THE T. & R.

BULLETIN

THE INC. RADIO SOCIETY OF GT. BRITAIN

AND THE BRITISH EMPIRE RADIO UNION

Vol. 7 No. 11 MAY, 1932 (Copyright) Price 1/6

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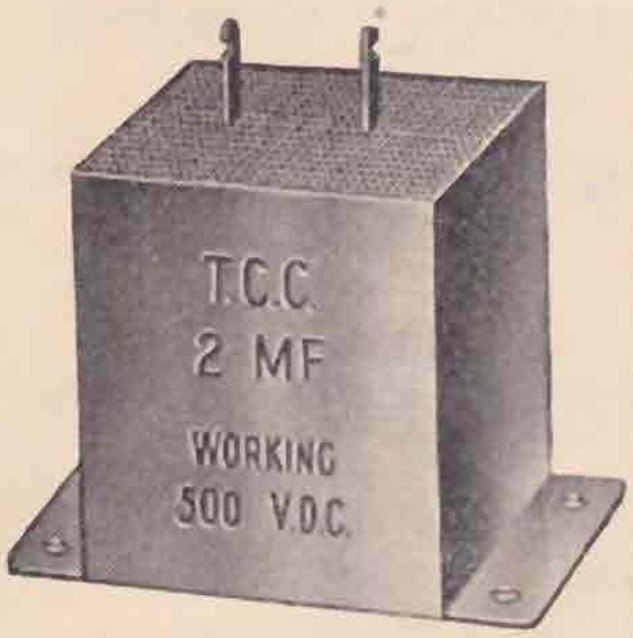

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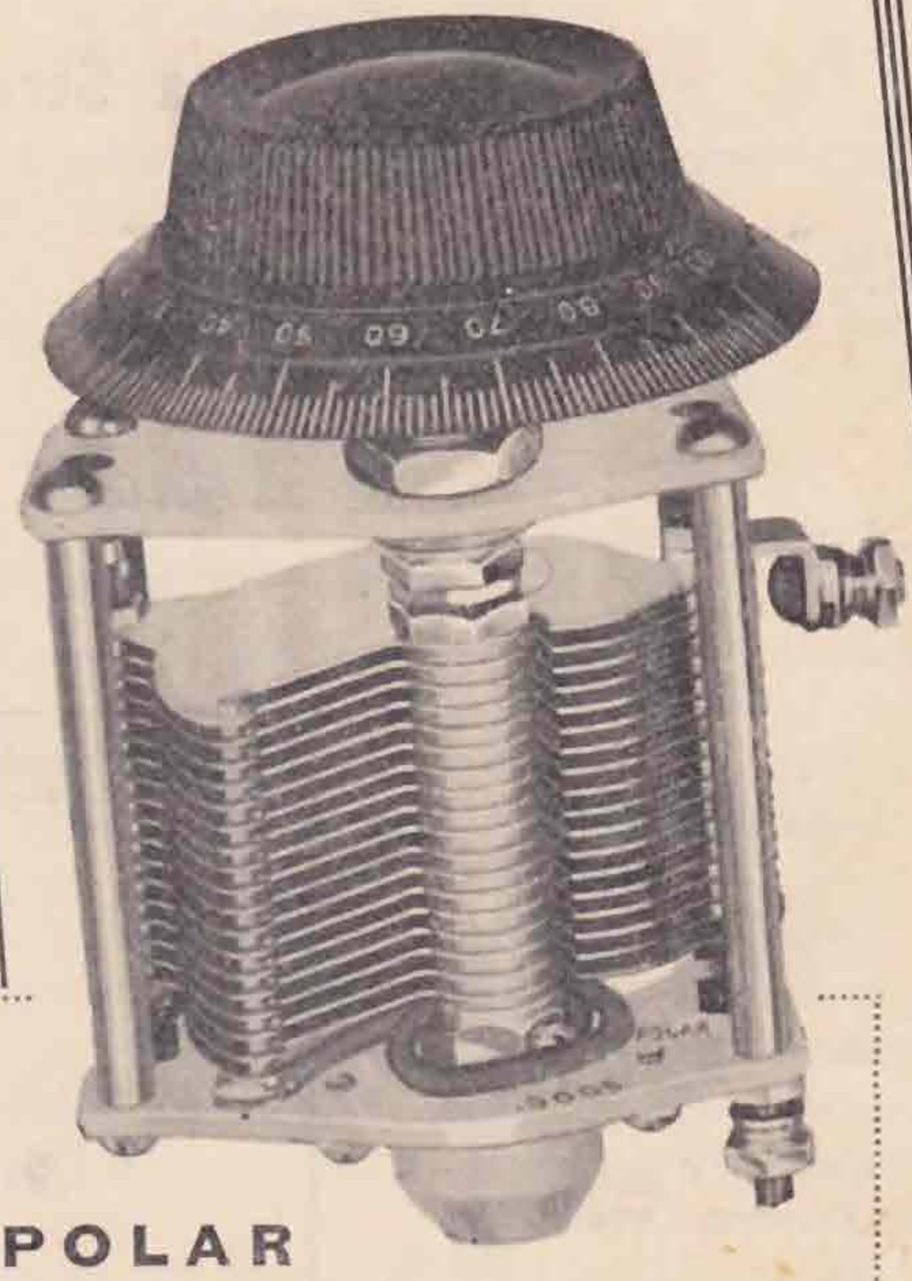

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R.S.G.B. CALENDAR

Annual Convention

AUGUST 26 and 27
in LONDON.

Full details will appear in future issues under the Social Section.

R.M.A. Exhibition at Olympia, August 19 to 27 inclusive.

Details of forthcoming local Conventionettes will be found under the District Notes Section as they become due. The following have still to take place this year: May 15 (Whitsun), District 6, at Torquay; June 5, District 7; June 19, District 4, at Nottingham.

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The T. & R. Bulletin.

(*Published on the 14th of the month.*)

Hon. Editor: G. W. Thomas (G5YK).

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T&R

Bulletin

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

MAY, 1932. Vol. 7. No. 11.

THE BRITISH EMPIRE RADIO UNION

FIRST mention of a British Empire Radio Organisation was made at the Second Annual Convention of the R.S.G.B. held in London during 1927, but from that time until the early part of 1929 little was done to further the suggestions made earlier. In April of that year two members of the old R.S.G.B. general committee, who were anxious to see the Dominions and Colonies of the British Empire working in closer co-operation upon amateur radio matters, commenced the task of establishing contact, by means of correspondence, with certain active amateurs in the Empire. Considerable success accrued from these efforts. It was, however, not until Convention, 1929, that any definite Empire programme was outlined. At that meeting a decision was made to approve the formation of a Publicity Section whose duty it would be to advertise the Society, both at home and abroad, particularly in the British Empire.

It was in this manner that the B.E.R.U. came into being. Dominion and Colonial amateurs, therefore, do not join the R.S.G.B. as such but the B.E.R.U. Both the Society and the Union are, however, one body working for a common cause—the extension of amateur radio within the Empire. This scheme provided an opportunity for putting into effect a further plan whereby Society members could claim recognition for having effected successful two-way communication (through their amateur transmitting stations) with some part of the British Empire in each of the five continents. A special certificate known as the "W.B.E." (Worked the British Empire) was issued for this purpose, and considerable keenness has been shown amongst our members desirous of qualifying for the honour of possessing this award. Up to the beginning of 1932 over 100 of these certificates have been awarded to amateurs situated in practically every part of the Empire.

The B.E.R.U. caters also for the person interested solely in the reception of amateur signals, and arrangements are made whereby overseas members may be issued with a special identification number, in a similar manner to that which has been adopted in Great Britain. Overseas amateurs in this class are granted a B.E.R.S. number—indicating that the holder is a British Empire Receiving Station. The possession of such a number is found to help considerably in forwarding QSL cards, via the special bureau, besides which it definitely identifies the member as a genuine experimenter.

All B.E.R.U. members are entitled to join Contact Bureau, which is the Society's experimental section organised to group together amateurs interested in radio subjects of kindred interest.

In practically every part of the Empire a B.E.R.U. representative has been appointed to act as a liaison between his country and the Homeland ; he forwards regularly notes concerning

(*Continued on page* 378.)

A LOW POWER CRYSTAL CONTROLLED TRANSMITTER

THIS transmitter has been designed and constructed to meet the demand for a really efficient low-power crystal-controlled set, made as far as possible from standard receiving components, and for those who are anxious to obtain a little experience of such transmitters before launching out with 50 or 100 watts.

The set described, if constructed to specification, could eventually be used as the preceding stages to a 50 or 100 watt power amplifier.

The question of working during broadcast has been specially considered, and a really efficient key-thump filter has been included in the design, to enable work to be carried out through a broadcast programme without interference to nearby receivers.

The transmitter has three stages and is intended to work on the 3.5, 7, and 14 M.C. bands, and requires 3.5 and 7 M.C. crystals. The first valve is, of course, the crystal oscillator, the second valve is either a frequency doubler, or a sub-amplifier, and the third valve is the power amplifier.

With a 3.5 M.C. crystal the first stage oscillates, of course, at 3.5 M.C. The second stage operates also at 3.5 M.C. as a neutralised sub-amplifier, driving the last stage to a full 10 watts or more.

If the second stage is operated as a frequency doubler, the output would be on 7 M.C., and this would drive the last stage as a 7 M.C. power amplifier.

With a 7 M.C. crystal the same conditions apply, the output being obtained on 7 and 14 M.C.

It will thus be seen that although several coils and two crystals are needed, the transmitter is particularly flexible, and the need for a second frequency doubling stage is obviated. This simplifies the set and effects a considerable saving in gear.

The power supply, for the whole set, could very easily be obtained from an ordinary B.C. eliminator, as only about 200 volts need be used on all stages to obtain quite a good output. If a greater output is desired, the voltage on the power amplifier may be increased to 400-500 volts.

It will be noticed that neutralising condensers are used in the last two stages, as any system other than a *neutralised* amplifier is definitely not recommended particularly to anyone unaccustomed to adjusting a crystal-controlled transmitter. The sub-amplifier stage must, of course, be neutralised, and if a neutralised power amplifier is not resorted to, we have a set which appears to be crystal-controlled, but which in reality is not. Such a form of oscillating amplifier cannot be too hardly condemned, and is usually only used where the operator finds difficulty in neutralising, owing to high losses.

General Construction.

Referring to the circuit diagram, it will be seen that the number of components used has been kept down to a minimum.

Only one millimeter is required, and by a system of jacks, can be inserted in the anode circuit of any stage.

Five plug-in coils for the first two stages are necessary, particulars of which appear later. The power amplifier coils are also plug-in, but two stand-off insulators form the holder for these.

The base-board is of half-inch wood, and measures 36 in. by 12 in. This is supported on 1 in. runners ½ in. thick, and the jacks and terminals mounted on these. This permits of a certain amount of sub-baseboard wiring, thereby simplifying the H.F. wiring.

The four tuning condensers are mounted on strips of black paxolin, this material being preferred to ebonite. The paxolin is screwed to a small block of wood, which in turn is fastened to the base-board.

Clix 5-pin valve holders are used throughout and the special reason for the use of these will be seen from the concluding paragraphs.

Before going over points of construction in detail it may be well to generalise upon the wiring of crystal controlled transmitters. So frequently we hear of amateurs building such sets from the best components available, the theoretical circuit being correctly followed, but "the set doesn't work. Why?" Or if it does work the output is so poor that to use any reasonable power resort has to be made to self-oscillation in the power amplifier.

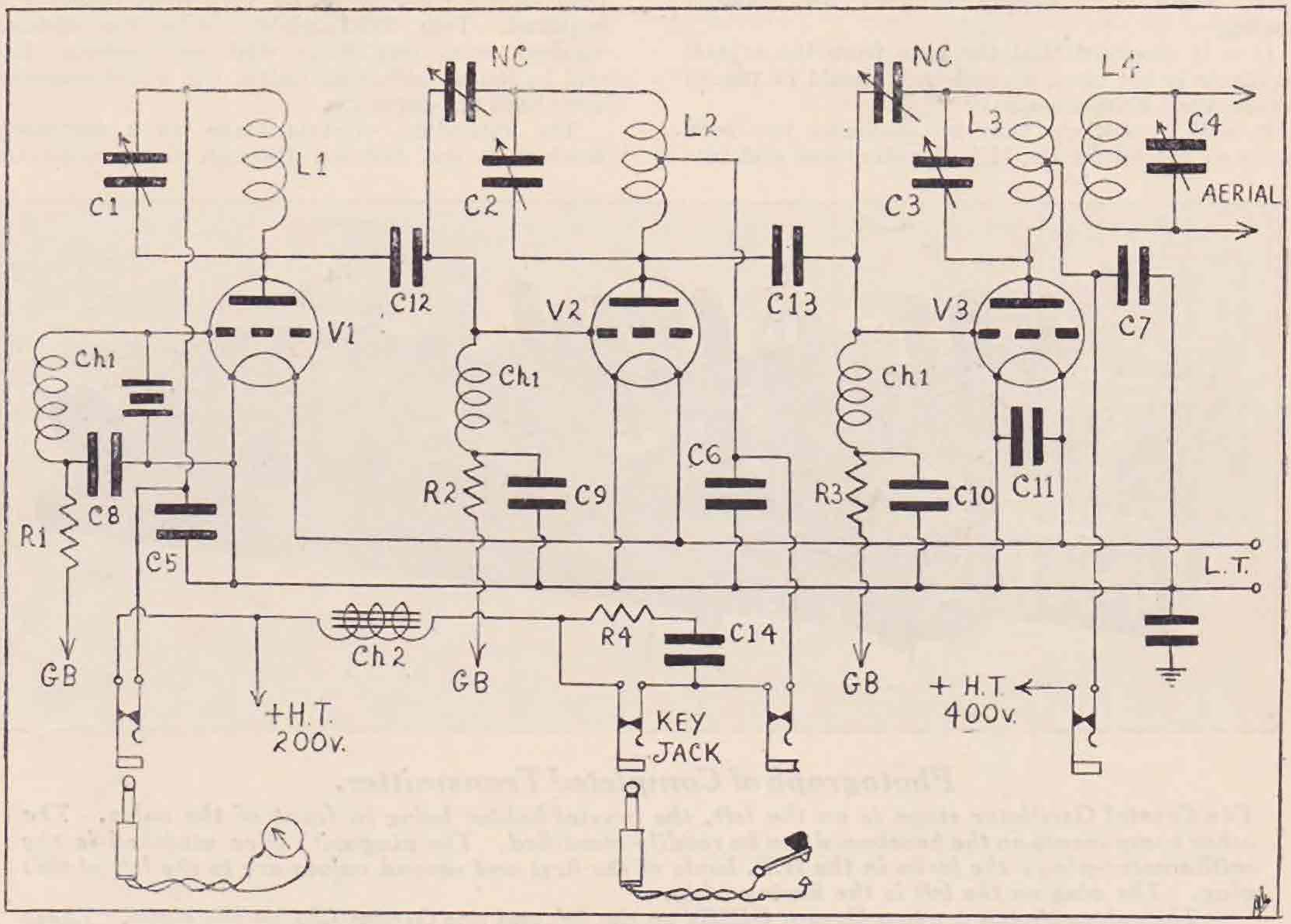
It will probably be said that the circuit is too full of condensers: there is not, however, a single condenser there that is not fulfilling some special duty, and though possibly one or two may be dispensed with, lack of fixed condensers is often a source of trouble in such a transmitter. Of the fixed condensers, C_5, C_6 and C_7 are H.T. by-pass condensers, and C_8, C_9 and C_{10} are grid-bias by-pass condensers.

It is very important that the low potential points of the tuned anode circuits (that is the points to

which the H.T. is fed) shall be connected to the filaments of the valves with which the anode circuits are associated by a short path ; this means, in effect, that the low potential point of tuned-anode-circuit C_1 L_1 must be connected to the filaments of valves V_1 and V_2. When this is applied to each stage in turn it will be seen that every low potential point is linked up with other low potential points. When the term " by a short path " is used, it is intended to mean that as much care should be used in carrying out this part of the wiring as the wiring connected with the grid and plate connections, and only solid wire of not thinner than 16 S.W.G. should be used.

The grid bias by-pass condensers are there for a rather different purpose. Each of the chokes Ch_1 is in series with a grid leak, (R_1, R_2 or R_3), from which a connection goes to the common grid bias battery. None of the resistances used for this purpose is truly non-inductive and the effect is obtained of two chokes in series, one a good choke and one a bad choke, one having no appreciable D.C. resistance and one having a high D.C. resistance. Further, the connection between the grid leak and the bias battery (if at all long) is often not free from H.F. potentials (whatever the size of the choke) and in order to prevent H.F. potentials developing across the grid leak and parts of the bias battery the by-pass condensers C_8, C_9 and C_{10} are inserted. These will keep the H.F. potentials in their proper places and if good chokes are used no trouble will be experienced.

It frequently happens when a transmitter such as this is constructed that trouble is experienced in neutralising the output stage, or a frequency doubling stage may go into self-oscillation when the drive is removed. In many cases such trouble can be cured by verifying that H.F. potentials are not being set up across lengths of wire, or components, which should be at zero potential. After all, the use of the fixed condensers referred to is nothing more than de-coupling (to complete the process H.F. chokes are occasionally inserted in H.T. leads as close to the fixed by-pass condensers as possible), and there is little difference between " motor-boating " in a speech amplifier and self-oscillation in



Circuit Diagram of Transmitter.

C_1 & C_2—.0001 mfd. Cyldon Bébé.
C_3 & C_4—.0002 mfd. Cyldon Receiving.
C_5, C_6, C_8, C_9, C_{10}—.002 mfd. T.C.C. " Flat."
C_{12} & C_{13}—.002 mfd. T.C.C. " Upright."
C_7—.005 T.C.C. 1,000 v. Test.
C_{11}—2 mfd. T.C.C.
C_{14}—.25 mfd. T.C.C.
NC—Bulgin .00005 mfd. Neutralising Condenser.
R_1, R_2, R_3—10,000 ohms " Spaghetti " (Burne-Jones).
R_4—25 ohms.
Ch_1—Eddystone Short-wave Choke, type 923.
Ch_2—Varley Dual L.F. Choke.
Valveholders—Clix.
Plugs and Jacks—Bulgin.

a 3-valve transmitter. In order to complete the scheme for maintaining low potential points and filaments at zero potential some part of the set should be earthed (through a large fixed condenser) even if operated from the mains : this connection should preferably be made to some part of the filament wiring of the power amplifier stage.

On referring to the figure, it will be seen that a condenser C_{11} (2 mfd.) is connected across the filament of the valve V_3. This reduces filament flicker on keying, especially with thin filament valves, and materially assists in obtaining a good note, when A.C. supply is used for filament heating.

If it is observed that the note from the crystal oscillator is not pure, a condenser should be placed across that filament also.

It will be noticed that no provision has been made on the set for the H.T. negative and grid bias positive connections, as it is realised that these would be taken, either to the centre tap of the filament winding on the transformer, or to the negative terminal of the L.T. accumulator, as the case may be.

Stage by Stage Considerations.

There is nothing unconventional about the crystal oscillator stage, the usual circuit being employed. The crystal holder is one of the *Quartz Crystal Co.'s* open type, and is mounted directly on the baseboard.

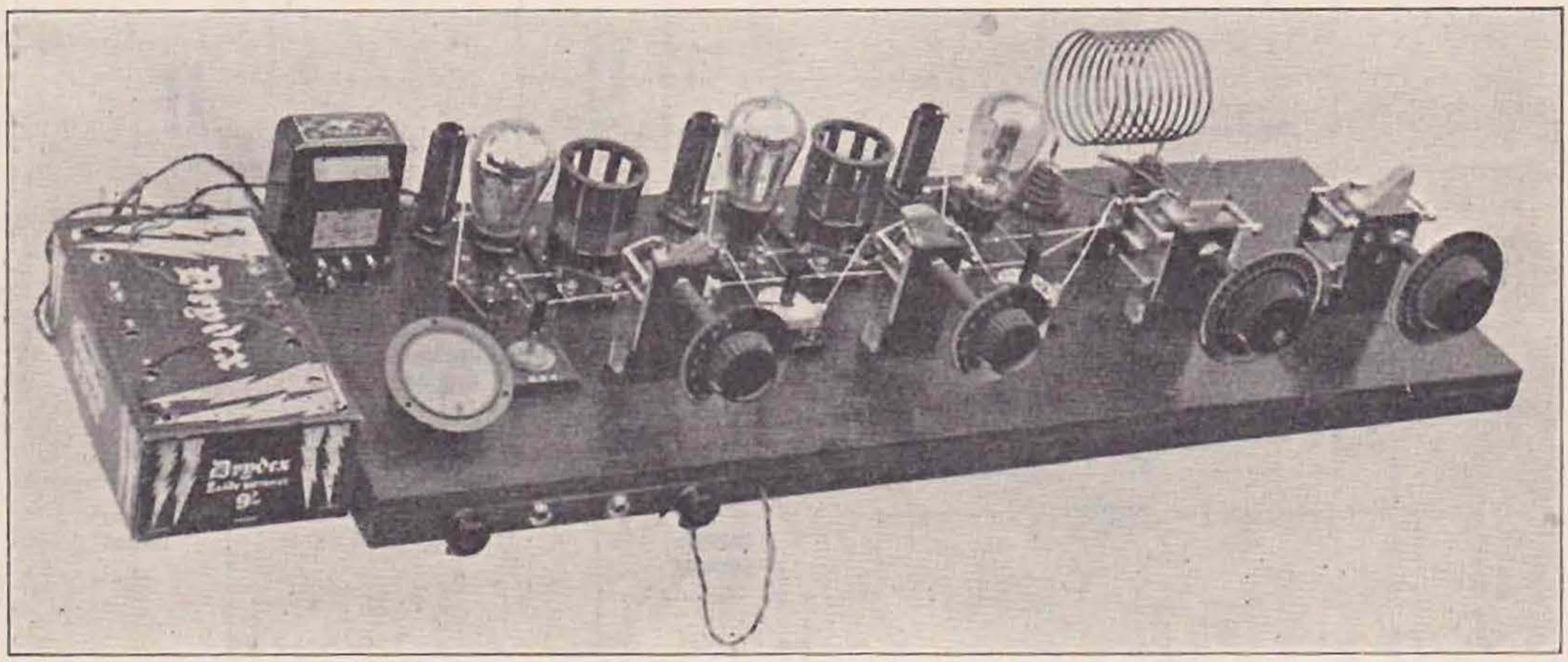
The variable condenser tuning the anode coil, is a *Cyldon* .0001 mfd. *Bébé*.

It may be stated here that the values of all fixed condensers may be obtained from the key below the diagram. With the exception of C_7 all are standard *T.C.C.* receiving condensers ; the condensers C_{11} and C_{14} are paper dielectric, non-inductive, the remainder being mica dielectric.

The next stage may be used either as a frequency doubler or sub-amplifier, as indicated in the introductory paragraphs.

In order to effect neutralisation when used as a sub-amplifier, the anode coil must be centre-tapped, the neutralising condenser being connected between the end of the anode coil remote from the anode and the grid of the same valve. This is a *Bulgin* .00005 mfd. neutralising condenser, mounted directly on to the baseboard between the condensers C_1 and C_2, as is clear from the photograph. It will be found advisable to double-space the neutralising condensers, as very little capacity is required. Two fixed plates, with two spacing washers separating them, with one moving plate will be found sufficient, unless the valve possesses very high self-capacity.

The operation of this stage as a frequency doubler is not harmed through the neutralising condenser being connected, provided its value remains at that pre-determined for neutralisation.



Photograph of Completed Transmitter.

The Crystal Oscillator stage is on the left, the crystal holder being in front of the valve. The other components on the baseboard can be readily identified. The plug with wire attached is the milliameter-plug ; the jacks in the H.T. leads of the first and second valves are to the left of this plug. The plug on the left is the keying-plug.

The valves shown are two Osram DE5Bs on the left and one Osram LS5 on the right. These were the valves used in testing.

It will be seen that both sides of the variable condenser C_2, which is also a *Cyldon* .0001 mfd. *Bébé*, are at H.F. potential, and this is one of the reasons why 3 in. insulated extensions are fitted to this and all tuning condensers.

The construction of the power amplifier stage is identical with that of the sub-amplifier apart from differences in the construction and mounting of the anode coil.

The anode tuning condenser is a .0002 mfd. *Cyldon* standard receiving type, and the fixed condenser C_7 is a special T.C.C. .005 mfd. 500 volts working.

The connection from the anode of the valve V_3, to right end (viewed from the photograph) of the coil L_3, is taken to a convenient point on the condenser C_3. This eliminates an unnecessarily long anode lead.

The H.F. chokes Ch_1, are *Eddystone* short wave chokes type 923, and are suitable for wavelengths up to 100 metres.

The grid-leaks R_1, R_2, R_3, are *Burne-Jones* Spaghetti resistances, of 10,000 ohms each, and are connected below the baseboard to their respective terminals, which are of the *Clix* All-in type.

Microfuses may be inserted in each H.T. + lead as a safeguard against short-circuits.

Coils.

The value of the coil L_1 will naturally depend upon the frequency of the crystal in use, and as this transmitter is designed to work with a 3.5 M.C. and a 7 M.C. crystal, two coils will be necessary for this stage. The formers for these are *Eddystone* skeleton short-wave six-pin type of 2½ in. diameter.

The accompanying table shows the number of turns necessary for the five coils required, the non-centre-tapped ones being for use in the crystal oscillator stage.

Both 3.5 M.C. coils are close wound upon plain formers, the ends being terminated at pins Nos. 1 and 5, the centre tap being taken to pin No. 6. The remaining coils are space wound 10 turns per inch upon screwed formers; this, by the way, is standard Stratton spacing.

The power amplifier coils are supported on two *Eddystone* stand-off insulators, the centre tap being made by a clip and flexible lead to the condenser C_7.

The 3.5 M.C. coil is wound with 14 S.W.G. enamelled wire, on a piece of Becol former, three inches diameter, and screwed six to the inch, 26 turns being required. To the lower side a strip of black paxolin, carrying two valve pins, is fixed by means of distance pieces. The ends of the coil are terminated at the valve pins, while the centre tap consists of a short length of wire soldered securely.

Coil Data.

FORMER	3.5 MC.	7 MC.	14 MC.
Plain	22	10	—
Centre-tap ...	28	14	6

The 7 M.C. coil is self-supporting, being wound with 10 S.W.G. bare, 10 turns, 3½ in. diameter, terminating in valve pins, a small piece of wire again being soldered to the centre for the H.T. clip.

The 14 M.C. coil, also self-supporting, is of 10 gauge wire, six turns of the same diameter being necessary, the centre tap being made as before.

Keying and Modulation.

It will be observed that the key is placed in the H.T. lead to the second valve. This is to be preferred to keying in the power amplifier direct, as there is considerably less power in this circuit. It also ensures the power amplifier being neutralised, as if self-oscillation were taking place, any keying in the driving circuit would make little difference to the output.

As will be seen the H.T. to this stage is taken through the *Varley* dual L.F. choke, to the key, and thence to the meter-jack, and anode coil. Across the key is a resistance, and a ·25 mfd. *T.C.C.* fixed condenser. This, with the choke, constitutes the key-thump filter.

The function of the choke is to remove the "thump" at "make," and the condenser the "thump" at "break." The resistance is necessary to eliminate arcing at the key contacts.

The choke also serves as a modulation choke, for Heising modulation of the sub-amplifier. This is quite a satisfactory method, and provided the power-amplifier is properly neutralised, will give very full modulation.

Grid modulation, of either the sub-amplifier, or power-amplifier, may be used with success, the speech amplifier being choke coupled, across the grid leak, by 2 mfd. condensers.

It is intended to deal more fully with the modulation of this transmitter in another article.

Using valves of the D.E.5B. class in the crystal oscillator and frequency doubler stages, with 200 volts on the anodes, about 9 volts bias is required on the crystal stage, and about 50 volts on the frequency doubler.

The condenser C_1 should be rotated from minimum to maximum, *very slowly*, and with the meter in the anode circuit of V_1. The milliamps will slowly rise, and then fall again. Just before minimum current, the maximum output will be obtained.

Assuming the second stage is to act as a doubler the meter may now be placed in the anode circuit of V_2, when it will be found that the current is at a maximum. If this is not so, a little adjustment of C_1 will be necessary. The condenser C_2 is now rotated slowly, and a point will be found where the anode current is at a minimum. This stage is now tuned for maximum output.

Before connecting the H.T. to the last stage, it must be neutralised. This process is carried out in the following manner: Light the filament of V_3, but *do not* switch on the H.T. Place a single-turn bulb (see G2WS's article in the April BULLETIN) or neon lamp against the coil L_2, when it should light. Rotate the condenser C_3, and it will be found that at one point the lamp will be extinguished. Now rotate the neutralising condenser associated with this circuit, making small adjustments on the condenser C_2, until a point is found on the neutralising condenser where no change in brilliancy of the lamp is noticed when C_3 is rotated slowly past the point previously found. The power amplifier stage is now neutralised, and the H.T. may be switched on.

With a valve of the L.S.5 class, with 400 volts on the anode, about 100 volts bias is necessary. When this stage is properly neutralised, the anode current will fall to a minimum when the circuit $C_3 L_3$ is tuned to resonance.

When the second stage is intended to work as a sub-amplifier, that is, when the power-amplifier is to work on the same frequency as the crystal, it is necessary to neutralise the second stage. This is done in exactly the same manner as described for the power-amplifier, care being taken to break the H.T. connection to the anode of V_2, by means of a plug inserted in the jack for that circuit. It is immaterial whether the valve V_3 is alight or not, but should be in circuit, with no H.T. connected.

Conclusion.

It will have been noticed that little has been said concerning valves, for it is intended to present a complete report of the performance of the set with various types of valves, including indirectly heated type, with different values of H.T., in the next issue.

(*Continued on page* 370.)

THE HOT CATHODE MERCURY VAPOUR RECTIFIER.

By H. K. Bourne, B.Sc. (G2KB).

UNTIL recently probably the most widely used rectifier for small powers has been the thermionic valve. The principles of the operation of this rectifier are well known to all, and briefly these are as follows :—

The filament, or cathode, is heated by the current flowing through it and so electrons are emitted from it; these are attracted to the anode when this is at a positive potential with respect to the filament. Should it be at a negative or zero potential, no attraction of electrons occurs, and so no current flows through the valve. If an alternating voltage is applied, the valve will only pass current when the anode is positive, and so we obtain a unidirectional, or rectified, current from the valve.

Now, some of the electrons emitted from the cathode will not possess sufficient energy to reach the anode, and so they will form a cloud of negatively charged ions around the cathode. This cloud of electrons is known as the "space charge," and owing to the fact that like charges repel one another, it is evident that this space charge will impede the emission of electrons from the cathode. As the anode voltage is increased, so the number of electrons reaching the anode is increased, but the space charge also increases rapidly. After a certain anode voltage is reached, a further rise will not cause any increase in the current through the valve. The valve is then said to be "saturated," and the electrons are being drawn away from the cathode as rapidly as they can be supplied at the particular filament temperature. The value of the current in this condition is the "saturation current."

The characteristic curve of this valve is given in Fig. 1. *Od* is the saturation current of the valve. The distance between the curve and the current axis *OY* gives the voltage between anode and cathode, or the voltage drop across the valve when this is used as a rectifier. For example, the anode voltage required to pass a current *Oa* through the valve is *Oc*, and this represents the voltage drop across the rectifier. The curve shows that the voltage drop increases very rapidly as the current drawn from the valve increases. If the repulsion effect of the space charge could be neutralised, we should then have a much lower voltage drop across the valve.

This is actually what is done in a mercury vapour rectifier. A valve of this type consists of an ordinary vacuum valve into which a little mercury vapour has been introduced. The atoms of this vapour are made up of protons and electrons. The protons are positively charged particles having a mass many times greater than that of the electrons, which revolve around them in orbits.

The electrons emitted from the cathode are shot off with a high velocity. Collisions with the orbital electrons occur, and so some of these are knocked away from the protons with which they are associated. The atoms of mercury vapour are thus split up into positive ions and negative electrons, and the gas is then said to be ionised. The positive ions attract the slow-moving electrons in the space charge, and so neutralise their effect and leave the high velocity electrons free to make their way to the anode without any opposition. Owing to the neutralisation of the space charge, the voltage drop caused by this is avoided.

The velocity of the electrons is dependent upon the difference of potential between the anode and cathode. A certain critical velocity must be reached before the electrons have enough energy to cause ionisation of the mercury vapour. The anode voltage necessary to produce this velocity is the "ionisation potential" of the gas, and in the case of mercury vapour, this is about 15 volts. When the anode voltage is greater than this value, ionisation occurs. So with this type of rectifier valve it is clear that there is a constant voltage drop of 15 volts, and that this is independent of the load current drawn from the valve.

The characteristic curve is shown in Fig. 2. The voltage drop is constant for all values of anode current, and the maximum current is the saturation current of the cathode, the value of which depends on the temperature.

The power loss in the valve is the product of the voltage drop and the current through the valve, and in the gasfilled rectifier this is obviously very much less than in the vacuum rectifier. This power loss in the valve is dissipated in the form of heat, and hence as the loss is small in mercury vapour rectifiers these may be made of very small dimensions for handling relatively large amounts of power.

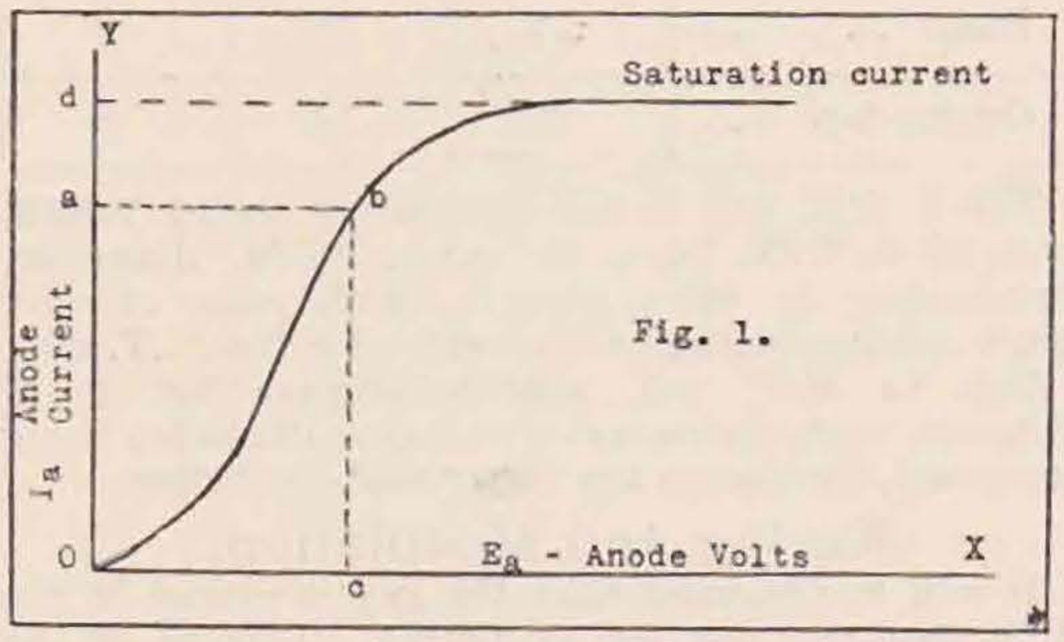


Fig. 1.

The earlier valves of this type were found to have a very short life as the cathode failed rapidly. This was due to the bombardment by the positive ions returning to the cathode and knocking atoms away from the cathode material.

However, it was found that a positive ion must travel at a certain velocity before disintegration of the cathode takes place. The potential required to produce this disintegration is about 25 volts, which is above the normal ionisation potential. So by using the correct amount of gas in the valve, it operates below the disintegration potential, and the trouble no longer exists.

As noted previously, the maximum current is limited by the saturation current of the cathode. If the gasfilled rectifier is forced to give more current than this, either the voltage drop rises above the disintegration potential or the cathode temperature must increase, both conditions leading to the destruction of the cathode. So it is essential to ensure that the peak current must not exceed the total emission current of the cathode, and so full load current cannot be taken when starting the valve from the cold. The cathode must be given

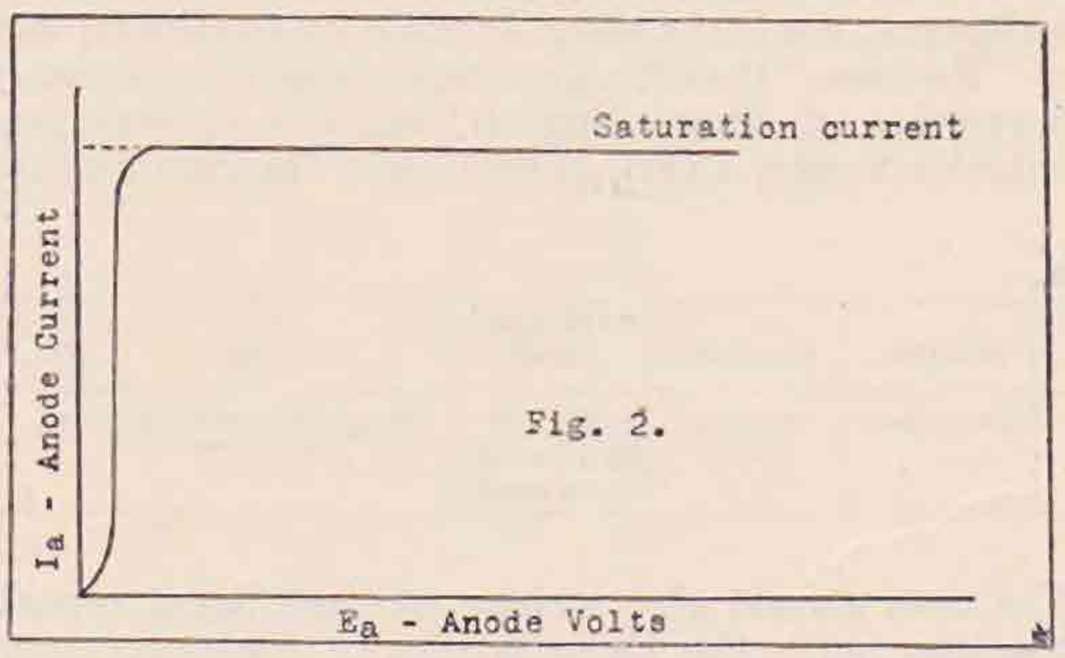


Fig. 2.

time to reach its operating temperature before the anode voltage is applied. Otherwise, the emissive coating of barium or thorium on the cathode will be destroyed. If the impedance of the load is high enough to keep the anode current low, then the cathode and anode supplies may be switched on simultaneously.

The switching for this type of rectifier may be arranged by a thermal delay switch, which switches on the anode supply a certain time after the cathode supply has been switched on. In the case of the power supply for an amateur transmitter, the best method is to keep the filament running all the time, so that the transmitter may be switched on at once without waiting for the cathode to warm up. The cathode may be supplied from a small filament transformer.

A typical valve of this type is the Osram GU1, which is a half-wave rectifier capable of giving 250 mA. output with 1,000 volts R.M.S. A.C. on the anode. The cathode requires 3 amps. at 4 volts.

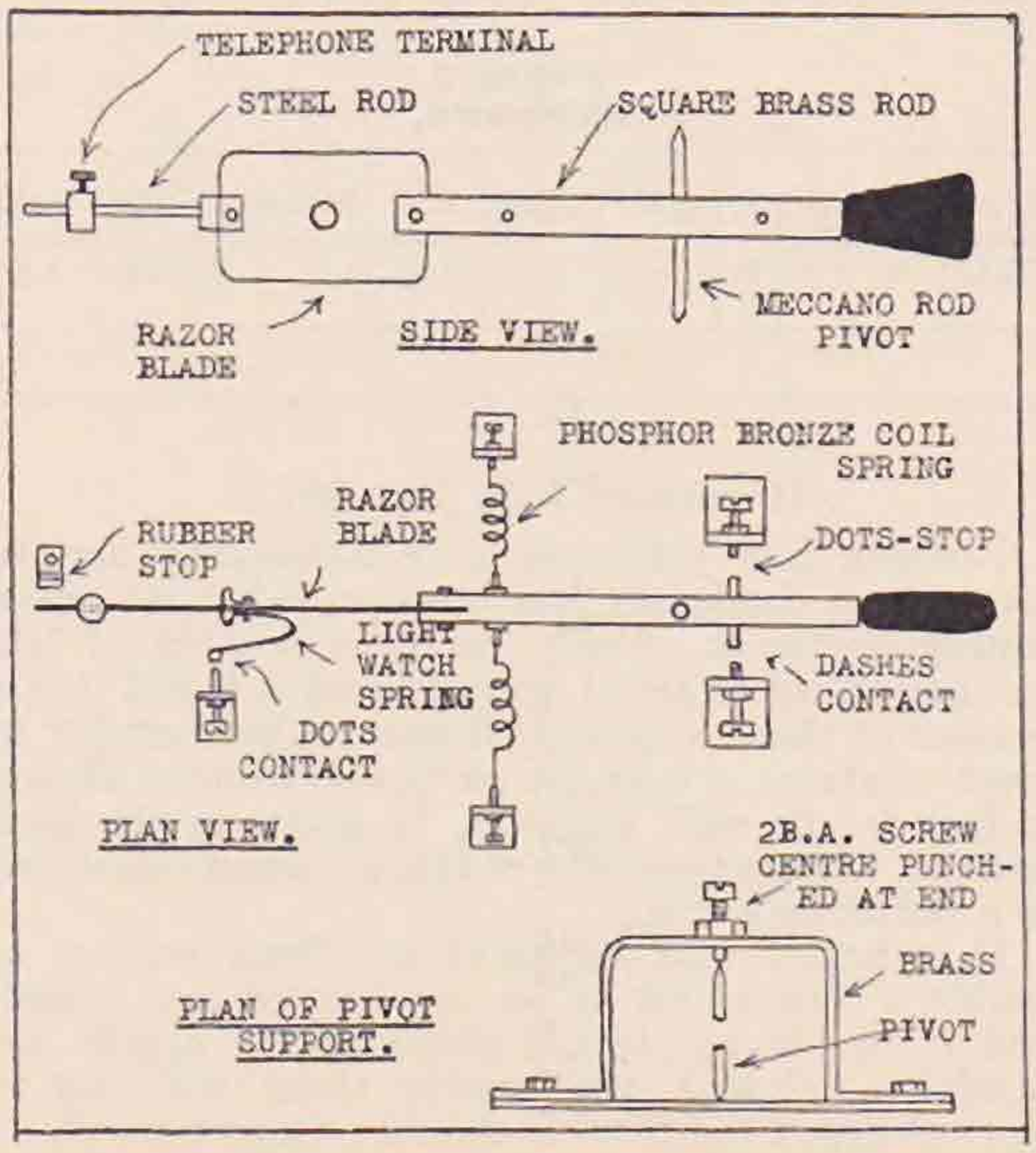
Another valve is the Ediswan ESU.75, which will give a peak current of 900 mA. with 1,700 volts R.M.S. on the anode. The cathode supply is 8 amps. at 2 volts. When using mercury vapour rectifiers it is necessary to place either a resistance or choke in series with the anode in order to limit the charging current of the smoothing condensers to a value below the peak current of the rectifier.

Let us consider the advantages of replacing a vacuum valve rectifier with a gasfilled valve. Take the case of a Mazda U65/550 with 550 volts R.M.S. input supplying a current of 60 mA. The output D.C. voltage will be about 560 volts. If this is replaced by the GU1, with the same input A.C. voltage, the output D.C. voltage will be about 650 volts—an increase of about 90 volts. Also the voltage surges on the condensers when keying is taking place are reduced, and so breakdown of the filter condensers is less likely to occur.

In concluding, it should be noted that the mercury vapour rectifier shows up to its best advantage at high voltages. At high anode voltages the efficiency of this rectifier is very great as the voltage drop of 15 volts is negligible in comparison with the anode voltage.

A VIBROPLEX KEY

G2KB has supplied the accompanying details of his Vibroplex key. The drawings are entirely self-explanatory, and it will be seen that the entire key has been made from odds and ends probably available in any junk box with the simplest of tools.



SEE PAGE 389

A LOG BOOK FOR THE SHORT WAVE AMATEUR.

By A. M. Robertson (G6QF).

MERE listening to the host of stations, commercial, broadcast, and amateur, operating on wavelengths below 100 metres appears to be entirely futile if carried out in anything but a systematic manner. The enthusiastic amateur surely wishes to be a little more than a mere "listener," concerned only with the "bagging" of distant stations. He should be systematic in his listening and keep a log of all stations received, together with any data which he thinks may be of use to him in collecting explanations of the many phenomena present on the high frequencies. The amateur may ask, "What shall I record in my log-book?" Well, the answer is given here.

Obtain a foolscap-size book (11 by 8 ins.) opening on the 8-inch side and ruled across the 11-inch page. Mark it off in columns as shown in Table 1.

Table 1
RECEIVER.

Station.	Date.	G.M.T.	QSA	Fade.	QRM	QRN	QRH	T.	R.	Weather.	Receiver.	Aerial and Earth.	Remarks.	Ref.
G2CG ...	1.11.31	18.30	5	*Nil*	*Slight*	*Nil*	*42m.*	9	3	*Dry, clear*	*Reinartz 0-v-1*	*28' × 60' Ac. Buried wire earth*	*Frequent jamming by RAC. C.W.*	8-1

This, it will be seen, provides a comprehensive and yet simple tabular method of recording reception.

The abbreviations used are :—

G.M.T.	Greenwich Mean Time.
QSA	Readability.
QRM	All forms of jamming, except atmospherics.
QRN	Atmospherics.
QRH	Wavelength.
T	Tone of signals.
R	Signal strength.

Now, should the amateur belong to the ranks of the transmitters, his log will have to be extended to cover his transmitting activities. Once again the method is simple, and Table 2 gives the idea.

Further abbreviations are :—

V.	Plate voltage.
ma.	Plate milliamperes.
W.	Watts input.

These two tables will cover his immediate requirements, but he may care to add yet a further table for the co-ordination of incoming reports (Table 3). Here the page is divided by a vertical line, as less has to be recorded. Entries are cross-referenced with the log of transmissions, so that it is easy to find the particular transmission data to which the report refers. The reference 8-1 indicates that the transmission to which the report refers wil be found as the first entry on page 8 of the transmission log. QRB signifies "distance."

A word on the subject of QSL cards may be opportune. A QSL card, it may be explained, is a convenient method of confirming a transmission or of acknowledging a report. It is not a form of wallpaper, nor is it a suitable place for the inscription of "Radiese," that most outrageous and unnecessary perversion of King's English, which is so very prevalent amongst a certain section of the community. The card should give a clear and intelligent report, together with the essential data. Only accepted abbreviations and the International "Q" code should be used.

The essence of the whole matter of logging and reporting is *system*, and any slight trouble spent in being systematic is amply repaid by the ease with which the amateur can compare and correlate data obtained in his reception and transmission.

Table 2
TRANSMITTER.

Crystal : 7145 K.C. Valve : Mullard PM2.

Call.	Date.	G.M.T.	QRH	V.	ma.	W.	Circuit.	Aerial.	Keying System.	Modulation System.	H.T.	Remarks.	Ref.
G2CG ...	1.11.31	18.30	K.C. 7145	200	10	2.0	*T.P.T.G. Crystal across grid coil.*	*Tuned Marconi Loose coupled. Buried wire earth. Aerial 30'x60'*	*In H.T. lead.*	—	*Dry cells.*	*Transmitter slightly unstable.*	8-1

Table 3
REPORTS.

From	QSA	R.	T.	QRN	QRM	Rec.	Remarks	QRB	Ref.
G2CG	5	5	8	—	—	0.v.1		*Local*	8-1

(*Continued from page* 367.)

Nothing has yet been said concerning aerials, although a condenser has been provided for aerial tuning purposes. Much has been written of late on the subject of aerial systems, and it is felt that a perusal of those articles will enable the operator to erect whatever system his particular locality allows. A few details will, however, be given in the next issue of the performance of this set when connected to a radiating aerial.

It is hoped that sufficient has been written to enable a transmitter to be constructed and tested, and if the broad details given in the article are carefully followed, particularly those applying to neutralising, little trouble should be experienced.

ROTTEN OPERATING

By Uncle Tom.

(*With very humble apologies to QST and "THE OLD MAN"*).

IT's not so very long since I burst into ham radio—June, 1923, is the date, I believe—but if I had done things in those days that certain hams do now, I know darn well that I should not be alive, well, and able to write this.

Mention "rotten operating" to the average ham and he conjures up a picture of one of those particular lids that can't grab a key without getting the delirium trimmings and spluttering out buckshee dots to everything. But operating goes much deeper than that. If a man puts out a note that makes his brother hams feel violently ill, that man is a *rotten operator*, even if he has a fist like Jack Hylton's band for rhythm.

Likewise if a man wanders out of the band with his transmitter—if he tunes up on a Sunday afternoon when DX is coming in—if he sends everything twice except his break signs, and sends those four times—that man is also a *rotten operator*.

Brother hams, let us get down to it and kill off some of these birds who are bringing ham radio down in the estimation of the radio world. Let me suggest some of the varieties that might be given a month to learn wisdom, with the alternative of being put painlessly out of their suffering for ever.

First and foremost—and Sunday morning 7 M.C. fans will rise up and call me blessed—I put the man that puts out deeply modulated fone on an unstable transmitter. May his microphone leads choke him. Luckily, there aren't many of him in Great Britain, and there will be still fewer when I've gone the rounds with my little hatchet.

Secondly, I proclaim sentence of death (preferably painful) on the few 1932 hams that think raw A.C. is nice. Even including (yes, I will mention him !) SM3XJ. Why a man should bring down the high operating standard of a civilised country like that I can't imagine.

Thirdly, I declare war on Goyder-lock stations with operators that can't tell whether they're in lock or not without twiddling the knobs and gassing the entire neighbourhood. May their crystals crack and their main transformers blow out.

Fourthly, brethren, I desire to loose my tame elephants on all owners of chirps, key-clicks and wobbles. If you are a low-power fan, use self-excited gear by all means, but don't squeeze it to bursting-point by trying to get the last milli-watt out of it and let the note go to blazes. Remember that there will be a time when popularity with your fellow hams may be more useful to you than a wall full of cards.

Now we will wipe off the slate some of the hams guilty of lesser offences, but, nevertheless, *offences* against the ham code. First, our friend that calls us for four minutes when we have called "test DX," particularly when he is so weak that we hang feverishly on for the call-sign and find that he is 200 miles away. If a ham calls "test DX" he *means* "test DX," and that's that. A suitable fate for these people would be to have someone next door to them that automatically called them on *spark* whenever they called "test DX" themselves.

Next comes the man that puts out self-excited stuff with high-power and a near DC note (yes, even near DC !) in a crowded neighbourhood. When told that his note, to all intents and purposes, is raw A.C. locally, he smiles sweetly and says, "Yes, but the Yanks give me T8." Yep, I say, but the Yanks don't have to *live* with him. The absolute *blister !*

And now for my real pet aversion. It is the ham who hears you calling a DX signal, and immediately starts up and calls the same chap in the hope of "pinching" him from you, even if he can't hear him. Many's the time I have started up calling an imaginary station, cut short my call, and found others wasting their watts on the same station ! I hope they hear him, that's all.

And it remains only for me to deliver a good round comprehensive curse on all the remaining pests—the ham that calls me up on land-line when I am working DX, everyone that says "QSL *es* foto, *dear* ob," all commercials in the amateur bands (they're *rotten operators*, too), all hams with fists that conjure up a vision of shaking hands with a lump of haddock, in fact the *whole darned lot* of 'em with the exception of those nice hams that one meets sometimes. Those hams that never get in the way, always have a note to be proud of, always send steadily, singly and well, are the hams that head the DX lists every time. Bless 'em—may they grow in number day by day.

In case any of you other young squirts think I'm not capable of putting my threats into action, I will tell you that I weigh 16 stone, stand 6-foot-four in my socks (some socks, too) and wear heavy boots. Further, I have my own instruments, including the Wuffletop, the Blitzenheimer, and the Gugglespitz. So just look out, you rotten operators, that's all. And don't say I didn't warn you !

Reports Wanted

Mr. G. H. Noblett, Barley Hill House, Westport, Co. Mayo, has received the call EI9D, and will welcome reports on his signals on 7 M.C.; all reports will be acknowledged.

LA3G, a new station operating in Oslo, will be glad to have QSO's with G or B.E. stations, and to receive reports from our listening stations. He will be on the air every evening, using 25 watts.

K. H. Janke, Harzstr. 13, Blankenburg/Harz, Germany, DE 0849, a new member of R.S.G.B., will be pleased to assist members with reports at any time.

G5CU, ex-2ANS, is transmitting on 1.7, 7 and 14 M.C., and will appreciate reports. His address is Radiohm, Acklam Road, Linthorpe, Middlesbrough, Yorks.

Pirates Again!

EI7D asks us to state that a pirate is borrowing his call sign, and he has received numerous reports during the last few months. His station has been off the air since last July. He has actually been reported as calling CQ !

THE IMPORTANCE OF MATCHING IMPEDANCES IN AMPLIFIER SYSTEMS.

By Gordon S. Mitchell. *

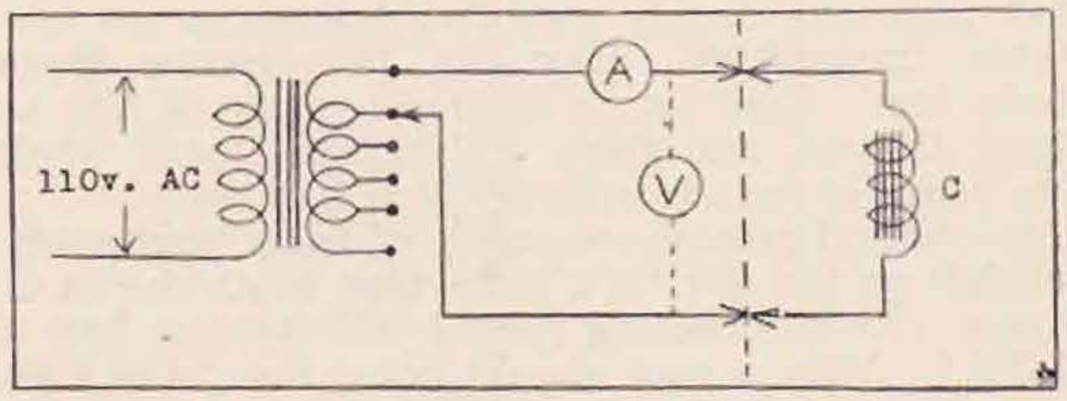
IN order to create the illusion of reality in any reproduced sound, it is extremely important that certain fundamental electrical principles be observed. Probably the most important of these is the principle of matching impedance. In order to obtain maximum efficiency and distortionless reproduction, it is of importance that the output impedance of each unit in the circuit should be as nearly as possible equal to the input impedance of the unit into which it works. It is important that valves working into transformers or resistances, or transformers which work into valves, loud-speakers or into other transformers, should be correctly matched as to impedance with their associated units.

To recapitulate, impedance is that property of alternating current circuits which corresponds to resistance in direct-current circuits. For a consideration of alternating currents, Ohm's Law ($E = I : R$) must be modified to read $E = I\sqrt{r^2+x^2}$ The Ir component in the above equation gives the energy component which is in phase with the E.M.F., while the Ix factor gives the component in quadrature with the E.M.F.—that is, the wattless component. Both of these factors, combined in the manner shown above, give the total E.M.F. The combination of resistance plus reactance, each squared and added, and the square root of the sum extracted as shown is known as the impedance, denoted in electrical engineering nomenclature by the letter Z. Thus, for alternating currents, Ohm's Law as modified becomes $E = I\,Z$ (where $Z = \sqrt{r^2+x^2}$.

The importance of correctly matching impedances lies wholly in the fact that it is by this means that power (watts) is transferred from one circuit to another with the least possible loss. The table accompanying will show the power loss in percentage which takes place when units are unmatched as to impedance. It may be seen, for an example, that when one unit, such as a transformer, has twice the impedance of its associated unit, such as a loud-speaker, the power loss will be 10 per cent. That is, the loud-speaker will receive only nine-tenths the power it would receive were the units matched. This chart holds for all electrical devices with one notable exception, which will be taken up in considerable detail later in this paper.

In order to discuss intelligently the effects of unmatched impedance, it might be well to point out the various types of distortion and their causes. Distortion in amplification systems is caused either by a removal of certain vital components of the transmitted wave, or by the addition of certain other components not present in the original sound. The most common of these is, of course, the first, which is known as frequency distortion.

There are several contributing causes of frequency distortion in amplifier systems. There is the frequency distortion due to the failure of the amplifier to respond to all frequencies in the audio band equally. Many amplifiers have a tendency to peak, or over-amplify, a narrow band of tones. Of course, if faithful reproduction of musical selections is to be obtained, the amplifier must be capable of handling all frequencies impartially. This is true for speech reproduction, however, to a lesser extent. The loss of frequencies above 3,000 cycles per second seriously affects the intelligibility of transmitted speech sounds in that certain consonant sounds are lost. The attenuation of the lower frequencies destroys the depth of music transmitted. Then there is the frequency distortion contributed by certain types of loud-speakers. Any material object tends to vibrate more readily at certain frequencies than at others. The diaphragm, cone or horn of the loud-speaker is no exception to this rule, hence certain portions of the audio band will be given undue prominence and the transmitted sound will be distorted. This effect is minimised by careful design of loud-speaker parts. Another form of frequency distortion,



Sketch showing connections for experimentally determining the impedance of any electrical unit.
A — A. C. Ammeter.
V — Voltmeter.
C — Unit Under Test.

present to a lesser extent than the others, occurs in certain projectors, and is caused by the higher frequencies setting up interfering vibrations in such a manner that all or part of the energy representing these frequencies is lost and never appears as audible energy.

Probably the most important cause of frequency distortion in sound apparatus is the varying impedance of the many units which go to make up the amplifier, and which allows a maximum energy transfer from amplifier to loud-speaker to occur at but one frequency. As has been brought out previously, any unit, such as a transformer, will allow a maximum energy transfer to an external unit such as a loud-speaker only when the impedance of the two units is equal. While the impedance of certain electrical devices remains constant over the entire frequency range, the impedance of magnetic type units varies with frequency, being low at low frequencies and correspondingly high at high frequencies. Hence it is obvious that the im-

* Electrical Engineer, Universal Pictures Corporation, Hollywood, Cal.

pedance of such units cannot be equal at all frequencies. Compensation for this disparity is made in many systems by combining the effects of resonance and impedance so that the sum of the two will give fairly constant results.

The other type of distortion, wherein certain components are added to the transmitted wave, is known as wave form or harmonic distortion, and in every case is due to the overloading of the apparatus beyond the proper limits of operation. Wave-form distortion is manifest by the unpleasant quality which is noted at high volume level, and which is entirely absent at lower levels.

In the earlier portion of this paper it was mentioned that there is one notable exception to the statement that impedances should be equal between the output and input units of any given amplification system. This statement holds for all units except the valve working into some following device. Were the characteristic curve of the valve a straight line, the statement that absolutely maximum energy transfer would take place when the following device had an impedance equal to the plate impedance of the valve would hold. However, inasmuch as this characteristic curve is not a straight line, the condition for maximum undistorted power transfer is that the plate of the valve will have one-half the impedance of the following unit. Inasmuch as faithfulness of reproduction is of as great importance as maximum energy transfer, circuit constants in amplifiers are always arranged whenever possible, so that each valve works into an impedance twice that of its own plate. This is one of the rare instances in electrical engineering practice where a maximum energy transfer is not striven for, but is sacrificed in the interest of purity. It should be borne in mind, however, that this is not a violation of the matched impedance law, for were impedances literally matched there would be greater efficiency, but a consequent greater distortion, hence energy transfer becomes of lesser importance in this instance. It has been determined entirely empirically that the best condition exists when the external load has twice the impedance of the valve anode circuit, inasmuch as the increase in load impedance tends to straighten out the undesired curvature of the characteristic curve of the valve. The two to one ratio has been set in an effort to combine this effect with the condition for maximum energy transfer, minimizing distortion, but not greatly reducing the power output. It has been determined also that the reduction in distortion which is realised when the two to one ratio is used allows the system to be operated at a considerable overload with no audible effects on the signal, and which will more than compensate for the slight reduction in energy transfer.

From a consideration of the facts, it may be deduced that any loud-speaker should have an impedance which bears a definite relation to the impedance of the plate of the valve which feeds the speaker. However, it is impossible to rest on this simple statement, inasmuch as various types of valve have widely varying plate impedances, and the different speakers have their various individual characteristics, as well as characteristics peculiar to their type and make. The only solution may be arrived at by assuming that each speaker has a characteristic impedance of some general value arrived at by experimental or other means.

A brief outline of a method for obtaining the impedance of any electrical device will conclude this paper. Although the impedance Z is in reality alternating current resistance, it depends in great measure for its absolute value upon the frequency of the current which is passing through the unit under consideration. The impedance at 1,000 cycles per second will not necessarily be the impedance at 200 cycles per second, although if two units be matched at one audio-frequency they will not be far off at any other point on the audio-spectrum. For determining the A.C. resistance of any unit, an A.C. millammeter and a toy transformer are needed, as well as a current such as the ordinary 60-cycle house-lighting supply.

By applying an ordinary 50- or 60-cycle current to the device under test, the absolute value of the impedance may be arrived at by a calculation of Ohm's Law, $E = I Z$, or $Z = \frac{E}{I}$, where E is the voltage applied (known) and I is the current read on the milliammeter divided by 1,000. The value of Z obtained is then the calculated impedance in ohms at 60 cycles per second. If units match at this frequency they will operate efficiently at other audio-frequencies.

When the impedance is known to be very low, as in the voice coil of the moving-coil loud-speaker or the secondary of the transformer designed to work into the speaker, 110 volts should not be directly applied to the unit inasmuch as this would burn out either the coil or the meter. When such units are to be tested, the toy transformer should be inserted in the circuit as shown to cut down the voltage. In selecting a test voltage the lowest voltage possible to obtain with the transformer should be tried first. If an A.C. voltmeter is available, it might be used

(*Continued at foot of column* 2, *page* 381.)

Table Showing Relation Between Output/Input Ratio and Per Cent. Power Loss.

Output impedance per cent. of input impedance.	Per cent. loss of power.
10	68
20	45
30	29
40	18
50	11
60	7
70	3
80	2
90	1
100	0
200	10
300	25
400	36
500	44
600	51
700	58
800	61
900	65
1000	68

From the above chart it can be seen that there is a condition of no-loss of power only when the output impedance is equal to the input impedance, and that as this ratio increases or decreases the loss of power correspondingly increases.

A SHORT THESIS ON ATMOSPHERICS.

By Maurice Gibson.

PART I.

Introduction.

IT is generally agreed that the most pressing and difficult of the unsolved problems of radio communication to-day is that of mitigation of atmospherics. It has been realised during the last fifteen years that the problem is so great and offers so many difficulties that it is useless to design eliminating devices without knowing a great deal about the physical nature and cause of atmospherics.

The necessity for uninterrupted communication between commercial stations has been one of the many reasons for the adoption of the very high frequencies, and this in turn has evolved the beam system for the purpose of power reduction to cover a given distance. The old theory that atmospherics had their origin in districts where thunderstorms had occurred has now proved to be more or less unsound. Even with the present state of our knowledge of the directions and wave forms of atmospherics very little can be done with any of the three general forms of eliminating device. At present we are little nearer the discovery of the actual cause of atmospherics than we were before, because both terrestial and cosmic theories do not seem completely to explain the phenomenon. There is much work yet to be done in the fields of cause, physical characteristics and methods of mitigation and these problems can best be solved by strict application to local conditions in the different parts of the world, although much can be done by research ships should the governments concerned agree to go to the expense of the same.

Much can be done by amateur experimenters in the different parts of the Empire, and world generally, in recording the direction, duration and season of the worst phenomena. Few of us can afford a cathode ray oscillograph with which to study the wave form of atmospherics, but if the former results were recorded and compiled much useful information would be obtained about the areas of origin for the different seasons of the year of the worst atmospherics.

(2) *Historical.*

Historically it appears that from 1908 to 1916 attention was chiefly paid to the construction of eliminating devices without much data as to the physical properties of the phenomenon to be eliminated; this naturally resulted in absolute failure. From 1916 to 1920 the Meteorolgical Office arranged for observations on the direction of atmospherics to be made from the British Naval Coast direction finding stations, about 15,000 observations were made in this way, and these were analysed by Watson Watt and Appleton.

In 1920 the Radio Research Board took up the study of atmospherics and decided to concentrate on the physical properties and direction of atmospherics, and to leave the problem of mitigation to a future date. A research station was equipped under the superintendence of Watson Watt. About 1922 or '23 it was suggested independently by Watson Watt and Appleton that a cathode ray tube could be used as a means of studying the wave form of atmospherics. From this time quantities of facts and figures have been collected on the physical properties and direction of atmospherics, and when analysed show an extraordinary advance in the knowledge of the subject. In connection with research ships there is little doubt that in the investigations on the propagation of electro magnetic waves carried out by the French s.s. *Aldebaran* in 1919, by H.M.S. *Antrim*, s.s. *Dorset* and s.s. *Boonah* in 1922, much useful information was obtained about the intensity and direction of atmospherics. It is therefore to be concluded that should the necessary funds be forthcoming this form of research is invaluable, although it must be admitted that a steel ship is not an ideal spot in which to carry out electrical research. A wooden ship is much nearer the ideal for these purposes and would do away with the quantity of metal screening necessary on a steel ship.

(3) *Directional Investigation.*

From the directional data obtained by the Meteorological Office between 1916 and 1920 it was found in 94 per cent. of the cases rain had fallen in the area of origin of the atmospheric, in 15 per cent. there had been thunder, and in another 10 per cent. the meteorological reports of the district were those associated with thunder. Fifty per cent. of the districts lay in Southern East Europe and North Africa. Analysis of data obtained by the Radio Research Board shows the apparent direction follows the sun with a time lag. Atmospherics arrive from the East at 9 a.m., from the South at 6 p.m., and from the West at 12 p.m., and finally die away in the West and starts the cycle over again from the East. The source in the West is further North during the English summer than in the winter. It has further been found that mountain ranges are frequently the source of disturbance, which suggests that the movement of air currents at different temperatures is one of the causes of atmospherics. This is also upheld in the fact that atmospherics are worst in the tropics, and the monsoons or other prevailing winds may or may not have something to do with it. On the East coast of America the source seems to be the Gulf of Mexico. The East Indies is a particularly bad spot for the production of atmospherics. It has also been discovered that apart from these atmospherics that seem to originate from near the earth's surface, the more intense ones seem to come from the upper atmosphere, that is, radial in direction.

PART II.

(4) *The General Nature of Atmospherics.*

Normally the vertical potential gradient of the atmosphere is about 100 volts per metre, and various meteorological disturbances may change the condition of things by, shall we say, reducing the capacity of a charged cloud and thereby increasing its potential. If a flash of lightning is compared to an ordinary spark, then atmospherics can be compared to brush discharge. C. T. R.

Wilson has shown that a flash of lightning may be two kilometres long and result from the passage of 20 coulombs, so it is not very difficult to realise how the "brush discharge" associated with similar phenomena causes so much trouble.

Actual measurements on the field strength of an atmospheric show that they may be as much as $\frac{1}{8}$th volt per metre or 2,500 times as strong as the weakest field for reliable reception. The wave-length of the quais-periodic form of atmospheric is about 600,000 metres, but these wave forms frequently have ripples which correspond to a wave-length of about 20,000 metres. These ripples probably cause most of the disturbance, as it is on about this wavelength that the atmospherics are most intense and therefore the one used for wave form investigations. Let us now consider briefly what occurs when an atmospheric is picked up by the aerial system, there will be two vibrations, one forced due to the atmospheric and the other free due to the constants of the system. It is therefore necessary when studying the wave form of the atmospheric to reduce the free vibration to a free aperiodic vibration of much shorter duration in order to separate the two.

(5) *Wave Form Investigation.*

It has just been mentioned that the first problem to be solved in order that the wave form of atmospherics could be studied was to separate the forced from the free vibration by making the latter aperiodic. This was accomplished by inserting a large ohmic resistance into the aerial circuit as by this means the free aperiodic disturbance would last, say, .01 milli-seconds, compared with the forced of one milli-second. The next problem was to devise an apparatus for recording the E.M.F. in the aerial with time, and for this purpose Watson

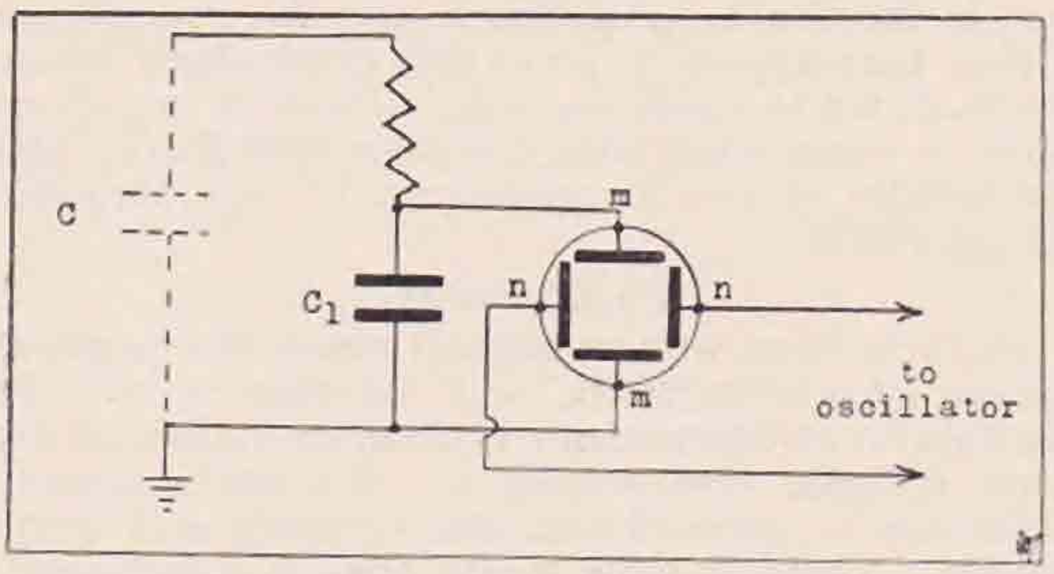


Fig. 1.

Watt and Appleton chose a low voltage cathode ray oscillograph. In this instrument a stream of electrons from a heated filament pass through a narrow tubular anode maintained at 400 volts positive. These electrons form a narrow beam which is brought to a focus on a sensitive fluorescent screen. The after-glow of the fluorescent material enables the observer to see any pattern traced by the spot of light. In the Western Electric's instrument a trace of gas is introduced between the filament and anode which becomes ionised by the passage of the electrons. The positive ions produced remain in the centre of the beam and attract the negative electrons and prevent the beam from spreading. Before reaching the screen the beam passes between two pairs of plates at right angles to each other as shown in Fig. 1. The E.M.F. due to the electric field of the atmospheric is applied to *m m*, and the spot is drawn out into a straight line. In order to obtain the E.M.F. time graph, *n n* is connected to a L.F. three electrode oscillator. This oscillator is made to produce a pure sine wave over a wide range of frequencies. The length of the time base can be adjusted by varying the frequency of the oscillator. The spot of light starts from rest, increases in speed to the mid point, slows down until it reaches the right end of the base, and then repeats from right to left, and so on. Using a sinusoidal time base the curve is complicated by the fact that time is measured for part of the oscillation from the right and for other portions from the left. For this reason a linear time base has been designed giving a slow motion from left to right and a quick return to the starting point. It will readily be seen that the voltage applied to

$m\,m = V = \frac{C}{C+C_1} hE$ where C = capacity of aerial, C_1 = capacity across the oscillograph, E = volts per metre acting on aerial, and h = effective height of aerial. It is usual to place one

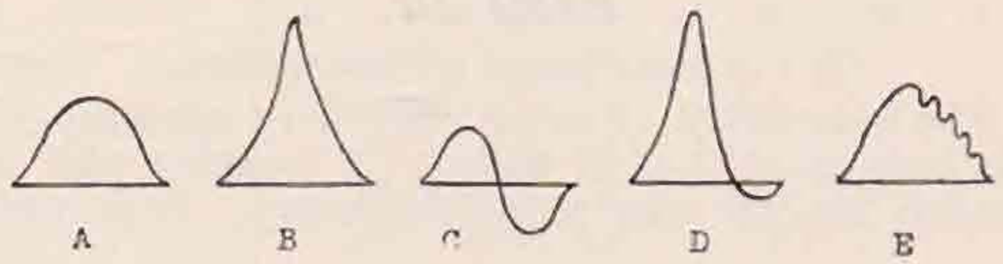


Fig. 2.

stage of amplification between the aerial and oscillograph, and by this means a deflection of about 1.5 cms. per condenser volt can be obtained.

Fig. 2 shows various types of wave form commonly obtained by this method. A and B are aperiodic disturbances, C and D quasi-periodic disturbances. The round types A and C are 2.43 times as frequent as the peaked types. The average duration of the aperiodic class is .00125 sec., and of the quasi-periodic .002 sec. E shows a wave form having high frequency ripples impressed on it. There is no doubt that even an aperiodic discharge of long duration is made up of a large number of high frequency components.

(6) *Elimination of Atmospherics.*

There are in general three principal methods of elimination of atmospherics (*a*) limiting devices; (*b*) balancing devices, and (*c*) directional devices. Fig. 3 shows a limiting device which tends to make the amplitudes of all output currents the same, irrespective of the magnitude of the amplitudes of the input voltage oscillations. If this be accomplished then all signals including atmospherics should be of the same strength in the 'phones. The circuit is connected between the closed input oscillatory circuit and the amplifier or detector. With large voltages from atmospherics this, like all other limiting devices, gives little relief. In balancing, two identical aerials or circuits are employed in which the currents resulting from the atmospherics, but not those from the signal, are arranged to neutralise each other. By affecting both aerials simultaneously such disturbances will produce currents of the same phase in the two circuits. These will tend to neutralise each other if the two circuits be identical. The signals coming from a horizontal direction will produce currents of

different phase, because the aerials will in general be at different distances from the transmitter. The resultant current will therefore be that due to the signal only. Such methods are extremely difficult to work and give relief only from a small portion of the atmospherics and that portion is that from the upper regions of the atmosphere, the direction of which is radial. With directional devices aerials which effectively receive signals from one particular direction will appreciably reduce the interference from atmospherics which originate in directions differing from that of the required signal. Directional methods are capable of giving, however, only a slight relief from atmospherics, and the interference increases as the angle between the two directions decreases. In general none of these methods is of much practical use because of the violent nature of the disturbance which has to be eliminated. The effects of atmospherics seem to be more a function of the energy received per second than of the amplitude of the disturbance. Filter circuits consisting of rejector and acceptor circuits are of little or no use.

PART III.

(7) *Possible Causes of Atmospherics.*

The possibility of solar control of atmospherics has been mentioned in section (3) together with the reasons for this very plausible theory. It is useful

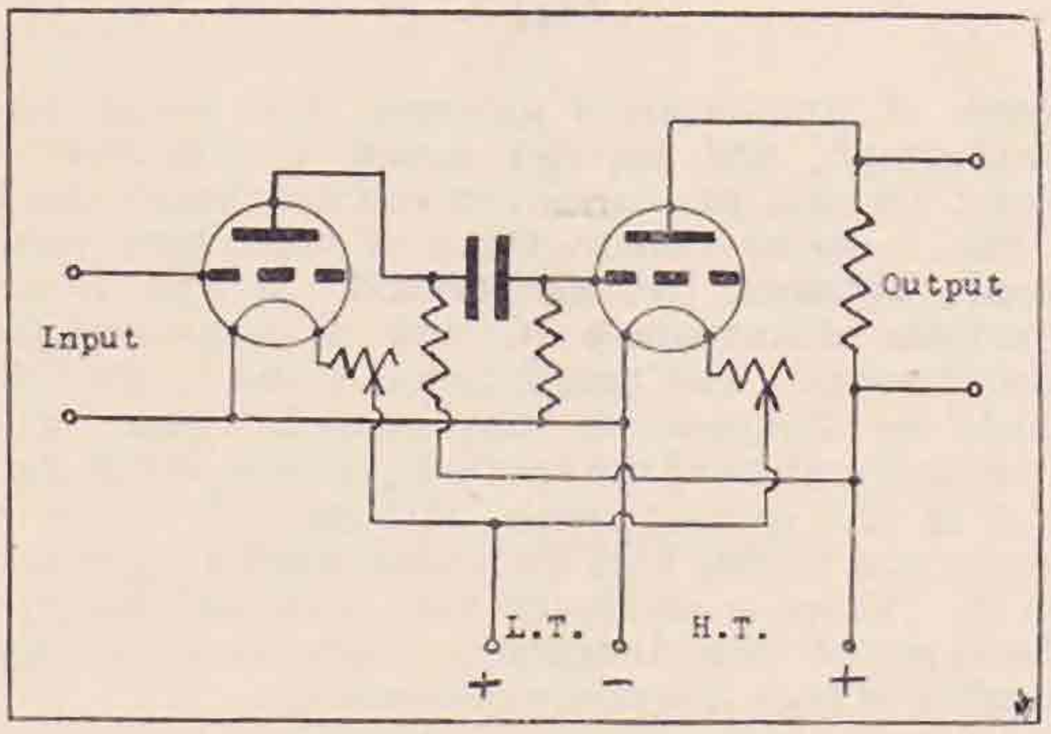


Fig. 3.

to remember in this connection the solar effect on the propagation of electro-magnetic waves (by this is meant the difference in the state of ionisation of the atmosphere during daylight and darkness), and its corresponding effect on reception. In connection with this theory it is also interesting to consider the ionisation effect of the ultra violet rays from the sun and its possible effect on the electrical stability of the atmosphere. There is also the possible effect of the cosmic rays on electrical disturbances, those rays which we are told would destroy human life were it not for the solid nitrogen barrier in the upper regions of the atmosphere that makes the sky blue. The meteorological effect on atmospherics is also dealt with in section (3) and may be accepted as a very important factor until further evidence comes to light. Similarly, air currents at different temperatures and prevailing winds (such as monsoons) must be regarded as possible factors in the problem. In connection with solar control and cosmic ray effect it is a singular coincidence that the strongest atmospherics come from the upper atmosphere, that is, in a radial direction.

(8) *Some Observations in Morocco.*

The atmospherics in Morocco are probably as bad as anywhere in the tropics. They continue day and night all the year round and so good reception is impossible. It has been observed here that the disturbance seems to travel from South Eastern Europe to Tunisia and through Algeria to Morocco. They are deafening here between 8.30 and 9.30 p.m., and decrease very slightly in frequency and intensity after that. It has also been noted that when they are worst here the stations from the North—that is, England, France and Spain—are most affected. Finally, they seem to drift out into the Atlantic, where they interfere with the American stations from about midnight. There are rarely actual thunderstorms here, but silent electrical storms are very frequent from May to October, the discharge from the sky to earth being seen towards the South East. The apparent drift of the disturbance can be seen from the following :—About 8 o'clock in the evening Algiers is impossible and at 9.15 it comes in perfectly ; this is closely followed by Toulouse, Barcelona, London, etc., clearing up. Quite different conditions are met with in the South of Spain and France for the more northerly stations. Again, although from 11.30 to 12 p.m. there is little trouble with the American stations, the atmsopherics from that direction become impossible after midnight. The difference set out above is perceptible every day in the year like a veil of mist passing through the æther. Another fact pointing to this drift is that conditions appear to improve in the North East of Morocco, *i.e.*, Tangier, slightly earlier every evening than they do here in the South. Another interesting coincidence is that they appear to leave this coast about where the N.E. trade winds leave it. These observations agree in many ways with the solar drift theory and the results of the investigations by the Meteorological Office.

(9) *Summary.*

Much in time will be learned about the physical nature of atmospherics, but whether it will be possible to mitigate them is another matter and a very difficult one owing to the extraoridnary difference in intensity of atmospherics and radio signals. There is little doubt that it is necessary to study the problem on the spot and to analyse the wave forms of the most prevalent atmospherics, and to work on wavelengths that are not components of them. The short wave beam system certainly seems to be advantageous because although in general the short wave transmitter requires greater power to cover long distances the use of the short wave lengths avoids a certain amount of the atmospheric interference and the beam undirectional aerial reduces the necessary power. The only further difficulty that seems to arise in using this system is the possible interference by magnetic storms. Until further facts come to light regarding the predominant wave forms in the various localities it is impossible to say whether total elimination can be obtained or not.

Finally, I shall be very grateful for any information members of the B.E.R.U. can send me on the atmospherics in their particular part of the world.

The Z Code.

G6FY has kindly supplied us with the following copy of the Z code. He has had considerable difficulty in obtaining the meaning of some the code groups, but by routing through many previously published copies he thinks he has obtained the correct meanings. Although amateurs as a rule use the Q code (and terribly mutilate it !), it is felt that the Z code will be of interest to many, and some of the groups could be well adopted by ourselves.

ZAL	Alter your wavelength.
ZAN	We can receive absolutely nothing.
ZCO	Send by code, groups once.
ZCS	Cease sending.
ZCT	Send by code, groups twice.
ZCW ?	Are you in direct communication with ... ?
ZDM	Your dots missing.
ZFA	Automatic system out of order.
ZFB	Signals fading badly.
ZFS	Signals fading slightly.
ZGS	Your signals getting stronger.
ZGW	Your signals getting weaker.
ZHA ?	How are your conditions for automatic reception ?
ZHC ?	How are receiving conditions ?
ZKQ	Let us know when you are ready to resume.
ZLB	Make long breaks.
ZLD	Make long dashes.
ZLS	We are disturbed by lightning.
ZMO	Stand by a moment.
ZMQ	Stand by for . . .
ZMR	Your signals moderately strong and readable.
ZNB	Not receiving your breaks ; will send twice.
ZNG	Conditions not good for code reception.
ZNN	Nothing more for you.
ZOH ?	What traffic have you on hand ?
ZOK	Receiving O.K.
ZPE	Send in plain lauguage.
ZPO	Send plain language, once.
ZPT	Send plain language, twice.
ZPR	Your signals readable.
ZSA	Stop automatic traffic.
ZSB	Your signals blurred.
ZSF	Send faster.
ZSS	Send slower.
ZSG	Stop automatic traffic.
ZSH	Static heavy.
ZSJ	Stop automatic traffic, owing to jamming.
ZSR	Signals strong and readable.
ZSU	Signals unreadable.
ZSV	Speed varying.
ZSW	Stop automatic traffic, signals too weak.
ZSX	Stop automatic traffic, static too strong.
ZTA	Send by automatic.
ZTF	Send twice, fast.
ZTH	Send by hand.
ZTI	Temporary interruption.
ZUA	Conditions unfavourable for automatic reception.
ZUB	Unable to break in.
ZVF	Your frequency varying.
ZVP	Please send V's.
ZVS	Signals varying in strength.
ZWC	Crackling atmospherics here.
ZWO	Send words once.
ZWT	Send words twice.
ZWR	Signals weak but readable.

New Members.

HOME CORPORATES.

A. H. WILSON (G2WN), 8, Stanley Street, Hanley, Stoke-on-Trent.
A. E. J. COOPER (G5VT), Half Acres, Bishop's Stortford, Herts.
E. C. WILSON (2AAZ), Edale, Blundell Drive, Birkdale, Southport.
E. N. ADCOCK (2BLG), 31, Churchill Road, Little Bromwich, Birmingham.
A. LIGHTBOURN (BRS835), The Grove, Loughborough, Leicestershire.
W. W. WARNER (BRS836), 56, East Grove Road, Exeter, Devon.
H. W. LEONARD (BRS837), 1, Ashgrove Road, Ashley Down, Bristol.
T. TREMAIN (BRS838), The Bryn, St. Mary's Road, West Newquay.
J. G. HAMLETT (BRS839), Bruce Cottage, New Wanstead, E.11.
H. A. LUCKHAM (BRS840), 2, Brookfield Avenue, Bishopston, Bristol.
R. B. MORTIMER (BRS841), Graycroft, Wheatcroft Avenue, Scarborough.
C. W. NASH (BRS842), The Lymes, Shackleford, Godalming.
J. R. CLARKSON (BRS843), 30, Glenaire Drive, Baildon, near Bradford.
H. MALTON (BRS844), 23, Oakdale Avenue, Wibsey, Bradford.
D. S. MITCHELL (BRS845), The Flagstaff, Colwyn Bay, N. Wales.
N. A. COLE (BRS846), 3, Holborough Terrace, Snodland, Kent.
E. W. TREGLOWN (BRS847), Broadhill, Hassocks, Sussex.
H. W. HOWES (BRS848), Rose Cottage, Brook Road, Fishponds, Bristol.
C. H. COLES (BRS849), 23, Manworthy Road, Brislington, Bristol.
A. L. V. COLES (BRS850), 105, Sandholme Road, Brislington, Bristol.
A. H. RADFORD (BRS851), 42, Wrington Crescent, Bedminster Down, Bristol.
R. T. WATTS (BRS852), 9, Featherstone Road, Fishponds, Bristol.
K. T. HARVEY (BRS853), 33, Howard Road, Westbury Park, Bristol.
W. K. WALKER (BRS854), 53, Ty-Coch Road, Swansea.
W. J. BARKER (BRS855), Springfield, Hollybush Hill, Snaresbrook.
H. JONES (BRS856), The Firs, The Straits, Houghton, near Preston.
A. C. SUMNERS (BRS857), 13, Carrington Road, Dartford, Kent.
A. E. DYSON (BRS858), Raggan House, Branstone Road, Burton-on-Trent.
R. C. MAYMAN (BRS859), 122, Victoria Avenue, Hull, Yorks.
H. E. BODMAN (BRS860), 9, Iron Street, Tredegar, Mon.
J. A. DOUGHARTY (BRS861, ex A), 5, Becmead Avenue, Streatham, S.W.16.
J. E. ATKINSON (BRS862), 15, Balfour Road, Acton, W.3.
A. J. MATHEWS (BRS863), 57, Hawthorn Road, Hornsey, N.8.
E. H. LAWRENCE (BRS864), Weavers Farm, Beaver Green, Ashford, Kent.
A. H. BROWN (BRS865, ex A), 71, Tintern Avenue, Westcliff-on-Sea.
W. PALMER (BRS866), Holly Bank, London Road, Leicester.
R. C. BRIMM (BRS867), 12, St. Vincent Place, Broughty Ferry, Angus.
E. KNOWLES (BRS868), Caravan, Springfields, Hemsworth, Yorks.
P. M. CARMENT (BRS869), 36, Westholm, N.W.11.
E. A. J. FLEXMORE (BRS870), 154, Mansford Street, Bethnal Green, E.3.
W. BURGESS (BRS871), Friedensthal, St. Giles Avenue, Scarthoe, Grimsby.

DOMINION AND FOREIGN.

J. R. BARNES (VS6AD), 10, Causeway Hill, Hong Kong, China.
J. H. ALVARES (VS6AG), 6, Cameron Road, Kowloon, Hong Kong.
A. P. ROSARIO (VS6AN), P.O. Box No. 391, Hong Kong.
REV. JOHN HEALY (W8BLP), The Rectory, Geneva, New York, U.S.A.
W. H. CRAGG (YI6WG), R.A.F. W/T Station, Sulaimania, Iraq.
G. G. SAMSON (ZL4AI), Rolleston House, Christchurch, New Zealand.
H. J. BUCKLEY (ZS5U), Sezela, Natal, South Africa.
A. S. INNES (ZS6D), 91, Becker Street, Yeoville, Johannesburg, S. Africa.
X. A. DE POMPIGNAN (BERS111), 9, Dere Street, Port of Spain, Trinidad.

(*Continued on page* 383).

HIC ET UBIQUE.

(*Continued from page* 363).

amateur radio activities in his country which are published in the Society's official journal, the T. & R. BULLETIN. So far, individual B.E.R.U. membership has been referred to but this is only part of Empire scheme.

In the T. & R. BULLETIN for November, 1929, appeared this paragraph : " We are confident that with such a body representative of the transmitting amateurs in the British Empire, amateur radio regulations could be framed by the respective Governments viewed through the perspective of Empire rather than isolated countries." This was followed by a memorandum dated May 19, 1931, and published in the June, 1931, T. & R. BULLETIN, which read as follows :—

" In order more firmly to establish the B.E.R.U., it has been decided by the Council now governing the R.S.G.B. and B.E.R.U. to invite all Dominion and Colonial radio societies, associations and groups to affiliate themselves *as organisations* with the B.E.R.U.

" At present the title ' B.E.R.U.' is used to identify the individual Dominion membership of R.S.G.B., but it is our desire to extend the scope of the Union by affiliating all recognised national and district organisations.

" We shall be glad, therefore, it you will place our invitation before your Council at the earliest moment. The affiliation of all Empire organisations will be without any fee or charge.

" In considering affiliations, we feel these should be confined to those radio organisations whose primary object is to foster amateur radio work in all its phases

" Our aim is to organise the B.E.R.U. on lines to suit the whole Empire, but the wishes of *the majority will, at all times, govern future actions.*

" The B.E.R.U. has for its objects the linking together of the radio amateurs of the British Empire ; the advancement of the art of radio ; and the promotion and fostering of Empire friendships. It is in no way competitive with I.A.R.U."

The response to this invitation has been most gratifying and already the national organisations in South Africa, Australia, Ceylon, South India, Hong Kong and Jamaica have accepted honorary affiliation. That the rest of the Empire will shortly follow is certain.

A. E. W.

The Courtenay Price Trophy

Capt. G. Courtenay Price very kindly offered a trophy to be awarded annually for research work among members. Council have been pleased to accept this trophy on behalf of the members of the Society, and wish to tender their thanks to the donor.

The rules governing the award of the trophy are appended.

RULES.

(1) The trophy shall be competed for annually, and shall be awarded to the R.S.G.B. or B.E.R.U. Member of Contact Bureau (or any subsequent experimental section of the Society which might be formed) who shall have made the most important original contribution to the science of Amateur Radio Communication.

(2) The trophy shall be presented at the Annual Convention of the Society, and the award based on the work accomplished during the year ending June 30.

(3) The award shall be made by the Council of the Society and the approval of the donor obtained prior to the announcement of the award.

(4) Awards shall be judged upon the published results of researches conducted, except in special cases, when publication is not possible.

(5) Claimants for the award may make their claim in writing, setting out details of the work upon which their claim is based. Council will reserve the right to withhold the award for any particular year if the original research work is not considered of sufficient merit.

Claims may be addressed to the Honorary Secretary of the Society, but must be delivered prior to July 15.

(6) The trophy shall remain the property of the Incorporated Radio Society of Great Britain or its successor, and shall be insured by that body against all risks.

(7) In the event of the trophy not being awarded during any particular year, it shall be returned to the donor or to his nominee.

Spanish International Tests

THE results have now come to hand of the International Tests organised during the last fortnight of January by that active body of Spanish amateurs, the Red Española. These tests, we are informed, were the most successful ever held in Spain.

A total of 2,778 QSO's were made by the 23 members of the Red Española who participated ; 346 of these were with stations situated in North and Central America. British amateurs come second, with a total of 212 QSO's to their credit.

The winner of the Copa de España (Spanish Cup) and Champion of the Red Española for 1932 is J. M. de Cordova, EAR96, who established QSO with nearly 400 different amateur stations situated in all parts of the globe. Second place is held by E. Mairlot, EAR185, who wins the gold medal. Third and fourth places are held by EAR224 and EAR177, to whom the silver and bronze medals are respectively awarded. The runners-up, who each receive a certificate, are : EAR227, EAR38, EAR16, and EAR74.

The gold medal offered by the R.E. to the foreign amateur residing outside Spain making the most contacts with R.E. members during the tests is won by W4AJX with 56 points. The second prize, a silver medal, is awarded to CT3AB with 48 points. The bronze medal offered for the third place goes to TI3LA, who totals 42 points. To the other 49

foreign amateurs who were runners-up for the prizes available to non-Spanish amateurs will be sent certificates. These successful stations include G2ZQ, G6CL snd G6RB, as well as GI6YM and EI8D.

The Red Española wishes to thank all amateurs who co-operated with their members in making such a success of these, their first International Tests. They, in their turn, are to be congratulated upon the true amateur spirit in which these tests were carried through.

Summer Outing

It is proposed to organise a summer outing to one of the Commercial Stations within easy reach of London, and will probably take place on a Saturday afternoon in late June. Before the Social Section can go ahead with the arrangements they must know how many are likely to be able to attend, and they therefore request all members who intend to be present to fill in the attached coupon and return it without delay to the

Social Manager,
Radio Society of Great Britain,
53, Victoria Street, London, S.W.1.

An unsealed envelope and a ½d. stamp may be used.

I (*name, call and address*),.....

.....

.....

should like to be present at the R.S.G.B. Summer Outing if arranged for a Saturday afternoon in June, and.....(*here insert "will" or "will not"*) be accompanied by YL (or OW).

QSL Section.

An important omission from the announcement concerning receiving cards going to ARRL stations has been brought to my notice, and I must apologise for not making the point clear in previous notes on the subject. The ARRL has refused to forward any more cards from listeners addressed to their stations, and whilst this is still under negotiation BRS and AA members should make a note that no more cards can be accepted by H.Q. for W or VE calls *and for other stations of the ARRL outside of N. America and Canada*, who, being in isolated districts, not having an organised QSL bureau, receive their cards regularly *via* the A.R.R.L. Such places are as follows and B.R.S. members are asked to make a note for reference when sending QSL cards :—CM, HC. HH, HI, HR, KA, K4, K5, K6, K7, OM, TI, VE, VO, and X.

It often comes to my ears that at various of the conventionettes and district meetings G — — is heard to complain that he hasn't had a card for months and he is sure that something must be wrong up at H.Q. as he knows that there are some of his envelopes in the section files. Whenever call signs are known the case is investigated and the trouble is invariably the same—no envelopes. Nobody objects to a legitimate grouse on occasions, but the QSL section is proud of its record of service, and whilst mistakes do occur even in the best regulated QSL bureaux, it is felt that the fairest method of settling a grievance is to hand it to the right quarter and not to promote dissatisfaction by grumbling to all and sundry. Let us have your complaints and we are certain we can put it right for you at once. J. D. C.

QRA Section.

Manager : M. W. Pilpel (G6PP).

NEW QRA's.

G2QW—F. H. Walters, 24, Marden Road, West Croydon, Surrey.
G2VR—H. B. Old, "The Shack," Spring Lane, Lambley, Nottinghamshire.
G2VX—*Portable*—H. B. Old, 3, St. Jude's Avenue, Mapperley, Nottingham.
G5CU—J. A. Cuthbertson, "Radiohm," Acklam Road, Linthorpe, Middlesbrough, Yorks.
G5DI—T. Brown, "Ashford," West Lane, Forest Hall, Newcastle-on-Tyne.
GI5MZ—F. McDowell, "Terra Nove," Osbourne Park, Belfsat.
G5SA—D. P. Jones, c/o Western Electric Co., Bush House, London, W.C.2.
GI5UR—This was erroneously given as GI5RU in the last Bulletin.
G5UT—A. H. Lawson, "The Hermitage," Ainsdale, Southport, Lancs.
G5VO—J. H. Hargreaves, 26, Kingsgate, Bridlington, Yorks.
G5VU—S. W. P. Henton, 11, Kelham Road, Newark, Notts.
GI5WD—W. S. Davison, 10, Mark Street, Portrush, Co. Antrim, N. Ireland.
G5WT—A. S. Wood, "Trebor," St. James' Road, Forfar, Scotland.
G5ZZ—Rex Emery, 96, Boundary Road, London, N.W.8.
G6CW—J. J. Curnow, "Tregenna," Garrard Road, Banstead, Surrey.
G6LF—J. H. Goodliffe, 97, Sheaf Gardens, Sheffield.
2BHZ—W. H. Mathews, 132, Hainault Road, Romford, Essex.
2BMB—F. Rogers, 16, Silversea Drive, Westcliff-on-Sea, Essex.
2BQO—W. C. G. Smith, 16, Fairlawn Road, Montpelier, Bristol.
2BQR—G. E. Russell and W. F. Gerrish, 19, King Street, Avonmouth, Bristol.
2BRG—F. A. Vost, 26, Pinewood Avenue, Warrington, Lancs.
2BUI—J. E. Sayers, 100, Victoria Road, Stretford, Manchester.
2BUS—T. L. Herdman, The Grove, Kingswinford, Dudley, Worcs.
2BVN—K. B. Roulston, 5, Pine Tree Avenue, Humberstone, Leicester.
2BWP—F. W. Foster, 562, Woodborough Road, Mapperley, Nottingham.
2BXW—W. S. Turpin, 1, Austin Avenue, Stockton-on-Tees, Co. Durham.
EI9D—G. H. Noblett, Barley Hill House, Westport, Co. Mayo, I.F.S.

The following are cancelled : G2KL, G2XB, 2AMC, 2ANS, 2ARN, 2AVF, 4AYX.

Prehistoric Signals.

Our contributor desires to offer apologies to G6LB for the appearance of his call in the list of Prehistoric Signals in the March issue. It appears that G6LB made no transmission on the day when these signals were heard, and it is presumed that one of the many pirates on the air borrowed it.

It is, however, singularly unfortunate that the call of one who takes so much pride in his note and operating should have thus appeared in the black list, and we feel that a public apology is due to Mr. Fuller. It is hoped that he will accept it.

* * *

Radio Roma in the 7 M.C.s Band.

The following is an extract from a letter received from the G.P.O. in connection with interference caused by the above broadcast station which has been operating nightly in the 7 M.C.s amateur band.

"With reference to your letter dated April 26, we have communicated by telegraph with the Italian Administration regarding the interference of the Rome Wireless Station with transmissions in the band 7,000-7,300 K.C.s allotted to amateurs, and we hope that the Italian Administration will take steps to prevent further interference."

B.R.S. LISTENING CONTEST

It is not the intention of Council to criticise unduly the apathy of our B.R.S. and A.A. membership towards organised tests, but we think it advisable, for the sake of posterity, to state that in response to the March B.R.S. Listening Contest (for which incidentally a valuable trophy and a £2 2s. prize were offered, providing 10 per cent of the non-transmitting membership took part), the sum total of entries received was TWO.

Special thanks are extended to Mr. Baveystock, B.R.S. 478, and to Mr. George Wells, B.R.S. 624, the two competitors.

No further B.R.S. tests will be arranged until at least 100 B.R.S. members have expressed their intention to co-operate.

A Portable on the Motor Yacht "Suzanette."

G5UW will be a portable from June 1 to 18 next, when G5UW and G2OQ take the Motor Yacht *Susanette* for a trip from Worcester down the River Severn, along the Bristol Channel, North Coasts of Devon and Cornwall, around Land's End, and along the English Channel as far as the Isle of Wight, calling at most of the holiday resorts and harbours along the coast. The 7 M.C. band will be utilised for the tests, and G5UW will be pleased to hear from any station situated along the proposed route willing to arrange skeds between 2030 and 2130 B.S.T. The transmitter will consist of a CO-PA outfit with 10 watts.

District 2 Conventionette.

THIRTY-THREE members were present, including visitors, at the Conventionette at York on April 16.

Mr. L. W. Parry (G6PY), D.R., took the chair, and Mr. Old (G2VQ) was present, representing the Council. Mr. Parry asked for the continued support of the members, and requested that members should reply to meeting notices.

Mr. Old then addressed the members, apologising for the absence of Mr. Clarricoats, who was unable to attend. Mr. Old gave interesting figures concerning the number of members of the Society, which was, in general, carrying out excellent work. He appealed to the active two-letter transmitters to help the B.R.S. members who are now in a large majority. B.E.R.U. was doing excellent work. Mr. Old appealed to the members to operate their stations in a satisfactory manner, keeping rigidly to their licences, and to support the Contact Bureau and Morse practice tests. The BULLETIN, Q.S.L. Section and tests took up a good deal of the Council's time, and he would appreciate suggestions and criticisms of the work. Mr. Old concluded by thanking Mr. Shaw, representative of the *Yorkshire Observer*, for being present.

G6PY then asked for members' criticisms. G5SZ asked if the Provinces were equally represented on the Council. G2VQ stated they were. G6OO, G6BX, G6UJ, and others contributed remarks regarding 2 M.C. C.B. tests. Suggestions are being sent to Council. G6FG mentioned that all articles in the BULLETIN dealt with low impedance valves, and thought some attention should be given to high impedance valves. G5SZ suggested an experimental section should appear in the BULLETIN. G2VQ said he thought C.B. covered this. G5VC thought the District Notes could consist only of a list of stations and wave-lengths, but it was also felt that they are a medium for the exchange of ideas.

The meeting was then closed, Mr. Old being asked to convey kind regards to Mr. Clarricoats.

G. M. W.

W.B.E. Certificates.

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

G5CV, P. D. WALTERS.
G5FV, W. A. CLARK.
G5PL, J. A. PHILPOT.
G6LI, A. E. LIVESEY.
G6YL, MISS B. M. DUNN.
VK4GK, A. H. MACKENZIE.
ZL3CC, J. B. ELLIOTT.
ZS2N, J. P. MALAN.

(*Continued from page* 373).

to check the absolute voltage to obtain a calculation of the definite absolute impedance. However, if two units are being tested merely for matching impedance, this is unnecessary and the current reading will suffice.

If careful matching of impedances is carried out throughout the circuit results will be satisfactory, and will closely approximate the ideal to the imperfect mechanism of the human ear.

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.

Locked or Neutralised Amplifiers.

To the Editor, T. & R. Bulletin.

DEAR SIR,—Having read the description of G2DZ's Station in the last Bulletin, I feel I must say something in favour of the neutralised amplifier, which his results are apt to condemn.

From the article I read that G2DZ obtained a greater output (using 500 volts H.T.) with a locked amplifier than he did with a neutralised one; and that on doubling the H.T. voltage the output was more than doubled. I should hope so—it should have been quadrupled, or nearly so. Doubling the H.T. volts should double the milliamps, which means four times the power.

In order to test this I have made a few measurements on my own transmitter and give them here for the benefit of others. The frequency doubler is an Osram LS5B running at 400 volts with about 40 milliamps (and runs cold). The power amplifier is an Osram DET.1.S.W. The aerial is a Zeppelin, 66 ft. 6 in. long, with 49 ft. feeders; the tests were made on 14 M.C., and the currents in the feeders were measured by means of Weston thermo-couple ammeters, not at the maximum current point.

Input to Power Amplifier.		Feeder Current.
560 volts	70 m/as.	0.65 amps.
750 volts	90 m/as.	0.82 amps.
1,200 volts	125 m/as.	1.22 amps.

Now if these feeder currents are squared they are proportional to the powers in the feeder. To get watts the powers must be multiplied by the resistance of the system (not ohmic, of course). This is where the amateur falls down; I don't know the resistance of the system, but it does remain constant for small changes of power. If I take a value for the resistance of 70 ohms (reasonable, I think), it will anyway enable comparisons to be made between the input and output powers.

Input.	Output.	Efficiency.
39.2 watts.	29.5 watts.	75.25%
67.5 watts.	47.0 watts.	69.62%
150.0 watts.	104.2 watts.	69.45%

This, I think, shows that there is nothing inefficient about a neutralised power amplifier when the input is increased. With the full input of 150 watts the plate of the DET.1.SW becomes just coloured after 2½ minutes with the key down, which shows that only a very small percentage of the input is dissipated in the valve. The tuning controls and general insulation are of the best obtainable, and I think therefore that the set is as efficient as it is reasonably possible to make it.

With apologies to the Editor for having taken up so much space,—I am,

Yours sincerely,

A. W. Alliston (G5LA).

CALLS HEARD.

B.R.S. 624, 44, *Grovelands Road, Palmers Green, London, N.*13. *March,* 1932.

3.5 M.C.: g2bi, g2cj, g2fn, g2gg, g2jg, g2jp, g2kb, g2ko, g2lz, g2mm, g2nh, g2nm, g2oa, g2oc, g2pa, g2qb, g2rj, g2wj, g2wp, g2wq, g2ws, g2xh, g2xs, g2xt, g5ad, g5aw, g5bd, g5cx, g5fb, g5fd, g5fj, g5fv, g5gz, g5ix, g5jm, g5ju, g5jz, g5np, g5ns, g5og, g5pk, g5uc, g5uy, g5wb, g5yk, g5yn, g5zn, g6bb, g6bs, g6cl, g6cw, g6dp, g6fm, g6fo, g6gv, g6ia, g6jg, g6kw, g6kp, g6li, g6ll, g6mn, g6nf, g6nw, g6om, g6oo, g6pa, g6qb, g6qx, g6rb, g6sc, g6sz, g6so, g6wn, g6wy, g6xn, g6yc, g6yp, xg6yp, yi6wg, za1ka.

* * *

G6YL, Felton, Northumberland. February, 1932.

7 M.C.: su1ch, ve1df, vk2bm, vk2oc, vk2xu, vk3lq, vk3wl, vk3zx, vs2af, vs6ah, vs7ap, vs7gt, vu2fx, vu2jp, yi2dc, yi6wg, zu5b, xearz, xla1s, xx1jp, xx1yj, fnbh.

14 M.C.: su1aq, ve1br, ve1bt, ve1dm, ve1dq, ve2ap, ve2ca, ve2cq, ve2cx, vk2lz, vk2oc, vk2xg, vk2xu, vk3wl, vk4xn, vk6gf, vk6wi, vo8mc, vs6ah, vs7ap, vs7gt, vu2fx, yi2dc, yi6kr, yi6wg, zl2af, zs4m, zs6y, zu6w, xx1yj, xzn2a.

March, 1932.

7 M.C.: su1ch, su1ec, vk3tm, vk3wl, vo8mc, xfnfh, xoz2w, xsm6ub, xx1yj.

14 M.C.: vs3ac, yi2dc, yi6wg.

* * *

2BHT, London, N.W.3, April.

7 M.C.: su1ch, su1ec, vk3vp, vk3wl, vk6or, vp2pa, vs7ap, vu2bg, xzn2a, zs2a, zs2ax, zu6w.

*BRS*536, 24, *Millway, Mill Hill, London, N.W.7. March* 21 *to April* 21.

7 M.C.: su1ec, su8ma, vp2pa, xx1yj, xzn2a, yi6wg, zs2a, zt1t.

14 M.C.: v1yb, vp2mr, xyi6kr, xzn2a, yi6wg.

* * *

YI2BT, C. H. Burchett, C Squadron, R.A.F., Hinaidi, Baghdad, Iraq. 08.00-16.00 *G.M.T. March.*

14 M.C.: g2dh, g2dz, g2ig, g2io, g2oa, g2rj, g2xu, g2yd, g2zj, g2zq, g5bj, g5cm, g5fv, g5ku, g5la, g5nf, g5ni, g5ns, g5oj, g5oy, g5pj, g5pl, g5qc, g5qv, g5rv, g5sy, g6gd, g6hp, g6ip, g6kl, g6nw, g6rb, g6rk, g6sy, g6ut, g6vp, g6vy, g6wl, g6wn, g6yk, g6yl, gi6yw, su1aa, vs3ac, vs7gt, vu2df, xzn2a, zc6jm, zs2i.

18.00-21.15 *G.M.T.*

7 M.C.: g2xa, g2xh, g2yc, g2zq, g5cv, g5dm, g5fb, g5hc, g5np, g5vm, g5yu, g5zg, g6iz, su8ma, vk3ek, vk6wi, xearz.

* * *

W. E. Lane, VQ4CRH, P.O. Box 570, *Nairobi, Kenya Colony. February,* 1932.

7 M.C.: vk5rh, vq3msn, vs7ap, vu2jp, zs5u, zu5b.

14 M.C.: g2cx, g2dx, g2ig, g2op, g2vq, g5ml, g5pj, g5yg, g6nf, g6qb, vk2hc, vk6gf, vs7ap, vs7am, vs7gt, vu2df, vu2fx, yi2dc, yi6wg, zd2a, zs2x, zs4m, zs5u, zs6y, zt1h, zt5r, zu6w.

* * *

VK2BR, until the end of February.

7 M.C.: vs1ad, vs2af, vs6ae, vs6ao, vs7gt, vu2fx.

14 M.C.: vp1ff, vs3ac, vs6ae, zt5v.

F. A. Robb, 2AXW, 3, Worcester Terrace, Chamberlain Street, Belfast, N. Ireland. March 1 *to April* 10.

7 M.C.: ve2ca, vk3wl, xzn2a, xx1yj, zs2a.

14 M.C.: su1ec, st2d, v1yb, ve1bm, ve1dm, ve2ch, vs3ac, vo8lc, vp2mo, vu2jt, vu2bg, vk2lz, xla1s, yi6wg.

* * *

VK7CH, C. Harrisson, Rokeby Road, Bellerive, Tasmania.

g2cw, g2cx, g2dh, g2dz, g2ig, g2ju, g2oq, g2vq, g2zq, g5bj, g5cv, g5fv, g5gq, g5la, g5ml, g5pj, g5qx, g5vb, g5yh, g5yu, g6gl, g6hp, g6jg, g6li, g6ll, g6nf, g6py, g6qb, g6rb, g6rg, g6wy, g6xq, g6yk, g6zr, gi5zy, st2d, su1ch, ve2be, ve2co, ve4al, vo8mc, vp1aj, vp1ff, vp1fr, vs1ab, vs1ad, vs1fd, vs2af, vs3ac, vs6ad, vs6ae, vs6ag, vs6ah, vs6al, vs6an, vs7ai, vs7ap, vs7gt, vu2df, vu2fx, vu2jp, vu2kh, yh1rv, yi2dc, zt6x.

* * *

Dr. J. Lunt, ZT1Q, Kenilworth, Capetown. February 1 *to March* 18.

14 M.C.: g2cx, g2vq, g2yd, g5la, g5ml, g5ni, g5qv, g5vm, g5yg, g6ip, g6jk, g6li, g6ll, g6vp, g6wy, g6xq, vk6gf, vk6wi, vq2ty, vq3msn, vs3ac, vs6ae. vs6ag, vs7ap, vs7gj, vs7gt, vu2df, vu2fx, vu2jp, x9a, xg2b, xx1jp, xx1yu, xzn2a, xzn2b, yi6wg, zd2a, ze1jh.

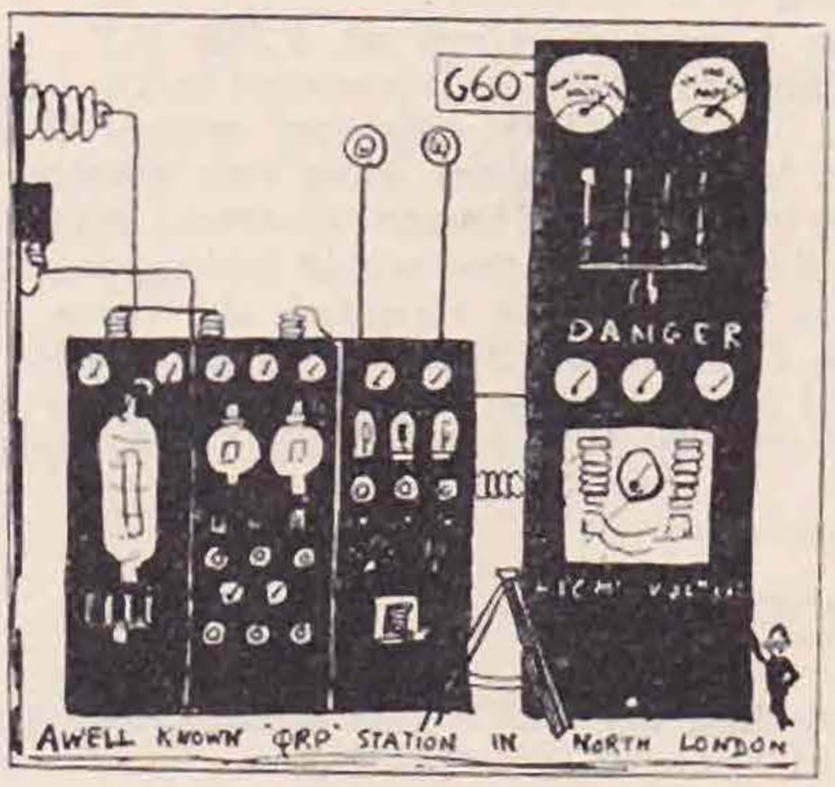
* * *

HB9Y, A. von Wattenwyl, Kirchenfeldstr. 84 *Berne, Switzerland. February-April.*

14 M.C.: st2d, su1aa, v1yb, ve1bv, ve1dl, vk2ba, vk2xu, vk4gk, vo8mc, vp2mo, vq4crh, vs3ac, vs7gt, vu2bg, vu2df, yi2dc, xyi6kr, yi6wg, zc6jm, zs1f, zs4m, zs6aa, zs6y, zt1t, zt1h, zt5v, zu1d, zu1p.

7 M.C.: su1ch, su1ec, vk2ba, vk2oc, vk2yr, vk3es, vk3tx, vk3vp, vk3wl, vk3xi, vk3zb, vk3zx, vk5hg, vs7gt, yi6wg, zl2ab, zl1cl, zl2ci, zl2cw, zl2dv, zl2fi, zl2gk, zl2gn, zl2gq, zl2ho, zl2je, zl2jg, zl3ah, zl3aq, zl3as, zl3aw, zl3az, zl3av, zl3bn, zl3cc, zl3cs, zl3ct, zl4am, zl4ao, zl4ap, zl4db.

3.5 M.C.: su1ch.



New Members—(*continued from page* 377).

D. E. White (BERS112), 53, Kerr's Road, Lidcombe, N.S.W.
L/Cpl. J. Spafford (BERS113), No. 2 Coy., 2nd Indian Divisional Signals, Quetta, Baluchistan, India.
S. M. Chard (BERS114), 241, Elm Avenue, Westmount, Quebec, Canada.
J. M. Silveira, 1,311, 85th Avenue, Oakland, California, U.S.A.
T. Bea (FRS25), Villa Matilde, Avenida Infante Don Juan Ondaretta, San Sebastian, Spain.
S. Xanthakis (FRS26), 134, III Septembre Road, Athens, Greece.
K. H. Janke (DE-0849), Harzstr. 13, Blankenburgh/H, Germany

BOOK REVIEWS.

First Principles of Television. By A. Dinsdale, M.I.R.E. 237 pages, 130 diagrams and 38 plates. Published by Chapman & Hall, Ltd., London. Price 12s. 6d. net.

The author sets out to explain the principles underlying the various systems of television and to describe the apparatus with which results have been obtained.

There is little in the book of an historical nature, even though television gear must become historical after a very short time, nor does the author attempt to survey the whole field of television. He wisely limits his book to the most outstanding methods in the hope that it will enable the student to understand any future system based on the principles described or variants of them.

The result is a very valuable addition to the growing literature on this subject, and the author is to be congratulated on the businesslike way he has gone about his job and the most lucid descriptions of gear and the principles underlying the various methods of transmission and reception.

The early chapters of this book deal with the "physics" of the subject, and treat the eye, simple optical systems, light-sensitive devices, and a few of the early experiments only in such detail as is essential to the main subject. The Jenkin's system, the Baird system, and the Bell system receive much more detailed treatment in a series of chapters, and chapters are devoted to Methods of Synchronism, Image Structure and Transmission Channels. The advantages of modulation transmission with regard to half-tones, and the relative merits of horizontal and vertical scanning and the various picture ratios, form a very interesting part of these chapters. It is interesting to note that the human eye can detect horizontal movement, as found in the "hunting" of the image, much more easily than vertical movement.

A chapter is given to the Present State of the Art in Germany, and another to England, and two to the conditions in America. In the concluding chapter the author quotes various opinions of prominent engineers with regard to the present state of the art and its future development, and many of these are thoroughly refreshing.

This meritable book has a double appeal; it has a very definite appeal naturally to those interested in television, but it will appeal strongly to anyone with an interest in physics who will appreciate the unfolding of a story of the almost unbelievable ingenuity of the experimenters.

This is possibly the best book which has yet appeared for the student of television.

T. P. A.

Abstract.

Bureau of Standards Journal of Research (U.S. Dept. of Commerce), Vol. 8, No. 2, February, 1932.

"Some studies of radio transmission over long paths, made on the Byrd Antarctic Expedition" (by L. V. Berkner).

Field intensity measurements were made of high frequency signals (9 to 15,000 K.C.) over the distances between Dunedin (N.Z.) and England and North America, respectively, during 1929-1930.

The relation is discussed of the diurnal and seasonal changes in signal intensity to the changes in daylight and darkness along the path of the signal. Under certain circumstances the possibility of a shift in the path of the signal has been observed. Evidence of correlation between magnetic disturbances and loss of signal strength along certain paths has been obtained, although together with a lack of such correlation simultaneously along another path.

In the summary to the paper, which is well illustrated by numerous charts and three-dimensional diagrams, it is pointed out that it is impossible to draw any except very general conclusions from observations taken over such a limited period.

The conclusions so drawn include :—

(1) A signal minimum occurs over a wholly light path ;

(2) A rise in signal intensity will occur as the path becomes partially dark ; and

(3) A steady fall in signal strength occurs after the maximum has been reached and becomes most pronounced after the path has become totally dark. In fact the transmitting conditions never become fixed and a secondary rise is frequently observed as daylight approaches the transmitter.

B. C. C.

A Newcomer.

Finland, since her freedom as a nation at the end of the war, has always commanded the respect of English people as a progressive and energetic country, and whilst the man in the street, we are sad to say, does not know very much of Suomi and her people, the radio amateur has no excuse for ignorance of their qualities. Whenever an OH station is on the air one can be certain that at least one decent signal, backed by a good operator, will be heard on the band, and it is therefore with added pleasure that we have to welcome to the ranks of amateur publications a magazine published by S.R.A.L. for their members.

" Radio OH " makes its bow in the form of a complete magazine instead of a supplement to the popular radio paper " Radio Sanoma," and we take this opportunity of wishing it all success in its venture.

The first number contains many articles of interest, and we are greatly flattered to note that the editorial and several of the strays, etc., are written in English !

J. D. C.

Calibration Section.

WE are requested to indicate to the N.P.L. what use is made of the present calibration service given on the first Tuesday of each quarter. Will members who make use of this service please let me have a P.C. in order that the necessary information may be given to the N.P.L. Do not forget !

Members are reminded that frequency meters and crystals may be sent for calibration to 49, Thornlaw Road, West Norwood, S.E.27, at owner's risk. The charge for meters is 5s. for a number of points on the 3.5 M.C. band, and 1s. 6d. for crystals of any frequency, except 14 M.C., within the amateur bands. Return postage must be prepaid.

The Society's certificate of calibration is accepted by the G.P.O. as *primâ facie* evidence of the accuracy of crystals used at amateur stations for frequency measurement or control.

A. D. G.

Calibration Services.

(1) *From G5YK (Cambridge) on the first Sunday in each month.*

[Owing to alterations to the meter this Service will not be transmitted in June].

(2) *From G2NM (Sonning-on-Thames, Berkshire).*

The Service is given at 3,583.13 K.C. according to the followiug schedule (times are G.M.T. or B.S.T. as in force) :—

11.00 every Sunday (telephony).
23.00 every Sunday and Thursday (Morse).

The crystal used for this transmission is worked in a constant temperature chamber, and the frequency of the complete oscillator has been checked and approved by the Post Office.

(3) *From G5HW (Teddington) on the first Tuesday in March, June, September, and December, commencing at* 21.00 *G.M.T.*

The Service is given at 1,785 K.C., and the standard transmission is preceded by the announcement CQ de G5HW, repeated several times, followed by the standard wave transmission on the above frequency. The announcement is followed by a continuous dash, the whole lasting ten minutes.

This procedure is repeated six times., i.e., at 21.00, 21.10, 21.20, 21.30, 21.40 and 21.50 G.M.T.

Full details for the reception of this service were given on page 126 of the October, 1931, issue.

TRADE NOTICES.

Quartz Valveholders and Valve Bases

The Quartz Crystal Co., of 39A, Kingston Road, New Malden, Surrey, are offering a valveholder and valve-base type coil former, the dielectric of which is fused quartz. The valveholder is made up from a tube of quartz cemented into a thin metal base, and the sockets are air-spaced. Terminals are provided, and the sockets, which are split, can be adjusted to a good fit for the valve pins if necessary.

The coil former is also composed of a tube of quartz, and the pins are air-spaced. It is 1⅜ ins. in diameter and 1 inch in height, with a space of ½ inch for winding the coil. This is bankrupt stock and only 120 of each are available.

* * *

High Voltage Condensers

We have tested a 2 mfd. condenser, working voltage 1200, supplied by Messrs. W. B. Savage. The condenser is made with a metal case and projecting porcelain-insulated terminals. It was used in a keyed circuit at 1200 volts and stood up to the work quite satisfactorily. For this type of condenser the price is 17s. 6d. for the 2 mfd., and 30s. for the 4 mfd.

DISTRICT 14 FIELD DAYS.

April 9-10, 16-17, 23-24.

Enthusiastic—that is the word that can best be applied to the members of District 14.

On a certain dull and cold Saturday afternoon in April certain members hied themselves to the rendezvous in rural Essex. Some went luxuriously, packed into small cars with large quantities of gear, some still more luxuriously inclined hired cars—from the station—and some (the heroes) walked—from the station.

It was very gratifying to see that quite a large proportion of the gathering was of the B.R.S. and A.A. fraternity.

The transmitter was rigged up, and the receiver re-soldered after its trip, and then it was discovered that there was no H.T. for the TX. Were they disheartened. NO! Somebody's dry-batts went on instead.

Later, thanks to the kindness of G5AR, a 500-volt M.L. turned up, much to the joy of the dry-batt owners.

Quite a number of QSO's followed on the 3.5 M.C. band, all the village (both of them) listening with joy and gratification to our key-clicks. Later in the evening fone QSO's on the 1.75 M.C. band were made before a return to the 3.5 M.C. band.

All through the night one could hear "Achtung —— " and " —— ici la station Anglaise," etc., for did they not have two well-known linguists with them ? And did not they stay at their post until 4.30 ack emma, when they both adjourned for a stroll in the early dawn ?

During the day numerous QSO's on the 1.75 M.C. band took place, and quite a lot of interest was aroused in the breasts of various station-owners within a 40-mile radius. They were honoured by a visit from G2LZ and YL and G2YI in the afternoon.

The return journey was less exciting than the trip down, the only difficulty being to get everyone on board the 'bus to the station.

The second week-end, being the wettest, the numbers dropped, but the enthusiasm remained. During the night conditions on the 3.5 M.C. band were remarkably good, and several fine fone reports were received, the best being R8 in Poland. American fone stations were coming in on the loud-speaker at such strength that it was thought that G2LZ was relaying them !

Being wet most of the day, the gang remained under cover, and worked 1.75 M.C. fone with much success. The D.R., to celebrate this, took a mud-bath, but was successfully scraped clean before being allowed in the operating room.

The third and last week-end was a fitting climax to a series of extremely enjoyable week-ends.

To begin with, the weather was kind, the sun shining most of the day. There were numerous visitors, but conditions was not quite so good as previously.

In the morning G2LZ, G2YI and G2WG paid a visit, and brought with them a small portable receiver, which, up to then, had not been used. G2LZ was able to instruct his second op., who was working his station, with impunity.

In the afternoon the first visitor was G6BS, then G5FB, and later G5AR, G5IS, G5AW, and last, but not least, our inimitable friend "Ham" Whyte. This brought our complement of linguists up to three, but the owner of the RX, who was operating during the early evening, was undoubtedly the best. At least, so the QSL's said, and QSL's never lie.

The general inference from results obtained shows that, in general, reception conditions are vastly superior, a few miles out of London, and that signals seem to follow suit.

Before drawing these remarks to a close the patience and endurance of our worthy D.R. G6UT cannot be too highly praised. Without his able organisation and forethought the entire scheme would have collapsed.

Our thanks, too, must go to G6TX for his trouble and kindness, and to G5GZ for the loan of an Rx, which certainly did produce some noise. On our list we see the names of G6FY, constructor of TX, G5JM, who kindly turned his car into a pantechnicon, and G6LL who did likewise.

The whole affair was a striking example of what can be accomplished when a district pulls together, and with the guidance of an enthusiastic D.R. Now you other districts, what about it ?

EUROPEAN NOTES.

The D.A.S.D. have created for their members a certificate, which will be awarded to those receiving stations who have logged a great number of amateur stations all over the world. Apart from the reception of these for distant stations, which must be moved by the submittance of 36 QSL cards from foreign amateurs acknowledging reception reports, the applicant must also submit a theoretical abstraction of some problem concerning short waves. The certificate will be known as the D.E.M. diploma and its holders will form a club similar to the W.A.C. Club. The emblem D.E.M. on their QSL cards will express the highest qualification and recognition that can be obtained amongst radio amateurs.

The D.A.S.D. expect that many of their members will attempt to obtain this certificate and they therefore once again request all their foreign friends to acknowledge promptly any report of any value which they may receive from a German receiving station. It is hoped that the somewhat difficult situation obtaining in Germany will be remembered. As a rule, transmitting licences are not granted in that country to amateurs and their only chance of keeping up their Society is by the organisation of a large and active group of receiving stations. They therefore depend to a large extent on the courtesy of foreign amateurs in replying to cards from German receivers.

The D.A.S.D. announce with regret that on account of the awkward economic situation they will be unable to organise an annual convention in 1932. Instead of this convention a formal business meeting will take place in Berlin towards the end of August. They extend a hearty welcome to any foreign friends who may care to attend this meeting.

Activity in Norway has recently centred around the construction of the Headquarters transmitter and preparing an inland network of relay lines. Conditions generally are improving and DX seems again to be possible in Norway.

All foreign amateurs are heartily invited to the general meeting of the N.R.R.L. which is to be held in Oslo during the first half of August.

CONTACT BUREAU NOTES.

By H. C. Page (G6PA).

ELSEWHERE will be found the reports on the 28 M.C. and 3.5 M.C. Tests, so I will not refer to them in detail here. I would like, however, to reiterate my words with regard to the BRS entries for the Tests. They were a disgrace. We have some 800 BRS members, and yet only about six in all took part in the Tests. Comment, or rather, further comment, seems to me to be unnecessary.

VK4XN has written to say that he is starting a 28 M.C. schedule on April 24. This is past, of course, but there may still be one or two die-hards who will care to listen for him. The times of operation are from 1700 to 1800 G.M.T. He will commence by calling CQ Ten for ten minutes, and then listen for ten minutes. This procedure will be followed during the whole hour. Reports should be sent to Contact Bureau, or direct to VK4XN.

VE2AS writes to say that he is still keeping up his 28 M.C. work despite months of negative results. He will soon be using more power, and an automatic transmitter, which will run for long periods without a stop. He claims Uncle Tom's Class " C " record for the maximum number of negative results !

G2ZC is still looking for more members for the fading groups, and will be glad to hear from anyone interested. His address is :—Capt. A. M. Houston Fergus, La Cotte, St. Brelades, Jersey, Channel Islands.

G6XN will soon be taking over the Group Managership of the 56 M.C. groups, and will be glad to hear from anyone interested in 56 M.C. work. Admittedly the 56 M.C. groups are very slack at present, but I hope that this will soon be remedied, as I feel sure that there are still some men interested. It seems to me that we in this country have not given 56 M.C. nearly as much attention as our friends in Germany, and the States. The work done in those countries far exceeds that done here, and it is time we pulled up our socks, and got down to it. 56 M.C. is far from-being a useless band, especially for short distance work.

This month I have much pleasure in publishing a short article from our old 56 M.C. enthusiast—G2DT—who, by the way, is leaving us for sunnier climes. I am sure we wish him the best of luck in his new home in the Canaries.

I will now leave the field to G2DT, who writes as follows :—

In Fig. 1 is shown an ultra high frequency circuit as developed by Whitehead in England and used successfully up to 115 M.C. It is a variation of the " Gill " circuit which is such a sure oscillator. It is worthy of note that a parallel tuning capacity is justified because of the detector valve used : this having short internal leads about ¼ in. long, and that reaction control can be satisfactorily obtained by the use of a 5-ohms variable resistance in the valve filament supply ; this having the merit of causing no appreciable frequency change. The size of the grid and plate inductances is best found by trial and error, but if these are made of No. 10 SWG copper and two turns 1½ in. diameter are used for each, a good beginning will have been made. Regarding the Quench circuit it may be mentioned that a frequency of about 30 K.c., or well above audibility, is best. Control of the amplitude of the quenching E.M.F. is obtained by R2. If quenching is not strong enough, weak signals are not sufficiently amplified ; if quenching is too strong then signals are rather prone to be drowned by overmuch " mush " of a type originating within the circuit itself. With a receiver of this type it will be found that, when the detector is not oscillating, tuning is rather flat but that when the detector oscillates tuning becomes impossibly sharp. If the quench is now used tuning will again become a trifle flat—of the order 8 degrees on the tuning dial. The quench can be put in or out of operation at will by the rheostat R2. Reaction by the filament temperature control rheostat should not prove critical so long as the valve is oscillating for super-regeneration, though careful control of the quench reaction is necessary. Owing to a prolonged bout of illness I (G2DT) have not been able to go any further into this type of receiver ; perhaps some other ultra high frequency experimenters will kindly do so and publish their results.

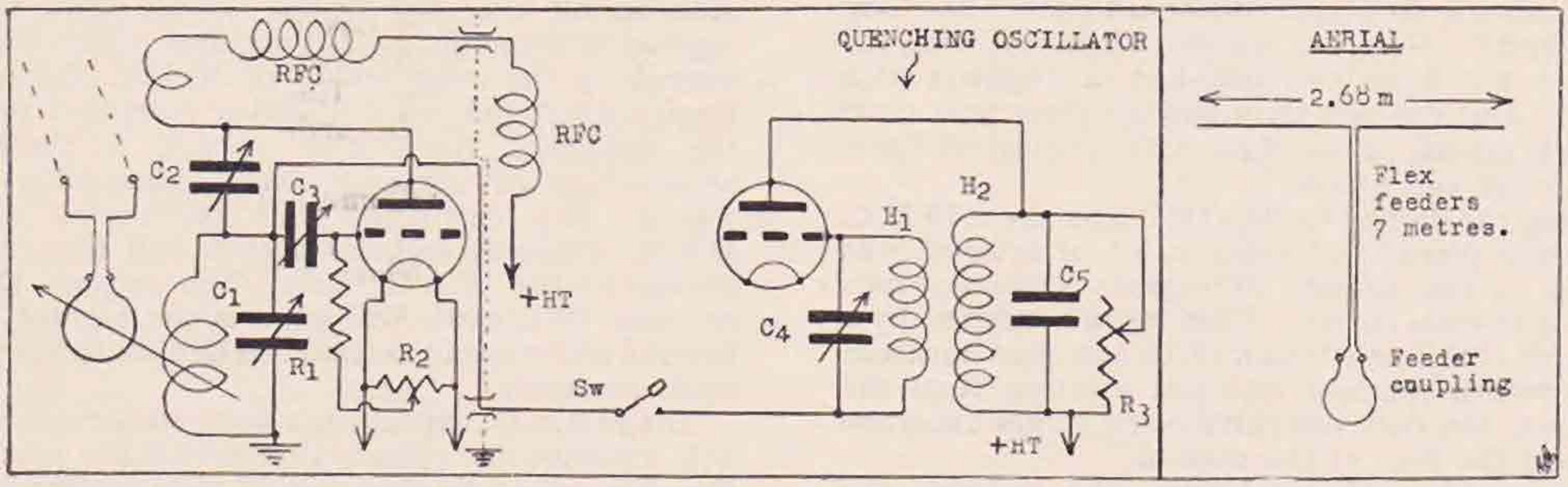


Fig. 1. 5-metre Super-regenerator Receiver.

V_1—V24 or D.E.Q.
C_2—50 mmfd.
C_3—Pre-set (max. 250 mmfd.)
C_4—.002 mfd.
C_5—.001 mfd.
H_1—Honeycomb, 1,250 turns.
H_2— „ 1,500 „
R_1—3 megohms.
R_2—400 ohms.
R_3—50,0000 ohms.

C_1 is a special condenser. See QST, November. 1930, page 43, or QTC, December, 1930, page 216.

28 M.C. Work.

G6VP, Group Manager.

ANOTHER month of negative results, and some of us are still trying. Well, it's small solace to reflect that conditions are also bad on the other frequencies. We must face the fact that 28 M.C. at present is not a DX band at all, and work in this direction seems so much waste of time. There are, however, many other things that we can do and keep doing, i.e., research work with both transmitters and receivers, and measurements of all kinds.

Our crystal 14 to 28 M.C.'s doubling stage, taken as a whole, does not appear too satisfactory, and also the old question of " drive " against " local " might keep us more usefully employed than the present futile energising of aerials in the forlorn hope of a freakish distant signal coming through.

At any rate something is wrong. G5SY raises the point that the fine work recently done in Australia was during their summer, and goes on to suggest that maybe our conception of the 28 M.C. DX season is at fault.

Personally, I intend to keep an eye on the band during the summer (if any!) Too many of us leave 10 metres completely alone as soon as the " season " is over.

The group reports are all negative, so are not worth publication.

No scheme of reconstruction of the Groups has yet been evolved, but the matter is in hand.

Fading, Blindspotting, and Skip.

G2ZC, Group Manager.

This month I have pleasure in announcing a new group, which will be known as 2C, and as we still have one more candidate than we can absorb into any of the existing groups, I will be glad to hear from any member, interested in our subjects, who would like to help in forming another group (2D). Actually our subjects are such that we have room for a lot of groups, so all that is needed is a supply of candidates.

Group 2C consists of BRS500 as G.C., and 2ASX, 2BRT, G5VQ, BRS499, but at the time of writing I do not know which of the two other applicants has been taken into the group.

I have also to record a change in 2B, in that G5GZ replaces CT1BK, and BERS6 replaces G2ZN. 2ATK has kindly sent in a comparison with his log to 2B's earthquake list, and 2B will be glad to receive such reports from any member of the R.S.G.B. I would particularly ask BRS members to assist in this matter.

Group 2A.—The discussion on the form of the Heavyside Layer is still being continued, and seems to take the line of Wave Form *v.* Stratified. As regards varying height by day and night, opinion seems to be in favour of a thickening, rather than a variation in height. In speaking of height, it is the " equivalent height " that is meant, and this is dependent upon the density of the ionisation. Two queries arise: (1) Whether the curve of this density is symmetrical about the line of maximum ionisation, or not, and (2) whether the refractive index varies directly as the height, or as some power of the height.

Since the path of a wave in the upper atmosphere depends upon the refractive index, and consequently upon the density of the layers, it becomes necessary to consider what is the difference between the lower layer and those above, and why a ray which has passed through the first layer can be refracted at the second, and so on. These problems tend to become rather involved, but 2A is discussing them seriously, and the individual reports reach a high standard. During March five members of the group were engaged in the tests by the French Meteorological Office.

Group 2B.—This group has had a very varied series of matters under discussion, and it is difficult to pick out any one for special comment. G6YL has again very kindly compiled a list of earthquakes for March, and this is reproduced. It has practically been decided that earthquakes and sunspot activity are closely connected with conditions on short waves, and the solar cycle, published by this group in 1929, seems to be following well defined lines, even to the fifteen month sub-cycle. It has been advanced that the ether may contain " pockets " similar to those experienced in the air, and though this subject is not a new one, at the same time destructive criticism is not strong enough to rule the idea out.

Hollowness in signals has also been discussed, and more will follow, but it would appear to some of the group that this phenomena can be accounted for by the Heavyside Layer. Should such be the case, then we have one more proof of the existence of the layer, or layers. The action that water has on wireless waves is also under review, as a reflector or absorber, or both.

We are glad to welcome G5GZ and BERS6 into the group.

3.5 M.C. Work.

G6RB, Group Manager.

Group 4B.—G6BS is contemplating use of higher power, using a DET1SW and 1,000 volts. Has done little work this month owing to QRM. G6FO states, in common with the rest of the group, that conditions for G work definitely fall off after about 1100 G.M.T. on this band. Gives useful information on elimination of BCL QRM. G2WP is now using a locked C.C. transmitter and a G6JV type of aerial which appears to be causing BCL QRM. He uses an earth with this aerial, and probably this accounts for the QRM. Has had several good reports. G5NS finds increase in efficiency and note by increasing the ratio of L.C. in his transmitter, which is a self-excited set. Is using aerial absorption keying, but he experiences some trouble with this. SM6WL finds the G6JV aerial gives better results on this band. Reports working 17 G stations in the 3.5 M.C. tests, and comments on the good notes of G stations on this band. BRS552 has done a lot of listening this month, and has found conditions very erratic on the band. Is now studying the effect of the moon on the conditions on this band. G2KB has done little on the air owing to change of address, but is working from new QRA now. The aerial is a 66-ft. AOG to a 45-ft. steel mast. This gives quite good results on the band up to date. Much interference from local telephony stations at Hillmorton makes working impossible at many times. A wave trap has proved useful in reducing this, however. G2OP, who is not a member of this group, has sent in a useful contribution to our budget. This is a

letter written on aerial coupling and gives useful information on this subject.

Group 4B will discontinue reports during the summer, so after next month no further reports will appear until the winter. G2KB and G6RB agree that it is best to discontinue the budget in the summer owing to the bad conditions on the band.

2 M.C. Work.

G5UM, Group Manager.

Although Group 10A have many interesting observations to make on the April tests on 2 M.C., it is thought advisable to withhold any comment until the results are made known. G5FP has been maintaining all night vigils on each week-end.

Suffice it to say at the moment that the much desired good conditions on 2 M.C. most fittingly arrived during the tests, and stations in France, Denmark and Switzerland were coming in at enormous power.

One point of interest to Group 2B: April 10, when the South American earthquakes commenced, was particularly good for distance work both on 2 and 3.5 M.C. On the latter band, in fact, exceptional DX appears to have been possible over Europe during the three or four days following April 10.

Earthquake Report.

Date (1932).	Time, G.M.T.	Situation.	Remarks.
Mar. 5	At night.	Slight shock felt at Granada, Spain.	—
Mar. 13-15	—	Eruptions of Mount Etna Volcano, and also of Anijak Volcano, Alaska.	—
Mar. 17	14.00	Earth tremors felt at Oban, Scotland.	Lasted several seconds.
Mar. 29	19.12 G.M.T. ?	One of the most severe earth tremors in the history of the city, felt at Johannesburg, South Africa.	One Seismograph needle was put out of action at the Observatory.

Dealing now with general group work, G5FP has built up a shielded crystal oscillator, which can be used as a piezo-electric wavemeter or (when the headphones are removed) as the drive for a transmitter amplifier. G6FO has been suffering from business QRM, which was somewhat retarded experimental work. It is expected that a second station will be put on the air soon, that at Newport being maintained for week-end work. G5RX was unfortunately unable to participate in the tests owing to an accident with his crystal. G5UM has been pondering the question of the best aerial for use on both 160 and 80 metres, having just commenced work on the latter band. Ultimately, no change was made from the 30-ft. twin A.O.G., which, when used with a counterpoise, functions reasonably well on both bands.

Television Group.

G5CV, Group Manager.

Group 11*A*.—I am glad to report that, in response to the S.O.S. in the last BULLETIN, several new members for this group have come forward, and two more are joining soon. The group now includes G5GJ, 2AOB, 6MS, 5AW, 2BFO, BRS759 and G.C., G5CV.

G5GJ sends along some interesting dope concerning his experiments with Kerr cells, which are temporarily held up owing to lack of help with the chemistry side. 5AW is using an H.F.-Det-1st L.F.* (R.C.) and AC/PEN output circuit with 500 volts H.T., but finds modulation very weak. (Possibly you have been using the neon for testing TX radiation and spoilt the H.F. response, OM.—G.C.) He has also been trying recording the vision sigs. with a home-recorder, but only the synchronising lines were visible.

2BFO has just started up with vision reception, and sends some interesting results in his letter. He complains about the short and restricted vision transmissions; but it appears that soon we are to have four transmissions a week at about 2300 G.M.T., which will be a great help, OM). Incidentally, there is often quite a long transmission on Saturday afternoons about 1500 G.M.T. This is usually announced at the end of the Friday morning transmission. BRS759 has been concentrating on an A.C. eliminator and a 2-valve (R.C. and transformer coupled) L.F. amplifier for vision purposes, and hopes to be receiving vision next month.

G.C. 5CV has rebuilt the amplifier three times, but cannot obtain the same results given by an identical amplifier last year. It has been found that for H.T. voltages below 280, two P625A's in parallel in the output stage give better results than a single PX4 and for voltages exceeding 300 a DO6O is excellent. Choke coupling between the penultimate and output stages gives better results than R.C. on speech, but is no good for vision reception.

Antenna Group.

G2OP, Group Manager.

Two Empire Link Stations have sent in reports concerning the BERU tests. In each case they confirm the theory of the 45° angle of radiation. The subject was dealt with by G6CI in the BULLETIN of April, 1930. For the benefit of newly-joined members it is, briefly, that a full-wave Hertz aerial, when suspended at a height of one half wavelength from the ground radiates the greater bulk of its energy in a plane 45 deg. to that of the aerial. That is to say, suppose one's aerial be slung in the plane East and West, then maximum radiation takes place in the planes N.E.-S.W. and N.W.-S.E.

The reports I have received are not complete, as it is known that both stations were using 66-ft. Zepps, but were also working on both 7 and 14 M.C. The above theory refers to full wave, i.e., 14 M.C. working, whereas one school definitely thinks that

(*Continued on page* 391.)

Strays.

Don't forget the forthcoming Local Conventionette: see individual notices in the District Notes Section.

* * *

CONVENTION at the end of August! Don't forget; reserve the dates now. As in former years, our Convention is being held at the same time as the R.M.A. Exhibition, so that means two reasons for visiting London.

* * *

B.E.R.U. Contest Report in next issue (we nearly added "Don't forget to order your copy now"!).

Notice to Contributors.

The Editor is pleased to have manuscripts submitted to him for publication, which 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 draughtsman. Photographs, if any, should not be smaller than ¼-plate, as otherwise the reproduction will be poor.*

The Incorporated Radio Society of Great Britain.

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

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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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(*Continued from page* 388.)

it does not hold good for half-wave working, at which radiation appears equal in all directions.

More reports on this, please. It is known that a large number of stations were active during the tests, and surely these did something more than brass pounding. You will have sent in your forms by this time, so it should be easy to tabulate your results and see in which directions your signals were getting out best. I should be glad to receive these for the benefit of others.

THE 28 M.C. TESTS REPORT.

By GI6YW.

THE heading of these columns is not the strict truth ; this is a dirge, not a report. Though many may be disappointed with the results, possibly none are surprised. The continuation of bad conditions on the higher frequencies did not encourage optimism about the Tests, and it would be difficult to imagine worse conditions than those during the Test periods.

Reports show that 14 M.C. had a bright stretch during the Tests, and that a number of 28 M.C. stations deserted the Tests to woo DX on the lower frequency. Though this may increase our admiration of the stations who had sufficient " stick-at-edness " to resist the temptation, it undoubtedly decreased the chances of 28 M.C. DX during what might have been the most favourable period of the whole Tests.

The only contact with a foreign station was made by G6HP when he was QSO with HAF4D on January 24, and the only foreign amateurs heard were HAF4D and HAF8B.

A number of G amateurs heard these two HAF stations, who are two of a little bunch of 28 M.C. enthusiasts in Hungary. G6HP was heard by HAF3D, but I have no information as to whether the latter was transmitting during the Tests, nor have I received any reports from Hungary. One cannot help but get the impression that had there been active 28 M.C. Groups in other countries the results of the Tests might have been more satisfactory. Consideration of this raises another point ; is it satisfactory to run 28 M.C. Tests without the *organised* and *experienced* co-operation of a number of foreign amateurs at various distances ? The Tests are capably organised at this end, but the results of the last two Tests have convinced me of the necessity of a *definite* knowledge that foreign-co-operating stations would be on the " air." The HAF men are few in number, but they seem to " get over " very successfully ; it is reported in last month's C.B. Notes that HAF8B has been heard in U.S.A. and South Africa. This little band of enthusiasts deserves our congratulations and our full co-operation. I do not know how closely our 28 M.C. Groups co-operate with the HAF men, but it would seem very desirable that every effort should be made to discover similar groups of enthusiasts in other countries and arrange some scheme of co-ordination of the work.

The conditions prevailing during the 1932 Tests have probably been the " last straw " for some of our members, and it is not surprising that many should have lost interest in 28 M.C. work ; at the same time, I am sure that quite a number of amateurs will continue to devote some time and interest to this rather recalcitrant band.

It would be the height of folly for me to attempt any technical analysis of the reports ; for one thing, they are few in number, and only *one* from abroad ; for another, they are mostly " nil " reports, if one excludes local contacts. Though a general analysis is impossible, it is probable that a brief summary of each report will prove of interest :

VE2AC-VE2AS.—At 13.13 G.M.T. on January 24 someone adjusting his transmitter was heard QSA5 T8, but despite chasing up and down the band after him no call sign was given before the signal was lost. Mr. Blais advises amateurs on 28 M.C. to sign frequently. Again, on January 31, a badly distorted A.C. note was heard on the amateur band ; though quite strong the only letters in the call-sign to be recognised were " ?HA?3." This looks like one of the HAF men. No amateurs were copied, and conditions were consistently bad. VE2AC-VE2AS used 10 watts C.C. and 75 watts M.O.P.A. on three different aerials.

G6HP.—On January 23-24 G6HP was listening for 36 hours continuously, and used a 10-metre Windom. Worked HAF4D on January 24, and heard HAF8B. Was heard by HAF3D on January 31. During the Tests worked or heard the following : G6NF, G5BY, G6WN, G2DZ, G2BM, G5SR, G6VP, G6OT, G6CJ, G6WY, G2IH, G2UX, G2ZJ, G2YD, G5OJ, G5PV, G5AW, G5IS, G2IM, G5LA, G2YC, G5GZ, G5RV, G6YK, G6CW.

G5MP.—No amateur signals heard. Was using 10 watts to LS6A in T.P.T.G. and 25 watts to two Triotron K450/25 in push-pull T.P.T.G. Aerials : Loosely-coupled A.O.G., with six half-waves, and vertical Windom of $\frac{1}{4}$ in. copper tube. Receiver : All-mains 0-SG-2.

G6WN.—Spent a total of 80 hours on the band. Power 40/50 watts. Heard HAF4D and HAF8B. Also CT1AA (Harmonic ?—GI6YW). Worked or heard the following : G6NF*, G6HP*, G6VP*, G2DZ*, G6CJ*, G6XN*, G6LL*, G2YD, G5BY, G2BM, G2XA, G6UN, G5SR, G2OL, G6QB, G6NK, G2CX, G6MB, G5RV, G6IP, G6YK, G5LA, G6CW, G5AW.

2ASX.—Same receiver used during first periods as used two years ago when he was successful in getting results, being then BRS310. Tried also a superhet and two different aerials. Seventy-five hours listening, but no signals heard.

BRS615.—Sends in a nicely tabulated log. Heard HAF8B on January 24. The following fundamentals were also heard : G6HP, G6WN, G5BY, G6UN, G6VP, G6NF, G2DZ, G6XN, G6LL, G6OT, G2CX, G2ZJ.

2ALR.—Also tabulates log in a convenient fashion. He heard HAF8B and HAF4D, and a number of G stations up to 60 miles from his QRA. The following G calls were heard : G6NF, G6HP, G2YD, G6WN, G5BY, G6VP. G2ALR is now G5LO.

* * *

That is the whole story, as I see it from the logs sent to me. The reader can see from the reports that quite a number of G stations were on the band, and also that reports have been received from only four transmitters (one in Canada) and three listeners. Comment is unnecessary. So let's ring down the curtain on a poor show.

THE 3.5 M.C. TESTS REPORT.

By G6PA.

WELL, here we are, and the Tests are over. Before I go on to try and draw any conclusions from the results I may as well tell you the winners of the two sections, i.e. receiving and transmitting. G2WP is the winner on the transmitting side with a score of 36 points. No mean score either, when one considers the adverse conditions which seem to dog all our Tests this season! G6RB is second with 27 points, and G2QB third with 23 points. There were 19 entries on the transmitting side, and only seven of the entrants sent in their logs, though quite a number sent in nil reports.

On the receiving side the palm goes to Miss Corry (BRS776), who gained no less than 83 points, while BRS575 was second with 54 points, and BRS681 third with 31 points. There were only four entries on the receiving side, and only three of the entrants sent in their logs. Before I say anything else I would just like to say a few words to our BRS membership. I think our BRS men can (should—Ed.) be absolutely ashamed of themselves. Never would I have expected to find so little support from our new members, who, owing to their freshness to the game should have been all the keener to take part. Even supposing a good proportion of them are B.C.L. members, and therefore not to be expected to take an interest, there are quite a number who do take an interest in S.W. work, as the number of cards I get from time to time shows! Can it be they have no interest apart from card collecting? I hope not, but it looks rather like it. Anyway, I hope they will take these words to heart, and buck up next time.

Now a word as to the different stations taking part. First, I will deal with the winning station G2WP. I had quite a few letters complaining that the method of scoring was heavily in favour of the high power man. Well, just look at G2WP. With an input of 8 watts he has swept the board. Now who says QRP did not have a chance? At any rate these tests go to show that the low power man had just as good a chance of winning as the QRO man. Here I think it would be as well to point out that, had the conditions been better, and DX to be had more easily, the high power man would probably have had an easier chance. G2WP was using a T.P.T.G. with a P650 valve having 200 volts on the plate. The aerial was a G6JV type, 81 ft. long. The receiver was a 0-V-1.

G6RB, with his 27 points, is very close behind, but although he was using more power he had not such good luck as G2WP. Unfortunately, I have no particulars of his station. His best QSO's seem to have been with OH1NJ and CV5VM.

G2QB was using a CO buffer amplifier, and PA and an input of 125 watts, and he had the good fortune to work W2BYP and receive an R5 report. This QSO was one of the only two DX QSO's throughout the Tests, and it is a pity that G2QB was not able to score more points from more local stations, and so stand a better chance. His receiver was a SG-SG detector and 2LF. His aerial was a C.F. Hertz 20 ft. high and 61 ft. long.

G5NS scored 15 points using an LS5 and 250 volts on the plate in a Hartley circuit. His aerial was an A.O.G., 68 ft. long and 25 to 30 ft. high. His power was 9½ watts. He remarks that very few DX stations were heard during the Tests and this seems to be the general report from all stations with the exception of BRS408, who heard a lot of W stations, but as he unfortunately did not enter for the Tests his score cannot count.

G6OM was the other station to work a W. He worked W2CSC on April 12 and got a report of R4. G6OM was using about 50 watts, but like G2QB he did not work many more local stations, and so his score is small compared to the winner. He scored 10 points. G2QB heard a W9 calling G6OM, but unfortunately no contact resulted from the call.

Space does not permit me to give details of the other stations which took part, so I will conclude this with their scores. G6KP scored 13, G2KB 1.

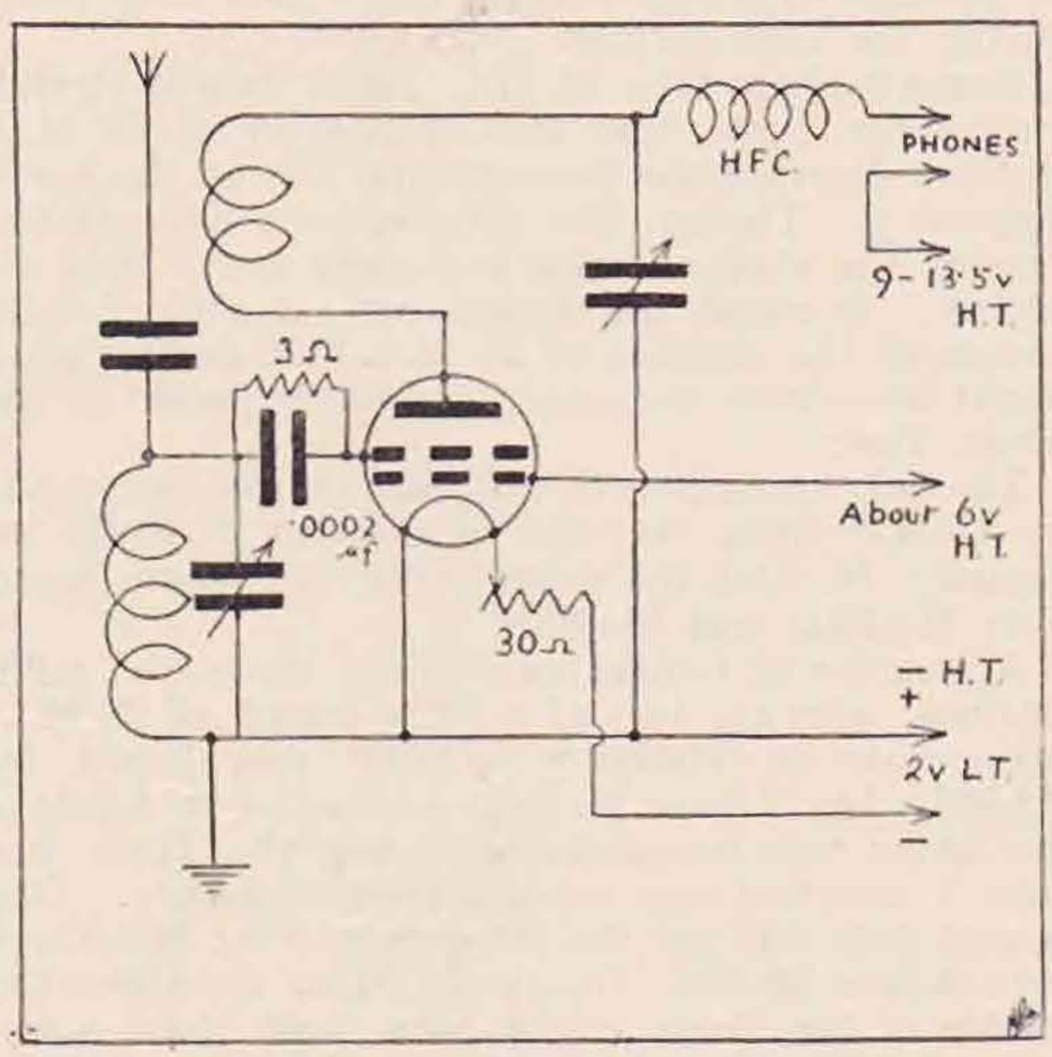


Fig. 2. EAR11's Receiver.

G6OO 2, G6BB 1, while several others had no success at all.

On the receiving side I feel that a word of praise is due to Miss Corry (BRS776) for an excellent log. Not only has she scored by far the most points, but her results are well set out, so that it is easy to see at a glance how things have gone with her. Her best DX was CV5CM, but she makes up for this by the number of stations heard, for during the two week-ends she heard no fewer than 18 French, 15 Dutch, 11 German, 4 Swiss, 3 Belgian, 3 Danish, and 1 Italian, Spanish, Lithuanian, Roumanian, Czecho-Slovakian, Austrian and Algerian.

BRS575, with 54 points, has heard some good stations, too, considering how poor conditions seem to have been.

BRS681, with 31 points, heard no DX, but a good number of the less heard stations in this country. The most distant stations he heard were FM and UO.

As mentioned previously, BRS408, who failed to enter for the Tests, had a great deal more success

than the other stations. Between 05.00 and 09.00 on April 6 he heard quite a number of W stations, which rather makes one think that our other BRS men were not after the worm quite early enough.

I have also to acknowledge logs from G2BI, SW6WL, and G5JU. G2BI also heard a few W stations, but late at night on April 5.

In conclusion, I would like to offer my thanks to those stations which did take part in what proved to be rather poor Tests, for there is no doubt that conditions were extremely poor during both week-ends. May we have better success next time.

Review of Foreign Magazines.

WE welcome the publication of yet another Ham magazine, the Finnish Society (SRAL) having produced the first number of their journal. This contains sixteen large and well-printed pages of what is, unfortunately, completely unintelligible matter to the reviewer.

An interesting receiver (Fig. 2) is described by EAR11 in the February "EAR." This uses a Tungsram type DG107 tetrode in a Schnell circuit. A vernier action 30 ohm filament resistance is included, and it is claimed that by careful pre-adjustment of this and of the degree of coil coupling, exceptionally smooth reaction control is obtainable.

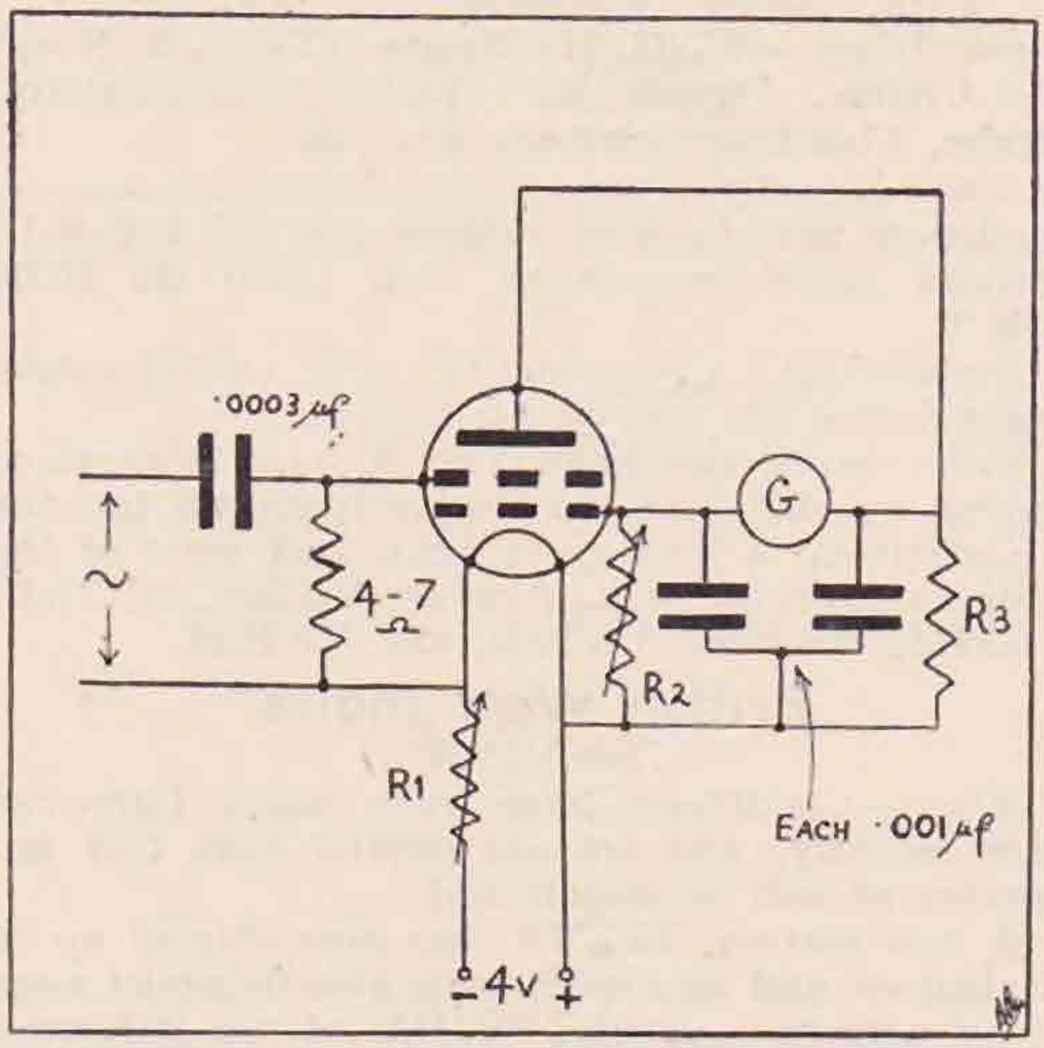


Fig. 3. Valve Voltmeter.
R_2—1,000 ohms. R_3—5,000 ohms.

The arrangement is particularly suitable for use in a portable outfit, as the filament current can be taken from a single dry cell, and the anode voltage supplied by a nine-volt dry battery, the accelerating grid voltage being set at about three volts less than the plate voltage.

Another application of the four electrodes valve is described by L. Medina in the issue of "Funk" of February 26. This is a valve voltmeter working entirely from a 4-volt accumulator so that calibration changes due to varying H.T. voltage are avoided (Fig. 3). A filament resistance R_1 is included to permit of adjustment of the filament voltage to the value used during calibration.

The principle adopted is to balance the voltage drops across R_2 and R_3 due to the passage of the accelerating grid current and anode current respectively, the balance being affected by variation of R_2, and indicated by the sensitive galvanometer G, which, of course, need not be calibrated.

The indications of the instrument have been found to be independent of frequency over a range 50 cycles to 300 Kc's.

DE908 calls attention, in CQ, to an international weather code which is used by ships' operators, and suggests its adoption by amateurs. The code is as follows :—

b clear sky.	p showery.
c few clouds.	q squally.
d drizzle.	r rain.
g overcast.	s snow.
h hail.	t thunder.
l lightning.	u threatening sky.
m misty.	v very clear.
o overcast.	w dew.

Reception Tests.

The dates and periods for the next Tests are given below. Additional contributors of logs are required, and here is an opportunity for B.R.S. members to do some useful and helpful work. Logs are also, of course, welcomed from transmitters, and we still await co-operation from Wales and Ireland. Standardised logs—quarto size—(as R.S.G.B. notepaper) should be headed as follows :—

Member's Name and Station Sign.....
Address .....
Wave Band.....M.C. Receiver.....
Type and Aerial Details.....
Direction .....
Date..... Period..... B.S.T
Other information.

Time. B.S.T.	Station. Calling.	Called.	QRK R	Tone T	QSA W	QSC	Remarks.
.....	.....	.....	.....	.....	.....	.....	.....

Separate sheets to be used for each period. All logs are circulated to all contributors (including Holland). Logs should be sent to T. G. St. Johnton, 28, Douglas Road, Chingford. E.4.

RECEPTION PERIODS AND BANDS.

Date.	B.S.T.			Band.
Sat., May 21	2300-2400	...	...	1.7 M.C.
Sun., May 22	0800-0900	...	...	1.7 ,,
Sun., May 29	0900-1000	...	...	1.7 ,,
Sun., May 22	1000-1100	...	...	3.5 ,,
Sun., May 29	1900-2000	...	...	3.5 ,,
Tues., May 31	2000-2100	...	...	3.5 ,,
Sat., May 21	2100-2200	...	...	7 ,,
Sun., May 22	1500-1600	...	...	7 ,,
Sun., May 29	0700-0800	...	...	7 ,,
Sat., May 21	1700-1800	...	...	14 ,,
Sun., May 22	1400-1500	...	...	14 ,,
Sun., May 29	1700-1800	...	...	14 ,,
Sat., May 21	1500-1600	...	...	28 ,,
Sat., May 28	1400-1500	...	...	28 ,,
Sun., May 29	1100-1200	...	...	28 ,,

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.

Channel Islands.—H. J. Ahier (G5OU), Lansdowne House, 45a, Colomberie, St. Helier, Jersey, C.I.

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 Regt., Kaduna, Nigeria.

N. India and Burma.—R. N. Fox (VU2DR), C/o VU2FX, Sgt. C. D. Connerton, Aircraft Park, Lahore Cantonments, Punjab, India.

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

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

WE are certainly voicing our own feelings and those of Dr. Lunt, ZT1Q, when we ask for more uniformity in the B.E.R.U. Notes. Most of the reports are dated, but the general value would be greatly increased if *all* could be dated, and some idea given occasionally of the differences between Standard Time and G.M.T. for the country reporting. We realise that reports reaching us by post are necessarily late, and rather out-of-date when published, and it is a matter of regret that the Empire Link Stations are finding the bad conditions so much against them that such few reports are received by Radio. With the careful organisation of the Link Stations last year by our Acting Vice-President, Mr. Arthur Watts (G6UN), we had hoped that all there ports would eventually be received by Radio, though at the present we must, apparently, await a return of good conditions to see our desire fulfilled.

ZT1Q also asks whether Cape Town is a better receiving centre than Johannesburg, as in the March issue, ZT6X says: "14 M.C. is absolutely dead, etc.," and on another page he (ZT1Q) reports reception on 14 M.C. of 101 stations in 25 countries in all continents!

Australia.

By VK2HC.

February-March. — Local work still continues on 28 M.C., but conditions are not as reliable as they have been for the past few months. On 14 M.C., DX is extremely erratic; the last two week-ends of the B.E.R.U. contest were the best, but not so good as this time in previous years. The best period is between 12.00 and 14.00 G.M.T. generally. Some very good results were obtained on 7 M.C. during the tests; QRM and QRN were bad, but conditions were far more reliable and DX B.E.R.U. stations could be worked from 12.00 till 19.00 G.M.T.

Despite QRN a large number of ZL contacts were made during the test on 3.5 M.C.

From results that have come to hand it seems as though we shall lose the trophy this year, but the VK's put up a jolly good fight, and some of the stations deserving of mention are VK2OC, VK2XU, VK3WL, VK4GK, VK5GR, and VK7CH.

British West Indies.

By V1YB.

April.—Conditions have very much improved here recently, and we are hoping that this improvement will be maintained.

A new station, VP2MR, has now started up in Barbadoes, and we expect to be able to report some of his activities shortly. V1BA, of the Bahamas, has opened up a Morse class for beginners in Nassau, and when he left for leave in England things were looking well for a radio boom in the West Indies.

Canada.

By VE2BB.

March-April.—Reports this month are scanty, as little DX has been worked and enthusiasm is difficult in such poor conditions. Some European stations, however, have been heard on the 3.5 M.C. band, but the spring rush of DX that was anticipated has not materialised, much to the disappointment of Canadian amateurs.

Enclosed with a QSL card received by a VE station from England recently was a letter which was greatly appreciated by the Canadian concerned, and we should like to say that letters such as these are always highly appreciated by the amateur,

who, although thousands of miles from "home," still keeps a corner of his heart for the Old Country.

Ceylon and S. India.

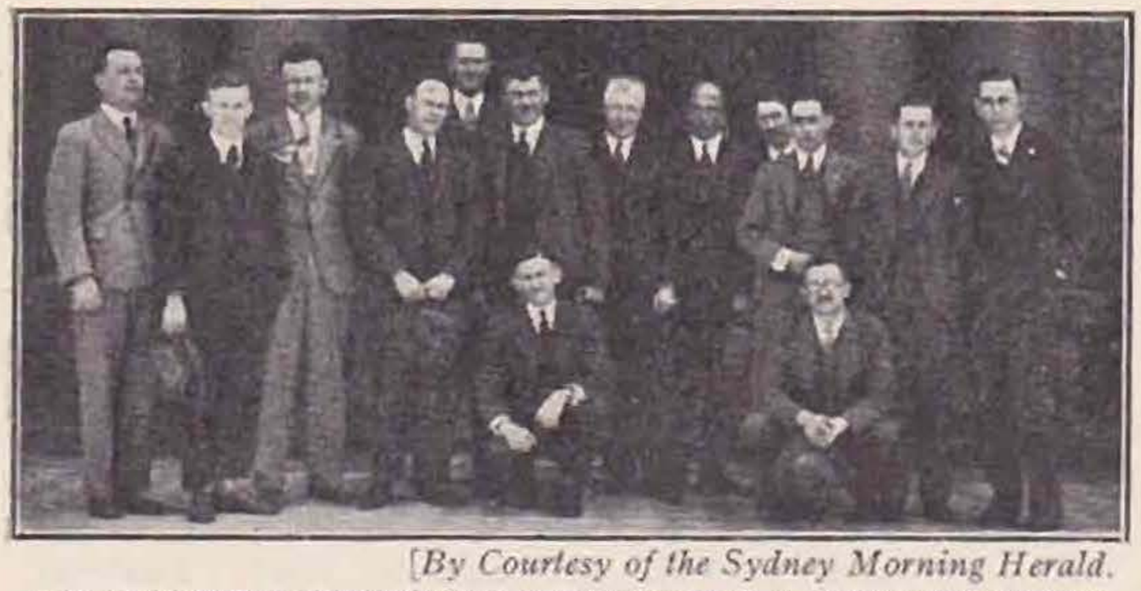
By VS7GJ.

March.—February 28 terminated the fourth and last week-end in connection with the B.E.R.U. Trophy Contest. Unfortunately all local stations competing were seriously handicapped by extremely poor conditions during the latter half of the test.

March has registered no improvement, and now with the approach of the inter-monsoon period, conditions will vary daily, the only constant feature being heavy QRN, which reaches R99 at times. Our local competing amateurs wish to express to all B.E.R.U. members and G6UN personally their appreciation of a most enjoyable month's working.

As VS7GJ is shortly leaving on furlough, all B.E.R.U. matters are being attended to by VS7GT.

(*We at H.Q. would like to take this opportunity of expressing to VS7GJ our sincere appreciation of the work that he has done for the cause of B.E.R.U. in Ceylon, and we hope that it will not be long before we have the pleasure of a personal meeting.*—Ed.)



[*By Courtesy of the Sydney Morning Herald.*

A GROUP OF OFFICERS AT THE W.I.A. CONVENTION. Left to right: VK4MM, C. H. Norville, VK2NS, VK3BM, VK2HC, Alderman Jackson (Lord Mayor of Sydney), VK2DE, E. T. Fisk, VK4LJ, H. Elliott, VK2DY, VC5KW. In front: VK3YX, VK2XX.

Egypt.

By SU1CH.

March-April.—ST2D, recently in Alexandria, paid a visit to SU1CH, and a very enyjoyable evening was spent in conversation and in QSO with other stations. This meeting will, it is hoped, be the first of many, as ST2D is to be transferred to Cairo some time in April and SU1CH is tired of being on his own in Alexandria. The station at the moment is temporarily off the air as it is now doing service as a local broadcast station to raise sufficient funds to buy new batteries for the receiver! Will anyone who works W1CH, W4FT, W3CEP or W2BDS please tell them of the foregoing and ask them to watch out for SU1CH again in May or June?

Iraq.

By YI2DC (*via* G2RJ.)

February-March.—Conditions during February have been very poor on both the 7 and 14 M.C. bands, except in the third week, when quite an appreciable number of DX stations were worked. YI2DC and YI6KR were very active during the B.E.R.U. tests.

Irish Free State.

By EI2B.

April.—Conditions here on 14 M.C. are still very irregular, with occasional quite good periods and long spells of very poor ones. This is the writer's experience borne out by the reports of the only two stations which have reported this month. On 7 M.C. conditions, though rather "patchy," are on the whole fairly good, but at week-ends phone QRM makes work on this band anything but a pleasure. EAR stations seem to come in particularly well after 20.00 G.M.T., and often when there is little else to be heard. We have to welcome a new EI station, EI9D, whose QRA is Capt. G. H. Noblett, M.C., Barley Hill House, Westport, Co. Mayo. He is on the air on 7 M.C. and would welcome reports on his signals.

Malaya.

By VS2AF (*via* G2OA).

January-February and March.—During January and February conditions on the 7 M.C. band were quite good, although 14 M.C. proved to be useless for DX contacts. March produced a rapid improvement in conditions on this band and 7 M.C. still remained a useful medium for DX. 28 M.C. continues to be as dead as mutton, but 56 M.C. is being used to considerable extent locally for duplex phone between VS2AB and VS2AF. The power is 7 watts over a distance of ten miles. All active stations are crystal controlled.

Nigeria.

By ZD2A.

March-April.—There is very little to report at present. ZD2A is closed down and has been on the move for the last two months, hence the lack of reports. Preparations were put in hand for listening to the long distance flight, which would pass over Nigeria, and there was disappointment when news came that it had been postponed till next winter.

ZD2A sails for England in May and a new representative is required to take over from him.

(*Our thanks to Capt. Wilmot for the hard work he has done in Nigeria. We have watched the progress of the Nigerian group with interest and hope that it may flourish in spite of the fact that the leading lights seem to have left for England.*—Ed.)

South Africa.

By ZS4M (*via* G5ML).

March-April.—The seventh annual Conference of the League was held at Port Elizabeth on Saturday, March 26. Opening the Conference, which took place at the Technical College, the principal, Mr. Pardham, made a brilliant speech, tracing the evolution of radio and eulogised the wonderful work which was being done by the amateur experimenter.

Owing to the unavoidable absence of Mr. White, Division 5 had the honour of providing Conference with a chairman in Mr. McIver, who at the request of Division 2 undertook the journey and duties at very short notice. The Conference was attended by 25 members. Mr. Everitt, ZT6U, was the representative of the newly-formed council.

Greetings and messages of goodwill were received from all parts of the world.

It must be understood that the Conference now meets for the purpose of making recommendations to the Council, regarding the policy and work of the League, to hear the reading of technical papers by members delegated to submit same and to receive and classify collective data as brought forward by

(*Continued on page* 400).

NOTES and NEWS from the BRITISH ISLES

DISTRICT REPRESENTATIVES.

DISTRICT 1 (North-Western).
(Cumberland, Westmorland, Cheshire, Lancashire.)
MR. S. HIGSON (G2RV), "Hebblecroft," Egremont Promenade, Wallasey, Cheshire.

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

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

DISTRICT 4 (East Midlands).
(Derby, Leicester, Northants, Notts, Rutland, Lincoln.)
MR. H. B. OLD (G2VQ), 3, St. Jude's Avenue, Mapperley, Nottingham.

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

DISTRICT 6 (South-Western).
(Cornwall, Devon, Dorset, Somerset.)
MR. H. A. BARTLETT (G5QA), 95, Old Tiverton Road, Exeter, Devon.

DISTRICT 7 (South-Eastern).
(Berkshire, Hampshire, Kent, Surrey, Sussex.)
MR. J. DRUDGE COATES (G2DC), "Burleigh," Farnborough Park, Hants.

DISTRICT 8 (Eastern).
(Cambridge, Huntingdon, Norfolk, Suffolk.)
MR. S. TOWNSEND (G2CJ), 115, Earlham Road, Norwich.

DISTRICT 9 (Home Counties).
(Bedfordshire, Hertfordshire, Essex, Buckinghamshire.
MR. F. L. STOLLERY (G5QV), "Kingsmead," Lancaster Gardens East, Clacton-on-Sea, Essex.

DISTRICT 10 (South Wales and Monmouth).
(Monmouth, Glamorgan, Breconshire, Carmarthen, Cardigan Pembroke.)
MR. A. J. E. FORSYTH (G6FO), "St. Aubyns," Gold Tops, Newport Mon.

DISTRICT 11 (North Wales).
(Anglesey, Carnarvon, Denbighshire, Flintshire, Merioneth, Montgomery, Radnorshire.)
[To be appointed.]

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

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

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

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

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

NORTHERN IRELAND.
Mr. C. MORTON, (GI5MO), 27, Bristol Avenue, Belfast.

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

DISTRICT 1 (North-Western).

A SUCCESSFUL meeting was held in Liverpool on Saturday, April 16, although the attendance was not too good. A very interesting talk was given by G5KR on a microphone which has been entirely home constructed, and is a very fine job. The way in which the main block of marble forming the mounting has been finished would have done credit to many a professional. It is mounted into a portable tubular aluminium stand. G2OA later gave a brief talk on a new development in self-excited frequency stabilisation especially suitable for frequencies in excess of 28 M.C. This was developed by the R.C.A. and is known as the "Long Line Frequency Stabilisation Method." No information is to hand about the Manchester meeting, but it is understood that a good one was held and the usual 20 or so members were present. A field day is projected for May 22. G2OA can give full particulars of this event, and we want as many as possible to turn out and make it an absolute success. Remember the date. One of the C.R.'s suggests that I should publish the reports as given to me. I am sure you will appreciate that the space in our BULLETIN is limited. So if your call does not get in the BULLETIN, please do not be disappointed; the C.R.'s are delighted to have long reports, but cannot always include everything in their report, and I have to cut down and use only what I consider the most outstanding pieces of news.

G2WP reports little doing, and has c.c. on 3.5 and 7 M.C. 2AWV sends in his usual fine list of DX heard, and reports hearing J1EE on 7 M.C. We offer our congrats to G5UT (ex BRS605), and welcome him to the "Full Ticket Ranks." G6QA has been busy with a condenser Mike, and says that 1,7 M.C. phone is very encouraging. BRS768 finds counterpoise earth a success. G5WG is having a spot of bother in getting going at his new QRA. The monthly budget is shrinking again. What about it? G6OM is on 3.5 M.C. G5GY is periodically active on 7 and 1.7 M.C. G5BR has left the county for the time being. G2VP, G5OZ and G2CG are active on 7 and 14 M.C.;

G5OL experimenting with key filters. G2OA active on 14 M.C: finds DX spasmodic except for the Far East. Welcome to BRS 789 and 812, who, with 2AOB are "brushing up their Morse." G2QB and G5FC report, but are inactive at the present.

DISTRICT 2 (North-Eastern).

First of all, let me thank all who attended York conventionette. The report appears elsewhere.

G6WP finds things rather bad except for local work and would welcome any reports on 7 M.C. G6SR and G6SH are on 7 M.C. G2JP is on 3.5. M.C.—reports wanted. G6FG is experimenting with aerials and frequency stability with a self-excited transmitter and wants reports—14 M.C. week-ends only. G5FV has had remarkable contacts. A regular sked with VK7CH daily is proving a success. 28 M.C. is being tried, but, so far, no DX. G6UF had DX contacts on 1.7 M.C. test, but objects to 200 mile limit. G5NP active on 3.5 M.C. G2XH and G6YC now busy with QRO. G6LF is off the air. G5IA is now rebuilding for 7 M.C., but is still active on 1.7 M.C. with the majority of the Leeds group. BRS588 is hoping for a transmitting licence in the near future.

The Sheffield meeting again a success. G6MN and G2XS attend regularly. (Thanks OM's for support.—D.R.)

DISTRICT 3 (West Midlands).

G5VM has now resumed his DR duties, and sincerely thanks G2ZW for the splendid way he carried on the district business during his absence, and takes this opportunity of thanking the members of this and other districts for their kind enquiries during his wife's illness.

Will all members in Staffordshire please note all future reports should be sent to Mr. F. J. Singleton (G5UW), Wellington Place, Penn Fields, Wolverhampton. G5UW has been asked to take over the CR of this county, and would like all members of same to get in touch with him, and send their reports by the 15th of each month. Mr. H. Littley (G5NV), Bridgnorth Road, Stourton, Stourbridge, is C.R. for Worcestershire, and Mr. F. W. Miles (G5ML) is C.R. for Warwickshire; will the members of these districts send their reports to the C.R.'s each month.

G2OQ and G5UW have been measuring and adjusting drive inputs and saturation points in the various stages of the transmitter, resulting in some very interesting data being obtained. (What about an article, OM?—D.R.) They have found conditions on 7 M.C. fair, and have had contacts with VK, ZS, K4, Afghanistan on that band. Much time has been spent in designing and constructing a portable RX-TX for G5UW's forthcoming cruise commencing June 1. (See separate notice elsewhere in this issue.) BRS587 is now 2BUS, and is testing a parallel fed Ultraudion with good results. G2ZW and G6XQ are changing over from DC to A.C. mains. G5QC has changed over to Push-Pull PA, and is very pleased with the performance. G2NO, an "old timer," is active again, but no report received. G5BJ, G2PD, G5NI, G6KI, G5TL, G5VM are all active, but find conditions very bad, and good contacts are few and far between.

DISTRICT 5 (Western).

Gloucestershire is still going ahead strongly, and 48 members attended the monthly meeting at Bristol in April. The membership is now 90, which is an increase of 220 per cent. in six months. Morse classes are in full swing on Mondays and Fridays, and the magazine is very popular, and the technical articles are much appreciated.

The Wiltshire letter budget is still going strong and contributions should reach G2BI on the last day of each month.

In Oxfordshire, G5LO has been working on 28 M.C. with G2GG, and got his sigs at R5 over 14 miles when using an aerial only 3 ft. high. We are glad to know that BRS616 has got a three letter call, and look forward to his full ticket before long.

During the summer it is hoped to arrange some field days, as last year these were a very great success and very much enjoyed by everybody who took part.

Everybody is complaining of the bad conditions on 14 M.C., and at the moment of writing the bottom seems to have dropped out of this band. Some time ago under C.B. aerial notes particulars were given of a small tansmitting aerial called the Wilkinson. The D.R. would appreciate reports from BRS members if this type aerial is better than the usual one for reception.

COME TO TORQUAY!

DISTRICT 6 CONVENTIONETTE

WHIT-SUNDAY, MAY 15

Meet at G5SY, "Sherrington," CLEVELAND ROAD, at 3 p.m. Tea at 5 p.m.

Station Visits.

Dinner, 7 p.m., at St. James' Hotel, Victoria Parade.

Make a point of spending your Whitsun Holiday in the Sunny South.

DISTRICT 6 (South-Western).

Conditions as a whole are reported by all members in this district as being very poor indeed. G5SY has had trouble with a DET1SW, which has been returned to the makers for their report. He finds an LS6a an excellent valve as PA, and he is now using this whilst awaiting another DET1SW. BRS458 hopes to have the full permit very soon. He has been busy putting up a 33-33 ft. antenna, and wants to know the best way of getting a T8 note in a self-excited TX, using A.C. on the filament. Is your centre tap accurate, OM? G5QS was QSO with OH and SP on 14 M.C. with 4 watts; these two stations were his first QSO's. G5WY, of Exeter, is disappointed with the neuted PA, and intends using a locked amplifier. He also complains of bad conditions on the 14 M.C. band. G5VL, our old friend of Porth, has not done much. He is still active, as also is G6XB of Redruth. G2ZP has purchased a new T6ID, which is working very satisfactorily. He works on 14,120 and 7,094 K.C.'s, G5QA is as active as he can be, although business QRM cuts off a lot of time which might otherwise get a few good QSO's. The frequency of this station is now 14,360 K.C.'s, and is C.C. with DO20 as PA.

If anyone wants a really good key thump filter, G5SY will be only too pleased to supply a diagram of one which DOES really cure all traces of key clicks. (Can we have details for the BULL, please? —ED.)

DISTRICT 7 (South-Eastern).

The annual Conventionette will be held at the Wellington Hotel, Mount Ephraim, Tunbridge Wells, on Sunday, June 5. It is requested that members attending will let their CR. or the D.R., know as soon as possible. We want to see a bumper crowd this year, and we want to cater for all, so drop your C.R. a card in good time OM'S.

G6WY reports a falling off in the conditions on all frequencies except 1,750 K.C.'s. Activity on this band is steadily increasing, and excellent work is being done. G2IG and G6XO are doing well with phone on 56 M.C. A Kent Conventionette was held at Gillingham on April 10, and was attended by 25 members.

DISTRICT 7 CONVENTIONETTE

SUNDAY, JUNE 5, 1932

THE WELLINGTON HOTEL
Mount Ephraim,
TUNBRIDGE WELLS

12.00 noon.	Assemble Wellington Hotel.
12.30 p.m.	Photograph.
1.00 p.m.	Luncheon.
2.30 p.m.	General Meeting.
5.00 p.m.	Tea.

The charge for luncheon and tea will be 4/6 per head. It is hoped that as many as possible will attend. Please let your CR know in good time. Y.L.'s welcome.

G6NK reports great activity prevailing in the Surrey area on the 56 M.C. band. Four transmitters are active and about 10 receivers. The monthly meeting was held at the QRA of G2NH, and 14 attended. A demonstration of 5-metre duplex phone was given by G2NH and G5MA with great success. G6NK asks for more reports from members; just a card each month, BRS men especially.

G6GZ is still going strong with the combined Letter Budget, which maintains an average of 15 letters per month. This budget is really good, and many interesting tests are described each month. G2AX reports conditions and activity about normal among the Sussex gang. More reports from members are wanted.

All of us, I expect, have had QSO's with "local" stations. Perhaps we have never met the individuals, yet quite a number of fellows that you have never seen are your pals, on the radio. Meet your pals, talk about that QSO, at Tunbridge Wells on June 5.

DISTRICT 8 (Eastern).

No members in this district attended the Districts 8 and 9 Conventionette at Easter. This is a pity, but is due to the fact that we have so few keen members, and even these could not manage to get to Clacton.

As a result of exhortations from Headquarters these notes will not in future contain any account of the activities of individual members, unless something outstanding has been achieved. To be mentioned here you must have W.A.C. with 1 watt, or raise a junior "op," and if anyone raises twin junior "ops" I will try and arrange for it to be mentioned in blocks capital.

I hope everyone realises that their monthly reports are wanted even though their contents does not appear in print. Reports last month were better. Keep it up!

DISTRICT 9 (Home Counties).

Very little to comment upon this month as G5QV has been rebuilding, and has not been QSO by radio with his usual sources of information.

The C.R.'s, G5FB and G2HJ report as usual. G5MR has been on the air again, and G5VT, our newest transmitter, has had encouraging results.

G5FB paid a visit to District No. 14's portable station at Abbis Roothing, Essex, and enjoyed himself immensely. He wishes he could instil some of the enthusiasm of District 14 into his county members.

DISTRICT 10 (South Wales and Monmouth)

Activity in the District is being well maintained, the bands chiefly in use being 1.75, 3.5 and 7 M.C., with a few stations working spasmodically on 14 M.C.

A further effort is being made to keep the Letter Budget alive, and it is hoped that it will be on a firmer basis by the time this is in print.

A local meeting was held at G6FO on Easter Tuesday, when I was glad to see the following: G2PA, G5NS, G6GW, 2ANN, 2BRA, BRS245, BRS766 and BRS827.

The monthly meeting at the Cardiff Technical College on April 7 was very poorly attended, though it seems that all members were not quite clear as to the date. There were present: G5WU, G6FO, 2AKG, BRS525 and BRS727. For the information of the District, it has been decided to hold these meetings on the first Thursday of each month, and all members will be notified by the C.R.'s.

G5WU (ex-2BRF) of Penarth, the C.R. for Glamorgan, is now going on 1.75 M.C., using a pair of P.650's in push-pull in a T.P.T.G. circuit, the radiating system being aerial/counterpoise. His great difficulty is noisy D.C. mains, the alleged D.C. being mercury-arc rectified A.C., with a dirty connection or two thrown in. We are very glad to have back in the fold G5FI of Cefn Coed, the C.R. for Brecon, after his long sojourn in hospital: he is to be working regularly on 1.75 M.C. G5KK of Newport has been heard making QSO's on 7 M.C., but otherwise seems to lead a hermit-like existence.

The following stations are known to be active, though few of them have told the C.R. anything it: G2PA, G5FI, G5LP, G5NS, G5PH, G5TW, G5WU, G6FO, G6GW, G6TH, 2AIS, 2AKG, 2BPM, 2BRA, BRS245, BRS518, BRS525, BRS573, BRS659, BRS727, BRS766, BRS827. Please report to your C.R. by the 15th of the month. We

also welcome as a new member Mr. Bodman, of Tredegar.

DISTRICT 13 (London South)

The amount of space taken up by District Notes is always a matter of regret on the part of our Editorial Committee. The compactness of the South London area and the monthly meetings makes the publication of notes seem redundant—at least, judging by the dwindling number of reports received each month. In future only matters of absolute importance will be inserted under District Notes. Where the membership is spread over a large county the notes may have some value in bonding scattered people together.

To the three supporters who sent me reports this month I tender my thanks, and hope they see the futility of continuing under the circumstances. The other members of this District will not mind if they never see these notes again!

DISTRICT 14 (London East)

At our last monthly meeting, which was held at the QRA of G6LL, Clapton, it was decided that a weekly rag-chew should take place on the 1.7 M.C. band from 2305 to 2400 B.S.T. every Tuesday except the fourth Tuesday of each month, which is reserved for our monthly meetings. An additional meeting was also held last month at the QRA of G6FY, Leytonstone. BRS752 is now 2BXO. Mr. Barker, a new member, is now in evidence as BRS855. A very successful series of field days over a period of three week-ends at Rookwood Hall, Abbess Roding, Essex, has just been concluded and it is hoped to publish an account of these in the June BULLETIN. A number of cinematograph pictures were taken by G6LL, and it is hoped that these will be shown in London later on. The next monthly meeting, to which members outside the District are cordially invited, will take place at 28, Douglas Road, Chingford, E.4, at 7.0 p.m., on Tuesday, May 24.

DISTRICT 15 (London West and Middlesex)

Only nine attended the monthly meeting, but those who did heard a very interesting paper on ultra high frequencies read by G6XN. The May meeting will take place at G6WN on Saturday, the 21st, at 7.30 p.m.

Sunday, April 17, saw a party from the District on a visit to the Nottingham gang. A very fine day was spent in their company visiting stations. Our thanks are due to those in Nottingham and district who made us so welcome, and in particular may I menton G2VQ.

Fewer reports have come to hand this month, and I should like to see more. All report conditions as not too good, but DX has been workable.

Our congratulations go to G5CV, who has W.A.C. 'on 'phone, and only awaits confirmation. This is, I think, the first claim for this achievement in the District.

SCOTLAND

I do not propose to make any comment on conditions this month, as continual wailings on this count become monotonous. This I will say, however: many appear to have the intention of giving radio a complete holiday this summer, and I fear the progressive deterioration of working conditions is to blame.

While in some degree sympathising with those who intend to express their disgust in this way, I would like at the same time to point out that amateur radio does not have for its sole ultimate end the facilitating of inter-communication between amateurs. Thanks to the past few years of intensive work, there is not now a great deal to be learnt with regard to inter-communication technique. I do not claim that all the problems of inter-communication have been solved, no, not by a very long chalk, but as certain conditions have meanwhile rendered research in this direction extremely difficult and unsatisfactory, we must not lose sight of the fact that there is an enormous unexplored field from a laboratory point of view, and especially in the regions of the ultra-high frequencies. I commend this thought to my fellow members.

"D" District has signified its intention to bring its fortnightly meetings to an end for the season on May 4, and I trust I shall be able to be present.

"A" District will conclude its monthly meetings for the season on Wednesday, May 25, when I hope there will be a full turn-out.

I am glad to learn that G5XQ, "A" District officer, has now recovered from his illness, and resumes control of his District.

The following alterations fall to be made to the Crystal Register: G6RG, who inadvertently purchased a crystal which, when doubled, QRM that of G6RT (whose crystal frequency is 7,030 Kc.), has had its frequency altered to that of one of his other crystals, which became fractured. Kindly, therefore, delete G6RG's 3,515 Kc. crystal.

The following new crystals have been purchased and fall to be added:—

2AQP. Mr. G. Spence, 107, Dumbiedykes Road, Edinburgh. Fundamental 7,033 Kc.

2AVU. Mr. J. Hunter, 51, Camphill Avenue, Langside, Glasgow. Fundamental 3,525 Kc.

G5IM. Mr. E. N. Black, 361, Brook Street, Broughty Ferry. Fundamental 1,770 Kc.

NORTHERN IRELAND

Conditions still remain poor, especially on 14 M.C. The 1.75 M.C. band is the best for G contacts; such contacts are difficult on 7 M.C. until late in the afternoon, and even then are mostly unsatisfactory, due to QSB and QRM.

GI5QX has certainly made a flying start to his transmitting career; his first report records activity on 7 M.C. and 14 M.C. with a bag of four continents, and including VS7GT, W1, 2, 8 and 9. W has been worked on both 7 M.C. and 14 M.C., which is excellent work for a 10-watt station in such poor conditions as prevail here. GI5UR, another new man, and whose call appeared in error as GI5RU in last month's QRA Section, is active with QRP 1.8 watts. His log for the month also shows excellent work, being QSO 18 countries, including CT2, OH and CV. GI6YW has not been so active this month, and reports conditions on 14 M.C. as almost impossible. Best contacts were two with Malaya. BRS515, now 2AXW, has been an active receiver, and collected a total of 2,646 points in the B.E.R.U. Tests. He has just passed his Morse test, and is to be expected on the air any time with a GI call. GI5MO has not been active this month. The following stations are known to be active, but have failed to report: GI2CN, GI6HI, GI2KN, GI6YM, GI6WG, GI5SQ, GI5SJ, GI5GV.

Reports should reach me not later than the 20th of each month.

B.E.R.U. Notes—(*Continued from page* 395.)

the various divisional committees or members individually. The development of the technical and scientific side of radio is now the ambition of Conference.

The annual general meeting, as distinct from Conference, will now be held at Johannesburg, and is merely a formal meeting for the consideration of the various reports, etc., on the year's working. The new constitution is now operative and this year's Conference was governed by it. The meeting received reports from the hon. organising secretary, the treasurer, and the Editor of Q.T.C., who reported a falling off in revenue and a slight decrease in members' help. This was felt to be due to the prevailing depression, but Conference was very optimistic regarding the future. The present Council of the League remains in office until next year, and Conference, in response to a resolution moved by our Chairman, placed its full confidence in the League's first council, with the assurance that every member would do his best to further the interests of his League. The future policy of the League was considered and certain suggestions regarding technical development were submitted for the consideration of the Council.

ZS2F delivered a very interesting lecture on aerials explaining various types, followed by a general discussion on the subject. Q.T.C. will be delayed for a full report.

At the dinner, held at the King's Hotel, our host, Mr. Lambson, ZS6C, introduced the Mayor of Port Elizabeth. Although it was their initial effort, Division 2 were to be congratulated on the excellent manner in which they organised and conducted the whole proceedings—a practical demonstration of the "ham" spirit.

Channel Islands.

By G5OU.

May.—There is not a great deal to report this month. Conditions on most of the amateur bands are fairly good, although the writer has not been on the air very much owing to building QRM and adjusting a CO-FD-PA transmitter for the 1.75, 7 and 14 M.C. bands. G2ZC is also busy building a four frequency transmitter and will be mostly on 3.5 and 1.75 M.C. when completed. ZC hopes to try out Tourmaline crystal control. 2BCS and 2BDP have been spending their week-ends "hiking" with a S.W. portable receiver. 2BYO has no radio report, but is having a good time on the Continent, and is doing some "ham" visiting. BRS775 also reports active.

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G5RV has 435 volt working 8 mfd. Electrolytics, 5s. 6d. each. Fairview, The Avenue, Sunbury-on-Thames.

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