety measure: with series feed they are completely unnecessary. The filament centre-tap is a wire-wound 20-ohm resistor. The diagram and photo are self explanatory, and the size is indicated by the pencil on the photo, the baseboard measuring 15 ins. by 3¼ ins.

The power supply used was an eliminator delivering 450 to 500 volts at no load, about 250 volts at a drain of 50 mils and about 175 volts when the set was coupled to an antenna. In all, it was a very poor power supply, and was used because it was the first thing to hand.

The transmitter was originally built, not with any idea of ever using it, but was rather the product of an idle afternoon and a desire to see how it would work on extremely high frequencies. The circuit, while not common, is advocated here for 14 M.C. work, and had been used here with 75-volt valves by the A.R.R.L.

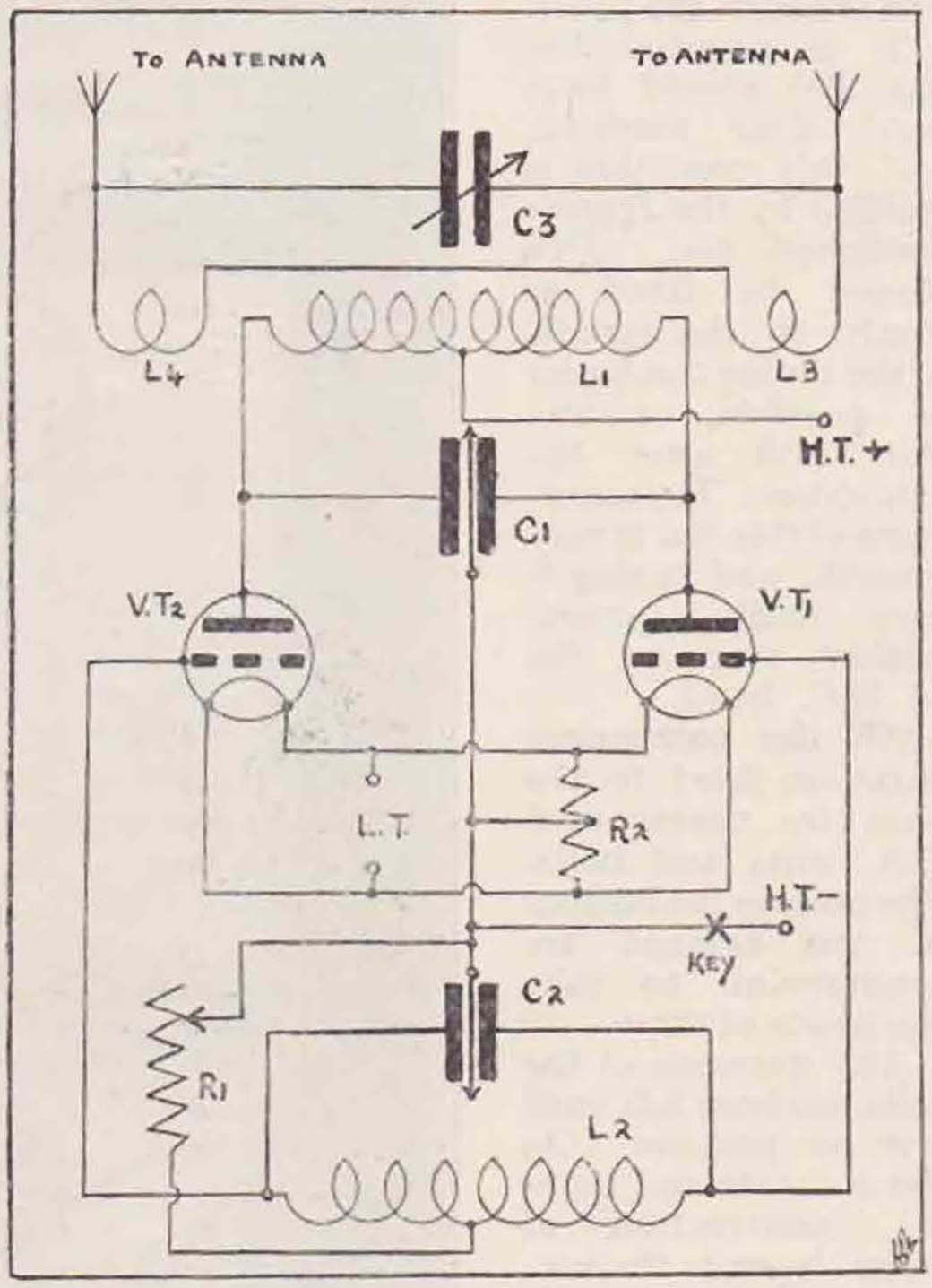
After it was built we started out with the coils used for 56 M.C. and immediately obtained oscillations. The value of grid resistor seems fairly critical, and when it is adjusted properly the

*Output in watts	5.0
Plate volts	250.0
Filament volts	2.5
do amps	1.5
Amplification factor	3.5
Anode impedance in ohms	1750

This valve was designed for an L.F. amplifier but is an excellent R.F. oscillator.

apparent efficiency is as good as we normally expect on 3.5 M.C.

Lecher wires were strung up and the wavelength measured. We were on 4.9 metres. From here on we continued to cut down the size of the inductance until we had a single turn. With this the minimum wavelength measured was 2.9 metres with the tubes still operating very efficiently. The coils were then removed and the terminals "shorted" with a straight wire, and the set still oscillated. At this point we were unable to make any wavelength measurements, due to the lack of an R.F. milliammeter and the failure of the light

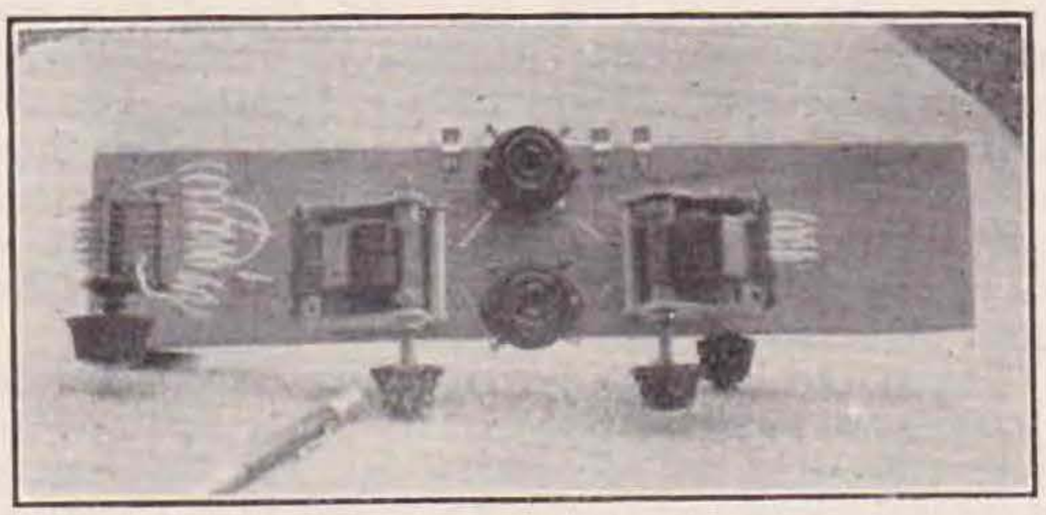


VT1 and VT2	...	*U×245*
L1 and L2	...	*4 turns ⅜" diam. 14 S.W.G. wire*
L3 and L4	...	*3 " " " " " "*
C1 and C2	...	*.0005 mfd. variable with split stators*
C3	...	*·000025 mfd. variable*
R1	...	*50,000 ohm rheostat*
R2	...	*20 ohm resistor*

in our Lecher wire bridge to operate. In this connection an interesting point turned up. Until we went below 4 metres we had been using a 2½-volt bulb as an oscillation indicator in a single turn loop. Then it stopped working, although the plate milliammeter said the circuit was working. Accidentally we substituted a 6-volt lamp of the same make and it worked. The spiral filament of the 2½-volt

lamp was apparently a good R.F. choke at this frequency !

We went back to 56 M.C. and started to try to feed the output into an antenna. Again we were hampered by measuring equipment and used a half-wave radiator with a lamp in the centre. At no time could we coax a glow from it, and eventually gave up the experiments. Both single wire voltage feed and Zepp feed were tried without results, at



east apparent. Then antenna-counterpoise was tried and made to operate until the antenna and counterpoise were each 16 ins. long. No frequency measurements were made at this time.

The set was finally dismantled and the transmitter turned over to Mr. Meyers to operate under the call of W3BHY, Gettysburg College, Gettysburg, Pa., where he is a student.

He set the transmitter up in the amateur shack in the college and immediately obtained results.

The operating room is about 80 ft. above the ground in the main building clock tower. The tower is brick, and there was set up in the same room a 250-watt crystal controlled set operating on 7 M.C. All calling was done with this transmitter on 7 M.C.

The antenna for the 56 M.C. transmitter was a single wire, direct coupled to the plate coil of the transmitter on the one end as shown dotted in the sketch. It had a total length of 56 ins., ran 28 ins. straight up and 28 ins. across. For no apparent reason it worked. The antenna for the 7 M.C. transmitter was a single wire feed 3.5 M.C. Hertz. The two transmitters were relatively close, and there is the chance that sufficient coupling existed for the 56 M.C. transmitter to excite the 3.5 M.C. antenna on a harmonic.

Mr. Meyers in the next few days worked several 8th district stations using the 56 M.C. wave and they using 7 M.C. At this point VE4CB sent a card reporting hearing the transmission and assumed it a 7 M.C. harmonic. This represented a distance of approximately 1,500 miles, and we believe it to be the 56 M.C. DX record. These tests were continued for a period of about one week and then the set was dismantled.

As soon as an automatic key can be devised this transmitter will be placed in continuous operation at W3UR's station to run for at least a month, when due notice will be given. No receiver was used, as we had none that would operate on these frequencies.

As an indication of the efficiency of this circuit W3BIT recently worked a G using a somewhat similar set when W3BIT was using 20 volts on the plate, 3.5 mils and zero antenna current. This was accomplished at about 17.00 G.M.T.

R.S.G.B. S.-W. Two—(*Continued from page* 71).

can be said beyond the fact that everything there seems to be easily received. It is rather interesting to note that, owing apparently to lack of background noise, signals appear at first to lack power. Probably the ear, in other cases, registers the volume of combined noise and signal strengths and, with a large quantity of the noise element removed, finds the pure signal lacking in apparant power. The test of putting signals on to a small loud speaker conclusively proves that the signal power is given out by the set. Most of the short wave broadcast stations and many amateurs have been read comfortably so. Broadcast stations at 500 miles have, at times, given overloading of the same speaker at night time.

In the part of the country where this set was first tested out, there are practically no amateur transmitters under 150 miles and the London Regional transmitter is over 200 miles away. Yet, as stated, both amateurs and broadcast transmissions at 500 miles distance could be read on loud-speaker and amateur transmissions from all parts of the world were often easily so read. Quality of speech is exceptionally good.

For the novice the set will offer a simple but extremely efficient introduction to happenings upon the short waves. If he has a working knowledge of Morse Code, then the news of the world is available. Amateurs in every Continent can be heard—and with the band spacing provided, even the countless American amateur code and speech transmissions can be sorted out with ease. Band changing is of the simplest and no great alteration to controls is required as coils are changed, the set operates at almost identical control positions throughout its range.

For the experienced short wave worker, no better " two-valver " can be recommended.

The receiver will be shown on the Society's stand, No. 246, at the R.M.A. Exhibition at Olympia.

Winning B.E.R.W. Station—(*Cont. from p.* 75),

ment transformer supplying the last two stages as this practically eliminates all trace of back wave. The key is a " Simplex-Auto," with an ordinary type of hand key in parallel for the convenience of visitors who are not used to the automatic type of key.

The operator has been interested in radio since 1913, and in 1914 was the proud possessor of a spark coil transmitter and coherer, the best DX being about 200 yards. A fair amount of interest has always been taken in any contests that have been organised from time to time, and in 1929 VK2NS was fortunate enough to win a 3.5 M.C. competition organised by the N.S.W.A.R.T.L., and in 1930 won three out of the four tests organised by the N.S.W. Division of the W.I.A. for the Maclurcan Cup, thus winning the cup for that year, and gaining a special prize for best quality phone as well.

STATION DESCRIPTION No. 16.

G6RB.

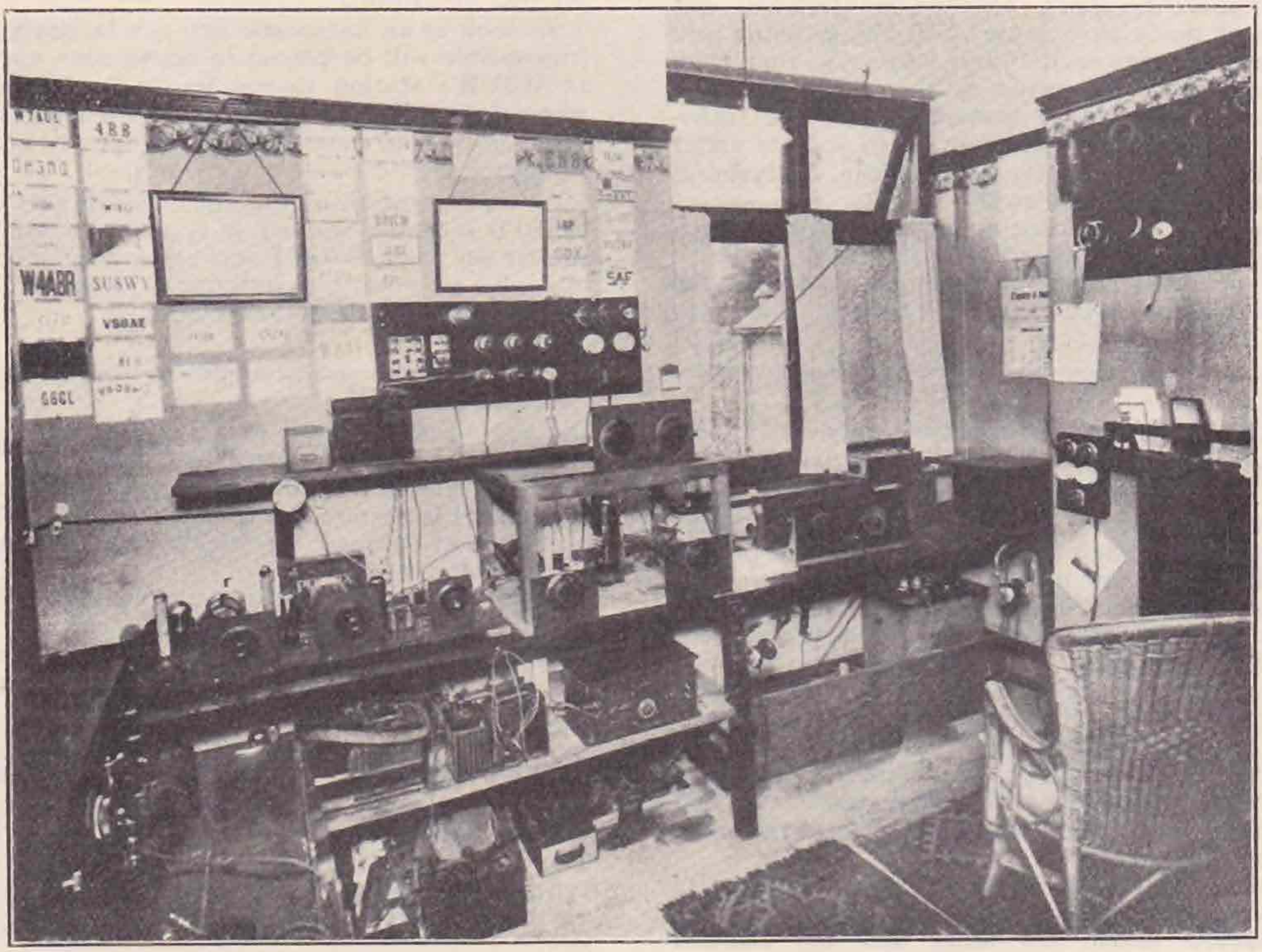
By "QRQ."

We have pleasure in presenting herewith a description of Station G6RB, winner of the "Wortley-Talbot Trophy for 1931-32. To Mr. Bartlett, the operator and owner, we offer sincere congratulations.

MR. R. A. BARTLETT, of G6RB, needs no introduction, as his signals are well known to amateurs in practically every country of the world, and his call-sign appears in nearly every published list of "Calls Heard." G6RB started radio work many years ago as a sea-going commercial operator, and he is the possessor of a first-class P.M.G. operator's certificate. After a year or so as a BRS station, during which time he co-operated with many DX stations by reports on their tests and schedules, he obtained his transmitting licence in April of 1927.

Near the end of 1928, however, the station was moved to its present situation at Bishopston, a suburb lying near the outskirts of Bristol. The site of the station is now at the top of a hill, and as there is but little local screening, the position is much better for radio transmission than the old site at Redland. It is in this QRA that his best work has been performed.

The photo shows a general view of the "radio shack"—a room situated on the first floor of the house, devoted entirely to radio. The transmitter is crystal-controlled in the 3.5, 7 and 14 M.C. bands,



At this time the station was in Redland, Bristol, and it was in a most unfavourable position for transmission, being situated in a valley and badly screened by houses. The transmitter was a low-power T.P.T.G., using an LS5 valve as oscillator, feeding into a loose-coupled aerial and counterpoise. In spite of the handicap under which the station was placed, excellent work was done with low power, and later, when a 50-watt licence was granted to G6RB, he substituted a DET1 for the old LS5, and soon won his W.A.C. certificate.

using the Goyder blocked oscillating amplifier method. The crystal oscillator, followed by two frequency doublers, is on the bench on the left. The frequency doubler anode coil is magnetically coupled to the grid coil of the power amplifier, thus locking the P.A. frequency to that of the doubler. The P.A., on the bench next to the crystal stages, consists of the usual T.P.T.G. circuit employing a DET1SW valve. Situated above the P.A. can be seen the feeder tuning panel and the main power switchboard.

Under the bench the speech amplifier for telephony transmission is visible. Grid modulation is employed, the output of the amplifier being fed into the grid leak circuit of the P.A., through a transformer. An Adolph microphone is used.

The main power supply for the P.A. is derived from a full-wave chemical rectifier of the " bridge " type, using lead and aluminium electrodes in a borax solution. This rectifier is supplied from the large power transformer seen under the right-hand end of the bench. The output from the rectifier is smoothed with the usual choke and condensers. Only a small smoothing filter is required with the chemical rectifier, and an output of pure D.C. at about 850 volts is obtained.

The power supply for the crystal stages is also underneath the bench ; this consists of a full-wave valve rectifier giving an output of 250 volts at 60 mA. The speech amplifier is fed from this same source, when telephony is used. The filament supply on all valves in the transmitter is A.C., derived from a 6-volt transformer.

The short-wave receiver, on the right of the transmitter, consists of a detector followed by one stage of L.F. amplification. A screened grid valve is used as detector, with excellent results, in spite of the fact that the L.F. amplifier is transformer-coupled. Shortly, however, the choke-resistance amplifier is to be tested, and it is expected that this will give better results. Hand and body capacity effects are overcome by extension spindles on the condensers, and by H.F. chokes in the phone leads.

The monitor at the right-hand end of the bench is used for checking transmissions and for locking the P.A. A switch changes over the phones from receiver to monitor and *vice versa*.

Three crystals are available for the control of the transmitter, so that changes may be made to avoid interference. On the 3.5 M.C. band the transmitter is sometimes worked as a self-excited oscillator, as on this band the note is good without crystal stabilisation.

Many aerials have been used, and all the well-known types have been tested by G6RB ; the best aerial for general DX work appears to be his present aerial, which is a Zeppelin, full-wave on 14 M.C. Half-wave feeders are employed, and with 40 watts input the feeder current on 14 M.C. is about 0.8 amp. The aerial is only just over 30 feet high and is used for all three bands. On the 3.5 M.C. one side of this aerial, together with a counterpoise, is used with excellent results.

Regarding DX contacts, about 74 countries have been worked at present, and the W.A.C. and W.B.E. certificates have been on the wall of the station for a considerable time. The most outstanding work was the two-way contact between G6RB and ZL2BE last winter on the 3.5 M.C. band. The input to the P.A. on this occasion was only 22 watts.

No work has been done on 28 M.C. so far, but a transmitter for this frequency will be built for use in the coming season, especially if conditions show signs of improving.

G6RB is a very keen member of the R.S.G.B., and he takes a great interest in the 3.5 M.C. band. On this band he has organised the Contact Bureau Group. It is in recognition of his work on this band that the Wortley-Talbot Trophy has been awarded to him this year.

In concluding, G6RB is always delighted to see any amateurs who may care to visit his station, and visitors are assured of a warm welcome. The writer feels confident that all stations will join with him in offering hearty congratulations to G6RB.

Single Valve S.W. Transmitter.

(*Continued from page* 74.)

The condenser C_2 is a *Cyldon* .0002 mfd. transmitting condenser ; the aerial connections should be taken to this condenser and the condenser connected to the coil by clip connections to facilitate alterations. The coil in the photograph will be seen to consist of seven turns of 3/16 in. copper tube wound to a diameter of 3 in. This was used for operation on 7,000 K.C.

It is hardly within the scope of this article* to do more than briefly touch on aerial systems, but it is being assumed that some form of tuned and loosely-coupled system will be used. In which case the two wires from such a system will be connected to the circuit L_2C_2 as indicated in the diagram. It is usual to insert aerial ammeter(s) in one or both of the aerial leads for purposes of adjustment.

If now the coils L_1 and L_2 are loosely coupled and condenser C_2 is rotated the anode feed current will be seen to rise at a point where the aerial is in tune. Use slightly more capacity than is shown by this method and vary the coupling between the coils for maximum efficiency. The reading of the aerial ammeter may be taken as an indication of the power output.

This transmitter, together with power supply, will be shown on the Society's Stand (No. 246) at the Olympia Exhibition. A set of *Eddystone* coils (for use on 40 metres) will be included in the set.

Power Supply.

A suitable power supply for working from A.C. mains is shown in the photograph, and the diagram (Fig. 2). The apparatus will be readily identified. A *Parmeko* transformer is on the left, and supplies 450—0—450 volts for the H.T., 6 volts (centre tapped) for the LS5, and 7.5 volts (centre tapped) for the *Osram* U8 rectifier. * A *Parmeko* smoothing choke (type No. 2) is seen at the back, on the left and right, of which are *T.C.C.* smoothing condensers (750 volts working) of capacities 2 and 4 mfds. respectively. Four *Clix* all-in terminals are seen at the right.

Referring to the diagram, choke L_2, condenser C_3 and resistance R constitute the key-thump filter. This apparatus is seen on the power supply board to the right of the valve. The choke is a *Savage*, type C32M, and the condenser a .25 mfd. *T.C.C.*, 500 volts working. The value of the resistance is 25 ohms. Two terminals for connecting the key may be seen.

* Articles, both elementary and advanced, on the erection and operation of various types of aerials will appear in early issues of the BULLETIN.

* We understand from the G.E.C. that the U8 is to be replaced by the U14 about the time that this article appears.

SEPTEMBER IS CONVENTION MONTH.

CONTACT BUREAU NOTES.

By H. C. Page (G6PA).

THINGS still seem to be comparatively quiet, although perhaps the recent contact between FM8IH and G6WN may be the forerunner of greater activity in the near future. At least we will hope so. A message from FM8IH which reached me *via* G6YL states that he is running regular 28 M.C. schedules between 18.00 and 20.00 G.M.T. each day, and asks English stations to keep a watch for him. This was the first FM-G contact this year!

VU2FX reports very little doing in his part of the world. He also makes some observations on the letter from F8BJ, which was published recently in these notes. VU2FX thinks there is a possibility of frequency doubling in the receiver, especially in receivers employing a stage of screen grid amplification. To quote from his letter: "Whilst agreeing with F8BJ as to the possibility of such frequency doubling, I do not think it usual. Most 'ham' receivers work on the leaky grid principle. There are, of course, numerous 28 M.C. receivers in which the detector is preceded by a screen grid H.F. valve. It is my opinion that in this case doubling *is* likely to occur. It is well known that S.G. valves possess non-linear properties, and that because of this our B/C friends are troubled with 'cross modulation' and other annoyances."

G2ZN writes to say that he has been unable to make any observations with regard to sunspots this month. The reason is obvious. In fact, the less said about it the better! He goes on to say that observations over a fair period do not seem to show any decisive result, but does not mean to assert that the sunspot theory is untenable, as such a statement would be ridiculous from an amateur observer. However, the observation of transitory upheavals of the solar surface do not seem to be of much use, as they are so conflicting. He intends to continue the observations for his own purposes, but wonders if there is any demand for their publication. Of course, this depends almost entirely on the attitude of the Clerk of the Weather. (G6PA).

G5CV tells me that there is practically nothing to report so far as television is concerned. This being the case Group 11A have disbanded for the time being. He has been staying in Belgium with ON4TO.

VE2AC sends a tentative list of schedules, which he hopes to keep fully. Every effort will be made to do so, and for the benefit of those who are working on 28 M.C. I give the schedule in full.

August 1, 8, 15, 22, 29, at the following hours:—12.00, 12.30, 13.00, 13.30, 14.00, 19.30, 23.30.

August 2, 9, 16, 23, 30, also September 6, 13, 20, 27, at 01.00, 02.00, 13.00, 13.30, 14.00, 14.30, 15.00, 16.30, 17.00, 19.30, 20.00, 20.30, 21.00, 22.00, 22.30.

August 3, 10, 17, 24, 31, also September 7, 14, 21, 28, as follows:—00.00, 01.00, 02.00, 03.00.

Of course most of these times are too late for us. But the dates in September may be possible for some of us. It is a pity we did not get the details before.

Tests from VE2AC will consist of: Ten minutes sending test (3 times), 28 M.C. de VE2AC (5 times). Five minutes' sending CQ (3 times), 28 M.C. de VE2AC (5 times).

Ten minutes listening in on 28 M.C. for calls.

To permit easier reports he will occasionally listen on 14 M.C. for stations calling him. He will mention when he is going to listen on 14 M.C. at the end of the 28 M.C. call.

The approximate frequency will be 28,400 K.C. But different settings will be tried at the higher part of the band.

All times are G.M.T.

Group Reports

28 M.C. Work.

G6VP, Group Manager.

As one would expect, holidays have interfered with our work. It's more the pity as conditions have been steadily improving and at times have been really good.

The usual small number of regular stations have all DX to report, and quite a number of harmonics are to be heard practically any evening.

Group 1B.—G5SY has got going again. He is now using a modified Hartley circuit and a 7 M.C. crystal. He finds both the circuit and the crystal much better than the usual T.P.T.G. and the 3.5 M.C. arrangement. He is now using battery bias instead of resistances to the frequency doublers, and finds the system more reliable and much easier to adjust.

After a QSO on 14 M.C. with FM8IH he QSY'd to 28 M.C., but contact was not established.

G6LL has everything ready and, as usual, will take the air during September.

BRS250 has done a lot of listening on the band and heard many commercial harmonics, including the trans-Atlantic telephony. He usually assists G6HP during the tests and will be there the first Sunday in each month searching for the numerous VK's and ZL's that are on schedule.

Group 1C.—G6VP is now regularly working, although not usually on high power. In common with others he has heard many commercial and amateur harmonics and has had many local QSO's up to 20 miles. He is rather intrigued with the following: He uses a six half-wave end on voltage (?) fed Hertz. On 30 watts input, the current as measured on a hot wire ammeter 18 inches from anode measures .25 amp. A 200-volt neon also strikes quite brilliantly; in theory very little current should be present at this point. On 50 watts input the current increases to nearly .5 amp. Given that the aerial end is not working as a Hertz, but as a quasi-current-fed arrangement, he wonders whether this would be the equivalent of 3 amps. and a $\frac{1}{2}\lambda$ aerial? His signals are always weak locally, but on August 17, at 19.30 B.S.T., whilst working on 14 M.C., FM8IH called him up to say that his harmonic on 28 M.C. was R5 to R6. Following an urgent appeal to QRX whilst VP

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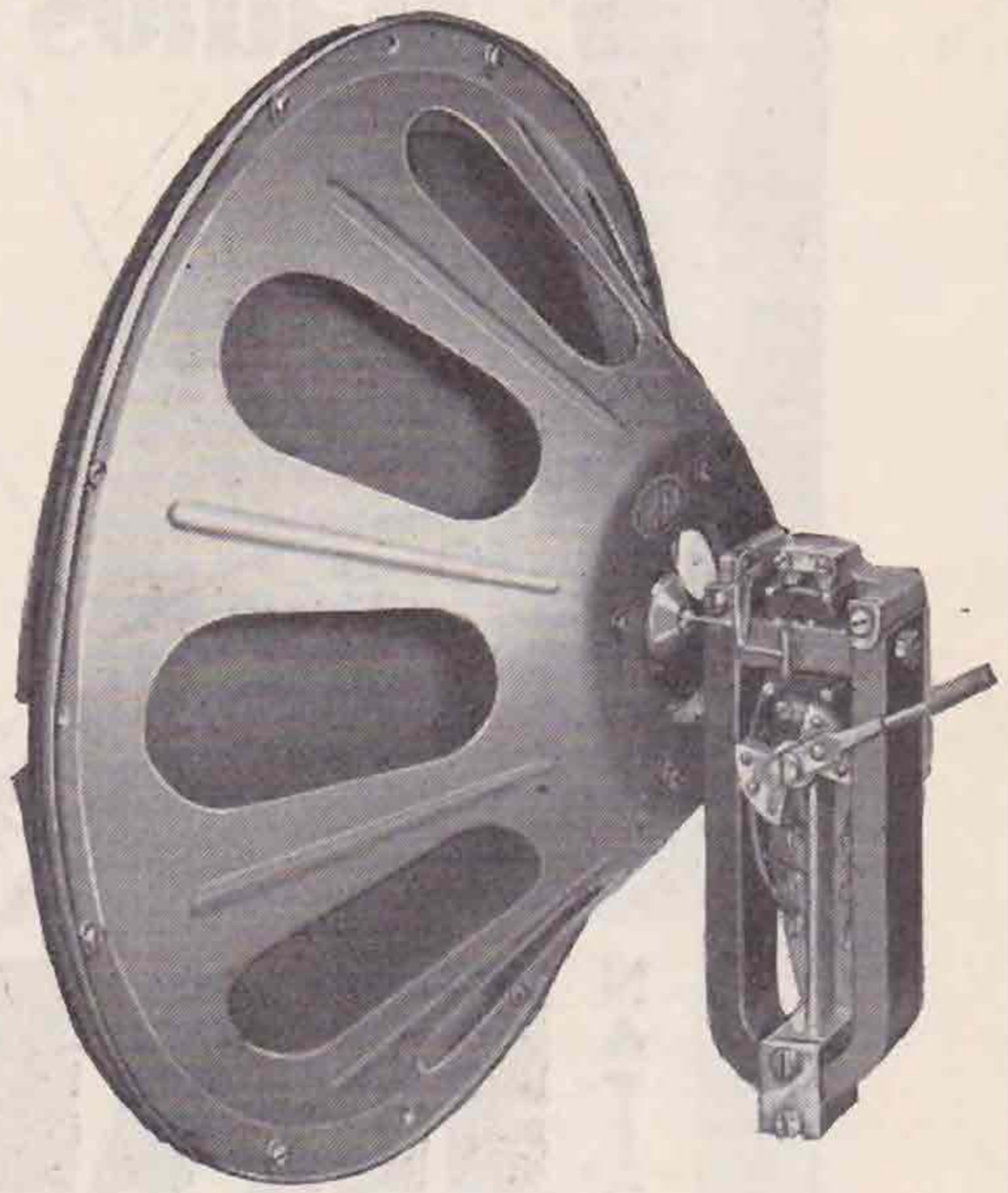

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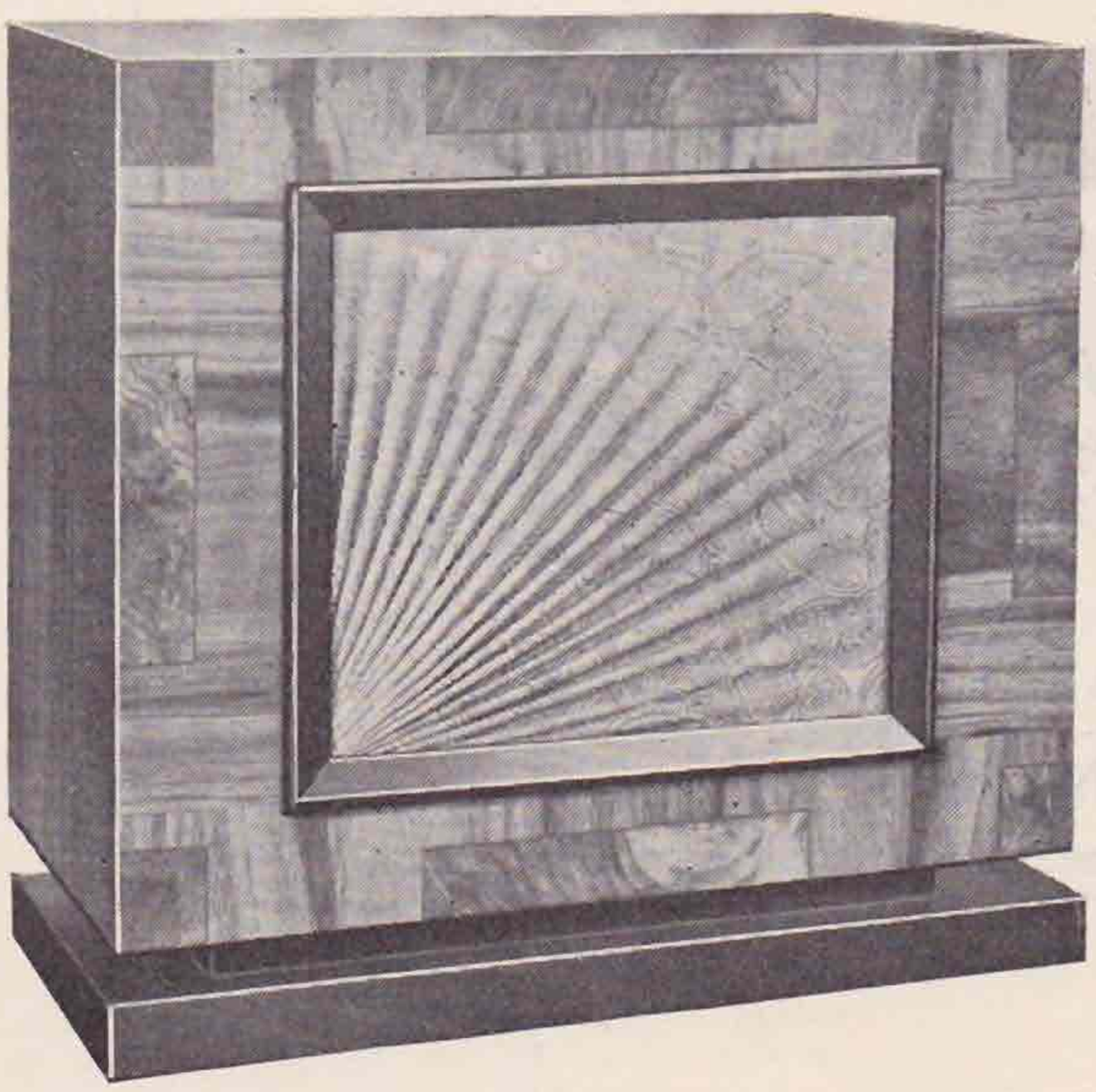

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OLYMPIA SEPT. 18-26

11a.m-10p.m DANCING

ORGANISED BY THE RADIO MANUFACTURERS' ASSOCIATION.

QSY'd to 28 M.C., communication was established, and his fundamental 30-watt signals reported R9+. Unfortunately, he was unable to hear FM8IH when this latter station QSY'd also.

G6WN have been on holidays half the month; nevertheless, as usual, they seem to have been doing the bulk of the work.

Harmonics of CT1AA and CTICW have been heard on 28 M.C. and the station requested to QSY, but, unfortunately, owing to QRM and a swinging receiving aerial nothing was done.

They comment on the fact that signals on 28 M.C. are very similar to those on 14 M.C., although they usually come in a little earlier from the same direction. Changing the grid choke of the last F.D. has done much to improve their transmitter. They find that one of 78 turns 1½in. diameter is much better than one of smaller size. They have been troubled with the choke getting in the field of the coil and being swamped. They have been QSO with FM8IH at R8 on the 18th ult., but no further details are to hand yet.

I1DA also sends them a report of reception of their signals on July 25 at 20.25 G.M.T., R3 T8. Here is their log :—

July 15, 1931 : 20.27 G.M.T., CT1BG heard, QSA3, R3; others heard, G6HP, G5PJ, G2DZ, G6VP.

July 16, 1931 : 19.00 G.M.T., G5VB heard and worked.

July 19, 1931 : Heard G5VB, G6HP, G6VP, G2UV, G2JU, G2GP, G2BY, CT1CW.

July 20, 1931 : Heard IDO, D4UAO, CT1AA.

July 21, 1931 : Heard CT1AA, CT1CW, 2 fone stations and G2JU and G5PJ.

July 24, 1931 : Heard GYJ, G6VP, G5SR, G2BY, FYQ, EAM.

July 25, 1931 : Heard CT1AA, G6VP, G2BY, G6HP, G2YD, G2OL, G5SR.

July 26, 1931 : Heard WCI, 4AM, G6VP and worked, G6HP and worked, G2DZ, G5SR, G5VB, and 2 fone stations.

July 27, 1931 : Heard EAM, IDO, and CT1BG.

July 28, 1931 : Heard G5LA.

July 31, 1931 : Heard G5SR, G2UV.

Group F.—BRS25 reports that none of his members have sent in reports. Well, this is too bad. Some, to my personal knowledge, are active. Please do play the game when you join a Group. You must report. That's that! Indirectly I have heard that G6HP has been heard on several occasions in Algeria and also that he has been QSO FM8IH. His station has been vastly improved and he has promised me a more or less detailed description of this circuit.

Fading, Blindspotting, and Skip.

By G2ZC, Group Manager.

This month I have the worst report I have ever had to make, and I must ask the members of both Groups 2A and 2B to remember that they must report.

G.C. G6NK, of 2A, writes to say that, possibly owing to holidays, he has had only three reports, and that there is nothing in them worth sending on to C.B. While I do not know what subject 2A has under discussion, at the same time surely there are plenty of subjects that the whole Group can discuss, and I ask them to take their work seriously and put their backs into it.

2B, on the other hand, had a very definite subject to discuss, namely, the possible cure of fading, but only G6PP and G2ZC have written on the subject, while G2IM sends in an interesting enough report, which, however, is not what was asked, while G6YL says she has nothing to report, save the daylight ranging of 7 M.C. signals, which again is not what was asked. G2ZN and CT1BK have not reported to the date reports have to be in, so that really means that only two members out of 12 have done what was asked. Such a state of affairs is beyond anything that has yet happened, and I can only hope that the members of both groups take the matter to heart, as, if not, then something else will have to be done.

In the possible cure for fading, both G6PP and G2ZC take into account the heavyside layer, and its being in undulating, or wave form. G6PP suggests that to overcome fading it would be necessary to eliminate the heavyside layer's effects, by a possible " beaming down " of transmitted signals, for as fading never takes place within the ground wave area, if the influence of the layer could be overcome, and sufficient distance could be covered with a " beamed down wave," then this might possibly overcome fading. G2ZC, on the other hand, uses the wave form of the heaviside layer in the usual way, but would have a series of aerials, working on a crank system, that would average out the angles of reflection, so that, considering any one given reception spot, we would always have one " ray " of the transmitted signal being reflected at approximately the same angle, and which would average out the reception strength.

Antenna Group.

By G2OP, Group Manager.

Fig. 1 shows an arrangement I used about three years ago. It has the double advantage that it worked well on all four bands (1.7, 3.5, 7 and 14 M.C.), and, having a thermo couple at the point T in the shack, one has a visible reading of what is taking place. The aerial part is 67ft. and the counterpoise is also 67ft. long. For 1.7 M.C. the counterpoise was disconnected and an earth hooked on to the point G.

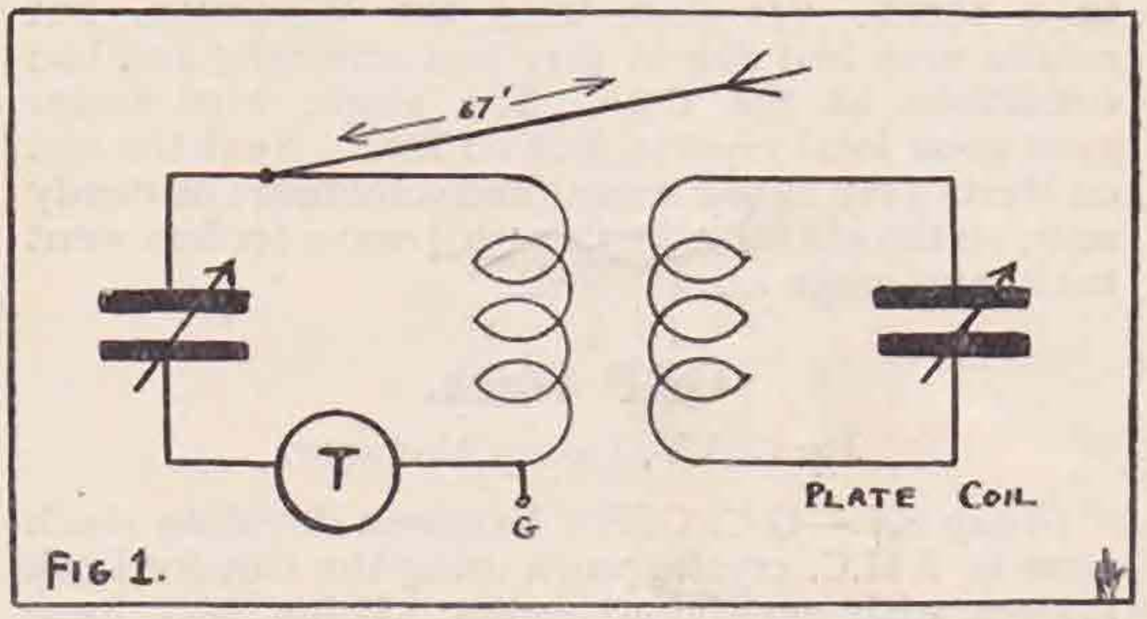


FIG 1.

For 3.5 M.C. the earth was disconnected and the counterpoise connected, when the system becomes a half-wave antenna current fed at the centre. The best results on this band were obtained by using a two-turn coupling coil and the tuning condenser in series with it. On the two higher frequencies neither earth nor counterpoise were used, and in each case the coupling coil and con-

denser were the same size as the plate coil. On 7 and 14 M.C. the coupling coil, therefore, is in resonance with the plate coil and is not influenced by the damping of the aerial, and provided it is low loss it is possible to use extremely loose coupling owing to the heavy currents flowing in the coupling coil. With 15 watts the thermo couple would read over 2 amps, so beware of the size meter you use in this position. If you haven't a high reading one, then use a 12-volt car headlamp, which is less expensive to replace. Having tuned for maximum current on these two bands, clip on the aerial, which on 14 M.C. is a full wave voltage fed type, and on 7 M.C. it becomes a half-wave voltage fed.

For getting out on these bands it was found that the secret lay in the end to which I connected the aerial. On one side of the tank circuit there would be plenty of current, but reports were few, while on the other side of the tank condenser the current became nearly half, but signals got out very well. For those who want to be able to work on all bands it is a simple system, and I was very pleased with results.

The holiday season is with us, and the two antenna groups are, therefore, not active as groups at the moment, but I have received several reports from individuals. I shall be away myself all next month, and it is extremely doubtful if any notes will appear in the October BULLETIN for this reason.

It is with pleasure that I welcome ST2D to the Group, and it is interesting to note that his inclusion was the result of a ragchew between himself and G2OP on the air.

G6MB has been silent for two months, but is now testing out the Wilkinson.

ST2D got good results with the Wilkinson when out in the blue, but using the same aerial at his permanent quarters had bad results, and thinks that the latter were due to the proximity of a tin roof.

G2YX has been away on military training, but is starting up on the 3.5 M.C. band soon.

G2OP at the moment is giving his end on Hertz a rest and is trying out another Zepp.

G2BI seems very pleased with his single wire feeder arrangement and is conducting further tests.

G6GS has been removing his gear from the house to a shack. He first tried the Wilkinson, but results were bad due to very bad screening and bad conditions at the time. The single wire feeder gave good local reports, but no DX. Next the end on Hertz gave mixed results and sometimes unsteady note, so the old 66ft. Zepp with ¾ wave feeders went back, and again all was well.

QRP Work.

By G2VV, Group Manager.

Group 8A.—G.C. G5RV has been devoting much time to 7 M.C. crystal work using the Goyder Lock system with gratifying results. Using very loose coupling between last F.D. tank and the T.P.T.G./PA grid circuit, good control has been maintained with a ratio of F.D. anode watts to P.A. anode watts as high as 1—7.5.

G2ZQ is now C.C. and says that he will remain so "for ever"! Works very consistently on 7 M.C.

G5YH is now using CO/PA arrangement and is obtaining excellent results both on local and DX work.

Group 8B.—G.C. G2VV reports conditions hopeless on 7 M.C. during the daytime and very bad QRN in the late evening. 14 M.C. is not so good as it was a couple of months ago. No 1.75 M.C. work has been done this month as the week-ends have been taken up with outdoor QRM! As mentioned in last month's notes, loading the 33-ft. V.F. with various size coils on 7 M.C. has been tried, but no improvements are found in reports. This aerial is not good for 7 M.C. work, but its excellent performance on 14 M.C. justifies its continued use. The best aerial for 7 M.C. work has been the 66-ft. A.O.G. It is hoped in a short time to start 28 M.C. work and the station will be fitted with a separate TX for this wave; it will be Ultraudion, of course!

Congratulations to 2AHB, who is now G6PV. He is working on 7 and 14 M.C. with an Ultraudion and QRP input. Using PM6 and 33-ft. V.F., but is not pleased with results on 7 M.C. Hopes to be working on 1.75 M.C. shortly. Requests reports on his signals on any wave. Says conditions poor.

G5CM active on 1.75 and 14 M.C. and has been using a 2-volt valve in TX with 1 and 2 watts with pleasing results. Finds conditions poor.

G5RX is using 5 watts and CO/PA circuit. Reports conditions for local work on 7 and 14 M.C. have shown a big improvement; DX not so good. Has done some good 5-watt work on 1.75 M.C., having worked OZ and OK, using 66ft. top aerial with 66ft. counterpoise loose coupled to TX.

G6SO reports improving conditions on 7 M.C., but no DX. Complains of lack of stations on the 3.5 M.C. band, especially G's. On 1.75 M.C. is using fone and C.W. with good results. Is working on 3.5 M.C. band after 19.00 G.M.T. each day and requests reports.

2ANU has been busy rebuilding T.P.T.G. and trying grid control fone getting 70 per cent. modulation. Says 14 M.C. has been good, but is now falling off. Says that he finds weather has a large effect on 1.75 M.C. reception. Sends usual list of stations heard on all bands.

We welcome ZD2A (Nigeria) to this Group and await his report with interest. It is hoped to arrange some schedules with this station.

Group 8D.—G.C. G5MR has been trying grid control fone with his C.C. outfit, but so far results are not good. Reports conditions on 7 and 14 M.C. very bad. Says fading on all waves spoils many contacts. Is running schedules with G6KP and G5FN.

2AGN reports varying conditions on 14 M.C., but often hears locals at R8, but no DX. 7 M.C. shows slight improvement, but still poor. Is now testing T.P.T.G. with H.T. accumulators for plate supply and A.C. on the filament of a DE5.

G5QY finds a UX245 better than LS5 as an oscillator for QRP TX work. Has been working on a portable parallel fed Hartley using 0.7 watts to a P215 (Osram) on the 7 M.C. band. Is running a schedule with VE2CU. A misprint about his aerial occurred in last month's notes. It is a 3/2 V.F. and not 66ft. C.F. as stated.

G6BU complains of terrible conditions, especially on 14 M.C., but has been getting DX at times and has also received DX reports.

STAND 246—OLYMPIA.

2APR sends an interesting report regarding the night of August 4 on conditions preceding the cloudburst and thunder at his QRA. At 20.30 conditions suddenly changed and such results have not been heard before. Stations in all parts came in, and especially those from a S.E. direction, at terrific strength. Every country in Europe was heard, with the exception of EAR and CT. Then came the storm, and he closed down until this was over, and on listening again at 24.00 he found conditions quiet and normal, except that EAR were very loud and stronger than any other country. He has noticed that EAR and CT always come in at terrific strength after local thunder. (What do our weather experts think of this ?—G.M.).

Group 8E.—G.C. EI7D says that his group have been suffering from summer QRM. Only G5XM and 2AOX reporting. EI7D's station was wrecked by lightning, and he himself had a narrow escape, as he had been working a few minutes previous to the catastrophe.

G5XM has been trying out the 33-ft. V.F. aerial à la Group 8B, but cannot raise anything with it ! Is using a CT25X in TX with good results.

2AOX is building monitor wavemeter. Has rebuilt receiver and finds better results using bare copper coils.

Group 8F.—G.C. G2TJ, in common with all members of this Group, report conditions on all bands exceptionally bad. Has had trouble with TX and could not find the cause, so rebuilt and is now working O.K. again. It is worth mentioning that he has worked YM4ZO on 7 and 14 M.C. with just under 5 watts, getting R9 and R8 respectively.

G2PF has been busy building 3-valve modulating arrangement. Has received permit for 3.5 M.C.

G6QA finds that varying the input when once in contact with a station seems to make little difference. Says that on some days weather effects alter C.C. notes, making them difficult to copy, and is trying to find days and times when this occurs.

G5LN has done outstanding work with 2.7 watts, and the contacts are worthy of mention. With this input has worked PY, 8 W's, and 2 VE's, getting an R8 report from W3AJO. Asks for details of some other aerial systems.

G5IH has been devoting time to fone experiments and finds choke control far superior to grid control.

G2QX has also erected the 33-ft. V.F., and finds it excellent on 14 M.C., but unsatisfactory on 7 M.C.

2 M.C. Work.

By G6FO.

There is a dearth of reports as regards the work of 10A this month. It can scarcely be the summer that is the cause of this, unless it is that everyone has been flooded out !

G5UM, being away on holiday, delegates the duty of writing up the report to G6FO. G5UM, still working with his P/P C.C. oscillator, has been trying various methods of feeding his aerial. It is his experience that a tight coupling to one side of the tank coil gives quite as good results as a split aerial coil, which is the theoretical requirement. Moreover, probably due to its position in the system, the aerial ammeter looks much more healthy with the single-ended arrangement. He asks for comments on this. (See BULLETIN July, 1931, p. 15.—FO).

G5UM goes on to say that he found conditions on July 26 particularly good, mentioning the reception of DX stations such as G6GW (Tredegar, Mon.) and G2OI (Manchester) at the phenomenal strength of R9 and R8 respectively. Did anyone else notice the same thing on that day ?

G6FO, having been very busy, has very little to report. He is trying to trace the cause of a 50 per cent. decrease in QRK on a transmission that meters indicate as being perfectly normal. The whole outfit is to be re-designed for the coming season. It is intended to put in a P/P oscillator, and the aerial system will be overhauled and the C'pse probably scrapped. The only work that has been done is the maintenance of schedules on the band. In common with the other members of the Group, the monthly party has been found not very pleasant, owing to the QRN and QRM from the locals. On the receiving side, a further innovation has been the substitution of an elderly Cosmos AC/SG as a detector valve. The heater is fed from batteries and the improvement is remarkable. Incidentally, the sensitivity is improved by connecting the heater to earth. This is especially the case at the higher frequencies.

G6ZH has been prevented from doing much amateur radio work. Schedule transmissions with G6FO have been maintained, but QRN and local interference from electrical machinery have been troublesome. It is expected that a move will be made to Devizes.

The recent remarks of G2OP regarding suitable aerials for 2 M.C. work are worthy of careful consideration. So far nobody has given practical details of a suitable antenna for this band—one that will not infringe G.P.O. regulations regarding aerial length, but yet will give considerably better results than the average type at present in use.

Actually, an aerial 264 ft. long should be almost ideal for 2 M.C., but even if official permission could be obtained to use one of this length, few amateurs have the necessary space in which to accommodate it. Half this length—132 ft.—is often impracticable also, but opinions are sought from anyone who may have tested aerials the lengths of which are multiples of 264 ft., that is, 132 ft. (half), 88 ft. (third), 66 ft. (quarter) and so on, used on 2 M.C. Information is also sought as to the types of feeder used for 2 M.C. aerials. Although many amateurs successfully operate their 7 M.C. aerials on lower frequencies, the best type of antenna seems to be that in which both the lead-in and the flat-top are radiating, i.e., the well-known inverted L type, known on occasion as the A.O.G. In such an aerial, needless to say, the lead-in and the flat-top must be included in the total length—and not merely the flat-top alone.

Although opinion seems to be that the A.O.G. is the best type of aerial for 2 M.C., it is obvious that this system can be improved upon. Accordingly, comments are invited from all interested in this problem, so that we can advance a step nearer to deciding what is really best for 2 M.C.

Stray.

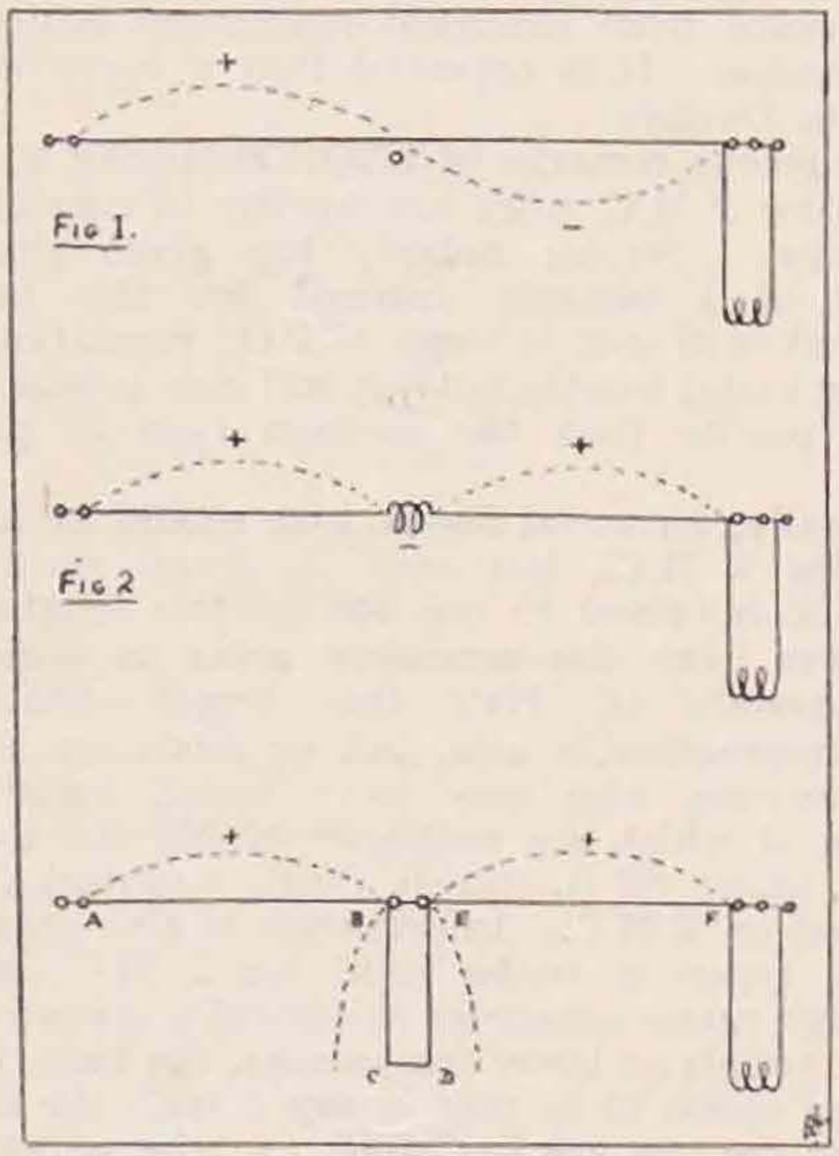
Mr. Colley, G5QC, is working on 14 M.C. and would appreciate reports, to all of which he will reply.

A NEW FEATURE IN AERIAL TRANSMITTING DESIGN.

By E. A. Dedman (G2NH).

PHASE correction, in full wave transmitting aerials, is a subject that appears to have received little attention from amateurs, and it is hoped that the few notes following will awaken an interest in some of the experimentally-minded DX men. The whole subject of directional aerials is exceedingly interesting, and it is unfortunate that the space to give even the simplest forms a trial is usually lacking at amateur stations. The effective gain of even a single wire reflector is very considerable and well worth a trial by all who have the space.

However, there is another alteration by which increased radiation effectiveness can be obtained, and which has the advantage that it takes up no more space than that already occupied by the full wave 14 M.C. aerials in use at the majority of amateur stations.



AB	...	*33 ft.*	*BC*	...	*16 ft. 3 ins.*
CD	...	*6 ins.*	*DE*	...	*16 ft. 3 ins.*
			EF	...	*33 ft.*

The above figures are for 14 MC. aerials..

This is the matter of phase correction. Referring to Fig. 1, which shows the current distribution in a full wave aerial, it is found that at any given moment there are two standing half-waves on the aerial, and although equal in all other respects, they are 180° out of phase. For horizontal propagation this is an undesirable state of affairs, and for transmission over distances exceeding 1,000 miles on the 14 M.C. band, this type of aerial is usually considerably inferior to an aerial having a single half-wave top. It is obvious, however, that if some means can be found to bring both standing half-waves into phase, a great improvement in useful radiation will ensue. The solution of this problem is considerably easier than it appears to be at first sight and can be done by inserting a phasing coil in the centre of the full-wave aerial, as shown in Fig. 2. This phasing coil should have a natural frequency of 14 M.C. and will then absorb what we will call the negative cycle, leaving two positive half-cycles on the aerial, as shown by the current distribution curves of Fig. 2. Due to the fact that the so-called negative cycle is concentrated in such a small space, its effect on the radiation will be practically negligible.

A suitable practical arrangement for the introduction of this phasing coil is shown in Fig. 3, in which it will be noticed that the actual strain is taken by a suitable insulator, preferably of the Pyrex type, the phasing coil being constructed of 3/16in. or ¼in. copper tube and suspended from either end of the insulators. The chief difficulty with this arrangement is likely to be the determination of the correct size of coil so that its fundamental frequency is 14 M.C.

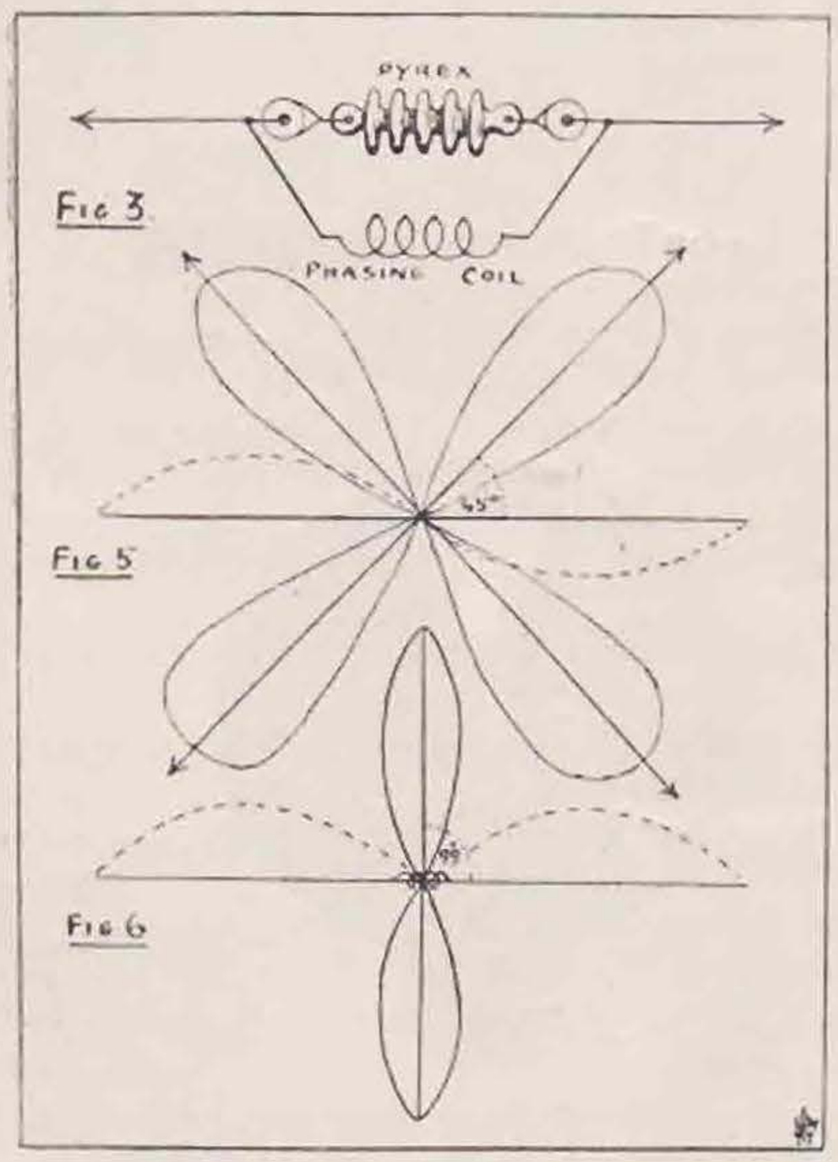
An inductance of 12 turns of copper tube 2½in. in diameter, and turns spaced ¼in. apart, will make a suitable starting point. To make the final adjustment the aerial should be erected about 8 or 10ft. from the ground, and an aerial ammeter placed at the centre point of each half of the aerial, *i.e.*, for a full-wave 14 M.C. aerial the aerial should be 66ft. long, excluding the few inches occupied by the phasing coil, and the aerial ammeters should be inserted at 16ft. 6in. from each free end of the aerial. First of all remove the phasing coil and short circuit the insulator from which it hangs. Now, having started up the transmitter and adjusted the feed in the usual manner employed at the station, it will be found that the two ammeters show the same reading. If they do not, it will usually be found that one meter is inaccurate and should be corrected. In the absence of two matched ammeters, two flashlamp bulbs that have been matched on H.F. current (*e.g.*, in an absorption wavemeter or resonance loop) can be used.

Now insert the phasing coil in place of the short circuiting strip and start the transmitter again. Do *not* alter the feed adjustments at all. Take the reading of both ammeters and they will probably differ by a considerable amount. Now adjust the amount of phasing coil in circuit by means of a suitable clip until each ammeter shows the same reading, which will be less than the original reading obtained when the phasing coil was not used. The phasing coil is now correctly adjusted, and after the ammeters have been removed the aerial can be erected to its operating position.

Another way of absorbing the unwanted cycle is shown in Fig. 4, and this has the great advantage that the constants can be measured with a foot rule

and need no electrical measurement. It is an adaptation of the Zeppelin feeder arrangement and, as can be seen from the figure, the half-wave " loop " is arranged so that the radiation from each lead is cancelled by the other lead. As far as the writer is aware this arrangement has not been published before, but it works exceedingly well in practice. The actual wire measurements shown in Fig. 4 are accurate for any frequency in the 14 M.C. amateur band. The hanging loop section B, C, D, E can be maintained in a vertical position by hanging two small weights from ropes at points C and D, or by means of ropes extending to the ground.

In the diagrams, Zeppelin feed has been shown in each case, but, of course, there is no reason whatever why any of the other feeding systems, that feed at the end of the aerial, may not be used, *e.g.*, tapping direct on to the plate coil (A.O.G.), Füch's system, etc.



Several other modifications are also fairly obvious. Providing that sufficient space is available the system could be used on 7 M.C. by multiplying the dimensions A-B, B-C, D-E, E-F, by two, or similarly it could be used for 28 M.C. work by dividing these dimensions by two.

The system could also be used to provide three half-waves in phase for 14 M.C. work by making the top section 99ft. long, with phasing coils or loops at 33ft. from each end, and this should provide a most efficient DX aerial.

It must also be remembered that phased aerials of the type described above are considerably more directional than aerials of the same dimensions that are out of phase. Fig. 5 shows the polar diagram for a full-wave aerial with no phase correction, and it will be seen that radiation is greatest in directions at 45° to the horizontal line of the aerial, giving a general effect of good radiation in all directions. The current distribution in the aerial is shown by the dotted line. Fig. 6 shows the polar diagram for a full-wave aerial, with phase correction, and it will be seen that there are now only two loops instead of four, and that they are considerably sharper, and now lie at 90° to the aerial, causing the directional effect to be strongly concentrated in the neighbourhood of right angles to the horizontal line of the aerial.

In practice this works out very well as, although the signal strength reported from directions at 90° to the aerial are considerably higher than obtained with an ordinary full-wave aerial, the signal strengths reported from other directions do not seem to be any less.

Those people who are lucky enough to be able to feed their aerials in the centre can obtain a phased aerial very simply by putting up a full-wave current-fed aerial with $\frac{1}{4}$ or $\frac{3}{4}$-wave feeders. Referring again to Fig. 4, it will be seen that if the feeders are disconnected from F and the connection C-D is replaced by a coil and condenser coupling circuit, the system will work as a half-wave centre-fed system for 7 M.C., or as a full-wave system for 14 M.C. It will then be a phased aerial with, as mentioned above, $\frac{1}{4}$-wave feeders. The dimensions for an aerial of this description were given in the notes of the Antenna Group of C.B. on page 20 of the July BULLETIN.

In next issue—

Mr. D. C. Birkinshaw, B.A., describes a short wave superheterodyne adapter for adding to an existing broadcast receiver. This adapter employs some very novel features to give ease of control and to overcome interlocking between circuits.

The winning article on "Aerials" in the recent competition for Mr. E. T. Somerset's 5-metre wave meter will also appear.

ACCOMMODATION FOR CONVENTION.

Will all provincial members requiring accommodation with London District members, get in touch with T. A. St. Johnston, G6UT, 28, Douglas Road Chingford, E.4. Telephone No.: " Silverthorne 1557," and will London District members let Mr. St. Johnston have their offers of accommodation, stating exactly what they have available.

SEE YOU AT STAND 246.

BOOK REVIEW.

EXPERIMENTAL RADIO ENGINEERING. By Prof. J. H. Morecroft. 345 pages; 250 diagrams. Published by Chapman & Hall, London. Price 17s. 6d. net.

The appearance of a text-book dealing with radio laboratory work in a very practical manner, and directed towards the teaching of radio principles, as distinct from descriptions of routine factory tests, has long been overdue.

Prof. Morecroft's latest work consists of an introduction and 51 experiments, and the whole book, written in the author's lucid and attractive style, is permeated with laboratory atmosphere. One sentence in particular struck me as indicative of the author's business-like outlook: "The balancing of the bridge requires common sense as well as the ability to vary resistance boxes."

The introduction contains valuable information of the practical type about the instruments used in the laboratory, and puts the reader *au fait* with many of the difficulties encountered and precautions to be taken in the laboratory.

Each experiment is headed by the "Object"; the "Analysis" consists of a consideration of the theory, a diagram of connections, specimen calculations and practical instruction as regards performing the experiment.

The first nine experiments are performed at low (commercial) frequencies, and are concerned with self and mutual induction, capacity, coupled circuits and resonance. Then follow audio-frequency experiments, including use of the A.C. bridge, and, later, radio frequency experiments.

The experiments are too numerous to mention individually, but the following are a few of the subjects dealt with, and will show the comprehensive nature of the work: Speakers, rectifiers (crystal, gas and copper oxide), aerial measurements, triodes, tetrodes, pentodes, H.F. resistance and internal capacity of coils, oscillators, permeability of iron at audio-frequencies, shielding, filters, detector action, amplifiers, modulation, superheterodyne and neutralisation.

The majority of the experiments can be performed with apparatus found in the average radio laboratory, and in only a few cases is special apparatus required.

T. P. A.

Strays.

There is no truth in the rumour that a well-known sixpenny store is contemplating stocking parts for the recently described "Aberdonian Modulation System."

* * *

Radiation is *not* measured in amperes!

* * *

We understand that the operator of a well-known Continental coast station is at present studying the Morse code.

* * *

We were recently kept waiting by a 'phone station for ten minutes whilst he looked up our QRA. It evidently never occurred to the poor fellow to ask us. This little story, by the way, is quite true!

* * *

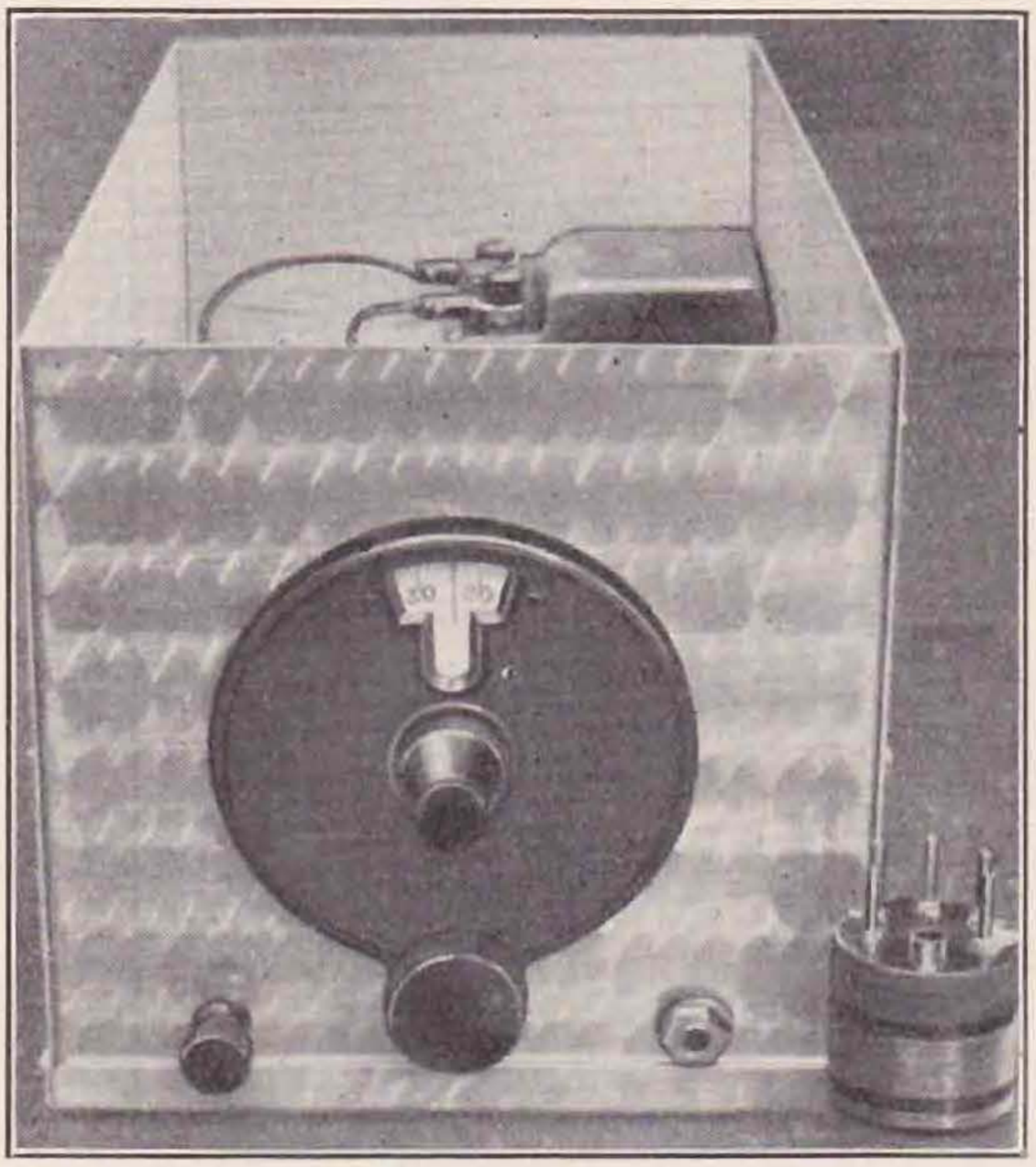
The ship's operator who is alleged to have called GNF on fone is progressing as well as can be expected.

Monitor-Wavemeter—(*Continued from page 77*).

matters so that the condenser is only across a few of the grid turns.

First the 7 M.C. coil. Proceed as before at the start, but having wound on ten turns bring the end of the winding out to the first pin from the right. Start the second half of the winding from this pin too, and wind on three turns, bringing the end of the winding out to the middle pin. The plate winding is as before, but has four turns, and is spaced at the same distance from the grid coil as the 3.5 M.C. plate coil.

The 14 M.C. coil is wound in the same manner, the turns being, five for the first section and *three-quarters of a turn* for the second section. The plate coil is three turns, and is spaced one thickness of wire from the grid coil.



It must be understood that some adjustment on these values may be necessary for the higher frequency coils, but this should not prove very difficult, for if everything is properly attended to the result will be well worth the trouble.

When wiring the monitor, follow the wiring as shown in the illustration as closely as possible. Glazeite should be used for all wires, with the exception of the battery leads, which should be of good quality rubber-covered flex.

Now just a few words as to operation. Treat the coils carefully. They will not keep their calibration if you handle the windings a lot. The length of the formers has been made long for this reason. You should be able to remove or replace any coil without ever touching the windings.

Keep the monitor as far away from the transmitter as possible. You get a truer idea of your signal by so doing. This is especially the case on the higher frequencies.

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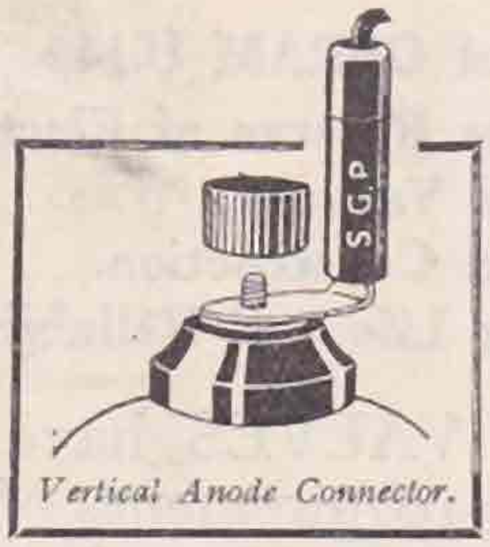
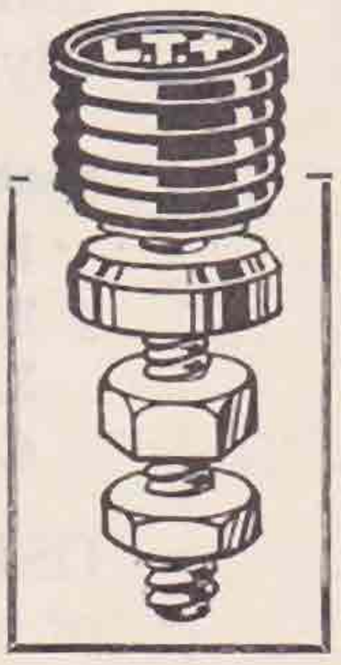


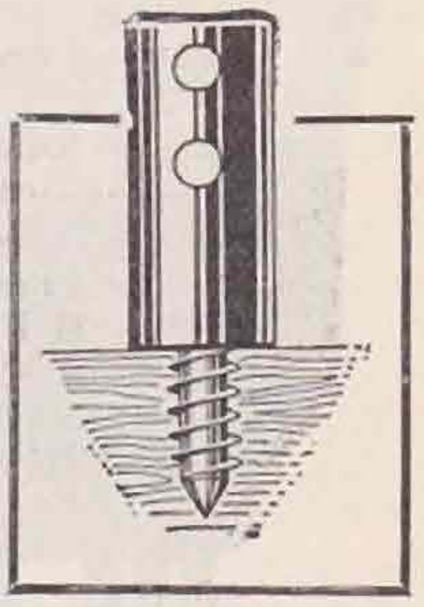
Vertical Anode Connector.

ANODE CONNECTOR 3d

Horizontal or Vertical.



PANEL TERMINAL 3d



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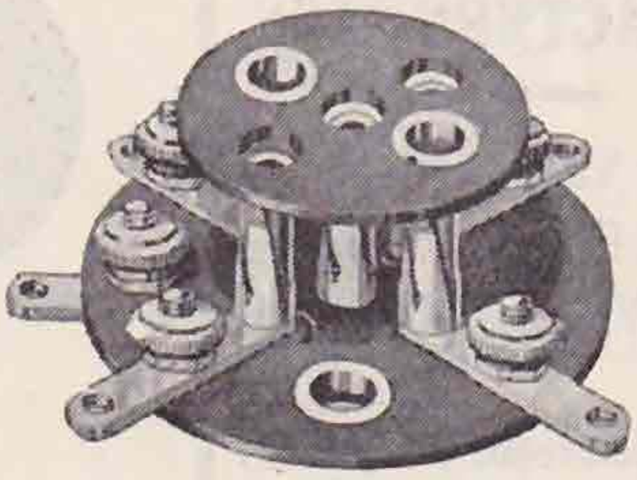

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This valve is specified in the power unit described in this issue, and particulars of this and other OSRAM VALVES mentioned can be obtained at the G.E.C. Stands in the National Hall and Empire Hall at the National Radio Exhibition, Olympia.

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DUPLEX "FONE"

By A. O. Milne (G2MI).

It is rather curious that the very interesting subject of Duplex telephony has not received more attention by amateur experimenters. Probably this is due to the prevalence of the idea that it requires complicated screening, separate aerials, remote control and whatnot. This, however, is quite a mistaken impression, and although, of course, the owner of a superhet has the advantage, it is by no means impossible to effect reliable Duplex working up to 15 miles with the very simplest apparatus. The writer has always been interested in the subject, and as long ago as 1927 obtained excellent results on the 1.7 M.C. band with a self-excited oscillator and an ordinary O-V-1 receiver.

The two stations need only be five or six metres apart in wavelength for quite stable working.

The receiver should be connected to a small separate aerial consisting of about 30ft. of thin d.c.c. wire slung up in the shack. The only modification to the receiver is the changing of the gridleak for one of much lower resistance, say, 250,000 m. This keeps the detector valve much more stable and relieves the grid of some of the pick-up from the transmitter.

The co-operating station should be tuned in and the transmitter switched on, when his signals are received O.K. with the transmitter going, then allow him to do the same at his end. Using six or seven watts, good Duplex was obtained up to 12 miles, and it may be mentioned that the writer's nearest station outside this radius is 32 miles away. Where stations are close together, as, for example, in the London area, there is plenty of scope for duplex fone, and it is an extremely useful thing to be able to change over to duplex in order to discuss some technical point which would entail much long-drawn-out "over to you OM" business, if conducted in the usual manner.

The writer believes he was the first duplex station in South-East England, although one or two of the Kent and Essex stations may now be heard on duplex on the 1.7 M.C. band.

This is a branch of the science which has been neglected and affords a wide field of interest for the QRP man.

It need not be emphasised, of course, that the power supply must be absolutely smooth and steady!

In conclusion, there awaits a further thrill for even the most *blasé* "ham" when he says, "You getting me OM," and receives "O.K., you're coming through fine."

THE "NAUTILUS"

We hear from Mr. J. H. Wetherill, G2TK, that he was in two-way communication with the submarine "Nautilus" by fone on the 7 M.C. band on July 19 and that he has received a cablegram from Rey Meyers (W3AJZ), the operator, confirming the QSO. He fixed a schedule for each night at 11 p.m., but so far has been unable to make further contact.

The call sign used by the submarine was K7XI. This is believed to be the only G station to have worked the "Nautilus," but we shall be interested to hear from any other stations who have been in communication with the expedition.

This station provides the opportunity for a very unique DX QSO, and we advise everyone who can to keep a sharp look-out for K7XI.

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(With acknowledgments to "DX.")

SEE PAGE 99

District and County Representatives, 1931-1932.

Council have much pleasure in announcing that, with but few exceptions, all English and Welsh county representatives have now been appointed.

The list of new Honorary District and County Representatives is as follows:—

DISTRICT 1 (North-Western).

D.R. · Mr. S. Higson (G2RV), "Hebblecroft," Egremont Promenade, Wallasey, Cheshire.

Cumberland, Westmorland — Mr. Garside (G2YN), 7, Egremont Road, Hensingham, Whitehaven, Cumberland
Cheshire ... Mr. J. Davies (G2OA), 13, Exeter Road, Wallasey, Cheshire.
Lancashire ... Mr. R. W. Bailey (G2QB), The Mount, Birchfield Road, Widnes, Lancs.

DISTRICT 2 (North-Eastern).

D.R. · Mr. L. W. Parry (G6PY), 13, Huddersfield Road, Barnsley, Yorks.

Yorkshire ... To be appointed later.
Durham, Northumber ... Mr. N. E. Read (G6US), Dene Well, Middle Drive, Ponteland, Newcastle-on-Tyne.

DISTRICT 3 (West Midlands).

D.R. · Mr. V. M. Desmond (G5VM), 199, Russell Road, Moseley, Birmingham.

Warwick, Worcester — Mr. F. W. Miles (G5ML), "Rydal," Beechwood Avenue, Coventry.
Staffs, Shropshire — Mr. H. Littley (G2NV), "Radiohm," Bridgnorth Road, Wollaston (near Stourbridge), Staffs.

DISTRICT 4 (East Midlands).

D.R. · Mr. H. B. Old (G2VQ), 3, St. Jude's Avenue, Mapperley, Nottingham.

Derby, Leicester, Northants, Notts, Rutland — Mr. J. Lees (G2IO), 17, Trevose Gardens, Sherwood, Nottingham.
Lincoln ... Mr. A. E. Livesey (G6LI), Stourton Hall, Horncastle.

DISTRICT 5 (Western).

D.R. · Capt. G. C. Price (G2OP), 2, St. Anne's Villas, Hewlett Road, Cheltenham, Glos.

Hereford ... To be appointed later.
Oxford ... Mr. C. I. Orr-Ewing (G5OG), Trinity College, Oxford.
Wiltshire ... Col. W. S. Palmer (G2B1), Elmfield, Calne.
Gloucester ... Mr. W. B. Weber (G6QW), 2, Balmoral Road, St. Anne's, Bristol.

DISTRICT 6 (South-Western).

D.R. · Mr. H. A. Bartlett (G5QA), 95, Old Tiverton Road, Exeter, Devon.

Cornwall ... Mr. G. E. Jones (G6XB), 11, Penventon Terrace, Redruth.
Devon ... Mr. W. B. Sydenham (G5SY), Sherrington, Cleveland Road, Torquay.
Dorset ... To be appointed later.
Somerset ... Ditto.

DISTRICT 7 (South-Eastern).

D.R. · Mr. J. Drudge Coates (G2DC), "Burleigh," Farnborough Park, Hants.

Berkshire ... Mr. G. Marcuse (G2NM), "The Ranch," West Drive, Sonning.
Hampshire ... Mr. R. C. Neale (G6GZ), Farnboro' Road, Farnborough.
Kent ... Mr. H. A. M. Whyte (G6WY), "Killiney," Worsley Bridge Road, Beckenham.
Surrey ... Mr. R. J. Denny (G6NK), 1, Hillside, Waverley Road, Weybridge.
Sussex ... Mr. A. F. N. Blackburne (G2AX), 11, Sea Road, Bexhill-on-Sea.

DISTRICT 8 (Eastern).

D.R. · Mr. C. E. Runeckles (BRS163), "The Myrtles," Needham Market, Suffolk.

Cambridge, Huntingdon — Mr. B. S. Scudamore (G6BS), 39, Owlstone Road, Newnham, Cambridge.
Norfolk ... Mr. S. Townsend (G2CJ), 115, Earlham Road, Norwich.
Suffolk ... Mr. C. A. Jamblin (G6BT), 121, Queen's Road, Bury St. Edmunds.

DISTRICT 9 (Home Counties).

D.R. · Mr. F. L. Stollery (G5QV), "Kingsmead," Lancaster Gardens East, Clacton-on-Sea, Essex.

Bedfordshire, Hertfordshire — Mr. G. Featherby (G5FB), 30, Lindsey Road, Bishops Stortford, Herts.
Essex ... Mr. D. W. Heightman (G6DH), "Belowda," Park Way, Clacton-on-Sea.
Buckinghamshire Mr. K. E. B. Jay (G2HJ), "The Quinta," El Close, Amersham, Bucks.

DISTRICT 10 (South Wales and Monmouth).

D.R. · Mr. A. J. E. Forsyth (G6FO), "St. Aubyns," Gold Tops, Newport Mon.

Monmouth ... Mr. H. Harding (G2HH), Treve Cottage, Ebbw Vale.
Glamorgan ... Mr. B. F. Phillips (G5PH), 144a, Cwm Road, Bonymaen, Swansea.
Breconshire ... Mr. G. R. S. Farnie (G5F1), The Grange, Cefn Coed, near Merthyr Tydfil.

Carmarthen, Cardigan, Pembroke — Lt.-Col. E. C. Jennings (G5OC), Gelli-Deg, Kidwelly, Carmarthen.

DISTRICT 11 (North Wales).

D.R. ·

Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire ... To be appointed later.

DISTRICT 12 (London North).

D.R. · Mr. S. Buckingham (G5QF), 19, Oakleigh Road, Whetstone, N.20.

DISTRICT 13 (London South).

D.R. · Mr. A. D. Gay (G6NF), 49, Thornlaw Road, West Norwood, S.E.27.

DISTRICT 14 (London East).

D.R. · Mr. T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4.

DISTRICT 15 (London West and Middlesex).

D.R. · Mr. H. V. Wilkins (G6WN), 81, Studland Road, Hanwell, W.7.

SCOTLAND.

D.R. · Mr. J. Wyllie (G5YG), 31, Lubnaig Road, Newlands, Glasgow.

All representatives take office as from September 24, 1931.

Members are requested to get into touch with their county representative on all general matters.

Notes for inclusion in the Bulletin District Reports, must reach C.R.'s not later than the 15th of each month.

Members in counties which have at present no C.R. should report direct to their D.R.

New Members.

Corporates—Great Britain.

L. V. Waumsley (2AML), 71, Hawthorn Road, Hornsey, N.8.
J. R. Boote (2BBQ), 1, First Avenue, St. Annes Park, Bristol.
E. N. Black (G5IM), 361, Brook Street, Broughty Ferry, Scotland.
D. N. Biltcliffe (G6DB), 41, Church Street, Morley, Leeds.
A. I. Rich (G6QV), 13, New Road, Ponders End, Middlesex.
H. Godden (BRS590), 50, Cheltenham Street, Swindon, Wilts.
W. H. Matthews (BRS591), 224, Becontree Avenue, Chadwell Heath, Essex.
F. L. H. Salmon (BRS592), Glendower Hotel, Burlington Place, Eastbourne.
N. C. Kirby (BRS593), 5, Station Road, Teynham, near Sittingbourne.
R. N. Croucher (BRS594), 4, Victoria Road, Milton Regis, Kent.
S. Brown (BRS595), 6, Addison Villas, New Eastwood, Notts.
R. W. Elliott (BRS596), 105, Oakhill Road, Putney, S.W.15.
A. Hey (BRS597), 79, Park Side, Woodford Green, Essex.
A. N. Harris (BRS598), 695, The Broadway, Green Lane, Chadwell Heath, Essex.
J. Hunter (BRS599), 51, Camphill Avenue, Langside, Glasgow.
C. L. Ward (BRS600), "Silverbirch," Hale Road, Farnham, Surrey.
P. R. Chapman (BRS601), "Bridgmont," Uppingham Road, Leicester.
N. Blackburn (BRS602), 4, Huntroyde Avenue, Tongemoor, Bolton, Lancs.
R. Y. Parry (BRS603), 127, Charlton Road, Kingswood, Bristol.
P. Langdon Jackson (BRS604), Enton Lodge, New Church Road, Hove, W.
A. H. Lawson (BRS605), The Hermitage, Ainsdale, Southport, Lancs.
C. Collins (A), Bagot House, Over Monnow, Monmouth.

Corporates—Dominion and Foreign.

G. Osmand (BERS73), c/o The Public Works Department, Zungeru, N. Nigeria.
G. W. Horton (BERS74), 31 A.C. Squadron, R.A.F., Quetta, India.
O. G. Chapman (VK2OC), Rankin Street, Wyong, N.S.W., Australia.
F. May (VK6FM), Gnowangerup, Western Australia.
G. W. Mossbarger (W9AUH), Box 177 (1,430, Indiana Avenue), Camp Taylor, Kentucky, U.S.A.

CONVENTION, 1931.

The following is the programme to be followed at the Sixth Annual Convention to be held on Friday, September 25, and Saturday, September 26, 1931, at the Institution of Electrical Engineers, Savoy Place, Victoria Embankment, London, W.C.2.

FRIDAY, SEPTEMBER 25.

5 p.m.—Informal tea and reunion.

5.55 p.m.—Reception by the President, H. Bevan Swift, Esq., A.M.I.E.E.

6 p.m.—Presidential greetings.

6.15 p.m.—Convention lecture.

8 p.m.—Charabanc parties will leave Savoy Place for the stations of Mr. J. W. Mathews (G6LL) at Clapton; and Mr. J. Clarricoats (G6CL) at Friern Barnet. Charabancs return to Central London at 11 p.m.

Provincial members who wish to be included in these parties are requested to notify Headquarters *at once*, as space is limited.

Members not taking part in these visits are requested to join London members' car parties which will be made up outside the I.E.E. These parties will visit stations.

SATURDAY, SEPTEMBER 26.

10 a.m.—District Representatives Business Meeting, to be attended by all new D.R.'s or their deputies. The agenda for this meeting has been circulated to all D.R.'s.

1.50 p.m.—Convention photograph on the steps of the I.E.E. Members are urged to be present in order that the photograph may be a complete souvenir of all those attending Convention. A proof of this photograph will be on view at the dinner. Price 3s.

2 p.m.—Presentation of Society trophies for 1931-2.

2.15 p.m.—Business meeting agenda.

1. Receive recommendations from the representatives' meeting.
2. Appoint Empire link stations for 1931-2.
3. Discuss progress of the B.E.R.U. and arrange future Empire tests.
4. International policy with special reference to the Madrid Conference in 1932.
5. New County Representatives scheme.
6. Discuss the question of telephony on the 7 megacycle band.
7. Other business.

The meeting will adjourn at 4 p.m. for tea, and conclude at 5.30 p.m.

6.30 p.m.—Convention dinner at Pinoli's Restaurant, 17, Wardour Street, London, W.1. Informal dress. Tickets 5s.

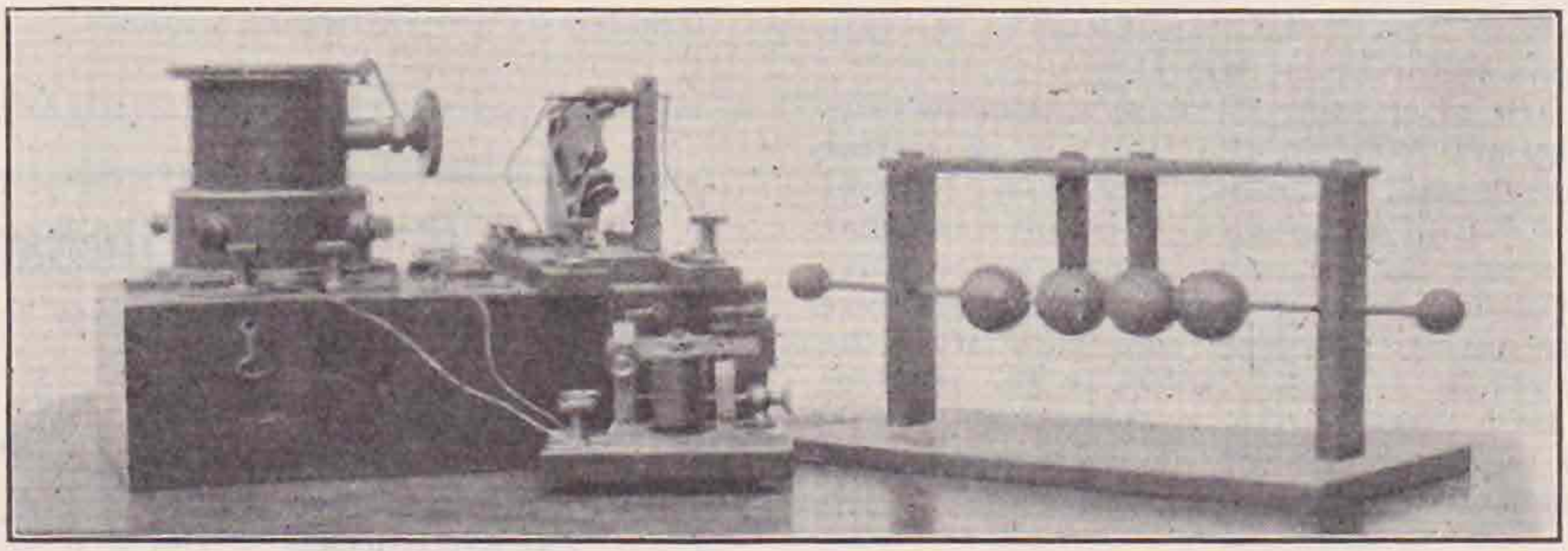
Members are urged to apply for tickets **immediately** in order that reservations may be made. Members desirous of bringing friends must apply to the Hon. Secretary with the names and addresses of such friends.

WE WANT TO SEE YOU AT CONVENTION!

Who was the First Ham?

EI2B made his first transmitter and receiver early in 1898 after attending a lecture given by (then) young Marconi in Dublin, at which signals were transmitted from the stage to the balcony of the lecture theatre by means of a 10-in. spark coil received and on a coherer and Morse printer.

EI2B's transmitter consisted of a four-ball Hertz oscillator and a 4-in. spark coil, and the receiver was a coherer, home made and exhausted, an electric bell tapper and Siemens relay operating a Morse sounder, and signals were transmitted over the immense distance of about 70 yards!



The original apparatus is still in existence at EI2B, and a photograph is reproduced herewith. Next please!

QRA Section.

Manager : M. W. PILPEL (G6PP).

NEW QRA's

G2CO.—N. COOKWELL, 34, Woodbine Terrace, Blyth, Northumberland.

G2IM.—E. R. RADFORD, 33, Whitehall Park, London, N.19.

G2NV.—H. LITTLEY, "Radiohm," Bridgnorth Road, Wollaston, Staffs.

G5CS.—G. R. M. GARRATT, 36, Fellows Road, South Farnborough, Hants.

G5LL.—H. ALLINSON, Oaks Road, Richmond, Yorks.

G5ND.—H. G. NEWLAND, 2, Gledhow Gardens, London, S.W.5.

G6CJ.—F. CHARMAN, 96, Cotswold Gardens, Hendon Way, London, N.W.2.

G6XB.—G. E. JONES, 11, Penventon Terrace, Redruth, Cornwall.

2AMY.—W. A. PANTON, "La Estancia," Marine Drive, Bridlington.

2BZZ.—J. T. SHROUDER, Beech Lea, Maghull, Lancs.

G6PK.—W. G. PYKE, Keswick, Brunswick Road, Kingston Hill, Surrey.

QRA's wanted : B7X, XIX.

Review of Foreign Magazines.

Some new data on ultra-high frequency transmission is provided by a paper in the August *Proc. I.R.E.* : "Application of Frequencies above 30,000 kilocycles to Communication Problems," by H. H. Beverage, H. O. Peterson, and C. W. Hansell—which summarises the results of experiments made by the R.C.A. over a period of years.

It is found that frequencies below about 43,000 K.C.'s can cover large distances, in the N.S. direction in daylight, owing to skip, but transmission in the E.W. direction is very erratic. For frequencies above this value skip seldom occurs, although a few instances have been noted of a reflected wave being received for a very short time. The range is thus restricted to that of the ground wave, which approaches the "optical" range as the frequency increases. Reception is considerably improved by elevating the receiver, although it is not necessary to "see" the transmitter in the case of frequencies below about 300 M.C.

Another line of enquiry for ham astronomers is suggested by a "Note on the Relation of Meteor Showers and Radio Reception," by G. W. Pickard (July *Proc. I.R.E.*). Although data is still somewhat meagre, it seems that signals improve a few days after each of the nine principal meteor showers which occur during the year, especially after the Perseid shower in August. Noises in the receiver have also been found to accompany the visible passage of a meteor. Most of the observations were made on transmissions from WBEM.

Trade Notices.

Lists and catalogues have been received from Partridge & Mee, Ltd., who have added further Parmeko transformers to their already excellent list. Lists of complete receivers, radio components and a short-wave converter have been received from Messrs. Burne-Jones & Co., Ltd.

APPARATUS WORTH BUYING.

High and Low Tension Current from D.C. Mains.

We have recently had the opportunity of testing some examples of M-L Rotary Transformers, now manufactured by Rotax, Ltd., of Willesden.

For the amateur who is unfortunate in only having D.C. mains available, and who wishes to increase his available power, here is a reasonable and efficient method.

Messrs. Rotax, Ltd., produce machines for any voltage input and output, thereby affording an opportunity to those situated without mains of any sort, or using high voltage.

The two samples tested were wound for 240 volts D.C. input, and rated at respectively, 1,000 volts, 100 ma., and 12 volts 9A.

The high voltage machine, under normal conditions, with about 80 ma. load, gives a perfectly steady output, with no appreciable rise in temperature. The voltage at this load being 960. Very little smoothing is required, and in the case of a crystal-controlled transmitter, none at all, except when being used for telephony. No "artificial load" is required when keying, even if the load is varied from nil to maximum, as, for example, when keying a C.C. transmitter.

The low voltage machine is admirable for supplying L.T. to a medium power transmitter, employing a number of valves.

The output from this machine is remarkably steady and may be applied direct to the filaments.

Under working conditions, no hum was noticed on the output of a 60-watt transmitter, by lighting the filaments from the machine, instead of from an accumulator.

This machine also kept quite cool even when running at full load for a long period, the voltage output being 11.6.

The makers' efficiency figure of 50 per cent. speaks well for small permanent magnet field machines of this type.

They are very silent running, and do not require extensive silence cabinets. They have a neat, attractive finish, and can be thoroughly recommended as an All-British product.

R.S.G.B. Sales Department

The following can be obtained from Headquarters on application :—

A.R.R.L. Handbook, by Handy ...		4/-
Citizens' Radio Amateur Call Book (4/- to Members)		4/6
Enamelled Coat Badges of Emblem	R.S.G.B....	2/6
	B.E.R.U....	1/-
Members' Headed Notepaper (per 100 sheet packets)		2/6
Call Sign Brooches...		2/6
Rubber Stamps of Emblem ...		1/6
K.C. Metre Charts		6d.

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GUARANTEE : We guarantee every Oscillator to control 10 Watts at its fundamental response frequency, and to oscillate without reaction other than is supplied by valve capacities. We CERTIFY the response frequency within 0.1 per cent. ; stating calibration conditions.

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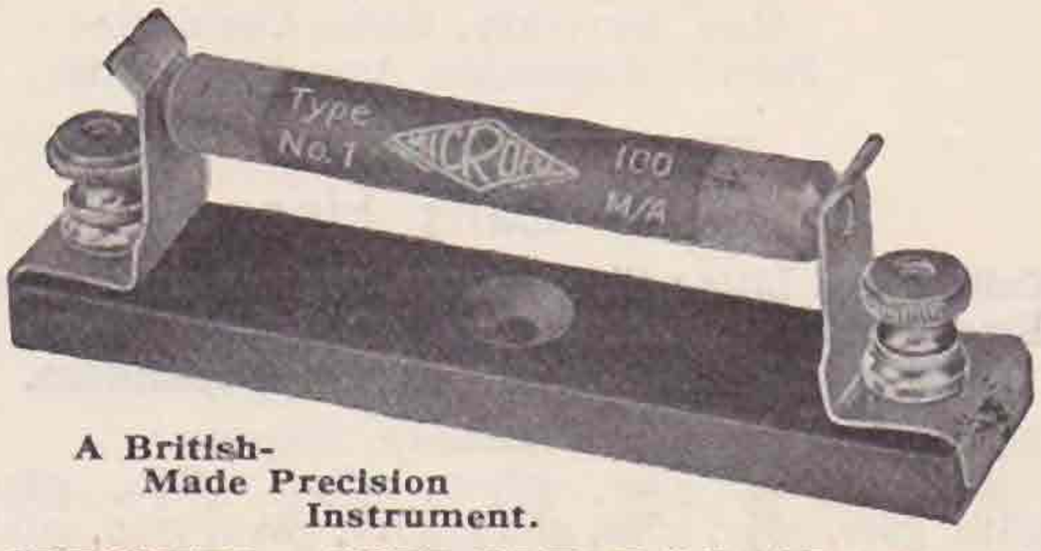

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CORRESPONDENCE.

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.

Regarding Tuned Circuit Losses.

To the Editor of T. & R. BULLETIN.

SIR,—I read with interest the admirable article on "The Design and Operation of a Crystal-Controlled Transmitter," by D. W. Heightman, in your July issue.

The writer is, however, I think, guilty of a slight mis-statement on a particular point. On Page 15 he says:—

"If we make the tuned circuit of the P.A. stage as low as possible ($\frac{\omega^2L^2}{R}$ or $\frac{L}{RC}$ to be great, therefore high L/C ratio) . . ."

I do not quite understand what "low" refers to, but what I want to point out particularly is that if $\frac{\omega^2L^2}{R}$ (or $\frac{L}{RC}$) is to be great it does not, in fact, imply necessarily that L/C must be great because L varies with R. If $\frac{\omega^2L^2}{R}$ is to be great then, assuming a value of ω, L/R must be large but not necessarily L large. In fact a coil of resistance wire might have a large L but a small value of L/R. The aim of the designer of transmitting inductances is usually to make L/R large. This ratio depends upon a multitude of factors and the interested will find a good deal of literature on the subject. My object is not to discuss the variation of L/R with coil design in this letter, but only to underline the fact that in designing inductance coils, it's the L/R ratio that counts and that a pure consideration of the L/C ratio, neglecting R, frequently leads to false conclusions.

May I once more say that this has little relevance to the article, which I consider most informative, but a great deal to the art in general, and therefore I hope of sufficient importance to merit this interjection in your journal?

Yours truly,
P. P. ECKERSLEY.

Low-Power Modulation.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—Mr. Powditch's article in the August BULLETIN raises the query again, "Why don't more stations use low-power modulation?" Quite apart from his "Aberdonian" scheme (which certainly seems to eliminate gear), any standard modulating system can generally be applied to a low-power stage.

There is one query arising out of this, however. G5VL suggests modulating either a buffer amplifier or frequency doubler. Since an unneutralised triode is shown in his picture, we assume he is illustrating the latter. When modulation of an F.D. at G6OT was attempted some months ago in a mood of "try it and see," a ghastly noise resulted. The trouble is that the F.D. wont be content with doubling the carrier frequency only, but also doubles the side band frequencies. Moreover, some seem to show that the modulation percentage increases as the successive harmonics are taken.

Thus, it seems necessary to have a modulated buffer amplifier operating on the final working carrier frequency.

That, at any rate, was the accepted version of the story at the time, but if G5VL has made it work in front of F.D.'s it would be interesting to have more details.

However, thanks to Mr. Powditch, another attempt will be made to reduce those 50 watts of modulation power!

Yours truly,
H. A. CLARK (G6OT).

Pulling Together.

To the Editor of T. & R. BULLETIN.

DEAR SIR,—As an entirely new member of the R.S.G.B., but by no means a person newly interested in radio, I was greatly pleased by the leading article in your August issue, namely, "Amateur Radio and World Peace."

For years I have been pushing the ideas as laid out in your leader, but my efforts, although for "Radio," have been, so far, in an entirely different camp. I have helped to plough a furrow parallel to yours, but making towards the same goal, i.e., The Unity of Man. Can it be wondered that I am so pleased with the welcome your article has afforded me.

Having become converted to S.W., and the amateurs' side in general, I shall do my best to encourage my colleagues, here and abroad, to do the same.

Broadcasting is now established, but amateur radio can be well strengthened against the forces of officialdom, of which I have some knowledge.

In the furtherance of our object,
Yours sincerely,
W. H. MATTHEWS (BRS591),
Hon. Secretary, Radio Committee,
British Esperanto Association (Inc.).

Empire Calls Heard.

Calls Heard Lists will, in future, contain only British Empire calls (including Great Britain) and those of British ships at sea and British Expeditions.

P. Cambier, Rivage 28, *Antwerp, Belgium:*
g2hd, g2oc, g2or, g2pm, g2pp, g2qb, g2zq, g5fb, g5fc, g5jv, g5ln, g5nq, g5rv, g5va, g6gl, g6hk, g6mn, g6qh, g6rg, g6ut, g6wt, g6xn, gi6ym.

* * *

ST2D, Khartoum, Sudan. July, 1931.—14 M.C.:
ei8b, g2by, g2cj, g2dh, g2dz, g2gm, g2ig, g2ko, g2nh, g2oi, g2op, g2qb, g2wp, g2ws, g2yd, g2zw, g5bj, g5cx, g5di, g5is, g5kl, g5mu, g5ni, g5pj, g5pl, g5rv, g5sy, g5ub, g5um, g5vl, g6cl, g6hp, g6ot, g6ut, g6vp, g6wn, g6wt, g6xq, g6yk, su1aa, su1ch, vs7gt, vu2cs, xg2b, xyi6kr, yi1rm, yi6wg, zc6jm.

* * *

G6GZ. Switzerland, Liechtenstein, Austria. (*Portable SG-V-1. July* 27-*August* 10.)—14 M.C.:
g2dz, g2ig, g2ma, g2op, g2yd, g5cv, g6bb, g6rb, g6wy.

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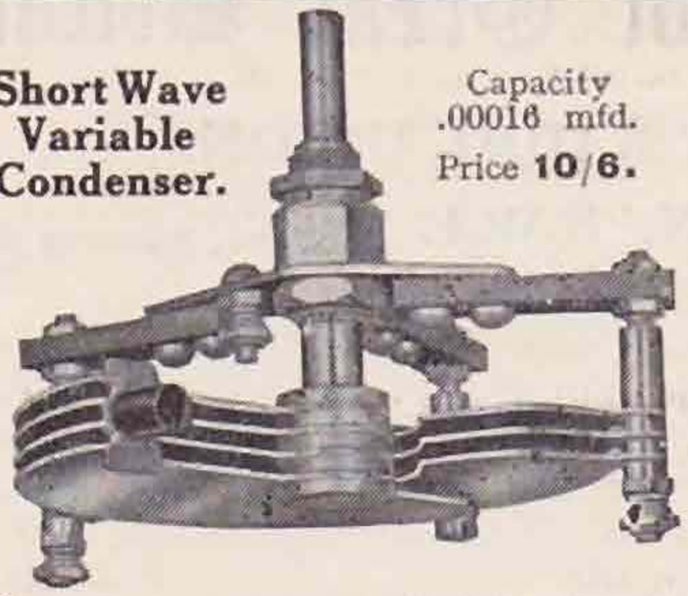

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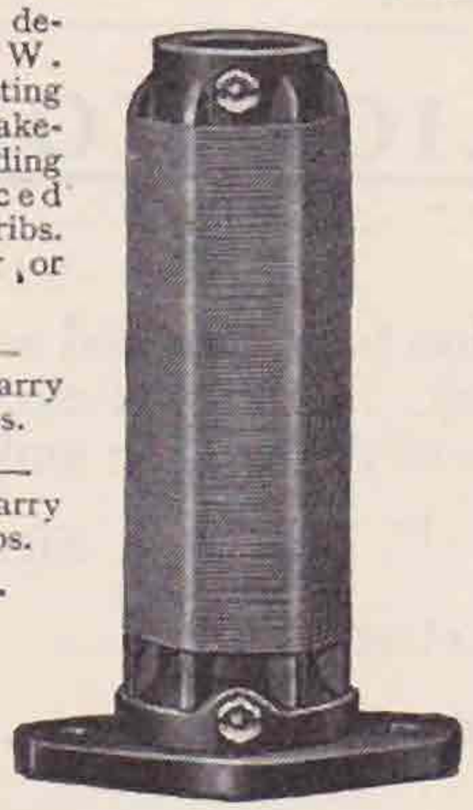

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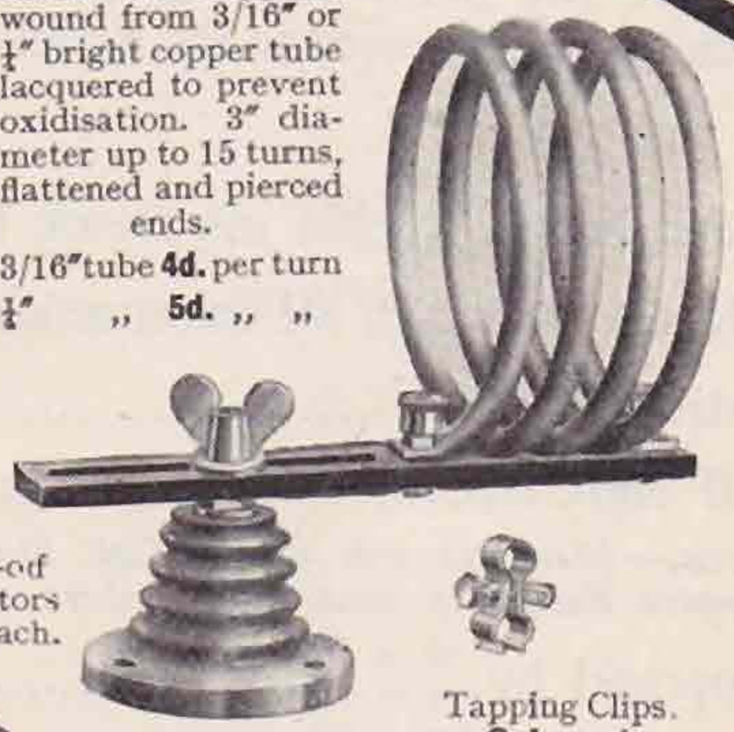
¼" „ **5d.** „ „



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"T. & R. Bulletin."

JAN. 1931 **ADVERTISEMENT RATES.**

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The Incorporated Radio Society of Great Britain.

Headquarters Society:—BRITISH EMPIRE RADIO UNION,
53, VICTORIA STREET, LONDON, S.W.1. **('Phone, Victoria 4412).**

APPLICATION FORM.

The Hon. Secretary,

Sir,—I beg to make application to be enrolled as a member, and shall be obliged if you will submit my name to your Council. I agree, if elected, to act and abide by the Rules of the Society as expressed in its Articles of Association and By-laws.

Signature.....

Name in full (please use Block Letters) .....

Address (to which all communications may be sent) .....

Nationality..... Age (if under 21).....

Call Sign.....

NOTE.—*Members not having Call Signs are allotted B.R.S. (British Receiving Station) or B.E.R.S. (British Empire Receiving Station) Numbers, which are used for identification purposes only.*

Proposed by..... Seconded by.....

NOTES.—*Applicants who do not know any member may accompany their forms by references in writing by persons to whom they are known. Such persons should be householders, and should state profession and length of acquaintance with applicant.*
The Council reserve the right to refuse any application without reason.

UNDERTAKING TO BE SIGNED BY APPLICANT.

I, the undersigned, agree that in the event of my election to membership of the INCORPORATED RADIO SOCIETY OF GREAT BRITAIN, I will abide by and observe the Rules, Regulations and Articles of Association of the Society, and that in the event of my resignation from the Society given under my hand in writing, I shall, after the payment of all arrears which may be due by me at that period, be free from this obligation. I further agree to observe strictly the terms of any licence issued to me by the responsible authorities to operate transmission or receiving apparatus.

Witness my hand this.....day of..... (*signed*).....

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Corporate Members and Associate Members (Town) ...	**£1**	**1**	**0**	**per annum.**
Corporate Members resident outside 25 mile radius Charing Cross	**0**	**15**	**0**	**,, ,,**
Corporate Members resident outside British Isles ...	**0**	**12**	**6**	**,, ,,**
Non-Corporate Members—Associates	**0**	**10**	**0**	**,, ,,**

Associates are not eligible to vote or receive individual notices of the Society.
Certificates of Membership and copy of the Articles of Association are issued to all members upon election.

NO ENTRANCE FEE.

A copy of the Articles of Association may be inspected at the Headquarters of the Society, 53, Victoria Street, London, S.W.1, by applicants upon request.

FOR OFFICE USE ONLY.

Approved by Council.....

B.(E.)R.S. Number issued.....First Subscription Paid.....

Empire B.E.R.U. News.

B.E.R.U. Representatives.

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

British West Indies, Bahamas, Bermuda, and British Guiana.—H. B. Trasler, No. 2 Mess, Pointe à Pierre, Trinidad, B.W.I.

Canada.—C. J. Dawes (VE2BB), Main Street, St. Anne de Bellevue, Quebec.

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

Egypt and Sudan.—H. Mohrstadt (SU1AQ), No. 1 Co. Egypt Signals, Polygon, Cairo.

Hong Kong.—P. J. O'Brien (VS6AE), 12, Kent Road, Kowloon Tong, Hong Kong.

Iraq.—H. W. Hamblin (YI6HT), Wireless Section, R.A.F., Shaibah, Basra, Iraq.

Irish Free State.—Col. M. J. C. Dennis (EI2B), Fortgranite, Baltinglass, Co. Wicklow.

Kenya, Uganda and Tanganyika.—H. W. Cox (VQ4CRF), Box 572, Nairobi, Kenya.

Malaya.—G. W. Salt (VS2AF), Glenmarie Estate, Batu Tiga, Selangor, Malay States.

Newfoundland.—Rev. W. P. Stoyles (VO8MC), Mount Cashel Home, St. John's East.

New Zealand.—D. W. Buchanan (ZL3AR), 74, Willis Street, Ashburton; and C. W. Parton (ZL3CP), 69, Hackthorne Road, Cashmere Hills, Christchurch.

Nigeria.—Capt. G. C. Wilmot (ZD2A), 1st Battalion Nigeria Regiment, Zaria, Nigeria.

N. India and Burma.—R. N. Fox (VU2DR), c/o Messrs. Lyons (India), 11, British Indian Street, Calcutta.

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

South Rhodesia.—S. Emptage (ZE1JG), Salcombe, Plumtree, Southern Rhodesia.

AUSTRALIA.

(By W.I.A. Publicity.)

THE work of the Section during the past month has been concentrated upon the construction of sub-standard frequency metres, which, after calibration from standards supplied by the Radio Department, will be distributed to each Divisional Technical Development Section. Several are almost ready to be tested, checked and re-checked.

A considerable amount of experimental broadcast work on about 1,500 k.c. (200 metres) is undertaken by members in Australia, which has been previously mentioned.

Local publicity is being satisfactorily undertaken by all Divisions, and a favourable amateur attitude is being fostered in the general public through local press, broadcast stations and experimental 'phone stations working on the 1,500 K.C. band.

The Victorian Division has under construction a new transmitter using relatively "high" power, which will be used by both the Federal Executive and the Division extensively for broadcast 'phone work on short waves.

Schedule details will be available later.

NORTHERN INDIA AND BURMA.

By VU2DR.

A circular letter addressed by G6UN to several VU amateurs proved to be the much-needed incentive required to stimulate action among the B.E.R.U. members resident in Northern India and Burma. By the term action, it is meant that interest has at last been aroused in furthering the cause of the B.E.R.U. in this territory, and as a result we all hope before long to organise a Group of some note and to materially assist in advancing the objects of the Union.

It was apparent from the circular letter that VU2DR was expected to take the lead, at least for a time, and on receipt of the requested letters of approval from the various Hams referred to by G6UN, a commencement was made to organise the Group to the best advantage. The first step decided upon was the division of Northern India and Burma into districts, but as a temporary arrangement pending the result of present negotiations with the Representative of Southern India and Ceylon* to combine the whole territory under one representative, three districts were demarcated and representatives nominated, particulars of which are follows:—

No. 1 District.—Representative: VU2AH, Karachi Territory: Sind, Rajputana and south to the Bombay Presidency (Aden), and territory connecting South India.

No. 2 District.—Representative: VU2FX, Lahore Territory: N.W.F. Provinces, Punjab, United Provinces, Central Provinces, Central India, Berar, Bengal, Bihar, Orissa, Assam, and south to the Northern Circars and territory connecting South India.

No. 3 District.—Representative: VU2JB, Akyab Territory: Burma.

Unfortunately, it will not be possible to distinguish the VU districts by the number given in the call-sign, but at a later date it is proposed to take the matter up with the Director of Wireless with a view to having the necessary numerical change made officially.

The districts are being encouraged to promote among themselves a spirit of friendly rivalry in order to increase the general efficiency of the Group as a whole, and to create the inventive spirit rather than competition in the best collection of QSL cards. DX communication, of course, is not condemned, as such in many cases proves to be the result of successful experiments, but the Ham who stirs up the ether nightly, looking for a report of no consequence to him other than its confirmation by card, will not be encouraged in such a pursuit. It is our united intention to institute "reforms" in this territory as early as possible, and to set afoot various schemes and researches from which we hope to obtain valuable data and a contribution towards the "amateurs' cause" which justifies their existence.

In order to commence research work without delay, it has been decided to investigate the "effects of the monsoon on wireless waves of ultra high frequency." Such will provide VU stations, in addition to research work, great scope for traffic over long distances. VU stations have been requested to maintain communication as far as possible with all amateurs situated in those regions where atmospheric variations are directly responsible for the Indian monsoon, with the object of recording signal characteristics throughout the monsoon season. The Director-General of Observatories in India, B.E.R.U. Groups of Australia and New Zealand, the A.R.R.L., S.A.R.R.L. and the I.A.R.A. of China have been asked to co-operate, as reports received from countries situated outside the influences of the monsoon will be valuable in providing a means of comparison at the time of drawing up the final report. A list of those areas directly responsible for the monsoon is given hereunder for the benefit of all B.E.R.U.-R.S.G.B. members who are willing to co-operate in this research. Detailed reports dealing with communication (and reception) effected from June 1 until October 31, 1931, with those amateurs situated within these areas will be warmly appreciated, and may kindly be sent to the B.E.R.U. Headquarters or direct to VU2FX, the station in charge of the research (C. D. Connerton, Aircraft Park, Royal Air Force, Lahore Cantonments, Punjab, India):—

Central Pacific Ocean	Excess pressure.
Chile and Argentine	,, ,,
Java, South Rhodesia & Zanzibar	Defect of rainfall.
Indian Ocean and the Cape ...	,, pressure.
Aleutian Islands, Dutch Harbour	Defect of temperature responsible for air circulation in the extreme north of the Pacific.

* Ceylon and Southern India are already a B.E.R.U. Group, and has been in operation for some long time.

District Representatives have been asked to make a special effort to recruit new B.E.R.U. members. We have not yet established a recruiting office for this purpose, but it is hoped that, as a result of their efforts, one will be very necessary.

Owing to short notice the various DR's have been unable to secure all reports from the membership, but those received in time for the closing of this report are given herewith.

No. 1 District.—VU2AH and VU2EK reports hourly changes of conditions on the 14 M.C. band, with signals constantly variable, accompanied with bad fading and mostly weak, particularly those from VU. Europeans were audible at the beginning of July, after which they gave way to heavy QRN. The efficiency of G5BJ in handling E.L.S. traffic under adverse conditions is praiseworthy and the operator is deserving of a " pat on the back " by B.E.R.U. H.Q.

No. 2 District.—VU2ZW has been cancelled, but the operator, B.E.R.S. 14 is continuing with his good work on the reception side and sends a detailed report of reception on consecutive days. VU2FX hopes to make some belated observations on the " Effects of the Monsoon on Wireless Waves," and, if he is not condemned to a hill-station during the next month or so, will take an active part in the proposed VU-VS-G-28 M.C. Tests in September. VU2DR reports poor results on 14 M.C. VU2KT has worked G5NI, OH7NF and local VU and VS7 stations on 14 M.C., and would be glad to arrange skeds for any day between 6 and 8 p.m. I.S.T. Would all stations hearing him kindly submit direct a QRI report.

No. 3 District.—VU2JB/JP has not reported owing to excessive pressure of work, but hopes to be in a position to forward some interesting matter for the next general report.

It would be appreciated if OM's Theobald and Rodman—ex AC3FR and XU2UU, respectively, would communicate with VU Group Headquarters as early as possible.

IRISH FREE STATE.

By EI2B.

There is practically nothing to report this month as the holiday season is in full swing and many stations are either QRT or the owners are away from home. Conditions have been very " patchy " on all bands, but especially on 14 M.C. on which band it has only occasionally been possible to work any real DX. EI7C has been keeping a daylight sked on 1.75 M.C. with G6GL, and has also done a little on 3.5 M.C., and reports the conditions as being not too bad, whilst W stations have been worked by some of us, on occasions, on 14 M.C. I hear that EI7D's aerial was recently struck by lightning and his transmitter much damaged, but fortunately there was no personal injury.

NIGERIA.

By ZD2A.

Conditions on 14 M.C. are steadily getting worse, the band being practically dead, except between the hours of 17.00 and 19.00 G.M.T.

Atmospherics have not been so bad on 7 M.C. lately, and a lot of stations can be heard from 23.00 G.M.T. onwards, though QRM is exceedingly bad.

ZD2A is trying out a full-wave Zepp aerial in place of an A.O.G. and finds results promising. He had a QSO with VS7GT, thus qualifying him for W.A.C. and W.B.E. certificates.

SUDAN.

By ST2D.

Frequent sand storms, accompanied by heavy rain, has made DX very difficult on all bands. ST2D has now got a C.C. transmitter working on 28 M.C., and is waiting for conditions to improve on that band. On 14 M.C. European stations are heard at fair strength between 05.00 and 10.00 G.M.T. and between 13.00 and 20.00 G.M.T. No stations south of Khartoum have been heard for weeks.

Later via G2BY.

European contacts during August have been fairly easy during the early evening. On 28 M.C. GFV, GFY and SUC have been heard between 13.00 and 15.30 G.M.T., but several skeds have been unsuccessful. ST2D has been trying 'phone with little success, but to the detriment of sundry valves. ST2C has returned from England, and is re-erecting his station at Khartoum.

Stray.

Members occasionally find the T-code very unsuitable for reporting on every kind of note heard on the air. Suggestions are at times received and we are asked to publish individual members' own ideas of the perfect T-code. Although we are usually prepared to publish suggestions we have found from experience that the publication is the last that is heard of the scheme. If members generally show that they consider the T-code should be drastically altered, and will put their ideas in writing, we will do our best to examine them and prepare some form of T-code based on the general desire.

BOOK REVIEW.

Short Waves. By Charles R. Leutz and Robt. B. Gable. 384 pages; 185 illustrations. Published by C. R. Leutz, Inc., Altoona, Pa, U.S.A. Price $3.

I took this book on holiday with me and enjoyed it immensely—there is not a formula in it.

No matter how much theory and " book-learning" a technical man absorbs, he is always anxious to visit works or large undertakings of whatever sort to see the real thing, and from the practical man who guides him he will pick up many details which never seem to get into books. He will get the " atmosphere " of the work and thoroughly enjoy seeing the wheels go round.

This book gives one exactly the same feeling; the authors are enthusiastic guides, taking the reader through the many departments of short-wave work.

Just as is desirable on a works visit, the reader is presumed to have some knowledge of the subject. The authors do not attempt to teach the fundamentals of radio; they show merely the applications. Any amateur transmitter has sufficient knowledge of his art to follow every word of the book.

An historical review of short waves precedes a very useful chapter on propagation. In the latter a section of great interest to amateurs deals with the 2-watt experiments carried out by the German Experimental Institute for Aeronautics, with plans and ground stations at Adlershof and Munich.

There are profusely illustrated chapters on " beam " stations and services in several countries, ship to shore radio telephony, directional aerials, television, and aircraft equipment. A chapter is assigned to short-wave broadcast receivers and another to amateur short-wave equipment.

Medical and surgical applications of ultra-short waves is a subject not usually met with in amateur literature, but it is rightly included and is expanded to consider experiments on signalling with these waves.

" Short Waves " is up to date, practical and well worth having. It is particularly recommended to amateur transmitters.

T. P. A.

Strays.

G5YG advises us that some thoughtful sportsman has been making use of his call-sign with telephony on the 7 M.C. band. This person's kind intentions are not relished by G5YG, who would like to make things very hot for the offender.

* * *

The Editor will be pleased to receive comments from members (both home and abroad) upon which they consider were the six *best* articles published during the 12 months ending with this issue.

Calibration Services.

A Calibration Service will be transmitted from G2NM, Mr. Marcuse's station at Sonning-on-Thames, Berkshire, on 3,583.13 K.C., according to the following schedule:—

At 11.00 every Sunday (Telephony).

At 23.00 every Sunday and Thursday (Morse).

Times are G.M.T. or B.S.T., as in force. The frequency has been checked and approved by the Post Office.

Notes and News from the British Isles.

DISTRICT No. 4.

Representative: J. Lees (G2IO), 17, Trevose Gardens, Sherwood, Nottingham.

It is pleasing again to report a further increase in membership throughout the area, and also a return of activity in Leicestershire. The submarine "Nautilus" has been heard working on the 7 M.C. band by several stations. The following report active: G2HD, G2OC, G2VQ, G2XS, G5IX, G6LI, G2IO, BRS365, 366, 453, 521, 550, 559, 582, 583.

DISTRICT No. 7.

Representative: H. A. M. Whyte (G6WY), "Killiney," Worsley Bridge Road, Beckenham, Kent.

At last we can say that there is a definite sign in this area of more interest being taken in the budget. Sixteen members have reported this month, and everybody who has reported seems to want the others who fail to do so to come up to scratch.

Might I ask all new members in Kent, Surrey or Sussex to send a brief report of their existence, and what they are doing or what they are interested in, to me by the 15th of every month. I am confident that once they have seen our budget they will continue to report regularly. It is the old idea that because they are new in the game they have nothing of interest to report. I'm sure they have ideas that are of interest to all of us, and I'm quite sure they will learn something.

Everybody complains of bad conditions and QRN. Some few nights have been fairly good on 14 M.C., but 7 M.C. has been poor, except in the early mornings.

G2VV has been doing good work forming a club to get new aspirants to the art of short-wave work, and I know that all will be welcome to his meetings. A special low fee is charged to people who cannot attend regularly because of their distance from Farnham. Any interested should apply to G2VV.

The following reported this month: G2VV, G5OG, G5IH, G6SY, G5JZ, G5UY, G5MR, G2IG, G2PF, G6PA, G6NK, 2AOX, 2AFO, BRS450, BRS464, G6WY.

DISTRICT No. 10.

Representative: S. Buckingham, 19, Oakleigh Road, Whetstone, N.20.

The district meeting will have been held by the time this is in print and promises to be a success.

Thanks are due to G6CW for his kind offer to meet at his QRA. Activity in the district is poor this month, owing to holidays.

I hope to meet all No. 10 District at the Society's Stand during Exhibition week. The letter budget has been very successful, and now takes five weeks to circulate.

DISTRICT No. 12.

Representative: T. A. St. Johnston (G6UT), 28, Douglas Road, Chingford, E.4. Telephone: Silverthorn 1557.

The second field day of this year took place on Sunday, August 16, near High Beech, Essex, and two stations, G6SG and G2NU, were active as portables on 1.75 M.C. A number of local stations were worked. At a recent area meeting BRS565, a new member, was welcomed and at the Field Day another new member, BRS597 attended. BRS473, from Tiverton, Devon, also attended our last meeting. Referring to our Honorary Secretary's letter in the August Bulletin, it is hoped by the active members of this District that more AA and BRS members will attend our meetings. BRS563 of this District has recently got in touch with us. G6LL, after a long time off the air, is now again active. Our next meeting will be held at Chingford on Tuesday, September 22. Provincial members up for Convention and Exhibition are invited to attend.

DISTRICT No. 13.

Representative: H. V. Wilkins (G6WN), "Hills View," 81, Studland Road, Hanwell, W.7.

The month's area meeting was not quite so well attended, but this is probably due to the time of year.

September 16 will see the next meeting at the QRA of G6VP, and is timed for 7.30 p.m. He wants to see as many as possible there, so please turn up. If you go before 8 p.m. you can get cheap day tickets on the G.W.R.

Activity in the area is rather low, reports few, and conditions, it appears, none too good, although the DX has been fair.

More work is being done on 28 M.C. than during past years at this period, and FM8IH has been worked by G6WN. He reported up to R8, and G6VP has had an R9 report from the same station.

I hope as many as possible will make it their business to be at Convention this year, and if you can accommodate a provincial member for a night or two, please notify headquarters.

You have, I see, again honoured me by re-election as your representative, and I will do my part as best I can. At the same time you yourselves must assist me in this task. Give me your wholehearted support, send in your reports on time, and attend all possible meetings, and I will do the rest.

Stray.

ZT2H, 145, Queen Street, Port Elizabeth, S.A., will be pleased to receive reports from any G station and to arrange skeds with this country.

THE WEST SURREY AMATEUR RADIO SOCIETY,

(By G2VV, Hon. Secretary and Treasurer.)

We are publishing Mr. Roe's report primarily because we wish to give his Society our support, and, secondly, because we believe much good will be served by the inauguration of similar local *Amateur Radio* in the Provinces. During recent months we have had the pleasure of watching the growth of two other societies in Birmingham and Exeter, and we look forward to the time when all groups of provincial amateurs will be not only members of the parent R.S.G.B., but also members of their own local society or club. J. C.

The writer has attempted to form an amateur radio club in the Farnham district for some time, and thanks to the untiring efforts of others it has now become an established fact. Acting upon the advice of Mr. Clarricoats it was decided to call it the West Surrey Amateur Radio Society rather than a local radio club, thus giving Surrey amateurs an opportunity to support the movement. We have about 15 members, all very keen, and we also have our own club room, which is open every evening for members. A start is being made with a three-valve short-wave receiver given by members.

It may seem easy to form a club of this sort and to get a room, but many difficulties lie in the path of what seems an easy proposition. A room must be paid for, and the subscription depends entirely on the number of members. We have fixed our subscription to suit our expenses, and at the moment they are rather high, at any rate for full members, the sum being 1s. per week. The amount is paid weekly, but we hope to get more members which will enable us to lower this figure. Many clubs pay only 2s. 6d. per year for their membership, but in most cases they do not possess a club room, and only hold meetings about once a month. We have a room, and it is our idea to get an official station if things work out as we hope they will. There is a great deal of hard work to be done yet, much has already been done, and although a membership of 15 may seem small, it must be remembered that Farnham is not a large town, and at present only G2VV and G6PV own stations in this district.

We need more members, and especially Surrey members. If you are in Surrey we are looking for your support. Membership is open to anyone interested in "Ham Radio," and a special rate of subscription has been fixed for outside members. These members are those who, owing to circumstances, cannot attend more than six meetings a year, but they receive notification of all important gatherings, such as field days and special lectures. The subscription for such members is only 2s. 6d. per year.

We hope later to run a budget, to which every member will contribute and receive a copy.

Space does not permit a full report on our Society, but we hope after you have read this you will support us and become an outside member, especially if you are a Surrey member of R.S.G.B.

Thanks are due to Mr. Clarricoats for help in getting this Society started. He is, incidentally, one of our founder members. The local press have given excellent support and columns of publicity on front pages, besides notices on street placards! They publish reports on our activities every week. Thanks are due to G6PV and G6NK, who have worked hard to get things going. Our committee consists of Mr. Denny (G6NK) (Surrey County Representative), Mr. P. Varney (G6PV) and Mr. C. L. Ward, a B.R.S. member of R.S.G.B. Mr. Bevan Swift (President of R.S.G.B.) has been asked to become our vice-president. The president will be a gentleman of local public standing interested in radio. In closing this report may we remind you that we hold a meeting every Thursday evening at 7.30 p.m., and the Committee are arranging an attractive programme of lectures, etc., for the winter. If you can come along please do so. The club room is situated at the back of my house, and the address is: "Ridgway," Hill Road, Farnham, Surrey. Will you give the W.S.A.R.S. your support, OM? J. N. R.

Strays.

GI6YM (City of Belfast Y.M.C.A. Radio Club, Wellington Place, Belfast, N. Ireland), has now built an all-mains transmitter, and will welcome reports. It is at present working in the 7 M.C. band on week-days from 20.00 to 22.00 B.S.T.

* * *

On June 27, G5BJ was WAC in 4 hours 20 mins. This is the seventh time he has done this in one day, and the fifth time this year. On one occasion he was WAC and WBE in the same day.

* * *

G5FC would be glad if the person using his call-sign on 7 M.C. would let him have his QRA in order that various QSL's may be forwarded.

European Notes

As announced last month, considerable time is being devoted by the R.E.F. to the arrangements relating to the International Congress which opens in Paris on the 23rd of this month. Full details, including a list of the technical subjects which are to be discussed, are now available and may be obtained at 53, Victoria Street. The R.E.F. extend their cordial greetings to members and will be very glad to welcome anyone who is able to attend the Congress.

With HB9Y there is yet another transmitter added to the rapidly increasing list of active amateurs in Switzerland. HB9Q has succeeded in recommencing his regular working with VK3WL. The W.S.K.A. relay tests, which were such a success last winter, are to be re-started in November with a greatly increased number of stations in the "chain."

28 M.C. Tests from VE2AC

A special series of tests on 28 M.C. will be run by VE2AC on the dates shown below and at the times given in the list of schedules.

It is hoped that all 28 M.C. enthusiasts will do their best to keep as many of these skeds as possible.

Report either direct or to C.B.

TIMES.

Schedules	**A**	14.00, 18.00, 20.00 G.M.T.
„	**B**	12.00, 13.00, 14.00, 15.00 G.M.T.
„	**C**	00.30, 01.00, 02.00, 12.00, 14.00 15.00, 16.00, 17.00, 18.00, 19.00, 20.00, 21.00, 22.00, 23.00 G.M.T.
„	**D**	00.00, 01.00, 02.00, 03.00 G.M.T.
„	**E**	13.00, 15.00, 19.00 G.M.T.
„	**F**	01.00 G.M.T.

DATES.

		October Tests.	November Tests.
Schedules	**A**	2, 9, 16	6, 13
„	**B**	3, 10, 17, 24, 31	7, 14, 21, 28
„	**C**	4, 11, 18, 25	1, 8, 15, 22, 29
„	**D**	5, 12, 19, 26	2, 9, 16, 23, 30
„	**E**	6, 13	3, 10, 17
„	**F**	7	4, 11, 18

Editorial—(*Continued from page* 67.)

some in speech—that are to be heard, to say nothing of happening by chance to tune in some out-of-the way part of the world and realise another country has been "logged." The next step is surely to take actual part in this most fascinating hobby, and to explore the hundred-and-one fields of adventure that lie open. It is our aim to assist all who feel inclined to progress along the paths of amateur radio, whether for only a short distance or into the mists of beyond. May we welcome you into the Brotherhood of Amateur Radio? We hope so.

* * *

We wish to draw the attention of members to the A.R.R.L. "Frequency Measuring Test" during October of this year. Many members have been-circularised from Hartford, and further announce ments will appear in the September and October editions of "Q.S.T." A line, however, to A.R.R.L. Headquarters will fetch advance and detailed information.

Notice to Contributors.

The Editor is pleased to have manuscripts submitted to him for publication, but would remind contributors that, owing to lack of space, a delay often elapses between the receipt of the MS. and the date of its appearance in these pages. All matter intended for publication should be written on one side of the paper only and preferably typewritten (double spaced). Diagrams should always be shown on separate *sheets. Rough sketches can be re-drawn by our draughtsmen. Photographs, if any, should not be smaller than ¼-plate as otherwise the reproduction will be poor.*

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Rates 1d. per word, minimum 1/6. First line in capitals if desired. 2d. per word where all capitals are required. Minimum 3/-.

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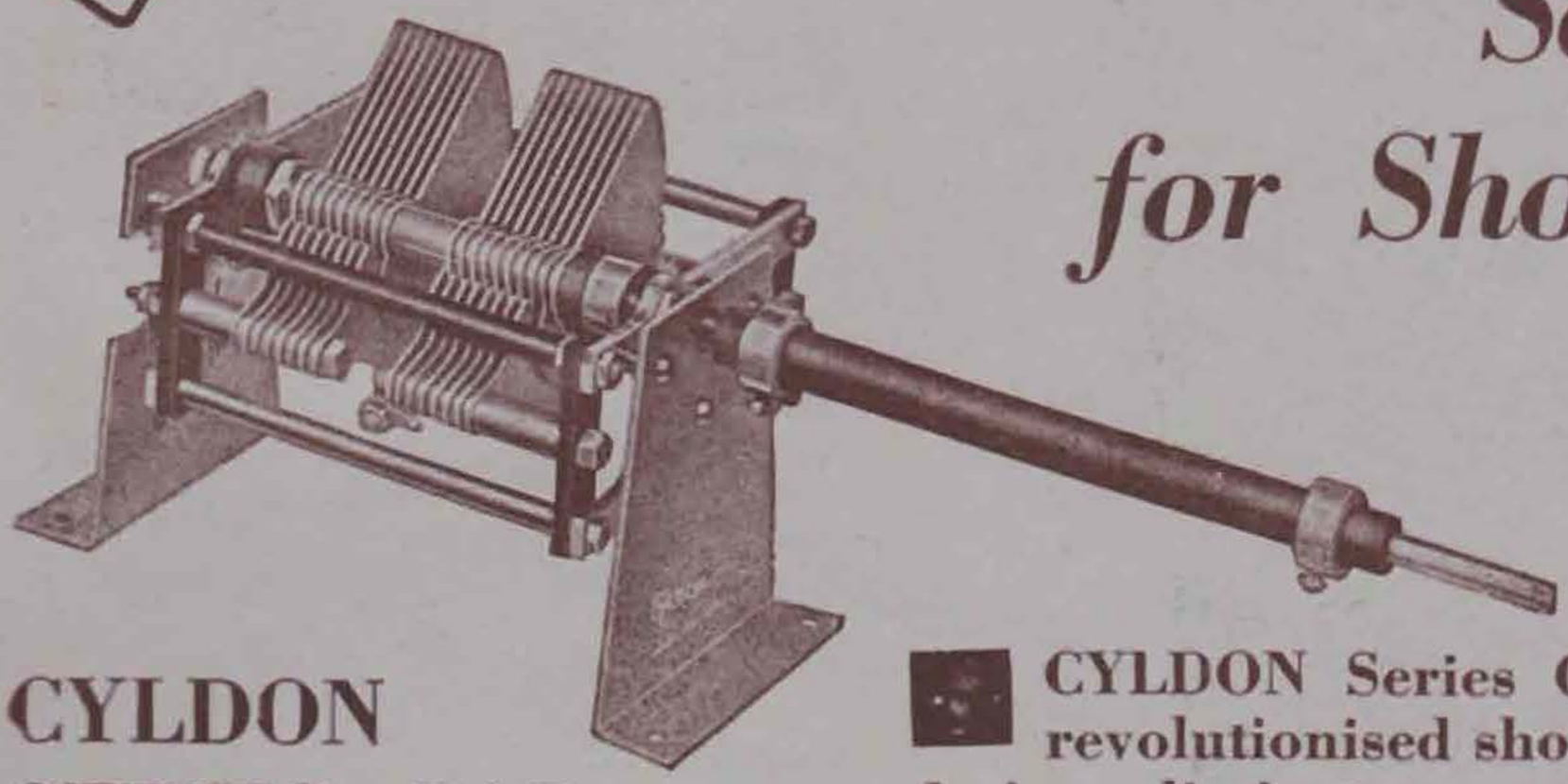

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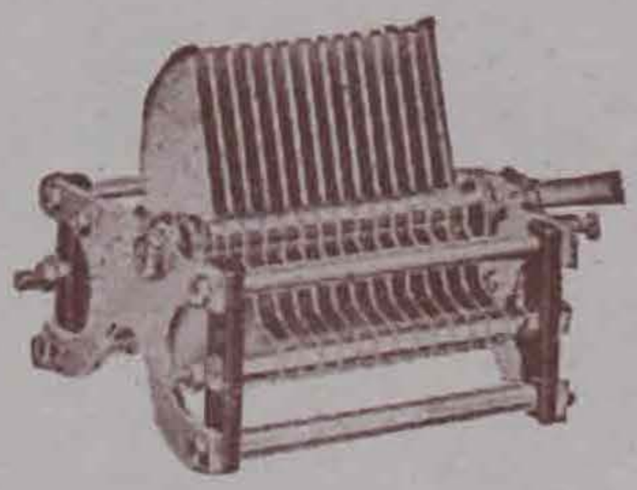

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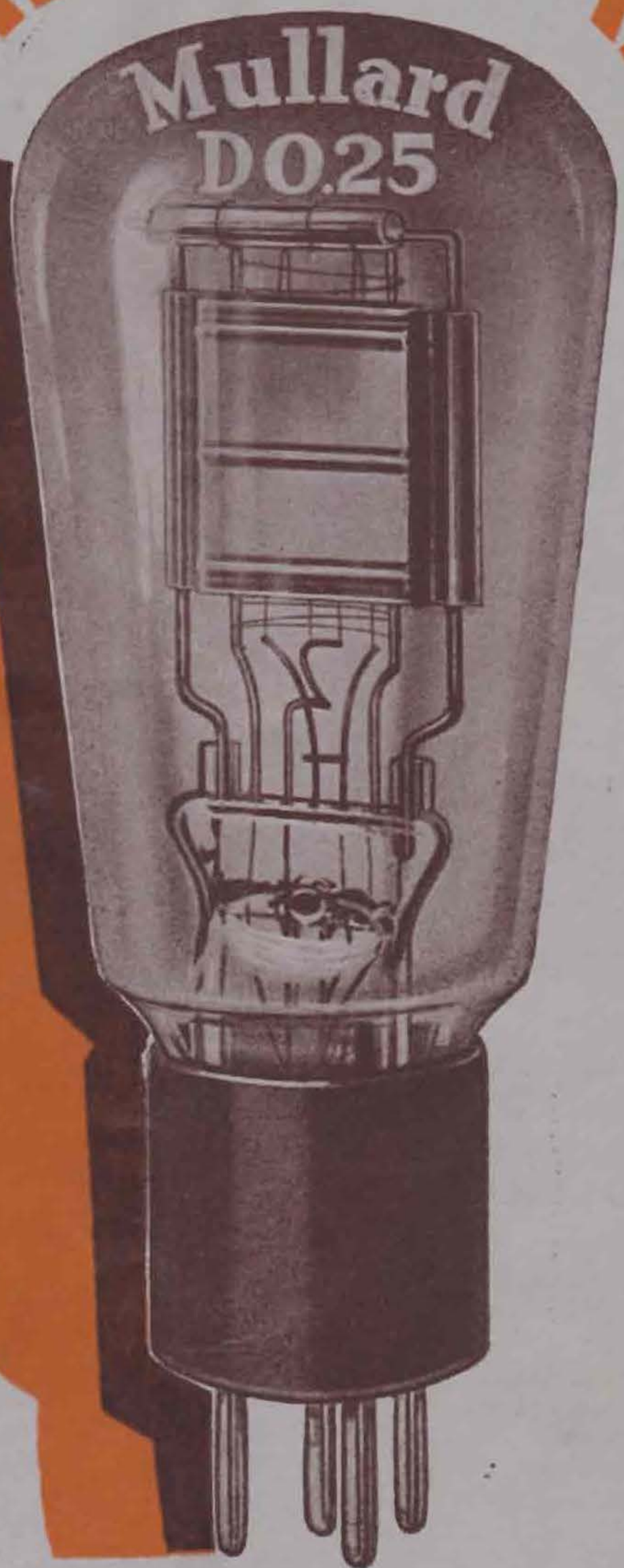

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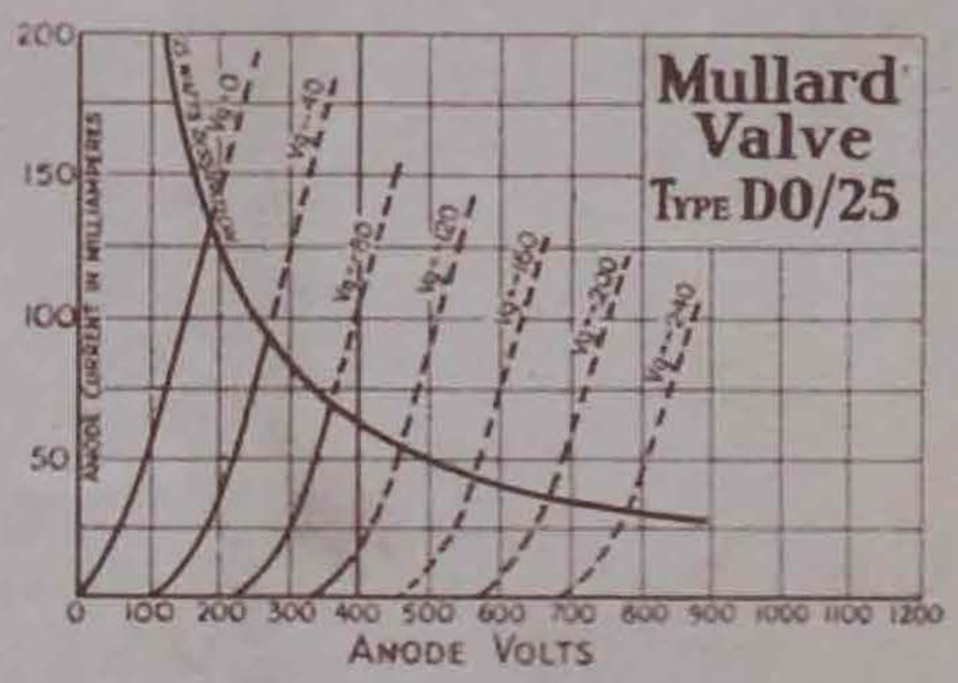

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Filament Current	- -	1.8 amps
Max. Anode Voltage	- -	400 volts
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