R·S·G·B VOLUME 22 · No. 12 · COPYRIGHT · PRICE 1/6 JUNE, 1947

BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

- FIVE METRE FIELD DAYS, 1947
- ATLANTIC CITY, 1947
- MILLER TIME BASE

R.S.G.B. BULLETIN

OFFICIAL JOURNAL OF THE INCORPORATED RADIO SOCIETY OF GREAT BRITAIN

Published on or about 15th of each month. Issued free to members.

Editor :
JOHN CLARRICOATS

Editorial office :
NEW RUSKIN HOUSE, LITTLE RUSSELL ST., LONDON, W.C.1
Telephone: Holborn 7373

Advertisement Manager:
HORACE FREEMAN

Advertising Office :
PARRS ADVERTISING LTD., 121 KINGSWAY, LONDON, W.C.2
Telephone: Holborn 2494

Honorary Editor : ARTHUR O. MILNE.

CONTENTS for JUNE, 1947

VOL. XXII No. 12

THE SUMMER SEASON

AT this time of the year begins the season of big provincial meetings which have become known to us all as P.D.M's. We now have to accustom ourselves to a new name, the O.R.M. for Official Regional Meeting, but even so a change in name will make no difference in the actual functions themselves, nor will it minimise their importance to the life of the Society.

Before the war, when the R.S.G.B. was so much smaller, these meetings were often very much of a local affair and apart from the appearance of our indefatigable General Secretary, were not generally attended officially by Members of Council, except perhaps those who may have had some local interest in the affair. In the year following Victory, Council wisely decided to encourage the holding of a P.D.M. in every District and to send a strong delegation of its members to each meeting. This step has been widely appreciated as it helped to gather up the threads of the war years, enabled the membership to see their Council men and what is more important, perhaps it gave Council the opportunity of sounding general opinion on a number of matters. We feel that this policy has more than proved its worth and has justified the expenditure of a certain amount of the Society's money and also the not inconsiderable amount of time involved which has come from the personal leisure, and quite often been deducted from the annual holiday of Members of Council.

The Membership more than ever looks forward to these large Regional Meetings, of this there can be no doubt, if the excellent attendance at Weston-super-Mare is any criterion. They provide a means of hearing the latest information from people who know and also afford excellent opportunity for discussion of matters of topical interest and for the ventilation of complaints.

Your Council realises all this and has decided to continue sending a representative delegation to each Official Regional Meeting.

In most cases this will mean three Members of Council, one of whom will be an Officer of the Society whenever possible.

It is to be hoped that the membership will fully support the meetings in their own Regions so that they can keep in touch with the latest authentic information concerning a number of important matters.

We look forward to record numbers and to renewing many old friendships whilst making many new ones.

Throughout the years the old Provincial District Meeting has become associated more and more with the personality of G6CL and his famous little black book. This year, however, our President and Secretary are many miles from these shores, concerned with sterner matters and will, therefore, not be present at many of the meetings. We feel certain that your thoughts will constantly turn to our representatives in Atlantic City and that they in turn, will feel themselves fortified by the knowledge of our united support.

Elsewhere in this issue is published the first of a series of reports from the Conference. Up to the time of going to press this is the only written information we have had, but those Members who have listened to our President and Secretary on the air from various American amateur stations will know that, although they do not make any rash promises, neither of them sounds particularly gloomy! "Keep your fingers crossed" is the slogan and we are content to do just that.

Rest assured that the R.S.G.B. team has gone to the United States to put up a strong case for Amateur Radio. Whilst the R.S.G.B. has no quarrel with much of the official British plan, we do not agree with it in its entirety and no effort will be spared in trying to induce the Conference to modify those parts of the plan with which we disagree.

The I.A.R.U. team represents Amateur Radio and no one else. It is not committed to support any one official plan, but will give support where it is desirable and oppose what is considered to be contrary to the Amateur interest from whatever quarter it may come.

A.O.M.

ISLE OF MAN — GD

As a result of representations made to the G.P.O. by the R.S.G.B. on behalf of radio amateurs resident in the Isle of Man, the separate prefix GD has been allocated to all Isle of Man amateur stations who are no longer authorised to use G.

Isle of Man will henceforth be regarded as a separate Dominion Zone for B.E.R.T.A. and the new Empire DX certificate. The A.R.R.L. have also agreed to its recognition as a separate country for DX.C.C.

THE MILLER TIME BASE

By B. H. BRIGGS, B.A. (G2FJD) *

NORMAN KEITH ADAMS PRIZE WINNER, 1945)

Introduction

THE Miller time base [1] [2], developed during the war for radar applications, is also a very useful circuit for ordinary oscilloscope work. For the radar display a time base of a high degree of linearity is needed and, moreover, it is desirable that the rate of sweep should not be changed by valve replacement, change of H.T. potential, etc. In the Miller time base these features are obtained by the use of a form of negative feedback. The circuit, in fact, is fundamentally the same as that of the anode follower [3], but the feedback resistance from anode to grid is replaced by a condenser (Fig. 1 (*a*)). In this article the properties of the circuit of Fig. 1(*a*), which can form the basis of a variety of practical time base circuits, are first considered from a theoretical point of view. Two practical circuits are then described. The first is a single valve time base, covering a range of sweep frequencies from 25 c/s. to 200 kc/s. The second is a circuit, employing the Miller principle, which effectively enables a variable condenser of very high capacity to be produced.

Practically all time bases produce the required linear change of potential by charging or discharging a condenser with a constant current, and the Miller time base is no exception.

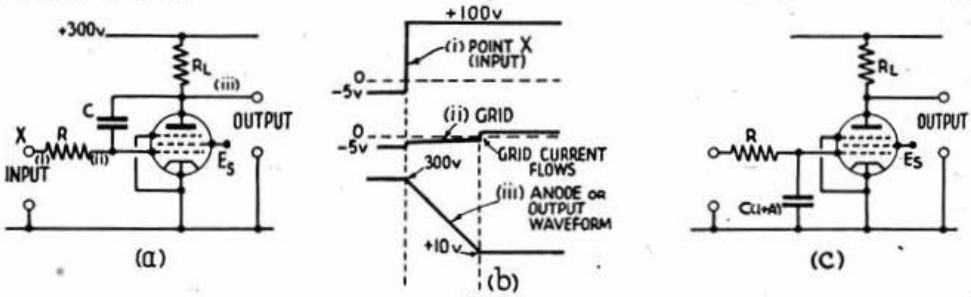


Fig. 1.
(*a*) Basic circuit of the Miller time base. (*b*) Waveforms. (*c*) Equivalent circuit.

Basic Theory of Operation

Consider first a sine wave input applied to the circuit of Fig. 1 (*a*). (Fig. 1 (*c*) should be ignored for the time being.) The output from the anode will be a sine wave, but the frequency response of the circuit will not be flat. The reactance of the condenser C will vary with frequency, and at low frequencies there will be very little feedback, while at high frequencies the feedback will be very heavy. Thus the output falls off with increasing frequency. The gain from input to output is given mathematically by the ratio of the impedances of the two arms of the "see-saw," so that :—

$$\text{Gain} = -\frac{-j/\omega C}{R} = \frac{j}{\omega CR}$$

This shows that there is 90° of phase shift in passing through the circuit, and that the output falls off inversely as the frequency.

This case is not of great importance for the purposes of the present article, but is given to show how the circuit is related to the anode follower. Of more immediate concern is the response of the circuit to an input waveform which is *not* a sine wave, and in particular to an input consisting of a sudden positive-going "step." Suppose, then, that the point X (Fig. 1 (*a*)) is first held at a small negative potential (say —5 volts†), sufficient to cut off all the current in the valve, and is then suddenly switched to a high positive potential (say + 100 volts) (Fig. 1 (*b*)). At first sight it might appear that the grid would immediately go positive, and a large current would suddenly flow in the valve. However, a sudden surge of current in the valve would cause a sudden fall in the potential of the anode, and this would be fed to the grid through the condenser C. The grid would be "pushed" negative, and no current could flow in the valve. It is therefore impossible that this should happen. Before any large current can be set up in the valve the condenser C must have time to discharge. Instead of a sudden fall of anode potential, then, we get a *slow* fall, and a corresponding *slow* rise of grid potential. The rate at which a condenser can charge or discharge is determined by the current flowing into it. From Fig. 1 (*a*) it is clear that the only current which can flow into C is that flowing through the resistance R (assuming that there is no grid current in the valve), and this current is very nearly constant. This last statement will be justified provided that the potential difference across R does not vary appreciably, *i.e.* the grid potential must not change by an amount comparable with 100 volts. This will always be the case in practice because a few volts change of grid potential will be sufficient to produce several hundred volts change at the anode. It follows that C discharges in a linear manner. The above can be summarised by the following statements :—

(1) When the point X is suddenly switched to a positive potential, the anode potential begins to fall in a linear manner, starting from H.T. potential. This effect is often referred to as a Miller "run-down" of the anode.

(2) The grid potential rises steadily during the run-down, this rise being the cause of the increasing current in the valve. The total change of grid potential during the run-down, however, will be very small.

(3) Originally C is charged to 305 volts. During the run-down it is discharged by the current flowing through R, which is very nearly constant.

(4) The conditions for proper operations are two in number (*cf* the anode follower). (*a*) There must be no grid current in the valve. (*b*) The D.C. gain of the valve must be sufficiently high for the grid motion to be negligible in comparison with the

* *20, Lindley Drive, Gt. Horton, Bradford.*

† *The voltages which are quoted in this section are intended to be for illustration only, but are roughly correct for an EF50 valve.*

anode motion, and with the positive potential to which R is taken.

The linear fall of anode potential continues until the anode falls very nearly down to cathode potential. It can then fall no further, and so the feedback to the grid ceases, and the grid rises rapidly in potential under the action of R. It will be prevented from rising appreciably above cathode potential, however, by the flow of grid current. The circuit will then remain in this condition indefinitely. The whole action is illustrated by the waveforms of Fig. 1 (*b*).

In order to make use of this effect as a time base, some method must be devised of " flashing-back " the circuit to its starting condition. This can be done by bringing the point X back to —5 volts, so that the current in the valve is cut off, and the anode returns to H.T. potential. In other words, a " square-wave " is fed in, and a " saw-tooth " waveform is produced at the output. Alternatively, the valve may be " switched " on its suppressor grid by means of a square-wave of about 60 volts peak to peak amplitude. When the suppressor is at earth potential the valve performs the Miller run-down ; the suppressor is then brought to —60 volts by the square-wave, which cuts off the anode current, so that the anode flashes back to H.T. potential on an exponential curve (because of the presence of C). Often the Miller valve is combined with several other valves to form a " trigger " circuit, so that the run-down can be initiated by a narrow triggering pulse ; the circuit can be made to flash itself back automatically at the end of the run-down. In all these cases it is necessary to start from some form of oscillator or multivibrator, and to use this to " control " the time base valve. This is standard practice in radar. By combining the Miller principle with the well-known " transitron " principle (4), however, it is possible to make a single valve " self-run," flashing itself backwards and forwards automatically. This is the principle of the single valve time base which is given later.

Calculation of Rate of Run-Down

An expression for the rate of change of anode potential during the run-down is easily obtained. Let E_b be the positive potential to which R is returned during the run-down (Fig. 1 (*a*)). Then the current flowing in R is E_b/R. This current will discharge C at a rate given by

$$\frac{dE}{dt} = \frac{E_b}{CR}$$

Provided that the two conditions previously mentioned are satisfied, this will give the rate of change of anode potential in volts per second. This is the basic equation for the design of all time bases employing the Miller principle. The following points should be noted :—

(1) The rate or " speed " of the time base is constant, and depends only on E_b, C, and R and is independent of valve characteristics, H.T. potential, etc. It may be varied by varying E_b or R, while C may be switched in steps.

(2) E_b is the only quantity which is likely to fluctuate, so that in a high precision time base, E_b should be derived from a stabilised supply (this is not usually important in ordinary variable frequency time bases).

(3) The linearity is not affected by curvature of valve characteristics.

As the grid motion, though small, is not zero, the above results are not strictly true. The following will give an idea of the departure from true linearity in a typical case :—R returned to +100 volts, H.T. voltage 300 volts. Anode load R_L = 100,000 ohms, slope of valve = 3 mA/volt. When the anode falls to cathode potential, about 3 mA of anode current will be flowing, so that the grid will have to rise 1 volt during the run-down. The voltage across R therefore changes by 1 per cent. during the run-down, so that the rate of discharge of C also varies by 1 per cent. The higher R_L and E_b, the more linear the time base will be.

It is interesting to consider the case of an arbitrary input waveform $E(t)$ applied to the circuit of Fig. 1 (*a*). The current in R will be $E(t)/R$, and the rate of change of anode potential E_a will be :—

$$\frac{dE}{dt} = \frac{E(t)}{CR}$$

It follows that :—

$$E = \frac{1}{CR}\int E(t)\,dt$$

The output waveform is the integral of the input waveform with respect to time. Because of this property the circuit is sometimes called an " integrating circuit," or a " Miller integrator." It will be observed that the results in the two cases already considered, *viz.*, sine wave input and constant " step " input, are only special cases of this general result.

Bottoming

The action which terminates the run-down when the anode falls very nearly to cathode potential can be considered in more detail in terms of the anode characteristic curves of a typical pentode (Fig. 2).

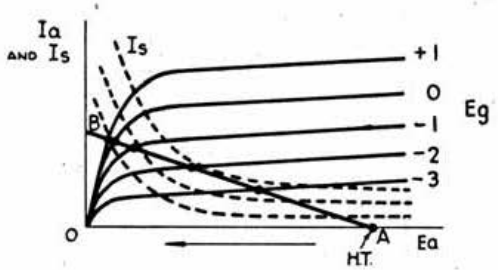


Fig. 2.
Typical anode characteristics of a pentode valve.

A load line AB for a fairly high anode load is shown. The dotted curves show the screen grid current. At the start of the run-down we are at the point A, with no anode current flowing. It has been shown that the effect of the feedback is to ensure that the anode potential falls at a constant rate ; this is indicated by the arrow under the E_a axis. The successive grid voltages as we progress from A to B along the load line are marked with large dots. It will be noticed that as the anode falls in potential, the grid has to rise ever more rapidly in order to maintain the correct rate of increase of current ; and eventually when the point B is reached, the characteristics merge together, and further increase in grid potential causes no further increase in anode current. The valve is then said to be *bottomed*. For an EF50, bottoming takes place when the anode falls to about 10 volts, for an anode load of 100,000 ohms. From the screen current curves, it will be seen that there is a large increase in screen current when the valve bottoms—in fact, the current which should have gone to the anode is diverted to the screen. This fact is made use of in the practical time base circuit which is given later.

Output Impedance During the Run-Down

By analogy with the anode follower, the circuit would be expected to have a low output impedance. It is easily shown that the output impedance consists of a resistance of value $1/g$ in series with a condenser of value CRg. (g, as usual, is the slope of the valve.) Now $1/g$ is a small resistance (200 ohms in a typical case), and CRg is a large condenser (1,000 times the value of C in a typical case), so that the output impedance is certainly low. Stray capacities across the output due, for example, to long leads and deflector plate capacity, therefore cause little trouble with this circuit. The effect of such capacity across the output is best illustrated by means of an actual example. The input capacity of an oscilloscope is usually about 100$\mu\mu$F. Let the speed of the linear sweep be 10^8 volts per second. (This corresponds to a time base frequency of 300 kc/s. if the amplitude of the saw-tooth waveform is 300 volts.) To produce a change of voltage at this rate across a condenser of 100$\mu\mu$F requires that a *constant* current of 10mA should flow through it. This current must come from the valve, and so the potential of the grid during the run-down will be higher than it would be if the capacity across the output were absent (this occurs automatically, in virtue of the feedback). If the value of the capacity, or the time base speed, is increased, the valve will eventually be overloaded, and grid current will begin to flow. This illustrates the fact, common to all negative feedback circuits, that the feedback cannot work miracles, and while it will do its best to achieve the desired result, it cannot do so when the valve becomes overloaded.

If symmetrical deflection is desired, and an anode follower paraphase circuit is used after the Miller time base, a particularly good combination results, because *both* the paraphased outputs will be low impedance.

The Self-Running Miller Time Base

As mentioned previously, this single valve time base circuit uses the Miller principle to produce the linear sweep, and the transitron principle to make the circuit self-running. (*cf.* Fleming-Williams time base ([5]).) The basic circuit, and the waveforms existing at various points in it are shown in Fig. 3. There are two main phases in the operation—the time from the point marked T_1 to the point marked T_2, which may be called the "run-down" phase, and the time from T_2 to T_3 which may be called the "flash-back" phase. We have to begin the explanation at some point in the cycle of operation, and it is most convenient to start at a point during the run-down phase. The anode is performing the usual Miller run-down, the current in the valve is increasing, and the screen voltage is therefore falling gradually, while the grid voltage is rising. This continues until the anode bottoms, whereupon there is a sudden increase of screen current, causing the screen voltage to fall (as indicated by the arrow in Fig. 3 (b)). This fall is communicated to the suppressor grid *via* the condenser C_1 and the suppressor therefore falls, cutting off the anode current, and causing an even larger current to flow to the screen grid. The action is cumulative; there is a sudden trigger effect, and the anode current is quickly brought to zero. The anode therefore flies back to H.T. potential, on an exponential curve of time constant CR_L. Typical voltage figures are given in Fig. 3, and it will be observed that the suppressor has dropped to about −120 volts. Nothing further can happen until the suppressor "recovers" to the point at which anode current can flow again. The suppressor will gradually return to earth potential as C_1 discharges through R_1. The time during which this is happening is the flash-back phase. At some point (T_3) anode current will begin to flow again; this

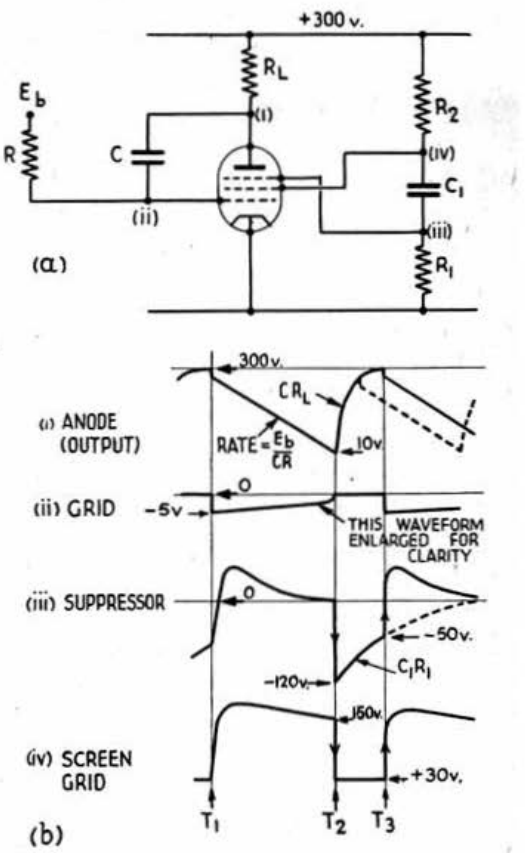


Fig. 3.
(a) Basic circuit of the self-running Miller time base. (b) Waveforms at various points in the circuit.

current will be subtracted from the screen current and the screen potential will therefore rise. This rise will be communicated to the suppressor grid *via* C_1, causing the suppressor to rise more rapidly than before; again there is a trigger effect and the screen and suppressor grids both shoot positive. Anode current can now flow in the normal manner, and because of the presence of C the anode performs the usual Miller run-down. We have now returned to the run-down phase and have completed one cycle of the operation which will clearly repeat itself indefinitely.

Variation of C or R will alter the length of the run-down phase, while the values of C_1 and R_1 determine the length of the flash-back phase. The values should be arranged so that the flash-back is as short as possible. The controlling factor is the time which the anode takes to recover to H.T. potential after the preceding run-down phase. However, it is permissible to start off the next sweep a little before the anode has reached H.T. potential, as shown dotted in Fig. 3. This results in a shorter flash-back time, at the cost of only a small decrease in the amplitude of the sweep. To synchronise the time base, some of the signal under observation may be fed into the suppressor grid, thus controlling the exact point at which the run-down starts. The screen waveform is suitable for application to the grid of the C.R.T. for flash-back suppression.

The Miller Effect

There is an alternative way of looking at both the Miller time base and the anode follower, ([3]) in terms of an "equivalent circuit." Fig. 1 (c) shows the

equivalent circuit for Fig. 1 (*a*); the condenser C from grid to anode has been replaced by a condenser C(1 + A) from grid to earth, where *A* is the gain of the valve. This is the well-known "Miller effect," from which the circuit derives its name. Looking into the grid the condenser C appears to be multiplied by the factor (1 + *A*) because of the amplification of the valve. Similarly, an equivalent circuit can be derived for the anode follower by replacing the resistance R_2 from grid to anode by a resistance $R_2/(1 + A)$ from grid to earth. The action of the Miller circuit can be explained in terms of Fig. 1 (*c*) by regarding the run-down as being the initial part of the exponential charge of the large condenser $C(1 + A)$ through R; owing to the amplification of the valve, only a very small portion of the exponential at the grid will be used, so that the output will be very nearly linear. The "integrating" property of the circuit is also evident from Fig. 1 (*c*) [6].

It should be noted that these circuits are "equivalent" in a limited sense only; none of the advantages of feedback are present in the equivalent circuits. For example, in Fig. 1 (*c*) the output would be linear only if the valve characteristics were perfectly straight, the speed of the time base would depend upon what the amplification happened to be, and the output impedance would not be low. For these reasons, this method of explaining the operation is not to be recommended. It is given here only because the use of the Miller circuit to effectively multiply up the capacity of a condenser is the basis of the second of the practical circuits which are now to be described.

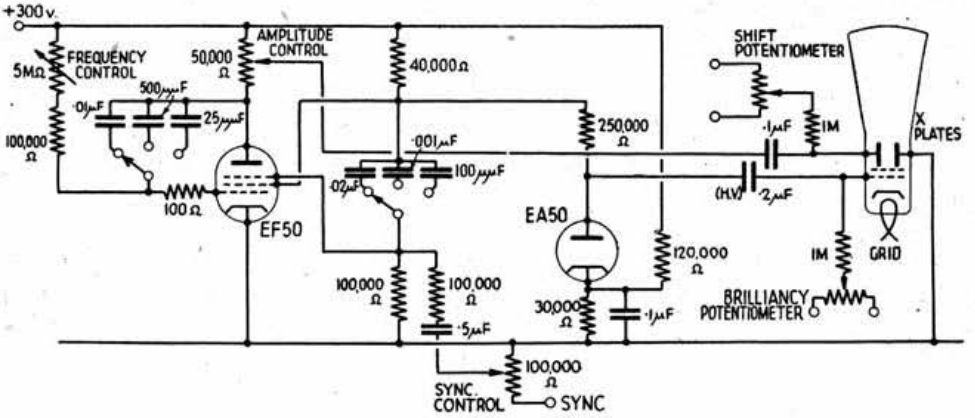


Fig. 4.
Complete circuit of single valve time base.

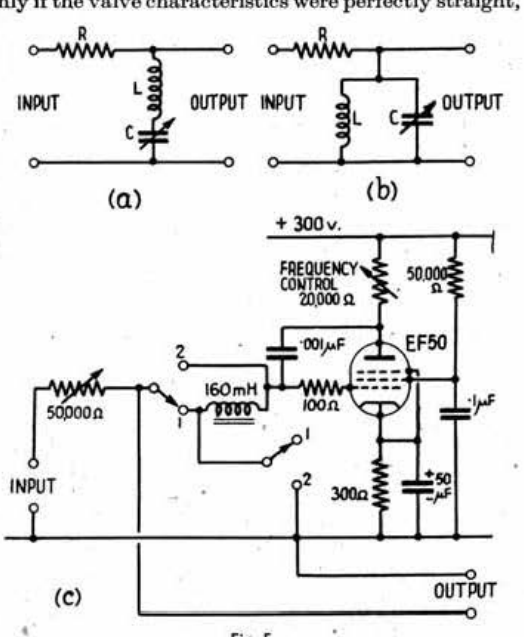


Fig. 5.
(*a*) Trough circuit. (*b*) Peak circuit. (*c*) Practical circuit, giving variable frequency peak or trough.

One valve time base circuit

The complete circuit is given in Fig. 4. Three frequency ranges are provided, covering the following frequencies, approximately:—20–500, 400–10,000, 8,000–200,000 c/s. The output is taken from a potentiometer in the anode of the valve which acts as a time base amplitude control. This method of amplitude control is the simplest one available, but it is not ideal, because when the potentiometer is centrally placed the output impedance will be increased to about 12,000 ohms. This effect will not be serious, unless there is an unusually large capacity across the output. The frequency and amplitude controls are quite independent in this circuit. Synchronisation may be applied as shown. A black-out waveform (for flyback suppression) is taken from the screen grid. The screen waveform is not quite flat on the top (Fig. 3) and so a diode is included to "chop" the waveform, and produce a perfectly flat top, before it is fed to the grid of the C.R.T. This refinement is not essential, and the diode may be omitted if desired, but there will then be a slight variation of brilliance along the length of the trace. The amplitude of the time base waveform produced by this circuit is very nearly equal to the H.T. voltage which is applied, *i.e.* usually about 300 volts.

A circuit for producing a high capacity variable condenser

It was desired to produce a circuit which, placed in the L.F. section of a receiver, would enable an audio frequency response to be produced which contained either a sharp "trough" or a sharp "peak" at a certain frequency. The frequency of the trough or peak was to be variable over the upper audio frequency range. The uses of such a device are obvious; the trough can be used to eliminate heterodynes in telephony reception, while the peak provides "audio selectivity" for c.w. reception. It was decided to use a simple tuned circuit, the fundamental circuits being as shown in Fig. 5 (*a*) and 5 (*b*). At this stage a difficulty was encountered, in that the variable tuning condenser C had to be of the order of ·01μF. (It might appear to be possible to use a smaller condenser,

and a larger inductance. In practice it is found to be impossible to obtain a sufficiently high Q in the coil if this is done.) It was decided to use a Miller valve to produce this large variable condenser, and the final circuit is shown in Fig. 5 (*c*). Any factor which varies the gain of the valve will enable the value of the capacity appearing between grid and earth to be altered, and it was found to be most convenient to vary the anode load. The variable resistance in the anode circuit is therefore the " tuning " control. The input resistance (R in Fig. 5 (*a*)) is made variable; this varies the sharpness of the trough or peak. Position (1) of the two-pole switch is the peak position and position (2) is the trough position. The 160mH inductance should be designed with care, to have as high a Q as possible. A dust core would probably be the best, but the following method of construction was found quite suitable. The coil was wound on a ¼ in. square stack of thin Radio-metal I-stampings, the corresponding E-stampings being discarded. 2,000 turns of 30 S.W.G. enamelled wire were required and were wound on in layers covering very nearly the full length of the I's. The value of the condenser from anode to grid may be adjusted to give the desired frequency coverage. The circuit should be placed early in the L.F. section of the receiver, to avoid overloading of the valve, which may cause distortion.

References :

(1) F. C. Williams: *Introduction to Circuit Techniques for Radiolocation.* " J.I.E.E," Part IIIA. No. 1, 1946, p. 289.

(2) W. T. Cocking: *Linear Saw-Tooth Oscillator.* " Wireless World," June, 1946.

(3) B. H. Briggs: *The Anode Follower.* R.S.G.B. BULLETIN, March, 1947.

(4) O. S. Puckle: *Time Bases.* Chapman & Hall, 1943, p. 51.

(5) *Ibid*, p. 41.

(6) S. C. Dunn: *Square Waves and Others.* R.S.G.B. BULLETIN, December, 1944.

Ministry of Supply Surplus Transmitters
WARNING

I have been informed by the Ministry of Supply that certain people purporting to be R.S.G.B. members, when calling for the first issue of Transmitters, attempted to bribe Officials of one of the M.O.S. Depots., in order to obtain Receivers and other Radio equipment not available for disposal on our lists. I understand that a careful check is being made at all depots in the future, and strong action will be taken by the M.O.S. if there is any repetition of this. In order to safeguard the interests of our members I would advise all representatives of the Society, who are making arrangements for collection to ascertain that any one collecting this gear at the depot are R.S.G.B. members of repute and above such practices.

In view of the heavy demands for transmitters in this second issue, a little thought should be given to the harassed CRs who are doing a noble job of work, free and on your behalf. The little time available to them, after having put in a full day at their respective businesses, in many cases, is being spent compiling records, trying to balance up orders against cheques and endeavouring to complete their lists for the orders on the Ministry. Please therefore refrain from adding to their burden by phoning, or writing frivolous letters, unless it is essential.

It may be quite a time before you receive your transmitter, as from appearances in London the lists are well over subscribed in which case orders will have to be sent back to be adjusted and this all takes time. So have a heart and bear with them. A word of thanks might not come amiss if nothing more tangible is forthcoming.

Also our thanks to the TRs, who are not forgotten.

G8TL.

New Radio Club Opened by Territorial Army Signal Regiment.

56th (London) Armoured Divisional Signal Regiment T.A. (City of London Signals), one of the oldest Signal Units in the T.A., has been open for recruiting since May 1, 1947, and has planned a large part of its wireless training in the form of an Amateur Radio Club.

In addition to the usual training that will take place with 19, 22 and 53 sets in Armoured Command Vehicles and Wireless Vans, familiar to all who have served in the Royal Signals, a Regimental Radio Club has been formed and is open to members of the regiment who are interested in amateur wireless activities of any description. The club is being issued with its own licence and call sign by the G.P.O. and will be affiliated to the R.S.G.B.

The club's station operates from the Regimental Headquarters in Clapham, and eventually its activities will cover amateur short wave transmitting and listening on all bands, and constructional work. Classes will be held for beginners and non-licensed members to enable them to obtain their tickets, either through the normal channels or by exemption through holding the required army signals trade.

The club is in the fortunate position of having a considerable quantity of kit provided for its use already. The following useful selection of gear is held :—

Receivers—
National H.R.O's.
Hammarlund Super Pros 200 and 400.
R.C.A. A.R.88.
B.C. 312N.
Hallicrafter UHF S36.

Transmitters—
25 Watt V.F.O. C.W./R.T. 3·5 to 14 Mc/s. Bands.
30 Watt V.F.O. C.W./R.T. 14 to 56 Mc/s. Bands.
75 Watt C.O. C.W. 3·5 to 28 Mc/s. Bands.
120 Watt C.O. C.W./R.T. 3·5 to 14 Mc/s. Bands.
150 Watt V.F.O. C.W./R.T. 3·5 to 14 Mc/s. Bands.

A good stock has been provided also of accessories and components and kit for constructional work.

Enlistment into the Territorial Army is for a period of four years. Completion of the obligatory annual training of 30 hours carries a bounty of £5, and a further £3 is awarded for a completion of a total of 40 hours training. Travelling expenses are refunded, and the following hourly allowance is paid for all periods of training lasting two hours or longer.

Officers	1s. 6d.
Sergeants	1s. 3d.
Corporals	1s. 0d.
Others	9d.

Attendance is also required at an annual camp, although there will not be one before 1948.

Further details of the Club, and of the new Conditions of Service in the T.A. are obtainable at the Regiment's Headquarters at 20 Atkins Road, Clapham, London, S.W.12 (Telephone: TULse Hill 1016), or on the air from G3CFN.

Japan

J4AAR advises us of the formation of the Far East Amateur Radio League which issues its own magazine. HQ's in Tokio and membership open to personnel of the Allied Forces. So far over 100 licences have been issued, excluding the J9's.

ATLANTIC CITY 1947.

The President and General Secretary are in Atlantic City, attending the World Tele-communications Conference—here is their first report.

The flag went down at 11 a.m. on Friday, May 16, 1947, in the Ambassadors Hotel, Atlantic City, New Jersey—the great race for frequencies had begun. Flanked by the flags of 70 odd participating nations, the first Plenary Session was addressed by the Hon. Garrison Norton, of the State Department, Washington, who spoke of the great responsibilities facing the Conference—the 7th of its kind and the first since the Cairo Conference of 1938. Mr. Norton referred to the five major fields to be covered at the Conference—Aeronautics, Mobile Maritime, Fixed Point to Point, H.F. Broadcasting and Amateur. International accord, he said, is essential to the continued development of radio and the best results would be achieved if every delegation was imbued with the spirit of "give and take." Mr. Norton suggested that the biggest task facing the Conference concerns frequency allocations. The U.S. had made spectrum studies over many years, and he was hopeful that their general plan would be adopted.

Col. Sir Stanley Angwin, D.S.O., Leader of the U.K. Delegation, thanked Mr. Norton for his encouraging speech and expressed the hope that the present Conference, unlike its predecessors, would finish earlier than scheduled. Sir Stanley formally proposed and the Leader of the U.S.S.R. Delegation seconded a motion that Mr. Charles R. Denny (Chairman F.C.C.) be elected Chairman of the Conference, and Mr. de Wolfe, Vice Chairman. The motion was unanimously adopted.

Mr. Denny thanked the Conference and commented on the vast technical developments that had taken place since 1938. He emphasised that radio holds the key to better understanding and called for the full support of all delegates in the task which confronted him as Chairman.

Following the opening addresses, which incidentally were translated instantly into French and conveyed to each delegate through the medium of a small two-valve receiving set, from a transmitter set up in a room adjoining the meeting room, the Conference appointed 10 committees to deal with the major issues. It was a source of satisfaction to the U.K. Delegation that a representative of their country (Col. Sir Stanley Angwin) had been nominated as Chairman of the all-important Frequency Allocations Committee.

The I.A.R.U. delegates lost no time in contacting representatives of other nations with a view to stressing the needs of the rapidly-growing amateur service.

Among the members of the British Delegation are Col. Eric Cole, G2EC, Chairman British Joint Communications Board, Sq./Ldr. Keith Street, BRS2990, Assistant Chief, BJCB, and Mr. David Low, GW5WU, representing Marine interests. Messrs. Mumford and Potts, of the Radio Branch, G.P.O., are also in attendance, together with numerous Service representatives and other officials.

The A.R.R.L. is represented by Mr. K. B. Warner, W1EH (Managing Secretary), Mr. A. L. Budlong, W1BUD (Assistant Secretary) and Mr. G. Grammar (Technical Editor, QST).

The I.A.R.U. is represented by its President (Mr. George Bailey, W1KH) and the President and General Secretary of the R.S.G.B. Mr. Bailey is also President of the A.R.R.L.

As far as can be judged at this early date the chief danger spots for amateurs lie around 3.5 Mc/s. and 7 Mc/s. Considerable pressure will no doubt be brought to bear for support of the European plan for a small exclusive amateur allocation between 3.5 and 3.6 Mc/s. and for the establishment of an exclusive broadcasting allocation between 7.2 and 7.3 Mc/s.

G6LJ and G6CL on board the *Mauretania* en route for Atlantic City.

It is gratifying to be able to record that China, like the U.S., has placed on record among its proposals a warm appreciation of the invaluable accomplishments of radio achieved by amateurs during the war years.

The Battle for Kilocycles Begins

Wednesday, May 21, saw the opening of the great battle for space in the frequency spectrum. That day the Frequency Allocations Committee, at its second meeting and under the able chairmanship of Col. Sir Stanley Angwin (United Kingdom), set up a sub-committee which was charged with examining between 2,850 kc/s. and 30 Mc/s. the proposals made in each frequency plan for each of the following services :—

(1) Aeronautical service.
(2) Amateur service.
(3) Broadcasting service.
(4) Fixed service.
(5) Maritime mobile service.

The Society's representatives, together with the representatives of other I.A.R.U. Societies, were gratified when the committee agreed to consider the amateurs as a distinct service.

The terms of reference for this important sub-committee are :—

"To endeavour to reach a compromise agreement on the total width of the allocations that should be made in each of the following bands :—

2.85–	4 Mc/s.	10–12	Mc/s.
4	– 6 ,,	12–16	,,
6	– 8 ,,	16–20	,,
8	–10 ,,	20–25	,,

Bearing in mind that the joint demands for frequencies of all the services are such as to preclude the possibility of meeting fully the demands of any one Service on the understanding that agreement reached at the sub-committee shall not be binding when the allocations for the Service concerned come to be considered in direct relation to the allocations for the other Services."

The sub-committee as at present constituted includes representatives of only those countries which have prepared *complete* frequency plans. The list of official participants is as follows :—

Argentina (speaking for and on behalf of the South American Republics), Australia, Canada, Chile, China, France, India, U.K., U.S.A., U.S.S.R. Sweden is also in attendance holding a watching brief on behalf of the Scandinavian nations.

The sub-committee had met twelve times up to the time of writing this report (May 29), each session running for an average of 2½ hours.

The first four meetings were devoted to a consideration of the needs of the Aeronautical Service.

No point would be served here by quoting figures, but for the information of readers an overall total of 2,000 kc/s. between 2.85 and 25 Mc/s. was adopted as the basis for the Aeronautical plan.

The Amateur Service

The chairman of the sub-committee (Dr. Y. Y. Mao, of China) opened the discussion on this Service by quoting at length from the document submitted by his country. Dr. Mao paid a warm tribute to amateurs emphasising that they had been instrumental in the discovery and development of short wave radio communications and the subsequent exploration of the Ionosphere. As a token of appreciation to the Amateur Service, China was recommending that the Cairo allocations to this Service be substantially retained. China recognises that apart from the fact that amateurs have been responsible for bringing the standards of short wave radio communication to such a high level, they are also invaluable in fostering international goodwill. The valuable contribution afforded by amateurs during the war by making their skill and resourcefulness available on the side of the United Nations is still fresh in the memories of China stated Dr. Mao.

" If I had not been an amateur myself," Dr. Mao concluded, " I would not be occupying my present honoured position as chairman of this important committee."

Similar warm tributes were paid by the official spokesmen for the United States, Canada and the United Kingdom.

Considerable discussion took place in regard to the proposals for a new amateur band in the region 20–25 Mc/s. Finally a figure of 400 kc/s. was agreed upon, but it should be clearly appreciated at this early stage that this and the other figures to be quoted are *target figures only*.

The U.K. had originally proposed only 200 kc/s. in this new band and the Society's representatives expressed appreciation to their official spokesman when he agreed to accept the new figure of 400 kc/s.

The figure of 400 kc/s. was unanimously accepted as the target for the band 12–16 Mc/s. (14–14.4 Mc/s.) but unfortunately no such happy agreement has yet been reached in regard to the band 6–8 Mc/s. Three target figures have been set by the sub-committee, namely 300 kc/s. (supported by Argentina for the South American nations, Canada, Chile, China and the U.S.A.), 200 kc/s. (supported by India, U.K., Australia and Sweden for the Scandinavian nations), and 150 kc/s. (supported by France and U.S.S.R.).

The I.A.R.U. delegates to the conference are making every effort to press for further support for the 300 kc/s. figure at the main committee stage.

A after long debate it was agreed to recommend to the main committee that amateur allocations in the 2.85–4 Mc/s. band (viz. 3.5 Mc/s.) be treated on a regional basis. In this connection the U.S.A., Canada and Argentina adhered to their original proposal that 500 kc/s. be assigned to amateurs, whilst France, India and the U.K. declined to concede a single kilocycle over and above their proposed figure of 100 kc/s. Australia (300 kc/s.), China (400 kc/s.), Chile (250 kc/s.), and U.S.S.R. (120 kc/s.) also adhered to their proposals but they will probably accept a compromise figure at a later stage.

The R.S.G.B. representatives have repeatedly pointed out to the U.K. delegation that an allocation of only 100 kc/s. at this part of the spectrum is totally inadequate for the needs of U.K. and European amateurs even if the allocation is on an exclusive basis. The U.K. and France appear to be pledged to support the thesis that smaller but exclusive bands for all services are highly desirable especially at this part of the spectrum.

Up to the time of writing no discussions had taken place in regard to the 1.75 Mc/s. and 28 Mc/s. bands.

Other Services

Very considerable debate took place when the Broadcasting, Fixed and Maritime Mobile Services were discussed. For the Fixed Service it has been agreed to consider the band 2.85–4 Mc/s. on a regional basis. A target figure of 950 kc/s. was agreed to between 6/8 Mc/s. and two target figures, namely 2,300 and 2,600 kc/s. for the band 12/16 Mc/s. These figures are important to us as they may affect amateur allocations. In the 20/25 Mc/s. band a target figure of 3,000 kc/s. has been agreed.

In the Maritime Mobile Service wide differences of opinion were recorded, due largely to the insistence of the U.S.S.R. that this Service should receive only a minimum of space (namely 2,200 kc/s. in a band width of 21 Mc/s.). Like the other Services it was agreed that the Maritime Mobile Service should be treated on a regional basis between 2.85 and 4 Mc/s.

For this Service a figure of 360 kc/s. was accepted by most nations (the exceptions being U.S.S.R., France and India) for the 6/8 Mc/s. band and a figure of 900 kc/s. for the 12/16 Mc/s. band. Unanimous agreement (U.S.S.R. excluded) was reached on a figure of 740 kc/s. for the 20/25 Mc/s. band.

The Broadcasting Service was under discussion when this report was prepared.

Other Committees

The I.A.R.U. delegates are watching carefully the activities of the other committees that will be dealing with matters affecting amateurs.

Several proposals have been tabled in connection with Article I (Definitions), including definitions for the Amateur Service and Amateur Stations.

Proposals have also been made in regard to Article VIII (Amateur and Private Experimental Stations).

France, for example, is proposing a world power limit of 300 watts input for all amateur stations working between 5 and 40 Mc/s. The U.K. is proposing that the Amateur Service be " a service of self training and inter-communication carried on by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest." France and the U.S.A. have made similar proposals but both wish to include the word " experimentation " in addition to self training and inter-communication.

This then is the story of the Atlantic City Conference to date. More than 60 nations are represented.

(*concluded on page* 212.)

THE MONTH ON THE AIR

By A. O. MILNE (G2MI)*

CQ

TO all swoopers, spitchers, chirpers, wobblers, long CQ senders, Royal "We's" and those one just cannot understand at all; Greeting!

To all ordinary sensible "hams" with good clear readable signals and good manners—Carry on, Ladies and Gentlemen!—which brings us straight to the point. Those people who fire their V.F.O.'s about our bands like whistling rockets, already know what we think of them; there are, however, far too many other bad signals on the air and they are not all commercials or second channel interference either!

Time was when British Amateurs were world renowned for their first-class signals and good operating. Certain newcomers are jeopardising this reputation. Some of the over-modulated mush which passes for telephony these days would make the average trawler skipper green with envy!

And you CQ merchants: If the band is wide open, short and snappy is the way to do it. If conditions are not so good, listen and call. Rare DX is not interested in CQ from G stations.

Here's another one. Please keep your signals out of the American 'phone band on 14 Mc/s. (14,200–14,300). There is quite enough din there already without making reception of U.S. 'phone signals utterly impossible. That goes for people who work 1 kc. outside, too, and for certain Europeans.

Yes, of course, we are entitled to work where we like in the band but use some common sense.

You and Who Else?

QST recently asked this question. We echo it. Who on earth started this idiotic "we" business? "We're running a hundred watts." "We always QSL," etc. You and who else?

R.S.T.

It is good to see the R.S.T. system gradually ousting the outworn Q/R method of reporting telephony. Why use R.S.T. for C.W. and then substitute Q for R and R for S when it's 'phone? Be consistent. "You're R5 on my S meter O.M."—Gertcher!

Notes and News

GW3ZV has asked KS4AC (Swan Is.) to listen for G calls each Wednesday and Saturday at 05.00 G.M.T. His frequency is 14,035 and he listens on 14,150.

ZK1AB will look for G's at 18.00 G.M.T. daily at 14,105 kc/s. He listens 5–10 kc/s. lower. 06.00–07.00 G.M.T. is no use because of W, QRM his end.

G6OY gives ZD1KR as Mr. Cartwright, c/o Post Office, Freetown, Sierra Leone. QSL via R.S.G.B. LC1AH is an expedition in the White Sea.

XZ2EM, ex G3NF, is using 50 watts and is looking for G's.

BRS11494 offers some useful frequencies, VU7BR, YS3L and SV1AH all on 14,350. VK7NC, 14,300. VQ2HC, 14,150.

GM8SQ worked XE1A at 06.00 G.M.T. on 14,005. Says EP2XZ is on 14,010 at 19.00. Ispahan, Persia, QSL via R.S.G.B. TG9JK, Box 118, Guatemala City, on 14,025, 10.00 G.M.T. PK6VR, Biak Is., 14,000 at 18.30, QSL via W.I.A. 'SQ says VR5PL is active in Tonga, QSL to Box 25, Nukuolofa.

KG6AI 14,025, W6VDG/KW6 14,010, and W3EKK/VK9 on Admiralty Is. are worth looking for.

VS1BX gives KP6AA and AB as c/o Navy 309, F.P.O., San Francisco. HP2CA/MM a Panamanian ship off Brazil and VU2PB on 14,020 in the Andaman Islands should be VU4PB, by rights!

From G8VR comes the QTH of PK6EE, Peter Arends, Box 76, Macassar, Celebes. For Y12AM QSL via A.R.R.L.

G8PB has worked ZK1AB. FT4AN is another nice one, Box 72, Bizerte, Tunis. He QSL's.

C6YZ on 14,100 worked by G8TD is at Sinking. QSL via R.S.G.B.

BERS195 says VK4OS has now returned to VK3 but that VK4BI is still in Papua.

Look out for LI2B, the Kon Tiki expedition on 7,071, 14,142 and 27,980 kc/s. They have skeds with WLMA/W3YA at 12.00 and 24.00 G.M.T. daily, and with New York at 09.00, 16.00 and 19.00 daily.

YI2AT is at Habbaniya and is using 12 watts grid modulated—the aerial, however, is a long wire 1,250 ft. in length on 90 ft. poles! There are three other stations at the same QTH.—2AH, 2CA and 2KP.

G4LX gives but does not guarantee HZ2BN, c/o Box 4, Sabina, Arabia. HZ1AB says he is the only active station in Arabia. Take your choice.

G6LX continues to collect the DX, with OA4BR, J2AMA and W6VTO/C1 in Shanghai as the latest.

VR5NC is c/o P.O., Norfolk Is., via Sydney. ZC6DD is Signals Troop, 3rd Para. Regt., M.E.L.F.

G5CI offers HS1SS, 14,120, U.S.A. Military Attache, American Embassy, Bangkok, Siam. UI8AA, 14,055, Tashkent. OX3GG, 14,075, A.P.O. 858, N.Y.C. UD6BM, 14,040, Baku. TA1AR, 14,040, who says QSL via A.R.R.L.—we wonder!

G5MR has worked OX3BF at Narsarssuak, 14,070. OA4BR, 14,050, and amongst other ZD6DT, 14,140, at 20.00 G.M.T. FL8AE in French Somaliland is a nice one, 14,100, right under I6USA. Why does the latter always send doubles when he is S9+? MR comments on the antics of some V.F.O.'s in their anxiety to contact ZD6DT.

G6ZO works them all! Says W3EKK/VK9 always listens QLM and never works anyone on his own frequency. Here is some of the DX worked: KS4AC, 14,030; XU6GRL, 14,060; K6ETF/KC6, 14,100; KV4AA, 7,130 and 14,000–14,150; VQ6HOS, 14,060; W6RWQ/VR6, T6/7 chirpy, 14,030 and 14,150 on Pitcairn Is.; ZS3F, 14,100—Box 297, Windhoek; ZK1AH, QSL via ZK1AB, 14,135.

XULP is an U.N.R.R.A. ship running between Burma and China, 14,100 kc/s., QSL to H. Taborda, c/o M.V. Wan Cheng, U.N.R.R.A., C.W.T. Bch. 20, Canton Road, Shanghai. LA4LA on 14,070 is reported to be in Spitzbergen. He corrects KA6FA's QTH to ILO ILO. 6ZO rounds off with VP1HQ, 14,050. VR4AA, 14,110. VS4BJ, 14,080. HR1BD, 14,140. FB3AC, 14,055.

Via G8QZ, RAEM draws attention to UA0KFC on Sahalin Island and UA0KQA at Tiksi Bay on the Lena R.

G8AB/XACP/ZB1AD is now back in England and has QSL'd 100 per cent.

BRS8330 has logged W6RWQ/VR6 and says SH2D is a Swedish expedition in Brazil.

G5RF has worked WMCF/C1 on 28 Mc/s.—Box 2497, Shanghai.

G6RH is another one with a fine log, and considers it is still worth while to publish frequencies! Here are a few: VQ5DES, 28,400; VQ5PBD, 28,356; VQ5TDB, 28,040; VQ5FCA, 28,040; VQ5JTW, 14,105—all in the early afternoon. ZD1KR, 14,080, 18.00 G.M.T. HH2CW, 14,380 'phone.

G6BY has just completed his 500th QSO with W1DQ. Contact has been made at least once in every 24 hours. Input 120 watts grid modulated to a rhombic. Truly a very remarkable achievement.

* 29 Kechill Gardens, Hayes, Bromley, Kent.

FIVE METRE FIELD DAYS, 1947

ON July 20 next the first of two Five Metre Field Days will be held. The second will take place on September 7, each Field Day being run as a completely separate event. Before the War these Field Days received some measure of support and if sufficient interest is shown in these two events, the Contests Committee will consider organising further V.H.F. Field Days in future years. The 58 Mc/s band is ideal for portable work; the design of compact aerial systems and equipment which can easily be carried and assembled provides wide scope for ingenuity, whilst the operation of low-power apparatus in the open air from carefully selected sites brings much satisfaction to those who are prepared to do the necessary preliminary work.

Rules for Both Field Days (July 20 and Sept. 7, 1947)

1. Each event is open to fully paid up members of the R.S.G.B. resident in the British Isles (G, GI, GM, GW, GC and GD.)

2. Entrants must operate according to the conditions of their own portable licences and the input to any stage of the transmitter must not exceed 25 watts.

3. Power supply may not be derived from public or private supply mains.

4. No part of the station may be situated in any building existent on the site prior to the day of the event.

5. No apparatus may be erected on the site prior to the day on which the event takes place.

6. The event will commence at 10 a.m. and conclude at 6 p.m.

7. Contacts may be made on telephony, C.W. or modulated C.W.

8. *Location:* The station must be operated from the same site for the duration of the event.

9. *Reporting:* An exchange of R.S.T. and QRA must be effected to count for points. The QRA must consist of distance and direction from the nearest town or village. A convenient method of reporting would be as follows:

"Ur RST 569 6SE Caterham" (*i.e.* 6 miles South-East of Caterham).

10. Only one contact with a specific station shall count for points.

11. Proof of contact may be required.

12. Contacts with unlicensed stations will not be permitted to count for points.

13. *Scoring:* Points will be scored on the following basis:

	With Portable Stations.	With Fixed Stations.
Up to 10 miles	2	1
10 „ 30 „	3	2
30 „ 50 „	5	3
50 „ 100 „	10	5
100 „ 150 „	15	7
Over 150 „	30	12

14. Entries, which should be on lined foolscap or quarto paper, must be submitted in the form set out below:

FIVE METRE FIELD DAY, 1947.

.....

Name.....

Home Address.....

Call Sign..... *Site of Station*.....

Details of Equipment Used.....

Aerials .....

Call Sign Worked.	Time.	Report Sent.	Report Received.	Estimated Distance.	Points Claimed.
				TOTAL	

Declaration: I declare that my station was operated strictly in accordance with the rules and spirit of the event and I agree that the ruling of the Council of the R.S.G.B. shall be final in all cases of dispute.

Signed.....

15. Completed Entry Forms must be posted not later than 7 days after the event to the Honorary Secretary, R.S.G.B. Contests Committee, New Ruskin House, Little Russell St., London, W.C.1. The date of the post-mark will be considered as the date of posting. Entrants are advised to read the note below regarding disqualification before sending in their entries.

16. A trophy may be awarded to the winning station in each event, at the discretion of Council, and the runner-up will receive a Certificate of Merit.

Disqualification: Entrants failing to sign the Declaration at the foot of the entry form, or whose logs are despatched later than seven days after the event, will automatically be disqualified.

Licences in Finland

It is now officially confirmed that licences are being issued in Finland. Calls are in the series OH(Figure)N—, OH(Figure)O, etc., viz., OH5NF. Call signs having the first letter of the call any letter before N are pirates.

Spain

We have no contact with amateurs in Spain. So far as is known the EA calls on the air at present are unlicenced, and cards cannot be forwarded. EA9AI is the one exception. He is in Spanish Morocco and QSL's.

The French Amateur Society

The French Amateur Society, R.E.F., informs us that from August 4–25, 1947, an International Scout Jamboree will be held in France.

R.E.F. is organising a display on radio control of small models (ships and aeroplanes) and will show an amateur station at work.

They would like to know in advance the names, etc., of members of R.S.G.B. who would wish to take part in this Jamboree. Please write direct to M. R. LARCHER, R.E.F., 6 Rue du Pont de Lodi, Paris 6e.

Institute of Practical Radio Engineers

The following meeting of the I.P.R.E. has been arranged:—

June 20 "Frequency Modulation," by I. G. W. Knott, A.M.I.P.R.E. and A. B. Bamford, B.Sc.

This lecture will include the complete analysis of the F.M. Receiver, using as a guide the known techniques in A.M. Receiver design. A practical demonstration will be given using an F. M. Phono-Oscillator. The B.B.C. 90 Mc. transmission will be tuned in during the evening.

R.S.G.B. members are cordially invited to attend this meeting which will commence at 7.30 p.m. at Alliance Hall, Palmer Street, Westminister (opposite St. James' Park Underground).

Australian Food Parcels

With reference to the above scheme which was announced on page 7 of the Supplement to the April issue, we would advise the many members who sent postcards that up to the time of going to press, no parcels had been received at Headquarters. As soon as these arrive they will be balloted for.

FIVE-METRE CONTEST, 1947

IN view of the exceptionally difficult conditions which prevailed during the first half of the Contest, the number of entries received and the scores obtained can be regarded as very satisfactory. The number of stations actually competing however, represents approximately a third of those logged during the weekends of the Contest, the 39 entries sent in containing reports of 113 stations on the air. Many intending competitors, especially those situated in the remoter districts, were undoubtedly discouraged by the extremely poor conditions, and Arctic weather, which prevailed throughout February 8 and 9.

Conditions

Those who braved the first weekend were well rewarded when, on March 8, the band really opened up. Not only was a magnetic storm in progress, but atmospheric conditions favoured tropospheric refraction and consequently many good inter-G DX contacts were made. During the late afternoon and evening of March 8, many competitors noticed that DX signals could be heard only with aerials beamed North, irrespective of the direction from which the signals originated. This effect has already been dealt with at length in "The Month on Five" for April. G3APY (Sutton-in-Ashfield, Notts.) found the whole band "alive with weak C.W. and 'phone signals coming from the North-East" at one period on March 8 and identified G2MV, 2XC, 5BY and 6LK amongst them. His QSO with G5BY was the best DX contact recorded during the Contest. On March 9 the auroral reflections disappeared, though conditions remained favourable for contacts up to 150 miles.

The Leading Stations

Mr. S. E. Martingell, G2MV, of Old Coulsdon, Surrey, an experienced worker on the band, is to be congratulated on obtaining the top score of 119 points and sending in a really excellent log. His contact with G2IQ (Sheffield) on February 8 was outstanding. This station was also worked during the second weekend, when other DX included G5BD (Mablethorpe) and G8JV (Nottingham). G2MV used three aerials, a 4-element rotary beam, ten feet high, a bi-square beam 42 feet high and a three-half-wave aerial at the same height. The transmitter used 807's in the final stage.

The runner-up, Mr. E. J. Pickard, G6VA, of Warlingham, Surrey, who secured 111 points, used a 4-element rotary beam in the loft. He has a very good location on the North Downs. Both transmitter and receiver are home-built. G6VA's best contacts were with G2IQ, G8UZ (Notts.) and G3APY (Notts.).

Mr. W. J. Thompson, G2MR, though situated only 80 feet above sea-level at Surbiton, also worked G2IQ during the first weekend and G5BD and G8JV during the second. He noticed pronounced sun-spot hiss on March 9.

Mr. E. J. Williams, G2XC (Portsmouth), who submitted a full report of atmospheric conditions with his log, made his best DX contact during the period of "auroral reflection" on March 8th when he worked G8JV with both aerials beamed North-East. G6CW and G5BY were also heard with T7 notes at this time, their signals apparently arriving from a Northerly direction.

Check Logs

The Committee wish to thank G2AJ, 2IQ, 2LC, 4AJ, 5PY, 8NM and GM3OL who submitted useful check logs.

Receiving Contest

The response of the B.R.S. members to the receiving side of the Contest was so poor that the Contests Committee was reluctantly compelled to declare the Contest null and void. The Committee's thanks are tendered to BRS3003 who sent in an excellent log, also to BRS1820.

Summary of Comments

There is no doubt that it is only on an occasion such as this that the individual operator has the chance to compare the performance of his equipment with that of his fellows under more or less identical conditions. Undoubtedly location and geographical position play a large part in deciding the actual contacts which are possible, and for this reason, every scoring system evolved must fall short of the ideal. The Contests Committee is indebted to all who submitted comments and suggestions.

Now for the open spaces and the Five Metre Field Days, when the weather will assume an even greater significance and when skill, ingenuity and often improvisation are needed if success is to be achieved. Elsewhere in this issue will be found details of the Five Metre Field Days, and it is hoped that these events will be well supported.

A list of entrants in order of merit appears below :—

Position	Call Sign	Points	QRA
1	G2MV	119	Old Coulsdon, Surrey.
2	G6VA	111	Warlingham, Surrey.
3	G2MR	99	Surbiton, Surrey.
4	G2XC	85	Portsmouth.
5	G4IG	79	New Beckenham, S.E.26.
5	G6LK	79	Cranleigh, Surrey.
7	G8UZ	65	Sutton-in-Ashfield, Notts.
8	G2YL	63	Walton-on-the-Hill, Surrey.
9	G5MA	62	Ashtead, Surrey.
10	G5BD	60	Mablethorpe, Lincs.
11	G8WV	58	Hanslope, Bucks.
12	G3APY	54	Sutton-in-Ashfield, Notts.
13	G2NH	52	New Malden, Surrey.
13	G2WS	52	Shortlands, Kent.
13	G6OH	52	Sunninghill, Berks.
13	G6OS	52	Hull, Yorks.
17	G2GL	51	Streatley, Berks.
18	G2UA	49	Kenton, Middx.
19	G8TS	47	Farnborough, Hants.
20	G6YU	46	Coventry.
21	G5MQ	45	Woolton, Liverpool.
22	G8VB	43	South Ealing, W.5.
22	G5IG	43	Cambridge.
24	G5US	41	Frimley, Surrey.
25	G8SM	37	East Molesey, Surrey.
26	G5UM	34	St. Albans, Herts.
27	G4MR	32	Slough, Bucks.
28	G2YC	31	Hendon, N.W.4.
29	G5LQ	30	Chiswick, W.4.
30	G6XM	27	Farnborough, Hants.
31	G2UJ	25	Tunbridge Wells, Kent.
31	G8LY	25	Basingstoke, Hants.
33	G3CU	22	Tooting, S.W.17.
33	G5OJ	22	Ewhurst, Surrey.
35	G5AS	18	Kingston, Surrey.
36	G6MN/A	16	Worksop, Notts.
37	G5MR	14	Bognor Regis, Sussex.
38	G3BY	9	Ashton-under-Lyne, Lancs.
39	G6KB	8	Stoke Row, Berks.

Can You Help ?

Via G6LX—Mr. Leslie Wickham, ZL3FG, of 20 Carrick Street, Christchurch, N.Z., wants to contact the pre-war holder of VS6AQ now thought to be in England.

"Pop" Edge, G6GD, wants to contact W./Com. L. A. Allan who served with him at Kandy, Ceylon. Can any A.C.S.E.A. amateur help, or supply his present address ?

THE EDDYSTONE S640 RECEIVER

WE have now had the opportunity of carrying out a number of tests on the S640 Receiver presented to the Society by *Messrs. Stratton & Co.*, as reported in our last issue.

The receiver, illustrated here, and utilising electrical bandspread, covers a tuning range of from 31 M/cs. to 1·7 Mc/s. in three ranges, viz :

Band 1. 31—12·5 Mc/s.
Band 2. 12·5—5 Mc/s.
Band 3. 5—1·7 Mc/s.

The left hand tuning knob controls the band setting, the amateur bands being clearly marked with a green line. When this control is set to the upper frequency limit of the three H.F. bands the remainder of the band is adequately spread and is covered by the bandspread condenser control seen as the right hand tuning knob, and which uses flywheel control. It was found that the pointer travelled smoothly and easily from one side of the dial to the other, by merely a flick of the finger. There is no backlash and tuning on the 30 Mc/s. band is easily effected.

A novel and convenient feature is the band change switch which is a butterfly control behind the band set knob.

The circuit is normal and employs permeability tuned I.F.s of 1,600 kc/s., with a standard type of crystal filter using a vacuum mounted crystal. In the model tested some hand capacity was observed on the phasing control and crystal switch. In actual operation it was found that, with the crystal in circuit it was not possible to peak signals, in the same way as, say, on an H.R.O. This appears to be due to the I.F.s being very slightly off the crystal.

A series type noise limiter is incorporated which gives a reasonable reduction in car noise and may be switched in or out from a switch on the front panel.

The A.V.C. switch is also located on the right and measurements of this gave a 7 dB output change for a 20 dB change of input, which is not particularly good. There is no delay on the A.V.C.

Other controls on the front are the R.F. gain control, which operates on the R.F. and I.F. stages, on the extreme left, next to it the B.F.O. tuning control, and below these the phone jack, mains switch and standby switch. On the right hand side above the B.F.O., noise limiter and A.V.C. switches are the crystal switch, phasing control and audio gain.

At the rear, provision is made for either dipole or aerial and earth connections. The input impedance is not quoted, but is probably in the region of 400 ohms. A socket is provided for the connection of an external S meter if desired. The operating voltage for this is derived via a diode from the cathode circuit of the 1st I.F. valve. A useful addition is an octal socket for providing power from an external source of H.T. and L.T., but it was found that the pilot lamps would not light unless sockets 6 and 7 were shorted. This, of course, when the receiver was operated from its own supply, which may be derived from 110, 200 or 230 volts A.C., at a consumption of approximately 60 watts. The hum level is very low. Also at the rear are the connections for the Loud Speaker which should have an impedance of about 2·5 ohms. The phone jack is so arranged that the speaker is out of circuit when the phones are inserted, but unfortunately no provision has been made to maintain a load on the Pentode output stage or the transformer under this condition. This is obviously deleterious for the valve and transformer.

Details and uses of the valves employed are as follows :—

R.F. Stage	EF39
Frequency Changer ..	6K8GT
1st and 2nd I.F.	EF39
2nd Detector	6Q7GT
Output	6V6GT
Noise Limiter	EB34
B.F.O.	EF39
Rectifier	6X5

These are all of standard international octal base and may readily be replaced should occasion arise. The general construction of the receiver is excellent, the R.F. portion being on a diecast chassis and the various other stages being built on individual sub-chassis and mounted appropriately round the main diecasting. Ventilation is good, a temperature rise of only a few degrees being registered inside the cabinet after several hours continual running, with only a very small amount of drift.

I.F. Crystal out of circuit, sensitivity 20μv for 50 milliwatts; output.

Selectivity —6 dB ± 32 K/cs off tune.
—60 dB ± 25 K/cs off tune.

R.F.

Band	F. in Mc/s.	uv for 50 mw out	uv for 20 dB S/N	Image Ratio dB	I.F. Break through dB
1	30	1	6	40	92
	20	1·5	6	60	
	13	2	8	71	83
2	11	·5	5·5	57	75
	7	·9	4	75	
	5	·65	4	>104	80
3	4	·7	5	78	72
	2·5	·4	4	>110	
	1·8	·4	4	>110	30

From the above figures it will be seen that the sensitivity is of a high order on all bands, being higher than that claimed by the manufacturers. The Signal to Noise ration is pleasing and the image ratio, except perhaps at 30 Mc/s., good. In view of the comparatively high I.F. employed the figures for I.F. break through are particularly interesting.

Under test on the various amateur bands the receiver gave a very pleasing performance and was

THE MONTH ON FIVE

By W. A. SCARR, M.A. (G2WS)*

THE warm weather during May did not lead to an increase in activity on the band as might have been expected. Few Southern stations have been regularly active, and in the north, G5BD, reporting things generally quiet, blames the effect of D.B.S.T. Certainly the optimum time of day for G—DX has become very near to bedtime for most of us and many of the best contacts are being made between 11 p.m. and midnight.

Further north, considerable enthusiasm is evident from GM3AKK's report. The erection of 4-element rotary beams has resulted in the establishment of a regular link between GM5VG (Glasgow) and GM6SR (Edinburgh). GM2LQ (Glasgow), GM3BDW (Edinburgh), GM2HOH (Edinburgh) and GM2OI (Wishaw) are also helping to establish a regular network in South Scotland. The high-spot this year to date is undoubtedly the reception by GM3BDA of Airdrie of signals from G5MA (Ashstead, Surrey). This occurred during the magnetic storm on April 17, and G5 MA's signals were identified by 3BDA at 23.45 D.B.S.T., the log having now been confirmed by 5MA. More recently 3BDA has succeeded in working GM3OL of Dumfries, who maintains regular contact with the Liverpool stations.

It would now seem possible to arrange a 5-metre relay from Northern Ireland via Glasgow, Liverpool, Nottingham, London, to the South and South West. The writer would be glad to hear from any stations who would like tests arranged on these lines.

ON4PW reports that Belgian stations are getting well-equipped for 58 Mc/s. working with crystal-controlled high-power rigs. No G stations have yet been heard, which is probably due to the fact that most of the 5-metre enthusiasts are in the Northern part of Belgium.

Information is still needed on the so-called "auroral reflection" effects. Commenting on the writer's April notes, G6DH (Clacton) gives the opinion that the auroral reflecting layers are not hundreds of miles up, but are in fact at similar heights to the E and F2 layers, if not identical with them. 6DH contends that "flutter" effects on "five" resemble those which give the characteristic T6 notes on "ten" during magnetic storms. G6DH who has heard PAØPN on the Dutch coast, 120 miles from Clacton, uses Paris television as an indicator for good tropospheric conditions over the sea, but remarks that these do not develop so favourably as over land. There is, however, every likelihood that sporadic—E layer reflections will again open up the band for continental DX during the next month or two.

"Stop Press."

The band opened up for "sporadic E" contacts at the end of May. On May 24 GM6KH and GM8MJ (Glasgow) worked OZ7G. May 26 G6UH (Middlesex) worked F8VV. May 28 G5IG worked PA0PN. G5WP, G6VX, G2NH all worked PA0UN. G6DH worked ON and G5TH worked SM5FS.

* 8 Beckenham Grove, Shortlands, Kent.

M.O.S. Surplus Transmitters

Below is a list of members who are prepared to furnish details and circuit diagrams of various transmitters applicable to the above scheme:

R. W. Halls, BRS14456, Barnsley Technical College, Church Street, Barnsley, Yorks, set W/S19, Mark II, Mark III.

J. E. Sutton, BRS14429, 14 Hill Street, Sheffield, 2, set 19, Mark I, Mark II.

D. Banister, BRS, 7, Crescent Road, Luton, sets TR1196, TR1143, TR1154, and would appreciate information from anyone who has converted a TR1143 or TR1133 by substituting a V.F.O. in place of crystals in the receiver portion only.

G. P. Marley, BRS13024, 6 Kirkstone Gardens, High Heaton, Newcastle Tyne, 7, set No. 58, set No. 19, also details of Nos. 18, 11, 38 and 48, not on our lists.

G. Hare, BRS2270, Station Road, Leadenham, Lincs., sets T1154, T1131, T1196.

G. Shackle, G2DVQ, 32, Bromwich Street, Haulgh, Bolton, Lancs, Set WS/19 MK. 111. (Canadian).

D. P. Doo, BRS5856, 26, East End Road, London, N.3. Set 19. G8TL.

Ex-Corporals' Club, Cranwell

The first general meeting and re-union of the "Ex-Corporals' Club" No. 1 Radio School, R.A.F., Cranwell, was held at Bolton's Hotel, South Kensington, on Saturday, April 26, 1947. Over 50 ex-corporal wireless instructors, including G2HNJ, G2AKY and several BRS members were present. After an excellent dinner a President, Mr. L. M. Simmons, and a Vice-President, Mr. Peter Gough, were elected. A brief outline of the club's aims was put forward by its founder and General Secretary, Mr. Frank Hayes. A general "get-together" finished the evening during which time many friendships were re-newed. A goodwill message was received from XZ2YP now in Burma.

During the war years Amateur Radio was kept alive at Cranwell by the monthly R.S.G.B. meetings in Hut 35 and Hut 358, and not a few of its pupils and instructors are now on the air.

All interested readers who wish to become members should contact Mr. Frank Hayes, 57, Windsor Avenue, Ashton-on-Ribble, Preston, Lancs. To qualify for membership, applicants must have been members of the Corporals' Club at some time during 1939-45.

Harrogate and District Short Wave Radio Society

On April 30 members were entertained by a talk on "Electrons" by Mr. A. Woodmansey. Covering much ground in limited time he was able to enlighten members on the composition of matter, atomic structure, nuclear energy, the properties of radium and uranium, electron emission and the workings of the Cyclotron. Several leading questions were put to the speaker before the meeting was thrown open to general discussion.

Catterick Radio Club

G5YN gave a very interesting talk on his experiences in Tibet during 1936 when he started the famous station AC4YN. Some of the first QSLs were shown and photographs were passed round. As the meetings have been so well attended larger premises have been secured. The Club is active on the air under the call G5KW. For details of future meetings see Forthcoming Events. The secretary, Cpl. Hall, will be glad to meet new members. G5KW

EDDYSTONE S640—(*continued from page* 208)

found to handle very well. The bandspread control is smooth and adequate, the 28 Mc/s. band being spread over about 80 divisions of the dial. Calibration was found to be accurate although there was a trace of backlash on the bandset control. The crystal filter was found to work well, except for the point mentioned previously. It was extremely useful in reading badly jammed telephony signals.

In short, this receiver marks a great step forward in the field of British made Communication sets, and once various small points have been dealt with, should be well able to hold its own with any similar receiver, regardless of make.

A SMALL PORTABLE PETROL ELECTRIC UNIT

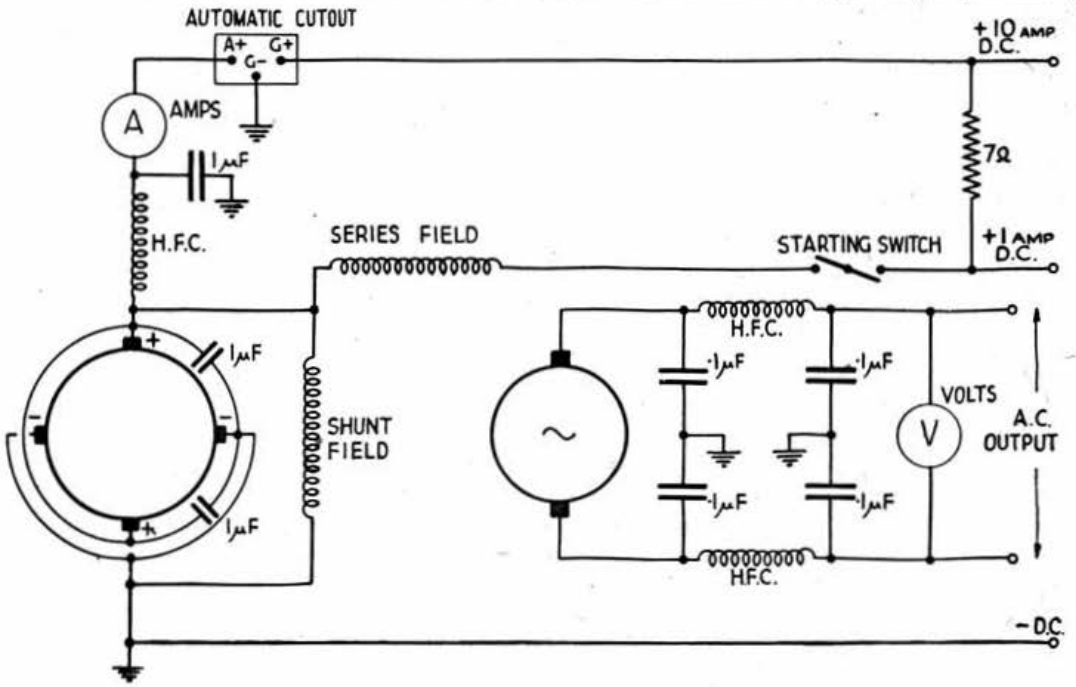
BY W. C. BROWN M.I.R.E. (VU2AL)*

THE following details of a small petrol-electric plant, known as "The Blue Diamond," may be of interest to those who have no mains supply, as well as to those who operate portable gear.

"The Blue Diamond," used chiefly by the U.S. Forces during the war, embodies a dual purpose generator which produces outputs of 230 volts A.C. 230 watts 50 c/s and 12 volts D.C. at 10 amps. is taken out to three terminals. This arrangement provides a choice of outputs. A 7 ohms 7 watt resistance connected between the generator positive and the low output terminal, limits the output to approximately 1 amp., which is considered satisfactory for keeping the starting battery charged. The other output terminal is connected directly to the generator positive brush through the automatic cut-out and suppressor choke.

The cut-out is designed to prevent the batteries discharging into the generator when the latter is stationary. The brushes used are of the Morgan Crucible H.M.8 Grade carbon type.

The engine, a single-cylinder, air cooled, four stroke unit, is directly coupled to the generator, with the cylinder mounted at an angle of 45° to the horizontal. Ignition (which is also suppressed) is provided by



The generator is a four pole shunt-wound machine, with a series winding which is used for starting up from accumulators. To this is fitted a wave-wound armature, comprising a 25 segment commutator with two slip rings on the same end. In addition to the normal direct current winding the armature carries an alternating current winding. Mounted on the field casing is a switch-box which houses the automatic cut-out and a 7 ohms resistance. The starting switch and an A.C. outlet socket are fitted to the lid of the box. The A.C. and D.C. outlets are suppressed to prevent interference on medium and short waves. On the D.C. side two 1μF condensers are connected between the positive brushes and earth. In addition there is a high-frequency choke in the positive lead with another 1μF condenser connected from the "load" end to earth.

The A.C. filter comprises two high-frequency chokes and four 0·1 μF. condensers, the chokes being connected between the slip-rings and the outlet sockets, with the condensers joined to the ends of the chokes and earth. All suppressors are fitted inside the generator casing on the commutator end.

The D.C. output, one negative and two positives, a flywheel magneto. Both engine and generator are mounted on a cast-iron bed which also serves as fuel tank. The needle-type carburettor is of very simple design and without a float chamber. Fuel is drawn up through a non-return valve by suction on the jet. Lubrication is by the splash method, oil being carried in the sump for this purpose. A switch is mounted on the flywheel magneto casing for stopping the engine.

The unit is very compact and not heavy, in fact two people can handle it with ease. Starting up by the battery method is simplicity itself. It should be noted however, that the starting battery is connected between the low output terminal and the negative. The unit can also be started by the usual cord method, a special pulley being mounted on the engine shaft for this purpose. Although a voltmeter and ammeter are shown in the diagram, these were were not universally fitted. It is therefore possible to find some units without these instruments.

* 1, Carno Road, Caersws, Montgomeryshire

Audio Engineering

We would advise members that the above is the title of a new magazine which has superseded *Radio*, the journal published by Radio Magazines Inc. of New York. The change dates as from the May, 1947, issue, but subscription rates remain the same, at 21s. per annum.

LETTERS TO THE EDITOR

DEAR SIR,—I have read with interest Mr. Dolphin's article on a Noise Signal Generator, which appears in the April issue of the R.S.G.B. BULLETIN.

Whereas I agree generally with his definition of noise factor, and the experimental details given, I do not agree with his formula for noise factor, or with his curves which are derived from that formula.

The formula is well known, and should read :—

$$\text{Noise Factor} = 10 \log_{10} \frac{2IR}{100}$$

where I is in milliamperes, and R is in ohms.

A detailed discussion of noise factor has recently been published in the *Wireless World*, written by Mr. L. A. Moxon, B.Sc., A.M.I.E.E.

Yours faithfully,
ALAN J. BAYLISS, B.Sc. (G8PD)

DEAR SIR,—In response to your invitation to me to express an opinion on the letter from Mr. Bayliss, I should like to make the following comments regarding the measurement of receiver noise factor as described in my article. As stated in the text the noise power at the input of the receiver is made such, that the noise voltage at the output of the receiver is *doubled*. This is more convenient for amateur use, where the carrier level meter or output, is usally a voltage indicating device calibrated in 6db steps.

But whatever signal level device is used it can be calibrated for a 2 : 1 voltage increase in receiver output, by the simple method as stated in my article. It means however, that the inherent noise in the receiver is increased by three, and it therefore becomes essential to divide the actual noise diode current by 3 to arrive at the noise factor; hence the formula $10 \log_{10} \frac{2IR}{300}$ in place of the more common version of $10 \log_{10} \frac{2IR}{100}$.

Yours faithfully,
W. P. DOLPHIN.

"Noise Radiation"

DEAR SIR,—With reference to G2FJD's letter re Noise Radiation of his switched multi Band Transmitter and the view held by Mr. Mathews, G6LL, that it is advisable to have the valves drawing current when the key is up and that it is an advantage to have Cathode Bias, I have also encountered this in the Rig I have just completed. I call it " Idle Radiation." But this can be cured by altering the impedance of the grid circuit to a lower value.

(Quote) Auto Bias. The anode current flows through the auto bias resistor " R " then back to cathode, and the voltage drop across the resistor can be applied to the grid circuit by connecting the grid circuit to earth via the R/F choke or by an inductive resistor.

This trouble gives the same effect as an open grid in an A/F amplifier, and due to the high gain of the valve used in the R/F amplifier mentioned a flywheel effect is set up caused by electron flow due to the valve passing some current. The mis-matched grid circuit in comparison to the resonated tank circuit sets itself in motion by a sudden surge which gives " Idle Radiation," and the noise in the receiver at operating frequency is similar to motor boating ; or an open grid circuit in an A/F amplifier. The trouble may also be eliminated by increasing the value of " C."

In effect, a type of current negative feedback is caused here due to " C " not being the right value, and this feedback can also cause Idle Radiation.

Note : This Idle Radiation can also be encountered if the grid bias supply decoupling condensors are not sufficiently large.

Yours faithfully,
R. A. H. COLLINS (G3AXS)

Break-in with V.F.O's.

DEAR SIR,—With reference to Mr. Briggs' letter in the April issue, I was interested to note that he has been troubled with noise radiation from his transmitter with the drive removed, and that this made break-in operation impossible with a weak station.

I have experienced a similar effect. In my case, the transmitter for 160 metres consists of a Franklin M.O., followed by a Class A EF50 Buffer, and a VT501 PA. (This latter is a small 7½-watt dissipation tetrode). With the key up (thus removing H.T. from the M.O.) the noise picked up by the receiver was such as to completely swamp all but local stations. This was solely due to the noise, and not to any form of parasitic.

The gain from the EF50 B.A. grid to the final anode circuit is of the order of 200 times. Thus, if the noise-voltage on the EF50 grid were only a tenth of a microvolt, this would represent 20 microvolts on the VT501 anode to be fed to the aerial circuit. It is thus easy to see that with the receiving and transmitting aerials in close proximity a fairly strong noise-voltage will be fed to the receiver. The remedy is, as Mr. Briggs suggested, to use fixed bias on the final. Another way to overcome the trouble is to use a change-over relay in the aerial circuit, which is operated by the key, thus removing the transmitting aerial when the key is up. In the writer's case the noise is completely removed when this is done.

Yours faithfully,
C. W. CRAGG (G2HDU).

The R.S.G.B. QSL Bureau

For the benefit of new members, the main features of the QSL Bureau are set out below.

1. All members have the right to full use of the Bureau both for sending and receiving cards.

2. There is no subscription. Use of the Bureau is one of the privileges of membership.

3. Envelopes for the collection of cards from the Bureau should be large enough to take the largest size of QSL card and bear the owner's name and address, a 2½d. stamp and the call sign in bold letters in the TOP LEFT CORNER.

4. All cards for outward transmission and supplies of envelopes should be sent direct to the QSL Manager,

Mr. A. O. Milne,
29 Kechill Gardens, Hayes,
Bromley, Kent.

Only cards and envelopes should be sent to the QSL Manager. Please do not send anything intended for H.Q's. to the QSL Bureau.

5. Please do not send cards and envelopes to H.Q's.

6. GI, GM and GW stations may send their *envelopes* direct to the appropriate Bureau.

GI to W. H. Martin, Esq.,
Greenisland Lodge,
Greenisland, Co. Antrim.

GM to D. Macadie, Esq.,
154, Kingsacre Road,
Glasgow, S.4.

GW to E. A. Hayward, Esq.
6 Kenfig Road,
Gabalfa, Cardiff.

7. Large packets of cards for U.S. Amateurs may be sent direct to the A.R.R.L., 38 La Salle Road, West Hartford, 7, Conn., U.S.A., as cheaply as to the R.S.G.B. Bureau. If left open at the ends they go " commercial paper rate."

8. It will assist the QSL Manager if members will sort their cards into countries, the U.S. and VE cards in numerical order and G cards into G2, 3, 4, 5, 6, 8, G2AAA–CZZ, G2DAA–G2HZZ, G3AAA–AZZ, G3BAA–CZZ, GM, GI, GW. There is a sub-manager for each of these divisions.

Don't tie sorted sections separately or ring them with paper tape. As long as all of one sort are together, we don't mind what main order they are in.

9. Don't stamp cards going abroad. They are sent in bulk so you are wasting your money.

10. Please do as we ask, and help us to give you a first-rate, fast and accurate service. A.O.M.

ATLANTIC CITY 1947—(*concluded from page* 204.)

The battle will continue for many weeks but to quote an old-time phrase we must " keep our fingers crossed."

* * *

Prior to arriving at Atlantic City the President and General Secretary were entertained by a number of prominent New York amateurs particularly Mr. Hank Lockwood, W2HFS Hartsdale, N.Y. The Society's representatives also spent three days at A.R.R.L. Headquarters where they were cordially entertained by Messrs. Warner, Handy, Mosky, Paddon and other members of the League staff.

A film record of their visit to the U.S. is being produced and this will be displayed upon their return.

J. C.

IGNORE ALL RUMOURS !

FORTHCOMING EVENTS

REGION 2

June 18 **Doncaster,** 7.30 p.m. at 73 Hexthorpe Road.
„ 18 **Huddersfield,** 7.30 p.m. at Plough Hotel.
„ 18 **York,** 8 p.m. at 29 Victor Street.
„ 20 **South Shields,** 7 p.m. at St. Paul's School, Westoe.
„ 22 **P.D.M., Leeds.**
„ 24 **Catterick,** 7 p.m. at S.T.C., H.Q. Block, Vimy Lines.
„ 25 **Harrogate,** 7.30 p.m. at Y.M.C.A., Victoria Avenue.
„ 25 **Hull,** 7.30 p.m. at 30 Princess Avenue.
„ 25 **Sheffield,** 8 p.m. at "Dog and Partridge," Trippet Lane.
„ 25 **Sunderland,** 7.30 p.m. at 16 North Bridge Street.
„ 25 **York,** 8 p.m. at 29 Victor Street.
„ 27 **Barnsley,** at King George Hotel, Peel Street.
„ 27 **South Shields,** 7 p.m. at St. Paul's School, Westoe.
„ 30 **Bradford** (Short Wave Club), 7 p.m. at Temperance Hall, Harewood Street.
July 1 **Catterick,** 7 p.m. at S.T.C., H.Q. Block, Vimy Lines.
„ 2 **Doncaster,** 7.30 p.m. at 73 Hexthorpe Road.
„ 2 **York,** 8 p.m. at 29 Victor Street.
„ 4 **South Shields,** 7 p.m. at St. Paul's School, Westoe.
„ 7 **Bradford** (Amateur Radio Society), 7.30 p.m. at Cambridge House, 66 Little Horton Lane.
„ 8 **Catterick,** 7 p.m. at S.T.C., H.Q. Block, Vimy Lines.
„ 9 **Harrogate,** 7.30 p.m. at Y.M.C.A., Victoria Avenue.
„ 9 **Sunderland,** 7.30 p.m. at 16 North Bridge Street.
„ 9 **York,** 8 p.m. at 29 Victor Street.
„ 11 **Barnsley,** at King George Hotel, Peel Street.
„ 11 **South Shields,** 7 p.m. at St. Paul's School, Westoe.
„ 14 **Halifax,** 7.30 p.m. at 32 Clare Road.
„ 15 **Catterick,** 7 p.m. at S.T.C., H.Q. Block, Vimy Lines.
„ 16 **Huddersfield,** 7.30 p.m. at Plough Hotel.
„ 16 **Hull,** 7.30 p.m. at 30 Princess Avenue.
„ 18 **South Shields,** 7 p.m. at St. Paul's School, Westoe.

REGION 5

July 1 **Chelmsford,** 7.30 p.m. at 184 Moulsham Street.
„ 25 **Norwich,** Board Room, N.C.E.D., Duke Street.

REGION 7

June 15 **Enfield,** 3 p.m. at A. & B. Cafe, Southbury Road (junction with Ladysmith Road).
„ 15 **New Cross,** at 63 Erlanger Road, New Cross Gate.
„ 17 **St. Albans,** 8 p.m. at "The Beehive," London Road.
„ 17 **Sutton and Cheam,** 7.30 p.m. at "Ye Olde Red Lion," Cheam.
„ 18 **Edgware,** at Orchard Cafe, The Broadway, Mill Hill.
„ 19 **Slough,** 7.30 p.m. at Congregational Church Hall, Church Street, Slough.
„ 20 **Hampstead,** 7.30 p.m. at 14B Belsize Lane, N.W.3 (Belsize Park, Northern Line).
„ 22 **Wimbledon,** 3 p.m. at G4CG, 57 Kingswood Road, S.W.19.
„ 25 **Edgware,** at Orchard Cafe, The Broadway, Mill Hill.
„ 26 **Ruislip,** 7.30 p.m. at 22 Highfield Avenue, Pinner.
„ 27 **West Norwood,** 7.30p.m. at Brotherhood Hall, West Norwood.
July 1 **Welwyn Garden City,** 8 p.m. at Council Offices, Welwyn Garden City.
„ 1 **Sutton and Cheam,** 7.30 p.m. at "Ye Olde Red Lion," Cheam.
„ 2 **Edgware,** at Orchard Cafe, The Broadway, Mill Hill.
„ 4 **Southgate,** 7.30 p.m. at Merryhills Hotel (near Oakwood Station).
„ 8 **Croydon,** 7.30 p.m. at "Blacksmith's Arms," South End, Croydon.
„ 9 **Edgware,** at Orchard Cafe, The Broadway, Mill Hill.
„ 10 **Ruislip,** 7.30 p.m. at 11A Ickenham Road, Ruislip.
„ 15 **Sutton and Cheam,** 7.30 p.m. at "Ye Olde Red Lion," Cheam.
„ 17 **Slough,** 7.30 p.m. at Congregational Church Hall, Church Street, Slough.

REGION 8

Chelmsford, meeting fixed for June 20 will not now take place.

REGION 10

July 14 **Cardiff,** 7 p.m. at Park Hotel.

REGION 14

June 25 **Glasgow,** 7 p.m. at Institute of Engineers and Shipbuilders, 39 Elmbank Crescent, Glasgow.
July 10 **Stirling (including Alloa, Larbert and Falkirk),** 7.30 p.m. at Plough Hotel, Stenhousemuir, Larbert.

If YOUR local meeting does not appear please contact your T.R direct for date.

New Regional Representatives

The Council has unanimously resolved to appoint Mr. E. G. Foulkes, GW5FU, of "Katheric," Kinard Drive, Rhyl, to the office of Acting Representative for Region 11.

Official Regional Meetings, 1947

Appended below is a list of the Official Regional Meetings which have been arranged for the current year, together with the names of the Council Representatives who hope to attend.

Date	Region	Venue	Chief Speaker	Names of Representatives attending
June 22	2	Leeds ..	V. M. Desmond ..	I. D. Auchterlonie and C. H. L. Edwards
July 12	5	Cambridge ..	H. A. M. Clark ..	V. M. Desmond and J. W. Mathews
Aug. 17	11	Prestatyn ..	I. D. Auchterlonie	C. H. L. Edwards
24	2	Newcastle ..	E. L. Gardiner ..	W. A. Scarr
30	15	Belfast ..	A. O. Milne ..	R. H. Hammans and W. A. Scarr
Sept. 6	12	Aberdeen ..	A. O. Milne ..	R. H. Hammans
14	1	Blackpool ..	W. A. Scarr ..	I. D. Auchterlonie and G. Bloomfield
20	10	Cardiff ..	S. K. Lewer ..	C. H. L. Edwards and K. Morton Evans
28	7	London ..	—	—
Oct. 18	14	Glasgow / Edinburgh	H. A. M. Clark ..	I. D. Auchterlonie, C. H. L. Edwards and A. J. H. Watson
25	8	Bournemouth	H. A. M. Clark ..	K. Morton Evans
26	4	Nottingham	V. M. Desmond ..	G. Bloomfield and E. L. Gardiner
Oct. 1-11		Radiolympia	—	—
Nov. 17-22		London Radio Exhibition, Royal Hotel	—	—

The General Secretary will, if possible, attend certain meetings after his return from the Atlantic City Conference.

EASTERN REGIONAL MEETING

UNIVERSITY ARMS HOTEL, CAMBRIDGE

SATURDAY, JULY 12th, 1947

2. 0 p.m. - Assemble
3. 0 p.m. - Business Meeting
5.30 p.m. - High Tea
7. 0 p.m. - Station Visits

Tickets (to be purchased before July 5th) 7/6 each of S.J. Granfield (G5BQ) (R. R.) 47, Warren Road, Cambridge.

BOOK THE DATE

LONDON MEMBERS' LADIES NIGHT

SATURDAY, SEPTEMBER 20, 1947.

Full details next month.

Congrats

● To Mr. and Mrs. J. E. Pitcher (BRS13900) of Norwich, on the arrival of a son.

NEWS FROM HEADQUARTERS

COUNCIL, 1947

President :
STANLEY K. LEWER, B.Sc., G6LJ.

Executive Vice-President : V. M. Desmond, G5VM.
Hon. Secretary : H. A. M. Clark, B.Sc.(*Eng.*), G6OT.
Hon. Treasurer : A. J. H. Watson, F.S.A.A., G2YD.
Hon. Editor : Arthur O. Milne, G2MI.
Immediate Past President : E. L. Gardiner, B.Sc., G6GR.

Members : I. D. Auchterlonie, G6OM, G. F. Bloomfield, Ph.D., A.R.I.C., G2NR, C. H. L. Edwards, A.M.I.E.E., G8TL, K. Morton Evans, O.B.E., G5KJ, R. H. Hammans, G2IG, J. W. Mathews, G6LL, W. A. Scarr, M.A., G2WS.

G.P.O. Liaison Officer: Arthur E. Watts, G6UN.
General Secretary : John Clarricoats, G6CL.

April Council Meeting

*Resume of the Minutes of a Meeting of the Council of the Inc. Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.*1, *on Monday, April* 14, 1947, *at* 5.45 *p.m.*

Present.—The President (Mr. S. K. Lewer, in the Chair), Messrs. Auchterlonie, Bloomfield, Clark, Edwards, Evans, Gardiner, Hammans, Mathews, Milne, Scarr, Watson, Watts and John Clarricoats (General Secretary).

Apology.—An apology was submitted for the absence of Mr. Desmond.

Committee Reports.

The Reports of Committees were presented.

Contests

Resolved to arrange for the North of the Thames D. F. Field Day to be filmed.

Finance

Resolved to accept and adopt the Cash Account for the month ended March 31, 1947.

Membership

Resolved to elect 266 Corporate Members, 64 Associates, 26 Junior Associates. Total elected 356.

One Corporate and one Associate member applied for and were granted Life Membership. Six Associates applied for and were granted Corporate membership.

Resolved to grant affiliation to the North Kent Radio Society, Slade Radio and the Stourbridge and District Wireless Society.

Technical Committee

Resolved to instruct the Society's printers to break-up the type for the Handbook and Supplement.

G.P.O. Liaison Committee

A detailed report of a meeting which took place on March 21, between Representatives of the Society and the G.P.O. was presented. The report outlined the British proposals to Atlantic City. The Council expressed great dissatisfaction with certain of the proposals and approved the sending of a letter of protest to the Engineer-in-Chief of the G.P.O.

It was agreed to write to the Radio Board asking for further consideration to be given to the claims of British amateurs in regard to frequency allocations.

A rough draft was submitted of various proposals affecting amateurs which had been submitted to Berne by France, Russia, the U.S., the U.K. and other Governments.

Resolved that as both U.S.S.R. and France propose an amateur allocation around 70 Mc/s, the G.P.O. Liaison Committee be instructed to again approach the G.P.O. for support of the Society's claim for an allocation at this part of the spectrum.

Atlantic City Conference

Resolved to effect accident insurance cover on behalf of the President and General Secretary in the sum of £5,000 each—the policies to cover all modes of transport.

Administration of the Society during the absence of the General Secretary

The Secretary expressed the view that there was sufficient work under normal circumstances for two senior male officials, and at the request of the Council outlined his duties. It was then reported that Mr. Milne had offered to join the Staff as Assistant Secretary at a salary of £500 per annum. After discussion (in the absence of Mr. Milne) it was resolved to inform Mr. Milne that Council was unable to accept his offer.

The Report of the General Secretary was submitted.

Isle of Man Status

Resolved to request the G.P.O. to issue a separate prefix to Isle of Man amateurs.

Past Presidents

Resolved that Past Presidents are not entitled to attend meetings of the Council, or to receive notices of such meetings.

Ministry of Supply Surplus Equipment

Mr. Edwards reported that arrangements were being made with the Ministry of Supply for a further consignment of surplus transmitters to be made available to members.

Fuel Rationing

Resolved that no official action be taken with the Government but the Contest Committee be made aware of the position, and be instructed to disqualify all B.E.R.U. Contest contacts made by U.K. amateurs during the power restriction periods.

Official Regional Meetings

A list of regional meetings was tabled and names of Representatives agreed.

The meeting terminated at 10.35 p.m.

Special Council Meeting

Resume of the Minutes of a Special Meeting of the Council of the Inc. Radio Society of Great Britain, held at the Imperial Hotel, Birmingham, on Saturday, April 19, 1947, *at* 10.30 *p.m.*

Present.—The President (Mr. S. K. Lewer, in the Chair), Messrs. Auchterlonie, Bloomfield, Clark, Desmond, Edwards, Gardiner, Mathews, Milne, Scarr and J. Clarricoats (General Secretary).

World Telecommunications Conference

It was agreed that Council would deal with all Administrative matters arising during the absence of the President and Secretary.

Membership Certificates

Resolved to use a rubber stamp or printed signature on Membership Certificates in future.

Regional Notes

Council considered Regional Representatives resolution in favour of terminating the publication of Regional Notes.

Resolved to suspend Regional Notes for a trial period of three months.

Operation during Restricted Hours

Resolved to obtain legal advice on amateur operation during restricted hours.

The meeting closed at 11.15 p.m.

Model Control Group

F./Lt. J. Oswald Dykes, who has been in charge of the above group has had to relinquish this position owing to R.A.F. duties. Mr. C. Terry, BRS12402, The Hermitage, Silver Street, Cambridge, has now taken over and will be pleased to hear from members interested in this Group.

INCORPORATED
RADIO SOCIETY OF GREAT BRITAIN

NEW RUSKIN HOUSE, LITTLE RUSSELL STREET
LONDON, W.C.1

Assistant to the General Secretary

APPLICATIONS are invited from keen young members for the above appointment on the Headquarters' staff of the Society. The undermentioned qualifications will be taken into consideration in the selection of an applicant:—

(*a*) Experience as an active amateur, preferably one well-known in the Society.
(*b*) Sound general knowledge of office routine including some knowledge of bookkeeping.
(*c*) Ability to address meetings of Society members and to entertain visitors.

The successful applicant will act as an Assistant to the General Secretary, and may be required to travel on behalf of the Society.

Commencing salary, £312 per annum.

Applications, in candidate's own handwriting, giving particulars of education, qualifications and experience, should be sent to the General Secretary, R.S.G.B., New Ruskin House, Little Russell Street, London, W.C.1, not later than 30th June, 1947.

Candidates selected for interview will be required to submit references as to character and ability.

Candidates canvassing members of the Council, directly or indirectly, will be disqualified.

H.A.M. CLARK,
Hon. Secretary.

15*th June*, 1947.

South Birmingham

Will members resident in the southern half of Birmingham who are interested in the holding of local meetings in that area please write to Mr. T. Higgins, G8JI, 391 Rednal Road, Northfield, Birmingham 31. These meetings will be held with the full approval of the Birmingham T.R.

EXCHANGE AND MART SECTION

Due to paper restrictions advertisements are only accepted "for insertion when space is available." No advertisement must exceed 50 words. RATES: Members Private Advertisements 2d. per word, minimum charge 3/-. Trade, 6d. per word, minimum charge 9/-. Use of Box number 1/6 extra. Send copy and payment to Parrs Advertising Ltd., 121 Kingsway, London, W.C.2.

A GIFT.—Cathode Ray Oscilloscope in working order, ex W.D. containing three-valve amplifier, 2½" C.R. Tube (List price £4 4s.), two VR65's, one VR66. 5 Potentiometers and a host of components. Complete in steel cabinet. Limited stock. Order early. Only £3, plus 5s. carriage. S.A.E. Lists other bargains. AMATEUR RADIO SERVICE, G6HP, Canning Street, Burnley. [257

A LIMITED number of meter-rectifiers by Westinghouse. New Midget, tubular ¾ in. × ¾ in., tag ends, half wave. 3s. each.—G2CDN, 87 Brixton Hill, S.W.2. [149

ATTENTION.—G2PU announces that the communications receiver in use at the station up until 1939 is now available for sale. Doesn't miss much DX ! E-series ; 1 RF–2 IF ; S-meter etc. Offers to Cambridge. [263

AVO Model 40, as new, £15. Mains transformers 4v 20 amp, CT 230v, primary, £3. 250–0–250 80 mA 4v 2 amp, 4v 3 amp. 25s. ; 6 range A.C./D.C. voltmeter 0–500v., £2. Condensers. 500 μf 50v. working, 15s. ; 1 μf 4000v., 15s. Crystal 7043 Kc/s, in QCC holder, 25s.—G2DPH, Bennington, Dean Row, Wilmslow, Cheshire. [289

A SUPER Communications Receiver for the Ham. Marconi type C.R./100. As new, 12 valves, 2 R.F. 3 I.F., B.F.O., D.D.T., 6V6 output. Switched noise suppressor, 5 position crystal filter. Continuous coverage, 6 bands, 10–2,000 meters switched. Logging scales. Built in power pack 230 A.C. Offers over £50.—109A Church Street, Croydon. [301

AMATEURS.—Coil Inductance Tables. There is no longer any need to laboriously calculate your coil sizes. 101 tables and thousands of individually calculated inductance values. Price 7s. plus 3d. postage from G5LF, 14 Silverston Way, Stanmore, Middlesex. [304

BULLETINS, July, 1935 to June, 1946, except February, 1937. Offers to G3ALN, 40 Greywood Avenue, Newcastle-on-Tyne, 4.

BRS selling out. Unused transmitter and receiver valves, 832's, 3E29's, 807's, Acorns, Midgets, Model 7 Avo, £12 10s. 1155 receiver, £18 10s., with power pack, speaker, gear too numerous to advertise. S.A.E. to PARRS, 42 Oxford Road, London, N.W.6, for list and prices. [290

BRS9065 has for disposal ex-Government radio and electrical equipment including meters, resistors, condensers, etc. Send S.A.E. list.—WILSON, Aughavey, Coagh, Cookstown, N. Ireland. [294

BEAUTIFUL job. R107 8 valve communication receiver, 17·6–1·2 Mc/s., 100/250 v. A.C., 12 v. D.C. internal speaker, weight 96 lb., as new, £45. Compact metal rectifier unit in case, variable output up to 400 v. D.C. at 80 mA, £4 10s. Portable moving coil voltmeter 0–15/0–250 D.C., new, 45s.—G2VV, 5 Gloucester Road, Hampton, Middx. [305

CONVERTERS.—58 to 80 Mc/s., ex R.A.F. RL7 R.F. stage RL7 mixer ; RL16 Osc. 7·5 Mc/s. ; I.F. silver-plated chassis ; 50–1 S.M. dial, £4 each, C.W.O. Post free. RED HOUSE RADIO, Phillips Street, Aston, Birmingham, 6. [250

COMMUNICATION Receiver, 8 valve superhet, 150 kc/s. to 25 Mc/s. R.F. and A.F. controls B.F.O., A.V.C. phone jack, power pack and speaker incorporated. Just realigned professionally, £25 or near offer.—G3QF, St. Thomas' Vicarage, Edinburgh Road, Norwich, 'phone : 24407. [272

COMMUNICATION Receiver, Marconi CR100 12 tube noise limiter and visual tuner, etc., 3000 metres to 10 metres; speaker, perfect order, only £27 10s., or swap for good 35 mm. Camera. Bendix American Aircraft Transceiver, R.A.F. No. T5017 and R5019, 100–150 Mc/s. ; easily converted, final, 832 9 watts, all tubes and service book, £10.—Box 280, PARRS, 121 Kingsway, London, W.C.2. [280

COMPLETE station for disposal, 100/150 watt transmitter, first-class equipment and construction, 9 valve superhet receiver, " S " meter, etc. Perfect. Bargain, £75 complete, or sell separately.—Box 286, PARRS, 121 Kingsway, London, W.C.2.

DUPLICATING.—Circular Letter, Lists, Notices, etc. We can offer a quick service and shall be pleased to quote you our special trade terms.—SCOTT'S, 14 Gardner Street, Brighton.

DET 20, 5s. each. 6J6, 12s. each. Metal and V.H.F. valves cheap. Headphones by S. G. Brown. 120 ohms, complete with headband, long cord and jack plug, 7s. 6d. per pair. All the above brand new. Many other bargains. 1d. stamp for list.—WATTS, 38 Chapel Avenue, Addlestone, Surrey. [292

ENGLISH valves, new and unused, all boxed, 4MKT4, 4 SP4, 4 MH4, 6 VMS4B, 1 D41. What offers ?—Box 273, PARRS, 121 Kingsway, London, W.C.2. [273

EX-Government equipment for sale, including earphones, meters, power units, etc. S.A.E.—Box 278, PARRS, 121 Kingsway, London, W.C.2. [278

EDDYSTONE Transmitting rack with 7 panels and 7 standard chassis. Panels are not drilled in any way. The whole as new. Value £13, offered for £7.—Fairbairn, 57 Monument Road, Ayr. [306

FEEDER Units Incorporating Denco C.T.2. coil turrets, Denco High " Q " I.F.T.'s (Q.155) wired and aligned, ECH35, EF39, EBC33 or 6K8, 6SK7 and 6R7. Usual guarantee. Superlative performance. 6½" square, price £9 9s. Denco, " Q "-Max and Armstrong Stockists.—GOODSELL LIMITED, 40 Gardner Street, Brighton. [219

FREQUENCY Meter BC–221–T. Range 125 to 20,000 Kc/s. Built by Zenith Radio Corporation, £10.—BRS10,608, 4 Wallis Avenue, Hunderton, Hereford. [293

FOR SALE.—New 40 watt amplifier, £17 10s. S.A.E. for list of other new and used valves, loud speakers, meters and other components.—PREVOST, 17 Perham Road, London, W.14. [300

HALLICRAFTERS Sky Chief S14, 7v. calibrated; new valves, auto-pack trans., £22.—SPENCER, 45 Sipson Way, West Drayton, Middlesex. [248

HALLICRAFTER Sky Champion S.20, provision battery operation, instruction book; purchaser must collect. Pre-war Eddystone condensers including ·00015 three-gang. Muirhead National type box and dial P.W.O., all good condition. What offers ?—G6TI, 29 Croft Avenue, Southwick, Sussex. [258

H.R.O. Senior (pre-utility) 1 to 30 Mc/s., excellent condition, no power pack, £45. Hallicrafter S27R am/fm 27 to 143 Mc/s. 110/230 volts perfect condition, £65. Hallicrafter amplifier, 40 watts, gram outputs etc., little used, £20. London, S.W.—Box 277, PARRS, 121 Kingsway, London, W.C.2. [277

HALLICRAFTER Ultra Skyrider, 5·65 to 79·5 Mc/s. Recently overhauled, crystal gate, noise limiter, B.F.O. etc., very good appearance and condition, £30.—G3TC, 62 Ringstead Crescent, Sheffield, 10. [296

HALLICRAFTER Ultra Skyrider, S.10, 2·5–53·5 metres with s.s. meter. Brown's type F phones, £35. Peter Scott pre-selector, 6·5–550 metres, £12 or nearest offers. Both little used. Condition as new.—Write Box 302, PARRS, 121 Kingsway, London. W.C.2. [302

LARGE Rotary wave-change switches, Yaxley type, oak pattern. Stand high voltage, ideal for transmitters. New, unused 3-pole, 4-position, 3-bank, plus 1-bank of miscellaneous contacts. Complete with knob. Real bargain, buy now for future use. 5s., post 6d. 54s. dozen, post 1s. 6d.—R.T.S. LTD., 8 Gladstone Road, Wimbledon, S.W.19. [261

MONOMARKS.—Permanent London address. Letters re-directed, 5s. p.a. Royal patronage.—Write MONOMARK, BCM/MONO7A, London, W.C.1. [160

MOVING Coil Mike, £3. Osram 75 watt H.F. triodes ACT/6, 45s. each. 6AK5 (3) 10s. EF54 (6), 7s. 6d. 120 watt modulator, complete, £25.—G21Q, 44 Taptonhill Road, Sheffield, 10.

NEON Radiation Indicators, 4s.; replacement contacts for Philips' tubular convertors, 3s. 6d. Set (9), 0–500 microamp. and 0–1 milliamp. or remove shunt to get 0–200 microamp meter. Both meters brand new, 10s. pair. ·00015 short wave tuning condenser, 1¼ in. spindle, 3s. 6d. each. Thermal Cutouts 4v 1 amp, 7s. 6d.—PARK RADIO, 678 Romford Road, London, E.12. [265

NATIONAL Union 813 Radiotron 805 and 829B for disposal. What offers ? Will separate.—BRS10,638, The Lodge, Marston Bank, Rocester, Staffs. [285

NC 100 complete with speaker. Excellent condition. Nearest offer £45.—G3DI, 122 Hillmorton Road, Rugby. [288

NATIONAL H.R.O. Rack mounted with power supply and matched 8 in. P.M. speaker. Coils 200 kc/s.–30 Mc/s. New tubes throughout. £45. Buyer collects London.—Box 307, PARRS, 121 Kingsway, London, W.C.2. [307

OFFERS over £40 wanted for GM6UU's National H.R.O., complete with eight sets coils, power pack and loudspeaker. What offers for Canadian R103 receiver with spares. The O.M's. station is being dismantled, everything to be sold. View by appointment only.—Apply THIRLWALL, Regal Cinema, Bonnyrigg. Phone: Lasswade 2274. [299

OSCILLOSCOPE, 2½ in. tube, usual controls, linear timebase. amplifier, attenuator, power supply, £17. Oscilloscope, 1½ in, type, as above, £12. 25 watt C.W. transmitter, complete, £6. Satisfaction or money refunded.—Box 282, PARRS, 121 Kingsway, London, W.C.2. [282

PATENTS and Trade Marks. Handbook and advice free.—KING'S PATENT AGENCY, LTD. (B. T. KING, G5TA, Mem. R.S.G.B. Reg. Pat. Agent), 146A Queen Victoria Street, London, E.C.4. Phone: City 6161. 50 years' refs.

QSL's and log books (P.M.G. approved). Samples free; state whether G or BRS.—ATKINSON BROS., Printers, Elland.

RME69 with noise limiter, RMEDH20 preselector and RME510X frequency expander, complete matched set in black crackle cabinets, £75. Suppressed rotary converters up to 400 watts. 30 watt PP 6L6 commercially built A.C. amplifier with multimatch modulation transformer, £15. 211G valve with holder, 30s.—G5BR, 6 Highbury Road, Streetly, Staffordshire.

RME 69, unscratched and perfect, £40. Hallicrafters S36 15v. receiver, unmarked, £45. Marconi 11v communication receiver black crackle cabinet, brand new, £30. Hallicrafters 12 in. speaker and cabinet, £4. H.R.O. cabinet speaker, 70s. Four H.R.O. coils, 110s. Numerous valves.—57 Briarlands Avenue, Sale, Cheshire. [276

RADIOGRAPHIC, LTD., 66 Osborne Street, Glasgow, C.1, offer transmitting valves. Eimac 35T, 45s.; RCA 813, 110s.; RCA 805, 110s.; Hytron RK25, 40s.; RCA 815, 45s.; Raytheon RK20A, 94s. 6d.; RCA 866/866A, 27s. 6d.; Gammatron 24G, 37s. 6d.; Kenrad 1625, 25s.; Hytron TZ40, 45s.; RCA 811, 52s. 6d.; RCA 616M, 18s. 10d.; RCA 807, 25s. [148

SALE.—Surplus Valves and Components. S.A.E. for list.—MORTIMER, 16 Kirkby Road, Rugby. [254

SELLING Up.—Must clear Condensers, Resistors, Valves, Meters, Crystals, Coils; all cheap. List, G2HKU, 27 Unity Street, Sheerness. [255

SALE.—T.C.S.12 Transmitter-Receiver, 100 watts C.W. 40 watts phone, plate mod., brand new; altered for mains operation. Transmitter/Receiver are separate units. Coverage 1·5–12 Mc/s. Offers, or consider exchange for AR88, 504 or similar in good condition. Weight 180 lbs.—BRS12997, 39 Sinclair Street, Stevenston, Ayrshire. [252

SALE (unused): TZ40's, 25s.; DET19, 10s.; 5 in. CR Tube, 55s.; slightly used EF50's, 4s.; EA50's, 4s.; 1155 visual indicator, 10s.—BRS10,911, Fairfield, Stagsden Road, Bromhom, Bedfordshire. [259

SKY Champion, £16; 813, £2; 866's (3), 807's (5), 15s. each; 834's (3), £1 each; transformer 2000v 250 mA, £3. Condensers, oil (2). 10 MFD 1500v, (2) 4 MFD 2000v, £1 each. Meters, moving coil 2500v–200 mA; 15 mA–RF 2 amps. Electrostatic 3000v, £1 each. D104, new, £2 10s.—Box 260, PARRS, 121 Kingsway, London. W.C.2. [260

SALE.—C.W. Transmitter line-up, 6L6, 807, 5Y3, 83 with tubes and packs. Offers. BPL multirange meter, £5. Trophy metal cabinet, £1. Mazda 7 in. CRT focus deflection coils, £5. Eddystone 504 with LS, £60.—Box 268, PARRS, 121 Kingsway, London, W.C.2. [268

SALE.—6L6 C.O. Chassis (Tritet) RK.25 P.A. Chassis—power pack, steel case, metal rectification, voltage doubler, 500 volts 150 mA—modulator, supp; grid, B.F.O. etc., separate P. pack in steel case—G.E.C. eliminator U.10 rectifier.—Offers to R. H. B. CANDOW, 60 Seafield Road, Dundee. [270

SALE.—Ten watt amplifier/modulator, two output transformers, separate bass boost, £7 15s. Two receivers, energised speaker, 7 Mc. crystals, A.C./D.C. voltmeter, auto transformer, components, cheap, S.A.E. details.—G8GI, School, Helpringham, Sleaford, Lincs. [275

SALE.—Hallicrafter Sky Champion, S.20 model, also 1155 with plugs (Jones). Both perfect condition.—G3AGF, 27 Grove Street, Retford, Notts. [295

SALE.—Patterson 16 valve communication receiver, crystal I.F.'s push-pull output, R meter, fine DX on 10 metres, £37 with Magnavox speaker. Eddystone 504 with speaker, £50 or offer near. RME DB20 (television tubes), £15. All surplus and guaranteed.—Vale House, Maidencombe, Torquay. [298

SALE.—Two H.F. 300's, £10 each. Eddystone All-World Two L.F. stage, H.T., L.T. meters, £5. A.C./D.C. turntable, £3. A.C. turntable, £3. "Wearite" 350–0–350 4 volt L.T.'s 150 mA, £2 10s. "Wearite" 250–0–250 4 volt L.T.'s 80 mA, £1 10s. Universal Avo minor new, £6.—G8NB, 7 Herondale Avenue, Wandsworth, S.W.18. [303

SALE.—New unused valves: HY25 (1), £1; 12SA7 (2), EF6 (2), 6A7 (1), 10s. each; 30 (2), 6s. each. Hund's "High Frequency Measurements," 27s. 6d. "Cathode Ray Oscillography" by McGregor Morris and Henley, 22s.; 8 in. Celestion 2,000 ohm M.E. speaker, new, 22s.—G4QG, "Roselea," Carlton Road, Ryde, I.O.W. [283

TRANSMITTING Valves.—Brand New Osram PT15, over 150 watts per pair, with 1000 volts H.T. with data, 21s. each, post free.—Box 251, PARRS, 121 Kingsway, London, W.C.2. [251

THE Institute of Practical Radio Engineers have home study courses covering elementary, theoretical, mathematical, practical and laboratory tuition in radio and television engineering; text suitable for I.P.R.E. Service entry and progressive exams.; fees pre-war rates. The syllabus or instructional test post free.—Apply SECRETARY, 20 Fairfield Road, Crouch End, London, N.8. [36

URGENTLY Wanted.—Accommodation for Ham in or near London. Please write HOBSON, 26 Cunningham Road, Doncaster. [253

URGENTLY wanted.—*Wireless World*, December 14, 1934. Condition immaterial.—TRUEMAN (BRS12,431), 141 Ince Avenue, Liverpool, 4. [284

VALVES.—Emission O.K., 2 Ediswan ES75 (listed £6), 150 watts P/P; 211E's, new; DET 1; PX4 P/P transformer; ¼ h.p. induction motor: 0 in.–1 in. micrometer, new, 33 r.p.m. induction gram-motor; 0–15 v. Mc./s. voltmeter swinging choke 300 mA, new, 25s.; 6 vols. *QST*, 1937–1942, 60s. Offers, exchanges.—E. R. MARTIN, G6MN, Castlemount, Worksop. [271

VALVES.—7C5, 1C5G, 1A7G, 1N5G, RK34, 6V6, 2101, SP220, 807, PM2, U920, MS18, etc. Crystals, components. S.A.E.—Box 274, PARRS, 121 Kingsway, London, W.C.2. [274

VALVES, unused, unboxed. 35T (2), 40s. each; PX25 (2)· 20s. each; 807, KT44, KT8C, EL33, 12s. each; 12SK7 (5), 7s. 6d. each; 6SA7, 6K6, 6K7G, 6B7, OZ4, Y63, 6H6, 5Y3G, 6SG7 (2), 6J5 (2), 5s. 6d. each or accept £12 lot. 0–5 ammeter, 0–250 milliameter, both M/C, 20s. each.—BRS10,321, 105, Highfield Road, Romford, Essex. [287

VALVES.—813, 6C4, 6J6, VT121, 955, two 9003, all new and unused. What offers ?—GM3ANO, 167 Perth Road, Cowdenbeath, Scotland. [291

VALVES.—Two ATS70, direct equivalent STC4282B. Carbon anodes, new, perfect. 85s. each, the two £8.—G3ATU, Roker House, Roker, Sunderland. [297

WANTED urgently, BC348 Manual. Buy or exchange for CR91 (AR88), CR100 or AN/APN-4 manuals, or gear.—BERNER, 4 Arundel Avenue, Morden, Surrey. [269

WANTED Urgently.—28, 14 and 7 Mc/s. bandspread coils for H.R.O.; also broadcast coil.—G5ND, 217 Great Cambridge Road, Enfield. Phone: Enfield 3174. [249

WANTED.—Senior H.R.O. or A.R.88 complete and in first-class condition. Full particulars and price to: Box 262, PARRS, 121 Kingsway, London, W.C.2. [262

WANTED.—Hallicrafters Sky Champion Receiver, good condition. Full particulars to: JACKSON, Ringfield House, Hurworth-on-Tees, Co. Durham. [267

WANTED.—Communication Receiver, 2·5b fil. transformer, 2,500 v. working smoothing condensers, high voltage transmitter 100 + 100 split stator. Full particulars, price please.—Box 281, PARRS, 121 Kingsway, London, W.C.2. [281

Printed in Great Britain for the Inc. Radio Society of Great Britain, New Ruskin House, Little Russell Street, London, W.C.1. by Sir Joseph Causton & Sons, Ltd., 72 Fleet Street, London, E.C.4.