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VOL. XXIV **JUNE 1949** **No. 12**

THE EXPERIMENTAL TRADITION

THERE can be few members who have not been assailed at times by the doubt that as Amateur Radio becomes technically more and more complicated, so the old experimental zest will recede further and further into the background. This thought must certainly have occurred to many of the 75 Old Timers who met recently in London. During the last 20 or so years, they have witnessed the growth of the science and practice of radio communication almost beyond recognition and have, indeed, played a not inconsiderable part in that development.

What was important, in the early days, was an alert, observant mind, backed by some mechanical skill and unlimited patience. Possessed of such assets, an amateur could, in a matter of months, assimilate current ideas and practices and pass rapidly to the stage where he was able to contribute usefully to work of a genuine experimental nature. Much good work was accomplished by amateurs while in their teens and even—as in the case of one at least of our notable pioneers, Cecil Goyder, 2SZ—while still at school.

When in December, 1921, the Society drew up its historic petition to the P.M.G. requesting that experiments with wireless telephony should be permitted (the petition which led to the establishment of broadcasting in this country), the following paragraph was included:

"*It should be remembered that Wireless Telegraphy was in the first instance originated, and has since been largely developed, by men, who at any rate to begin with, were not even electrical engineers or electricians, and still less qualified telegraphists. New inventions and important improvements are still being made by this class of person, and the more numerous they are the more chance there is for good and useful work to be done. In this connection it is noteworthy that it is entirely due to amateurs that all records have quite recently been broken by the successful transmission and reception of signals across the Atlantic on* 200 *metre waves.*"

What is the position nowadays? Would such a claim be still valid, 28 years later? During and since the war millions of pounds have been poured into radio research establishments. Techniques have advanced so far that the experts themselves can only hope to specialise in some relatively small section of the field of electronics.

Does this mean that the experimental work of the amateur has become valueless? Or are there still opportunities for the average amateur who makes no claim to more than a moderate technical knowledge coupled with unbounded enthusiasm?

We believe, most emphatically, that the amateur can and will continue to play an important role in experimental research and development. Not only as a member of organisations such as the *Scientific Observation Groups* but also as an individual who refuses to be satisfied until he finds out just *why* a certain piece of equipment—receiver, transmitter or aerial—does not behave in the expected manner. The history of science provides many examples to prove that it is a new approach towards, or a fresh outlook upon, a subject rather than profound learning that leads to far-reaching discoveries. There are many unexplained gaps left in the science of radio. The new V.H.F. and U.H.F. bands, in particular, offer great possibilities for valuable experimental work with simple apparatus while, even on the lower frequencies, there is still plenty of scope for the improvement of equipment.

The amateur has also, in the course of the last 30 years, come to occupy a leading role in the *practical application* of new techniques, evolved in the laboratory, but in which the professional engineers have seen little commercial value until it has been underlined for them on the amateur bands. Crystal control for low power transmitters; highly selective communication receivers employing the crystal filter; rotary beams for communication work—such a list could be expanded almost indefinitely.

Despite its fine record of achievement, the Amateur Radio Movement cannot afford to rest upon its laurels; it must constantly seek new outlets for its experimental zeal. In this connection there must have been many important discoveries made during the war but which, in the urgency of the moment, were cast aside as unsuitable for the immediate purpose. The amateur, to-day, should be ready to search amongst the accumulated mass of scientific data for ideas which are capable of application to our problems. By refusing to be overawed by the complexity of modern radio, by turning a receptive ear towards new ideas and by encouraging those who —whether they are new or old hands at the game—have something fresh to say, so shall we all ensure that the experimental tradition of Amateur Radio is fully maintained.

J. P. H.

A STABLE VARIABLE FREQUENCY OSCILLATOR

CONVERSION OF TUNING UNIT, TYPE TU5B

By J. S. WATSON, B.Sc., A.R.I.C. (GM3BXQ)*

THE advantages of temperature-compensation in condensers and solid mechanical construction can be made available to the V.F.O.-constructor in the form of Government Surplus Tuning Unit, Type TU5B. By retaining the tuning condensers and coils, and by adding a small chassis to accommodate the valves, an excellent variable frequency oscillator, giving enough R.F. output to drive an 807, can be built.

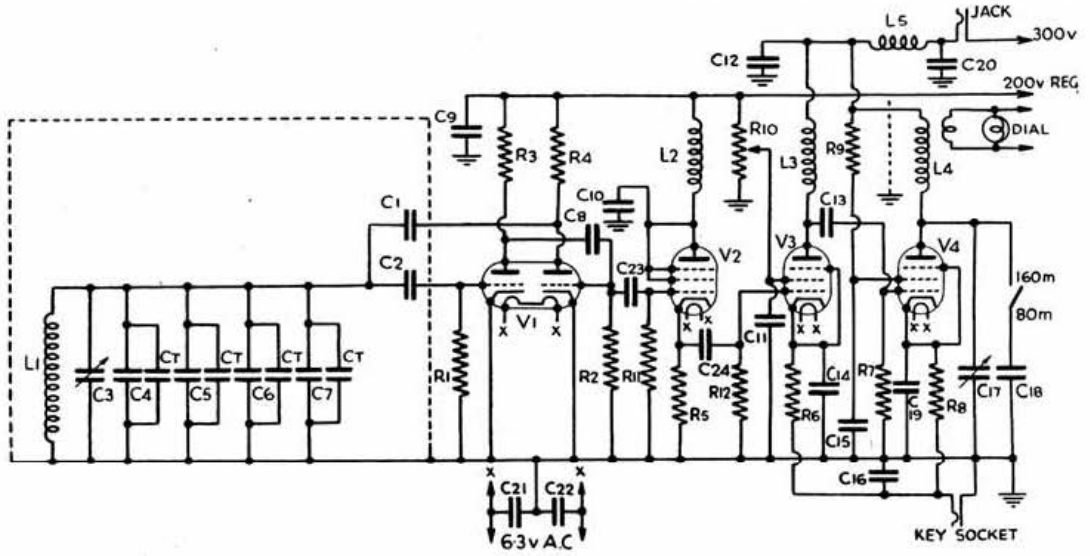

Fig. 1.
Circuit Diagram of Variable Frequency Oscillator.

C1, 2	Oscillator Coupling (See text.)		
C3	M.O. Tuning (Original TU5B or TU6B.)		
C4, 5, 6, 7	100 $\mu\mu$F. (Original in TU5B.)		
C8	50 $\mu\mu$F.	C9	2 μF, 250v. D.C.
C10, 11, 14, 15, 19, 20, 21, 22	0·01 μF 500v. D.C.		
C12	0·5 μF. 500v. D.C.		
C13	300 $\mu\mu$F.	C16	0·002 μF.
C17	P.A. Tuning (Original TU5B.)		
C18	200 $\mu\mu$F. C23 5 $\mu\mu$F.	C24	0·001 μF
CT	Temperature-compensated		

R1, 2, 11	1 Megohms 1 watt.	V1	6SN7.
R3, 4	47,000 ohms 3 watt.	V2, 3	EF50.
R5	2,200 ohms 1 watt.	V4	EL32.
R6	100 ohms 1 watt.		
R7	47,000 ohms 1 watt.		
R8	1,200 ohms 5 watt.		
R9	10,000 ohms 2 watt.		
R10	200,000 ohms potentiometer.	L1	M.O.
		L2, 3, 5	R.F. Chokes.
R12	100,000 ohms 1 watt.	L4	P.A.

Circuit

The basis of the V.F.O. is a Franklin oscillator working on 1·75 Mc/s., using a 6SN7 valve. A Franklin was chosen because it is least affected by external conditions such as might occur if the oscillator valve was changed. The output is fed through two EF50 buffer stages. The first EF50 is triode connected and acts as a cathode follower, the second being an untuned amplifier. In the V.F.O. as originally designed, both these stages were untuned amplifiers but it was found that, on keying, there was a change in the oscillator frequency of about 100 cycles at 3·5 Mc/s. This change was instantaneous so that it was not noticed at the receiving station. However, it was thought that an improvement was desirable and this has been accomplished by the use of the cathode follower stage which effectively isolates the Master Oscillator. The final stage of the unit is an EL32 which acts as a power amplifier on 1·75 Mc/s. and as a doubler for 3·5 Mc/s. This valve was used because it happened to be available, but there is, of course, no reason why a 6V6 or similar type should not be used instead. The output is taken *via* 80 ohm concentric cable to the transmitter and provides enough power to drive an 807 valve fully. The oscillator is allowed to run continuously during operation, thus obviating any tendency to produce chirps on keying. The second buffer and the P.A. stage are keyed in their cathode circuits. The high tension for the oscillator and cathode follower is fed from a voltage-regulated power pack at 200 volts, the other valves have a supply of 300 volts from the same power unit but unregulated. The circuit is shown in Fig. 1.

Construction

The TU5B† unit is first stripped of all parts with the exception of the M.O. tuning condensers and inductance and the P.A. tuning condenser. The

* 49 *Barrhill Road, Cumnock, Ayrshire.*

† *The writer's unit is made entirely from a TU5B with the exception of the M.O. tuning condenser which is taken from a TU6B. This has smaller capacity and gives greater bandspread. However, there is no reason why the original condenser should not be retained.*

P.A. inductance is placed under the P.A. tuning condenser, its coupling coil first having been removed. In the space left in the P.A. compartment is fitted a small chassis (Fig. 2) on which the four valves are mounted. In order to fit this chassis it is necessary to remove the centre screen of the TU5B temporarily and to replace it after the chassis has been inserted in approximately the correct position. The valve holder for the EL32 is sunk about 1in. under the chassis, since this valve is larger than the others and would otherwise foul the top of the compartment. This, incidentally, assists screening. All the temperature-compensated condensers are connected in parallel across the M.O. tuning condenser and it was found in the writer's case that a slight adjustment of the tuning inductance brought the frequency within the desired range. As the oscillator is a Franklin, two small condensers are required in order to couple the tuned circuit to the oscillator valve. Neutralising condensers of a few micro-microfarads would be suitable here, but as these were not at hand the condensers were fabricated from 20 gauge aluminium sheet by making two squares of about 1 in. × 1 in. and spacing

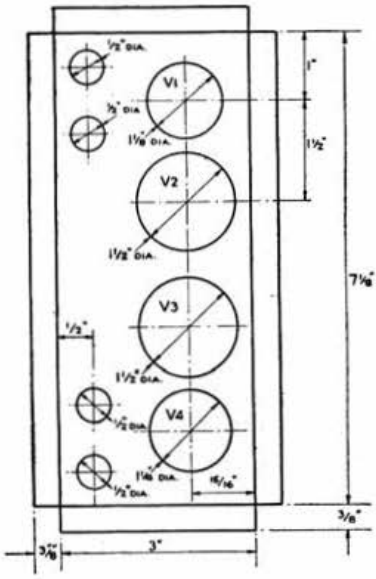

Fig. 2. Diagram of small chassis required to mount the valves.

them about 1/10 in. apart. The output from the tank coil is taken from three turns of insulated wire round the coil to a coaxial socket and across this is connected a dial light which glows when the P.A. is tuned to resonance.

Adjustment and Calibration

The procedure for the correct adjustment of the unit is as follows :—If the small coupling condensers C1 and C2 are large enough, oscillation should commence immediately, and these capacities should then be reduced to the minimum consistent with stable oscillation. The capacity should be about 1–2 μμF. It will then be necessary to bring the oscillator frequency within the desired range and to do this it may be necessary to tap down the M.O. inductance. Fine adjustment is obtained by altering the position of the copper loop inside the M.O. inductance. Final adjustment of frequency should be done with all covers on the unit.

When the key is pressed and the P.A. tuned to resonance the dial light should glow, the potentiometer on the screen of the second buffer being adjusted if necessary. When the unit is coupled to the transmitter the bulb will decrease in brilliance, and, for greater output it may be disconnected. However, the bulb consumes very little power and provides a ready check on the performance.

The high tension consumption is as follows :—

	Key up.	Key down.
200 volts, regulated ..	6·0mA.	8·5mA.
300 volts, unregulated ..	0 mA.	30·0mA.

The unit was calibrated from a 100 kc/s. substandard crystal which was itself adjusted to zero beat against the carrier of the 200 kc/s. B.B.C. Droitwich transmitter. By means of a 10 kc/s. multivibrator it has been possible to obtain calibration every 10 kc/s.

Performance

The special points to be noted with this V.F.O. are as follows :—

(1) *Bandspread.* The tuning dial consists of 25 divisions and each of these is further subdivided into 100 parts, so that for the 3·5 Mc/s. band, where the total capacity covers from 3·5 Mc/s. to 3·75 Mc/s., each division becomes approximately equal to 100 c/s. The unit can thus be tuned to beat within a few cycles of a crystal on 3·5 Mc/s.

(2) *Frequency Stability.* As the unit is fitted with temperature-compensated condensers and as a Franklin oscillator is used, frequency drift is negligible, certainly not more than 50 cycles per hour. The V.F.O. is ready for operation within a few minutes of switching on.

Keying produces a very small change in frequency —about 5 cycles at 3·5 Mc/s. Tuning the output stage of the unit also produces a very small change but the later stages of the transmitter have no noticeable effect whatever. Since the oscillator is allowed to run continuously, clicks and chirps are eliminated. Changing the 6SN7 oscillator valve produced a change in frequency of about 200 cycles at 3·5 Mc/s.

(3) *Reception of weak signals.* The output of the oscillator when the key is up is so small that it does not interfere with the reception of weak signals, and this also makes " break-in " operation possible. In fact, if it is desired to beat the V.F.O. against an incoming signal, a wire has to be led from the receiver into the unit.

The unit has been used on the 3·5 Mc/s. and 7 Mc/s. bands, and all reports have been T9 or T9X. Many very good reports have also been received on the stability of the unit and on its performance in general.

In conclusion it might be noted that all the parts in the original model came from ex-Government surplus and the entire unit, excluding power supplies, costs only about £2 to build.

CLAPP—OR COLPITTS?

By A. G. DUNN, G3PL.

MANY versions of the Clapp oscillator have been published in recent months, but it is evident that the main difference between the Clapp and the Colpitts has escaped the attention of the designers of some of these so-called Clapp circuits. The majority are found on close inspection to be little, if at all, better than the original Colpitts circuit and the only reason they give quite good results is because the Colpitts electron-coupled circuit has advantages of its own, quite apart from the Clapp principle. This article is an attempt to point out the essential difference between the Clapp and the Colpitts circuits.

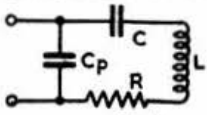

Fig. 1.
Equivalent circuit of quartz crystal.

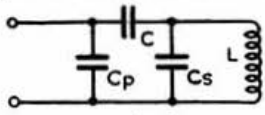

Fig. 2.
Crystal substitute circuit.

A quartz crystal has very high frequency stability, and it is instructive to enquire the reason for this. The crystal behaves like a circuit of the kind shown in Fig. 1, where L, C and R are electrical equivalents of the mechanical properties of the quartz itself; C_p is the capacity of the crystal holder, together with any other stray capacities which may be present in the circuit to which the crystal is connected. It is evident that the circuit will resonate at a frequency determined by the value of L, and the effective capacity across it. This is made up of C, in series with C_p.

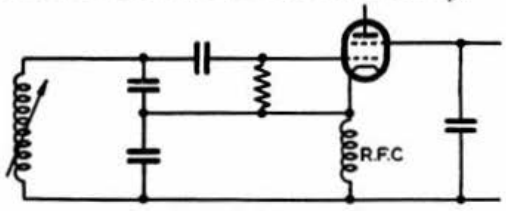

Fig. 3.
Colpitts electron coupled oscillator.

The value of C, is, however, very small indeed, being of the order of 0·01 μμF, and L is correspondingly large, of the order of one Henry. This means that the very tiny amount of coupling between the external circuit and L, due to C, will not allow changes in the capacity of the external circuit to cause much alteration of the resonant frequency of the crystal. An increase of 100 per cent. in the external capacity will cause a decrease of less than 0·1 per cent. in the resonant frequency in a typical case. Let us see whether it is possible to construct a stable tuned circuit, using this principle, from ordinary components.

A Real Crystal Substitute

The chief obstacle to the realisation of an exact working model of a crystal is the existence of stray capacities across the inductance L (see Fig. 2). In the crystal these do not exist, so that the capacity across L cannot be greater than C, which is very tiny. In the substitute circuit of Fig. 2, although we might conceivably keep the value of C as low as 0·01 μμF, the self capacitance of a coil with an inductance of about one Henry, would inevitably be many micro-microfarads, which would lower the resonant frequency very considerably. The practical size of L is therefore reduced greatly by the effect of C_s, for a given resonant frequency. We cannot hope, therefore, to obtain anything like the L/C ratio and the Q of a crystal.

It is interesting to note that in the crystal, the losses represented by R are also rather large, so that the Q of the crystal, although better than that of a normal tuned circuit, is nothing like so much better as one would assume from the very large value of L. A typical value of Q is 1,000, which is only about four times better than can be obtained with a coil and condenser.

Accepting the limitations caused by C_s, and keeping the latter small, it is possible to obtain very high stability from this crystal substitute circuit. C cannot be made as small as in the actual crystal,

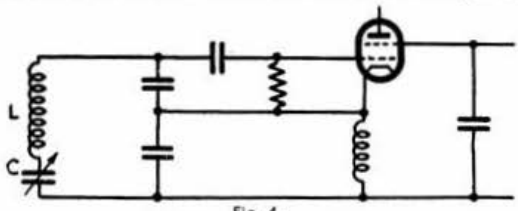

Fig. 4.
Basic Clapp oscillator circuit.

because of the impedance step-down caused by C and C_p. The dynamic resistance of the crystal is very high and, even with the step-down due to the capacitances C and C_p, the impedance across the crystal holder terminals is still quite high. In the substitute circuit, L has been very much reduced by the effect of C_s, with a consequent reduction in the dynamic impedance of the circuit. C must therefore be increased to reduce the impedance step-down. A reasonably high impedance is necessary in the tuned circuit of an oscillator so that sufficient R.F. voltage can be developed across it by the valve to maintain oscillation.

C should be of the same order of size as C_s, but its size in any particular case depends on the ease with which oscillation is obtained. It should obviously be as small as possible consistent with this to maintain frequency stability.

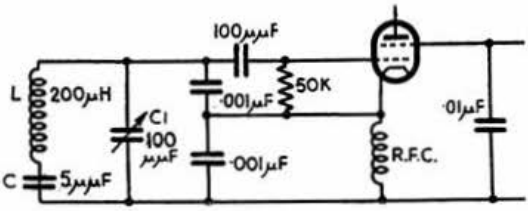

Fig. 5.
Clapp V.F.O. for 3·5 Mc/s.
Bandspread about 100 kc/s. if C_s is approx. 5 μμF.

The Clapp Oscillator

The Clapp oscillator is nothing more than a "crystal substitute" circuit used in place of a plain inductance in a Colpitts circuit. A version of the latter was used in some types of Service equipment of the late war, with variable inductance tuning, as shown

in Fig. 3. The basic Clapp circuit, as usually shown, (Fig. 4) uses the same capacitive tap method of obtaining feedback. L and C are the crystal substitute circuit. C is often shown as a variable condenser for tuning purposes, but this is not by any means essential. The value of C has been given as 400 or 500 $\mu\mu$F in some published circuits, but this is clearly quite wrong. The isolating effect is negligible and the circuit is not really a Clapp circuit at all, but the original Colpitts. The whole point of the circuit has been missed. In particular, tapping extra capacity across L, for bandspreading or any other purpose, has a detrimental effect on frequency stability, for it means reducing L still further to tune to a given frequency.

The true Clapp circuit, as shown in Fig. 5, has adequate bandspread without the need for the expedients recommended by some writers. The values of L and C are provisional only, since that of L depends to a great extent on its own self-capacity, and C depends on other factors already discussed, but the values given are a good starting point. It should be noted that L is of a value more usually associated with medium wave circuits, and is some twenty times as large as values commonly used in V.F.O. circuits for 3·5 Mc/s.

The writer did some experiments during the war with the "crystal substitute" circuit and this is one reason why he is keenly interested in the correct use of the Clapp.

BIRMINGHAM CONFERENCE

THE IMPERIAL HOTEL, Birmingham, was the venue on Saturday, April 23, 1949, for a Conference between members of the Council and the Regional Representatives. The primary purpose of the Conference was to examine the system of representation and if changes were thought to be desirable to put forward recommendations for the consideration of the Council.

After receiving a report from the General Secretary on the working of the present scheme, each Representative was invited to express his views on the subject. A number of recommendations were subsequently adopted by the Representatives and these are now being examined by the Council.

It was made clear during the Conference that the present system of representation is in general satisfactory, but most of the R.R.'s consider that nominations submitted on behalf of a Town or Area Representative, should in future be supported by five, instead of—as at present—two Corporate members resident in the Town or Area concerned.

The Conference also discussed the relationship between the Society and its Affiliated Societies. After careful consideration of the problem it was agreed to record that, in the view of the Delegates present, no serious difficulties appear to exist at the present time as between the R.S.G.B. and its Affiliated Societies.

During the Conference each Representative submitted a report dealing with subjects of local and national interest. These included Regional Grouping, Regional Notes, Headquarters' Station, National Field Day, R.S.G.B. BULLETIN, Membership Records, Field Man.

A copy of the Report of the Conference, which occupies 21 foolscap pages, has been forwarded to each R.R.

Attendance

The following were present at the Conference.

BIRMINGHAM CONFERENCE—APRIL 23, 1949

Seated left to right: P. A. Thorogood, G4KD, W. A. Scarr, M.A., G2WS, John Clarricoats, G6CL, V. M. Desmond, G5VM, Miss May Gadsden, J. W. Mathews, G6LL. *Standing left to right:* W. P. Cargill, G5LR (R.R. No. 8), J. Douglas, GM2CAS (R.R. No. 12), A. P. G. Amos, G3AGM (R.R. No. 6), A. A. Uppington, G2BAR (R.R. No. 9), A. Dyer, GW8UH (R.R. No. 10), D. A. G. Edwards, G3DO (R.R. No. 3), I. D. Auchterlonie, G6OM, G. Webster, G5GK (R.R. No. 1), W. N. Craig, G6JJ (representing Region 7), S. J. Granfield, G5BQ (R.R. No. 5), J. P. Hawker, G3VA, C. Sharp, G6KU (R.R. No. 2), S. N. Johnson, G15SJ (R.R. No. 15), F. Southworth, GW2CCU (R.R. No. 11), W. H. Allen, M.B.E., G2UJ, A. H. Mason, GM6MS (representing Region 14). Photograph taken by A. O. Milne, G2MI

The President (Mr. V. M. Desmond, in the Chair), Messrs. W. H. Allen, I. D. Auchterlonie, J. W. Mathews, A. O. Milne, W. A. Scarr, and P. A. Thorogood (Members of Council). Messrs. G. Webster, C. A. Sharp, D. A. G. Edwards, S. Granfield, A. P. G. Amos, W. N. Craig (representing H. T. McFarlane), W. P. Cargill, A. A. Uppington, D. A. Dyer, F. G. Southworth, J. Douglas, A. H. Mason (representing D. Macadie), and S. N. Johnson (Regional Representatives), Mr. John Clarricoats, Miss A. M. Gadsden and Mr. J. P. Hawker (Headquarters).

Regions 4 and 13 were not represented.

VALVE TESTING METHODS

By H. R. SINGH, D.F.H., Grad.I.E.E. (B.R.S. 6889)

RADIO valve checking is an inherent part of any receiver servicing, particularly when high efficiency circuits are in use and faulty valve operation, loss of efficiency (due to age), or inter-electrode defects, can completely upset the performance of a receiver. This article is intended to provide a survey of the principle of operation of commercial Valve Testers or "Tube Analysers."

Mutual Conductance Test

It is generally agreed that the electronic emission test is applicable to rectifier valves and the mutual conductance test to any valve fitted with a control grid. The amplifying property of a valve depends upon the total change in anode current for a given change in grid voltage, and by comparing these two values a "figure of merit" is obtained. This is known as the "mutual conductance" and is represented by the symbol g_m. The plate impedance (R_a) and the amplification factor (μ) are also important factors, but since $\mu = R_a \times g_m$, it follows that any change in either is bound to affect the mutual conductance. It will be seen that if the latter is found to be normal, the other two factors are also normal, and so these need not be tested separately.

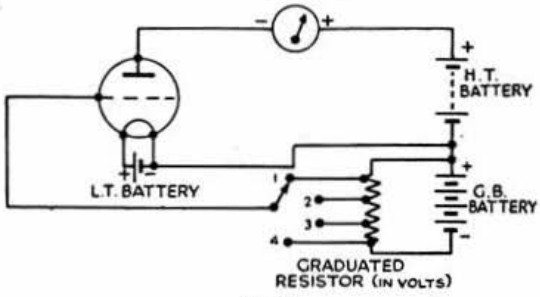

Fig. 1.
Mutual Conductance Test Circuit.

As however the mutual conductance (or emission) test is not always conclusive, additional tests are often required. For example it may be necessary to test for short-circuits between electrodes, or, in the case of indirectly heated valves, to test the insulation between cathode and heater. It is also necessary to be able to test the gaseous content of the evacuated envelope. Most good analysers permit all these tests to be made quite easily and effectively.

A valve is operated under suitable conditions, and, at a certain grid bias, the anode current is noted. The grid bias is then changed by one volt, and the current again noted. The difference in the currents gives directly the mutual conductance (g_m) in mA/V.

Suppose the first reading at zero grid bias is 15 mA with the switch set to position 1 (Fig. 1), then with one volt negative bias, *i.e.* with the switch set to position 2, the current is 12·5 mA.

$g_m = 15 - 12{\cdot}5 = 2{\cdot}5$ mA/V.

Obviously each time a valve is tested a mathematical calculation must be made. This is particularly the case where a unit volt-shift in the bias is not possible. The process therefore becomes monotonous as well as lengthy. In order to make the instrument more flexible and direct reading, the original meter current is usually neutralised by passing a current through it in the reverse direction, This procedure is known as "bucking the meter" and the current as the "bucking current." With the meter current thus neutralised the grid voltage could be reduced by one volt, and the increase in the anode current as shown in the meter, would be the mutual conductance.

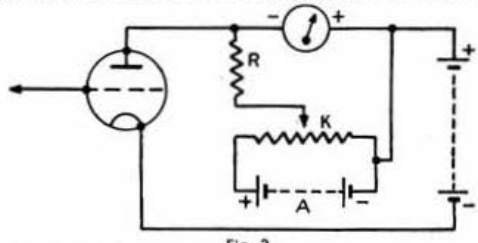

Fig. 2.
In the "bucking" system the original meter current is neutralised by passing a current through the meter winding in the reverse direction.

The "Bucking" System

The bucking system seen in Fig. 2 consists of a small battery A together with the potentiometer K. It should be observed that the negative end of the combination is connected to the positive side of the meter. The resistance R prevents the meter carrying the original anode current, being short circuited when the potentiometer slider is in the extreme right position.

Commercially designed analysers invariably employ raw A.C. potentials to anodes, screen grids and filaments or heaters, and as a result the principle of operation is somewhat different to that already discussed. The primary object in so designing analysers is to make them less bulky and avoid the cost of elaborate D.C. power-packs.

The theory of operation is as follows :—

The valve V in Fig. 3 is made, in the first instance, to act as a half-wave rectifier and the D.C. moving-coil meter in the cathode circuit records the average rectified direct current at each half cycle. The cathode current is made to pass through R_1 and R_2 and the grid is made negative by being connected through switch K to a point as shown. The full bias voltage is that which is developed across both R_1 and R_2. Winding "a" of the mains transformer supplies the correct anode voltage. The meter current is now "bucked" to zero. The bucking voltage is supplied by the winding "b" in series with a metal rectifier

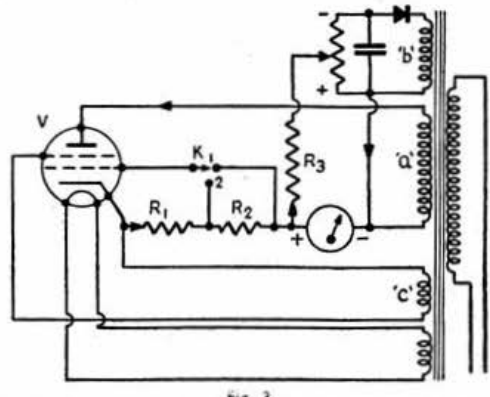

Fig. 3.
Circuit of a commercial type valve tester employing mains supply equipment.

and filter condenser. The mutual conductance key K is depressed to make contact with fixed arm 2 and part of the bias voltage is nullified. The increase in anode current (which is read directly on the meter) gives the g_m of the valve.

It should be noted that manufacturers do not necessarily allow for the grid voltage to be shifted by

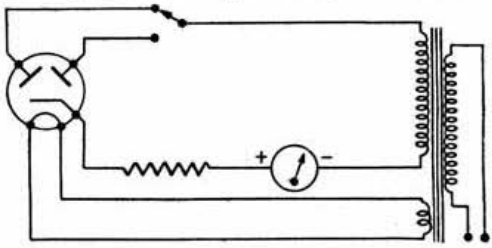

Fig. 4.
Valve emission test circuit.

exactly one volt, as might at first seem necessary. They merely allow for neutralising a safe part of the bias, and the increase in anode current is taken for the g_m. In such cases the figure quoted is in mA and not in mA/V. If the mutual conductance alters, the increase in anode current will also alter for the known bias that is neutralised.

Suppose a valve has a correct g_m of 5mA/V, then the correct increase in anode current for a 2 volt alteration in bias will be $5 \times 2 = 10$ mA and the meter will show full scale for 10 mA. If now the g_m has altered to $2 \cdot 5$ mA/V, then the increase in anode current will be $2 \cdot 5 \times 2 = 5$ mA for the same variation of grid volts. Thus, the meter will indicate half scale, *i.e.* a g_m drop of 50 per cent. and a similar result is obtained for all intermediate values. It should also be noted that the screen-grid current is not made to pass through R_1 and R_2. Winding " c," which supplies the screen potential, is connected directly to the screen grid and cathode.

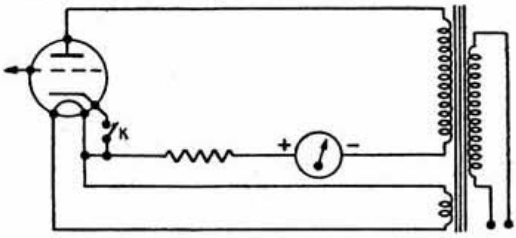

Fig. 5.
Circuit for checking cathode leakage.

Emission Test

Non-amplifying valves are the only types subjected to this test, in fact it is the only test that they *can* be subjected to in order to determine their state of efficiency. Power rectifiers, diodes and double-diodes fall into this class.

In practice a small A.C. voltage of between 60 and 100 volts is impressed on each diode section in turn and the average rectified direct current is measured in the meter. The emission of each diode section of double-diode valves should be about equal if the valve is in good order (See Fig. 4).

Cathode Leakage

In this test the valve is made to rectify as usual and the rectified direct current is noted in the meter. The cathode circuit is then broken by the switch K and the deflection in the meter noted (Fig. 5). If there is any leakage between the cathode and heater then the leakage current will be recorded by the meter, the magnitude of the deflection being directly proportional to the leakage current. It is usual to calibrate the meter in terms of leakage resistance rather than in current, the values being given generally in megohms. It should be observed that one end of the filament transformer winding is connected to the cathode circuit so as to make the leakage path possible when K is open.

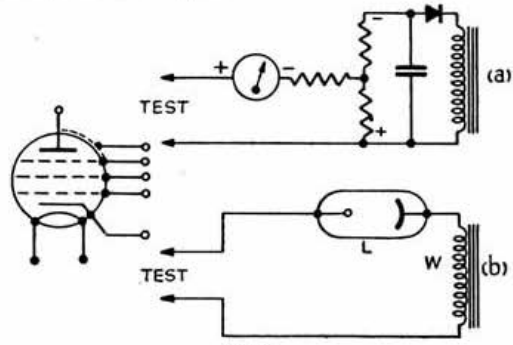

Fig. 6.
Circuits for ascertaining that electrodes are not short-circuited.

Inter-electrode Short Circuit Test

Tests for inter-electrode short circuits and filament or heater continuity are made by one of the two arrangements shown in Fig. 6.

In Fig. 6(a), a small rectified D.C. voltage of the order of 3 volts (obtained from a winding on the mains transformer and a metal rectifier and filter condenser) is impressed across a potential divider, and approximately one volt is tapped off and connected to any two electrodes of the valve in series with the meter. If there is a short circuit the meter circuit is completed and a reading obtained.

In Fig. 6(b), a neon indicator lamp L is connected in series with a winding W and any two electrodes. In the case of a short circuit the neon circuit is completed and the lamp begins to glow.

Gas Test

The presence of gas in a valve gives rise to such faults as weak signals, distortion and broad tuning in radio frequency stage. As this is often difficult to locate it is useful to be able to test for its presence.

Bombardment of the gas particles with high velocity electrons causes the gas to ionise and gives rise to grid current, which flows in the external circuit either from cathode to grid or *vice-versâ*, the direction of the flow depending upon various factors. In either case a voltage is developed across resistor R_3 (Fig. 7) which acts with or against the bias voltage developed across R_1. This in turn alters the initial anode current shown in the meter. Thus if the switch S is depressed and released several times, the voltage across R_3 will be made to vary, giving rise to a varying anode current. For very slight variations of current the gas content of the valve may be assumed to be negligible.

In this test it is usual to run the valve at high

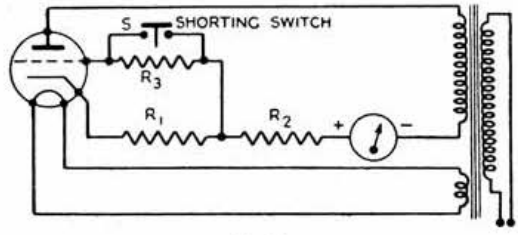

Fig. 7.
Circuit for testing for the presence of gas in a valve.

anode and screen potentials and at a low bias, so that it will have a fairly high emission. The high emission rate helps to bring about ionisation, and in addition the low bias helps to show up small voltage variations across R_3. If the bias voltage had been high, small voltage variations developed across R_3, either added to or taken away from the bias, would not cause appreciable anode current fluctuations.

It will be appreciated that in this article no complete design has been considered nor any particular manufacturer's system described. The object has rather been to detail the method of operation of the various sections of any commercial valve tester or "Vacuum Tube Analyser."

R1132A Receiver

MANY amateurs, in their search for a receiver for the 144 Mc/s. band, have been attracted by the ex-R.A.F. receiver type R1132A. Originally designed to cover 100–124 Mc/s., this 10-valve superhet appears, at first glance, to be readily convertible, with only a slight alteration to the R.F. coils, into an efficient 2-metre receiver.

Mr. J. M. Reid, G2FKP, suggests, however, that unless the entire R.F. sub-assembly is rebuilt, results are likely to prove disappointing. He points out that the valves used in the original R.F. section—VR65 R.F. amplifier, VR65 mixer and VR66 oscillator—are rated for a maximum frequency of 100 Mc/s. Losses at 144 Mc/s. are sufficient to cause erratic performance and difficulty may be experienced in making the VR66 oscillate smoothly. This particular difficulty could be overcome by tuning the oscillator to a sub-harmonic but nevertheless the comparative inefficiency of the R.F. and mixer valves would remain a problem. The changing of the coils to resonate at the higher frequencies also presents some difficulty since the proportion of "lead" inductance to coil inductance increases so considerably as to limit the maximum efficient working frequency.

The points raised by G2FKP emphasise the fact that when attempting to modify ex-Government equipment for amateur use, far better results can usually be obtained by converting apparatus to slightly lower rather than to higher frequencies unless extensive re-building is contemplated.

Type 26 R.F. Unit

MR. STANLEY W. RILEY (B.R.S.15049), author of the article describing the conversion of a Type 26 R.F. Unit for 28 Mc/s. reception, published in the May issue of the BULLETIN, has now suggested the following additional modifications to obtain improved results.

(1) To increase gain, the 10,000 ohms resistor across the output transformer should be removed. The slug of this transformer must then be carefully re-tuned for peak background noise.

(2) When used with a ½ wave dipole, the aerial input transformer should be removed and the leads from the co-axial input socket taken to a new 2-turn link wound on L1.

(3) A slight decrease in noise level can often be effected by injecting the oscillator output to the screen grid instead of to the grid of the mixer stage.

(4) Where additional R.F. amplification is required, a second unit consisting of another R.F. 26 or a modified R.F. 24 may be placed in front of the converter. This scheme is particularly effective for long-distance television reception.

TECHNICAL ARTICLES WANTED

Broadcasting in the 7 Mc/s. Amateur Band

THE Council of the Society has drawn the attention of the G.P.O. to statements published in the National Press to the effect that the B.B.C. are now using a frequency of 7120 kc/s. for a service in Russian. This frequency falls within a band allocated exclusively to radio amateurs by the Cairo I.T.U. Conference.

The Council is aware that during the immediate post-war period it was necessary for the B.B.C. to continue to use certain frequencies within exclusive amateur bands, but the revival of this practice, now that conditions are more normal, constitutes, in the view of the Council, a grave breach of international agreement.

The Council has pointed out to the G.P.O. that while a single broadcasting station may occupy a reasonably small band-width, its presence may well provoke counter-measures which occupy a far larger band-width than the broadcast transmission. Observations made recently show that a considerable portion of the exclusive 7 Mc/s. amateur band is being rendered useless for amateur purposes through attempts to obliterate the B.B.C. transmissions. The Council fear that the continued operation of this B.B.C. service may lead to the intrusion into the amateur bands of other unauthorised broadcast stations.

Up to the time this issue closed for press (June 8) the G.P.O. had not replied to the Society's letter written on May 13, 1949.

Log Entries

TO avoid any misunderstanding that may arise in interpreting the conditions in the licence which refer to log entries, the G.P.O. Radio Branch has drawn up a list of the points which should be watched. These are as follows :—

(*a*) A record must be kept of the date, time, frequency and type of emission of every call made from the station, whether answered or not.

(*b*) The time of beginning and ending a QSO must be entered, always bearing in mind that the period of actual sending does not exceed 10 consecutive minutes. (See Condition 5.) (The calling period is covered in Condition 10.)

(*c*) The log book must not be loose-leaf and the entries should be legible with no gaps left between them. The entries should be made in the log book at the time, or immediately following the end, of the call or QSO.

There is no objection to the entry of additional information by the amateur concerned, to suit his individual requirements, as it all helps to make a comprehensive record of the activities of the station.

Slúshayte!

According to a recent press statement, the number of letters received by the B.B.C. from Russian listeners were as follows :

1947...	200
1948...	11
1949 (to date)	0

From these figures it would appear that G2MI was over-generous when he made his estimate of one S.W. broadcast listener per radiated kilowatt.

Govorit London

THE SECOND OLD TIMERS' DINNER

THE Second Old Timers' Dinner held at The Horse Shoe Hotel, Tottenham Court Road, London, W.C.1, on Friday, May 20, 1949 (Gerald Marcuse, G2NM, presiding), was organised jointly by Austin Forsyth, O.B.E., G6FO, Editor of *The Short Wave Magazine*, representing the British Old Timers' Club, and John Clarricoats, G6CL, representing the Radio Society of Great Britain. The Dinner was made the occasion of the first meeting of the B.O.T.C., which now has a membership of more than 150.

Whilst old friendships were being renewed and fresh contacts established, a collection of souvenirs—many dating back to before the first World War—were examined with interest and some amusement.

During dinner numerous informal toasts were offered and responded to with enthusiasm. It was noticed that nearly half the company rose to such toasts as "The 1,000 Metre Days," "Participators in the Original Trans-Atlantic Tests" and "Service in the 1914–18 War."

Although the qualification for attendance at this function was the possession of a full licence in both December, 1928, and December, 1948, it appeared that the majority of those present had been licensed for well over 25 years.

Solo Toast

The solitary formal toast—that to "Amateur Radio"—was neatly proposed by Charles Harris, VE6HM, of Edmonton, Canada, who recalled that he had been present at one of the Pinoli Hamfests during his last visit to England 21 years ago. Mr. Harris extended greetings from Alex Reid (Canadian General Manager, A.R.R.L. Canadian Section).

In the course of an amusing reply Gerry Marcuse read pithy extracts from correspondence which had reached him during the Trans-Atlantic Tests and in the early days of Empire Broadcasting.

Ragchewing and "line shooting" kept the party going until 11 p.m.

Roll Call

The following were present: G2AD, AK, BZ, CN, CX, DX, FM, HP, HQ, LP, NH, NM, NO, NY, PC, QB, TP, UF, UV, VS, WD, WJ, G3HT, G4FX, KI, RD, RK, G5AR, BA, BC, BD, BV, BZ, CD, DT, GQ, GR, HG, KH, LJ, MA, ML, MM, QA, RS, RZ, VM, WP, G6CI, CJ, CL, CW, FI, FO, GR, HX, IO, JB, KK, LB, LL, LR, MN, NH, OT, OX, PA, PY, QB, QX, SC, SR, UT, WN, VE6HM.

For the record 34 of the 75 present attended the first Old Timers' Dinner at the Florence Restaurant, London, on January 22, 1938.

E. D. Ostermeyer, G5AR (Past President) left, and V. M. Desmond G5VM (President) right, with G6FO and G6CL.

Bevan Swift Memorial Fund

During the evening, as the result of an appeal by Mr. Clarricoats, the Bevan Swift Memorial Fund benefited to the extent of £72. To this figure has now been added a further £50 from an Old Timer who promised to donate that amount provided the rest of the company contributed a like or greater sum during the evening.

Photographs

Copies of all photographs taken during the Dinner may be obtained from Mr. F. G. S. Wise, Abbey House, 5 Victoria Street, London, S.W.1, price 4/- each (size 8¼in. × 6in.).

TOP TABLE

H. A. M. Clark, G6OT, E. D. Ostermeyer, G5AR, T. A. St. Johnson, G6UT, John Clarricoats, G6CL, Gerald Marcuse, G2NM, Austin Forsyth, G6FO, C. H. Harris, VE6HM.

The Liverpool Amateur Radio Exhibition

THE first large-scale Amateur Radio Exhibition ever held in the North-West was opened by Mr. James R. Spencer, General Manager of the *Liverpool Daily Post and Echo*, in the Crane Building, Liverpool at noon on May 2, 1949. Mr. Spencer spoke to the large crowd assembled in the Exhibition Hall from his office a quarter of a mile away, through the medium of the newspaper's radio van which was parked outside the hall.

In the course of introducing Mr. Spencer, Mr. John B. Rudkin G3CDW (Cheshire C.R.) speaking from the balcony in the Exhibition Hall, said that the Amateur Radio Movement was the greatest example of International Freemasonry that had ever existed in the history of the world. The unwritten laws of the Radio Amateurs' Code—the Ham Spirit—knew no bounds of race, religion, politics or social status.

The Amateur Radio Stand run jointly by the Wirral, Liverpool, Merseyside and Ellesmere Port Clubs.

The Exhibition, which was open until May 7, was organised jointly by the Wirral Amateur Radio Society, the Liverpool and District Short Wave Club, the Merseyside Radio Society and the Ellesmere Port Radio Club. A station was operated from the Exhibition with the call-sign G3BNO/A. Two transmitters were used—one on 160 and 80 metres (constructed by G2AMV) and another on 40 and 20 metres (constructed by members of the Liverpool and Merseyside Clubs). The receivers in use were a 15-valve communication receiver built by G2AMV and an HRO. Aerials were erected on the roof of the building, six stories high, by members of the Clubs taking part. Among the many interesting contacts made was one with VE2AIV operating in an aircraft proceeding from Prestwick to Iceland. The contact was made when the aircraft was approaching Iceland at a height of 10,000 feet.

General view of the Amateur Station, G3BNO/A, which operated throughout the period of the exhibition.

On the central stand, a number of interesting demonstrations were staged by the organising clubs, together with examples of equipment constructed by members and an intriguing "Museum" display, showing the development of equipment from the coherer to the magnetron.

Among the concerns who exhibited their products were *Denco, Labgear, Avo, Standard Telephones, B. I. Cables,* and *Carlton Coilwinding Company,* while the full range of "Eddystone" components and equipment was shown by *W. B. Radio* of Liverpool. The Liverpool City Police Radio Department displayed some typical V.H.F. mobile equipment and operated a typical mobile station from the Exhibition, keeping in touch with Police Headquarters by radio. The 22nd Corps Signal Regiment, T.A., displayed and demonstrated some typical Army Field Communications Equipment, including teleprinters, a telephone exchange, mobile wireless sets and a playback recorder.

As a mark of their appreciation of the value of the work of the Radio Amateur, *Crane and Sons Limited* generously lent their Liverpool piano and radio showrooms for use as an Exhibition Hall, whilst *Denco, B. I. Cables,* and *Lawrence's* of Liverpool donated gifts which were raffled among club members to help defray Exhibition Expenses.

During the week, the Exhibition received about 7,000 visitors including Mr. G. Webster G5GK (Regional Representative), Mr. I. D. Auchterlonie G6OM (Council Member), PA0NS, EI2W and EI3L.

Photographs

The Copyright of the photographs used to illustrate this article is vested in the Exhibition Executive Committee.

Reprints of these and other photographs taken at the Exhibition are available at 3/– (8½ in. × 6½ in.) and 1/9 (6½ in. × 4¾ in.) each. Orders should be sent to the Liverpool & District Short Wave Club, St. Barnabas Hall, Ferry Lane, Liverpool, 15.

The Porthcawl O.R.M.

The District 10 Official Regional Meeting held at the Esplanade Hotel, Porthcawl, South Wales, on May 22, 1949, was attended by fifty members. Headquarters was represented by Mr. W. A. Scarr, M.A., G2WS (Executive Vice President), Mr. W. H. Allen, M.B.E., G2UJ, Mr. John Clarricoats, G6CL (General Secretary), and Miss May Gadsden (Assistant Secretary).

During the business meeting presided over by the Regional Representative (Mr. D. Alan Dyer, GW8UH), who had the support of W./C. Cyril Parsons, GW8NP (Glamorgan C.R.), the General Secretary dealt with a variety of topics of interest, after which the Assistant Secretary, on her first visit to Wales, received a warm welcome and spoke of some of the difficulties experienced by Headquarters. The meeting was then thrown open for questions by members and replies were given by the Secretary.

During tea a Raffle for numerous prizes was inaugurated, and later the lucky numbers were drawn by Miss Iris Parsons, daughter of GW4FW.

Later in the day very instructive talks on V.H.F. and U.H.F. Technique given by Messrs. Allen and Scarr led to some profitable discussions. The talks have undoubtedly stimulated local interest in V.H.F. and U.H.F. work.

A comprehensive display of *Eddystone* equipment was shown by *City and Rural Radio* of Swansea, and an imposing array of chassis and cabinets by Mr. L. Philpott, G4BI, of Loughborough.

All who attended expressed their indebtedness to Mr. P. R. Jenkins, GW3VL, for the excellent arrangements he had made for accommodation and catering.

E. A. H.

The Station Behind the Call

G* M 3 C I X

MANY amateurs, at some time or another, are faced with the problem of keeping a station going while they are living in temporary accommodation either in furnished rooms or with relatives. The difficulties are even more pronounced when it is necessary to make frequent moves. Under such circumstances equipment must be kept compact, easily transportable and self-contained. Weight and size must allow the apparatus to be carried up the steepest flights of stairs without undue strain and with due regard to the wall-paper.

But even before this stage is reached, there is usually a preliminary operation which requires the tact of a diplomat to be combined with the persuasive powers of a patent-medicine pedlar. Landladies, though a much maligned race in many ways, do appear to share a deep-rooted suspicion of all electricity-consuming apparatus. To obtain permission for the installation of a transmitter it is a great help to be able to quote figures of power-consumption coupled with the assurance that the station will *not* interfere with the reception of the B.B.C. news. Once the initial objections are overcome, it is surprising how quickly the average landlady will become quite proud of having a " broadcaster " in the house !

A Portable Transmitter

At GM3CIX the problem of mobility has been overcome by building the transmitter, modulator, and power supplies in three BC.375 stowage cases—the cases which were designed to house the well-known range of Tuning Units such as the TU5B. The three cases can be bolted together to form a convenient but cheap rack, approximately 2 ft. high, 17 in. wide and 8 in. deep. When necessary the units can very easily be split apart for removal to a new location.

The transmitter proper is contained in the top section and consists of a 7C5 " hot cathode " Colpitts oscillator, with screen keying. This type of oscillator delivers a useful output not only on the fundamental frequency but also on the second, third and even higher harmonics if required. The second stage is a 6L6, working as a buffer on 7 and 14 Mc/s. and as a doubler to 28 Mc/s. It is link-coupled to the P.A., which comprises a pair of 807's in push-pull running at 100 watts input on 7, 14, and 28 Mc/s., both telephony and telegraphy. Band changing is achieved by using plug-in coils, and coupling to the aerial is made by a variable link.

*L. J. McDougall, c/o 72 North Drive, Muirhead, Troon.

Modulator

The modulator, complete with its own power supplies, and housed in the middle compartment, employs a 6SJ7 first amplifier feeding one half of a 6SN7 double-triode valve. This is followed by a speech clipper similar to the one described by G5JU in the November, 1948 issue of the BULLETIN except that a 6H6 double-diode replaces the metal rectifiers. The output is then fed back into the other half of the 6SN7 followed by a 6F6, triode connected, driving a pair of 807's in Class AB2, with 550 volts on the plates and a stabilised 300 volts on the screens. Bias is obtained by connecting a metal rectifier through a resistor to one end of the H.T. secondary winding. With a normal smoothing circuit this arrangement gives the 30 volts of negative bias required for Class AB2 operation. The modulator can deliver up to 80 watts of audio, more than sufficient to plate and screen modulate the transmitter.

The bottom section holds the transmitter power supplies and consists of a 260 volts stabilised supply for the 7C5, a 350 volts supply for the 6L6 buffer/doubler and a 650 volts supply for the plates of the P.A. valves, the screens of which are fed with 300 volts from a potentiometer network across this supply. A variable bias supply of 0–120 volts is obtained in the same way as for the modulator. Each power supply is individually switched, with the exception of the bias which comes-on as soon as the 230 volts A.C. supply is switched into circuit.

Units are inter-connected by plugs and sockets the leads being just long enough to allow each unit to be operated out of its case for checking and adjustment, with large holes cut to permit the plugs to remain in their sockets when the units are withdrawn. Adequate ventilation is also provided. Indicator lamps are fitted in the power supply circuits so that power failures in any section can be seen in an instant.

Aerials

Aerials at present in use include a 7 Mc/s. doublet, two 14 Mc/s. doublets erected at right angles to one another, all three being fed with 75 ohm co-axial cable. A 28 Mc/s. aerial three halfwaves long is also fed with 75 ohm cable but with a small " delta-match " to allow for the rise in impedance to approximately 100 ohms at the centre of the three half-waves. These aerials can be selected by switches mounted in an aluminium box bolted to the right hand side of the transmitter compartment. There is also a rotary switch for changing the aerials from transmitter to receiver.

Standing on top of the rack is the receiver—a BC.348 which has been modified to cover 28 Mc/s. by removing the 200–500 kc/s. coils and replacing them with coils wound to cover 21–31 Mc/s. The first R.F. valve has also been replaced by the more efficient 6AK5 and the aerial circuit redesigned to match into the 75 ohm cable; these simple modifications have enormously improved performance on the higher frequencies. To improve quality the audio section has been rebuilt to include negative feed back.

A BC.221 frequency meter and a field strength meter complete the station which has allowed GM3CIX to work plenty of DX, to keep in touch with many friends, and to prove that landladies are much more co-operative towards Amateur Radio than is commonly supposed.

THE MONTH ON THE AIR

By A. O. MILNE (G2MI)*

FORTHCOMING R.S.G.B. CONTESTS

July	3	144 Mc/s. Field Day.
August	20–21	420 Mc/s. Tests.
September	25	Direction Finding.
October	1– 2	Low Power (3·5 Mc/s.).
November	26–27	"Top Band" (1·8 Mc/s.).

Date to be announced. Affiliated Societies.

N.F.D.

AS we write these few lines, N.F.D. is ten days or so away. By the time those of you who trouble to read them have done so, we shall know what the weather was like, and how many people are off sick with strained backs lugging AR88's, etc., up 1 in 2 slopes! There is little doubt that everyone will enjoy himself on this day of days when all the QRM goes QRP! If anyone did happen to hear G2MI/P it was quite genuine. A one-man station carried by one man, including a 33ft. mast, to and from the site!

Duds

We often list stations worth trying for. Here are a few to avoid. All the following calls are proved pirates. You are wasting your time and pasteboard in working them. With acknowledgements to CQ, A.R.R.L., I.R.A. and F.E.A.R.L.

AC2MA, AC3CG, CR8AC, EA7A, ES1TU, ET1JJ, FB3AC, FB8AC, FB8AJ, FB8FT, FF8Z, FG3BK, FG8A, FG8D, FK8AN, FL8AE, FL8AM, FP8A, FP8AA, FR3CE, HZ2J, LX1BW, LX1EN, LX1ER, LX1ES, LX1FR, LX1HW, LX1TS, LX2DN, LX2EF, LZ1K, LZ1BG, LZ1CJ, OY5AA. All stations with the prefix PX, SO3IF, all SP's, SU1X, SU2IB, TA1B, TA1C, TA1AB, TA1AC, TA3M, TA6AC, TA6ST, TF2KA, TF3EK, TF3EL, TF3F, TF5OA, UA2BU/UP2, UM8DG, VQ1RK, VQ6BZ, VQ9AA, VQ9AC, VR4BR, VS5A, VS9AE, VS9AU, YA1A, YA2B, YA2AB, YA3A, YA3B, YI7BZ, ZA2A, ZA2D, ZA2F, ZA2X, ZA7AA, ZD1WB, ZD3AC, and last but not least G4TQ and G4ZZ.

Notes and News

XZ2HP now G3ATH of 6 Granville Street, Skipton, Yorks, has cards for XZ2AG, AN, DY, JD, JW and TD. Please collect them from him before July 1st.

G5JF has a weekly sked with AC4RF and the latter will entirely ignore anyone who calls him during this period. 4RF may be on shortly with 100 watts input. BRS.11494 offers a queer one heard on 28 Mc/s.—MS4A—who says he is in Italian Somaliland. Others, heard on 14 Mc/s., include DU1AK, HI6ET, VP3CW, KA1AI and YS1CS. Do any of these YS stations QSL?

Will all amateurs please note that cards for Indian stations should not be sent to Col. Whatman, ex-VU2BC. He has been home from India for several years. AC3NC is now QRT and has moved to AC4 where he is active on 14,200 every Sunday at 1000 I.S.T., as AC4NC.

G2BP has worked MXRKL on 7,055 kc/s., who said he was in an aircraft over Brandenburg, Germany. BRS.15844 comments on SC4AI mentioned last month and confirms that it should read FT4AI. G3EJC is leaving for a tour of duty with the R.A.F. and hopes to be on from "rare DX." soon. G3ERB is another potential traveller and will leave for W6 in July.

Don Dahl, NY4DD, draws attention to the new prefix for Guantanamo Bay which is now KG4. He is KG4AD. BRS.18017 has made a good collection during the month, including AR8BC, DL4HA/PM in a car near Osburg travelling at 40 m.p.h., EK1DI (9 watts), HI6EC, PI1L (Dutch weather ship), TAC/Tripoli, all on 'phone. C.W. includes HG4H(?), TA1OU, TA3GVU, UA9KCA, and UA9PA, zone unknown.

Please note that ZE2K's are now being issued. Some of the newly licensed ZE's dislike being treated as pirates!

MP4BAC, who has come through very promptly with his cards, is on 'phone around 14,320 kc/s. MP4BAB is now in the Suez Canal zone but is QRT. MP4BAJ is on Bahrain and MP4BAD in Sharjah, active on 7 and 14 Mc/s. MP4BAC still has not worked a GW. How about it Wales? I1IR tells us that the station using an HV1 call who recently QSL'd was an unlicensed Italian in Rome and that he has been apprehended. I1IR badly needs cards from AP2H and ZD2RGY. Anyone ever had a card from this latter station?

MO1A has had his callsign changed back again to MD1A. Life gets tedious, don't it?

G2FSR, of VS4JH fame, has been going places on 14 Mc/s.—VP2AA, 2AH, 2KS, VP8AK, and FO8AC (0730 G.M.T. on the low end of 14 Mc/s.) are his latest. He has heard, but not worked, PK5HL, Box 21, Bandoermason, Indonesia, who puts in a good signal up to 1530 G.M.T., but has no communications receiver and is in difficulties with QRM.

How many G's worked VK4SI/VR4? OY3IGO tells us that the only genuine OY's besides himself are 5WS and 2RD, but neither is very active.

G3ATU looks like being in the G3 + 3 running for EDXC. He has just made his 50th QSO on the "other bands." He suggests G3AAE as a possible strong competitor.

BRS.15876 recently heard DU7AK working PA0DW. He gave his QTH as A.P.O.74, c/o Postmaster, San Francisco, and seemed quite uninhibited about working non-American amateurs.

G6RH has now joined the ranks of those who can operate their T.V. set and transmitter together. HI8WF, 28400 'phone and KG6DI 14060 C.W. are the month's best. Any one had a QSL from FF8GP, FD8RG, FI8ZZ or FU8AA?

G3BDS says W8QH on 14 Mc/s. C.W. wants to QSO Gateshead. G5CI and others have worked AC4AK on 14050 kc/s.—any information please? He asked for QSL's via A.R.R.L.

MD3MD sends a list of stations active in Eritrea and all are situated within about ½ mile radius! MI3AB, BC, CD, DF, FG, GH, LZ, NC, SC, SI, ZZ, MD3AB, MB. Average height above sea-level 8,000 ft. Very dry and barren country.

BERS195 says licence authorities disclaim any knowledge of VK4SI/VR4. His card to ZD4AQ was returned marked "Unknown."

Bahamas

VP7NU recently worked by several G's is quite genuine, as are the following VP7's: NG, NH, NJ, NK, NL, NR, NP. Static level is very high in Nassau due to power leaks and most of the local amateurs are rather inactive.

Next Month

As from the July issue this feature will appear once again in 8 point type, but we want lots more support from the DX. fraternity. We also need photographs of interest. Reports by June 25th please.

Slow Morse Transmissions

B.S.T.	*Call*	*kc/s.*	*Town*
Sundays			
09.30	G6NA	1840	Guildford
20.30	G2DLJ	1802	Derby
Mondays			
13.00	G3AXN	1870	Southend-on-Sea
20.00	G2AJU	1900	Stutton, Ipswich
20.00	G2DJS	1800	Bradford
20.00	G3BHS	1820	Eastleigh, Hants.
20.00	G3DSR	1750	Derby
21.00	G2BLN	1900	Bournemouth
21.00	G8VR	1850	London, S.E.2
Tuesdays			
13.00	G3AXN	1870	Southend-on-Sea
22.00	G8TL	1896	Ilford
22.30	G4GA	1896	Chingford
22.30	G6JB	1820	Salcombe, Devon
23.00	GM4AN	1820	Kirkcaldy
Wednesdays			
20.00	PA0AA	3625	Hilversum
20.00	G3AFD	1783	Southampton
22.00	G6NA	1840	Guildford
22.00	G3DLC	1800	Grays, Essex
Thursdays			
18.00	G3AXN	1870	Southend-on-Sea
22.00	G2BCX	1873	South Woodford
22.30	G3ARU	1873	South Woodford
22.30	G3OB	1803	Manchester
Fridays			
13.00	G3AXN	1870	Southend-on-Sea
19.00	G3BLN	1900	Bournemouth
20.00	G2AJU	1900	Stutton, Ipswich
20.00	G3AKW	1860	Wirral
20.00	G3BHS	1820	Eastleigh, Hants.
20.30	G8LZ	1868	Gravesend
22.30	G6JB	1820	Salcombe, Devon
23.00	GM4AN	1820	Kirkcaldy
Saturdays			
23.00	G3CHY	1800	Ashton-u-Lyne

Volunteers in districts not covered by these transmissions are invited to write to Mr. C. H. L. Edwards, G8TL, 10, Chepstow Crescent, Newbury Park, Ilford, Essex.

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

AROUND THE V.H.F.'s

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

Two Metres

G5MI (Wimbledon), sends details of tests which he conducted from an alternative address at Ipswich, during which some interesting observations were made. The transmitter consisted of a 954 tri-tet crystal oscillator, with a fundamental frequency of 8 Mc/s., followed by a 954 tripler, a 9003 doubler, and a 6J6 neutralised P.A. with an input of 4 watts. The modulator was a 6J6 with a 6AK5 speech pre-amplifier, one half of a further 6J6 as a M.C.W. oscillator, and the other half of the same valve serving to amplify either the M.C.W. or the speech. The converter, push-pull throughout, employed a neutralised 6J6 followed by a pair of 6AG5's as R.F. stages, and two VR92 diodes in the mixer. The oscillator/tripler used another 6J6, and the I.F. was either 8 or 11 Mc/s.

The dates of the experiments were May 9th, 10th and 11th, when conditions appeared to be fairly good, and the 16th and 17th when they were considered to be poor. On both occasions a number of London stations were heard at workable strength, although the only one raised was G6YP on the 11th. The local stations, namely G2CPL, KG, WJ and 6DH, were all worked at S9, the latter on telephony. G4LU (Oswestry), 200 miles distant, was heard at S7 on one occasion together with 3DEP (Ryde, I.O.W.) at S5, while 21Q (Sheffield) was heard several times and worked on schedule. G3DAH (Herne Bay, Kent) reported 5MI's 'phone at S7 at a distance of 50 miles. One of the main factors in these tests was undoubtedly the excellent aerial system, consisting of 8 driven half-wave elements backed by reflectors, and it would appear that, given a good situation, and a first-class aerial, reliable communication on 2 metres can be carried on with a low powered transmitter even under poor propagation conditions. G5MI hopes to conduct further experiments at a later date to determine to what extent range depends upon the power of the transmitted signal. We were interested to note that 5MI also experienced the effect, mentioned in this feature in February last, of low modulation on certain 'phone transmissions which rendered their speech entirely unreadable although their C.W. signals were easily copied.

The Stacked Array

We make no apology for returning yet again to the question of the superiority of an array employing a number of stacked half-wave driven elements as compared with the Yagi type of beam which forms the radiating system at the majority of V.H.F. stations. G2FMF (Hillingdon), and 6UH (Hayes, Middlesex), as well as 5MI, are now using aerials of this pattern, and report a greatly improved performance as compared with the flat-top type of beam. Both FMF and UH have two such arrays in operation at right angles to one another to provide all round coverage without the necessity for rotation. 6UH, who says that his situation is very poor from a two metre standpoint, has worked more than 75 stations in four months, a feat which proved quite impossible with his 4-element Yagi, and we are pleased to announce that an article by him and G6CJ, giving full constructional details for this aerial, will shortly appear in the BULLETIN.

Scottish Activity

April 26 saw the first two-way QSO on two metres between Edinburgh and Glasgow when GM6LS (Edinburgh) established contact with GM5VG on 'phone at 2230 GMT. Signals from the west were R5, S7 at 6LS's station on Corstorphine Hill on a super-regen. receiver, but the report in Glasgow was S9 plus 4 db. on a converter working into an *Eddystone* 640. A subsequent test in daylight on May 8 produced substantially similar results. The wide divergence in signal strength between the two stations might be accounted for partly by 6LS's 9-element beam, but a superhet. converter would no doubt enable him to make even better use of his good situation and aerial system.

Other Scottish amateurs working on two metres include GM2DI and 3EDQ (Wishaw), and 6KH (Hamilton), all of whom have contacted GM6LS. GM3BBW and 6SR (Edinburgh) are also active. 6LS is searching for signals from the south at 2130 G.M.T. nightly.

Other News

Those looking for a contact with Wales on two metres could do worse than try for GW2ADZ of Llanymynech, Montgomeryshire, in the near future. G2ADZ who is at present located in Oswestry and appears to hear pretty well every station active on the band will find it much tougher going from his new home six miles S.S.W. of his present situation. Fenced off from the south-east by granite hills 1,200ft. high and only three miles away, and with a further 700ft. barrier half-a-mile to the north, he will certainly have his work cut out to reproduce his old form, but he is going to do his best to put Montgomeryshire on the map, and we shall not be unduly surprised to see him regularly in the two metre news again after his emigration to Wales. He reminds us that his future times of operation will be as at present—1930 to 2030 B.S.T. Good hunting, O.M.! ADZ reports that during May conditions were generally good, apart from a spell of thundery weather when the maximum range fell to about 100 miles. On Sunday, May 22, conditions were superb during the morning, and several London stations were worked on 'phone despite the very low modulation produced by 2 watts of A.F. to an 829B running at 25 watts input. GM3OL (Dumfries), whose frequency, by the way is 145·29 Mc/s., was heard on the 9th, and a two-way contact was established the following day. It was learnt that the Scottish station had heard G3EHY (Banwell, Som.), although no QSO had so far resulted.

G3WW (Wimblington, Cambs.), who was well known on the five metre band, is now on two with a modified SCR522 transmitter, a converted ZB2 receiver, and a six-element beam. At present the latter is only 20ft. off the ground, but it will shortly be placed on top of the 50ft. tower available, when it is anticipated that range will be greatly improved. G5BD (Mablethorpe), did not hear a single signal on the band during the recent R.S.G.B. two metre contest, but during May conditions improved somewhat, and G5WP (Woking) was worked on five successive nights, three times on 'phone. Other contacts include G2CIW, HCG, NH, XV, 3AUA, BKQ, DAH, 5JO, MA, 6DH, NB and 8WV.

A comparative newcomer to the band—G3DAH—is getting out extremely well, and attributes this to his almost unscreened situation 450ft. above sea level at Herne Bay, Kent. DAH is serving in the R.A.F. in Cambridgeshire, and only gets home about once a fortnight, but when there his C.W. signal on approximately 145·15 Mc/s. certainly goes places.

The Two Metre Band in Sweden

We welcome a report from a new member of the Society, SM5VL in Enskede, near Stockholm, who is an enthusiastic V.H.F. worker, and who was mentioned in our last issue in connection with the forthcoming 2, 6 and 10 metre tests to be conducted by members of S.S.A. this month. SM5VL is employing a triode-connected 6AK5 (Wallman circuit) R.F. stage followed by a further 6J4 grounded-grid triode in his receiver, which on noise diode tests, gives a noise factor of around 5 db., which is pretty good on *any* band, let alone two metres. He holds the present SM record of 120 miles with SM5MN (Linkoping), whom he works every morning and evening with an average of R5 S4 on 80 per cent. of their schedules. Tests are being carried out with OH2OK at about 250 miles, but so far no contact has been made. 5VL is not hopeful of a G/SM contact this year as, unfortunately, those amateurs on the west coast are for the most part employing self-excited transmitters and super-regen. receivers, but if propagational conditions are exceptional it is just possible that signals might reach as far as SM5 or 7 where the majority of workers are using more modern apparatus. A number of SM stations will be on the six metre band this summer, and will look for replies on the high frequency end of the ten metre band.

Seventy Centimetres

On May 15 G2WS carried out the first of a series of tests from his new alternative address at Crowborough, Sussex, 650ft. above sea level. In spite of this elevation, the North Downs, rising to nearly 900ft. on the London side, present a formidable barrier to signals directed that way. Although several stations in the London area were active at the time, no contacts were made on this occasion. Signals from G2WS/A were, however, received by G2FKZ (Dulwich) throughout the tests at a distance of 28 miles. A noticeable feature was the gradually increasing strength of reception towards evening, presumably due to refraction of the signals over the hills by the slight temperature inversion to be expected at such a time. G2WS hopes to work regularly from Crowborough in the future, and occasionally will be at the alternative address for the Wednesday evening schedule periods.

G8OS (Pulborough, Sussex), anticipates being active every Wednesday from 2000 B.S.T. by the time these notes appear, from a site about one mile from his home, which commands a good view over the Weald to the north. The transmitter will be crystal controlled on approximately 435 Mc/s., the output stage being a Type 105 unit modified as described by G3MY in the February issue of the BULLETIN.

* * * *

Notes for inclusion in the July issue, which will appear in 8 point type, should reach us not later than June 23.

Home Posting

F/O R. C. (Bob) Honey, ex-ST2CH, MD5CH and MD7RH is now operating under the call G3FKE from 31 Greenhill Road, Liverpool 18, at which address he will be glad to receive letters or visits from old friends.

*32 Earls Road, Tunbridge Wells, Kent.

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---

re Amateur Radio Service

T. B. WIMBUSH, deceased

The above deceased who traded as "Amateur Radio Service" (G6HP) from 27/29 Canning Street, Burnley, died on the 19th March, 1949. All persons having any claims against the estate of any description should communicate forthwith to the undersigned Solicitors for the Administrators of the estate.

Robt. Kidd Whitaker & Pratt,
Solicitors,
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Accrington, Lancashire.

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E.534. Filament Transformer. Pri. 0–210–230–250 V. 50 c/s. Sec. 2·5 V. C.T. 10 A. 2·5 V. C.T. 10 A. Test 7,500 V. ceramic S.O. terminals. Size 4½" × 4" × 5½", Weight 8 lbs. Clydesdale's price only. **21/–** each. Post paid.

E.535. Power Transformer. Pri. 0–210–230–250 V. 50 c/s. Sec. 1,360 V. C.T. 225 mA. Test 2,500 V. Size 4¼" × 4½" × 6½". Weight 16 lbs. Clydesdale's price only. **35/–** each. Carriage paid.

E.537. Filter Reactor Choke. Thermador potted type (U.S.A. made) 10 Henrys 225 mA. Res. 84 ohms. Test voltage 2,500 V. Size 4½" × 4" × 5½". Weight 10½ lbs. Clydesdale's price only. **21/–** each. Post paid.

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E.542. Pri. 0–250 V. tapped 200, 220, 240. Sec. 350–0–350 V. 100 mA. Capable of delivering up to 150 mA. with slight temperature rise. 6·3 V. 6 A., 5 V. 3 A. Size 4½" × 4½" × 4", weight 7 ¼ lb. Clydesdale's price only. **30/–.** Post paid.

E.531. EHT Transformer, ideal for VCR-97. Pri. 0–250 V., tapped 200, 240 V. Sec. 2,000 V. 5 mA., 4 V. 1·1 A., 2–0–2 V. 1 A. Upright mtg., dim. 3½" × 3½" × 3". Clydesdale's price only. **29/6.**
Ideal for Charger (With E285 Metal Rectifier).

E.545. Pri. 0–230–250 V. screened. Sec. 20 V. 3 A. or 32 V. 1·5 A. Size 5" × 4" × 3¼". Weight 6½ lbs. **19/6** each.

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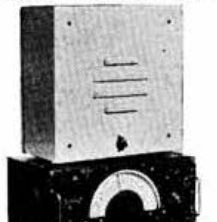

18—7·5 Mc/s. (17–40 metres); 7·5—3 Mc/s. (40–100 metres); 1500—600 kc/s. (200–500 metres); 500—200 kc/s. (600–1500 metres); 200—75 kc/s. (1500–4000 metres) S.M. drive, B.F.O., A.V.C., M.V.C., etc., metal case 6½" × 9" × 9".

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E.177. 90 ohms, 12 mm. at **7d.** per yard. Minimum 20 yards, **11/8** post paid.

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HIC ET UBIQUE

April 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, April 12, 1949, *at* 6 *p.m.*

Present.—The President (Mr. V. M. Desmond) in the Chair, Messrs. W. H. Allen, A. P. G. Amos, I. D. Auchterlonie, D. N. Corfield, S. K. Lewer, J. W. Mathews, A. O. Milne, W. A. Scarr, P. A. Thorogood, A. J. H. Watson, and John Clarricoats (General Secretary).

Apologies for Absence.—The Secretary submitted apologies for the absence of Messrs. F. Charman and A. E. Watts.

Festival of Britain, 1951.

Messrs. Lewer, Milne, Scarr, and the General Secretary were appointed to meet representatives of the Festival of Britain Organising Committee, with a view to discussing a suggestion that the Society should participate in the Festival.

Membership.

Resolved—

(*a*) to elect 102 Corporate Members, 26 Associates and 6 Junior Associates, (total elected 134).
(*b*) to grant Corporate Membership to 6 Associates who had applied for transfer.
(*c*) to grant affiliation to Austin Radio Amateurs' Society, Nottingham Amateur Radio Society, Queensbridge Radio Club, and Amateur Radio Club of India.

Amateur Radio Exhibition.

It was reported that a number of the concerns who supported the 1948 Exhibition had agreed to participate in the 1949 Exhibition.

Convention.

Mr. Auchterlonie stated that it was the intention of the members resident in Region 1 to organise an Amateur Radio Exhibition in Manchester during the period of the Convention, and enquired whether it would receive the official support of the Society. After a lengthy discussion Mr. Scarr moved, Mr. Amos seconded, and it was resolved (by 8 votes to 1) to sponsor an Amateur Radio Exhibition in Manchester during the period of the forthcoming Convention. Mr. J. W. Mathews asked to be recorded as voting against the motion.

The Secretary expressed the view that an experienced person, with knowledge of Exhibitions and the Radio Trade, should be appointed to the post of Manager.

Proceedings of the R.S.G.B.

Resolved to accept a recommendation of the Technical Committee that publication of the *Proceedings of the R.S.G.B.* shall cease as from July, 1949.

The Committee recalled that the *Proceedings* were first published at a time when the paper position was precarious, and that the publication was designed to provide members with additional reading matter. The project had, however, proved costly, due to the difficulty of obtaining advertisements.

The Committee recorded that arrangements would be made to publish in the BULLETIN all papers, read at London (I.E.E.) meetings, which are of general interest to the membership.

R.S.G.B. Bulletin.

The Technical Committee informed the Council that it had considered once again a suggestion that the BULLETIN should be published in a smaller-size format. On the basis of 28 page issues it would be possible to produce 44 page issues in smaller format.

Having received advice that the paper position is likely to improve during the next few months the Committee decided to recommend to the Council that no change of format be approved. The recommendation was accepted.

Technical Booklets.

The Technical Committee advised the Council that reports had been received from the co-authors of the several booklets in course of preparation and that these show that no new title can be produced during the current financial year. The Committee is pressing forward with plans for the publication, at an early date, of a booklet which will contain details of simple amateur equipment.

The Committee has given consideration to suggestions that the Society should produce a text book especially designed to assist candidates for the Radio Amateurs' Examination and it hopes to report favourably on this matter at a later date.

Amateur Radio Club of India.

The Technical Committee has agreed to permit the above Club to reproduce, in its monthly journal "QRZ," technical articles which have appeared in the R.S.G.B. BULLETIN, on the understanding that due acknowledgments will be made.

Bank Charges.

It was reported that the Society's Bankers had decided to make a charge of Thirty Guineas per annum for operating the Society's account. Originally a figure of One Hundred Guineas had been suggested. The final figure had been reached after negotiations.

The meeting terminated at 8.25 p.m.

Resignations

The Council has accepted with regret the resignation of Mr. Arthur E. Watts, G6UN, from the G.P.O. Liaison Committee. Mr. Watts represented the Society at the Madrid and Cairo Conferences and in more recent years he held the office of G.P.O. Liaison Officer.

The work previously undertaken by Mr. Watts will in future be dealt with collectively by the G.P.O. Liaison Committee who have been authorised by the Council to invite to their meetings any member of the Society whose presence would assist them in their negotiations with the G.P.O.

Mr. W. A. Scarr, M.A., G2WS, Executive Vice-President, is the new Chairman of the Committee and the Secretary is Mr. John Clarricoats, G6CL. The other members are Mr. V. M. Desmond, G5VM, President, and Mr. S. K. Lewer, B.Sc., G6LJ, Immediate Past President.

* * *

The Council has also accepted with regret the resignation of Mr. D. A. G. Edwards, G3DO, from the Council on the grounds of ill health. Mr. Edwards has agreed to continue in office as Region 3 Representative.

Mr. W. N. Craig, G6JJ, West London D.R., who obtained the highest number of votes among the unsuccessful candidates at the recent Council election, has been appointed to serve on that body as a co-opted member.

Representation

The following are additions or alterations to the list of Representatives published in the February, 1948, and subsequent issues :—

Town Representatives

Region 4.		
Lincolnshire—		
Cranwell ...	...	N. Davis, G6TV, 57 North Parade, Sleaford.
Region 8.		
Hampshire—		
Petersfield and District	...	R. T. Dealey, G6DT, "Woodville," Drill Hall Road, Horndean.
Sussex—		
Bexhill and Hastings	...	P. H. Hunter, BRS13,331, 30 Collington Avenue, Bexhill.
Channel Islands—		
Jersey ...	...	C. J. Wilson, BRS16,593, 29 Stopford Road, St. Helier.

Changes of Address

Region 7.		
Ilford ...	...	J. P. Tyndall, G2QI, 174 The Drive.
Region 9.		
Exeter ...	...	E. G. Wheatcroft, BRS13,968, 27 Lower Wear Road, Countess Wear.

Vacancy

Mr. W. R. Joss, G2AJ, has resigned as Town Representative for Hendon. Nominations for his successor should be made in the prescribed form and sent to reach the General Secretary by June 30, 1949.

Convention Arrangements

The Convention Working Committee under the Chairmanship of Mr. I. D. Auchterlonie, G6OM, is preparing an extensive programme of wide interest, full details of which will be announced shortly. In the meantime members from other parts of the country who intend to be present are urged to advise Mr. Auchterlonie (4 Stand Close, Ringley Road, Whitefield, Manchester), of their hotel requirements so that reservations may be made.

Convention Headquarters will be at the Grand Hotel.

Incidentally something of interest to everyone will be going on throughout the period from noon on Friday, October 21, until late in the evening of Sunday, October 23.

FORTHCOMING EVENTS

REGION 1

Ashton-under-Lyne.—July 3, 3 p.m., New Jerusalem Schools, Katherine Street.
Bolton.—July 5, 8 p.m., Y.M.C.A.
Burnley.—July 6, 7.30 p.m., Mechanics Institute, Manchester Road.
Bury.—July 14, 7.30 p.m., Atheneum, Market Street.
Darwen and Blackburn.—June 24, 7.30 p.m., Weavers Institute, Darwen.
Manchester.—July 4, 7.30 p.m., Reynolds Hall, College of Technology, Sackville Street.
Rochdale.—July 3, 3 p.m., Drill Hall, Baron Street.
Wirral (A.R.S.).—July 6, 8 p.m., Y.M.C.A., Whetstone Lane, Birkenhead.

REGION 2

Barnsley.—June 24, July 8, 7.30 p.m., King George Hotel, Peel Street.
Bradford.—June 27, 7.30 p.m., Cambridge House, 66 Little Horton Lane.
Catterick.—Tuesdays, 7 p.m., Loos Lines, Catterick Camp.
Darlington.—Thursdays, 7.30 p.m., Club Room, British School Yard, Skinnergate.
Doncaster.—Wednesdays, 7.30 p.m., 73 Hexthorpe Road.
Harrogate.—Wednesdays, 7.30 p.m., rear of 31 Park Parade.
Huddersfield.—July 6, 7.30 p.m., Plough Hotel, Westgate.
Hull.—June 29, 7.30 p.m., Ye Olde White Harte, Mytongate.
Newcastle-on-Tyne.—June 20, 8 p.m., British Legion Rooms, 1 Jesmond Road.
Sheffield.—June 22, 8 p.m., "Dog and Partridge," Trippet Lane. July 13, 8 p.m., Albreda Works, Lydgate Lane.
South Shields.—Thursdays, 7.30 p.m., Trinity House, Laygate.
Spenborough.—June 22, July 6, July 20, 7.30 p.m., Temperance Hall, Cleckheaton.
York.—Wednesdays, 8 p.m., 29 Victor Street.

REGION 3

Derby (D. and D.A.R.S.).—June 16, 7.30 p.m., P.O. Social Club, 50A Sadler Gate. June 22, 7.30 p.m., Room No. 4, M.U.O.O., 119 Green Lane. July 6, 7.30 p.m., Lecture Theatre, Derby School of Arts and Crafts, Green Lane. July 14, 7.30 p.m., P.O. Social Club.
South Birmingham.—June 26, July 3, 17, 10.30 a.m., Stirchley Institute.
Stourbridge (S.R.S.).—June 18, 7.30 p.m., King Edward's School. Visit by G2MI.

REGION 7

Barnes and Putney.—July 12, 7.30 p.m., 28 Nassau Road, S.W.13.
Chingford.—June 23, 8 p.m., 23 Moreland Way. July 7, 8 p.m., 7 Cranworth Crescent.
Croydon (Surrey R.C.C.).—July 17, 7.30 p.m., Blacksmiths Arms, South End.
Edgware (E. and D.R.S.).—June 22, 29, July 6, 13, St. Michael's School, Flower Lane, Mill Hill.
Enfield.—June 19, 3 p.m., George Spicer School, Southbury Road. Lecture and demonstration by Mr. C. A. Pratt, of AVO on Test Gear.
Hayes.—July 4, 7 30 p.m., "The Vine," Uxbridge Road.
Holloway (Grafton R.S.).—7.30 p.m., Grafton School, Eburne Road, N.7. (Mondays, Wednesdays and Fridays.)
Hoddesdon.—June 16, July 7, 8 p.m., Salisbury Arms Hotel.
Peckham.—July 4, 7.30 p.m., "The Kentish Drover," Rye Lane.
St. Albans.—July 13, 8 p.m., "The Beehive," London Road.
Wanstead and Woodford.—July 4, 8 p.m., G2BRR, 10 Hillcrest Road, South Woodford, E.18.
Welwyn Garden City.—July 5, 8 p.m., Council Offices.
Southgate.—July 1, 7.30 p.m., Merryhills Hotel (Oakwood Station).

REGION 8

Brighton (B.R.C.).—Tuesdays, 7.30 p.m., Eagle Inn, Gloucester Road.
Southampton.—July 2, 7.30 p.m., 22 Anglesea Road, Shirley.

REGION 9

Exeter.—July 1, 7 p.m., Y.M.C.A., 41 St. David's Hill.
Plymouth.—June 18, July 16, 7 p.m., Tothill Community Centre, Tothill Park, Knighton Road, St. Judes.
Torquay.—June 18, July 16, 7.30 p.m., Y.M.C.A., Castle Road.

REGION 14

Ayr.—June 29, Royal Hotel, Prestwick.
Glasgow.—June 29, 39 Elmbank Crescent.

Affiliated Societies

The address of the Honorary Secretary of the *Surrey Radio Contact Club* is 122 St. Andrews Road, Coulsdon, and not 123 as given in the list published last month.

Amateur Radio International Friendship Association

Mr. D. Poole, G3AQW, 13 Oldfield Avenue, Norton-le-Moors, Stoke on Trent, Staffs., will be glad to hear from members who are prepared to devote a few hours each week to furthering the cause of the Association, details of which appeared in the May and October, 1948 issues of the BULLETIN.

Brighton and District Radio Club

The new Headquarters of the Club is at "The Eagle Arms," Gloucester Road, where meetings are now held every Tuesday at 7 p.m. Membership totals 59 and the Club has recently been allocated the call-sign G3EVE.

Cheltenham and District A.R.S.

On July 17th, the Society is holding the first of three Direction Finding Tests planned for this season. A full programme of lectures has also been arranged for the fortnightly meetings which are held on alternate Fridays at the St. Marks Community Centre, Brooklyn Road. Details may be obtained from the Secretary: S. Kelly (G3COZ), 10 London Road.

Chingford Group

During the past few months attendance at the fortnightly meetings has continued to improve; a demonstration of aerial systems by G2BCX and G2FLG attracted more than 50 members. The normal policy of informal discussions rather than planned lectures has, however, proved very popular. New members can be sure of a warm welcome; dates and venues of meetings will be found under "Forthcoming Events."

East London Instructional Courses

Further information is now available on the instructional courses organised by the East London R.S.G.B. Group with the co-operation of the Ilford Borough Council. In addition to the classes covering the syllabus of the Radio Amateurs' Examination and a refresher course for licensed amateurs as described in the May BULLETIN, it is also intended to provide an instructional course covering the theory and construction of television receivers

The classes will be held as follows:

Mondays	7.15—9.15 p.m.	*Television Constructors' Course.*
Tuesdays	7.15—9.15 p.m.	*Radio Amateurs' Refresher Course.*
Wednesdays	7.15—9.15 p.m.	*Radio Amateurs' Examination Course.*

Members who are interested in joining these classes should communicate with Mr C. H. L. Edwards, G8TL, 10 Chepstow Crescent, Newbury Park, Ilford, Essex.

Gillingham Telecommunications Society

Meetings of the above Society, which has been formed by a group of R.S.G.B. members resident in Chatham, Gillingham and Rochester, are held once every three weeks on Tuesday evenings at the Medway Technical College, Gardiner Street, Gillingham, commencing at 7.30 p.m. An interesting programme of lectures has been arranged and new members will be welcomed. The Hon. Secretary is Mr. Roy A. Lucas, G2BJW, 97 Milton Road.

Gloucestershire County Dance

Nearly 100 members with their wives and friends spent an enjoyable evening at the "County Supper Dance" held recently at the Prince of Wales Hotel, Berkeley. Amongst those present were the President, Mr. V. M. Desmond (G5VM), Mr. A. A. Uppington (G2BAR), Region 9 Representative, Mr. G. Webster (G5GK), Region 1 Representative, and Mr. R. M. Sharp, Gloucestershire C.R. The function, was supported by members from Bristol, Cheltenham, Stroud and Gloucester.

Reading Radio Society

The formation of a new instructional section of the Society has recently been announced. At its first meeting the President, Dr. Lemon (G2GL) described some of the less familiar aspects of the frequency spectrum of radiant energy. The Hon. Secretary is Mr. F. Hill (G2FZI), 997 Oxford Road, Tilehurst, and meetings of both the main Society and of the instructional section are held at Abbey Gateway, The Forbury.

H.M.S. Ganges A.R.C.

The Club, which holds the call-sign G3DID, has been carrying out an interesting series of experiments with low power telephony on the 7 Mc/s. band. With less than one watt input, contacts have been made with stations all over Western Europe. The transmitter is a modified Naval type 66 transceiver unit with V.F.O./P.A. powered by dry batteries. The new President is Mr. T. Brookes, Senior Commissioned Communications Officer, R.N.

Sunderland Radio Society

A year of steady progress and an expanding field of activities was reviewed at the third A.G.M. of the Society when 25 members were present. Miss E. J. Bolton, who now holds the call-sign G3KYO, was elected Treasurer and other appointments included: Chairman R. V. Duesbury (G3CTE); Vice-Chairman F. Rose (G3BLV); and Hon. Secretary C. A. Chester (BRS16850), 38 Westfield Grove, High Barnes, Sunderland.

West London Hamfest

The success of the first West London "Hamfest," held at Uxbridge on May 23, must have given considerable satisfaction to the R.S.G.B. Hayes Group who planned the function on a most ambitious scale. More than 100 members attended to hear technical lectures by G6CJ and G6OT as well as some entertaining personal reminiscences from the guest speaker, Air Commodore R. L. Phillips, C.B.E., who paid tribute to the work of the radio amateur in peace and war. A midget low-power transmitter/receiver designed by G3BTP was judged the most original entry in a Constructors' Contest. Mr. W. N. Craig, G6JJ, Chairman of the meeting, received congratulations upon his recent appointment to the Council of the R.S.G.B.

Region 12 News Letter

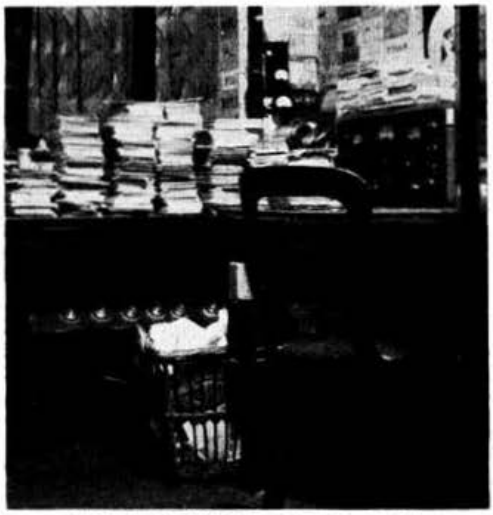
Members resident in Region 12 who have failed to receive a copy of the News Letter should communicate with the Regional Representative Mr. John Douglas, GM2CAS, 223 Abbotswell Road, Aberdeen.

General view of the equipment displayed by local members at the Model Engineer's Exhibition held in the Town Hall, Falkirk, from May 9 to 14, 1949. The exhibition station operated under the call GM3AVA/A.

British Wireless Dinner Club

At the 25th Annual Dinner of the Club, held recently at the Connaught Rooms, London, W.C.2, the guest of honour was Lord Cherwell, P.C. Radio amateurs present included G. R. Scott Farnie, Ian Orr Ewing, G5OG, Douglas Johnson, G6DW, S. G. Morgan, G6SM, A. Dormer, G3DAH, and John Clarricoats, G6CL.

Officers who have undertaken wireless duties in H.M. Forces are eligible for club membership, the Life Subscription to which is 21/-. Air Vice-Marshal Lywood, C.B., C.B.E., is president of the club, which has a membership of 450 and meets annually.



WHEN THE RUSSIAN INVASION CAME!

The scene at G2MI after the arrival of a sackful of QSL cards from the U.S.S.R. Each pile is for one sub-division only, i.e. G2, G3, etc.

BOOK REVIEWS

THE RADIO AMATEURS' HANDBOOK (Twenty-sixth edition, 1949). By the H.Q. Staff of the A.R.R.L. 736 pages, 1,651 illustrations, 118 charts and tables; 12s. 6d. From R.S.G.B., delivery 4 weeks.

This edition brings the total number of copies printed to over two million. In the twenty-three years since it first appeared, the Handbook has been a source of immense help, practical wisdom, reliable guidance and unending interest to amateurs, engineers, students, and indeed, to all who have to deal with high frequencies.

The reviewer, relieved of the job of stating what the book sets out to do, and how well in his opinion it achieves its aim, can only record the changes which have been made to keep in line with a fast-moving art.

The new constructional material in the receiver section includes a simple one-valve receiver, an improved audio noise filter, selective I.F. amplifiers, band-switching preselectors, crystal-controlled converters, and N.F.M. adaptors. The principles of S.S.S.C. transmission are explained, and how best to adjust a receiver for it.

In the transmitter section, there is a completely new band-switching transmitter. Attention is paid to harmonic suppression and the T.V.I. situation in general. There are new designs for V.F.O. units. The power supply section has been rearranged and a new treatment of filter design included.

The aerial chapter has, additionally, four pages of graphs of aerial and beam dimensions.

There has been a redrafting of the valve-base diagrams for additional clarity, and the larger type-face which has been used for the index is a great help.

Many changes have been made in revising the Handbook for this edition, and the above gives only a brief indication of the major ones.

The reviewer wonders what happens to obsolete editions of the Handbook, for he cannot imagine anyone destroying them.

T.P.A.

Club Lectures

Mr. D. W. Thomasson, A.M.Brit.I.R.E., offers to give technical lectures to local Clubs or Groups providing that a reasonable attendance can be expected. Mr. Thomasson is a frequent contributor to the technical press, particularly upon long-distance television problems. His address is *Earl Services*, Matford Avenue, Exeter.

Dave Mitchell at Bay of Plenty

After making a 2,000 miles camping expedition which covered the whole of the North Island of New Zealand, David Mitchell, ZL1MP, ex GW6AA, has decided to settle down on the Ohauiti Settlement near Tauranga, Bay of Plenty. The site, which covers an area of 8 acres, overlooks the Pacific. An "antenna farm" is in course of construction.

David will be pleased to help any keen British amateur who wishes to settle in New Zealand. G6YS arrived in March and GW5OD is due next month.

TWO METRE FIELD DAY

JULY 3, 1949

THE first Two Metre Field Day will be held on July 3, between 10 a.m. and 6 p.m. (B.S.T.). The Contest should enable V.H.F. enthusiasts whose home locations are poor to test their equipment under more favourable conditions. The Rules are similar to those for previous Five Metre Field events but the system of scoring has been revised in the light of experience of the 2 metre band under normal conditions and also to encourage participation throughout the British Isles. Members who are unable to operate portable are invited to take part in the event and to submit check logs.

Rules.

1. The event is open to fully paid up members of the R.S.G.B. resident in the British Isles (G, GI, GM, GW, GC and GD).
2. Entrants must operate according to the conditions of their own portable licences, and the input to any stage of the transmitter must not exceed 25 watts.
3. Power supply may not be derived from public or private supply mains.
4. No part of the station may be situated in any building existent on the site prior to the day of the event.
5. No apparatus may be erected on the site prior to the day on which the event takes place.
6. The event will commence at 10 a.m. (B.S.T.), July 3, 1949, and conclude at 6 p.m. (B.S.T.) on July 3, 1949.
7. Contacts may be made on telephony, C.W. or modulated C.W.
8. Location: The station must be operated from the same site for the duration of the event. Except for N. Ireland and Channel Is. entries, the National Grid Full Four Figure Reference must be shown.
9. Reporting: An exchange of RST and location must be effected to count for points. The location given must consist of distance and direction from the nearest town or village. A convenient method of reporting would be as follows: " Ur RST 569 6SE Caterham " (*i.e.* 6 miles south-east of Caterham).
10. Only one contact with a specific station shall count for points.
11. Proof of contact may be required.
12. Contacts with unlicensed stations will not be permitted to count for points.
13. Scoring: Points will be scored on the following basis:—

	With Portable Stations.	With Fixed Stations.
Up to 50 miles ...	2	1
50 ,, 75 ,, ...	4	2
75 ,, 100 ,, ...	6	3
100 ,, 150 ,, ...	8	4
Over 150 ,, ...	10	5

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

R.S.G.B. TWO METRE FIELD DAY, 1949.

Name .....

Home Address .....

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

National Grid Full Four Figure Reference .....

Details of Equipment Used .....

Aerials .....

Call Sign Station Worked	Time	Report Sent	Report Received	Location	Estimated Distance	Points Claimed
					Total	

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

Signed .....

15. Completed Entry Forms must be posted not later than July 10, to the Honorary Secretary, R.S.G.B. Contests Committee, New Ruskin House, Little Russell Street, London, W.C.1. The date of the postmark will be considered as the date of posting. Entrants are advised to read the note below regarding disqualification before sending in their entries.
16. A miniature cup will be awarded to the winning station, at the discretion of Council, and the runner-up will receive a Certificate of Merit.

Disqualification: Entrants failing to sign the Declaration at the foot of the entry form or to provide (in the case of stations located in Great Britain) a National Grid Full Four Figure Reference, or whose logs are despatched later than July 10, 1949, will automatically be disqualified.

Note.—The National Grid Full Four Figure (or Full Kilometre) reference specifies a point to the nearest kilometre. These figures and instructions will be found on the popular editions of the Ordnance Survey (one inch and quarter-inch) maps. Stations located outside Great Britain should substitute latitude and longitude. These reference numbers are required for checking purposes since it is possible to verify distances by simple calculation. For example: The Grid Reference for Headquarters would be given as 51/3081.

Norwegian Honour for GC8NO

The King of Norway, has been pleased to confer on Lt.-Colonel R. Postill, T.D., Royal Signals, the King Haakon VII Liberty Cross in recognition of services given to the Norwegian cause during the late war.

It is believed that the award was made because of liaison work which Mr. Postill was able to carry out with the Norwegian Signal Corps in connection with the liberation of Norway.

Mr. Postill is Headmaster of Victoria College, Jersey, and holder of the call GC8NO.

A.R.I. Meeting in San Marino

The Italian Society—*Associazione Radiotecnica Italiana*—is planning to hold a General Assembly at Remini in the tiny independent republic of San Marino from July 3–8. During this period several portable stations will be operating on both C.W. and telephony with the prefix MI. It is understood that a special postage stamp and cancellation mark will be used on QSL cards to commemorate the meeting.

Photographs of V.H.F. Gear

Apropos the remarks concerning photographs made last month by Mr. W. H. Allen in his article " Around the V.H.F.'s " it should be explained that payment for Copyright is not made until after publication.

In certain circumstances the Society is prepared to pay for the services of a professional photographer, but only if Editorial authority has previously been given in writing.

Photographs of V.H.F. gear may be submitted either to the Editor or to Mr. Allen.

Single Side Band Transmissions

The Society has been informed by the Engineer-in-Chief of the G.P.O. that no objection will be raised to the use by amateurs of the single side band system of transmission.

The Editor will be interested to hear from any member who successfully uses this system.

London I.E.E. Meeting

About 100 members were present at the Institution of Electrical Engineers on Friday, May 27, 1949, when Mr. Denis Heightman, G6DH, lectured on modern communication-type receivers. Mr. Heightman, who is Managing Director of *Denco Radio Ltd.*, Clacton, outlined many of the important features of design which are embodied in the DCR19 receiver—a product of his company. A typical receiver was successfully demonstrated.

Past President Stanley K. Lewer, B.Sc., G6LJ, was in the Chair and a vote of thanks to the lecturer was moved by Mr. R. H. Hammans, G2IG.

Food for Britain Appeal

Mr. W. E. Mitchell, Federal Secretary of the Wireless Institute of Australia, has informed the Society that funds are available for the despatch of a number of food parcels to U.K. transmitting amateurs. Members who would like to be considered when the next distribution takes place are invited to send a post card to the General Secretary quoting their name, address and call sign (in block letters).

THE picture on the front cover this month shows a Universal AvoMinor being used to check the screen voltage of the PM24M Crystal Oscillator which is being adjusted to run from a 250 volt plate supply. The screen voltage is being obtained by the setting of a high wattage variable resistance.

The photograph, submitted by Mr. R. C. Parnaby (G2DPA), of Beverley, Yorks, was awarded a prize in the " Avo " competition for R.S.G.B. members.

EX-GOVERNMENT STOCK DISPOSAL!

SPECIAL VALVES
12J5GTG 3 for 9/6
12A6GT 3 for 12/-
6SH7GT 3 for 5/-
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ALL NEW AND CARTONED

The finest
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SATISFACTION GUARANTEED OR MONEY REFUNDED!

ROTHERMEL CRYSTAL MICROPHONES. Torpedo shaped with chromium grill. Complete with plug and socket with screen lead. List price, 18 gns. Brand new and boxed. Note our price, **£3/15/-**. Astounding Value.

HEADPHONES. S. G. Brown's, 4,000 ohms per pair. Bakelite ear-pieces with steel headbands. Brand new. Only **5/-** per pair. Great Bargain.

A.C. MOTORS. Input Standard 230 V., 50 cycle, complete with shaft and flex. Approx. 4,000 r.p.m., 1/40th h.p. Size 4¼" × 2⅞" diam., **12/6**. 1/25th h.p. Size 7⅛" × 3⅛" diam., **20/-**. Suitable for small workshop application, e.g. grinders, models, fans, etc.

L.F. CHOKES. 6H. 200 mA. 100 ohms. D.C. Parmeko. New, **3/6**. Swinging type, 3·6/4·2 H. 250 mA. 75 ohms D.C. New. Slightly soiled, **5/6**. WORTH treble.

TWIN RUBBER CABLE. Owing to many demands, we have secured a further quantity of this useful twin nine-strand, ·012 tinned copper, rubber-covered cable in cab tyre type. List price 11d. per yard. Again we offer twelve yards or upwards at **3/6** per dozen yards.

OUTPUT TRANSFORMERS. Output 6L6 P.P. Class A. 250–300 V. Anode C.T. Match 2/3 ohms or 15 ohms Secondary. 12 watts. Brand new, **12/6**.

MAINS TRANSFORMER. 110 V. A.C. 50 cycles input. Output 250-0-250 V. at 200 mA., 5 V. 3 A., 6·3 V. 4·5 A. Brand New. Made by R.C.A. Use two in series with voltage doubler circuit and get 2,000V. for E.H.T. Price **30/-** per pair. Worth **£5**.

12-VOLT VIBRATOR AMPLIFIER. Output 200 V. 60 mA. Incorporates full smoothing, volume control, input and output transformers, etc. Output valve 6K6 and OZ4 rectifier with 12 V. vibrator. Ideal conversion for mobile amplifier or inter-comm. unit, etc.; 100 only left. In good condition, **20/-**.

METEOROLOGICAL BALLOONS. Expand to 5 ft. diam. when filled. Each in sealed tin. Snip, **4/-**.

UNREPEATABLE OFFER. BRAND NEW ELECTROLYTIC CANS T.C.C. 8 × 8 × 8 uF. 400 volt working with high ripple section for rectifier. 4 for **10/6** or **3/-** each
Buy four for the value of one.
Size 4½" by 1¼".

16 x 8 uF	450 volts working	...	2/6 ea.
16 uF	450 " "	...	2/- ea.
32 uF	350 " "	...	1/6 ea.
500 uF	15 " "	...	§2/6 ea.
1000 uF	15 " "	...	§2/6 ea.

§U.S.A. Manufacture.

METERS

Scale				Size	M/Coil
5 m/a	...	...	...	*2½"	5/-
15 ...	...	...	...	†3½"	10/-
100	...	...	...	†2½"	6/-
200	...	...	...	†3"	6/-
300	...	...	...	†3½"	10/-
2·5 kV. with shunt			...	†3½"	20/-
·5 A. R.F.		...	...	*2½"	3/6
1 A. R.F. ...		...	...	*2½"	3/6
4 A. R.F. ...		...	...	*2½"	3/6

*Square †Round

SPEAKERS. At smash hit prices! Manufacturers' surplus stock. Brand new. 5" Plessy with super magnet and pentode matching transformer 4 ohms speech coil to 7,000 ohms matching, **12/9**. 3½" Goodmans 3·2 ohms speech coil less transformer, **17/6**. 8" Truvox Monobolt, 3 ohms speech coil less matching transformer. We are able to offer these superb speakers at the special price of **14/6**. Order at once as stocks are limited. 10" Truvox Monobolt, 3 ohms speech coil less matching transformer. Another fine offer at **21/-** each. 12" Truvox C.P.N. Limited offer of this excellent line. 3 ohms speech coil without transformer. Rush your order at **42/-** each.

CARBON THROAT MICROPHONE with lead and two-pin plug. Three for **4/-**. Wonderful value.

FLEXIBLE DRIVES. For use on Command Receivers B.C.453/4/5, **7/6** each. For use on Radio Compass Receiver B.C.433G, **8/6** each.

CORK MATS. 5½" diam., ¼" thick. 12 for **4/-**. Cork sheets, 24" × 36" × ¼", **6/-** each. 24" × 36" × ⅛", **3/-** each.

NEW VALVES BOXED. 6Y6G, 6V6, 5U4G, 77, 78, 2051, 6K8, 1T4, 6C5, 6AG7, **7/-** VR105, 6X5, 6SL7, 6AG5, 6J7, 3Q5, 6SQ7, 6SA7, R3, 5Z4, 6Q7, 713A, **5/6**. 6SS7, 955, 76, 6L5, 12SG7, 12SH7, 71A, 6AC7, 6J5, 9006, **4/-**. VR54, VR65, VR66, **3/-**. 6H6, Metal, **1/6**.

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LETTERS TO THE EDITOR

In a Big Way

DEAR SIR,—There has been some perturbation of late at the possibility of the subscription being increased but I doubt if the membership, as a whole, has given careful thought to the matter.

As I see it, good value is at present provided for the fifteen shillings subscription. But much better value, shilling for shilling, could undoubtedly be given if the subscription was increased.

The wish of the Society to develop is evident but development is hindered (prevented is probably a truer word) by the constant necessity for keeping maintenance expenditure within income. Additional funds are *essential* before further progress becomes possible.

The subscription to-day remains the same as before the war, but the equivalent value is much less. Do some members really expect the Society to be run on efficient lines when the "sub," in effect, is less than half it was before the war? In any case, for a Society of the standing of the R.S.G.B., fifteen shillings is absurdly low.

So let the members ask for—no, press for—an increase in the subscription, not fight against it. Then the Society can go ahead in a big way.

A big way. Which brings forward at once the urgent necessity for new Headquarters. It is evident that it will not be possible, for a long time to come, to find suitable accommodation in London. Nor is there any good reason why the H.Q. should be in London. It should be situated near the centre of Great Britain, with reasonably easy access to all parts—on the outskirts of Coventry, for example.

The Society has an ample reserve of funds lying dormant. Now is the time to use it for the benefit of the members. Let the Society purchase a largish house with several acres of ground, and turn it into a first class H.Q.—an establishment worthy of the name. Furnish it adequately for the secretarial, technical and general staff (the latter to include the QSL Bureau). Make it a real home for GB1RS and arrange for normal amateur communications facilities also. Equip it with every modern facility possible to assist amateurs—measuring gear of all types (and including frequency sub-standards extending into E.H.F.); a complete technical library; a museum for historical amateur equipment. In the interests of the movement as a whole, monitor the amateur bands so that those who regularly offend, can be warned, without fear or favour.

When circumstances permit, provide accommodation for small parties to stay overnight or longer. In any case, make provision for the entertainment of foreign amateurs, in a real "ham" spirit atmosphere. In fact, visitors should be thoroughly welcomed, so that it is worth their while to go out of their way to visit H.Q. It would form the ideal venue for friends "over the air" to realise personal contact.

All too ambitious? Not at all. No one expects all this to happen overnight. But now is the time to make the first move and for long term planning to commence. Or, if, as is very probable, long term plans have been drawn up, let a start be made to bring them to fruition. One thing is certain—if the subscription stays where it is, so does the Society and, in the times we live in, to stand still is to move backward.

What have the members to say? Do they not unanimously agree that Council should give this most important matter their immediate attention?

Yours faithfully,
J. N. WALKER (G5JU).

331 Rednal Road, Birmingham, 31.

Code Proficiency Transmissions

DEAR SIR,—Every month, the A.R.R.L. organises Morse Code "Qualifying Runs" from three stations at speeds of 15, 20, 25, 30 and 35 w.p.m. If satisfactory "copy" at any of these speeds is submitted to the League, a proficiency certificate is issued. If higher speeds are subsequently attained "Endorsement Stickers" are provided for the certificate.

I believe that a similar training scheme organised in this country, *at a suitable time during the evening*, would be of great assistance to many operators. Very few people can benefit from the A.R.R.L. transmissions which begin here at 3.0 a.m.

Slow Morse practices are already being organised by G8TL but the higher speed groups are not catered for.

In these unsettled days it is in the interest of the country to ensure that a large reserve of skilled operators is available and I am sure that a scheme on the lines suggested would be of benefit.

As it does not appear possible at present to operate the scheme from GB1RS, perhaps a member whose station is equipped with a Wheatstone auto-transmitter would offer his services. The Society could officially recognise this station and award certificates, which would become a valued addition to others issued by the Society.

So long as plain language is used and the normal licence conditions observed I do not think the G.P.O. would object to the scheme.

Yours faithfully.
T. F. HIGGINS (G8JI).

391 Rednal Road, Birmingham 31.

R.F. Pentodes

DEAR SIR,—BRS16549 has kindly pointed out an error which occured in my article "R.F. Pentode Valves," published in the March issue of the R.S.G.B. BULLETIN. In the table on page 220 the equivalent noise resistance, column 5, for type 6AC7 is incorrectly given, the true figure should read 720 ohms not 1,140. This will, of course, make the figure in column 10, Rip/Rn, also wrong, and this should read 7·5, not 4·74 as stated.

Several members have also asked if I could provide figures for many other valve types, but I regret that the only ones for which I have the necessary information are as set out below (column headings as shown in the original article).

1	2	3	4	5	6	7	8	9	10
6AK5	5·1	6·8	·02	1,900	32,000	S	0·75	163	16·8
Z77	7·5	9·2	·0055	1,000	10,000	S	0·82	75	10
6BA6	4·4	10·5	·0035	3,800	6,900	R	0·42	30·4	1·82
6AG5	5·0	8·3	·025	1,900	13,300	S	0·60	66·5	7·0

Yours faithfully,
H. N. GANT, A.M.Brit.I.R.E.
(BRS3759)

Future Low Power Contests

DEAR SIR,—I am prompted by the remarks of G2VV and G6LH regarding the Low Power Contest to add my own. From my experience and observation I would say that even were the most perfect rules evolved to govern a contest there would still be dissenters. Moreover, unless the body formulating the rules is prepared to administer them rigidly, justly and impartially, without fear of offense to all, then we shall remain unprotected against those persons who do offend.

As it stands, the Contest is a feat of endurance as well as a battle of skill. Many, although unwilling (or unable as your correspondents suggest) to dissipate their physical endurance were surprisingly willing to dissipate the endurance of their H.T. battery by sending CQ's. This—amongst an army of new G3's who were only too happy to go searching for an answer to their own CQ's and reply to even the veriest whisper of a call.

There is a case for a time limit, of course, but let us not suggest or heed advice that would have us start level, which is fair, but would also have us finish level, which is preposterous.

I will not say that there should never be another QRP contest, but I will say that it should be confined to all-the-year-round users of QRP, and, if need be, only those who are forced to use HT batteries as a source of power, *e.g.* G6ZN, G3XT, G2JN/A.

Yours sincerely,
JOHN PEACH (G5JP).

Voltage Regulation

DEAR SIR,—The caption to Fig. 1 in the above article (April, 1949 issue) might be taken to mean that this regulator will give 230 V. stabilised at 70 mA. With only 270 V. minus 230 V. (=40 V.) across V1 the max. current that can be obtained without loss of stabilisation is, of course, much less that this—about 25 mA.

Yours faithfully,
E. F. GOOD.

c/o R.R.D.E., Malvern, Worcs.

DEAR SIR,—Referring to Dr. Good's letter, I fear the statement made in the caption to Fig. 1—that the power unit described will deliver a stabilised voltage of 230 V. at a current up to 70 mA.—is somewhat ambiguous.

The current which may be drawn from the power unit with stabilisation maintained, depends on the output voltage and the following approximate figures apply:—

Stabilised Volts		Max. Current in mA.	Stabilised Volts		Max. Current in mA.
230	...	40	180	...	65
210	...	50	165	...	70
200	...	60	150	...	80

Yours faithfully,
J. N. WALKER (G5JU).

Birmingham 31.

T.V.I.—Class B Operation for P.A.

DEAR SIR,—With reference to the admirable article by G5RV on T.V.I. reduction, in the May BULLETIN, the writer has felt for some time that successful harmonic reduction is assisted by attention to transmitter design and choice of valve-operating conditions, which contention would seem to be borne out by G5RV's exhaustive experiments. Of course, this is not to say that T.V.I. suppression would necessarily be achieved without harmonic traps and filters, but no doubt there are many cases where a slight readjustment on the lines suggested in the article would clear T.V.I. without the aid of filters.

As the writer is located only about four miles from Alexandra Palace, and uses C.W. exclusively when on 14 Mc/s., the problem is far simpler than in the case of "fringe areas," but some tentative tests have been carried out, running push-pull 807's in Class B P.A. operation, using fixed grid bias only. This arrangement gave an anode efficiency of about 65 per cent. on 14 Mc/s., with a noticeable reduction of 3rd harmonic indicated on a harmonic monitor similar to that used by G5RV. Care was necessary to avoid parasitics and neutralisation had to be adopted; alternatively a pair of triodes, such as the TZ40, could be used in neutralised Class B push-pull with zero bias.

(Continued on page 323).

Rejecting Class A operation as being too inefficient, a further reduction of harmonic content would probably be achieved by Class AB2 operation, with a possible anode efficiency of about 50 per cent.; the reduction of efficiency from about 80 per cent. for Class C, to about 50 per cent. for Class AB2, corresponds to only about 2 db power loss; on the other hand with telephony operation, low level modulation would have to be used, resulting in a further loss, as opposed to Class C anode modulation.

I should be interested to hear from any member in a fringe area who has tried Class B P.A.'s.

Yours faithfully,
R. D. McMILLAN (G2CWY).

London, N.W.11.

Television—Choice of Frequency

DEAR SIR,—I feel that some comment is called for by the section on "Television" in "The Month on the Air" feature in the May issue. Whether this represents the Society's official view of the matter or is an expression of Mr. Milne's own feelings I know not but such a broad statement, calling in question as it does the decisions of those well qualified to make them, may well cause some raising of eyebrows among those outside your membership.

The choice of the 45 Mc/s. band for the London television service cannot have been lightly made, it being desirable to use a frequency which could not be relied upon for regular long distance communication while at the same time being as low as possible to ensure the maximum ground-wave service area, essential from the economic point of view. The fact that the London service is received regularly in South Africa for a few months is of little significance if this only occurs near the peak period of the 11 year sunspot cycle. Are there in fact records of similar reception in or before 1939? The opinion of some of our ionospheric specialists would perhaps throw some light on this problem.

Again, it would be interesting to know the received field strength of the signal in S. Africa for it may well be expected to be weaker than that necessary to cause interference with a similar service out there assuming the authorities to guarantee the latter down to a level of say 100 μV/m. Outside this figure local amateurs might, as here, be blamed on occasion for such interference but the reverse could equally well be true!

The choice of 45 Mc/s. is unfortunate for quite another reason, as many amateurs are only too aware, but far too many receivers are in the hands of the public for any radical change to be expected for some time to come. If, as Mr. Milne suggests, all television should be operated above 100 Mc/s. the present method of coverage of the country by a few high power transmitters would not be possible and it would then be necessary to resort to a large number of lower powered local transmitters centred on the main areas of population; why then stop at the limit of 100 Mc/s?—400 Mc/s. would probably suffice. Ideally the programme could be beamed at U.H.F. to the centres and thence be relayed either by a local U.H.F. transmitter or better, by line or superimposed upon one of the existing services. Provided the same video standards were adhered to, the problem of converters for existing receivers need not be large and the resulting picture would be free from the depredations of foreign services, car ignition and the likes of—

Yours faithfully,
R. ADDIE (G5LT).

Woking, Surrey.

DEAR SIR,—In the May BULLETIN Mr. Milne criticises the choice of frequencies for Television, in view of the "regular" reception of Alexandra Palace signals in South Africa.

This reception is the result of abnormal reflections from the F2 layer due to high U.V. radiation from the sun causing intense ionization. The chance of these reflections giving long-distance signals is a maximum in the north-south direction. When the sunspot cycle has passed its present maximum similar conditions are unlikely to occur till the next peak in the 11-year cycle.

Even when this ionosphere reflection does occur, the skip distance is of the order of 2,000 miles, and signals will not be received from European stations by this means, as suggested by Mr. Milne.

Sporadic E reflections may occasionally give signals from Europe but will not be at all regular.

Signals from Europe may be received in this country on the present TV band by ducting, but this is likely if anything to be more serious above 100 Mc/s. (see p. 283, May BULLETIN).

The disadvantages of TV transmissions above 100 Mc/s. would include more expensive receivers, lower-power transmitters and smaller service areas. So perhaps the television bands are in the right place after all.

I agree that viewers should realise that an interference-free picture cannot be guaranteed, but believe that most of them are already aware of this fact.

Yours faithfully,
PETER BRAMHAM (G3FIP).

Bradford, Yorks.

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AMERICAN U.F.1 trans-receivers, new, canvas case, telescopic aerial, handset. B.2 transmitter-receivers complete. Offers. S.A.E. for lists of equipment at bargain prices.—G5XS, The Forge, Coreley, Ludlow. [*759*

AS new two 1359 receivers 130/520 Mc/s. £10 each. Wireless Set 8 £4. Two T-28/APT1 £4 each. Power pack RA34H £13. TS.69/AP 341/1000 Mc/s. £5.—RUTH, 579 High Road, Ilford. [*747*

AVO A.C. all-wave oscillator used to line up one set only; as new £10.—C. S. CUTTS, 90 Poppleton Road, Leytonstone, E.11. Phone WAN. 4629. [*766*

BC221 mains operated, crystal wavemeter, switched audio-modulation, calibration book, £8 10s. or offer. R.C.A. P.M. speaker, needs new cone 7s. 6d. 2 Universal mains transformers £1 each.—HEATH, 7 Beulah Road, Thornton Heath, Surrey. [*741*

B2 RECEIVER Transmitter power pack and all accessories. Brand new and unused. £12.—Box 737, PARRS, 121 Kingsway, London, W.C.2. [*737*

CHASSIS, Panels, Racks and Metal Cabinets stock sizes or made to specification in steel or aluminium: Wrinkle finishes available.—REOSOUND ENGINEERING & ELECTRICAL COMPANY, Coleshill Road, Sutton Coldfield. [*699*

CLASS D Wavemeter. 6 V. A.C. perfect. With manual 75s.—LIVERMORE, 256 Grove Green Road, Leytonstone, E.11. [*770*

CRYSTAL Microphone inserts (Cosmocord). Mic-6. Bakelised Diaphragm. Brand new. 15s. 6d. post free.—RADIO-AID LTD., 29 Market Street, Watford. [*750*

ELECTRONIC Key with built in audio monitor £4, ZB2 unit converted and aligned for 2 Metres £2, Avo Minor A.C./D.C. £4, or would exchange for Ham gear.—G3DJQ, 131 Church Lane, Birmingham, 20. [*749*

FOR SALE: Selection of transmitting gear, crystals, valves write for list.—L. HEUDEBOURCK, 51 Winding Way, Dagenham, Essex. [*752*

FOR SALE: CR100 excellent condition spare set valves, phones £40. Hunts C.R. Bridge with lens attachment £13. Avo Model 7 £15. Available for inspection after 7 p.m.—D. HUME, 67 Elmsleigh Avenue, Kenton, Harrow, Middlesex.

FOR SALE: RME70 with separate speaker, just overhauled and re-aligned, excellent condition. £25 or offer.—BELL, 42 Lansdowne Crescent, Glasgow, N.W. [*758*

FOR SALE: Transmitters BC457-A 4–5·3 Mc/s., BC458-A 5·3–7 Mc/s. Receivers BC454-B 3–6 Mc/s., BC455-B 6–9·1 Mc/s. Receiver BC348Q. Radio Altimeter transmitter/receiver 400 460 Mc/s. Wanted: Receiver 1132 with power pack. No. 2 Headset for 19 set with junction distribution box.—J. K. SMITH, 62 Maple Gardens, Methil, Fife. *776*

FOR SALE: Canadian 58 Transmitter/Receiver, V.P.U. requires attention £5: M.C.R.1 as new, with power pack and phones £8; D.C. Avominor 35s.; Myford 3½" treadle lathe, offers ?—G3EEY, Green Gables, Courtlands Lane, Exmouth. [*765*

FOR SALE: CR100 (B28), 60 kcs/. to 28 Mc/s. perfect condition. Also American R-4/ARR-2 (ZBX) 120 Mc/s. 6 pre-set frequencies and TN-8/APX-1 comprises 28 midget tubes (6C4's, 9006's, 6AG5's). Offers.—ROBERTSON, 25 Edmondscote Road, Leamington Spa. [*768*

HALLICRAFTERS "Echophone" Model EC-1B. A.C./D.C. 6 valves 550 kc/s. to 30 Mc/s., built in speaker, bandspread tuning, noiselimiter. 12 months old, excellent condition, with makers manual. £15.—G2CZM, 12 Grove Wood Close, Chorleywood, Herts. [*751*

HALLICRAFTERS, SX23, 550 kc/s.–32 Mc/s. Excellent condition, S-Meter, crystal, band spread 80, 40, 20, 10 metres, with handbook £27 10s.—C. A. La RIVIERE, 3 Cranbourne Drive, Hoddesdon, Herts. [*744*

HRO National Senior, 5 coils and power pack with built-in speaker. Recent £10 overhaul. Bill available. £30 including carriage; Also Marconi RG-37, 16 kc/s.–30 Mc/s. turret-tuning. Excellent condition £11 including carriage; also few kits containing 5 lbs. resistors and condensers (unused), 7s. 6d. post free. 300–0–300 V. 500 mA. transformers (and chokes) £1.—Box 739, PARRS, 121 Kingsway, London, W.C.2. [*739*

MARCONI CR100/4 communications receiver, colour grey, as new from factory with complete set of spare valves, resistances, condensers, transformers and instruction manual £35; Cossor Model 339A double beam oscilloscope, blue trace, as new with instruction manual £35.—Box 740, PARRS, 121 Kingsway, London, W.C.2. [*740*

M.C.R.1 receiver and power pack in good condition, four coils covering 150 kc/s. to 15 Mc/s., phones, as and gen. book, £6.—BRS14849, 187 Eastwood Road, Rayleis, Essex. [*755*

MULTIMATCH modulation transformer. Match P.P. Audio amplifier 250 mA. maximum into P.A. 425 mA. maximum or reverse. 70 ratios 32s. 6d. S.A.E. particulars: TU9B new 12s. 6d.; TU6B 14s. 6d.; 5R4GY 5s. 9d.—KNIGHT, 82, Fairfield Road, Widnes. [*731*

NEW unused T1154M. 4 frequency band £8; T1154F used but perfect, 4 band £6 10s.; Brand new unboxed 813's Pair £5; Boxed TZ40 pair £2 10s.; Hammarlund communication receiver HQ120X, used, perfect, bargain £25; Offers considered any item S.A.E.—HANCOCK, 198 Petre Street, Sheffield, 4. [*732*

QSL Cards.—Distinctive and attractive designs. Samples and prices from G5KT, 35 Hillside Avenue, Kingswood, Bristol. [*767*

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QUICK Sale.—Carriage paid. New R.107 for 20, 40, 80 metres, etc. Also Mains R1155. £12 the pair or offers. WS22 for £3.—Box 742, PARRS, 121 Kingsway, London, W.C.2. [*742*

Q5R9 Beams, 2½ to 20 metres. Masts, lashings, bearings, rotators, indicators and rigging. S.A.E. for list. The Countries leading specialists.—EMDO, Ace Works, Staines. [*562*

REQUIRED urgently.—Power pack for B2 write or phone.—G3AOS, 5 Prospect Drive, Hale Barns, Cheshire. Altrincham 4464. [*753*

RK25, KT44, 59, ATP4, KT2, VU111, 6F6G, X41/C, £1 lot; McElroy Bug £1; CT3 turret with three IFT's £5; 1155 with power pack £9.—34 Birch Avenue, Romiley, Cheshire. [*769*

SALE: 30 watt amplifier, microphone, turn-tables (2), 2 Horn speakers, 1 box speaker, 150 assorted dance records.—STEVENS, South View, Uppingham, Rutland. [*771*

SALE: "Electronic Engineering," March, 1944–October, 1947; "Wireless World," August, 1944–August, 1947 (September, December, 1944, January, June, 1947, missing), May–November, 1943, March, May, June, 1944; "Bulletins," April, 1941–June, 1947; S.W. Magazines, 21 pre-war copies.—Offers to G3BKF, "Braunston," St. Nicholas Road, Witham, Essex. [*733*

SALE: R1155, 75 kc/s. to 18 Mc/s., fitted with internal A.C. 230 V. power pack and 5" speaker, grey enamel finish, good job £15. Taylor 47A Valve Tester with Universal Meter £16, also Taylor 110A condenser, resistance test bridge £9, both in perfect order.—BUNTING, 4 Jubilee Terrace, Newcastle, Co. Down, N. Ireland. [*746*

SURPLUS Gear.—Transmitters, receivers, test gear, valves and components at bargain prices. S.A.E. for list. Wanted set of B2 coils.—Box 743, PARRS, 121 Kingsway, London, W.C.2. [*743*

URGENTLY required, instruction manual and circuit diagrams for Eddystone 358, and 400X/DS23. Also coils, for 400X/DS23. 130 to 2200 kc/s., AA, BB, CC, DD. No C.O.D. State price, or swop new 813 and base R.C.A. boxed.—FIELD, 103 Claybrook Road, Hammersmith, W.6. [*760*

UNUSED.—35T, TZ40, 829, 832, 17s. 6d.; 4074, KT8, QV04/7-VT510, 10s. 6d.; Tested, PT15, 12s. 6d.; 807, 6s.; VR91, 5s.; 100 and 1000 kc/s. crystals, 12s. 6d. each; VG7030, 30s.; HRO 4-Gang and gear box, 30s.; 1132 crackel panel, 70s.; AF8, 20s.; 33 foot tubular mast complete, 50s. Wanted: 813 bases UM3 or similar.—Box 764, PARRS, 121 Kingsway, London, W.C.2. [*764*

WANTED: Working instructions for Type 62 set. Loan or buy.—L. GROUT, 68 The Drive, Worthing, Sussex. [*735*

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WANTED: Tuning unit TN17/APR4 74/320 Mc/s.—G5RL, 15 Market Hill, St. Ives, Huntingdonshire. [*756*

WANTED: To buy CR100 manual.—Price to F. POLLARD, 9 Roland Avenue, Nuthall, Notts. [*761*

358X Eddystone receiver. Complete set of coils in case, 90 kc/s.–31 Mc/s. External power pack. Handbook. One owner. Carefully used. Not ex-Govt. surplus. £25.—14 Highbury Avenue, Hoddesdon, Herts. Phone Hoddesdon 3240 week-days.

WANTED: Circuit diagram with component values, for Canadian Marconi Receiver No. 52.—68 Terrace Road, Elvington, Dover. [*763*

WANTED: SX24 or SX25. Also American radio Magazines. Any date or condition.—Offers to Box 754, PARRS, 121 Kingsway, London, W.C.2. [*754*

150/200 watt transmitter. 54 inch rack; black crackle panels fully metered £37; also R1481 receiver modified for 10 and 20, two IFS 465 kc/s., £8; BC433 modified for 20, both with power packs.—Box 745, PARRS, 121 Kingsway, London, W.C.2. [*745*

100W modulator, 3 stages into p/p 6B4G's into p/p TZ40's, Thordarson Multimatch modulation and Audio transformers, fits standard 19" rack, all valves, class B and P.A. meters £14. Taylormeter 83C, 20,000 OPV on A.C./D.C. £14. Ghirardi's "Radio Trouble Shooter's Handbook" new 17s. AC6 Pen 7s. 6d.—G4QG, "High View," Upperton, Petworth. [*738*

1131 for sale. Perfect condition. Complete all valves, stored 2 years. Also ex-Police transmitter, in 6 ft. rack, F.B. job, 250 watts, phone/C.W. No reasonable offer refused. Carriage arranged. S.A.E. to: G8VB 42 South Ealing Road, London, W.5. [*734*