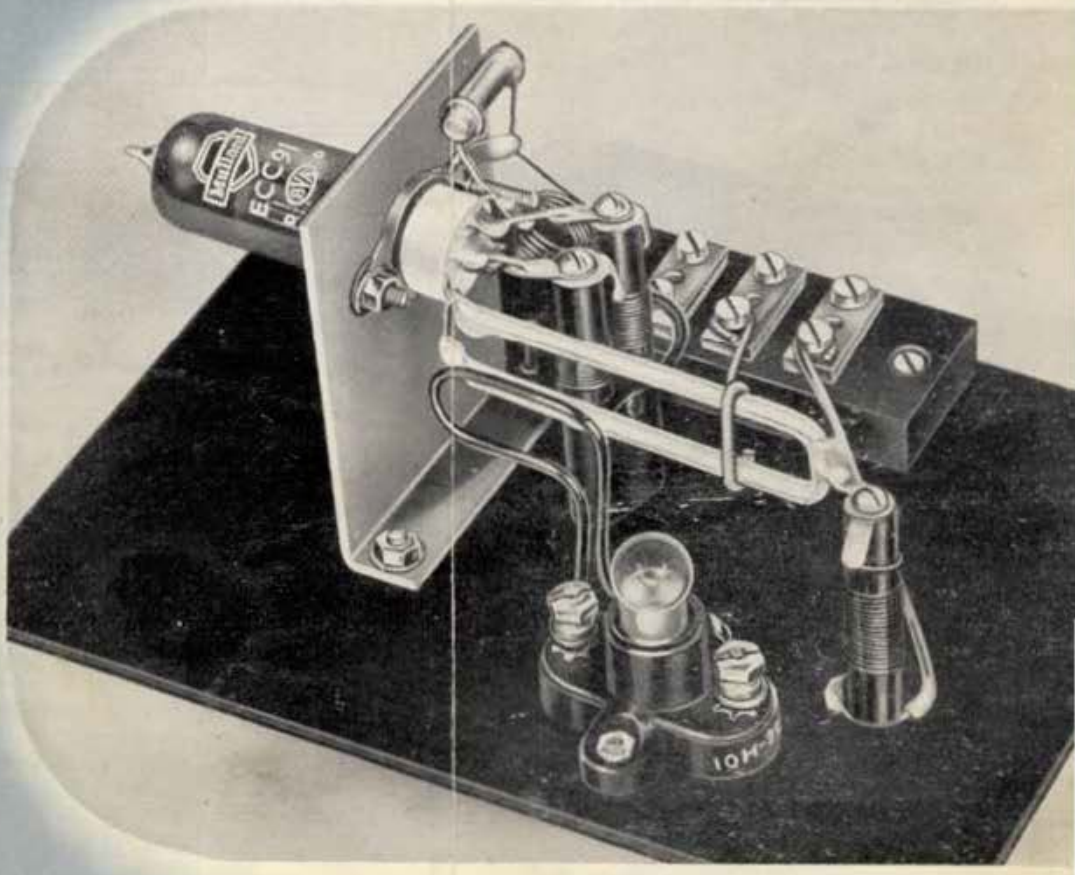
R·S·G·B AMATEUR RADIO

BULLETIN



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THE EXHIBITION

ONCE again the Royal Hotel, Woburn Place, London, becomes the Mecca for the Radio Amateurs of Great Britain. There, from November 17 to 20, the Second Amateur Radio Exhibition organised by the Society, will take place. There, manufacturers, large and small, will vie with one another for the custom of the thousands who will crowd into the Exhibition halls. Firms who were represented last year will need no reminding that their potential customers are discerning folk, technically minded and with an eye for novelty. It is to be hoped that new exhibitors will see to it that their stands are manned by good technicians as well as by good salesmen.

This drawing together of manufacturer and customer can only lead to better understanding. Manufacturers will learn something of the problems which confront amateurs. Amateurs will benefit from their personal contacts with the trade.

The fact that this year some of the leading British radio manufacturers have taken space is a matter of great satisfaction to the Society. Without their support the cost of running the Exhibition would have been considerably greater, in fact so great that many of the small specialist firms would have been barred from showing. Run by a handful of enthusiastic amateurs, often with little capital behind them, these are the firms for whom the Exhibition means so much. To them we look for most of the new gadgets and many new items of equipment.

The presence of a special Post Office exhibit is most welcome for it provides evidence of the desire on the part of that great Government Department to give practical support and encouragement to the activities of a body of people which it has done so much to help.

Last year sixteen concerns supported the Exhibition; this year the number has increased to twenty-six, a point which must have impressed many Old Timers when they opened their copy of the catalogue. They remember that in the early days it was most difficult to persuade all but a few representatives of the industry that the Amateur Radio market was worthy of more than passing attention. It was argued then that the demand was too small to warrant the expenditure of time and money on the design and production of special lines. The few firms that catered for our needs in the years before the war were faced with intense competition from America; in spite of that handicap, quite a lot of well-made British equipment was sold.

Since the war it has been said, on more than one occasion, that the Amateur Radio market in Great Britain is worth at least £250,000 a year. Even that figure is probably an under-estimate, bearing in mind that there are now nearly 7,000 fully licensed transmitting amateurs and at least 20,000 keenly interested short-wave listeners. There have been marked indications in recent months that British equipment and component manufacturers are determined to hold this valuable market against any possible competition that may come from abroad, by offering their products at most attractive prices. In one outstanding case the price of a communications receiver was reduced so low as to make the purchase of a second-hand Government Surplus receiver definitely not worth while.

It is unfortunate that British valve manufacturers are still unable to reduce the retail price of transmitting valves to a figure which will encourage us to buy them in preference to new or second-hand American tubes. Consider the case of the RK28. A member anxious to "buy British" enquired the price of the English equivalent from a leading British manufacturer. He was quoted £12 10s. 0d. Can he be blamed for purchasing a guaranteed RK28 for £2 10s. 0d. ? Production of special valves is no doubt expensive and the wastage high but if manufacturers would cut their profits initially, there is little doubt that sales would increase to such an extent as to make it possible for future orders to be produced at a price which would show a reasonable profit. If, at the same time, manufacturers could be induced to employ American code numbers in all cases where the British valve is similar to the American they would be doing a good turn to themselves as well as to everyone else. It *may* only be psychology but whatever the reason, it is a fact that the average British amateur prefers to think in terms of say an 829 rather than a QQVO7–40. Yet both are identical.

The Exhibition will provide many opportunities for discussion on a multitude of interesting topics. Will *you* be there to add your contribution ? If so—see you on Stand 21.

J. C.

In this issue

A MODERN MODULATOR WITH PRE-AMPLIFIER—PART I

By J. N. WALKER (G5JU) *

THE modulator and its associated pre-amplifier described here have been designed to fulfil the requirements of a modern amateur station using amplitude modulated telephony with any power up to the permitted maximum of 150 watts. A number of special features are incorporated and these will be discussed separately.

Voltage Stabilisation

It is natural to turn to 807 type valves to obtain the 80 watts or so maximum output required—allowing for transformer loss—for full modulation of a 150 watt carrier. Compared with triodes, the anode voltage is lower, simplifying the power supply, and the driving power is also much less, simplifying the earlier stages.

To secure the specified output and also to minimise distortion, it is essential to stabilise the voltage applied to the screens of the 807 valves. The stabilised voltage of—in this instance—280 volts is obtained from a *Marconi* type 280/40 Stabilovolt, which is also capable of supplying three other values of stabilised voltage—210, 145 and 75. The two latter can often be used to advantage in R.F. equipment but, in the present case, they are not required. The 210 volt supply provides regulated H.T. for the first amplifier valve in the modulator proper, the anode of the driver valve being fed from the 280 volt supply.

A Stabilovolt not only regulates the H.T. supply, it also forms a path to earth of relatively low impedance and thereby gives increased decoupling. It will be seen therefore that, in effect, each valve in the modulator proper is supplied with regulated voltage and efficiently decoupled. As one would expect, the result is stability of a high order.

Speech Clipping

Space does not permit a lengthy treatise on modulation characteristics when using speech, as opposed to a sine wave input. Suffice to say that, when the adjustment is such as to give 100 per cent. modulation on peaks, the average depth of modulation is much less—somewhere about 40 per cent. Further, the peaks occur on vowel sounds—the consonant sounds, which contribute much more to the intelligibility than do the vowels, are reproduced at much lower strengths.

The remedy is to clip-off the peaks and lift the general level of other speech sounds. Obviously, with the squaring-off of the peaks, a certain amount of distortion is inevitable but provided the clipping is not overdone, it is not apparent. The actual modulated sideband output is much increased, giving definitely improved intelligibility particularly under adverse conditions.

Peak clipping is therefore considered to be a necessary adjunct in any modern modulator and it has been incorporated in the present equipment. The shunt type is employed, with miniature Westectors for the clipping elements.

Restriction of Frequency Response

When clipping is employed, the action of squaring-off the peaks introduces high harmonic frequencies, which must not be radiated. A low-pass filter is therefore essential to suppress them.

* *333 Rednal Road, Birmingham, 31.*

A filter is also very desirable for other reasons. Unless frequency restriction is applied, normal speech equipment will amplify all frequencies up to 15 kc/s. or higher, and these will, when applied to a transmitter, all be radiated. Admittedly, the power in the edges of the sidebands will be small but nevertheless, the transmission will appear broad and will tend to cause considerable local interference. The higher frequencies, whilst necessary for the reproduction of music, contribute little or nothing to the intelligibility of speech and therefore, when they are allowed to remain, power is being wasted both in the modulator and in the transmitter.

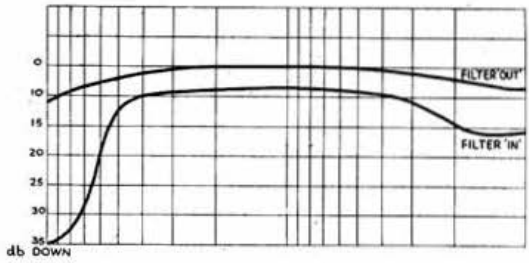


Fig. 1.
Response curves of the pre-amplifier, with and without the filter in circuit.

Yet again, the tendency these days is for communication receivers to be provided with ever greater selectivity and the narrow band-width strived after will not pass the higher audio frequencies—hence there is no point in transmitting them.

From all points of view, it is evident that it is beneficial to restrict the band of frequencies transmitted to that necessary for good speech intelligibility. The filter incorporated in the pre-amplifier has been designed to cut-off at 5,000 cycles and, with the various shunt capacities in later stages (particularly the by-pass condenser associated with the P.A.), frequencies above about 4,000 cycles are not transmitted.

The lower frequencies—below about 300 cycles—can develop quite considerable power and again contribute but little to intelligibility. It is not desirable to cut them out completely; if this is done, the pitch—at least of a male voice—is much altered and speech tends to sound distinctly unnatural. Attenuation of the lower frequencies is introduced by choice of suitable capacities for the coupling condensers, the filter also contributing in some degree.

Separation of Equipment

It is not practicable to build the whole equipment on a single chassis—the latter would be unduly heavy and bulky and the risk of interaction between the early high gain stages and the final high power stage would be considerable.

The modulator proper has no controls of any type fitted to it, the only component on the front panel being the anode current meter. The chassis can therefore be fitted in a rack or stowed away out of normal reach, all control being carried out with the pre-amplifier. The latter is small and compact and can be arranged conveniently near the operating position.

Each unit contains its own power supply, of appropriate rating. The output of the pre-amplifier is fed to the modulator through low-impedance

screened cable, which can be of any reasonable length.

Reliability

Another aim has been complete reliability, long term as well as short term. It was the intention that, once built in its final form, the equipment should remain ready for use at any time, with the minimum of attention. Therefore only components of the highest grade have been incorporated. For example, the resistors used in all but a few positions are of the *Welwyn* High Stability type, giving consistency of performance over long periods and also, because of their low noise factor, assisting in the reduction of the inherent noise level.

Performance

The performance, of course, has to be judged bearing in mind that the equipment has been designed for communication speech transmission with maximum intelligibility under adverse conditions, rather than for overall high fidelity. At the same time, it is interesting to note that the response curve of the modulator proper is flat within 3 db over a frequency range from 100 to 10,000 cycles. It is desirable that the modulator should have a linear characteristic so that it does not, to any extent, alter the relative amplitudes of the voltages supplied by the pre-amplifier.

The maximum undistorted output is in the region of 50 watts. Beyond this, distortion becomes evident when viewing the output on an oscilloscope and reaches a maximum of 8 per cent. at full output. This figure would not be too serious if musical sounds were being considered and it is not readily apparent to the ear in the case of speech sounds.

Ample gain is provided in the pre-amplifier to cater for any type of microphone and, in practice, with the usually available types of crystal and moving coil microphone, the setting of the gain control (R.1 in Fig. 2) will be well below maximum.

The frequency characteristics of the pre-amplifier are shown in Fig. 1, with and without the filter/clipper in circuit. Because of the intentional attenuation of the lower frequencies, the curves are based on the response relative to 1,000 c/s., rather than on the frequency of 400 or 440 c/s. adopted in the case of high-fidelity amplifiers.

It will be seen that, at 5,000 c/s., with the filter in, the response is 7db down, thereafter dropping rapidly. In the other direction, the characteristic is reasonably linear to 300 c/s., when a gradual falling away takes place. The filter itself introduces an average loss of 7 db, which is allowed for in the overall gain.

Much attention has been paid to the reduction of

COMPONENTS LIST.

Pre-Amplifier.

1	Cabinet and Chassis, Cat. Nos. 644 and 643	Eddystone
1	Mains Transformer (T3), type PTM11A	Woden
1	Smoothing Choke, 60 Henries, type DCS16	Woden
1	L.F. Filter Choke, type DP18	Varley
1	Output Transformer (T2), Hyperloy, type 207	Wearite
1	Screened Microphone Transformer (T1)	Woden
2	Switches, D.P.D.T., Toggle (S1 and S3), type S277	Bulgin
1	Switch, S.P.S.T., Toggle (S2), type S270	Bulgin
1	Pilot Lampholder, type D19	Bulgin
1	Coaxial Plug and Socket, List L604	Belling-Lee
1	Screened Input Plug and Socket, List L1266/L1267	Belling-Lee
1	Single Fuseholder and 1 amp. Fuse, List L1045/L1055	Belling-Lee
1	Screened Top Cap Connector, List L519/T	Belling-Lee
1	3-pin Plug and Socket, List L1107/L1113	Belling-Lee
1	Potentiometer (Input Gain Control R1), 1 megohm, type SG	Reliance
1	Potentiometer (Output Gain Control R12), 0·5 megohm, type SG	Reliance
1	Valve, type EF37 (V1)	Mullard
2	Valves, type 6J5G (V2, V3)	Brimar
1	Valve, type 5Z4G (V4)	Brimar
1	Resistor, 1,500 ohms (R2)	Welwyn (High Stability Carbon, ½ watt, type A3623, 5%)
1	,, 330 ,, (R14)	
2	Resistors, 620 ,, (R15, 16)	
1	Resistor, 2,500 ,, (R8)	
3	Resistors, 47,000 ,, (R5, 7, 13)	
4	,, 100,000 ,, (R3, 9, 10, 11)	
2	,, 1 megohm (R4, 6)	
1	Condenser Electrolytic, 25 μF, 25 volt (C10), type CE32C	T.C.C.
2	Condensers ,, 50 μF, 12 volt (C1, 5), type CE32B	T.C.C.
2	,, ,, 16 × 16 μF, 350 volt (C2, 3, 11, 12), type CE28L	T.C.C.
2	,, Mica, ·005 μF (C4, 6), type M3N	T.C.C.
3	,, ,, 200 pF (C7, 8, 9), type CM2ON	T.C.C.
2	Westectors, type WX2	Westinghouse
	Group Boards, Gain Control Scales, Octal Valveholders (4), 6v. lamp, etc.	

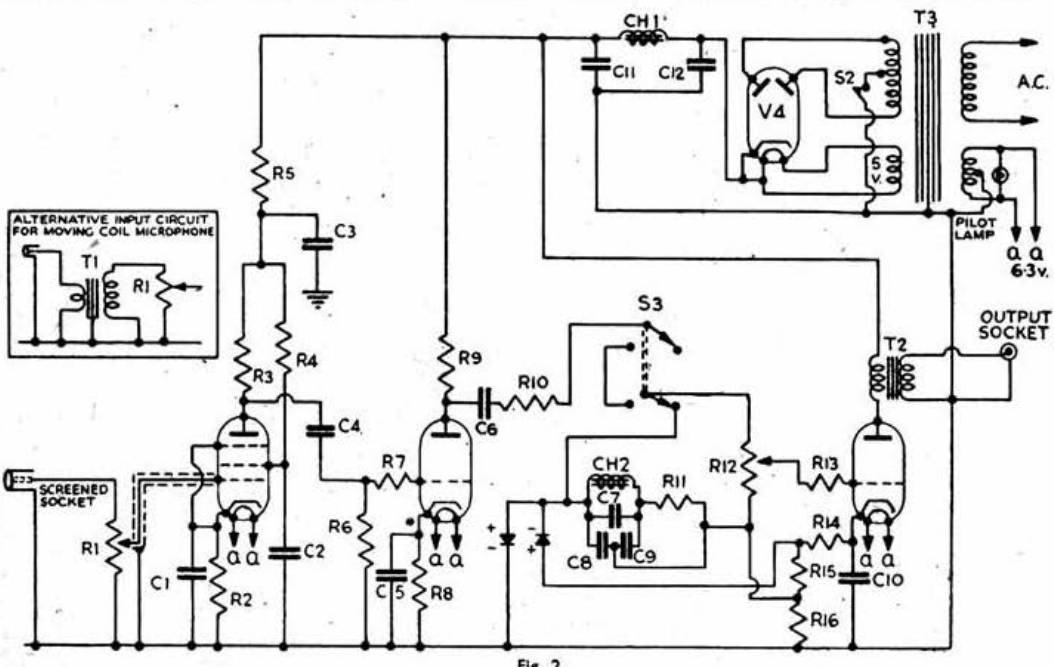


Fig. 2.
Circuit diagram of the pre-amplifier unit.

hum, which is often a bugbear in amateur modulators. At full gain, a slight amount of noise is visible on an oscilloscope screen but there is no trace of either 50 or 100 c/s. components. In fact, hum is conspicuous by its complete absence. The noise level, also, by reason of the choice of valves and components, is remarkably low.

The foregoing paragraph presumes the use of a fully screened input plug and socket, as specified. With an ordinary telephone type plug and jack (used with a high impedance microphone), the electrostatic pick-up is sufficient to introduce a small but noticeable amount of hum and it may also introduce some R.F. voltage, which is undesirable, even though precautions have been taken to prevent trouble from that source.

The Preamplifier Circuit

Provision is made for either a crystal or a moving coil microphone—the transformer for the latter is mounted sub-chassis so that the screened leads from it can be easily connected to the input socket and gain control. The latter controls the voltage applied to the first valve—a *Mullard* EF37, chosen for its low noise factor and freedom from microphony. It is perhaps more usual to allow the first valve to operate at full gain and control the input to the second valve but no drawback has been found in the present method and it is more convenient for wiring.

Very effective decoupling is employed in the screen and anode circuits of V.1, resulting not only in excellent stability but also in the complete elimination of hum—an important point since any hum developed in the first stage is amplified in each successive stage.

In order to ensure adequate voltage for the clipper/filter section (discussed later), a triode amplifier follows, using a 6J5 valve with a high anode load resistance. The final valve is another 6J5, with the circuit values arranged so that a small amount of power becomes available, to make up for transference losses in the transformers, etc.

The interstage coupling condensers are of the mica type, to ensure high insulation resistance—the slightest leak would upset completely the correct operation of the valves. Since the equipment will be used in strong R.F. fields, grid stoppers are included, to ensure freedom from interaction with the transmitter.

The unit is built into a metal cabinet and includes its own comparatively low voltage power supply, which is thoroughly smoothed.

In R.F. equipment, it is the general practice to earth one side of the heater of an indirectly heated valve. It is not wise to follow this principle in audio equipment—the unbalance of the heater voltage can give rise to hum, which it is then practically impossible to eliminate.

The Clipper and Filter Circuits

It is not possible to go into details of these circuits, since considerable space would be required to deal with them properly. Acknowledgement is made to the article by W0UCM and W0J1H in the November 1946 issue of *QST* for the basic design, which employs a single section M-derived filter, with the constants arranged to give an input and output impedance of 100,000 ohms, this value being convenient for the types of valve used and minimising the insertion loss. Those interested in the design factors are recommended to read the article by W6BCX in the February, 1946 issue of *QST*.

In the original design, a 6H6 double diode valve was used for clipping but two miniature Westectors have been substituted, to eliminate cathode derived hum and to simplify the wiring. The Westectors perform with efficiency equal to that of a valve.

Bias for the Westectors is obtained from the voltage-drop across the split-up cathode bias resistors of V.3 and it is important to use the specified values, to maintain correct clipper operation. The clipping action commences when the peak audio voltage reaches a value just below six volts.

A switch S.3 is provided for cutting-out the filter/clipper completely as, on occasions, for purely local work, particularly on the V.H.F. bands, the user may desire to transmit speech of better than communication quality. Also, when testing microphones, the filter should be cut out, otherwise the actual characteristics of a microphone will be masked by the action of the filter. In practice, the filter is left in circuit and constructors may think fit to omit switch S.3, thereby simplifying the wiring.

Another switch (S.2) removes the H.T. voltage during reception periods. Otherwise, if a speaker is used, the microphone will pick-up the incoming signal and the modulator will continue to function to some extent. Since, under these conditions, no proper anode load exists, high peak voltages may be generated, leading to a possible breakdown. An automatic method of performing the same function would be to fit a relay energised by the P.A. anode current, the contacts closing some essential part of the modulator circuit. If the associated transmitter is operated with a more or less constant anode current, this refinement may well be fitted, at the constructor's discretion. In the writer's case, final power and anode current vary from band to band and it would complicate matters unduly to wire in a comparatively low current relay and make provision to shunt it when higher power is used.

Inter-Connections

In commercial audio frequency practice, a standard impedance of 600 ohms has been adopted for the transfer of audio energy. In amateur work, where usually only short lengths of line are involved, there is no reason why a much lower value should not be employed. Further, the lower the impedance, the less the likelihood of extraneous pick-up. In the present case, therefore, identical transformers—the compact *Wearite* Hyperloy type—are used as input and output transformers in the modulator and pre-amplifier respectively, the primaries showing an impedance (at 1,000 c/s.) of 5 ohms. Connection between the two is made *via* coaxial sockets and a length of ¼ in. coaxial cable, although screened wire with rubber or P.V.C. insulation is equally suitable.

The double-pole mains switch S.1 on the pre-amplifier panel controls the application of A.C. to both units and a *Belling-Lee* plug and socket is provided for inter-connection of the power lead. It is a matter of convenience to which unit the actual mains lead is fitted. If (as in the present case) it is the pre-amplifier, the circuit will be as in Fig. 3 (*a*), using two pins. If the mains are fed into the modulator (as will be desirable if the latter is mounted in a rack) the circuit is as in Fig. 3 (*b*), calling for the three pin plug specified. In either case, ensure that the socket is the live portion of the lead, when disconnected, or there will be trouble!

The Modulator

The total input voltage available is insufficient for the driver valve and rather too great for the 6J5 amplifier which precedes the driver. A degree of negative feedback is therefore incorporated as it is undesirable to introduce a further gain control. The negative feedback also improves the linearity of the modulator and contributes to the stability.

The 6J5 valve is resistance-capacity coupled to the driver valve. A low impedance triode is necessary at this point, to improve the regulation of the voltage applied to the grids of the output valves. The *Mullard*

EC31 chosen is capable of giving adequate output with low distortion. The anode voltage is a little higher than that specified by the manufacturers but the dissipation is within its proper limit.

A *Woden* DT1 driver transformer feeds the grids of the *Mullard* QV05/25 (807) output valves. The latter are provided with grid and anode stoppers to prevent V.H.F. parasitic oscillation. Screen stoppers were found unnecessary.

Originally, a snag was encountered—an oscillation at a radio frequency of about 30 kc/s. developed, due to coupling between the 6J5 and the output valves. It was completely eradicated by screening R.19 and its connecting wires and earthing the metal outer case of C.14. Also, a periodic damped wave train of low amplitude could be seen on an oscilloscope and was found to originate from the two unused electrodes of the Stabilovolt. The insertion of C.17 and C.18 removed the trouble.

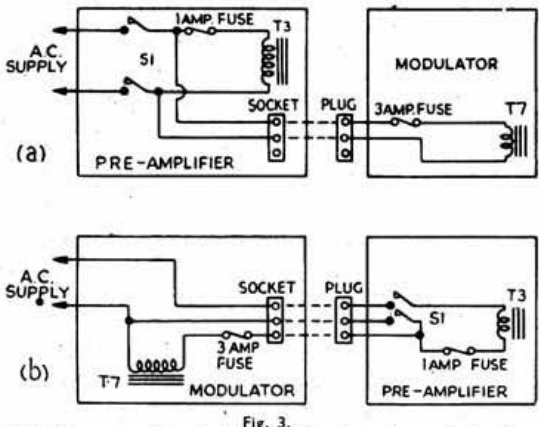


Fig. 3.
Mains inter-connection circuits; (*a*) when the main supply is taken to the pre-amplifier (*b*) when taken to the modulator.

The anode current of the QVO5/25 valves is observed on a large *Pullin* meter, fitted with indirect lighting. It is quite easy to read the meter at some distance, often an advantage.

For the sake of good regulation, the power supply, as one would expect, employs a choke input filter, the anodes of the QVO5/25 valves being fed directly

COMPONENTS LIST

Modulator.

1 Chassis and Brackets, Cat. Nos. 617 and 618 ...	**Eddystone**
1 10½ in. Panel and pair of 3 in. Handles, Cat. Nos. 619 and 635	**Eddystone**
1 Mains Transformer (T7), outputs 750-0-750 v. 250 mA., 6·3 v. 4 amp., 5 v. 3 amp., type DTM17 (with fil. windings)	**Woden**
1 Swinging Choke (CH4), type PCS12	**Woden**
1 Smoothing Choke (CH3), type DCS16 ...	**Woden**
1 Driver Transformer (T5), type DT1	**Woden**
1 Modulation Transformer (T6), type UM3 ...	**Woden**
1 Input Transformer (T4), Hyperloy, type 207 ...	**Wearite**
1 M.C. Meter (Illum. Dial), 0-250 mA., 3½ in., Series 35	**Pullin**
1 Single Fuseholder and 3 amp. Fuse, List L1045/ L1055	**Belling-Lee**
1 Coaxial Plug and Socket, List L604	**Belling-Lee**
2 Insulators, Chassis Lead-through, Cat. No. 695	**Eddystone**
2 Insulators (Mod. Output), Cat. No. 564 ...	**Eddystone**
2 Insulators, miniature Stand-off, Cat. No. 1019	**Eddystone**
2 Insulated Top Cap Connectors, Cat. No. 562...	**Eddystone**
1 Valve, type 6J5G (V5)	**Brimar**
1 Valve, type EC31 (V6)	**Mullard**
2 Valves, type QV05/25 (V7, 8)	**Mullard**
1 Stabilovolt, type 280/40 (V9)	**Marconi**
1 Rectifier Valve, type 4274A	**S.T.C.**
2 Resistors, 50 ohms (R25, 26)	
1 Resistor 3,000 ,, (R20)	
2 Resistors 10,000 ,, (R17, 23)	High Stability Carbon, ½ watt, type A3623, 5% — **Welwyn**
1 Resistor 47,000 ,, (R19)	
1 ,, 100,000 ,, (R21)	
1 ,, 200,000 ,, (R18)	
1 ,, 470,000 ,, (R22)	
2 Resistors 1 megohm (R29, 30)	
2 ,, 22 ohms (R27, 28)	High Stability Carbon, 1 watt, type A3624, 5% — **Welwyn**
1 Resistor 1,000 ,, (R24)	
1 ,, 5,000 ,, (R31), 12 watt, type AW3112	**Welwyn**
1 ,, 10 ,, (or near) (R32), Wire-wound, 1 watt or more	
2 Condensers, 4 μF, Paper, 750 v. wkg. (C21, 22), type 92	**T.C.C.**
2 ,, 8 μF, Electrolytic, 500 v. wkg. (C19, 20), type CE10P ...	**T.C.C.**
1 Condenser 25 μF, 25 v. Electrolytic (C16), type CE32C	**T.C.C.**
1 ,, 50 μF, 12 v. Electrolytic (C13), type CE32B	**T.C.C.**
3 Condensers 0·1 μF, Paper, 500 v. wkg., type CP46S	**T.C.C.**
1 Condenser ·005 μF, Mica (C15), type M3N...	**T.C.C.**

6 Valveholders (2 American 5-pin, 1 American 4-pin, 1 British 5-pin, 2 Octal), Group-board, bias batteries, plugs **Belling-Lee** L1019), etc.

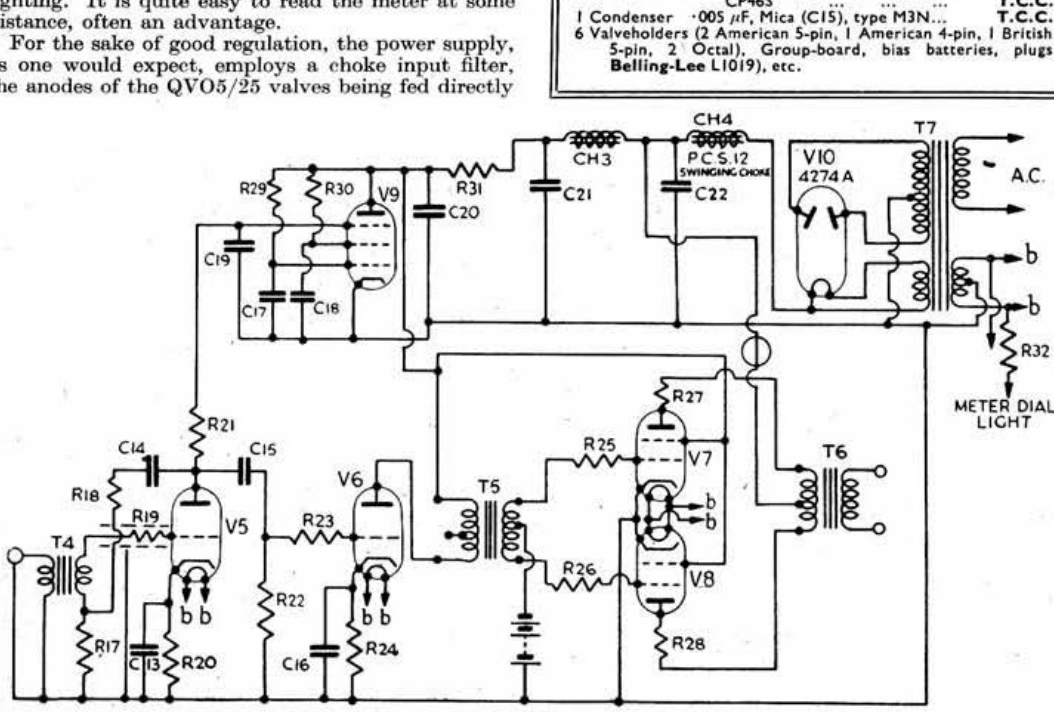


Fig. 4.
Circuit diagram of the modulator unit.

from the reservoir condenser C.22. A further filter section ensures adequate smoothing for other parts of the circuit, the 1,100 ohms of choke CH3 also forming part of the series dropping resistance required for the Stabilovolt.

To obtain 600 volts output, it is necessary to employ a transformer giving 750 volts R.M.S. on the high voltage secondary windings. If an audio output of 60 watts is sufficient, a transformer with a secondary voltage of 650 will serve, reducing the value of R.31 to 4,000 ohms and noting that the output load impedance is changed to a value of about 4,600 ohms. It is unfortunate that no full-wave mercury rectifier valve is available capable of handling 750 volts. Consideration was given to the use of two half-wave rectifiers but the idea was dropped because of the complications of providing altered filament voltage and wattage, delayed anode switching and increased space. One has therefore to put-up with the greater internal voltage drop and somewhat poorer regulation resulting from the use of a hard vacuum rectifier valve.

The benefits conferred by the Stabilovolt valve V.9 have been discussed earlier. Suffice to mention here that condensers C.19 and C.20 are essential—otherwise the rated voltages are not developed.

Bias for the output valves is provided by the simple method of using four grid bias batteries in series. The idea of including a mains-derived bias supply was rejected in view of its complexity (thoroughly smoothed, well regulated, comparatively low voltage and low resistance and impedance). Although not shown in the circuit, it is advisable to connect one side of the output transformer secondary to the chassis *via* a 4 μF. high voltage condenser. Care must then be taken, of course, to ensure that connections to the P.A. stage are made the right way round. It is also advisable to connect the chassis to a good earth.

(*To be concluded next month.*)

AN OVER-MODULATION INDICATOR

By C. B. RAITHBY, G8GI*

THIS article describes a method of providing a visible indication when the carrier of a telephony transmitter falls to zero, or to some predetermined level, to facilitate the avoidance of over-modulation in the downward direction. The majority of speech transmissions on the amateur bands suffer from over-modulation during speech-peaks, and it is probable, too, that in many transmitters attempts are made to exceed the modulation capacity of the P.A. valve(s) in the upward direction. It is, however, the former fault which is particularly undesirable, as it creates interference both on amateur and broadcast frequencies.

The trouble arises when the carrier level drops momentarily to zero, as the sharp " corners " of the wave-form produce a series of unwanted harmonics. Before describing the apparatus for indicating over-modulation, there are two factors which, although strictly outside the scope of this article, should be mentioned, as they help to ensure that maximum use is being made of the existing modulation capabilities.

(1) The male voice wave-form is not symmetrical, but the peaks on one side are greater in amplitude than those on the other. The polarity of the applied modulation should be such that the extended peaks cause a carrier *increase*.

(2) Some form of automatic modulation control (volume compression) or speech-clipping should be used.

The Over-Modulation Indicator

With the apparatus thus arranged to make the maximum use of the available modulation capacity, the next requirement is to provide a simple indicator to give warning of over-modulation, and the circuit of Fig. 1 shows how this is done.

The meter operates only on over-modulation in the downward direction, *i.e.* the direction which is responsible for interference and interference with broadcasting. Under conditions of no modulation, the filament of the rectifier, V1, is positive with respect to its anode by an amount equal to the P.A. supply voltage (say 750 volts), *i.e.* the rectifier anode is at — 750 volts to its filament. Upon the application of modulation, the anode is still negative to the filament, and no current flows through the rectifier unless over-modulation in the downward direction occurs. When this happens, the anode of V1 is momentarily positive with respect to its filament, the valve conducts, and a reading is shown on the meter. R1 limits the current through the meter, and protects it from damage if excessive over-modulation occurs.

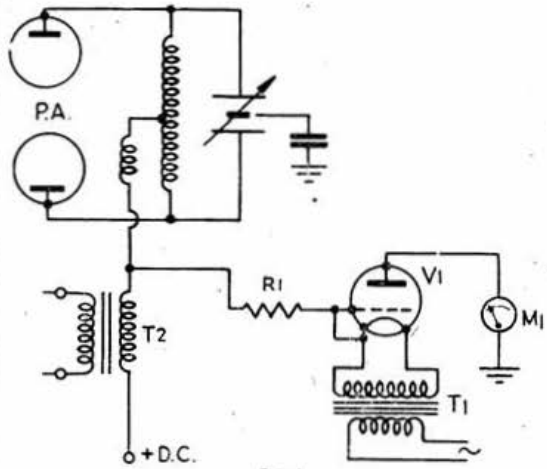


Fig. 1.
Circuit of the Over-Modulation Indicator. R1, 100,000 ohms 1 watt; M1, 0–1 mA. meter; T2, modulation transformer. For T1 and V1 see text.

If it is preferred to have an indication in the meter *before* the over-modulated condition is reached, the anode of V1 should be returned to a point some volts positive to the chassis. In Fig. 2, this voltage is obtained from a fixed potentiometer across the D.C. voltage supply bleeder, but a battery could be used equally well, there being no current drawn from it. If a maximum of 85 per cent. modulation is desired, then this voltage should be 15 per cent. of the D.C. P.A. voltage (750 volts), which is approximately 110 volts.

The Rectifier

The rectifier valve, V1, must be capable of withstanding the peak R.F. plus the peak A.F. voltages without flashover. Strictly, this valve should be a

* "*Schoolhouse*," *Helpringham, Sleaford, Lincs.*

high-voltage type (*e.g.* a 2X2, U16 or HVR2), but it is not necessary to use these expensive valves if some old P.A. valves, with reduced emissions, are available. The type used by the writer was a 35T, which, although useless for normal service, was quite capable of passing the few milliamps required in this application. For lower voltages than 1,000 volts, types such as the 210, PX25, etc., have proved successful.

The Transformer

As the transformer, T1, also has to withstand the total peak voltages, it must have very good insulation. A commercial 3,000 volt D.C.-insulation rectifier transformer as well as one made at home have been used successfully. A separate transformer is desirable, but, since V1 can be run at up to 25 per cent. reduced filament voltage, the turns-ratio of the transformer is not critical. The transformer should have a low capacity between the secondary winding and earth, to avoid losses at high speech-frequencies, but no ill effects have been noticed with a normally wound transformer.

The Meter

A 0–1 mA. moving-coil meter was used in the original apparatus, but, with suitable adjustment of R1, meters ranging from 250 μA. to 5 mA. could be substituted. In the initial experiments, a Model 7 *Avo* was used, on the 2 mA. range. Considerable confusion was caused by a persistent reading of about 0·5 mA. before any modulation was applied, until it was realised that this was being caused by rectification of stray R.F. by the protective rectifier in the instrument. No such effect occurs with normal meters.

When tried out, the results were so surprising—it seemed so easy to over-modulate—that a thorough comparison was made, using an oscilloscope, and the indications of the device were completely confirmed. No particular originality is claimed for the circuit (other than the use of discarded valves), but it can be thoroughly recommended, and it will provide something of a revelation to many users of telephony.

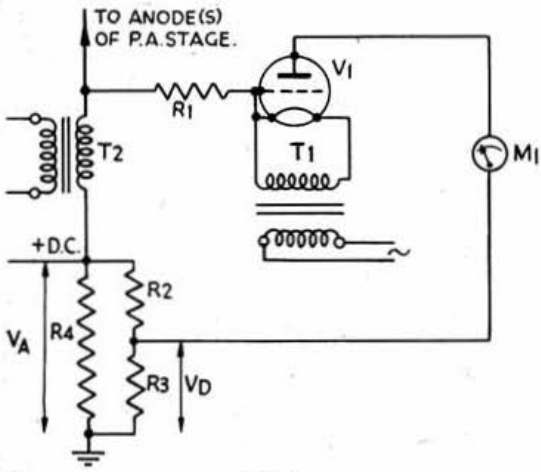


Fig. 2.
The Over-Modulation Indicator, adjusted to give a reading at 80 per cent. modulation.

$$V_d = \frac{100 - \text{required modulation \%}}{100} \times V_a.$$

R1, V1, M1 and T2 are as in Fig. 1. R4 is the normal bleeder across the H.T. supply.

For 80 per cent. modulation, $V_d = \frac{1}{5} V_a$,

or 200 volts with 1,000 volts applied to the P.A. anodes. Suitable values in this case are R2 80,000 ohms and R3 20,000 ohms.

New Wireless Telegraphy Bill

A NEW Wireless Telegraphy Bill was presented to Parliament by Mr. Wilfred Paling, the Postmaster General, on October 29 last. The text of the Bill became available on November 2.

The Bill has two main purposes :—Part I provides permanent legislation for the licensing of wireless telegraphy in place of the Acts of 1904 to 1926, and Part II provides for the regulation of undue interference with wireless telegraphy caused by apparatus of other kinds.

Part I resembles the 1904 Act in its basic licensing provision. "Wireless Telegraphy" is, however, defined more widely so as to include the actuation or control of machinery or apparatus and to cover more clearly modern developments such as radar and navigational aids for ships and aircraft. The right of experimenters in wireless telegraphy to have licences is defined more precisely.

Part II breaks new ground. It embodies provisions for controlling by regulations and enforcement notices undue interference with wireless reception caused by certain apparatus other than wireless telegraphy apparatus. The regulations will be made by the P.M.G. after consultation with an Advisory Committee and will prescribe requirements with which such apparatus is to comply.

Clause 12 makes it an offence to interfere deliberately with wireless telegraphy whether or not the interfering apparatus is itself wireless telegraphy apparatus.

Part III contains supplementary provisions. The power to seize apparatus conferred by the 1904 Act has been omitted but a Justice of the Peace on sworn information that there is reasonable ground for suspecting the commission of an offence under the Bill, may issue a warrant for the P.M.G.'s representatives to enter and search premises, etc., to examine and test apparatus found there.

Annual General Meeting

In past years the Annual General Meeting of the Society has taken place towards the end of December and the audited annual accounts have been sent out with the December issue of the BULLETIN. Prior to the coming into force of the 1948 Companies Act this arrangement was in order, providing seven days notice of the meeting was given. However, under the terms of the new Act the Audited Accounts must be circulated at least 21 days prior to the date of the meeting. This means that it becomes impossible to send out the accounts with the December issue of the BULLETIN (published on or about the 15th) and still hold the meeting in December.

In view of these difficulties the Council, after taking legal advice, has decided to hold the Annual General Meeting on January 28th, 1949.

The notice convening the meeting, together with a copy of the Accounts and the Annual Report of the Council will be included in the December issue. The same issue will also include the Council Ballot envelope and voting form.

Silent Key

Henry Bevan Swift, G2TI—*Honorary Member*
President 1931–1933

With great sorrow we record the death on November 3 last, of Mr. Henry Bevan Swift, Past-President and Honorary Member.

Next month, the BULLETIN—which he helped to create 23 years ago—will pay tribute to his memory.

The grief which has come to Mrs. Bevan Swift and to her daughters will be shared by radio amateurs everywhere.

INTERFERENCE TO TELEVISION BY SPEECH EQUIPMENT

By C. H. RANFT (G5RF*)

ALTHOUGH the matter referred to in this article concerns interference to a television receiver, it can apply equally well to ordinary B.C.L. interference. The television case is, perhaps, more unusual and, to the newcomer, more surprising than its well-known aural counterpart, for it seems almost incredible that one innocent-looking 10,000 ohms resistor could be proved guilty of causing such strange patterns to appear on a distant television screen.

Location

The writer's station is situated in flat country, some 70 miles from Alexandra Palace, and the signal strength on both sound and vision channels is naturally very low. Television sets in the lower-price groups do not normally give readable signals unless fitted with a pre-amplifier, and the set in use was, in fact, a *Murphy* Model V.114, plus pre-amplifier. In this set, the vision I.F. is 13·5 Mc/s., and its aerial consisted of a vertical dipole with reflector, about 30 feet high, located some 200 yards from the shack.

At G5RF, a 75—80 watt transmitter was in use on 28 Mc/s. only, connected by low impedance lines to a "Lazy-H" array and a three-element rotary beam. The A.F. section of the transmitter consisted of an L63 and an EL33 followed by two KT8C's in Class AB2 push-pull, the latter being shown in the circuit diagram of Fig. 1. 100-ohm screen and plate-stoppers were added later, as an additional precaution against parasitics. The station is located between the viewer and Alexandra Palace.

The Effect

The transmitter had been in use for many months on C.W. with no report of interference, but on the same day as the modulator was completed and put into service, a report of severe interference to the neighbouring television set was received. An investigation was made, with a colleague operating the transmitter, and as soon as modulation was applied to the carrier, serious interference was produced, taking the form of groups of "streamlined" dots darting across the screen from left to right, about 5 dots across and 4 down. This "movement of dots" appeared to follow the speech peaks, although no interference was noticeable on the sound channel. An attempt to convey the appearance of the interference is made in Fig. 2.

Lowering the A.F. gain control reduced the brightness of the dots, and their number, but not their spacing, and even at the lowest modulation levels, some interference remained. At no time was the synchronisation disturbed, the picture remaining intact behind the dots. Several widely separated frequencies in the 28 Mc/s. band were tried without affecting the result. The carrier, or the 45 Mc/s. component of it, could not have been responsible, it was argued, because no interference was caused by C.W. transmissions, and direct break-through from the main signal was not the cause of the trouble, otherwise interference would also have been caused on the sound channel, which is nearer to the transmitter frequency than the vision.

The advice of a television design engineer was sought, and he expressed the opinion that the pattern might be interpreted as being due to a parasitic oscillation, possibly at some multiple of the frame line repetition frequency, presumably indicating a very high "audio" frequency. The shape of the dots could be explained by the wave-form of the oscillation.

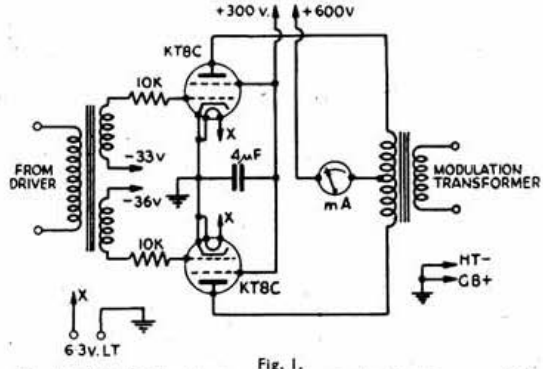


Fig. 1.
Circuit of the final audio stage which proved to be the cause of the interference to a television receiver situated 200 yards away.

It seemed unlikely that an oscillation at this order of frequency could be generated in the P.A. stage itself, if only because no components in it were of a suitable value. At the same time, reports were being received of poor quality, and this was confirmed on the monitor. Irrespective of audio level, speech peaks produced a "splashing" or "breaking" sound. An investigation of the modulator equipment seemed to be called for, with a view to finding an unwanted parasitic oscillation.

The Cause and the Cure

The early stages were tested with the aid of a pair of 'phones, and they appeared to be perfectly satisfactory. The KT8C's were checked for balance, and a discrepancy of 30 per cent. in standing current was discovered. Restoration of the balance was effected by applying a slightly different bias to each valve, a procedure which produced some small improvement. The "full-drive" currents were then checked and considerable unbalance was again

(*Continued on page* 114)

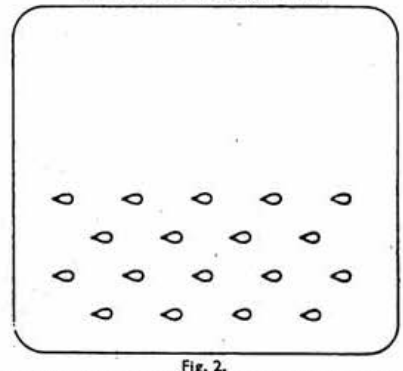


Fig. 2.
"'Streamlined' shaped dots, darting across the screen from left to right."

* *90 Dulwich Road, Holland-on-Sea, Essex.*

A COMMUNICATIONS SUPERHET FROM THE T.R.1196

By R. M. BAERLEIN, BRS14639

THE receiver to be described was built-up largely from the parts of a Government Surplus Transmitter-Receiver, Type T.R.1196. Attempts were made to convert the instrument as originally manufactured, but as the result was not very satisfactory, it was decided to affect a complete re-build, using as many as possible of the original parts.

Circuit Description

The circuit of the re-built receiver is given in Fig. 1. The R.F. valve, an EF50 (VR91), was taken from the original transmitter section, whilst the mixer stage uses the original EK32 (VR57). The coils are *Denco* Ranges 2, 3, 4 and 5, tuned by a 160 pF ganged condenser obtained at 5s. from surplus stores. Although this condenser does not give a continuous frequency coverage (the coils are designed for use with 300 pF tuning condensers), the frequencies covered include all the amateur bands from 1·7 to 30 Mc/s. (Details are shown in the accompanying Table.) As a point of interest the coils are priced at 4s. 2d. each.

The R.F. stage is tuned by a separate condenser, since difficulty was experieneed in obtaining a 3-gang of suitable capacity. A 3-gang condenser could, of course, be used if available.

Bandswitching is accomplished by the aid of 4-way switches, suitably banked, removed from the T.R.1196. Detection and A.V.C. are conventional, using the EBC33 (VR55) double-diode-triode valve

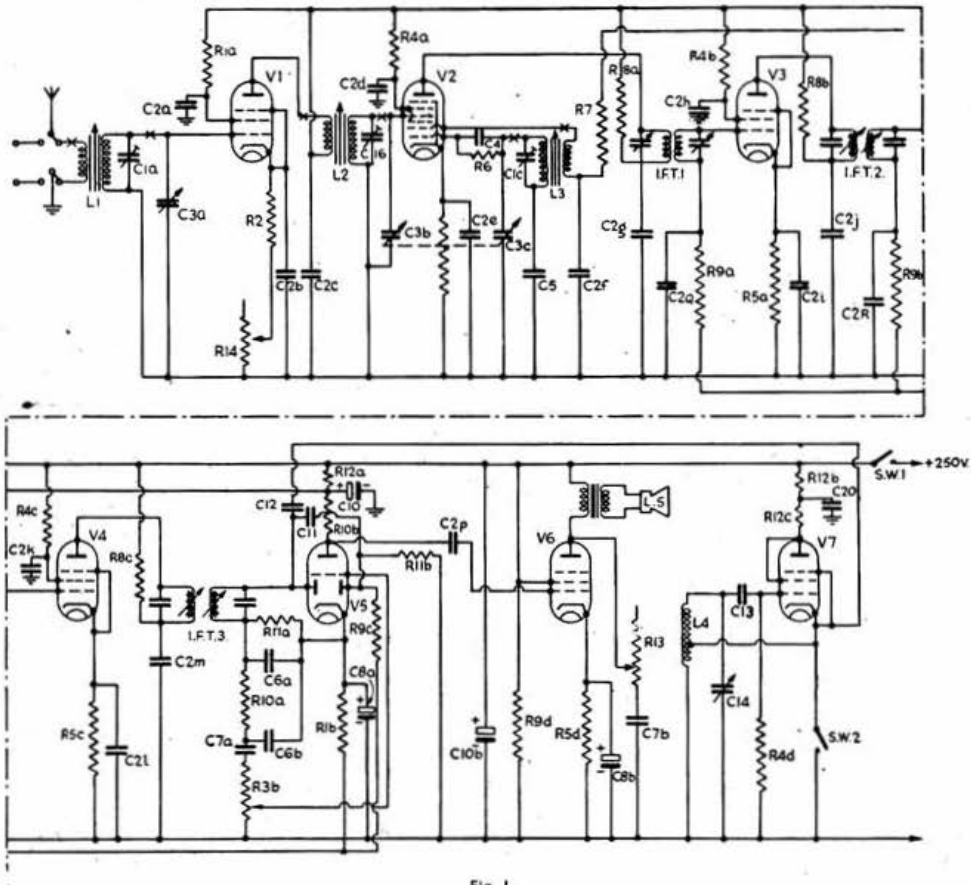


Fig. 1.

Circuit of a Communications Receiver built from the T.R.1196. The figure in brackets after each component indicates the quantity taken from the T.R.1196. Positions marked " X " are for wave-change switches (not otherwise shown in the circuit). C5 is the " padder " (see Table), a different capacity being used for each range.

C1a-c	3—30 pF Trimmer.	C10a-b	8 uF 300 v. Electrolytic.	R3	500K	Variable.	R12a-c	10K	
C2a-r	·1 uF.	C11	30 pF.	R4a-d	50K		R13	10K	Variable.
C3a	160 pF Variable.	C12	2—4 pF (1).	R5a-c	470		R14	5K	1 watt,
C3b-c	160 pF (2-gang).	C13	100 pF (1).	R5d	470	1 watt.		wirewound,	variable.
C4	500 pF.	C14	75 pF variable (1).	R6	56K		V1	(VR 91)	EF 50
C5	Padder.	IFT1	Denco IFT6B/465.	R7	25K	(1).	V2	(VR 57)	EK 32
C6a-b	200 pF (2).	IFT2	ex-T.R.1196 " T2."	R8a-c	5K	(1).	V3, V4	(VR 53)	EF 39
C7a	·05 uF.	IFT3	ex-T.R.1196 " T3."	R9a-d	250K	(2).	V5	(VR 55)	EBC 33
C7b	·05 uF 350 v.	R1a-b	2500 (2).	R10a-b	100K	(2).	V6	6V6 or (VT 52)	EL 32
C8a-b	25 uF 25 v. Electrolytic.	R2	150 (1).	R11a-b	500K	(2).	V7	(VR 56)	EF 36

Note.—Where ratings are not stated, resistors are ½-watt and condensers are 250 volts working.

from the original receiver. An extra stage of I.F. amplification is incorporated, using an additional 465 kc/s. transformer (such as the *Denco* IFT6B/465). The output stage can make use of the EL32 valve from the transmitter, although a 6V6 is shown in this position in the circuit.

Tone control is obtained by by-passing the higher audio-frequencies at the anode of the output valve, C7b being rated at 350 v. working, in order to withstand the pressure of the H.T. plus the peak audio voltages developed. The B.F.O. uses the EF36 (VR56) in a conventional circuit.

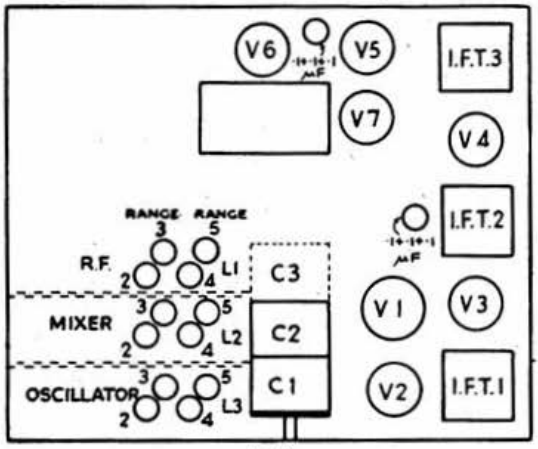


Fig. 2.
Lay-out of the Converted T.R.1196.

Construction

The construction was carried out on a chassis measuring 12 in. × 10 in. × 2 in., leaving ample room to accommodate power supply components if required. The ganged condenser was mounted on its side, and the separate R.F. tuning condenser above it. This necessitated fairly long leads for the latter, but did not appear to be detrimental to the performance of the set.

Two of the ·1 + ·1 + ·1 μF metal-cased condensers were used for by-passing, but separate ·1 μF condensers were used in the R.F. and mixer stages. Several of these ·1 μF condensers had to be provided in addition to those taken from the T.R.1196, as also were about eleven resistors and the three potentiometers (the originals, having short spindles, are unsuitable for panel-mounting). The contacts of the two 250 ohms relays were combined in such a way as to form a double-pole double-throw aerial relay,

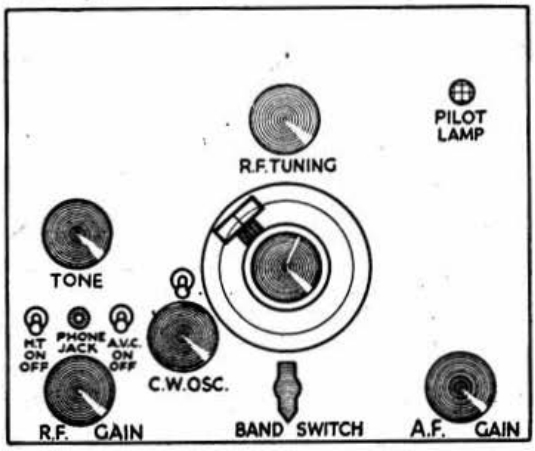


Fig. 3.
Front Panel after Conversion.

Denco Range Coil.	Tuning Condenser.		Oscillator.	
	10 to 160 pF + strays 25 pF.	39 to 324 pF* + strays 15 pF.	Padder (C5).	Trimmer (C1c).
2	·715 to 1·66	·515 to 1·515	440	25
3	2·25 to 5·1	1·67 to 5·0	1,140	3·6
4	6·9 to 15·8	5 to 15	3,250	1·5
5	14·45 to 33·4	10·5 to 31·5	nil	·6

All frequencies in Mc/s. All capacities in pF.
Colour Code: *Blue*, R.F. and aerial coupling. *Yellow*, mixer and coupling to R.F. *Red*, oscillator.
Variation of iron cores gives ± 15% change in inductance.
* As specified by makers.

energised by placing the windings in series with the H.T. line.

The B.F.O. coil, condenser and grid leak were mounted on top of the chassis, suitably screened. The position of the B.F.O. tuning condenser is dependent on, among other things, the type of main tuning dial used.

Operation

In operation, the receiver has been found extremely sensitive and selective. Slight instability at first was cured by adding a ·0005 μF condenser in parallel with each of the ·1 μF R.F. and mixer tubular by-pass condensers.

The cost of the conversion amounted to very little consisting mainly in the purchase of the tuning coils (£2 10s.). No doubt many constructors will wish to incorporate their own ideas in that direction when planning a similar conversion.

INTERFERENCE TO TELEVISION

(*Continued from Page* 112.)

observed, in spite of the fact that the no-load currents were equal. It appeared that unequal bias was "piling up" on one valve, due to the voltage-drop across a resistor carrying grid current. A quick check disclosed the fact that one of the 10,000 ohms resistors (checked before installation) had altered in value to 150 ohms, and after replacing it, the quality was found to be entirely satisfactory.

This turned out to be the answer to the television interference. A careful series of tests, one with the carrier deliberately heavily overmodulated, showed no interference at all.

Some Good Advice

The moral would appear to be threefold:—(1) If reports of poor speech quality are received, don't put telephony on the air again until it is cleared up. (2) Before inserting traps and filters, and before searching for 45 Mc/s. emissions, look for lower frequency components. The small amount of 45 Mc/s. radiation may be harmless until it gets modulated with excessively high-frequency sidebands. (3) When monitoring a transmission, listen *beyond* the normal speech sidebands. If any strange noises are heard, find out where they are coming from.

Some doubtful points arise in attempting to determine the exact nature of the interference. How does the parasitic oscillation reach the television set—by modulation of the 45 Mc/s. component of the carrier, or by the 14 Mc/s. component, modulated, entering the 13·5 Mc/s. I.F.? Is it a matter of sheer luck that the parasitic frequency interferes with the vision, or will any excessively high sideband frequency cause it? Perhaps in the future, when television becomes more common, questions like these will seem elementary, but in the meantime they must remain unanswered.

A USEFUL 7-RANGE D.C. TESTMETER

By L. TRANMER (G6TG)*

THE design of this instrument centres around a Government surplus moving-coil voltmeter. Built into a small case, about 4⅝ in. × 3⅜ in. × 2¼ in., it provides a very useful multi-range D.C. testmeter, small enough to be carried in the pocket.

A miniature 2-pole 6-way switch performs the actual switching, and a small 200 ohm potentiometer acts as a zero-adjuster. The meter has a 5 mA. movement (F.S.D.), and it was decided that the most useful ranges obtainable from six positions would be three voltage ranges, two current ranges (on the same switch position, with the aid of a press-button switch) and two resistance ranges, one high and one low. These ranges can be seen in Fig. 1.

The original meter read 0–50 volts, and it was found convenient to retain the existing scale for all measurements except resistance, by mentally adding noughts where necessary. After checking that the full scale deflection of the meter takes the rated 5 mA., the meter should be opened, and the series resistor removed. This resistor, which has a value of 10,000 ohms, is retained, and incorporated in the

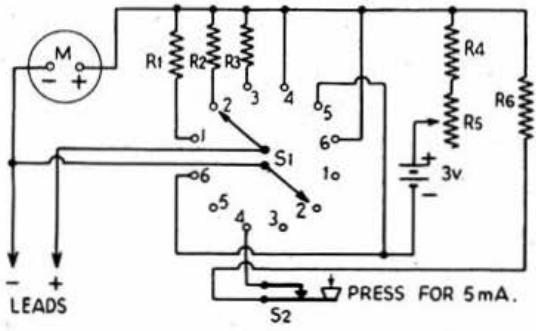


Fig. 1.

General circuit of the Testmeter. S_2 operates only when S_1 is in position (4), and provides the 5 mA. range. R_5 is the zero-adjuster for use on the resistance ranges (5) and (6), and R_6 is the 50 mA. shunt. R_2 is the resistance originally included internally in the meter.

Ranges:		*Components:*	
(1)	0—5 volts.	R1	1,000 ohms ½ watt.
(2)	0—50 volts.	R2	10,000 ohms ½ watt.
(3)	0—500 volts.	R3	100,000 ohms 2 watts.
(4)	0—50 mA.	R4	400 ohms ½ watt.
	0—5 mA. (with S_2 open).	R5	200 ohms Potentiometer.
(5)	High ohms.	R6	See text.
(6)	Low ohms.	M	Meter (200 ohms per volt).

circuit for the 50 volts range of the Testmeter. The 5 volts range requires a series resistor slightly lower than 1,000 ohms, and the 500 volts range 100,000 ohms. The latter should be capable of dissipating 2 watts, so that it is only slightly over-run when the meter is reading between 450 and 500 volts. No shunt is required for the 5 mA. current range, and the 50 mA. shunt is made-up experimentally from either resistance wire or thin copper wire, until the meter reads one-tenth scale. The value will be something under one ohm, depending on the meter in use.

The values of the series resistors can be found by experiment (using batteries or accumulators of known voltage), or by checking against another voltmeter placed in parallel with the series resistor and meter. Because of the fact that most commercial resistors are

* *Wandsworth, Scalby Road, Burniston, Scarborough, Yorks.*

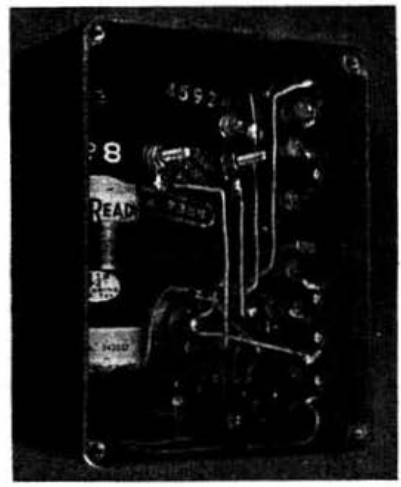


Fig. 2.

The 7-range D.C. Testmeter. All the resistances are mounted on the bakelite terminal-strip on the right, which is held in position clear of the metal sides of the case. An *Eddystone* die-cast box is used to house the meter and other components.

of 20 per cent. tolerance, it may be necessary to place a second resistor either in series or in parallel with the chosen resistors in order to make up the necessary resistance accurately.

The resistance measurements on the Testmeter were designed to range from 10 ohms to 20,000 ohms and from 1 ohm to 500 ohms. Rather than endeavour to ink-in a number of resistance values on the existing dial, the writer preferred to check a number of known resistors, and plot a graph from the results. As a

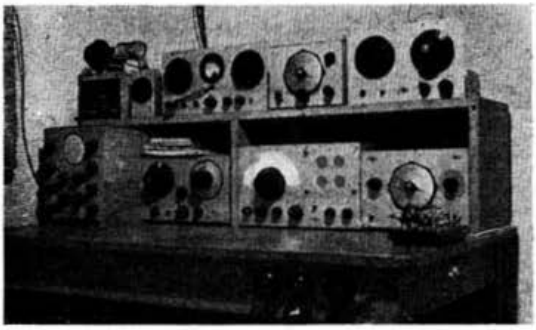
(*Continued on page* 116)

Fig. 3.

Front view of Testmeter.

The Station Behind the Call

G2DRY*



A view of the home-constructed equipment at G2DRY.

A MODERN amateur station with 80% of the entire equipment—including all chassis and cabinet work, mains transformers, chokes, variable condensers, coil holders and a semi-automatic key—home constructed from the raw materials is decidedly unusual. Especially so when the finished product displays such neat professional lines as the gear at G2DRY of Epsom, Surrey. Perhaps the astute amateur will already have begun to suspect that there must be some link with the already half-forgotten era when the short-wave enthusiast had, perforce, to combine the duties of designer, engineer and mechanic if he wished to share in the first exciting days of " 100 metres and below." Nor would such a guess be far wrong for, although the call was not obtained until 1938, G2DRY was struggling with G.P.O. application forms as far back as 1921 when it was almost as difficult for an ordinary citizen to persuade the authorities that he was capable of being entrusted with an experimental receiving permit as it later became to obtain a transmitting licence.

But all the patience learned in the early days must have been required when, just as a full radiating licence was about to be granted in September, 1939, the war put an end to all thoughts of Amateur Radio. With the resumption of activities in 1946, G2DRY—in company with many others—took one look at the long-impounded apparatus and promptly decided that most of it was fit only for the junk box. Sufficient parts, however, were salvaged to permit low-power operation on the 28 Mc/s. band while work proceeded on the new rig and, by easy stages, the station assumed the layout depicted in the accompanying illustration.

The Present Equipment

On the top shelf, lefthand side, is a compact switching unit so that any aerial can be used on either transmitter or receiver at will. Standing on this unit is an artificial aerial for transmitter testing and at the side an absorption wavemeter using plug-in coils with a flashlamp bulb indicator mounted on the top. Next comes the main transmitter containing a conventional 6L6 crystal oscillator with three switched crystals or V.F.O. control. In the latter position the 6L6 acts as a buffer or doubler according to the band in use. The power amplifier is a single 807 which can be run at 65 watts input on four bands: 3·5, 7, 14, and 28 Mc/s. though power is usually reduced to 20 watts for the two lower frequency bands.

The V.F.O. seen to the right of the transmitter is built into a screened box and consists of a 6K7 E.C.O. with a 6V6 untuned buffer stage which provides more than enough drive. On the right is a low power 6V6–6L6 transmitter for the 3·5 and 7 Mc/s. bands. The keying of both crystal oscillators and V.F.O. is accomplished by the grid block method arranged so that when the key is in the raised position the grids are coupled through one megohm resistances to the P.A. bias supply.

On the lower shelf is a 3½in. oscilloscope complete with variable time base and sweep amplifiers. Next is a stand-by three-valve straight receiver which covers all amateur bands up to 60 Mc/s. using plug-in coils. On the right of this set is the main receiver with four switched bands covering from 1·6 to 32 Mc/s. This receiver is also of T.R.F. design but with four valves and a self-contained power pack. Low frequency filters are fitted to improve selectivity and to facilitate break-in operation.

The cabinet on the extreme right contains a combined frequency meter, monitor and substandard employing an EF37 100 kc/s. oscillator, a 6K7 E.C.O. tuning from 1·5 to 2 Mc/s. and a 6L7 mixer and amplifier. The outputs of both the stand-by receiver and the frequency meter are coupled to the audio output of the main receiver in order that either receiver can be used or the transmission monitored on the main receiver speaker or by headphones plugged into any of the output jacks on the three units.

Power Supplies

All power supplies are installed on a shelf under the table. The transmitter power pack can deliver outputs of 850, 650, 400 and 350 volts at 200 milliamps allowing wide choice of voltage and providing ample reserve for future developments. Also incorporated is a variable D.C. ouput supplying up to a maximum of 250 volts of negative bias. The shelf also holds two more 250 volt power packs, one for the three valve T.R.F. receiver and the other for the V.F.O. and the frequency meter. The two switches on the front edge of the table control the mains supply and in the event of an emergency the entire equipment can be switched off immediately.

The aerial system at present in use consists of an 85ft. end-fed Hertz suitable for operation on any of the four bands. In the roof space are three half-wave dipoles, one for 14 Mc/s. and the other two mounted at 90° to each other and used on 28 Mc/s.

*T. W. Lee, "The Nook", 1 Great Tattenhams, Epsom, Surrey.

D.C. TESTMETER (*Continued from page* 115)

rough guide of what may be expected, the following figures are given:

High Ohms	20K	10K	4700	500	50	
Scale Reading ..	1·0	2·5	5·0	27	46	
Low Ohms	500	120	50	15	5	1·5
Scale Reading ..	49	47	42	31·5	19	9

The circuit is given in Fig. 1. The switch S_1 should not be left in the No. 6 position (Low Ohms) as this causes a continuous drain on the battery. The latter, incidentally, is a 3-volt No. 8 type, with connecting wires soldered directly to its terminals. The general layout and construction will be seen from the photograph in Fig. 2. Fig. 3 shows a front view of the completed meter.

Altogether, this little instrument has proved extremely useful, and well worth the time spent on its construction.

THE MONTH ON THE AIR

By A. O. MILNE (G2MI)*

FORTHCOMING R.S.G.B. CONTEST

Nov. 27–28 Top Band.

Final Finals

APROPOS our remarks last month, regarding how to make a contact (!) we have had some correspondence from members who admit to having broken into QSO's quite unwittingly, because after waiting for the contact to end they have been caught out by a series of finals, final finals and final final finals! When a station states "This is . . . . off and clear with G . . . . and by on the band," one is entitled to assume that he means it. There is therefore nothing unethical in calling him reasonably close to the G's frequency, and it is rather disconcerting to discover that the contact is still in progress with a series of finals. Let us therefore be quite definite when we say we are "off and clear" and shut up . . . There are two sides to every question . . . .

Note to Americans

When you call "CQ Europe" on 28 Mc/s., please don't say "and tuning from 28 Mc/s up." This is a direct invitation to the unscrupulous to put their phone into the C.W. portion of the band. Please adopt the expression "tuning from 28·2 up" and give the C.W. chaps a break. Incidentally a large number of G stations now operate between 29·7 and 30 Mc/s. so don't forget the high end of the band.

Maritime Mobile

One or two U.K. amateurs have been operating "Maritime Mobile" due to some misunderstanding. These have now been advised to close down pending the outcome of negotiations by the Society. Meanwhile, several other countries appear to be licensing their amateurs for M.M. operation. The number of U.S. Maritime calls is steadily increasing and there is quite a thrill to be got out of working these stations. G6CL has contacted a number recently on 28 Mc/s. and here is some information about a few of them :—

W6YYT	..	S.S. "Gibbes Lykes." Worked in Persian Gulf.
W0IAX	..	S.S. "Pendleton." Worked off Mozambique.
W1PPH	..	S.S. "Explorer." Worked off East coast of Africa.
W0KRW	..	S.S. "Almeria Lykes." Worked off Rhodes.
W5AXI	..	S.S. "Fullerton Hills." Worked off Malta.
W4LCF	..	S.S. "Cape Archway." Worked in Persian Gulf.
W7LAP	..	S.S. "Clyde L. Seavey." Worked off Malta.

The "Gibbes Lykes," Almeria Lykes" and "Cape Archway" are all owned by Lykes Bros., New Orleans, La.

Notes and News

ZC6JL has QSL'd 100 per cent. but still receives requests. He will be glad to send again to anyone who has not yet received his card. QTH is 89, Hurstfield Crescent, Hayes, Middlesex.

BRS11494 seems to have heard everything this month. On 28 Mc/s. HL1AD, AE, AR, AY, BD and CC put Korea on the map. Other good ones are ZP7FA, FF8FP at the airport Dakar, French West Africa, W0MCF/CI and W7FMV/Iwojima. He mentions that a number of W's working on 27 Mc/s. call "CQ cross band" and listen for replies on 28 Mc/s. By the way, the W's are allowed to work duplex 'phone on 27 Mc/s. On 14 Mc/s. ZK1AS, ZD1SW and ZP5AR have all been copied on 'phone between 1800 and 2200 G.M.T.

Will anyone working VP8AD please ring G2MI on Hurstway 1877 as he has some information for him. The next mail is not until February. Ask him to QRX and reverse the charge. Incidentally 200 cards have just arrived from 8AD for contacts dating back to early in 1947, are you one of the lucky ones?

ZC6UN on 14,350 is operated by U.N. personnel c/o. Hotel des Rose, Rhodes, Greece and may be heard on other frequencies outside the amateur bands.

We are informed that amateurs in Palestine now sign 4X4 as a prefix. Calls such as 4X4AA, 4X4AB etc. are now being heard. This seems directly contrary to the international prefix scheme. Whether the call prefix has been allocated by international agreement or just adopted locally is not clear at present.

[The Atlantic City Regulations state that Call Signs in the series 4XA–4ZZ may be allocated, but as far as is known the series 4X4 is unauthorised. It is possible that the series has been allocated for military purposes in which case the prefix should not be used by amateurs.—ED.]

ST2CH acknowledges all reports and QSO's. Anyone who has not received his card should write to F./O. R. C. Honey, H.Q. 324 Wing, R.A.F. Station, Deversior, M.E.F. BRS10789 at Shruba, M.E.L.F. has to confine himself to reception. He has copied many G's on 7 Mc/s. including G5LP (569) and G2VZ (559). His formidable list of calls heard, shows what you can hear if you don't waste time calling them! G2LU has added three nice ones to his collection VK9BI Papua on 14,100, VP3JM on the L.F. end of the C.W. band and HL1BA on 14,050. He also has LU1ZA's card. ZS1JB is ex-GM3ARW and is looking for old friends. GW6AA is now ZL1MP and is also on the look out for G's. BRS16940 writing from the British Embassy in Kabul, assures us that there are no amateurs in Afghanistan. YA3B is a "phoney," as we said.

EP3H was QRT from August 20th. All contacts have been confirmed. He will shortly be on the air again with another "exotic" call. MD5PS is now BRS17270 and is another 100 per cent. QSL man, including S.W.L. reports. His address is now Mr. P. C. Swann, "Vale Mount," Langham Rd., Bowdon, Cheshire.

G2UA, hopes soon to be on with a VE3 call. Good luck O.M. G3YM is much in demand in New England by W's who get him to work their first G for them! His first call across the pond raised G5YM ex-VQ3EDD. He can be heard quite often from W1QZZ on 28 Mc/s. GM6MS has worked ZP7AF on 28 Mc/s. 'phone QSL *via* Box 654, Ascuncion, Paraguay. The question is "Does he QSL?" G2JN, using 2 watts recently worked D2IJ on 1·7 Mc/s. during daylight. The QSO was solid for 35 minutes at 559.

G3APX remarks on G6DY's first QSO, see September BULLETIN. He worked G6DY/M on May 3, 1947 at 2250 D.P.S.T. on 7 Mc/s. He sent a card to the address given and received an acknowledgement (but no QSL) from a Miss E. M. Easchen, of Wortley House, Morecambe Bay. He wonders what is the explanation?

From the G6RH bag comes the following on 'phone: FF8FP 28,280, HC2OT 28,300 (QSL's), W7ILE/KX6 28,500, W6YOT/C6 28,550, VP5AR 28,300, VQ5PBD 28,400 (QSL's). This latter station puts in a remarkable signal around midday with about 30 watts input. On C.W. G6RH offers VR2AP 14,155, VR2BD 14,120, ZK2AA 14,125, KX6AF 14,080 and CZ2AC 14,120.

VS1CX is active again using 25 watts on 14,080. He and VS1CW are both good for a QSL card. BRS16949 has heard C3ET in Canton on 14 Mc/s. and says KG6DO with 600 watts and a fantastic aerial array puts in a good signal on 28 Mc/s.

BRS7594 gives the QTH of HP1LB as Herman Luria, Box 91, Panama City, and of W2WMV/C9 on 28,640 kc/s. as J. M. Clossom, Box 10, Navy 3930, c/o. F. P. O., San Francisco. ZC1AZ is another snip on the 28 Mc/s. 'phone. Our old friend Eric Trebilcock, BERS195, now settled in a house of his own, says MP4BAB is O.K. and QSL's. His is the same as VS9GT but has a rather unstable signal. Eric continues to hear lots of G's on 7 Mc/s. and also plenty of South Africans but remarks that he never hears a G work a ZS.

Alas our poor 7 Mc/s. band! What with Russian Commercials, Spanish Broadcasters and the B.B.C., it is just a dog-fight. It would be interesting to know what percentage of the World's population ever listens to these broadcasts. If every short wave broadcasting station has one listener per kilowatt per hour we'd be surprised.

When we think of the peaceable use that we used to make of this band, even if we did QRM each other, it is ironical to listen now. Russian and B.B.C. on adjacent channels each giving their version of the same thing and the rest of the world not giving a hoot either way! We sigh for the days when news took several weeks to reach foreign capitals and when international relations were conducted by diplomats instead of fanatics with microphones and 500 kilowatts!

AROUND THE EMPIRE.

By fitting wooden shelving above the operating desk, VK5BZ, of Adelaide, is able to arrange his equipment conveniently, whilst leaving the table clear both for constructional work and a comfortable operating position. He also has plenty of space for technical books. Tools can be kept close at hand in the nest of drawers.

Congrats

●To Mr. and Mrs. Maurice Frost BRS10234 on the safe arrival of Rosemary Anne. "Jack" Frost was the stalwart who took over the QSL Bureau during G2MI's vacation and is now studying for his ticket.

* *29 Kechill Gardens, Hayes, Bromley, Kent.*

AROUND THE VHF's

By W. H. ALLEN, M.B.E.(G2UJ)*

IT is a pleasing to record that activity still continues on the 58 Mc/s. band despite the migration of many old timers to 145 Mc/s. Conditions have been very good on many occasions recently, particularly in the late evening, and some fairly distant stations have been logged by the writer who, as previously stated, is situated very unfavourably for VHF working. Outstanding among these stations has been G3HW/A of Teignmouth, Devon, who has been heard at good strength several times during the past month when no other transmissions have been audible from the same area.

Six Metres

Without preliminary warning the G.P.O. announced last month that those who were authorised last winter to operate on 6 metres would be allowed to use that band up to December 31 next. We have not yet heard of any DX being worked on that band this winter.

French Five-Metre Contest

The first of three contests arranged by R.E.F. took place on October 23 and 24, and coincided with a spell of first-rate propagation conditions which lasted until late in the afternoon of the 24th. Many contacts were made with British stations, the outstanding performers being G3HW/A and G3AVF, both in the Torquay area. Their best DX was F8YZ (Nancy) at 455 miles—thought to be a French record for the band—and F9FT at 350 miles, both at excellent strengths. In all 3HW/A made 12 contacts, 3AVF 10, and another Torquay station, 3CQC, six during the week-end. All reported that signals beamed unusually sharply. In Tunbridge Wells G2UJ heard and worked F8NW and F8ZF who were both slightly stronger than usual. The following stations are known to have been active:—F3CA, DC, 8BY, GH, LO, NW, OL, QL, YZand 9FT.

Five Metres

G3WW (Wimblington, Cambs.), now with 32 counties to his credit, also remarks upon G3HW/A's consistent signal, and says that he intends staying on five until thrown out! GM2HIK (Forfar), together with 2CCC, 2DRD and three BRS members, operated portable during the Field Day on September 26. Weather was extremely bad, and on one occasion the torrential rain found its way into the converter and put the station off the air for a period. Despite these difficulties, however, they managed to work GW4OS/P at 232 miles for a 569 report, besides a number of GM stations. There would certainly seem to be no lack of enthusiasm for the VHF's among our Forfar members. We understand that an attempt was made on October 17 to establish 5 metre contact between EI8P in Dublin and GI5SJ in Belfast, but so far no news has been forthcoming as to whether their efforts were successful. It is unfortunate that lack of notice prevented us from giving publicity to this test, but reports from anyone on this side of the Irish Sea who heard EI8P on this, or any other, occasion will be welcome.

Two Metres

G3AHB (Slough)—we unfortunately gave his call as 3AMB last month—found October 2 a good day, and after listening to a QSO between G5BY and G6DH succeeded in raising the Devon station just before he faded out about 22.00 GMT. Signals were 559 both ways. Following this contact a move was made to 5 metres where conditions were also found to be good, and the harmonic of an Italian commercial station was heard on approximately 59·6 Mc/s., but only when the beam was directed towards the north. No other European signals were heard at that time. At least three stations—G2XV, 3BK and 3WW—are active in the Cambridge area, but so far they have heard little on the band apart from one another, and suggest that the London stations might turn their beams in their direction now and again.

Some months ago we received a most informative letter from Mr. William L. Smith, W3GKP, of Silver Spring, Maryland, dealing with various aspects of 2 metre operation. We have purposely refrained from quoting extensively from this letter until we in this country had obtained some experience of the band, but we feel that readers might now appreciate some of Mr. Smith's remarks, bearing in mind that he has been active on the band since November, 1945. In the light of much experience with various forms of transmitter and receiver, 3GKP considers that the MO–PA type is just not worth the trouble, as modulation of the PA produces such a reaction on the oscillator that the overall effect is little better than a good modulated oscillator, and as such is almost unreceivable on a superhet. with any pretence towards selectivity. A really well-designed M.O.–B.A.–P.A. transmitter offers some improvement, but is still a long way behind crystal controlled apparatus. He has found the best C.O.-trebler to be the 6AG7, with the 6AC7/1852 second, and both better than the 6V6. Quarter-wave rods ¼in. in diameter and spaced 1 in. and tuned by a shorting bar and *not* a variable condenser are recommended for the tank circuit of push-pull output valves such as the 815, 829 and 832. Fine tuning may be carried out by means of a copper vane placed between or close to the rods at their low potential ends.

Passing to the design of a converter, stress is laid upon the necessity for sufficient R.F. gain ahead of the mixer—the 6AK5 has proved its worth in both R.F. and mixer positions—with an additional high-efficiency I.F. stage between the mixer and the input of the associated communications receiver should the latter be either lacking in R.F. stages or R.F. gain. Careful adjustment of the aerial coupling and of the mixer operating conditions should enable the signal-to-noise ratio to be improved, but it should be remembered that this state of affairs is not that which gives the loudest signals. To this end a weak, tone-modulated signal, and plenty of patience are the chief ingredients for success. Discussing results, 3GKP has found that under normal conditions five metres has a considerably greater range than two, but that the latter band opens up for tropospheric DX more often than does five, and that under these circumstances the maximum range appears to be greater.

The 2,350 Mc/s. station operated by G3CBN/P at High Salvington, Sussex, when a distance of 13 miles was covered. Using the same gear the record now stands at nearly twice this distance.

The 420 Mc/s Band

The expected spate of reports following the release of this band last month has not materialised, and if any outstanding results have been obtained we have yet to hear of them. G2FKZ and G3CU, both of Dulwich, London, S.E. 24, were in two-way communication at 18.46 G.M.T., October 30. Distance 1¼ miles. Each transmitter employed a pair of CV6's working as a push-pull tripler. Input was 8 watts and the transmissions were crystal controlled. Receivers were modified R1294's and aerials vertically polarised beams. There is no direct line-of sight between the stations. G2RD (Wallington, Sy.), is on the band, but so far has made no contacts. He would appreciate co-operation from anyone in his locality.

2350 Mc/s Record Again Broken

The 2350 Mc/s record has again been broken by that enterprising team G3CBN and 8IH with the establishment of two-way 'phone contact between Ealing and Leith Hill, Surrey, a distance of 24·4 miles. Signals were R5 S9 both ways, and a move was made by 8IH to the Devil's Punchbowl at Hindhead, 35·5 miles from Ealing. From there signals were R5 S5 on MCW, but unfortunately line-of-sight working was impossible, and contact was made in one direction only. Hearty congratulations to all concerned, and may we soon be able to record an even further extension of this record.

The closing date for the December issue will be Wednesday, November 24.

OUR FRONT COVER

FOR the purpose of lining-up receivers operating on the new V.H.F. bands, there is a great need for a compact, stable, and economic signal source. This need is fully met by the simple and inexpensive oscillator illustrated on the front cover. The circuit employs a Mullard Type ECC91 miniature double triode and, when used in conjunction with Lecher wires, it enables V.H.F. receivers to be lined-up, easily and accurately. The device, constructed by Mr. W. A. Scarr, M.A., (G2WS), was fully described in the October issue.

* *32 Earls Road, Tunbridge Wells, Kent*

LETTERS TO THE EDITOR

Band Planning

DEAR SIR,—No doubt you will receive numerous letters about the Band Planning proposals, but I must register one very definite point of view about which I feel strongly. Throughout the whole history of Band Planning—which as far as I know started in America—one of the fundamental principles which has been adhered to universally is that C.W. shall be permitted anywhere in any amateur band. I feel that the R.S.G.B. proposals—which include " telephony only " bands in which C.W. will be forbidden—cut right across this principle. I can see no sufficiently clear reason for this unprecedented step, and as an amateur who uses both methods of communication I am of the opinion that it would definitely not be in the best interests of Amateur Radio to thus close large parts of our lower frequency bands to what is the fundamental system of communication by radio. The reason why the " telephony only " advocates desire this is shrouded in mystery. A telephony station suffers far more by interference from another telephony station than it does from a C.W. station of the same power on the same frequency, so why do these " anti-C.W. " fanatics regard C.W. interference as a crime against humanity ? There can be no possible doubt about the relative amounts of interference caused by the two systems ; we all know that telephony takes up at least ten times as much frequency room as C.W. Or is it some queer kind of snobbery, or contempt of the beginner who is not allowed to use telephony for the first year of his licence ?

Whatever it is, it certainly does not sound like Amateur Radio to me. An amateur signal is an amateur signal, whether 'phone or C.W., and since telephony is so selfish in its frequency requirements, the sole object of band planning should be to protect the C.W. transmissions (of beginners and old-timers alike) from obliteration in a part of each band. The essential thing, however, is not to take any notice of the wishes of the fanatics either of the Anti-C.W. or the Anti'-phone camps.

Yours sincerely,
ALAN G. DUNN (G3PL).

79, Hayton Grove, Hull, Yorks.

* * *

DEAR SIR,—During a discussion at one of the local R.S.G.B. meetings, I was struck by the divergence of views on the subject of what percentage of any Amateur Band should be devoted to Telephony and C.W. operation respectively. A C.W. station can communicate on a channel 100 c/s. wide, while a telephony station must occupy a channel 5 kc/s. wide (assuming " communications quality " of 0-2,500 c/s.). Consequently, fifty C.W. stations can be accommodated in the same number of kc/s. as one telephony station. There are, however, more of the former than the latter, so if we can discover the average ratio of C.W. to telephony stations on any band, division by 50 will give the logical ratio of space which should be allotted to each type. For example, if there are 300 C.W. stations on 14 Mc/s., and 30 telephony stations, then the ratio would be 300/30 divided by 50, or in other words the telephony band should be five times as wide as the C.W. band.

As a first approximation, it should be sufficient simply to count the number of C.W. and telephony stations heard on each of the bands, although the merit of such a procedure would lie rather in the ease with which it could be carried out than in the statistical value of the figures. Anyone who cares to spend half an hour logging C.W. stations, and then a similar length of time logging telephony stations, can provide himself with a useful indication of the ratio of C.W. to telephony stations, which, divided by 50, gives the only logical solution to the problem.

This, of course, gives no indication of how much (if any) of a band should be shared by both telephony and C.W. stations. Remembering that, with no band-planning, *all* the bands are " shared," it would seem advisable, in the early years of band-planning, to leave a relatively large shared portion, so that we can see how well the plan works. If more (unscrupulous) telephony stations appear in the C.W. band than the number of (unscrupulous) C.W. stations that appear in the telephony band, then the inference to be drawn is *that the telephony band is not wide enough*. Ideally, it should be just as easy, or as difficult, for a telephony station to find space amongst other telephony stations as amongst C.W. stations, and an unscrupulous telephony operator, faced with the choice, will tend *of his own accord* to remain amongst his fellows in the telephony part of the band.

It seems to me, therefore, that the official R.S.G.B. plan for telephony, shared and C.W. portions of the Amateur Bands, is very fair to both C.W. and telephony enthusiasts, favouring neither at the expense of the other.

Yours faithfully,
T. R. NISBET, Assoc.Brit.I.R.E. (GM3SW).

* * *

Future Low Power Contests

DEAR SIR,—During the 1948 QRP Contest it was noticed that certain stations were fortunate enough to have, more or less, unlimited time for operating. Such a condition permits a big advantage over the majority of competitors who are unable to get on the air during the normal working day.

Without in any way reflecting discredit upon our more fortunate members who come within the former category I do suggest that a time limit of operating hours—as employed in the B.E.R.U. Contests—would give all participants a fairer chance to accumulate comparable points.

In commending this suggestion to the Contests Committee for consideration in future QRP Contests it would be interesting to have the views of other entrants.

Yours faithfully,
JAMES N. ROE (G2VV).

BOOK REVIEWS

APPLIED ELECTRONICS. By D. Hylton Thomas. Blackie & Sons, Ltd. ; 7s. 6d. ELECTRONICS. By F. G. Spreadbury. Pitman : 55s. ELECTRONICS. Edited by B. Lovell. Pilot Press, Ltd. ; 42s.

These three books deal, each in its own way, with a subject whose course runs so close to that of radio proper that it frequently crosses it.

The first one, which is intended for use by university and technical college students, has a chapter devoted to each of the main branches of the subject. The introductory chapter deals with the theory of the electron and is followed by others on thermionic valves, cathode ray tubes, gas-filled rectifiers, discharge tubes, photo-cells and metal rectifiers. It appears to be a sound textbook and includes a number of examples, drawn from recent examinations, the answers to which are given at the end of the book. The publishers are to be congratulated on producing a book of this size and standard at a price below that of the average novel.

* * *

Mr. Spreadbury's book covers a very similar field to that by Mr. Thomas but, by virtue of its much larger size, it can deal with the subject in a far more exhaustive manner. The physics of the electron occupies the first seven chapters, the remaining thirteen being devoted to a detailed description of the construction and application of all types of electronic devices from the simple diode to the electron microscope and the cyclotron.

In a book on this subject, it is, of course, difficult to avoid extensive overlapping into the province of radio engineering. We are therefore not surprised to find the theory and design of class A and class B amplifiers included, but if only for completeness, one therefore would have expected R.F. class C amplifiers and valve modulators to be covered also ; there appears to be no mention of these important applications, however.

The book is lavishly illustrated by photographs and diagrams, most of the latter being very clear and easy to read, although in a few isolated cases standard symbols are not always used, as for example in Fig. 20-22, where resistances are represented by the symbol usually adopted for inductances. Altogether the advanced student should find this book very valuable.

* * *

In the third book of this group we are presented with an entirely different work. In it, upwards of a dozen authors, each a specialist in his own branch of the subject, have written monographs on the most recent applications of electronics. One can perhaps be forgiven for expressing amazement at finding between one pair of covers such a wealth of intensely interesting material.

In two chapters by Dr. Lubszinski and Dr. Elliott, photocells for visible and ultra-violet light and for the infra-red region respectively are dealt with. These are followed by one on television camera tubes by Dr. McGee in which not only are all known types fully described, but a detailed description of the various manufacturing processes is given, information which has probably never appeared in print before.

Dr. R. A. Smith contributes a long chapter on Radar which could well stand as a volume on its own.

Other chapters which are of absorbing interest are those by Dr. Grimmett on Electronics in Medicine and Dr. Pumphrey on Electronics in Physiology.

The last chapter by Dr. Cosslett is concerned with the electron microscope and is remarkable for the large number of beautiful photographs illustrating results obtained with magnifications of over 100,000 diameters. Surely this must be admitted as one of the most amazing scientific advances which electronics has produced. In little over a decade the minimum size of object which can be made visible to the eye has been reduced by about 100 times.

To a radio enthusiast, who would like to read of the extraordinary applications of electronics, of which his own subject was the first, no better book could be suggested. H.A.M.C.

HIC ET UBIQUE

COUNCIL, 1948

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September Council Meeting

Resume of the Minutes of a Meeting of the Council of the Incorporated Radio Society of Great Britain held at New Ruskin House, Little Russell Street, London, W.C.1, on Tuesday, September 14, 1948, *at* 6 *p.m.*

Present.—The President (Mr. V. M. Desmond in the Chair), Messrs. Auchterlonie, Charman, Corfield, Edwards, Evans, Lewer, Mathews, Milne, Scarr, Watts and John Clarricoats (General Secretary).

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

I.A.R.U. Calendar No. 34.

Resolved to record an "aye" vote in favour of the election to membership in the Union of the Radio Club of Guatemala, the Hong Kong Amateur Radio Transmitting Society, the Phillipine Amateur Radio Association and the Radio Club of Peru.

It was reported that the Iceland Radio Society had been elected a Member of the I.A.R.U.

Headquarters of the I.A.R.U. acknowledged "the magnificent contribution of the Radio Society of Great Britain in sending two of its officers to the Atlantic City Conference for several months, during which time—since most other amateur representatives were attached to delegations—they played the major role in the representation of the Union itself." Headquarters of the Union also recorded that "it gives us a warm feeling to realise that our societies have this ability to send representatives in our common effort at that distance, at that expense and for that duration."

Interference with Television.

It was reported that the Society had suggested to the British Radio Equipment Manufacturers' Association and to the Radio and Television Retailers Association that the sale of television receivers should be restricted to the normal service area of the London television station. The Society had also put forward certain suggestions regarding the establishment of a protected limit of field strength. An encouraging reply had been received from B.R.E.M.A.

Welfare Committee.

Consideration was given to a suggestion made by Mr. W. N. Craig, G6JJ, that the Council should set up a Welfare Committee to raise funds and administer them for the benefit of members who, through no fault of their own, find themselves in need of assistance.

After a full discussion it was resolved to inform Mr. Craig that the Council does not consider that the formation of a Welfare Committee is appropriate to a Society such as the R.S.G.B.

The Council expressed the view that it is preferable for local funds to be created to deal with specific cases of hardship.

It was reported that local members had donated the sum of £77 to a fund established by the Grafton Radio Club for the benefit of the widow of the late Mr. Harry West.

News Letter.

Consideration was given to a letter from Mr. P. Woodhouse, G2BQY, who suggested that the Society should issue a news letter to T.R.'s.

After a full discussion it was resolved to inform Mr. Woodhouse that—

(*a*) in the view of the Council it is not a practical proposition to issue circulars to T.R.'s on the lines he suggests.
(*b*) all important news is published without delay in the BULLETIN.
(*c*) an advanced copy of the Resume of the Minutes of each Council Meeting is sent to the R.R.'s.

With some 250 T.R.'s now in office the work and expense of issuing hand-produced circulars would be considerable. The Council expect to publish a special T.R.'s section in the BULLETIN as soon as the paper position improves.

London (I.E.E.) Meetings.

It was reported that the Institute of Electrical Engineers had increased their charge for buffet teas from 1s. to 1s. 3d. a head.

Membership.

Resolved—

(*a*) to confirm the election of
117 Corporate Members
25 Associates
7 Junior Associates
whose applications had been dealt with during the recess by the President and Chairman of the Membership Committee.
TOTAL ELECTED 149.
(*b*) to confirm the election to Life Membership of three Corporate Members.
(*c*) to confirm the transfer to Corporate Membership of four Associates.

Resolved—

(*a*) to elect
121 Corporate Members
35 Associates
12 Junior Associates.
TOTAL ELECTED 168.
(*b*) to grant Corporate Membership to five Associates who had applied for transfer.
(*c*) to renew the affiliation of the Murphy Radio Sports Club.
(*d*) to grant Corporate Membership to a blind person and to inform him that the cost of his first subscription has been borne by the Society.

Headquarters' Station.

Mr. Charman gave a full report on the operation of GB1RS.

Other Matters.

The Council also dealt with the award of Society Trophies for the year 1948/9, the 1948 Amateur Radio Exhibition, Council Nominations for the year 1949, the Radio Amateurs' Examination for the year 1948, the release of the 145 and 420 Mc/s. bands. All of these matters have been reported upon in earlier issues of the Society's Journal.

The meeting terminated at 9.45 p.m.

Slow Morse Transmissions

Mondays	20.00 G.M.T., 1900 kc/s.,	G2AJU (Stutton Ipswich)
Mondays	20.00 G.M.T., 1800 kc/s.,	G2DJS (Bradford)
Mondays	21.00 G.M.T., 1900 kc/s.,	G3BLN (Bournemouth)
Tuesdays	22.00 G.M.T., 1896 kc/s.,	G8TL (Ilford)
Tuesdays	23.00 G.M.T., 1820 kc/s.,	GM4AN (Kirkcaldy)
Wednesdays	22.00 G.M.T., 1800 kc/s.,	G3DLC (Grays)
Thursdays	22.00 G.M.T., 1896 kc/s.,	G2BCX (Sth. Woodford)
Thursdays	22.30 G.M.T., 1803 kc/s.,	G3OB (Manchester)
Fridays	19.00 G.M.T., 1900 kc/s.,	G3BLN (Bournemouth)
Fridays	20.00 G.M.T., 1900 kc/s.,	G2AJU (Stutton Ipswich)
Fridays	20.00 G.M.T., 1860 kc/s.,	G3AKW (Wirral)
Fridays	20.30 G.M.T., 1868 kc/s.,	G8LZ (Gravesend)
Fridays	23.00 G.M.T., 1820 kc/s.,	GM4AN (Kirkaldy)

Volunteers for this service are still required. Details to Mr. C. H. L. Edwards, G8TL, 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

* * *

Slow Morse practice transmissions are radiated from the V.E.R.O.N. headquarters' station PA0AA every Wednesday, at 20.00 G.M.T., on 3625 kc/s. The first part of the weekly lesson, from 20.00–20.45, is intended for beginners. Those who know the code but wish to improve their speed are invited to listen from 21.00—21.45 G.M.T. Announcements and exercises are given in both Dutch and English. The operator is PA0VP.

EXPERIMENTAL STANDARD FREQUENCY TRANSMISSIONS

GB1RS

The Headquarters' Station, GB1RS, transmits daily for two minutes at each hour from 1800 G.M.T. to 0900 G.M.T. on a frequency of

3500.25 kc/s

when the following message is sent automatically in Morse Code at a speed of 12 words per minute :

CQ de GB1RS QRG 3500·25 kc/s $\overline{\text{VA}}$ GB1RS

High accuracy observations made frequently since the start of the service have shown the frequency to within *one cycle* of the stated figure

Low Power Contest 1948

Results of the Low Power (3·5 Mc/s.) Contest held during the period from September 18–25, 1948.

Position	Call Sign	Points	Position	Call Sign	Points
1	G5JP	14,840	16	GM6RI	4,257
2	G6NC	14,022	17	G2VV	3,478
3	G3AH	12,488	18	G3EDW	3,400
4	G6GM	12,031	19	G8DL	2,880
5	G6ZN	10,146	20	G2KF	2,838
6	G4FN	8,036	21	G6ZA	2,628
7	G2BQC	7,700	22	G4AL	2,211
8	G6GH	7,399	23	G5ZX	2,112
9	G2WQ	7,056	24	G2DHV	2,070
10	G6LH	6,116	25	G3ACC	1,798
11	GI3BKG	5,439	26	GM2CGY	966
12	G5KT	5,289	27	G3XT	880
13	G2FJD	4,988	28	G6MH	612
14	G3BGQ	4,859	29	G2WS	464
15	G3CAG	4,520	30	G2BLA	378

Disqualification. G3YH (2442): no times entered on log.

Check Logs. The following are thanked for sending check logs: G2ATV, FYA, LC, 3AZD, BYW, DFV, EBY, 4QK, 5JL, 8PR, GC8NO.

The Contests Committee noted the use of MCW (A2) by certain stations. This type of transmission, however, was not prohibited by the Rules.

Five Metre Field Day

Results of the second Five Metre Field Day held on September 26, 1948.

Position	Call	Points	Location
1	G3CQR/P	452	4m. W. Bovey Tracey, Devon.
2	G3MY/P	419	"Sir William" Hill, Derbyshire.
3	G3HW/P	388	8m. S. Exeter, Devon.
4	GW4OS/P	354	Hope Mountain, Flintshire.
5	G3MA/P	315	May Hill, Herefordshire.
6	G6XM/P	313	4m. N.W. Petersfield, Hants.
7	G3BWS/P	304	5m. N.E. Canterbury, Kent.
8	G5MA/P	299	1m. S. Storrington, Sussex.
9	G8QZ/P	276	6m. N.E. Derby.
10	G6NB/P	249	4m. N.W. Woking, Surrey.
11	G4NT/P	200	2m. N.E. High Wycombe, Bucks.
12	G2ATK/P	165	11m. S. Birmingham, Warks.
13	GM2HIK/P	47	8m. S. Forfar, Forfarshire.

Check Logs. The following are thanked for submitting check logs: G2AOL, DHV, LC, 3BLP, 4MR, 6YU.

Representation

The following are additions or alterations to the list of Representatives published as a Supplement to the February issue.

Regional Representative

Region 8. — Dr. W. P. Cargill, G5LR, "Truro," Coxford Road, Lordswood, Southampton. (Returned unopposed.)

Town Representatives

Region 3.
Shropshire—
Bridgnorth .. — M. Davies, BRS16,883, Whitbrook Hotel, Mill Street.

Region 7.
London South—
Sutton and Cheam — F. J. Harris, BRS1820, 143 Collingwood Road, Sutton.

Region 8.
Hampshire—
Bournemouth .. — J. E. Squires, G2DBF, now 18 Wakefield Avenue, Northbourne.

Region 9.
Gloucestershire—
Bristol .. — P. Smith, G3DIB, 39 Halsbury Road, Bristol 6.

Vacancies

The death of Mr. Raymond Waite, G3PZ, creates a vacancy for the office of Gloucestershire C.R. In addition Messrs. A. Walmsley, G2HIO, L. J. Groves, G4GT, P. Woodhouse, G2BQY, and D. H. Jones, G3BO, have resigned as Representatives for Accrington, St. Albans, East Ham and North Devon respectively. Nominations should be made in the prescribed form and sent to reach the General Secretary by November 30, 1948.

N.F.D. 1948

The Contests Committee regrets that the scores of the Sunderland and South Shields groups were published as separate entries in the August, 1948, BULLETIN. The combined score of the groups is 385 points, placing them 52nd instead of 79th and 98th as published.

London (I.E.E.) Meeting

About 100 members were present at the Institution of Electrical Engineers on October 29, 1948, when Mr. P. F. Cundy, A.M.I.E.E. (G2MQ) lectured on "Speech Clippers." The chair was taken by Mr. H. A. M. Clark, B.Sc. (G6OT), Chairman of the Technical Committee, and a vote of thanks to the lecturer was proposed by Mr. J. W. Mathews, G6LL.

Mr. Cundy's paper will appear in the winter issue of the *Proceedings of the R.S.G.B.*

"Equipment for the 145 Mc/s. Band"

London members who have constructed equipment for operation in the 145 Mc/s. (2 metre) band are invited to display the same at the Society meeting to be held at the Institution of Electrical Engineers on November 26, 1948. The lecturer on that occasion will be Mr. E. A. Dedman, G2NH, whose work on the V.H.F. bands is well known.

British Sound Recording Association

The following is a list of meetings of the above Association which are due to take place at the Royal Society of Arts, John Adam Street, Adelphi, W.C.2.:

Friday, November 19, 1948. E. W. Berth-Jones, B.Sc.
"Some Fundamentals of Magnetic Recording." To be held at E.M.I. Studios, Ltd., 3 Abbey Road, London, N.W.8 (St. John's Wood Underground).

Friday, December 17, 1948. E. A. Vetter.
"Some Physiological Factors in Quality Appreciation."

Friday, January 28, 1949. E. D. Parchment.
"Gramophone Record Processing."

Meetings commence at 7 p.m.

A special meeting of the Association will be held at the Imperial Hotel, Birmingham, on Saturday, November 20, at 2.30 p.m. in the afternoon, and 7.30 p.m. in the evening, when talks and demonstrations will be arranged. A complete range of magnetic recording equipment will be on show.

Society members are cordially invited to attend meetings of the B.S.R.A.

Ionospheric Radio Propagation

The physical and mathematical theory underlying electromagnetic-wave propagation, with particular reference to radio-wave propagation, by reflection from the ionosphere, is presented in a new book prepared by the National Bureau of Standards: *Ionospheric Radio Propagation*, and these fundamental principles are brought into understandable relation with the practical problems of radio communication.

The variations of the ionosphere with locality, season, time of day or night, and solar activity, constitute a complex geophysical phenomenon, the principles of which must be understood in order to achieve the best use of radio. The nine chapters of this volume are planned to yield a basic understanding of this phenomenon and a satisfactory solution of the problems usually encountered in sky-wave communication. The mathematical theory underlying the propagation of radio waves by way of the ionosphere is first presented. Subsequent chapters deal with measurement techniques; structure and variations of the ionosphere; maximum usable frequencies; practical problems of ionospheric absorption; radio noise of atmospheric, solar, and cosmic origin; and lowest useful high frequencies. A number of problems are worked out in detail to assist the reader in applying the methods to specific cases.

Available from the Superintendent of Documents, U.S. Government Printing Office, Washington 25, D.C., $1.00 a copy. Remittance must be in U.S. currency. Foreign postage 33 cents.

The 5 Ack R East London Trophy

To encourage the continuance of amateur constructional work, adaption and invention, Mr. E. Dawson Ostermeyer, G5AR, a Past President of the Society, has donated a handsome silver trophy to the East London R.S.G.B. District for annual competition.

The panel of judges which will be set up to examine entries, from members resident in the East London District, will award points for craftsmanship, efficiency, beauty of appearance, utility, adaption, invention and research.

Further details can be obtained from the East London D.R. Mr. W. H. Matthews, G2CD, 7 Beddington Road, Seven Kings.

Ham Hospitality Solicited

Mr. H. de Waard, PA0ZX, Eendrachtskade 17A, Groningen, Holland, President of the Groningen Section of V.E.R.O.N., contemplates visiting London from January 3 to 10, 1949, and would be glad to stay with a London member during that period. He would entertain his host in Groningen later in the year.

Mr. de Waard is particularly interested in television and is prepared to deliver one or two lectures on this subject to R.S.G.B. members during his visit. T.R.'s in the London Region are invited to contact PA0ZX at the above address.

Dr. Bloomfield

Dr. Bloomfield, G2NR, who recently left England to take up an appointment in Malaya, has been granted the call VS2CQ. He will be working on a frequency of 14,060 kc/s. Dr. Bloomfield's address is P.O. Box 150, Kuala Lumpur.

CLUB NEWS

City of Belfast Y.M.C.A. Radio Club

A special Silver Jubilee programme is being arranged to mark the 25th year of continuous activity of the City of Belfast Y.M.C.A. Radio Club. The club station (GI6YM)—active since 1926—now possesses three fine transmitters and a Super-Pro receiver. These and other indications of the flourishing state of the Club were revealed at the 25th A.G.M. held recently when Mr. Frank A. Robb, GI6TK, was elected President and Hon. Secretary. Other officers now include Chairman Mr. E. Beat, GI3AV, and Hon. Treasurer Mr. R. Boal, GI3AXI. The clubroom is open every evening except Sundays while new members are welcomed on Wednesdays. A Morse class is held on Tuesdays. War-time visitors to the Club are asked to contact the Hon. Secretary, 60 Victoria Avenue, Sydenham, Belfast.

Coventry Amateur Radio Society

The expanding field of activities of the C.A.R.S. is reflected in the steadily increasing membership. At the recent A.G.M., presided over by the Mayor of Coventry (Coun. W. H. Malcolm, J.P., G6WX), the Hon. Secretary (Mr. J. W. Swinnerton, G2YS), was able to report that the 100 mark was reached during the past year. The Chairman (Mr. L. W. Gardner, G5GR), Hon. Treasurer (Mr. H. J. Chater, G2LU) and all other officers were re-elected. Mr. R. Palmer, G5PP, retired from the committee and was accorded a vote of thanks for his valuable services since the early days of the Society.

The photograph shows an exhibit arranged by Ipswich members at the Model Engineering Exhibition held in that town recently. A complete amateur station (call G2SQ/A) was in operation during the Exhibition when a large number of contacts were made on 3.5 Mc/s. phone with an input of 25 watts.

Cumberland Meetings

The visit to Cumberland on October 15 and 16 by Mr. G. Webster, G5GK, Region 1 representative, established a contact which members in this more remote part of the Region have long desired. The occasion was the first official visit paid by a representative of the Society living outside the county. Mr. Webster addressed meetings at Carlisle and Workington, and answered many questions on Society matters.

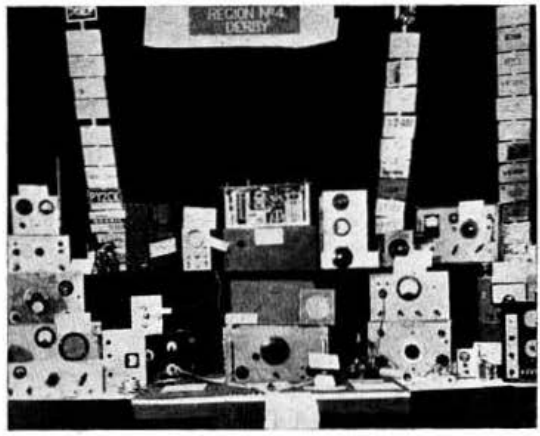
A welcome visitor to the Workington meeting was VS9AH, who will shortly be heard again from Aden. The hospitality of the Area Representative for West Cumberland, G8DP, and Mrs. Williams, deserves special mention, and their kindness in providing accommodation and refreshments for the members present was warmly appreciated. It is hoped to arrange further meetings at both centres during the Spring of 1949.

Doncaster & District Amateur Radio Society

Regular Morse classes are a feature of activity at 73 Hexthorpe Road, Doncaster, headquarters of the above Society, where meetings are held every Wednesday. New members are assured of a hearty welcome. The Society recently entertained Mr. G. E. Ferrar, C. R. for the West Riding.

Harrogate Radio Society

The former Harrogate and District Short Wave Radio Society is to be complimented on the adoption of the above title. Meetings are held weekly (see Forthcoming Events) and the Society has its own premises with workshop facilities available to members at all times. The Club transmitter is active on 14 Mc/s. under the call G3EDJ/A. The secretary, Mr. A. Wilson, 16 St. George's Road, will be glad to hear from new members.



Home-constructed equipment exhibited by the Derby and District Amateur Radio Society at an exhibition held in the Queens Hall, Derby, from 22nd to 25th September, 1948

Ilford and District Radio Society

Mr. John Clarricoats (General Secretary of the R.S.G.B.) was elected a Vice-President of the Ilford and District Radio Society at the recent Annual General Meeting.

The Honorary Secretary (Mr. C. E. Largen, 44 Trelawney Road, Barkingside, Ilford) will be glad to hear from prospective members. The Society meets at St. Alban's Church Room, Albert Road, Ilford, and operates an amateur station under the call G3QU.

Medway Towns' Radiolympia

Under the auspices of the go-ahead Medway Amateur Radio Receiving and Transmitting Society a miniature Radiolympia is to be held at the New Corn Exchange, Rochester, Kent, from November 24 to 27 next.

The Exhibition will be opened at 3.15 p.m. on the 24th by Miss Sylvia Peters of the B.B.C. Television Service. Other speakers will be the President of the local society (Mr. W. Nutton, G6NU), the General Secretary of the R.S.G.B., and the Mayors of Rochester and Gillingham.

A cordial welcome will be extended to all members who visit the Exhibition.

York Short Wave Club

The winter programme opened with a series of lectures whilst a course covering the Radio Amateurs' Examination has been prepared by the local Technical College. Both class and "over the air" Morse instruction is being given.

About half of the members who constitute the Bradford R.S.G.B. Group are featured in this photograph taken recently by Mr. Donald Blakey, G3CUM, of Baildon.

Seated, L. to R.: R. J. A. Kemp, G2FVP; E. J. Simonard, G2CQY; W. S. Sykes, G2DJS; C. A. Sharp, G6KU (R.R.); J. J. Platt, G2VO; J. H. Macdonald, G4GJ (T.R.); W. Hanner, BRS; W. Gill, G6NP; G. R. B. Wilson, G3APV.

Second row: F. J. Smart, G3CJS; R. P. Pohlmann, G3ZK; D. Rhodes, G5UZ; R. Stewart; V. W. Sowen, G2BYC; W. Walker, G3DAR; T. H. Brown; A. Croft, 13,924; J. S. Peevor, 10,919; H. V. Found, G2AKU; A. W. Walmsley, G3ADQ; J. C. Tyler, 10,383; L. L. Cobb, G3UI; D. Skirrow.

Back row: M. Beck, G3DTK; W. M. Potts, G3EDP; S. Stobbs, G3AEJ; H. Beadle, G8UO; F. E. Lancaster, G3BJP; J. Clegg, 4,349; W. C. Longman, G2DYY; C. Chilton, G3UV; J. W. Stevenson, G3DKO; B. D. Watmough; K. Binks; J. D. Bradford, G3CQF.

Can You Help ?

Mr. W. E. Roberts, BRS8919, 52 Saffron Platt, Tilehouse Estate, Guildford, is anxious to secure an instruction manual for the F.M. receiver type BC–306.

Mr. A. Sugden, BRS10988, 2 Willoughby Road, Liverpool 22, wishes to obtain information on wire recorders, particularly head design.

Mr. J. Lewis, Associate, 83 Duke Street, London, W.1, requires information on the midget receiver type 4204, and the *Jefferson Travis* UF-1.

Mr. D. S. S. Fraser, BRS14042, Brookside, Willington, Derby, seeks details of the Air Ministry " 2 " Magslip Receiver R637727.

Mr. H. Reeve, G2HFD, The Angel Inn, 21 Rotherhithe Street, London, S.E.16, would be grateful for the loan of a circuit or other details of the R1149.

Mr. R. F. Stevens, G2BVN, 51 Pettits Lane, Romford, Essex, is endeavouring to obtain the circuit of the APN/1 Radio Altimeter.

Mr. J. A. W. Bate, G6WB, Lyneal Lodge, Ellesmere, Shropshire seeks information on the Admiralty transmitter 7AD and R.A.F. receiver R3039.

Mr. R. J. Donald, G3DJD, 2 Canfield Road, Brighton, requires help in replacing the medium/long wave coil assembly in an MCR1 receiver.

Mr. R. H. Biddulph, Associate, Queen's College, Oxford, would appreciate details of the American receiver CPR–46ACT (ASB series).

Mr. D. M. Menteith BRS16371, 20 Links View Road, Jerviston, Motherwell is anxious to obtain details of the type TGY1 Marconi transmitter.

Congrats

●To Mr. R. C. Horsnell, G2YJ and his wife, of Reading, on the birth of a second son—Michael Roy.

●To Mr. W. Adams (ex-G8JF) and his wife, now of Middletown, New York, on the birth of a daughter—Marion.

●To Mr. J. W. Stevenson (G3DKO) and his wife, of Bingley, Yorks, on the birth of a son—Robert—on September 29, 1948.

●To Mr. C. P. Callanan, BRS14012 who was married in Glasgow on October 4 to Miss May Miller. GM4BK was the best man.

Around the Trade

The push-pull power tetrode, QQV07–40, recently introduced by *Mullard Electronic Products Ltd.* has been designed to give stable and efficient VHF performance and is particularly suitable for the 145 Mc/s. band. Due to the special construction of the electrode assembly and the inclusion of a decoupling condenser between the second grid and cathode, it has been possible to reduce the anode-to-grid capacitance to less than ·1 $\mu\mu$F. so that neutralisation is not usually necessary. The valve operates efficiently up to 250 Mc/s. and, on 200 Mc/s., an output of 83 watts can be obtained with an anode voltage of 500 and only ·7 watts grid drive. This low driving power makes it possible to reduce the number of driving stages, a feature which leads to economy and simplicity in equipment design. The list price is £7 10s. 0d. and the valve is the direct equivalent of the 829B.

The Silver Trophy presented to the East London District by Mr. E. Dawson Ostermeyer, G5AR, Past President.

" Wireless World " Diary, 1949

The reference pages of this diary, compiled by the technical staff of *Wireless World*, include a large selection of useful formulæ, abacs, lists of units abbreviations, definitions and classifications, miscellaneous circuit diagrams. Base connections for some 400 valves are included. Data is given for television and extra short-wave aerials ; this has been revised to include F.M. aerials designed for the projected B.B.C. service. In addition there are general reference pages giving a summary of existing regulations affecting the wireless user, addresses of radio organisations.

The short-wave forecast for 1949 includes a table of optimum working frequencies for the year.

The price is 3s. 4½d. including purchase tax.

" Wireless World " Great Circle Projection Map

Copies of this very useful map—a new edition of which has just been printed—can be obtained from the publishers (*Iliffe & Sons Ltd.*, Dorset House, Stamford Street, London, S.E.1.), price 2s. 6d., plus postage 6d., or from booksellers.

The map gives the true bearing " as the radio wave travels " to any part of the British Isles. Nothing more elaborate than a rule with inches divided decimally, is needed for making measurements.

New Books

SHORT WAVE RECEPTION AND TRANSMISSION. By W. Oliver. Revised Edition. Foulsham ; 2s. 6d.

A useful little book for the short wave listener and budding amateur. The author holds the call G3XT.

* * *

RADIO INDUCTANCE MANUAL. By N. H. Crowhurst. Bernards (Publishers) Ltd. ; 2s. 6d.

Deals with the design of iron-cored components for use at audio frequencies.

* * *

TELEVISION EXPLAINED. By W. E. Miller, M.A.(Cantab.), M.Brit.I.R.E. Second Edition. Iliffe ; 3s. 6d.

Television receiving circuits surveyed step by step. Non-mathematical and fully illustrated. Present edition contains information on the latest methods of providing E.H.T. for receivers.

Television Licences

Owners of television receiving sets are reminded that a special comprehensive licence costing £2 covering both sound and television programmes is required immediately a television set is installed (*not* merely when the old £1 licence expires). A rebate will be allowed at the rate of 1s. 8d. for each month of the unexpired portion of the 20/– sound licence, and can be claimed and collected at any Head Post Office.

Deptford Men's Institute

The Principal, Deptford Men's Institute, Childeric Road School, New Cross, London, S.E.14, is anxious to start evening classes in Amateur Radio theory. He would like to hear from any member willing to assist and also from prospective students.

Stray

Mr. C. H. L. Edwards, G8TL, 10 Chepstow Crescent, Newbury Park, Ilford, Essex, wishes to contact the member with whom he discussed the use of a CV66 grounded grid triode in the RF27 unit at the recent Manchester O.R.M.

Silent Keys

We record with deep regret the passing of Mr. Raymond Waite, G3PZ, of Cheltenham, Gloucestershire, and Mr. R. Howarth, BRS4609, of Ashton-u-Lyne.

* * *

The death of Raymond Waite, G3PZ, will leave a gap in the ranks of Amateur Radio which will take a long time to fill. His unflagging enthusiasm for the movement, and his never-failing co-operation will always be remembered, not only in his own immediate circle but in a much wider sphere. It is singularly unfortunate that his election as County Representative came too late for him to put his willing help at the disposal of Gloucestershire members. We who knew him intimately realise only too well that we have lost a fine technician, a true " ham " and a wonderful friend. Our deepest sympathies are extended to his widow, daughter and infant son. At the funeral which took place at Golders Green Crematorium, London, Headquarters was represented by Mr. J. P. Hawker, G3VA. Messrs. E. A. Perkins, G3MA, H. F. O'Brien, G3LP, and A. Barber, G5WA, represented local members. G3MA.

* * *

Mr. Howarth was a very willing helper in all spheres of Amateur Radio and was particularly generous with financial assistance to the Ashton-u-Lyne Radio Club.

FORTHCOMING EVENTS

REGION 1

Accrington.—December 8, 7.30 p.m., Cambridge Street Schools.
Ashton-under-Lyne.—December 5, 3 p.m., New Jerusalem Schools, Katherine Street.
Bolton.—December 7, 8 p.m., Y.M.C.A.
Burnley.—December 1, 7.30 p.m., Mechanics Institute, Manchester Road.
Bury.—November 18, 25, December 2, 16, 7.30 p.m., Club Rooms, Spring Mills, Tottington. December 9, 7.30 p.m., Atheneum, Market Street.
Carlisle.—November 19, December 3, 17, Trades Hall, Scotch Street.
Darwen and Blackburn.—November 26, Business Meeting. December 10, Lecture, 7.30 p.m. Weaver's Institute, Darwen.
Manchester.—December 6, 6.30 p.m., Reynold's Hall, College of Technology, Sackville Street.
Oldham.—November 27, December 1, 15, 7.30 p.m., Civic Centre, Clegg Street.
Rochdale.—December 5, 3 p.m., Drill Hall, Baron Street.
Whitehaven.—November 20, 6.30 p.m., Kell's Miners' Welfare Institute.

REGION 2

Bradford.—November 30, December 14, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Doncaster.—Wednesdays, 7.30 p.m., 73 Hexthorpe Road.
Harrogate.—Wednesdays, 7.30 p.m., rear of 31 Park Parade.
Hull.—November 24, 7.30 p.m., Imperial Hotel, Paragon Street.
Middlesbrough.—November 22, December 6, 7.30 p.m., 400 Linthorpe Road.
Sheffield.—November 24, 8 p.m., Dog and Partridge, Trippit Lane. December 8, 8 p.m., Albreda Works, Lydgate Lane.
Spenborough.—November 24, 7.30 p.m., Temperance Hall, Cleckheaton.
York.—Wednesdays, 8 p.m., 29 Victor Street.

REGION 3

South Birmingham.—November 7, December 5, 10.30 a.m., at Stirchley Institute.

REGION 5

Cambridge.—November 26, 7.30 p.m., at the Jolly Waterman, Chesterton Road.
Southend-on-Sea.—November 24, 7.45 p.m., at G3CQL, 29 Station Road, Leigh-on-Sea.

REGION 6

Bedfordshire County Meeting.—December 12, 2.30 p.m., Golden Grill, Castle Street, Luton. Tea.

REGION 7

London.—November 26, 6.30 p.m., at the Institution of Electrical Engineers, W.C.2. "Equipment for the 144 Mc/s. Band," by E. A. Dedman, G2NH.
Barnes and Putney.—December 14, 7.30 p.m., at 28 Nassau Road, S.W.13.
East London.—November 21, 2.30 p.m., Lambourne Room, Ilford Town Hall. "Fun and Games." G2CD. December 19, "A.G.M." "Measuring Instruments," P. Woodhouse, G2BQY.
Edgware and District R.S.—November 17, 24, December 1, 8, 15, 22, St. Michael's School, Flower Lane, Mill Hill.
Enfield.—November 21, December 19, 3 p.m., George Spicer School, Southbury Road.
Hampstead.—November 19, 8 p.m., 14B Belsize Lane, N.W.3. Station, Belsize Park.
Holloway (Grafton Radio).—Every Monday, Wednesday and Friday, 7.30 p.m., Grafton School, Eburne Road. N.7 (Nr. Nag's Head).
Hoddesdon.—December 2, 8 p.m., "Salisbury Arms" Hotel.
Peckham.—December 6, 7.30 p.m., at The Kentish Drover, Rye Lane.
Southgate.—December 3, 7.30 p.m., The Merry Hills Hotel (Oakwood Station).
St. Albans.—December 8, 8 p.m., at The Beehive, London Road.
Welwyn Garden City.—First Tuesday every month, 8 p.m., at Council Offices.

REGION 8

Reading.—November 27, December 11, 6.30 p.m., at Palmer Hall, West Street.
Southampton.—December 4, 7.30 p.m., at 22 Anglesea Road, Shirley.

REGION 9

Bristol.—November 26, December 17, 7.30 p.m., Keens University Cafe, Park Row.
Exeter.—First Friday, 7 p.m., at Y.M.C.A., St. Davids Hill.
Plymouth.—Third Saturday, 7 p.m., at Tothill Community Centre, Tothill Park, Knighton Road, St. Judes.
Weston-super-Mare.—December 3, 7.30 p.m., Y.M.C.A., 2 Bristol Road.

REGION 13

Edinburgh.—November 25, 7.30 p.m., at Chamber of Commerce, 25 Charlotte Square.

REGION 14

Ayr.—November 24, 7.30 p.m., at Bantam Tea Rooms, Queen Street, Kilmarnock.
Glasgow.—November 24, 7 p.m., at Institute of Engineers and Shipbuilders, 39 Elmbank Crescent.

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