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*The*  
**SHORTWAVE**  
*Magazine*



**EXCLUSIVELY FOR THE  
RADIO EXPERIMENTER &  
TRANSMITTING AMATEUR**

**VOL. VIII No. 12 FEBRUARY 1951**

# H. WHITAKER G3SJ

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**XTALS.** 1000 kc Bliley, Valpey or Somerset, standard  $\frac{1}{2}$  in. pin spacing 20/- . 100 kc RCA, Bliley, sub-standards, 17/6. Western Elec. 500 kc  $\frac{1}{2}$  in. Ft. 243 holders, 7/6.

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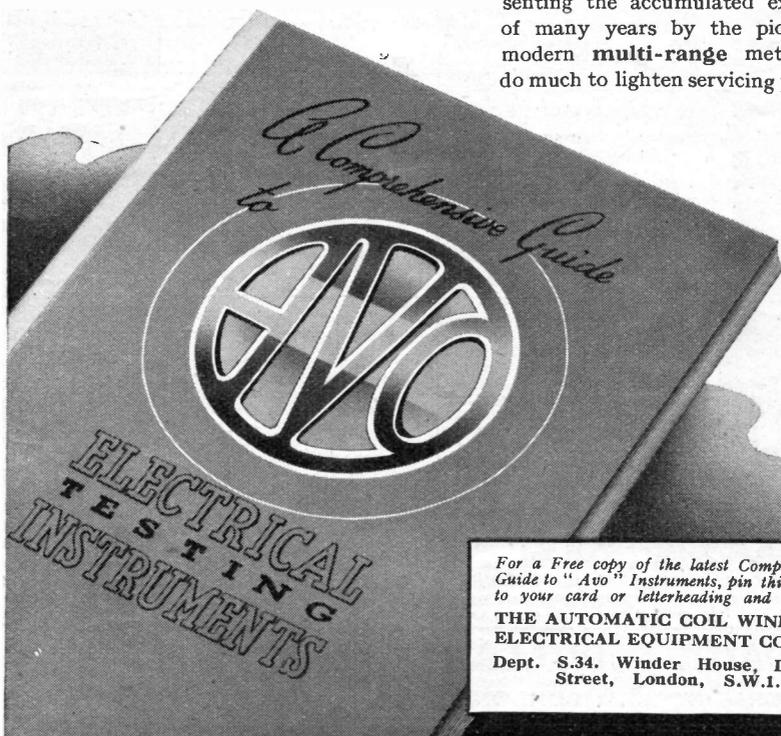
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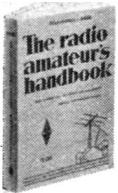
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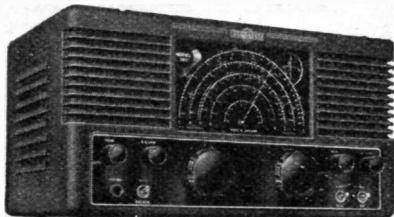
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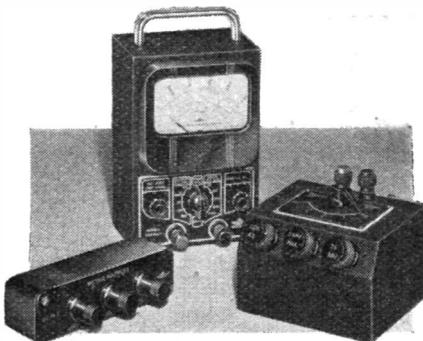
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# NEW

## R.C.A. TELEGRAPH AND TELEPHONE COMMUNICATIONS TRANSMITTERS TYPE ET. 4336

Designed and produced by the Radio Corporation of America, the Type ET.4336 is outstanding in the exceptional quality of construction, versatile operation with rapid band selection and adjustment, and the embodiment of modern advantageous features not generally found together in one equipment.

The transmitter is designed for communications service in the high frequency range of 2,200 to 20,000 kilocycles, and any desired operating frequency within this range may be quickly selected, using ordinary crystals. All controls employed in tuning the transmitter to any frequency within the overall range are mounted upon the front panel. Shift from telegraph to telephone operation is switch controlled, and high speed keying is permissible. Two transmission power levels of 250 or 350 watts are available, however the actual outputs obtained are somewhat in excess of these values at 20 mc/s, and increase with decreasing frequency to values in excess of 300 and 450 watts respectively at 3 mc/s.

### GENERAL FEATURES

The complete transmitter is housed in a tall console cabinet, superbly finished, and has a very attractive appearance. Side and rear panels are removable, and electrical interlocks are fitted as a safety feature. Stylish panel controls are conveniently grouped, and clearly identified. Five Meters are employed to read Aerial, Plate and Grid currents, and Filament voltages. A modulation and keying indicator of the vapour column type is mounted on the front panel. The Type M1-19468 Crystal Multiplier, which we supply with the transmitter, slides into an aperture which is normally concealed by a removable panel. When employing this unit, the oscillator stage in the transmitter functions as an intermediate P.A. stage, or frequency multiplier, and whilst employment is optional, transmission over the entire transmitter frequency range, using low frequency crystals, is a distinct operational advantage.

### CIRCUITRY

Valves Type 807 are employed in the Crystal Multiplier Unit and the Transmitter Crystal Controlled Oscillator. The Power Amplifier stage utilizes two Valves Type 813 operating in parallel, and the Modulator stage uses two Valves Type 805 operated in a Class B arrangement. Plate and screen voltages for all stages are obtained from a mercury-vapour rectifier comprising four Valves Type 868A, connected in a full-wave parallel circuit. An Antenna Coupling and Matching system is provided, and is so designed to allow the use of various feeder arrangements.

### ELECTRICAL CHARACTERISTICS

Type of Modulation	... ..	Class B, high level.
Audio-Input Impedance	... ..	500 ohms.
Audio-Input Level for 100 per cent Modulation	... ..	20 vu.
A-F. Response	... ..	$\pm$ 5 db from 400 to 7,500 cycles.
A-F Harmonic Distortion	... ..	5 per cent. r.m.s.
Power Input :		
Telegraph, Low Power	... ..	1.25 kW.
Telegraph, High Power	... ..	1.46 kW.
Telephone, 100 per cent. Modulation	... ..	1.82 kW.
Power Supply Requirements	... ..	115-230 v., 1 phase, 50-60 cycles.
Regulation (Maximum)	... ..	5 per cent.

**DIMENSIONS** Height, 58ins. Width, 17ins. Depth, 24ins.

**WEIGHT** 500 lbs.

**CONDITION** New and perfect, as ex-factory. Our Guarantee and Individual Test Certificate is supplied with each transmitter.

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FOR THE RADIO AMATEUR & AMATEUR RADIO

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# SHORT WAVE MAGAZINE

FOR THE RADIO AMATEUR AND AMATEUR RADIO

## EDITORIAL

### *Progress*

*This issue completes our fifth post-war year—and during that long period since early 1946 there can be no doubt that Amateur Radio has made great strides.*

*This progress is measured both technically and by the increased—and still steadily increasing—number of newcomers to our ranks, whether as listeners or on the air as transmitters. And there are hundreds more preparing themselves for the licence examinations.*

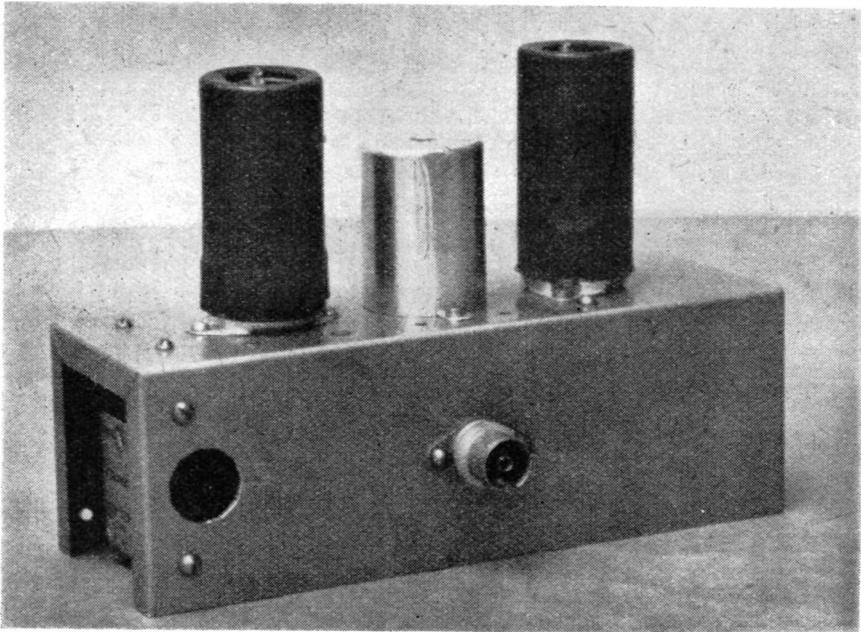
*Technically, progress has been equally steady, and a comparison between methods and equipments used in March 1946 and February 1951 shows some remarkable changes. In the field of VHF, it can be said that amateur progress has been truly remarkable, and we of SHORT WAVE MAGAZINE are glad to have been able to make some contribution in this respect.*

*It is not our intention here to forecast the future, nor even to discuss it, except to say that it will remain the function of SHORT WAVE MAGAZINE to mirror the progress of Amateur Radio and to play our due part in furthering and developing the art.*

AUSTIN FORSYTH, G6FO

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## CRYSTAL CONTROLLED VHF CONVERTER

Using Twin Triodes  
and Tuned IF

By M. D. MASON (G6VX)

THE converter to be described was originally designed for the front end of a small portable 2-metre receiver. It has been used for the reception of the Midland TV, and as part of the IF on a 70 cm receiver.

At one time or another, everyone must have felt like tearing the receiving equipment apart due to the utter loneliness that occasionally prevails on the VHF bands. But comparison tests have shown that this converter, when fed into a suitable communication receiver, has sufficient gain coupled with low noise-factor to give one confidence that if there is anything to be heard it will

be heard. To work the VHF bands successfully experience has proved that equipment must be absolutely dependable and possess the highest possible stability—but it need not, perhaps, be the last word in super-sensitivity.

In these days, the usable sensitivity is controlled by the receiving site, and not by any limitation in receiver design. If the greater part of the noise is produced with the aerial connected, there is not much that can be done. A 16-element beam coupled to the converter described, working into an Eddystone S. 640 satisfies the argument at this location. Incidentally, the standard converter used for comparison tests consists of two grounded-grid ECC91 RF stages, 6AK5 triode mixer and 6J6 oscillator. The only noticeable difference is a small advance of the RF gain on the 640 for the same listening conditions.

### Description

There are no outstanding design features or special precautions to take for those wishing to make a similar unit. The mechanical construction is simplicity itself. The chassis is made of 22 gauge brass and measures 6ins. x 2ins. x 2ins. A partition is soldered in across the RF/mixer socket placed 1½ins. from one end. The oscillator is

mounted  $1\frac{1}{2}$ ins. from the opposite end. The RF socket is positioned to allow the screen to pass between pins 5 and 6, 9 and 1. The aerial comes into one side of the RF section, the IF output is situated on the opposite side, about the middle of the chassis, and the power input is a little farther along at the end. The IF output coil is mounted on top of the chassis between the two valves. The shield can is made from the case of a dud electrolytic condenser, one inch diameter, but the length is cut down to  $1\frac{1}{2}$ ins.; two lugs are left for mounting and a  $\frac{1}{4}$ in. hole drilled in the top for tuning. The Neosid coil formers used for L5 and L6 are mounted on small  $\frac{1}{4}$ in. x  $3/16$ in. paxolin pillars tapped for 8 BA screws. The RF anode choke is mounted vertically in the mixer compartment, next to pin 9. From the choke a short lead passes through the partition and connects to pin 1. In the same way, a short lead goes from pin 9 through the partition to one of the heater chokes situated on the RF input side of the unit. The "cold" ends of the mixer and input coils, together with the two 2.8  $\mu\mu\text{F}$  trimmers, are soldered directly to the chassis.

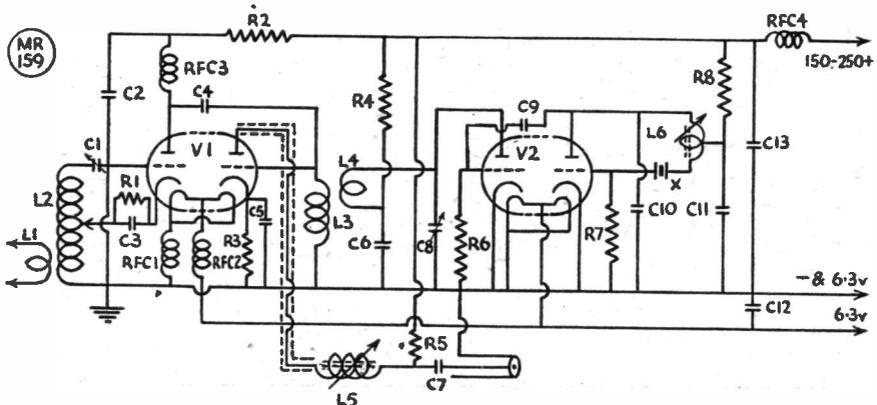
The input circuit was chosen to allow reasonable coupling to a balanced 300-ohm feeder. Should a coaxial feeder be preferred, it could connect directly to the cathode tap, but some kind of shunt inductance must be kept in circuit to prevent IF break-through. Good RF chokes should be used and the figures given are just about optimum for a good choke at 145 mc.

The IF output coupling circuit is very useful if wide band-width is necessary, and is similar to the familiar Collins' coupler. The input capacity is made up by the mixer anode and 3ins. of screened lead going to the IF output coil. The variable inductance is L5, and the output capacity is supplied by 3 feet of 8-ohm coaxial cable. The tuning is very flat, but should be peaked at the centre of the IF tuning range, i.e., 10 mc in this case. The IF tuning range could be anywhere between 7

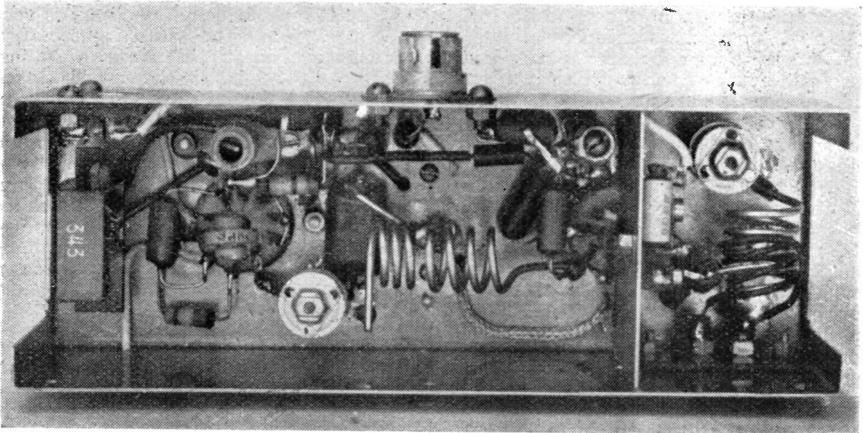
Table of Values

Crystal Controlled Two-Metre Converter

- C1, C8 = 2.8  $\mu\mu\text{F}$  trimmers
- C2, C3, C6 = 500  $\mu\mu\text{F}$
- C4, C10 = 25  $\mu\mu\text{F}$
- C5, C11 = 750  $\mu\mu\text{F}$
- C7 = 100  $\mu\mu\text{F}$
- C9 = 10  $\mu\mu\text{F}$
- C12, C13 = .01  $\mu\text{F}$
- R1 = 100 ohms,  $\frac{1}{2}$ -watt
- R2, R3, R4 = 1,500 ohms,  $\frac{1}{2}$ -watt
- R5, R7, R8 = 4,700 ohms,  $\frac{1}{2}$ -watt
- R6 = 47,000 ohms,  $\frac{1}{2}$ -watt
- RFC1, 2, 3 = 21 turns 26 SWG DCC on  $\frac{1}{4}$ -in. former, slipped off and doped.
- RFC4 = 1.5 mH
- L1 = 4 turns 22 SWG P.V.C. interwound at cold end L2
- L2 = 5 turns tinned copper, 16 SWG, 7/16-in. i.d. by  $\frac{1}{4}$ -in. tapped at  $1\frac{1}{2}$  t.
- L3 = 4 turns as above,  $\frac{3}{8}$ -in. i.d. by  $\frac{3}{8}$ -in. long.
- L4 = 3 turns as above  $\frac{3}{8}$ -in. i.d. by  $\frac{1}{2}$ -in. long, spaced  $\frac{1}{4}$ -in. from L3.
- L5 = 40 turns 40 SWG enam. pile wound on  $\frac{1}{4}$ -in. former.
- L6 = 17 turns 26 SWG DCC tapped at 4  $\frac{1}{2}$  turns,  $\frac{1}{2}$ -in. former.
- X = 7500 kc crystal, excited at 22.5 mc
- V1 = 12AT7
- V2 = 12AT7, or 6J6



Circuit of the crystal-controlled two-metre converter designed by G6VX. V1, V2, are 12AT7's, high-mu twin triodes with heaters arranged for either series or parallel connection.



Under-chassis view of the 2-metre converter described in the text.

and 30 mc provided suitable crystals are available.

It is a great mistake to take the IF any lower than 8 mc with this kind of open construction. The oscillator comes too close to the RF tuning range and as there is little or no pre-selection, and screening is non-existent, a large unwanted voltage can be present on the RF input stage so that some valves will become biased, possibly to cut-off, thus producing an actual loss between the aerial and mixer.

A useful guide to determine the lowest safe intermediate frequency to use is to divide the signal input frequency by twenty.

### Setting Up

In this converter the crystal is made to oscillate very near to 22.5 mc (it should be exactly 22.5). The sixth harmonic amplifier is tuned to 135 mc, about one half-turn of C<sub>5</sub> from maximum capacity; the mixer coil is adjusted for maximum signal at 145 mc by opening or closing the turns. The RF input is tuned to 145 mc; this must be done on a received signal with the aerial connected because a slight increase in noise level as the trimmer is rotated is not necessarily the correct setting. The trimmer C<sub>2</sub> should be two turns from maximum capacity.

The last important check is to open up the cathode of the mixer and adjust the tuning of C<sub>8</sub> and the coupling of L<sub>4</sub> and L<sub>3</sub> so that the cathode current is about 2.5 mA; this should drop to around 1.4 mA if the crystal is removed, and the HT must be 150 volts for these readings. The converter can be operated successfully with an HT of 150 to 250 volts, and the filaments may be wired for 6v. or 12v. operation if two 12AT7's are chosen; total HT consumption with 150 v. HT is 20 mA. RFC<sub>4</sub> and C<sub>12</sub> are only included to filter out IF pick-up that may come from the power supply leads.

For those who do not fancy a crystal controlled converter a very simple change will produce an extremely stable *tunable* version. Remove the crystal holder and complete this circuit by a 20-40  $\mu\mu\text{F}$  ceramic condenser. With one end plate connected to the chassis, mount a suitable tuning condenser that has a swing from a minimum capacity of 5 to a maximum of 10  $\mu\mu\text{F}$ .

The IF need not be altered, but an improvement in selectivity is possible by adding 50  $\mu\mu\text{F}$  to the mixer anode and removing about 20 turns from L<sub>5</sub>. Take away R<sub>5</sub> and C<sub>7</sub>, and wind about 6 turns of 30 gauge silk covered around the cold end of L<sub>5</sub>. This coil will then serve as a low impedance output link.

*Keep in Touch—Read the Magazine regularly*

## SCREEN GRID KEYING METHODS.

### Practical Discussion

### Circuits and Values

By J. N. WALKER (G5JU)

ALTHOUGH many may not agree, in the writer's opinion the best all-round system of keying a transmitter is to break the HT supply to the screen grid of one or more valves. The current across the key can be kept small; and by suitable arrangement and choice of component values, a key-click filter action can be automatically introduced, without the necessity of adding the conventional type of key-click filter. It is particularly desirable to eliminate the iron-cored choke commonly used in such a filter. Whilst this choke limits the rate of current rise on "make," the spark it creates on "break" is, in practice, difficult to damp out fully. It is noticeable that, when a signal with key-clicks is heard, the interference on "break" is more often than not much worse than on "make."

There is more to screen-grid keying than just inserting the key where one thinks fit and leaving it at that, and the purpose of this article is to discuss certain points which may have caused difficulty or been overlooked.

#### Point of Insertion of Key

It is impossible to lay down hard and fast rules about the point of insertion, as much will depend on the number of stages in the transmitter, on whether or not break-in operation is desired, and so on.

If the primary oscillator—VFO or crystal—is on a frequency well removed from the final transmitter frequency, there should be no need to key this stage, unless trouble is experienced from what should only be a weak residual heterodyne note when working break-in. Although many claims have been made for complete stability, when the primary oscillator is keyed, this method does not lend itself to the production of a signal with a real T<sub>9</sub> tone.

If the transmitter has only two stages

*The author shows that there is a good deal more in keying systems generally—and screen keying in particular—than simply jacking in the key and connecting up one of the "text-book" thump filters. Apart from any question of the quality of the radiated signal, it is almost essential if local TVI is to be avoided that the keying be smooth and absolutely clickless. Much TV interference troubles are due to nothing more than the good old-fashioned phenomenon of shock excitation of the TV receiving aerial.—Editor.*

—oscillator and output—it will be well to carry out tests, first with the key placed in the screen-grid feed to the first stage and then to the second stage, presuming the latter is not a high power one.

Keying the second stage is good, but the third stage is even better—if there is a third stage. There is then adequate buffer action between the keyed stage and the primary oscillator, and keying should have little or no effect on the fundamental frequency.

#### Obtaining Complete Cut-off

When keying the screen supply, difficulty is often experienced in obtaining complete cut-off—the transmitter continues to radiate a weak signal. This effect is particularly noticeable with beam tetrode valves such as the 807 and KT8, and is due in part to the fact that the drive is still on the control grid when the key is up.

In the first place, the screen-grid should not be left floating, as would be the case if the circuit in Fig. 1 were employed. Almost certainly the valve would continue to pass on appreciable amount of anode current and the output would be measurable. An improvement results when the resistor R<sub>4</sub> is added, as shown in Fig. 2, the potential of the screen grid then being tied to the chassis (key up). However, to obtain complete cessation of anode current, the screen potential must be made definitely negative—not necessarily to chassis but to the cathode of the valve; this is the point which counts.

If a negative bias supply is available, the circuit in Fig. 3 can be used, R<sub>4</sub> being returned to the negative rail instead of to chassis. Providing the rail potential does not exceed, say, 20 or 25 volts, it will not greatly affect the operation of the valve (key down), but, if necessary, R<sub>3</sub> (Fig. 2) can be reduced in

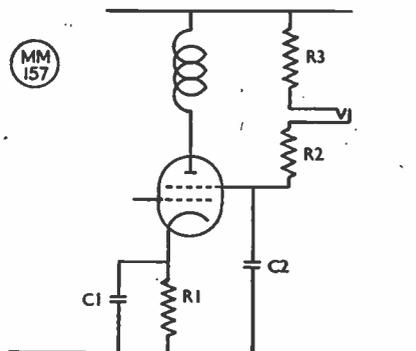


Fig. 1.

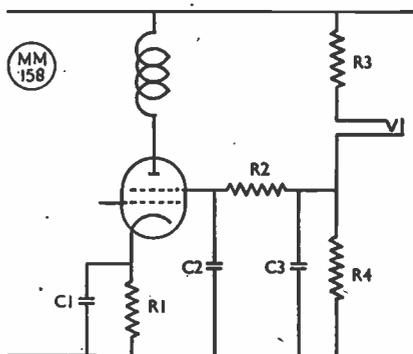


Fig. 2.

value to compensate. Should the rail potential be greater than 25 volts, a potentiometer system should be used, R<sub>4</sub> being connected to the junction of two resistors, the latter being in series across the bias supply. The actual value of R<sub>4</sub> is bound up with other considerations, which are dealt with later.

If no separate negative supply is incorporated, the circuit given in Fig. 4 is effective. R<sub>1</sub> is the usual cathode resistor, the potential drop across which is increased by passing through it a small current from the HT line, *via* R<sub>6</sub>. Giving values of 100,000 ohms to R<sub>6</sub> and 2,000 ohms to R<sub>1</sub>, and assuming 300 volts HT, a bias of about six volts is developed across R<sub>1</sub> (key up) and is applied, in a negative direction, to the screen grid through R<sub>4</sub>. With most valves, the result will be complete cut-off of anode current. (Individual cases may call for variation in the values of R<sub>1</sub> and R<sub>6</sub> to give a different bias voltage.)

In a really obstinate case, such as

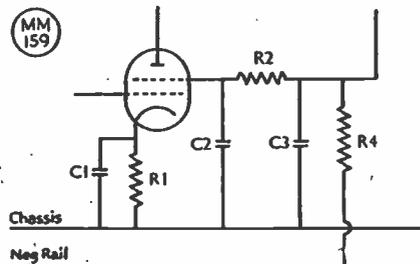


Fig. 3.

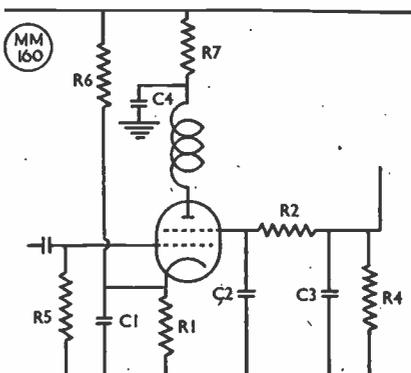


Fig. 4.

may occur when very heavy drive is being applied to the control grid, the remedy is to key the screen grids of two valves simultaneously, using a circuit similar to that shown in Fig. 5. In this case, drive to the second valve is automatically greatly reduced when the key is up and the circuit is guaranteed to be absolutely effective. Also, the values of R<sub>1(1)</sub> and R<sub>1(2)</sub> can be lower than in a single valve keying circuit.

But there is one drawback to this method. The value of R<sub>1</sub> has been made considerably higher than the normal safety value and, when the key is down, the voltage drop across R<sub>1</sub> will be increased accordingly. For example, if the total valve current is 20 mA, the drop across R<sub>1</sub> will be 46 volts. In the majority of cases, this will be of little account, since the system is only intended to apply to the smaller

class of valve as generally found in the early stages of a transmitter. Often the HT voltage is too high, and some is purposely lost in an anode resistor (R7 in Fig. 4). As R1 now fulfils this function, R7 can be reduced in value to, say, 200 or 250 ohms, being retained only for its decoupling action.

**Control Grid Bias**

The employment of a higher-than-normal value for the cathode resistor has repercussions on the control grid-bias. If the latter has previously been adjusted for optimum for the class of service, returning the grid resistor R5 to chassis will result in too high a bias being applied to the valve. However, the operating conditions of most valves

the cathode bias is not to be applied to the control grid.

The second case in mind is that of a buffer stage following a VFO. Such a stage should operate under Class-A conditions, using normal cathode resistor bias, and the circuit shown in Fig. 7 is suitable. The cathode resistor is split into two parts, with the grid leak R5 returned to the junction. R1 (a) is of a value to give normal bias for Class-A operation, whilst R1 (b) will be considerably greater, to provide additional negative bias on the screen grid when the key is up.

**Keying Characteristics**

Fig. 2 has been drawn in a special way to illustrate another point. This is

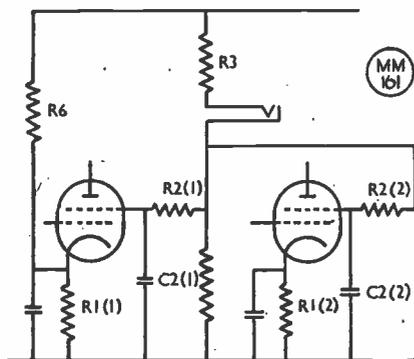


Fig. 5.

are elastic and, in a frequency multiplying stage, often the additional bias will not reduce the output; in fact, the efficiency may well increase, probably at some slight saving in anode current.

Returning R5 to the chassis has the advantage that negative bias (derived from R1) is applied to both screen and control grids (key up), thus aiding cut-off.

There are two stages where high bias is not required or desirable. One is a crystal oscillator, in which the self-biasing action of the grid leak should not be disturbed. (Exceptionally, a valve will follow keying better if a small amount of cathode bias is used.) Therefore, when it is proposed to key the crystal oscillator (usually essential with "break-in" working), the grid resistor should be returned to cathode, as in Fig. 6. This method of connection is correct also in any stage where

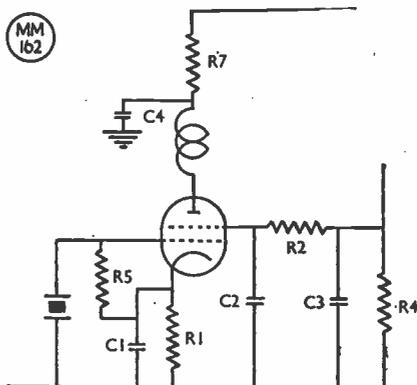


Fig. 6.

that the shape of the keyed waveform can be changed by varying the value of the components in the circuit. Straight-forward keying—that is to say, keying direct without chokes, resistors or condensers inserted to modify matters—would result in a perfectly square waveform, indicated by the solid line in Fig. 8. As is well known, such a waveform is liable to cause severe interference through key-clicks. The rise and fall of amplitude must be rounded off, as in the dotted and chain dotted lines in Fig. 8—more about the actual shapelater.

In Fig. 2, C2 is the usual decoupling condenser (the actual value will vary with frequency and may be anything between .0003 μF and .01 μF) and R2 the decoupling resistor, both mounted close to the valveholder. Although they affect the results slightly, these two components can be forgotten for

the moment and attention directed to  $R_3$ ,  $R_4$  and  $C_3$ , which, incidentally, can be mounted in any convenient position, not necessarily near the valve. When the key is pressed, the voltage on the screen reaches a final value determined by the ratio of  $R_3$  to  $R_4$ , allowing also for the resistance of the screen grid-cathode path inside the valve. This value is not acquired instantly, but builds up gradually. The rate of rise would be exponential if  $C_3$  were a pure capacity, but matters are complicated by the presence of  $R_4$  and of screen current. As the condenser charges up, so the current drain increases. One is reminded of the old mathematical problem of the water tank, with so many gallons going in, a lesser quantity being simultaneously drawn off, the answer required being the length of time required to fill the tank. The present problem is a good deal more complicated because the pressure and quantity going in and coming out are varying and bear a definite relationship one to the other. Fortunately, these complications do not affect the issue to any extent and can well be left out of the discussion.

The time of building-up, then, is dependent on the time constant of  $R_3$  and  $C_3$  (by definition, the time constant is the time taken for the voltage across a condenser, in series with an impedance, to build up to 63% of the applied voltage). The value of  $R_3$  is usually fixed to give the correct screen potential, but  $C_3$  can be varied over wide limits.

When the key is released, the charge held by  $C_3$  decays exponentially accord-

ing to the time constant of  $C_3$  and  $R_4$  (the latter again being taken to include the effective valve resistance).

### Keying Analysis

It now becomes necessary to arrive at the proper rate of rise and fall, so that actual component values can be determined. To answer this question, the times occupied by various signals must be analysed.

The length of a dot can be taken as a standard time unit, and working on normal intervals between characters, the space between a dot and a dash in any one character will also occupy one time unit. A dash takes three, and the spacing between letters takes three. On this basis, an average word of five or six letters will be found to contain roughly fifty time units. Taking a keying speed of twelve words per minute, one word occupies approximately five seconds and a single time unit is 100 milliseconds. A dot therefore lasts for 100 milliseconds and a dash 300 milliseconds. Fig 8 has been drawn to represent one dot and a reasonable allowance for the rise of the signal (and also the fall) is 10 milliseconds. The dotted curve in Fig 8 applies.

If the rate of rise and fall is overdone, a curve like the chain-dotted one in Fig 8 results. It is seen that maximum amplitude on dots is maintained for only a relatively short time. Although the effect will not be so serious on dashes, the overall result will be an appreciable loss of intelligibility, particularly if the signals are weak.

The length of the standard time unit depends on the speed of keying and, at thirty words a minute, it becomes about

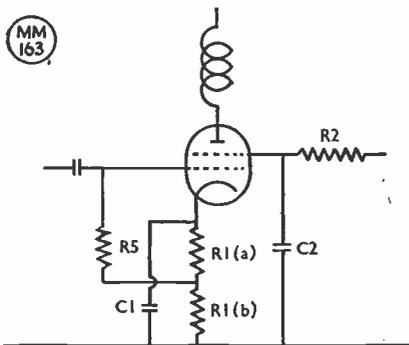


Fig. 7.

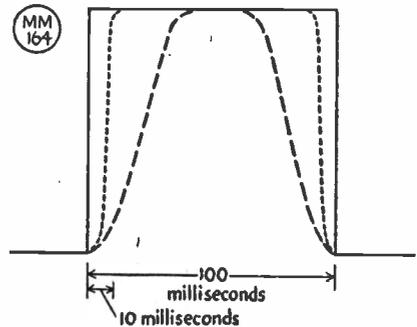


Fig. 8.

33 milliseconds. The 10 millisecond delay shown in Fig. 8 then becomes useless, since maximum amplitude is only maintained for 13 milliseconds.

Therefore, the selection of circuit constants depends on the operator's normal sending speed. If the speed is relatively low, the keying characters can be made smooth and clean by incorporating a slow rate of rise and fall. If sending is fast, there is no option but to increase the rate of rise and fall. In most instances, the speed of keying necessarily varies over wide limits to suit the circumstances applying during any one contact, and thus it is desirable to be in a position to alter the keying lag. This is easily done by fitting a Yaxley switch and several fixed condensers, instead of the single C3 shown in the circuit diagrams.

#### Circuit Values

The following values of R3 and C3 give a 10 millisecond time constant:—

100,000 ohms and 0.1 $\mu$ F
50,000 ohms and 0.2 $\mu$ F
20,000 ohms and 0.5 $\mu$ F
10,000 ohms and 1 $\mu$ F

Looked at another way, if R3 is fixed at 50,000 ohms the following values of C3 give the time constants shown:—

0.2 $\mu$ F	10 milliseconds
0.1 $\mu$ F	5 "
.05 $\mu$ F	2.5 "

If the value of R3 is halved, the values of capacity shown should be doubled to give the same time constant, and *vice versa*. It is therefore an easy matter to arrive at suitable values of capacity to be controlled by the switch and, in most cases, condensers of 0.5, 0.2, 0.1 and .05  $\mu$ F will be satisfactory.

It will be seen that the effect of C2 only becomes of account when the series screen fed resistor R3 is of comparatively high value—100,000 ohms or more. It is, perhaps, wise to include C2(1) and C2(2) in the calculations when the circuit shown in Fig. 5 is used, if condensers of larger capacity than .002  $\mu$ F are being employed in these positions.

#### Rate of Decay

It is in order if the rate of decay of the signal is equal to, or faster than, the rate of rise. If R4 is made equal to R3, these conditions are satisfied. In actual fact, the rate of decay will be faster because there is no retarding effect as occurred during the build-up. What must be avoided is an unduly

slow rate of fall, which adds a tail to the signal and makes it difficult to copy.

It is important to note that a key-click filter of the usual type will modify the operation of the circuits previously discussed, and it is not intended, nor is it necessary, that any such filter be used. In particular, the insertion of an AF choke will alter the performance completely and probably render signals quite unintelligible!

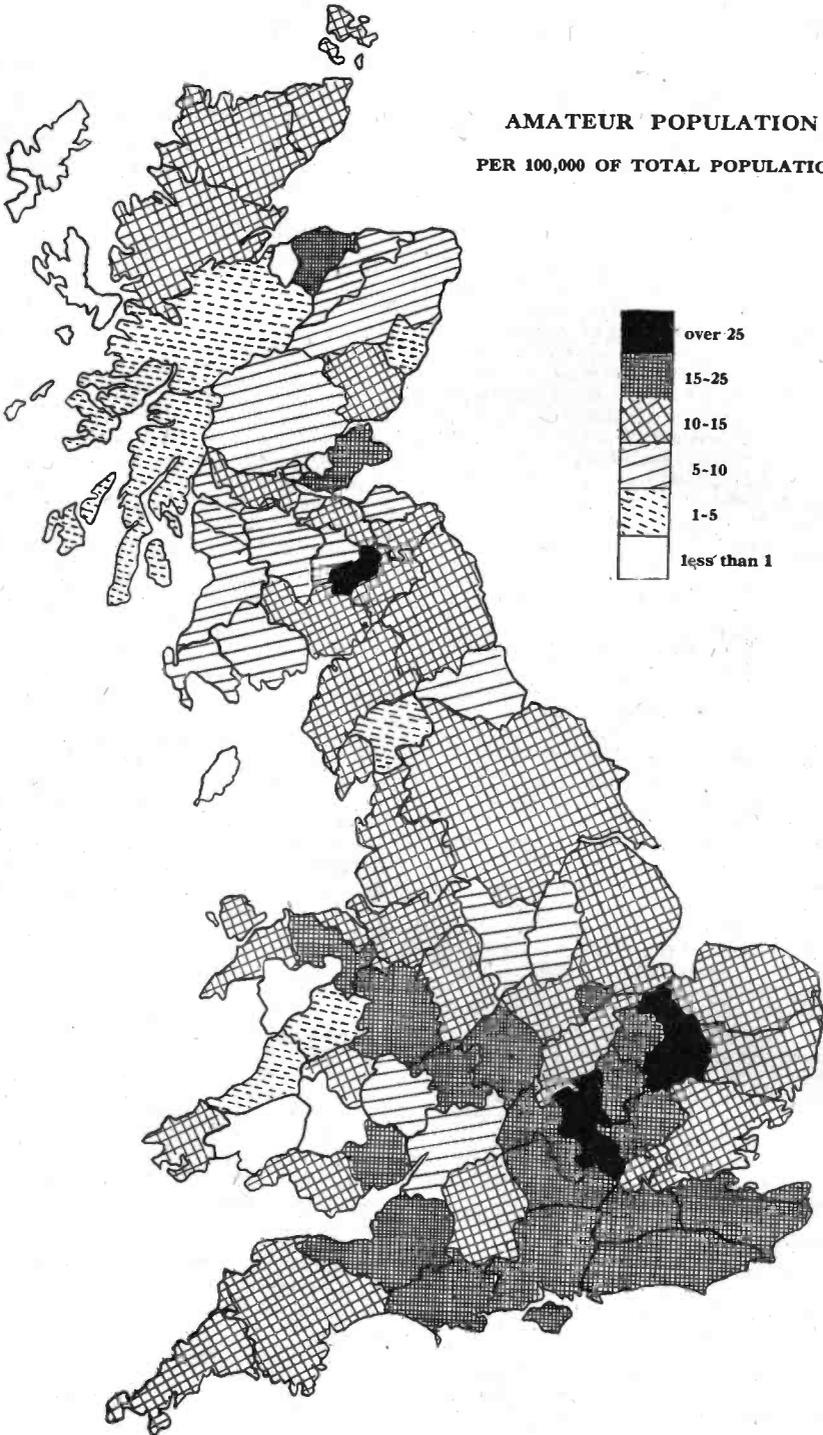
#### Oscilloscope Tests

For the experimentally-minded or for those who may not be convinced on the effectiveness of the circuits described, an hour spent making tests in conjunction with an oscilloscope can be most informative. The 'scope need not be of an elaborate type—all that is required is a fairly slow-running time base and an amplitude control for the input signal.

The input is taken from the screen grid of the keyed valve and, since under some circumstances the voltage surge may be considerable, a 0.1  $\mu$ F condenser of high voltage rating should be interposed, irrespective of whether or not a condenser is already in series with the input terminal of the oscilloscope.

On pressing and releasing the key, the trace on the 'scope will show a transient kick up or down to a degree depending on the circuit constants, and the amplitude control should be adjusted so that the peak of the kick comes conveniently within the screen limits. The test should first be made with the present keying system and, in nine cases out of ten, the kick on "break" will be found much more severe than on "make," especially where an AF choke is in use as part of the filter system. The benefit obtained with a circuit of the Fig. 4 type is immediately obvious on the 'scope, and the correct combination of components values can easily be determined. When correct, the trace on the screen will show only small transient voltages as the key is pressed and released. The user can then be sure that he will cause the minimum of interference, both to other amateurs, to broadcast listeners and to television viewers. It should be remembered that, in many cases, TVI is caused by direct shock excitation, and smooth clickless keying will often remove most if not all of the interference.

**AMATEUR POPULATION  
PER 100,000 OF TOTAL POPULATION**



## WHERE ARE WE ALL?

### Distribution of the Amateur Population

By J. D. HEYS, F.R.G.S.  
(G3BDQ)

**D**EMOGRAPHY is the science of community study, and is based upon available statistics. Although usually applied in discussing mortality, marriage, or disease, demographical studies prove useful in many other fields.

Recognising that in some domestic circles, at least, the "Ham Bug" is regarded as a disease, some such study of our British amateur population is probably justified—and may be of interest and practical value.

The greatest difficulty in preparing a useful amateur distribution map is, of course, the lack of accurate official statistics. No doubt the authorities could furnish the latter, but at present such information is not available to the general public. Though realising its obvious limitations, the writer decided to use the second-best source, the *Radio Amateur Call Book*. Most of the active types ensure that they are in the *Call Book*, and it is they in whom we are interested.

Figures for the area and total population of counties were obtained easily enough in the reference room of the local Public Library—but it should be borne in mind that the last official census was taken in 1931! When one realises that Buckinghamshire, our most amateur-conscious county, has only thirty licensed operators per 100,000 of its total population, it is evident that population changes since 1931 will have little effect upon results.

#### Methods Used

Those all-too-frequent long wet evenings, when every band seems dead, were ideal for the task of sorting out the G section of the *Call Book* into counties. After this, the production of units suitable for map representation

*This is a very interesting study, the first of its kind ever attempted, of the distribution of British amateur activity on a geographical basis. Though the figures from which the accompanying charts have been compiled are not up-to-date—for one thing, there has been no national population census in the last 20 years—the trends are quite clearly discernible and there is no reason to suppose that a survey based on the latest available figures would be significantly different. Our learned contributor has spent many hours on his self-imposed task, and the results of his work are most instructive.—Editor.*

was largely a matter of simple arithmetic. Maps are essential in the presentation of the data, as the overall distribution cannot be ascertained from number lists and tables. Two maps were produced: One showing the density of amateur population per 100 square miles, and a second representing our numbers per 100,000 of total population.

#### Use of the Data

Each map has a specific function. The first is of greatest direct interest to the amateur. It tells us from where we may reasonably expect the greatest number of QSO's; and should also be useful to VHF operators with rotary beams. Of course, statistics can be very misleading and one must assume that the same proportional interest is shown in VHF work throughout Britain before the map can have any meaning. Nevertheless, one feels that this is, in fact, true, for most amateur groups have their share of VHF, DX and experimentally-minded types in the same proportions.

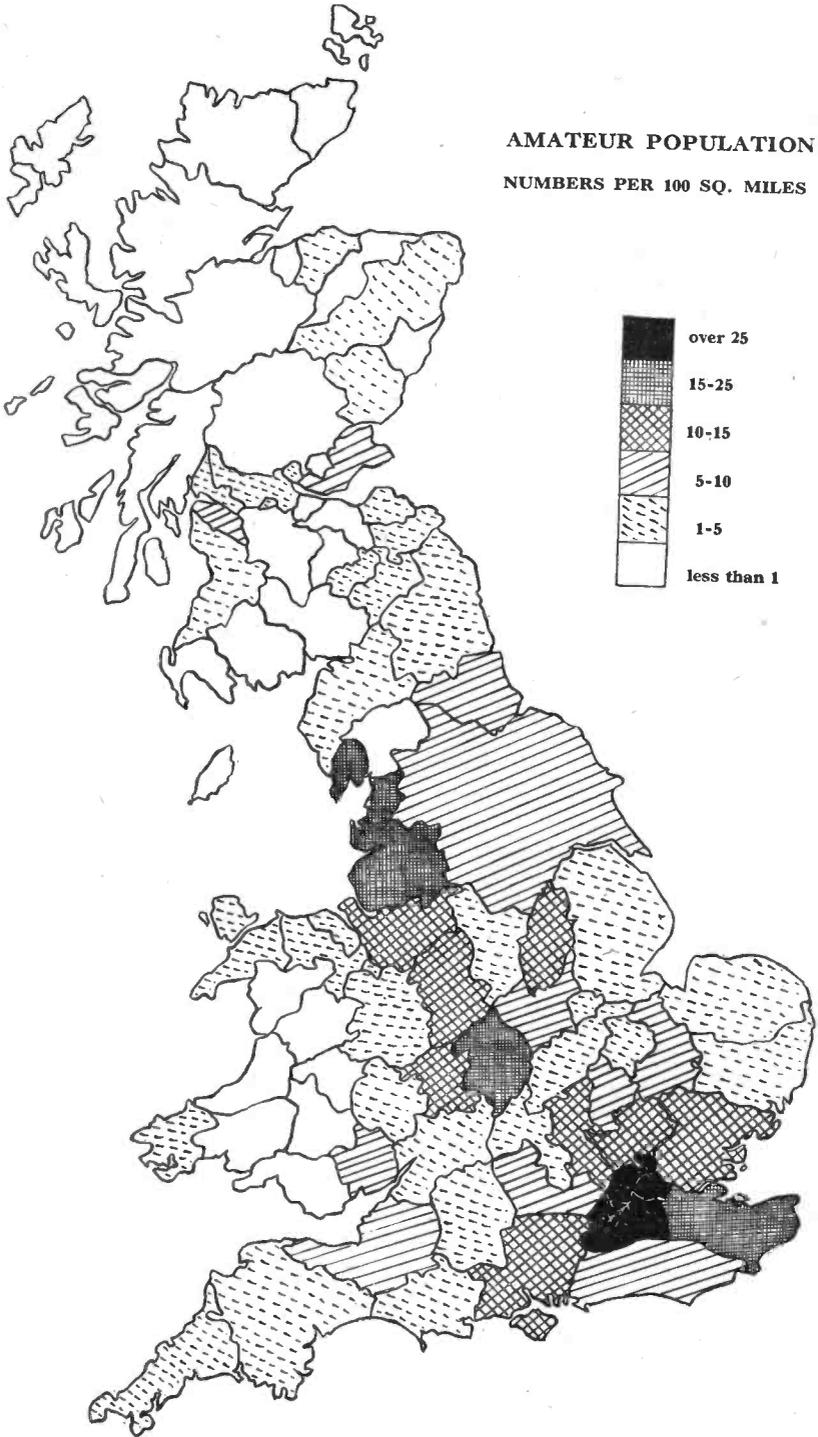
An interesting feature of the first map is that it shows zones of heavy local QRM. London and the Home Counties certainly take the lead in this respect!

The second map, which deals with amateurs in relation to county populations, shows the distribution of interest in our hobby. Interpretation of this map is difficult. Why, for instance, is there such a high degree of Amateur Radio-consciousness in Buckinghamshire, Cambridgeshire and Selkirk? The answers to this question remain to be solved. This second map could be useful to club promoters, and also to retailers of components and amateur gear.

Although a set of maps made up on

# AMATEUR POPULATION

NUMBERS PER 100 SQ. MILES



these lines but actually based upon the distribution of active amateurs on the various bands would be most useful, it is difficult to see how this could be achieved at present, since the essential data are not available.

It is, however, hoped that readers will find practical use for these admittedly far-from-ideal studies, e.g., in the siting of portable stations in VHF tests, or in whipping up enthusiasm in apathetic districts.

## EXPERIMENTS WITH SLOPING AERIALS

### Overcoming Lack of Space

By F. D. CRAWLEY (G2GM)

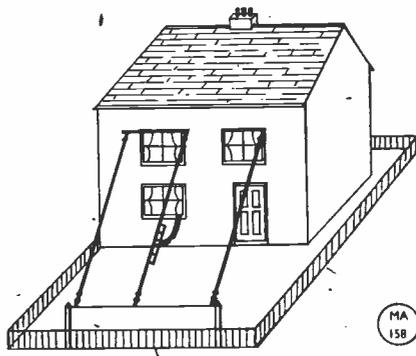
IT is surprising how few references are to be found in the various Amateur Radio handbooks on the subject of sloping aerials, for there must be many amateurs who, like the writer, are unable for one reason or another to erect a horizontal aerial. However, experiments carried out here over the past four years have proved sloping aerials to be efficient radiators, with interesting directive patterns, and they are certainly well worth a trial. How many stations, not using beams, can claim S7 reports from LU, KZ5, KH6, KG6, and VK6, using the same aerial? Yet this has been achieved on 14 mc with a sloping wire.

The text books, in very brief references to the subject, inform their readers that a sloping aerial (which our American friends call a "tilted wire") combines horizontal polarization with vertical polarization, resulting in an asymmetrical directive pattern. This is to a large extent borne out by practice, as will be seen by an examination of the radiation pattern sketched herewith, which is based solely on results actually obtained on the air.

#### Site Layout

The house accommodating G2GM is built on the side of a hill, and it is so constructed that while the front door is level with the road, the back door is on a floor below. The garden falls away still lower! The radio room is at the back of the house, on the same level as the front door. Under these conditions, at first the aerial was slung between an upstairs bedroom window and a clothes post in the garden, the angle between

*There are all sorts of ways in which the transmitting aerial can be erected—from the orthodox outdoor array "as per text book" to cunningly contrived indoor systems when space outside is not available. This article describes experiments with aerials under those particularly awkward conditions where the outdoor space slopes away from the house, making some form of tilted wire necessary—Editor.*



the wire and the ground being about 65 degrees. Results were quite encouraging, but always there was the feeling that better could be done. (This feeling is, of course, general in amateur stations!)

Then one day a Post Office van arrived, and a modern miracle occurred in the shape of a telephone pole, which was duly erected at the bottom of the garden. Not a tall one—the top is no higher than the window of the shack—but a very attractive pole all the same.

It was over a year before permission was obtained to support one end of the aerial from this pole, giving additional height at the far end of about 20 feet, and reducing the angle between the wire and the ground to about 45 degrees. Incidentally, the Post Office authorities at first refused to allow their pole to be used for this purpose, but after a second application, the decision was reversed

and sanction was given, subject to about 10 conditions, all of which are quite reasonable in their way. Moral: If at first you don't succeed . . . . .!

### Aerial Experiments

Many different types of aerials have been tried, with a view to obtaining the most satisfactory degree of impedance matching at the point of feed. It was assumed that the impedance of the top of a half-wave sloping wire would be different from that of a horizontal wire, due to the proximity of the house at one end, and the ground at the other. It was soon found that although an ordinary dipole with 70-ohm feeder line worked quite well, it was not possible to achieve full loading, on coupling the aerial to the final stage of the transmitter. A length of 300-ohm line was then tried, with slight fanning at the centre, with little improvement. Next, a delta match system was tried, using open wire feeders, and this has proved to be the most satisfactory of all the systems tested, giving the results on which the diagram of the approximate radiation pattern is based, as shown here.

Other systems which were tried, and found to be not particularly efficient, included a folded dipole consisting entirely of 300-ohm line; a 3-wire folded dipole with open wire feeders; and a form of "8JK" mounted on two long wooden poles supported from bedroom windows at the house end, and between

clothes posts at the garden end. The conclusion reached was that these more complicated systems were more difficult to match than single wires, and in the case of the "8JK" in particular, it is understood that this type of aerial is found to work satisfactorily only when the elements are mounted in a horizontal plane.

### Sloping Fixed Beam

With the sloping delta match aerial serving as a reliable stand-by, a sloping 3-element fixed beam is now being tested. The lengths of the three wires were cut from the formula given in the *ARRL Handbook*, the radiator being 33ft. 6ins. long, the director 32ft. 6ins., and the reflector 35ft. 8ins. The spacing between radiator and director is 0.1 wavelength, with 0.15 wavelength between radiator and reflector, these figures working out at 7ft. and 10ft. 6ins. respectively.

The only way in which such an array could be erected in this cramped location was to fix one end of the radiator and director wires, suitably spaced, on to a pole about 8ft. long, which was then hoisted out of one bedroom window, where it was anchored to the frame, with the end jutting out along the wall. The top end of the reflector wire was fastened to the far end of the other bedroom window frame, which happened to be just about the correct spacing, although this is not critical in the case of the reflector. The lower ends of the three wires were mounted on a stay wire stretched as tightly as possible between two clothes posts.

A "T" match is used at the radiator, which loads up very well indeed. A delta match was tried, but had to be given up, as there was no room for the delta in the cramped space. Various other types of radiator were tried, and it was particularly noticeable that while according to theory, the radiator in a system containing two parasitic elements should consist of three wires of similar diameter when fed with 70-ohm line, 5 wires with 300-ohm line, and 8 wires with open-wire feeders, in practice none of these multi-wire creations worked as well as a single wire, although when hoisted they certainly looked attractive! It was also found impossible to load up fully when using either 70-ohm or 300-ohm feeder systems.

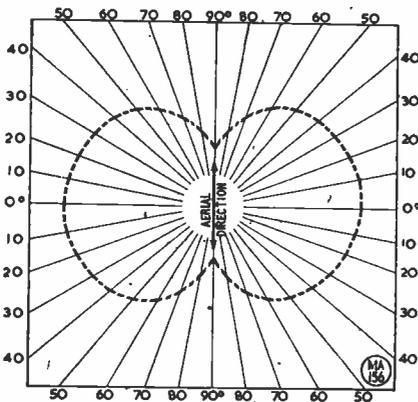


Fig. 1. The familiar radiation pattern of a half-wave dipole.

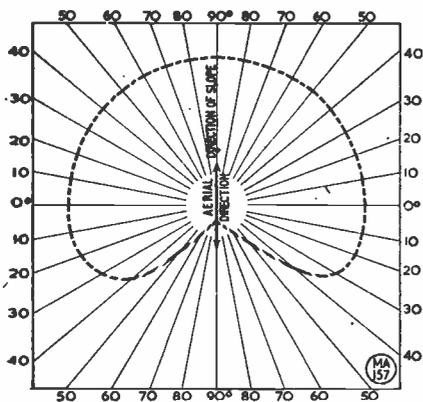


Fig. 2. With the wire sloping 45° to the ground, G2GM estimates the pattern to be as shown in this sketch.

**Results**

The whole array slopes from the ground at an angle of about 65 degrees, and as the back of the house faces North, all gain should be to the East. So far, contacts with UA6, VS7, VS2, and VK5 have been obtained, and none in any other direction, which is quite encouraging.

Thus it can be said with confidence that sloping wires are at least as efficient as horizontal single wires, with the advantage of additional gain in the direction of the slope. They are certainly well worth a trial by anyone who is short of space. The disadvantage is that there is a complete lack of radiation off the high end (against the direction of the slope). Open wire feed systems produce the best results.



**INTERFERENCE SUPPRESSION ON TV RECEIVERS**

Picture interference is a serious problem on many TV receivers, and much attention is now being given to the design of suitable suppression circuits—the analogy being the noise limiter in a traffic receiver. The December issue of our *Short Wave Listener & Television Review* goes into this as a practical problem, and several suppressor circuits are discussed in detail. Copies can be obtained (1s. 7d. post free) of the Circulation Manager, Short Wave Magazine, Ltd., 53 Victoria Street, London, S.W.1.

**XTAL XCHANGE**

On this occasion, an unusual number of offerings—and just as we were beginning to wonder whether it would be worth continuing this feature in the new volume. Insertions in this space are free, but can be accepted in respect of exchanges of crystals only; notices should be set out on separate slips in the form shown below, headed "Xtal Xchange—Free Insertion," and all negotiations between interested parties conducted direct.

**G2FVD, 108A Tudor Drive, Morden Park, Surrey.**

Has QCC 7010, 7067, 7332 and 8092 kc crystals, with certificates. Wants frequencies between 8047 and 8070 kc.

**G3BYY, 51 Kenworthy Road, Homerton, London, E.9.**

Has QCC Type P5 7358-kc crystal, certificated. Wants 1000 kc bar.

**G3DFS, 20 Oakwood Road, Sutton Coldfield, Warks.**

Has 3980, 6450, 7225, 7640 and 7766 kc crystals 1/4-in. mounting; and 8180, 8410 and 8910 kc, 1/2-in. spacing. Wants any frequency 7000-7125 or 3685-3800 kc, either mounting.

**G3DO, 25 Pilkington Avenue, Sutton Coldfield, Warks.**

Has 1790 kc crystal and 100/1000 kc bar. Wants frequencies 1840-1950 kc.

**G3DVH, 5 Ashcroft, Dunstable, Beds.**

Has Biley 7118 kc crystal, 1/4-in. mounting. Wants any frequency in 160-metre band.

**G3FKH, 42 Crossing Road, Witham, Essex.**

Has new QCC P4 3516 kc crystal, with certificate; also Biley 3586, 7051 and FT4 7106 and 7273 kc crystals. Wants 100, 500 or 1000 kc calibrated bar in exchange any two.

**G3GKG, Oaklands House, Stamford Road, Lees, Oldham, Lancs.**

Has silvered 500 kc crystal in FT-241-A holder, 1/4-in. mounting. Wants 500 kc bar, 1/2-in. pin spacing, in British type holder.

**G3GRA, 31 Byng Road, Barnet, Herts.**

Has 1806 and 7266 kc crystals, 1/4-in. mounting; and 8001, 8075 and 8100 kc type FT243 with 1/4-in. pin spacing. Wants frequencies 3500-3600 and 8038-8047 kc, and 1000 kc bar, any mounting.

**G3HEC, 270 Spotland Road, Rochdale, Lancs.**

Has 5340, 6030 and 6040 kc crystals in FT243 holders; also 6000, 6010 and 8000 kc with 1/4-in. pin spacing. Wants frequencies 1450-1480 or 1720-1750 kc any mounting, and 500 kc bar.

**G3UV, 35 Crownthorpe Road, Bingley, Yorks.**

Has 8087 kc crystal, FT243 mounting, certificated. Wants any frequency 8011-8022 kc, similar mounting.

**G6DZ, 6 Chesilton Road, Fulham, London, S.W.6.**

Has 3518 kc crystal, 1/4-in. pin spacing; also 7130, 7140, 7170, 7200 and 7300 kc, all 1/4-in. mounting. Wants 5000 and 7000 kc crystals, any pin spacing.

**G8UN, 15 Leach Street, Prestwich, Manchester.**

Has Brookes 7200 kc crystal, certificated. Wants mounted 1000 kc bar.

**SWL, 3 Park Avenue, Hill Top, Wilmslow, Cheshire.**

Has 6010 kc crystals in 1/4-in. and 1/2-in. mountings. Wants frequencies 6016-6081 kc, and anything in 3.5 and 7 mc bands.



# DX COMMENTARY

CALLS HEARD, WORKED & QSL'd

**T**HIS business of DX reporting is a lot more difficult, these days. Ten letters come in saying that conditions were uniformly punk on a particular band, and then the eleventh gives proof of having polished off quite a lot of unusual DX on that same band. The whole month has been extremely patchy, although the emphasis has been on the LF bands, where there has been *something* doing all the time.

For the first time in over four years we can practically write off 28 mc. Broadly speaking, no one even mentions it any more! And it seems that 14 mc is fast going the same way. Just how much worse we shall have it, before things get better, remains to be seen. We are not sticking our necks out with any personal opinions on that one.

## The Top-Band Transatlantics

The Top-Band tests—first leg—seem about the most exciting topic of conversation for the present. The morning of January 14 found practically everyone on the job, although conditions, unfortunately, didn't co-operate. But we have to start the story from a fortnight earlier.

On December 31 at 0445 GMT, G6BQ (Gravesend) called CQ DX. Back came VE1EA (349, peaking 459), and they were in contact until 0527 GMT. 'BQ's signals were 449, QSB to 229.

By **L. H. THOMAS, M.B.E. (G6QB)**

This was probably the first Transatlantic QSO this season.

A week later, on January 7, quite a lot of interesting things happened. W1BB worked EK1AO (0120), G6GM (0232), and G3PU (0250)—note the times—while W1EFN worked the same three and added G2YS to his bag. Some of the stations are also believed to have worked W8WXV and to have been heard in the 9th district. That same Sunday morning, January 7, G2YS received W1BB, W2EQS, W8FLV, W8WXV and VE1EA. And G2HKU (Sheerness) worked EK1AO with an input of less than 4 watts. TA3FAS has been logged by several stations, often showing up as early as 1800 GMT. There is also a persistent rumour that PY7WS has been on the band, but we haven't yet nailed that one down and cannot, therefore, say any more about it.

Now for the morning of the 14th and the first actual test. This seemed to go off very smoothly. A very few operators complain about the number of G's who called CQ in the W/VE band, out of their turn, and all that; but we were listening ourselves throughout the whole period, supported by a monitoring station, and thought the co-operation was extremely good. Only one or two

black sheep showed up above 1800 kc. and they were speedily told what the others thought of them. In any case, it was an utter waste of time on their part, because the W and VE stations were only listening *below* 1800 kc. Taking it by and large, we simply can't agree that operating behaviour was not good; in fact, things appeared to go very well indeed.

The hero of the other side was, of course, W1BB, who kept on banging through in every single five-minute period. He worked GW3ZV, G2PL and EK1AO, but couldn't make anything of the other signals. 'BB heard, and came back to, a "G3S??" who was almost certainly G3SU; the signals were just below noise over there and so he missed the boat. Hard luck!

Apart from W1BB, the following DX stations were heard: VE1EA, VE3AAZ, W1EFN, W1PLO, W2CDH, W2ESO, W2UKS, W3FNF and W3LII. A goodly bag. W3AAA on *phone* was reported by one or two people who seemed a little doubtful about him. The great majority were not listening for phone and would probably have missed him anyway, so quite possibly he was genuine.

#### The Successful Stations

Honours for this side undoubtedly go

to GW3ZV, who put up an amazing show and worked W1BB, W1EFN, W2ESO, W2PTV, W2UKS, W3LII, VE1EA and VE3AAZ. W1BB gave GW3ZV RST 119/579. 'ZV spent £8 on aerial wire and finished putting up his Vee-beam at midnight, five hours before the test began. He was naturally overjoyed to find it worked so well, not having a clue until people began coming back to him. This giant among beams has three full waves on each leg—work out the amount of wire for yourselves!

The only other G who was called or worked at all during the first Test on January 14 was G2PL, but we haven't heard from him and cannot say what *he* was using in the way of rhombics. At W1BB he was RST 119/469. No one else on this side produced a signal above noise level.

Our thanks are due to the following for their logs and comments on the affair of January 14: G2AMV, 2DPO, 2HKU, 2YS, 3DIY, 3PU, 4OU, 4XF, 5MR, 6LB, 8PX, G16YW, GM2HIK, GW3ZV, N. C. Smith (Petts Wood), G. C. Allen (Thornton Heath) and R. H. Jeakings (Luton). Of course, by the time you read this, the January 28 tests will be over; we fervently hope that conditions were better and that lots more G's will have got across. W1BB says, "Tell



Last summer G8GD (Sutton, Surrey) visited Cagliari, the capital of Sardinia, and there met IS1BV (left) and IS1EH; this photograph was taken at the station of IS1EH, who operates mainly on 14 mc. G8GD pays a high tribute to the kindness and hospitality of the IS's during his short stay of four days.

the boys not to get discouraged—we are going to pull a lot more of them through."

A second airmail from W1BB reports that he was on for the supplementary test period 2200-0200 on the night January 20-21, but heard no G's. However, he did work HC1JW at 0030, who was on 1785 kc with  $3\frac{1}{2}$  kilowatts! And HC1JW will be observing the remainder of the test schedule; but as he has chosen to bat for us, he comes up during the European calling periods. Another interesting item is that KV4AA, Virgin Is., will be on 1995 kc throughout the February Tests, though we are not quite clear which schedule he will be following; but it is almost certain that his intention is to try to work us. Loran noise may make his signals difficult to read, on that frequency. HZ1KE also writes to say he will be on the Top Band during February, and that he is already hearing many G's. During the January 14 session, though actually around 0400 before the majority of operators were on, HZ1KE worked EK1AO and VE1EA, hearing G3GRF and G5JL.

So there is a fine tale of 1.7 mc DX,

#### FOUR BAND MARATHON (STARTING JANUARY 1, 1951)

Station	Total Points	3.5 mc	7 mc	14 mc	28 mc	Countries
G3ABG	89	17	50	21	1	54
G5FA	85	7	36	40	2	52
G6QB	79	5	25	48	1	53
G3ATU	73	7	47	18	1	?
G2AVP	56	5	42	7	2	49
G8IP	39	5	21	10	3	27
G3GUM	34	8	11	14	1	21
G6AT	31	7	15	8	1	23
G2BW	27	12	8	6	1	20
G3COI	16	2	1	12	1	13
G2YS	12	4	4	3	1	4

Note:—You may join in at any time, but all scores reported must date back not more than two months, i.e. you cannot suddenly appear at the top of the list in November or December next. Once you have made your first appearance, scores should be reported progressively, month by month.

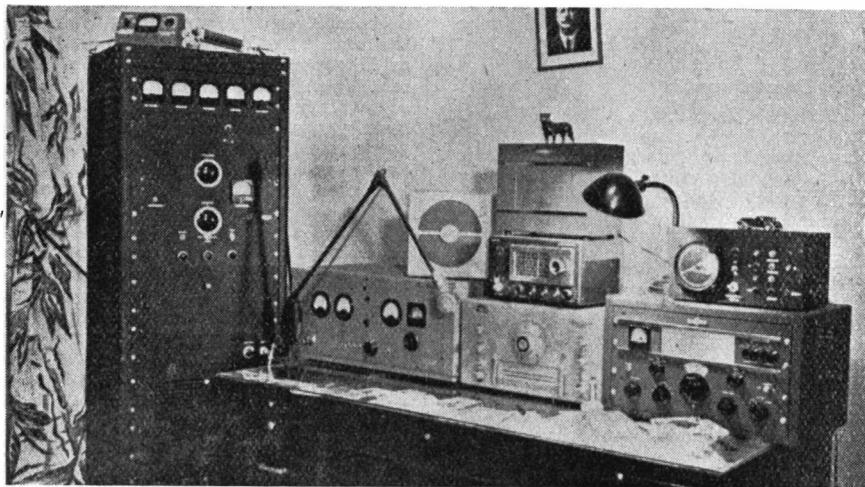
mainly inspired by these Top Band Tests of ours, with a promise of much interesting activity during February.

A few other comments, apart from the Transatlantics: G6LB (Chelmsford) worked TA3FAS on 1820 kc at 1845 GMT on January 10. 'LB says that dozens of G's called the TA on his own frequency, and were ignored. Some of these DX stations are learning the answers at last!

G3NT (Northallerton) asks for a list of countries known to be using the Top Band. We can't vouch for its completeness, but the following are known: G, GC, GD, GI, GM, GW, EI, HA, OK, OZ, UA3, UR2, ZB1, EK, HZ, VE, W, KV4. DL2's, unfortunately, have just had their Top Band licences cancelled; it is not yet known whether this applies also to DL4's. One or two HB9's appear with a special licence from time to time, and rumour has it that there may be a ZB2 about. Also there's our friend PY7WS, about whom the buzz is going round. So that seems to make a total of about 20 countries as "possible," even if only just! G3NT also asks if we have yet decided to produce a "Worked All English Countries" Certificate for the band. The answer, as yet, is No. G3COI (Wolverhampton) was told by TA3FAS that he will be on 1815 kc most nights, looking for G's between 1800 and 2200 GMT.

#### DX on Forty Metres

For some time we have been alluding to the possibility of working W6's "the long way round" at about 1500 GMT on the 7 mc band. Early in January G5RI (Hexham) was heard busily knocking off W6DFY and others, so we ploughed in and were surprised to contact W6DFY (four times), W6EBG, 6FSJ, 6GAL, 6MHB, 6OEG, 7OY and 7VY in the course of a few days. At the same time, G6OB was called by VK's and ZL's. What is so surprising is that these DX stations never seem to hear any other Europeans at all. Probably the truth is that you 'need a ground-plane or a very long wire to get there. The W6's were peaking RST 569/579 at times, but even so were very difficult to copy through the shrieks, groans, growls, grunts, clicks, chirps, creaks and all the multifarious rude noises that pass for signals on 7 mc. Some of them, we confess, might have been either phone or CW — we just didn't know. Fortunately they nearly all creep, so they don't jam out the W6's for long at a time. (We are not



**XE2KW, Monterrey, Mexico, runs a kilowatt on Ten and Twenty with a pair of 810's in the PA, modulated by push-pull 810's. Aerials are 3-element beams for both bands, and receives a Collins 75A and an HRO.**

referring, in the main, to G stations, most of whose notes, on 7 mc at least, are beyond reproach . . . but there *are* exceptions.)

G2AVP (Thaxted) worked 42 countries on the band between January 1 and 14; his best were ZS, LU, VP4, VP6, CR5, FQ8, VS6, TI, YV and HK. In addition, he heard CE, HC, VE8, PJ5, ZS3, CR7 and VP8. Nice going for 7 mc, we should say?

G5FA (London, N.11), during the same period, worked 36 countries, including several of the Russian districts, Corsica, Trieste and other awkward ones. (We find some of these European countries are the ones that make this Marathon business difficult; much harder to induce some of them to reply to you than to work real DX.)

G3ATU (Roker) has received W6OA the long way round more than once, and the remarkable thing is that he heard this same chap a year ago under the same circumstances; he is the only one found by 'ATU. 7 mc has come in for most of the DX at G3ATU, who says it's a better band than 14 mc "if you can stand the QRM."

G3ABG (Cannock) appears to be King of the Band at the moment, with 50 countries already this year. He obviously didn't waste time, since January 1 produced KV4, W6, KP4,

VP4 and VP5. He has heard a lot of nice ones, too, such as YV, LU, ZD4, ZS, CE, VP1, HK, FF, FQ, VS7, VP8 and the like. What a band it is!

G8IP (Hampton) worked W6KRI at 0920 GMT, and heard a W6 by the long path one afternoon, but hasn't yet worked them that way.

#### Eighty Metres

There's not really much news about 3.5 mc—the band seems to be suffering an eclipse in favour of Top Band and Forty—but we extract a few news items from letters.

W2QHH (Hamilton, N.Y.) made what is believed to be the first W/ZB2 contact on the band when he worked ZB2I—so that means a credit mark at *both* ends.

G6QX (Hornchurch) worked OX1FU on the band, but suspects him of being not quite . . . He adds that VE1HG and W2AIS are good signals at 2300 GMT. G3ABG raised TA3FAS for a new one, and already has a very nice score of 17 . . . G3ATU has heard VP5AL around 0100 GMT, but usually in contact with W's. He apparently goes on 7 mc when he wants to work Europe.

We have a suspicion that G6GM and a few of the diehards are still busily working ZL's every morning on Eighty,

but they haven't told us so. We really must get up some time and see . . .

**News From Overseas**

HZ1KE (Taif, Saudi Arabia) says that he too has put up a W6SAI ground plane for Forty, and has worked a string of DX stations on it, including ZL, PK4, W6 and W7; Ken will be on 7 mc regularly now at about 1500 GMT, and reports SU1AS (the first SU to be officially licensed post-war) as also on Forty. Other items from HZ1KE are that HZ1AF is in Mecca, HZ1AB is active again, and that HZ1KE himself can be heard as MP4KW—and he has a new Eddystone 750 on the Rx side.

A month or so back we said we wouldn't believe that anyone had worked Afghanistan until we saw a card—and even then it had better be good! This has prompted VS2AA (Kuala Lumpur) to tell us a Very Queer Story. For a while before the war he was VS2AF, and during this period a certain French station claimed to have worked "VS2AF." This Frenchman was challenged to produce a card, and he did—a properly printed one! The

operator's signature was not known to the real VS2AF; the QTH was given as Singapore, which was VS1; and the real VS2AF had never heard, or heard of, a station using his call. So, as he says, you never know—even if they do produce a card. Incidentally, VS2AA, as he now is, is also ex-VS1AA, who has gone down to fame in connection with a variation of the Windom aerial. All VS2AA's gear, logs, cards and so on went to the Japs in 1942; but he is now active again and hopes to work G's.

ZS2AT (East London) is on the air once more, still looking for Zone 19. He did a caravan trek of 3,000 miles up to Rhodesia, but returned quickly when he found that if he settled there he would have to start all over again for WAZ.

YI3BZL is ex-G3BZL, and is usually found around 14022 kc. He will be glad to arrange skeeds with any G's who want a YI contact. VP2GG (Grenada) sends a message to the effect that he does *not* want International Reply Coupons with QSL's.

MS4FM is no more, having returned to G; he is on the air from Bletchley with the call G3HAX. Before he left Mogadishu, MS4CIB had started up on 14 mc. 'HAX returned by air from Nairobi and found that he was sharing a seat with SM6ET.

KV4AAT will be in operation from the Virgin Is. during February, all bands from 28 mc to 3.5 mc with 150 watts CW and phone. As before, the operator is G3AAT, to whom all QSL's and correspondence should be addressed.

G3GUK (Tunbridge Wells) is leaving the U.K. for Aden, where he hopes to be wielding a VS9 call very soon.

ZB1CH (Rabat, Malta) reports that ZB1AK, 1BE, 1IH and 1KQ are now all QRT. 1CH has been having a bit of trouble with his aerial on the hotel roof; first it pulled a cowl off the cook's chimney and ruined a lot of food, and then it got mixed up with the clothes lines and dumped a lot of raiment on the deck! Despite all this, he is still alive.

VS7DB (Negombo) tells us that Ceylon is losing VS7BJ and 7KR, both returning to the U.K. '7DB is relatively new to it, but operates on 7 and 14 mc and hopes to be on 28 mc some time.

Eric Trebilcock writes again from Williamstown, Australia, with a budget of interesting news. He says there

**ZONES WORKED LISTING  
POST WAR**

Station	Z	C	Station	Z	C
<b>Phone and CW</b>			<b>Phone and CW</b>		
G6ZO	WAZ	227	G8PW	38	129
G6RH	WAZ	224	GM3EST	38	127
G6QB	WAZ	212			
G5YV	WAZ	205	G3ABG	37	129
G3ATU	WAZ	202	G2FYT	36	133
G2FSR	WAZ	196	G2YS	36	130
G4CP	WAZ	195	G6QX	36	124
G3DO	WAZ	191			
G81G	WAZ	181	G6TC	35	107
G2VD	WAZ	171	G3GUM	35	92
G3BI	WAZ	162			
G3TK	WAZ	157	G3FGT	34	129
G3AAM	WAZ	154	GM3CVZ	34	105
G2IO	WAZ	152	G6AT	34	100
G3YF	WAZ	152	G2DHV	34	96
G3AZ	WAZ	133			
G81P	WAZ	133	G2BBI	30	100
G5BJ	WAZ	126			
G5VU	WAZ	124	<b>Phone only</b>		
			G2AJ	38	157
G2AJ	40	196			
G2WW	40	181	G3DO	37	154
G3FNJ	40	150	G6WX	37	128
G6BB	40	136			
G3BNE	40	132	G8QX	36	139
G5MR	40	125	G3COJ	36	134
			G2WW	36	121
G3DCU	39	159			
G5FA	39	150	G2VJ	34	116
G3BDQ	39	140			
			GM2DBX	31	93
G3COJ	38	157			
G2BJY	38	152	G2BBI	30	97

never has been a genuine VK1JM, and that VK9MR was never in the Admiralty Islands, but at Madang, New Guinea. VK1RF has just started up on Macquarie Island, both phone and CW on 14 mc. Eric, who has been content to remain an SWL for goodness knows how many years, says he mailed 958 receiving reports during 1950. (And when he sends them, they're good—we know!)

VS2CQ (Kuala Lumpur) is just on the point of departure and will one day be heard on the air again as G2NR. He tells us that an SWL out there often logs G's nattering away to each other on 3.5 mc, quite ignorant of the fact that they are being copied nicely in VS2. He has a big grouse about G's on 80-metre phone who don't identify themselves properly. This strikes us as *real DX*—VS2 on 80-metre phone. Think of it!

#### DX Miscellany

We certainly didn't think the day would ever come when 14 mc DX didn't merit a heading of its own! But such activity as there has been on the band is more a matter for stray comments than one of DX achievements, so this month poor old Twenty joins the "miscellaneous patter."

G3COI mentions the strange prefix "FKS," having worked FK58AR in Vienna. These chaps are genuine, but, of course, don't count as an extra score, or anything like that. GM2DBX (Methilhill) raised KP4, KS4 and EL for new ones on phone, and heard KG4AT several times. He asks whether it is worth mentioning that if a QSL card is sent in an unsealed envelope, the "words of greeting" confined to five, and no message written thereon, the postage all over the world is *one penny* if it is marked "Printed Matter."

G5YV (Leeds) asks us to amend his WAZ listing to 205 countries, and he thus joins the select few who are over the double-century mark. He is not on much these days, as he wastes a lot of time watching TV! G6AT (Hampton Hill) raised SU1UU and Corsica on 14 mc, plus TA3FAS on 7 mc, and—best "DX feat" of all—an SM on 28 mc! He asks how to get a card out of CN8 or EK; funny thing, but we have had both without any chasing at all. 'AT, however, has a DU card, which is something of a rarity by any standard.

G6AH (Seven Kings) makes some



A big meeting at Bad Homburg last September launched the DARC (German Amateur Radio Society) with DL1FK, left above, as president and DL7AA as contest manager. The DARC is organised into 13 districts, each with an elected manager.

interesting remarks about signals arriving *via* the long path on 14 mc. He has recently heard PK, VS6 and KG6 from the south-west, and a JA coming simultaneously from both directions (with the "echo" stronger than the signal). There is a lot of this sort of thing going on at times, but only those with really discriminating beams are wise to it; G6AH's is a "reversible H-R (Heath-Robinson)." 'AH also reminds us that VK3NC has now made DXCC with 6 watts input from batteries; but he does live on a farm where Vee-beams and rhombics are practicable.

G3GUM (Formby) just missed his Century by December 31, but plods on. He still builds his own receivers, though he does admit to getting his variable condensers ready-made of late. He popped up on 3.5 mc and worked his first W's; says "Isn't it easy? They come back to CQ's!" Then he poses a sticky one: TA3FAS is at the U.S. Embassy, Ankara; if this is so, he is on U.S. territory, and should count as just another W—no?

G2BW (Walton-on-Thames) is an Old Timer who has become active again and has joined the ranks in the Four-Band Marathon. He hopes to be going on QRO next month and will doubtless swell the scores. (over.)

### Four-Band Marathon

Talking of this, a few words of pained surprise concerning the quite considerable number of runners who sent in their score with a "Zero" in the 28 mc column. How can you possibly enter a Four-Band listing when you only have a Three-Band score? This has reduced the entries for the table quite a little—but let's have some more entries this month. After all, even if you are a month late in starting, you still have a very good chance of catching up—those who were away to a flying start will find things very sticky a bit, later in the year.

GW8SC (Chepstow), who is ex-VQ4SC and ZC6JK, asks us to state that if anyone lacks a QSL from either station, he will send one on request—if the log checks; this applies to the period 1947-50.

G2WW (Penzance) worked quite a nice lot of DX on 14 mc, such as CR6AK, ZS3M, EA8 and EA9, VP5AK and 5AL, OX3BD, YV5AB, VK6OR and our old friend ZC1AL, who is on again.

### QRP Corner

G6ZN (Horbury) reminds us that in last month's survey of the past five years we did not mention the effect upon the QRP man. 'Zn says that before the war his favourite band was 7 mc, and once, during the ARRL DX Contest, he worked 30 W's in an hour, using 3 watts and a crystal! He doesn't imagine that *that* will ever be repeated. Surprisingly, 'ZN finds that he works a lot more stations now than he did before the war—probably the liking for short QSO's accounts for this. But he says, "One has to use a lot more craft and cunning these days—150-watt stations take a good deal more dodging than 10-watters did."

New ones recently added to G6ZN's score are CT, SP, LX and YO, on 3.5 mc; also KP4 on 7 mc. On the Top Band he has worked HA5BK/1 and OK1AWA, and also has all the cards for WAEC.

G2BTO (Bolton) tried a small rig during his summer holiday, and has been quite converted to QRP, using only this 5-watt portable for Top Band and 3.5 mc operation. He has made several successful QSO's with 1 watt or less—on phone as well as CW. 'BTO rightly says that far too many have a fixed idea that only brute force will get through. Finally, he remarks about his

SWL friend near John o' Groats, who has heard all the following on Top Band CW: UA1AA, 3IS, 3KLA, 4FC, OK1AJB, 1AW, 1AWA, 1VW, 3HS, HA5BK, EI9J, and also UA3IS and 4FC on phone.

### Ethics And All That

The little prelude to last month's Commentary has brought forth quite a number of letters. G3GUM remarks: "One thing, I would add is that much of the worst behaviour—VFO swishing, tuning PA, calling CQ without listening on the frequency, and so on—is a *direct breach of the licence conditions*." Too true, and so it's not just bad manners—it's law-breaking!

Referring to 3A2AB's remarks about snappy operating, 'GUM says he deliberately tried to avoid a rubber-stamp QSO, as he didn't want the Monaco station to think that all he was interested in was the card. He asks: "Is it the call-sign that matters, or the man behind it?" Think it over.

We have collected a nice fat bunch of letters, now, on this very subject, and they are being summarised in a general article on Ethics, Behaviour and All That, which will appear in the near future. Included among the letters are long screeds, almost amounting to articles on their own, from the operators of 3A2AB and VP6CDI, both of whom put their own points of view very strongly.

The only conclusion we can come to is that it is time that we got together and adopted, universally, *two* kinds of CQ call. One would mean "I want a QSO and don't much care with whom, so long as he can read and write," and the other would mean "I want a quick one with a new country—rubber-stamp preferred."

After all, there are times when all of us want quick ones (during Contests, for example), and there are also times when the most rabid DX-chaser would like to stop and talk. But it will all sort itself out without the need for any more complicated sets of rules.

### Thought For To-Day

Two stations on consecutive QSO's came back to us with the remarks, "Tks dope" and "Tks vy om." We are not sure whether we like being called either a dope or a very old man. But let it pass!

That's about the lot for now, but, for next month, please let us have some

more entries for the Four-Band Marathon. There will be plenty of Top-Band news flying around, too, and the Contest season is hard upon us. Let us hope than our friend "Cndx" realises this, too.

Closing date is just about when you read this. **First Post on February 14.**

Next month we shall be in the same sort of rush, with a closing date of **March 14**, so please bear it in mind.

Address everything to DX Commentary, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1. So, until then, 73, Good Hunting, and may you hear all that you work.

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## FIRST CLASS OPERATORS' CLUB

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President:  
GERALD MARCUSE, G2NM

Hon. Secretary:  
Capt. A. M. H. FERGUS, G2ZC

Asst. Hon. Secretary:  
J. E. CATT, G5PS

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The success of the annual Club dinners held in London has prompted several members living at a distance to ask if a similar FOC gathering could be arranged at a more convenient centre, additionally to the annual event in Town. This is a request which it is hoped to be able to meet, as it would enable many more members to make personal contact. The matter is being considered and an announcement will appear in a Circular Letter in the near future.

### Membership

This continues to increase and the January C/L (No. 42) contained a complete list of new members, and amendments made since the last printed roll was issued in August, 1950. As there are many changes, members are asked to bring their master list up-to-date from the details in C/L 42. If anyone has not had a copy of this it can be obtained on application to either Honorary Secretary.

Members who have not yet paid their annual subscription (2s.) or the charge for the personal copy service of the Circular Letters (3s. per annum, where applicable) are asked to remit these amounts as soon as may be; they fell due on January 1.

### Activity Notes

As this column is being written, news is coming in of certain FOC members who are knocking off the DX both on Eighty and the Top Band—at least one

member has worked a W on 1.7 mc. These and other doings will be reported in the February C/L. In the realm of QRP, G6ZN's patience and unremitting zeal have again won him laurels.

The final (1950) Four-Band DX listing which appeared in the January, 1951, issue of *Short Wave Magazine* shows that the first three places are taken by FOC members—and, indeed, of the total number of operators listed in that table, more than one-third are members of the Club.

Logs are still coming in for the Club's own DX Contest, so the results cannot yet be announced; they will be published in the earliest possible C/L after the contest has been judged.

### Election Notice

In accordance with the Rules of the Club, the following are declared elected to the active membership list of the First Class Operators' Club:

D. D. Paine, VK3FH (Frankston, Victoria);  
A. J. Munro, G3GBB (Henlow); UK.  
Ormerod, G3CXA (Arnside); J. Hogg,  
G2OG (Dudley); R. Neve, PA0FN (Middelburg);  
P. A. Tremaine, G8PB (Cambridge);  
Mrs. J. E. Catt, G5PS/2 (Kings Langley);  
R. A. Harding, G3AKU (St. Ives, Hunts.);  
E. Banks, G2CNC (Jersey, C.I.); H.  
Waldvogel, HB9HT (Zurich); S. Sjøberg,  
SM4ALB (Charlottenberg); and J. Gunnar,  
SM5AQW (Upsala).

All communications respecting the First Class Operators' Club should be addressed direct to: Capt. A. M. H. Fergus, G2ZC, 89 West Street, Farnham, Surrey, (Tel.: Farnham, Surrey, 6067).

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*The Short Wave Magazine covers the whole field of Amateur Radio*

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## REMOTE OPERATING SYSTEM

### With Motor-Controlled VFO Drive

By W. E. PHILPOTT (G4LC)

RECENT articles on remote control suggest that the system in use at G4LC may be of interest to others in similar circumstances.

The old radio room having had to be evacuated some time ago in favour of a growing member of the family, all the gear was shifted up into the roof space, where the amount of room was restricted and apt to be uncomfortable in winter; the latter condition started a train of thought as to the possibility of remote control from two floors down, where the fire and an armchair appeared to be the ideal operating position.

This was facilitated somewhat by the fact that, when taking over the house, a distribution system for BC reception was installed at four points, for which a 4-core lead-covered cable was put in; one end of this terminated at the proposed operating position, with the BC Rx and a cabinet with turntable, pick-up and amplifier. After convincing the XYL that nothing unsightly in the way of wires and odds and ends of gear other than the communications Rx (a converted R1155) would be added to the equipment already in the corner, plans were put in hand, and after some thought and much drawing of diagrams, the system described below was evolved.

#### General Layout

The transmitter consists of a 145 oscillator, 6L6 B/D and 807 PA. Two 6L6's in P/P plate-screen modulate the 807, this portion of the gear all being up in the roof. The gramophone amplifier downstairs was modified to take an additional input from the microphone transformer, and an additional output via two 0.1  $\mu$ F condensers to feed the grids of the P/P 6L6's upstairs.

A control box was built, the panel having two DPDT switches (one with a normal centre position for tuning), two SP switches, a 7-pin A.M. socket and terminal points inside for the leads, together with the microphone battery and transformer, and a relay.

*There are few of us who have not, at one time or another, had ideas about operating from a chair by the sitting-room fire, with the gear out of the way upstairs. Line control of a transmitter for single-frequency working is easy enough, but there are obvious difficulties with VFO drive. This article describes a system of remote control which will be of great interest to those concerned with that problem.—Editor.*

A 12v DC mains unit was also made up and put in the bottom of the cabinet. Two of the four control wires available had to be reserved for the connections from preamplifier to modulator, so this left two leads and earth (lead casing) over which to:

**Switch on the Tx for either phone or CW, putting in or out the modulator stage as required.**

**Key the Tx when using CW.**

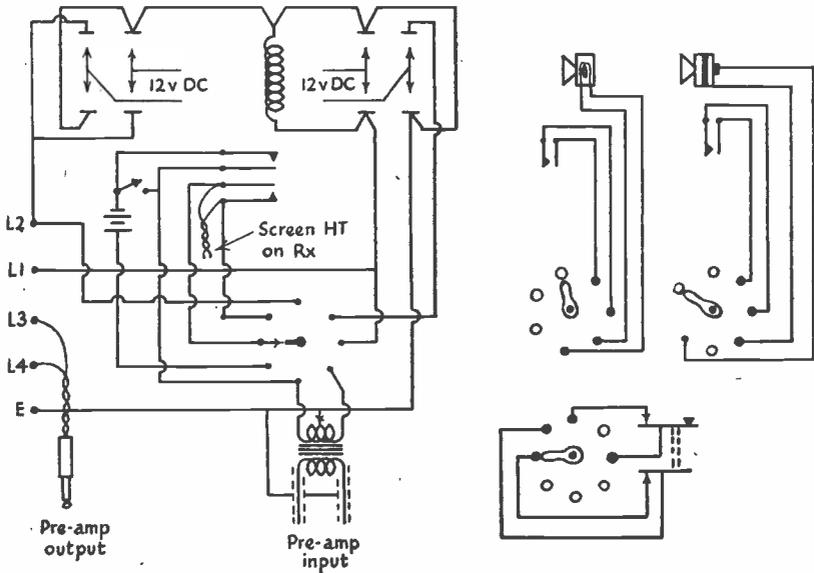
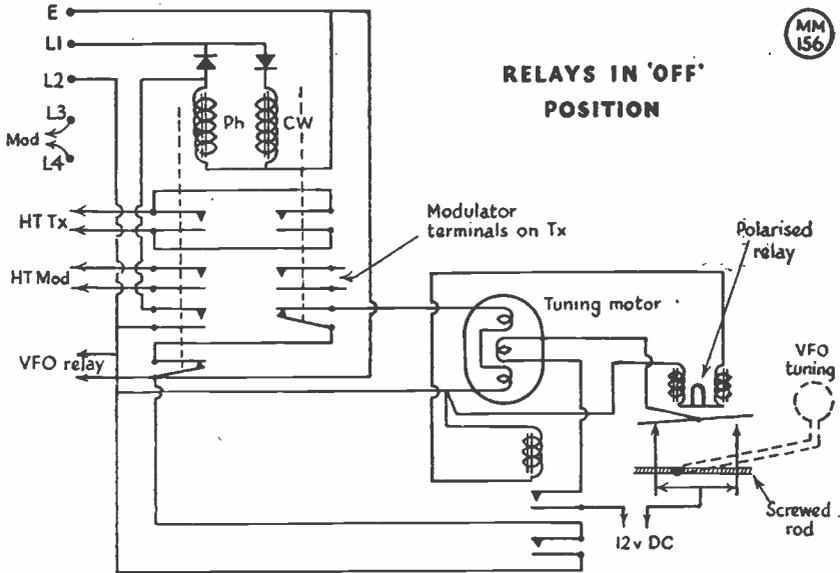
**Tune the VFO over a narrow band.**

Part of the switching was taken care of by supplying power to the radio room via a mains power lead removed from the main fuse board and connected through a 5 amp. fuse and switch to an extension of a power point downstairs. This, when switched on, lights all heaters and supplies HT to the VFO, also to another 12v DC mains unit upstairs.

#### Control System

Two GPO-type relays were used upstairs for switching the Tx for phone or CW, the contacts being rearranged to make the necessary changes. These relays were selected over one line and earth by feeding them through a separate metal rectifier each, one reversed to the other, so that the DPDT switch could change over the polarity of the supply and actuate the relay required. The phone-control relay circuit is, however, interrupted by taking it to the "push-to-talk" switch on the microphone, so that when switched, nothing happens until the mike switch is pressed. Across this circuit also is a relay in the control box which completes the microphone battery circuit and breaks the screen supply in the receiver. The two SP switches on the box also allow independent control of these latter functions, and a send-receive switch on the Rx can be used to duplicate it also.

A five-way lead terminates in an octal plug, which goes into a corresponding socket at the terminal point of the lead-covered cable, and a four-way lead with



plug is taken into a socket on the Rx, making all neat and tidy.

**VFO Tuning Control**

So much for the switching arrangements—now for the tuning. The 145

oscillator has a lock-knob on a rod screwed into the centre of the main tuning knob; this was used to carry a 3-in. Meccano pulley, after drilling the boss out to fit, and mounting two felt pads on the back, so that when the lock-

knob was screwed home the friction of the pads caused the main knob to turn with the pulley. This pulley had a drop arm attached to it, connected at the lower end by a double strip to a Meccano coupling threaded on a length of screwed rod driven by gearing from a 12v motor; the armature was supplied with current from the upper mains unit, but the motor field was energised from the lower mains unit *via* the second DPDT switch, thus obtaining control of the direction of rotation.

The current for the armature is taken to a pair of contacts at each end of the screwed rod, so that when the coupling almost reaches the end of its limit of travel it opens the contact and stops the motor. Each contact goes to an additional contact opposite each end of the armature of a polarised relay, which completes the circuit to the motor; the relay or armature is connected so that when the circuit is broken at one end of the travel, reversal of the current to the motor field reverses the polarised relay and completes the circuit for the motor to drive back again—the same thing, of course, happening at the other extreme position. This arrangement prevents jamming of the drive. The VFO relay

is switched on at the same time and the beat can be heard in the receiver, enabling the VFO to be spotted on to another station's transmission or tuned to a quiet spot in the band, if any!

Preliminary setting of the VFO is achieved by slacking off the lock-knob so that the pads on the pulley do not grip the main knob; the VFO main control can then be set as desired and the lock-knob again tightened.

Keying is carried out over both lines without the earth as shown, an additional contact being fitted to the locating key of the 7-pin A.M. plug used for the key; the connections allow muting of the Rx by the back contact, thus giving break-in working.

No adjustment of the other tuning circuits of the Tx seems necessary, and the 40-metre aerial is left permanently on the transmitter, the ordinary BC aerial being used on the receiver.

The system functions very satisfactorily and is well worth the time and trouble spent in working it out and putting it into use. It is the writer's hope that these ideas may give other operators, who have a cold and draughty shack away from the fireside, comfortable winter QSO's.

## CALIBRATION CHECKS ON TWO METRES

Using the BC-221

By R. REW (G3HAZ)

*The BC-221 is an extremely versatile instrument, and can be used not only for its original purpose of accurate frequency measurement on the LF bands, but also, as this article shows, for VHF calibration as well.—Editor.*

THE writer recently came to the conclusion that it was high time a frequency meter suitable for the lower frequency bands occupied a permanent place on the operating table. It was soon found that a BC-221 was a very useful acquisition, and one wondered how it had been possible to manage without it for so many years!

However, quite a large proportion of the time at this station is spent on the VHF bands, and with it must be

admitted, no great expectations, the BC-221 output terminal was connected to the 2-metre converter aerial coil. With the converter set to approximately 145 mc, the BC-221 dial was slowly rotated. A number of beats were heard and a check on three adjacent ones showed them to be the 38th, 39th, and 40th harmonics of the BC-221 oscillator fundamental.

### The Possibilities

It was soon decided that, with careful setting up of the BC-221, it should be possible to calibrate quite accurately a 2-metre receiver, and it also seemed feasible to read the frequencies of 2-metre stations to plus or minus 2 kc. Furthermore, by using the 40th harmonic of the oscillator, it was only necessary to add a further nought to the figure in the 3rd column of the BC-221 chart to read off the 2-metre frequency directly in kc. It was also found that, in addition to the given frequency check point with its own crystal standard as provided on the BC-221 chart, two strong beats occurred at 3600 and 3625 kc, with a weaker note at 3650 kc, corresponding to 144, 145 and 146 mc respectively.

These provide excellent markers for the 2-metre band and also a means of finally touching-up the BC-221 to be exactly "spot on" over the narrow range of frequencies required for calibration.

### Setting up the BC-221

In order to obtain accurate results, the first essential is that the internal crystal standard of the BC-221 be set at exactly 1 mc, for it is its 144th and 146th harmonics that will determine how accurate the final results are on 2 metres. This is preferably done by utilising the 25, 30 or 35 mc transmissions of WWV, these three frequencies generally being less susceptible to interference than the lower-frequency calibration signals. Also, using one of these frequencies means that any crystal error is multiplied 25, 30 or 35 times. The time to make use of WWV is during a "carrier only" transmission and when the signal is reasonably steady in strength. The BC-221 should always be given a warming-up period before making any adjustments and should then be switched to the "Xtal only" position and the name plate on the front panel removed, exposing the slotted head of the crystal oscillator trimmer. Sufficient signal from the BC-221 is then injected into the receiver input terminals to add a further 50 per cent. to the S-meter reading obtained on WWV. The crystal trimmer should then be adjusted to bring the audio beat down to zero, the final setting being made by watching the S-meter for a very slow swing. The writer then prefers to "thump" the BC-221 in order to check for any instability in the crystal, crystal oscillator valve or associated circuits. Any such instability will, of course, no longer result in a zero beat with WWV, and should be investigated before proceeding further. These adjustments are also equally applicable for accurate use of the BC-221 on the lower frequencies.

### Calibrating the 2-Metre Receiver

After a warming-up period of quarter to half-an-hour, the BC-221 should be checked against its own internal crystal standard, using the check frequency given at the bottom of the chart covering 3600-3650 kc. First of all, the centre of the 2-metre band, at 145 mc, should be found on the receiver, as follows:—

Set the BC-221 to 3625 kc with switch in "Het. Osc." position, and couple its output terminal fairly tightly to the receiver input coil. With BFO on, the

### CHECK POINT DATA

With the BC-221 originally tuned to 3625 kc		Retuning BC-221 for adjacent higher and lower frequency beats	
Receiver Tuned to	Corresponding Harmonic	Lower Beat	Higher Beat
134.125 mc	37th	3529.6 kc	3725.7 kc
137.750 mc	38th	3521.1 kc	3723.0 kc
141.375 mc	39th	3534.4 kc	3720.4 kc
145.000 mc	40th	3536.6 kc	3717.9 kc
148.625 mc	41st	3538.7 kc	3715.6 kc
152.250 mc	42nd	3540.7 kc	3713.4 kc
155.875 mc	43rd	3542.6 kc	3711.3 kc

receiver should now be tuned around the expected 145 mc position, when a beat should be heard. If the receiver is correctly tuned for 145 mc, this beat is the 40th harmonic of 3625 kc. To check that this is so, leave the receiver alone and tune the BC-221 above and below 3625 kc for the first-heard new beats. These should occur at 3717.9 kc and 3536.6 kc, corresponding to the 39th and 41st harmonics of these frequencies on 145 mc. If these frequencies are not obtained, a glance at the accompanying table may help to indicate which harmonic of the BC-221's 3625 kc signal was picked out in the first instance. Suitable corrections can be made and the above procedure repeated until the 145 mc calibration point has been centred on the receiver dial.

The BC-221 should now be checked against its own internal crystal at 3600, 3625 and 3650 kc, using the previously mentioned check points and, if necessary, the corrector condenser should be touched-up to bring the calibration "spot on." The receiver can now have a calibration table drawn up if its dial reading is checked off against, say, every 2 kc change of BC-221 fundamental, corresponding to 80 kc intervals on Two. A graph of ample accuracy can be drawn from the calibration table. The writer now has the habit of switching on the BC-221 at the same time as the 2-metre converter, and logs the frequencies of all stations heard by zero beating the BC-221 with their carriers. A little mental calculation is usually necessary, due to the fact that on this particular BC-221, 2.3 divisions on the main dial correspond to 1 kc at the fundamental; hence, 0.1 of a division corresponds to about 7.75 kc at 145 mc. If it was only 2.0 divisions per kc calculations would be much simplified!

Assuming the BC-221 has been set up

as suggested, the writer considers that, with careful use, it is possible to assess frequencies to plus or minus 1 kc at 2 metres—an accuracy of better than 15 parts in one million, which is quite good going by anybody's standard!

Finally, one or two other points worthy of mention. If the BC-221 is operated from a mains power pack, the HT line should be stabilised; a VR150 fits the bill very nicely. It is also a good idea, especially if the BC-221 is left on for long periods, to provide a ¼-in. asbestos heat baffle fixed to the top of the battery compartment. And if you fail to find any BC-221 beats on your 2-metre receiver, then it's time you gave it the once-over, because you won't hear the GDX either! But up to the present the writer has been unable to find the 120th harmonic on his 70-cm receiver!

#### AN N.P.L. TRIUMPH

The Department of Scientific and Industrial Research has recently circulated an exceedingly interesting paper describing the pilot model of the new "Automatic Computing Engine" (ACE) now working at the National Physical Laboratory, where it was designed and constructed. The ACE itself will be built later, but the pilot is a complete computer, or "electronic brain" so-called, and will solve problems involving lengthy and intricate arithmetical working. In fact, the Superintendent of the Mathematics Division, N.P.L., would be glad to hear of (industrial) problems requiring tedious calculations, which the machine will be pleased to tackle as a mere exercise! For instance, a lens calculation which normally takes about 56 working hours can be done by ACE in less than 15 minutes. The answer to a sum which would take a skilled arithmetician about 8 minutes can be handed out by ACE in one five-hundredth of a second. And the N.P.L. says that when they have added the "auxiliary magnetic recording storage system," its memory capacity will be greatly increased. The whole outfit is on a 12-foot rack with 40 plug-in chassis units, using 800 valves, with a power consumption of 5 kW.

#### THE PIRACY PROBLEM

Until recently, we have been noting in "DX Commentary" cases of piracy reported to us, though the original intention was that only overseas pirates should be so reported, for the

information of G's who may have worked them. Any G operator should, of course, give full details regarding an authentic case of piracy to the GPO—and, in the matter of authentication, please see the comments on p.680 of the December *Short Wave Magazine*.

However, in order to inform our overseas readers as to G pirates, as well as G's who may have worked "foreign phonies," we propose in future to report piracy under a separate heading, rather than in "DX Commentary." So will all operators afflicted let us have—on a *separate slip*, please, headed "Piracy Report"—the necessary details, which will be published in the earliest issue possible after the report is received. Here are the first reports, both of which illustrate and emphasise the foregoing points:

G3EAP (Sheffield) is being pirated on 3.5 and 14 mc. One victim was MF2AB, working "his first G on 3.5 mc."

GM3ECI is now serving with the R.A.F. in Ismailia. He heard his call being used on 14 mc in QSO with EL4SY.

#### CARDS IN THE BOX

Operators listed here are asked to send us a large S.A.E., with name and callsign, to enable card(s) held for them in our QSL Bureau to be cleared. In the ordinary way, a first batch of cards is always sent direct to any operator for whom we receive QSL's, irrespective of whether the amateur concerned is a user of our Bureau—provided we can find an address. In the cases below, there is no QTH in any of the published lists, hence the appearance of the call in this space. If publication of the address is desired in "New QTH's" and subsequently in the *Radio Amateur Call Book*, this should be mentioned when asking for the cards. Write BCM/QSL, London, W.C.1., which for our Bureau is a full and sufficient address from any part of the world.

G2BRF, 2BVW, 2CXA, 2FMH, 2PZ,  
2QS, 2RS, 3AIJ, 3CMS, 3CRA, 3CYS,  
3DYR, 3FDX, 3FTY, 3FUO, 3FZB,  
3GNI, 3GPT, 3GUU, 3GVK, 3GVY,  
3GWC, 3GWE, 3GWY, 3GXH,  
3GYU, 3GYW, 3GZO, 3HAS, 3HBI,  
3HCD, 4BP, 6YC, GM3DZG, 4RF,  
GW3HHD.

# VHF BANDS

By E. J. WILLIAMS, B.Sc. (G2XC)

*The Activity Factor—*

*Why Are Calls Missed?—*

*Station Reports and News—*

*Fiveband Club Dinner Fixed*

THE general impression gained from this month's mail is that the Christmas Season and the apparently poor conditions have combined to keep activity at a low level. Your conductor must confess to having been one of those whose appearances on the VHF bands have been somewhat less frequent than normal. In actual fact, however, on the few occasions in recent weeks when G2XC has been on two metres, activity (at least in the Hampshire area) has been much better than anticipated and there has been no difficulty in making contacts. On the evening of January 17, for instance, there were at least 11 stations on the air in and around Portsmouth and Southampton. There have also been days when DX has filtered through—if one may count 100 miles and just over as DX. But as implied above, one gathers, though, that this South Coast enthusiasm is unique.

It is difficult to decide what is the answer to the inactivity problem. Some have suggested activity week-ends or nights. Such periods met with a measure of success on five metres some years ago, but what we really require is not just more activity on one week-end, but consistently night by night. The Contest entry showed that somewhat over 200 two-metre stations can be active at times. These are spread over the whole country, although London and the South account for about three-quarters of the total. A

little thought will show that this number of stations can never provide a consistently high level of activity, for even assuming none of these 200 work on other bands, and that they never build new equipment, domestic responsibilities and other interests obviously set a limit to the time available at each individual station. The answer to the problem would appear, therefore, to be not so much an increase in the activity of the 200 existing VHF operators (desirable as that may be), but rather an increase in the number of stations equipped and interested in VHF band working, and your conductor suggests that our efforts should be directed to that end. If everyone of us persuaded just one more station to come on Two, the improvement would be noticeable.

In the meantime, come on the bands as often as you can. If everyone who writes to us grumbling about low activity was genuinely active himself much of the cause of the grumbling would have been removed! When newcomers arrive on the band, make them welcome and do what you can to encourage them to stay on VHF. If conditions happen to be poor at the time, give them a hint of the exciting things that can and do happen every now and again. Complaints are made from time to time that the old-timers on 2 metres only want one contact with a newcomer and then refuse to answer any further calls from him. Such complaints are usually unjustified, but undoubtedly something of the sort does happen and they do not encourage the inexperienced operator to continue on the band. If we all endeavour to maintain local activity and interest then when the band does open for DX there will be many to take advantage of it.

The evening of January 19 produced excellent conditions in Southern England. Were you on to make the most of it? And much the same can be said of the afternoon of Sunday, 21st.

### The Contest

The various tabular presentations of the Contest results in last month's issue have brought a large number of appreciative comments, which are gratefully acknowledged, but your conductor has come under fire from the Cambridge stations who were mentioned as "being repeatedly called by G5BY without result." G2XV and G4MW remark that *they* also called G5BY repeatedly, especially during the early part of the week-end, without avail and finally decided it was a waste of time! Of course, none of our comments printed in January "VHF Bands" were intended to imply that the equipment or operating technique at either G2XV or G4MW were below standard. This is in fact another example of the situation mentioned by G5UM in this column in December, 1950. His words were: "Can anyone explain why on two metres you can frantically call a chap and never raise him, later to be called by him with the assertion that he'd called you many times before?" G2XC had a similar experience. G2CPL was called, on and off, for two hours on the Saturday evening of the Contest, apparently to no avail. Yet during a contact with G5PY it was learned that G2CPL had also been calling G2XC during this same period! This encouraged your conductor to a further effort which was rewarded with success. It was with this in mind that G5BY's own remark was followed by that of G3DAH on page 756 of last month's issue. The report since received from G2XV and G4MW serves to emphasise still further this queer phenomenon.

Any attempt at suggesting explanations will probably involve us in still more cross-fire, so it is hoped that nobody will read any unintended implications into the following remarks! One possible answer, especially if signals are weak, is out-of-phase fading. Searching for replies, in particular during contests, must be done fairly rapidly if the whole two megacycles are to be covered, and this increases the chances of missing a weak fading signal. Local noise during a particular search period may add still further to the possibility of this happening. Unless some indication, such as QLH, is given as to how it is proposed to search the band for replies, it is difficult to judge how long to make the reply. The result is a compromise; much too long a call if it is at the end from which searching begins, much too short if at the other end, and therefore a "miss." Add in the fading and noise factors, and it is easy to understand why calls can be missed. And this is apart, of course, from the obvious explanation that maybe someone else got in first! All of which brings us back to the phenomenon of those "one-way conditions," so frequently mentioned in this space during 1950.

Contest operating technique varies widely with different operators. Some seek the "many-point" DX contacts, others decide it is a waste of time calling weak DX and so concentrate on locals on the principle that a local worked for 1 point is better than the DX issued at 20 points; others again just work what comes. And there are, of course, variations on these three

### TWO-METRE ACTIVITY REPORT

#### G3EYV, London, S.W.4

WORKED: G2BN, 2DPD, 2FAB, 2FNQ, 2HDZ, 2WJ, 2XV, 3AFT, 3BCY, 3BVA, 3DIV/A, 3DJX, 3HBW, 4MR, 4HQ, 5AA, 6JK, 6LO/A, 6QN, 8KZ.

(December 16 to January 14).

#### G3EHY, Banwell, Somerset.

WORKED: G2AOK/A, 2CPL, 2DCI, 2WJ, 3AHX, 3BA, 3BCY, 3BHE, 3DUP, 3ECA, 3FH, 3GHI, 4GR, 4HT, 4OS, 5LN, 5MA, 5SK, 6NB, 6PY, 8ML, 8SB, GW2ADZ, 3HCH.

(December 1 to January 7).

#### G3HBW, Wembley, Middlesex.

WORKED: G2AHP, 2AVR, 2CIW, 2DD, 3CGQ, 3DIV/A,

3EHY, 3EYV, 3FAN, 3GRA, 4HT, 5LK, 5UF, 6LO/A, 6NB, 8IL.

HEARD: G2AIQ, 2AOK, 2CPL, 2DSW, 2HCG, 2IQ, 2RI, 2XC, 2XV, 3ABA, 3ABH, 3AUS, 3BA, 3DUP, 4MW.

(December 13 to January 14).

#### G3GOP, Southampton, Hants.

WORKED: G2BMZ, 2DSW, 2XC, 3ABH, 3ARL, 3BA, 3BHS, 3BHE, 3BNC, 3CFR, 3CGE, 3ESS, 3FAN, 3GAV, 5MA, 5UF, 6JK, 6XM, 8IL, 8QW.

HEARD: G3EHY, 3GAO, 5TP, 6CB, 6NB.

#### G2XC, Portsmouth, Hants.

WORKED: G2AHP, 2ANT,

2DSW, 2DZI, 2XV, 3ARL, 3BCY, 3BEX, 3BNC, 3FAN, 3FD, 3GAV, 3GOP, 3GSE, 4GR, 4HT, 5LQ, 5NF, 6WU, 6XM, 8IL.

(December 16 to January 19).

### 70 cm Activity Report

#### G8SM, East Molesey, Surrey.

WORKED: G2ANT, 2CIW, 2DD, 2FKZ, 2QY, 3FP, 3FZL/A, 3HBW, 4CG, 5PY, 5TP, 6LK.

HEARD: G2XC.

(Since November 1950).

#### G2OI, Eccles, Lancs.

WORKED: G3ELT, 6DP, GW5MQ (crossband).

HEARD: G2JT.

(Since January 1).

## TWO-METRE ACTIVITY BY ZONES AND COUNTIES

(Based on reports for current issue only)

### Zone A (144.0 to 144.2 mc)

Ayr : GM2BUD, GM3DDE, GM3DIQ, GM3FVX  
Dumfries : GM3OL  
Lanark : GM3BDA, GM5VG, GM6WL, GM6ZV

### Zone C (144.2 to 144.4 mc)

Lancashire : G2BTO, G2DCI, G2OI, G3BKS,  
G6RT, G8SB  
Yorkshire : G2IQ

### Zone D (145.8 to 146 mc)

Nil

### Zone E (144.4 to 144.65 mc)

Cheshire : G3ATZ, G4OS  
Leicestershire : G2RI  
Nottinghamshire : G6CW  
Warwickshire : G3ABA, G4NB, G5JU, G5SK,  
G6CI

### Zone F (145.65 to 145.8 mc)

Flintshire : GW5MQ  
Montgomeryshire : GW2ADZ  
Monmouth : G4GR

### Zone G (144.65 to 144.85 mc)

Bedfordshire : G3CGQ  
Buckinghamshire : G4MR, G6JK, G6NB  
Cambridgeshire : G2AIQ, G2UQ, G2XV,  
G3AEP, G3BK, G3WW, G4MW  
Hertfordshire : G3DJX, G3FD, G3GRA

Huntingdonshire : G2FQP, G3AKU  
Norfolk : G3VM  
Nottinghamshire : G2HCG, G3DUP, G3BA  
Suffolk : G2CPL

### Zone H (145.25 to 145.5 mc)

Dorset : G3ABH, G5UF  
Gloucestershire : G2AOK/A  
Hampshire : G2DSW, G2DZT, G2XC, G3ARL,  
G3BHS, G3BNC, G3CFR, G3CGE, G3FAN,  
G3GAV, G3GOP, G6XM  
Wiltshire : G8IL

### Zone I (145.5 to 145.65 mc)

Cornwall : G3AGA  
Devon : G2BMZ, G3AUS  
Somerset : G3EHY

### Zone J (144.85 to 145.25 mc)

Essex : G2CIW, G2WJ, G3ECA  
Kent : G2UJ, G3BVA  
London : G2DTO, G3AFT, G3BCY, G3EIW,  
G3EYV, G5PY, G6WU, G8LN  
Middlesex : G2AHP, G2DD, G2HDZ, G3GSE,  
G3HBW, G4HT, G5LQ, G8KZ  
Surrey : G2ANT, G2BN, G2DPD, G3BLP,  
G5MA, G5LK, G5NF, G6LK  
Sussex : G2AVR, G3BEX, G3DIV/A

*Note: The frequency areas given above are in accordance with the Two-metre Zone Plan, as accepted by the majority of VHF operators. A few stations are not conforming.*

methods. At G2XC, for instance, we hopefully aim the beam in the direction that should bring most points, and search the DX frequencies first; but when, as is usually the case, these produce a blank the more local frequency zones are examined.

### Seventycems

News that the 70 cm record had been pushed up to 191 miles in the States was squeezed out of the last two issues of *Short Wave Magazine* by the Contest results. This new record was made by W2QED and W4ODG on October 2, 1950. W2QED was using a 150-watt modulated oscillator, but had considerable difficulty in putting a signal through to W4ODG, whose receiver was apparently not too good. In the reverse direction signals were "loud and clear" and in fact W4ODG was heard by K2AH at 300 miles!

In this country, G2XC is temporarily off 70 cm, as it was necessary to take down the beam just after Christmas. It is hoped to be active again in a few weeks' time. G2DD and G2QY

suggest the formation of the SCCC ("Seventy Centimetre Century Club") for those who have had over 100 contacts on the band. Both of them qualify and ask to be enrolled as founder members. It seems a good idea and the first membership list will appear in these columns next month. Please note the contacts are not with 100 different stations. Life is too short for that!

G2QY (Pinner) has dropped his 70 cm schedules, but is willing to carry out tests at any time. He is frequently to be found on 1850 kc. G3HBW (Wembley) is still using low power on 70 cm and has worked G2DD and G8SM (East Molesey) during the month. The latter is now operating on 70 cm exclusively and has a nightly test with G2DD at 1930 or 2230. He has worked 12 stations since November and has heard one other—G2XC! The receiver at G8SM is crystal-controlled with injection on 410 mc. A CV100 in a coax line is used as mixer, and a 446A as RF stage, also in coax line. This stage gives 6 dB gain in signal-to-noise. A

straight PA is under way for the transmitter.

G2OI (Eccles) gives the following Lancashire stations as active on the Seventycem band: G2DCI, G2JT, G2OI, G3AOO, G3AYT, G3ELT. In addition, G6DP in Cheshire and GW5MQ in Flint have been worked, the latter crossband at 40 miles. He thinks 70 cm will be as good a DX band as 2 metres when conditions improve. Nightly schedules with G3ELT continue and transmissions on 435.72 or 433.2 mc are made as follows: NE 2230, E 2245, SE 2300, S 2315, SW 2330, W 2345.

### Two Metre Station News

DL3FM (Mulheim) is having repairs done to his attic shack and so is temporarily QRT. He promises a new beam, a 12-element colinear stack, by the Spring and asks for daily schedules during the periods March 1 to May 1, and August 1 to November 1. Anyone interested should write to him direct; QTH as in *Call Book*. He is hoping to contact GM and GW during the summer.

GW5MQ (Mold, Flints) has returned to two metres and is using 15 watts

at a location about 1,000 feet up. Apparently this elevated site produces some colossal signals and at least one station has accused GW5MQ of being a pirate. Frequency is, at present, 144 mc exactly, although a crystal to give 145.8 mc is available. But, says GW5MQ, no one tunes up there.

GM3DIQ (Saltcoats) reports good activity North of the Border. At GM3DIQ a new 16-element beam is in use, while GM3DDE has three 5-element Yagis spaced one wavelength apart. Apparently some of the GM's feel that stations south of the border do not want to work GM. The more probable answer is the lack of activity in the northern counties of England, since the average VHF operator, like anyone else, wants to work as many stations as he can in every direction. GM3DIQ and others in his locality can be assured there are plenty of G's down south who would gladly work any GM on Two., without the suggested offer of a cash prize! And our beams spend most of their time aimed North!

In Lancashire, G2HGR (Westhoughton) on 144.25 mc, is using a converted Admiralty type transmitter with an RK34 in the PA. The receiver is a 6J6 converter into a BC348 and a 3-element beam completes the line-up. G3BKS (Farnworth) has 7 watts to an 832, with receiver and beam similar to G2HGR. G6QT (Bolton) employs an SCR522 as transmitter and is on 144.126 mc. The receiver is EF91-6AK5-EAC91 into BC348, while G2BTO (Bolton), on the same frequency with a similar transmitter, has EF54-EF54-VR66/D1 converter and a 3-element beam. G2HGR and G6QT, although only about 6 miles apart, cannot hear each other; the path goes across the town of Bolton. G2OI (Eccles) has found conditions very poor this month, but is glad to report some increase in local activity.

G3VM (Norwich) considers conditions have often been superior to activity, as the occasional signals heard have often been good. Activity in his own area is nearly nil. G2CPL (Lowestoft) reports similarly. He has spent some time juggling with the Contest tables, and G3VM suggests that a table showing points-per-watt causes a bit of a reshuffle. G3WW (March) puts it forward that the trouble with two metres is that too many people listen and too few transmit, and gives a number of instances to prove his point. He urges.

### VHF RECORDS

#### 144 mc

<b>World :</b>	<b>W5VY/W8WXV</b>	1196 miles	June 24, 1950
<b>European :</b>	<b>G2BMZ/DL4XS</b>	520 miles	Sept. 13, 1950

<b>Inter-G :</b>	<b>G3BLP/G12FHN</b>	330 miles	Aug. 20, 1949
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#### 420 mc

<b>World (Fixed)</b>	<b>W2QED/W4ODG</b>	191 miles	Oct. 2, 1950
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<b>(Portable)</b>	<b>W6VIX/6/W6ZRN/6</b>	262 miles	July 4, 1949
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<b>European :</b>	<b>G5BY/G6LK</b>	161 miles	June 4, 1950
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#### 1215 mc

<b>World :</b>	<b>G3QC/P/G8DD/P</b>	75 miles	Oct. 1, 1950
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#### 2300 mc

<b>World :</b>	<b>W6IFE/6/W6ET/6</b>	150 miles	Oct. 5, 1947
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<b>European :</b>	<b>G3CBN/G8IH/P</b>	24.4 miles	Oct. 20, 1948
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#### 10,000 mc

<b>World :</b>	<b>G3APY/P/G3ENS/P</b>	27 miles	Oct. 22, 1950
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activity week-ends again, and he would be interested to know if anyone has tried super modulation on Two.

G8LN (Plumstead) visited G2OI recently and comments on the difficult conditions under which a VHF station in the North has to work. He wonders how much the smoke layers in the Northern industrial areas affect two-metre propagation—this is certainly a thought. In Plumstead G3EIW is also active and is using screen-grid modulation and a new folded dipole beam. Tests with this suggest that when coax feeder is used good local contacts are made, due presumably to standing waves, but the beam does not work as a beam. Using twin feeder all is well and the radiation pattern as expected.

G3DVQ (Purley) has been mainly active with soldering iron and screw-driver, but has turned his 2-over-2 beam to radiate NW and SE. A copy has been fitted at the other end of the roof space and fires at right angles, a change-over switch under the operating table enabling a rapid change to be made. G3EYV (S.W. London) is running 15 watts to a much modified SCR522 and a 4-element Yagi. Several receivers are in use, but according to G3EYV they only perform well on car ignition!

G4HT (Ealing) is becoming tired of references to his harmonic on 70 cm and suggests that those who crack about it might listen to what they themselves radiate on Two when they are supposed to be on Seventycems! G2AHP (Perivale) suggests that all members of the Fiveband Club should promise to be active on one or other of the VHF bands at least 100 times during the year. He says that a careful check shows that this would result in far greater activity. G3HBW (Wembley), one of our newer transmitters but a most experienced SWL, set himself the task of working 14 counties in time for his monthly report, but did not quite manage it. He actually reached 12. He is on 144.87 mc and asks for all to listen for him on that frequency, or he threatens to give up trying! G3HBW has been using 8 watts to push-pull 6C4's for most of the time, but has now a QQVO7/40 with 22 to 24 watts input.

G3BCY (Greenwich) is one of those who believe in a high aerial. His stack of two 5-element Yagis is 90 feet up and is fed with 300-ohm ribbon. The trans-

**TWO METRES**  
**ALL-TIME COUNTIES WORKED LIST**  
Starting Figure, 14  
From Fixed QTH only.

Worked	Station
49	G2OI (158)
46	G3BLP (330)
45	G3EHY (213)
43	G2AJ (304), G3COJ (139), G5WP, G6NB
41	G2NH (283), G3ABA (178), G5MA
39	G6XM (208)
38	G2IQ, G3APY, G3WW, G4HT (318), G5BY
36	G2XC, G3CGQ, G3CXD
35	G4LU, G6LK
34	G3VM (143), G4AU (201), G4DC, G5BM, G8SB
33	G2XS (147), G3DMU (115), G5JU
32	G2CPL (200), G3BK, G8WV
31	G2CIW, G5RP (148), G8IP (213)
30	G3BOB, G4CI (181), G8IL, G8SM (172)
29	G5NF, G5DS (145)
28	G6VC
27	G3DAH, G8QY
26	G2ADR, G2FNW, G3BW, G3BHS, G3FIJ, G6UH (212), G8QC (126)
25	G6WT
24	G2AIQ, G3FAN (118), G3FXG, G3AKU, G8KL
23	G2NM, G3AVO/A, G3GSE, G4NB, G5PY, G6CI
22	G3GBO (165), G4RK
21	G2FMF
20	G2ANT, G3AEP, G3EYV (118), G8KZ
19	G5SK, G8CB
18	G3CAZ, G8VR, GM3OL
17	G3ANB, GM3BDA
16	G2AOL, G4LX, G5LI, (121), G5LQ, G5MR, GW5SA
15	G2AHP (135), G2AVR, G4RX, G4MR
14	G2HDZ

NOTE: Figures in brackets after call are number different stations worked: Starting figure, 100.

TWO METRES COUNTIES WORKED SINCE SEPTEMBER 1, 1950 Starting Figure, 14	
Worked	Station
33	G5MA
32	G3EHY
31	G4HT
30	G3ABA, G3WW
28	G5DS
24	G2AIQ, G2AJ, G5RP
23	G2OI, G3VM, G8IL
22	G2CPL
21	G3AKU, G3BOB, G3COJ, G3FAN
20	G3AEP, G3FD, G3GBO
18	G2CIW, G3EYV, G5PY, G6CW
17	G2ANT, G3GSE
15	G8IP

*Note: This Table will run for one year to August 31, 1951.*

mitter is an SCR522 with 28 watts, and the converter has 6AK5 RF and 9002 mixer and oscillator stages. G6XM (Farnborough), who is now on every evening, has a new experimental receiver in use with all miniature valves and feeds in the converter output at 6 to 8 mc. This means that the station at G6XM is now entirely home-built. G2DZT (Southsea), assisted by ZBIAK, has made a welcome appearance on the band. Initial contacts have been achieved with an indoor dipole, but a 4-element beam is promised. G3GOP (Southampton) has been very active, but thinks conditions have been poor; he is using 22 watts and is looking for Midland DX.

G3EHY (Banwell) comments that, in spite of the severe weather, the number of evenings when good DX can be heard is appreciable. Some of the London stations get through to him almost nightly, and good contacts were made with G2CPL, of Lowestoft, during December—and that is DX. The receiver has been modified by the addition of a Wallman Cascode pre-amplifier; this makes four RF stages in all. The oscillator is now a push-pull 6J6, which is found to be superior to a 9002. Later,

when the weather improves, the pre-amplifier will be going up at the mast-head. G3FIH (Radstock) has been off the band due to a broken feeder.

#### Fiveband Club

The Fiveband Club dinner has been arranged for April 14 at the Monico Grillroom in Shaftesbury Avenue. The charge will be 11s. 6d., and it is proposed to have a few lucky ticket number prizes, to be donated by *Short Wave Magazine*. It is also hoped that members with pieces of apparatus which they think would be of general interest will bring them along. Full details and tickets can be obtained from J. Haydon, G3BLP, 52 Littleheath Road, Selsdon, Surrey, and a further reminder will appear in this space next month. In the meantime, book the date.

New Club members include G2AHP, G3HBW and G3EYV, while G2AHP, G3GSE and G3BTC have qualified for the VHF Century Club.

The Fiveband Club (named such in the days when five metres was our main VHF band) is open to all transmitters who are keenly interested in VHF work. Applications for membership should include a statement of the applicant's interest in such work and his intention to support all activities which further the use of these frequencies. Members are eligible to apply for the VHF Century Club parchment as soon as they have 100 QSL's confirming contacts on frequencies above 50 mc during the post-war period. Such applications must include a signed statement that all cards received have been acknowledged by a return QSL, and that the applicant will continue to reply to all cards received.

#### Activity Period

As an experiment, an activity period will be tried during the second week-end in March. Times will be 1830 to midnight on Saturday, March 10, and 1000 to 1600 on Sunday, March 11. Lists of calls worked and heard during these two periods will be welcomed and may be sent with the monthly reports, which will be due on March 14. Please make a special effort to be on for this—and call CQ, and report your results.

#### Sayings of the Month

"Ask the G boys to turn their beams up North" (GM3DIQ) . . . "I hope more stations will beam South" (G3GOP) . . . "It's nice to know other people have teething troubles"

(G8LY) . . . "It seems to me most people come on only to work locals and/or their own special DX stations" (G3HBW) . . . "One good CQ deserves another" (G4HT) . . . "Never have I received so many good wishes before, and with these carried on to the New Year I feel sure I shall benefit accordingly."

#### In Conclusion

A word of thanks to all those who

have sent in reports this month. When conditions and activity are low, such reports are doubly welcome. Do not forget to encourage someone else to get going on 'Two, and remember that Activity Week-End next month. Reports for the March issue should reach E. J. Williams, G2XC, *Short Wave Magazine*, 53 Victoria Street, London, S.W.1, by February 14 at latest. And now, GB till March 9.

## C.A.V. SECEDES FROM I.A.R.U.

### On "Peace" Grounds

*EDITORIAL NOTE: Following is the untouched reprint of a letter in English dated December 7 and sent to SHORT WAVE MAGAZINE from the headquarters in Prague of the CAV (Ceskoslovenski Amateri Vysilaci), the recently "purged and reorganised" Czech national amateur body. A development inspired by the notorious Stockholm Peace Appeal, it is clear that other Communist-controlled countries will be compelled to take the same line as the CAV. For the information of those who may not know, the IARU (International Amateur Radio Union) is an old-established though rather loose federation composed of the national amateur organisations of most countries of the world; the IARU has always been largely under the controlling influence of the American Radio Relay League, as the most powerful member, but Union activities are, of course, entirely non-political in character.*

"On the 26th of July 1950, Czechoslovak Amateurs (CAV) sent a letter to IARU in which they asked this body to call upon all member organizations to take a vote on whether to associate themselves with the Stockholm Peace Appeal of the World Congress of Partisans of Peace, or not. To-date this appeal has been endorsed by over one quarter of all humanity. Czechoslovak amateurs, convinced that the majority of radio amateurs desire peace, wished to thus gain the world radio-amateur movement for the camp of peace, that is for the camp of decent people throughout the world. For after all the purpose and aim of the IARU should be to bring understanding among

nations without regard to language, nationality, race and distance.

"IARU's reply to our appeal, to have the vote taken in all member organizations, was an undemocratic rejection.

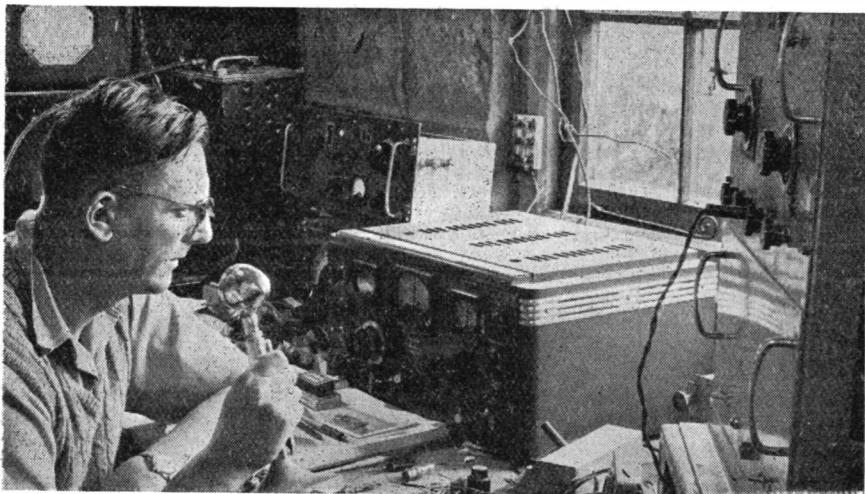
"Our QSL-cards on which the Peace Appeal is printed, were returned by ARRL, of which the IARU is an appendage, we can only conclude, because they were afraid and unwilling to have radio amateurs in the USA become acquainted with the unadulterated form of the Appeal which calls for the banning of all barbarous weapons of mass destruction, headed by the atom bomb. On the other hand ARRL without hesitation distributes QSL-cards of US amateurs, cards with atomic weapon and war propaganda.

"ARRL which openly dedicates whole pages in its magazine, *QST*, to the recruiting of radio amateurs into the service of war-minded MARS (Military Amateur Radio Service) is thus incontrovertibly supporting the inhuman attacks by American troops against defenseless children and women in Korea and elsewhere. This stand clearly places the ARRL in the camp of the insurgents-of-war.

"The recent threatening speech by President Truman, which was intended to prepare world public with regard to the use of the atom bomb against Peoples Democratic China, makes it our duty to clearly proclaim:

Czechoslovak amateurs never belonged nor will belong to the camp of the insurgents of mass murder. In the war against Fascism too many Czechoslovak amateurs laid down their lives to permit us to remain members of an organization that actively participates in the preparation of new wars and bestial atom-bomb murders.

"We are therefore giving up our membership in the IARU and the ARRL and informing all amateur organizations in the world of our decision and our reasons for it."



## The other man's station VQ4RF

VQ4RF was first licensed for phone and CW in October, 1948, and the station is located on a 700-acre farm about 16 miles from Nakuru and 120 miles North of Nairobi. The altitude is 6,000 feet and the soil volcanic ash. A very good location.

The first transmitter was an Army 21 Set with an output of just under two watts and an 8-wave rhombic for 28 mc; many W's and quite a few Europeans were worked on CW during the first 10 days of operation. By November, 1948, a phone transmitter with a 6L6 in the final and a power input of 20 watts was in use on Ten. Power was obtained from batteries and a vibrator unit, and by April, 1949, 71 countries had been worked, all on 28 mc.

In April, 1949, a 1½ kW alternator was installed and this was used to light the house and run the rig, and as there was now plenty of AC power in hand, a 60-watt phone transmitter (p/p 807's) was put on 28 mc. By September, 1949, 100 countries had been worked on Ten and by the following October the total was 108. Some 1,300 W's and over 300 G's had been QSO'd—and QSL'd.

The next step was to replace the 1½ kW alternator with a 4 kW machine driven by a diesel engine, with the old 20-watt transmitter pushing the final of the 60-watt Tx on 14 mc. About 50 countries have been worked on this band in four months (the station was

QRT during July and August, for a trip to ZS-land).

On the receiving side an S.40 plus a "Radiovision" Preselector was in use up to April, 1950, when the S.40 was replaced by an SX28. A 1355 (not 1155) with an RF-24 unit is used as a broad band receiver operating as a kind of "audio panadaptor" for 28 mc. The idea is that if Ten is dead the 1355 is switched on and left running, and another band worked or a constructional job got on with; as soon as a signal appears on 28 mc the 1355 brings it in.

Aerials in use at present are an 8-wave 28 mc rhombic directed on U.S.A.; an 8-wave 28 mc V-beam lined up on Europe; a 3-element 28 mc close-spaced rotary beam, and two full-waves-in-phase (28 mc) centre fed. All the long wire aerials are used as multiple band systems on 7, 14 and 28 mc.

Future intentions are to increase power to 150 watts on both 28 and 14 mc, with two separate transmitters and a switched power supply. The transmitters and power supply are already installed (not visible in photograph) and are undergoing final testing before being put into commission. The 14 mc rig will use super modulation and the 28 mc Tx grid control. The 3-element beam will be dismantled and will be replaced eventually by four V-beams spread through 180°, which should give 360° coverage.

# Here and There

## No. 1 of Vol. IX

The next (March) issue of *Short Wave Magazine* will commence a new volume, and each copy will therefore contain, as a loose insert, the Index to the 12 issues of Vol. VIII, which concludes with the present issue.

We must also take this opportunity to apologise for the delayed appearance of the *Magazine* in certain areas during the last two or three months. These delays have been quite outside our control, but having made new production arrangements, we hope that they will not recur.

## American Valve Guide

A new edition of the *RCA Receiving Tube Manual* is now available. Running to over 300 pages, it lists more than 450 RCA valves and CRT's, with all the necessary operating data, base connections and application notes. Designated Manual RC-16, it costs 5s. 6d. post free and can be ordered through RCA Photophone, Ltd., 36 Woodstock Grove, London, W.12.

## Error Crep' In

Not a few readers will be waiting to see what we have to say about certain pretty obvious boobs perpetrated in the last issue. The diagram on p.737 contains five mistakes which render the circuit unworkable—simply because the block put down was that made from the uncorrected drawing and (as so often happens) this was not noticed until the damage was done. Then, in the circuit on p.758, the earthy side of S<sub>2</sub> should go to the junction above the phone jack; alternatively, S<sub>1</sub> can be a 3-position switch.

And while we are drinking ink, a lil' error has just come to light in G3CFR's article in the December 1950 issue: The main change-over switch correctly marked S<sub>1</sub> in the circuit on p.669 is referred to in the text as S<sub>2</sub>, while in the diagram itself the arrowed leads between the contacts of S<sub>1</sub> would be direct connections, i.e., points 2-3 and the corresponding junction just below the "S<sub>1</sub>" in the diagram.

Several readers have been good

enough to write in at length to draw attention to these regrettable lapses—for our part, we can only offer a humble apology to those who may have been misled, frustrated or infuriated thereby, adding that we are only too glad to find and correct those quite few (we believe) errors that do occasionally creep into the great mass of material we disseminate each month.

## The 1951 R.A.E.

This year's Radio Amateur Examination will be held on Wednesday, May 2, by the City & Guilds of London Institute, at examination centres in various parts of the country. Intending candidates should apply, by March 1, to the secretary of their local technical college or the Local Education Authority or (in cases of doubt or difficulty) to the Superintendent, Department of Technology, City & Guilds of London Institute, 31 Brechin Place, London, S.W.7. The examination fee is 15s. and, in general, arrangements are made to examine candidates at centres within easy reach of their homes.

The paper set for the 1950 R.A.E. is given in full in the January issue of our *Short Wave Listener & Television Review*, and commencing with the March issue we shall be giving a set of specimen answers to these questions.

## The Winter Call Book

The *Radio Amateur Call Book* in the Winter 1950-'51 edition, No. 4 of Volume 28, is now available, and the G Section, listing some 6,500 British amateurs, contains all addresses published in "New QTH's" up to and including our issue for November last. In all, there are 52 columns of G's, and, as always, the *Call Book* is indispensable at the operating position.

## News of AC4YN

From VU2LJ, via G2YL, we get it that AC4YN is now at Kalimpong, a small town in North Bengal quite near Darjeeling; presumably, AC4YN is still in the retinue of the Dalai Lama, who recently withdrew from Lhasa to Kalimpong.

## NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the quarterly issue of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

- |                 |                                                                                                           |                                                            |                                                                                              |
|-----------------|-----------------------------------------------------------------------------------------------------------|------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| <b>G2DAR</b>    | W. A. Hague, 7 Ridgeway Close, East Herringthorpe, Rotherham, Yorkshire.                                  | <b>G3HCX</b>                                               | J. Arundel, Drapery Stores, The Square Airedale, Castleford, Yorkshire.                      |
| <b>G2DHV/A</b>  | G. V. Haylock, A.M.I.P.R.E., A.M.Inst.E., 28 Longlands Road, Sidcup, Kent. (Tel.: <i>Footscray</i> 1649). | <b>G3HCY</b>                                               | H. W. Cross, 8 Grange Close, Hayes, Middlesex.                                               |
| <b>G2HMG</b>    | F. H. Palmer, Central Hotel, Thetford, Norfolk. (Tel.: <i>Thetford</i> 225911).                           | <b>G3HCZ</b>                                               | B. Edmondson, 131 Hatfield Road, Bolton, Lancs.                                              |
| <b>G3AAX</b>    | T. R. G. Lampard, Glencairn, Upper Weybourne Lane, Farnham, Surrey.                                       | <b>G3HDB</b>                                               | J. H. Whitty, 16 St. Andrews Road, Ilford, Essex.                                            |
| <b>GM3AEI/A</b> | K. M. Senior, The Cottage, Faladam, Blackshields, Midlothian.                                             | <b>G3HDJ</b>                                               | L. J. Smith, D.W.S. (F. Block), Bletchley Park, Bletchley, Bucks.                            |
| <b>G3CCZ/A</b>  | E. L. Devereux, Rydaldene, High Road North Weald, Epping, Essex. (Tel.: <i>North Weald</i> 295).          | <b>G3HDK</b>                                               | G. W. C. Smith, 105a, Alcester Road, Moseley, Birmingham, 13. (Tel.: <i>South</i> 1712).     |
| <b>GW3DHY</b>   | E. J. Edwards, 71 Bro Eryl, Bala, Merioneth, N. Wales.                                                    | <b>G3MDL</b>                                               | S. E. Kelly, 39 Priory Road, Anfield, Liverpool, 4.                                          |
| <b>G3DVB</b>    | D. M. Bolton, 45 Terence Road, Liverpool, 16.                                                             | <b>G3HDQ</b>                                               | W. Baker, 14 Vaudrey Drive, Cheadle Hulme, Cheshire. (Tel.: <i>Hulme Hall</i> 874).          |
| <b>G3DZJ</b>    | F. F. R. Parry ( <i>ex-VS2BT</i> ), 79 Burnside Road, Green Lane, Dagenham, Essex.                        | <b>G3HEV</b>                                               | Ravensbourne Amateur Radio Club, Childeric Road School, New Cross, London, S.E.14.           |
| <b>G3FEY</b>    | J. Hopper, 52 Brandon Village, Co. Durham.                                                                | <b>G3HEV/P</b>                                             | c/o 28 Longlands Road, Sidcup, Kent.                                                         |
| <b>GM3FSV</b>   | C. O. Thomsen, B.Sc., Sourin School, Rousay, Orkney.                                                      | <b>CHANGE OF ADDRESS</b>                                   |                                                                                              |
| <b>G3GEF</b>    | T. A. Andrews, 106 Manchester Road, Blackpool, Lancs.                                                     | <b>G2ALZ</b>                                               | W. H. Heywood, 150 Ruskin Road, Crewe, Cheshire.                                             |
| <b>G3GLZ</b>    | G. Weston, 14 Ash Street, Trawden, nr. Colne, Lancs.                                                      | <b>G2DNY</b>                                               | C. A. Wheaton, Devon Constabulary, Instow, Bideford, Devon.                                  |
| <b>G3GMN</b>    | H. Ward Elsworthly, 20 Rowan Walk, West Town Lane, Brislington, Bristol, 4.                               | <b>GW2IP</b>                                               | C. J. Reed, The Nook, Highcroft Road, Newport, Mon.                                          |
| <b>G3GOH</b>    | P. Elliot, 23 Ravensdowne, Berwick-on-Tweed, Northumberland.                                              | <b>G2LR</b>                                                | Wg. Cdr. W. E. Dunn, O.B.E., Officers' Mess, R.A.F. Station, Colerne, nr. Bath, Wilts.       |
| <b>G3GSG</b>    | M. Buchanan, D.W.S. (F. Block), Bletchley Park, Bletchley, Bucks.                                         | <b>G3AAV</b>                                               | G. N. Glover, 166 Otley Road, Leeds, 6, Yorkshire. (Tel.: <i>Leeds</i> 51277).               |
| <b>GM3GUQ</b>   | A. Stirling, 19 Montgomery Street, Irvine, Ayrshire.                                                      | <b>GM3AEI</b>                                              | K. M. Senior, 23 Marchmont Crescent, Edinburgh.                                              |
| <b>G3GUX</b>    | W. L. Hughes, Woodcroft, The Nook, Gateacre, nr. Liverpool.                                               | <b>GW3ASW</b>                                              | Capt. C. R. Mountjoy, M.M., Pant Villa, Cwmbach, Aberdare, Glam.                             |
| <b>G3GVN</b>    | J. H. Butt, 8 Endsleigh Grove, Hall Green, Birmingham, 28.                                                | <b>G3CHE</b>                                               | M. A. Holley, 70 Hampden Street, Bolton, Lancs.                                              |
| <b>G3GWW</b>    | J. Oliver, 6 Shelley Road, Maidstone, Kent.                                                               | <b>G3CKF</b>                                               | G. G. R. Mason, 8 Herrick Road, Loughborough, Leics.                                         |
| <b>G3GWI</b>    | N. Spivey, 143 Carr Lane, Acomb, York.                                                                    | <b>G3DML</b>                                               | J. R. Brindley, B.Sc., 45, Rosendale Avenue, Chesterton, Newcastle, Staffs.                  |
| <b>G3GWS</b>    | H. Snowdon, 25 Fourth Row, Linton Colliery, Morpeth, Northumberland.                                      | <b>G3EKF</b>                                               | J. A. Slater, 79 Newhouse Road, Blackpool, Lancs.                                            |
| <b>G3GXR</b>    | J. Matthews, 49 Crescent Avenue, Ashton-in-Makerfield, Lancs.                                             | <b>GM3EQD</b>                                              | J. K. Weir, 72 Clincart Road, Glasgow S.2.                                                   |
| <b>G3GYF</b>    | A. J. F. Powell, 19 Stratford Road, Stroud, Glos.                                                         | <b>GW3ERW</b>                                              | J. Lines, 6 Heol-y-Castell, Caerau-Ely, Cardiff.                                             |
| <b>G3GYQ</b>    | C. J. Spackman, 3 Corby Avenue, Swindon, Wilts.                                                           | <b>G3EVT</b>                                               | R. J. Mutton, 113 Studley Road, Redditch, Worcs.                                             |
| <b>G3GYS</b>    | G. M. Thornhill, 5 Shepherds Row, Gloucester Road, Stonehouse, Glos.                                      | <b>G3EXT</b>                                               | S. H. Dutton, 35 Carrick Road, Curzon, Park, Chester.                                        |
| <b>G3GZB</b>    | S. N. Radcliffe, 56 Crescent Road, Wood Green, London, N.22.                                              | <b>G3PCT</b>                                               | S. J. Coe, 29 South Road, Faversham, Kent.                                                   |
| <b>GM3GZC</b>   | C. H. Fraser, 7 Castle Drive, Dunstaffnage, Connel, Argyll.                                               | <b>G3FMO</b>                                               | G. Elliott, B.Sc., A.R.I.C., 90 Victoria Avenue, Chard, Somerset. (Tel.: <i>Chard</i> 3385). |
| <b>GM3GZR</b>   | I. M. MacIntyre, 8 Hermiston Avenue, Glasgow, E.2.                                                        | <b>G3FMP</b>                                               | W. D. Hart, Pancakes, Leverstock Green, Hemel Hempstead, Herts.                              |
| <b>G3HAC</b>    | H. G. Kimber, 29 Harold Street, Prestwich, nr. Manchester.                                                | <b>G3FQX</b>                                               | P. Johnson, 35a Bird Hill Road, Woodhouse Eaves, nr. Loughborough, Leics.                    |
| <b>G3HBB</b>    | H. B. Blich, 52 Norman Road, Northfield, Birmingham, 31. (Tel.: <i>Priory</i> 3647).                      | <b>G3GDA</b>                                               | J. E. Armstrong, 42 Married Quarters, R.A.F. Station, Dishforth, nr. Thirsk Yorkshire.       |
| <b>G3HBU</b>    | F. A. Hall, Morlaix Farm, Reading Road, Finchampstead, Berks. (Tel.: <i>Eversley</i> 2188).               | <b>G3OV</b>                                                | A. H. Parker, 99 Bramwell House, Kockingham Estate, New Kent Road, London, S.E.1.            |
| <b>G3HBW</b>    | A. L. Mynett, B.Sc., 29 Sunleigh Road, Alperton, Wembley, Middlesex.                                      | <b>GW5MQ</b>                                               | E. Menzies ( <i>ex-G5MQ</i> ), Bryn Celyn, Berth Ddu, Rhosesmor, nr. Mold, Flintshire.       |
| <b>G3HCQ</b>    | R. T. Gabriel, 99a Peartree Road, Derby.                                                                  | <b>GM8KR</b>                                               | C. A. M. Clackson, 7 John Street, Brucefield, Dunfermline, Fife.                             |
| <b>G3HCS</b>    | H. F. W. Martin, 38 Havering Road, Romford, Essex. (Tel.: <i>Romford</i> 1099).                           | <b>CORRECTION</b>                                          |                                                                                              |
| <b>G3HCU</b>    | A. E. White, Old Barn Cottage, Dyers Cross, Chiddingfold, Surrey.                                         | <b>R. Rew, 73 Pamela Road, Northfield, Birmingham, 31.</b> |                                                                                              |
| <b>G3HCV</b>    | C. F. Atkins, Bourton-on-the-Hill, Moreton-in-Marsh, Glos.                                                |                                                            |                                                                                              |

# The Month with the Clubs

FROM REPORTS RECEIVED

This month we publish reports from 39 Clubs, all of whom appear to be in an enthusiastic and flourishing state. We also wish to acknowledge receipt of the following Club Circulars, News Letters and Broadsheets:

*MARS News Letter, G3 Experimental Radio Derby, The Brighton Link, Quid Novi?* (North-West Kent), *Wirral Amateur Radio Society News Letter, West Somerset News Letter, Sutton and Cheam News Letter, South Manchester Monthly Magazine, The Radio Link* (West Cornwall) and *Rag-Chew* (Worthing).

Club Secretaries are once more asked to watch their dates carefully. It is no good reporting, this month, the dates of the February meetings; they may be in the future for the Club and the Secretary when writing us, but they will be in the past by the time they appear in our next issue on March 9.

Note, also, that we have introduced a "Club News in Brief" heading for those Clubs that simply send us details of forthcoming meetings. If you have nothing else to report, therefore, do not shrink from sending just two lines with that information, rather than trying to pad them out to make a long paragraph!

Further to assist Clubs with special publicity for important events—such as area gatherings and the like—we are prepared to make display space available in this feature. These notices will usually take the form of a box or panel in the "Month with the Clubs" section. This facility will not, of course, be available merely to announce "the next meeting," as it will be reserved for special notices only. Club secretaries interested are asked to send in such items on a separate sheet, referring to this paragraph, and giving all the details they want to see in print. The usual closing dates will apply.

Closing date for next month's notes is first post on February 14. Address them to "Club Secretary," *Short Wave Magazine*, 53 Victoria Street, London, S.W.1.

**Reading Radio Society**—December meetings were reduced by the Christmas holiday, but in January and February there are to be talks by local amateurs on operating in the various bands—beginning with the Top Band and reaching Ten and the VHF's before March.

**Brighton and District Radio Club**—The AGM was held on January 2 and the Club's 1950

activities reviewed. New officers have been elected for 1951, and the programme is under way with talks, demonstrations and Film Shows. It is hoped to maintain the high standard set by the retiring committee.

**Worthing and District Amateur Radio Club**—Meetings are held on the second Monday of the month. 7.30 p.m. at the Adult

Education Centre, and slow Morse transmissions are now running on the Top Band, every Wednesday between 9 and 10 p.m. A 40-metre contest was organised during January—results later.

**Cambridge and District Amateur Radio Club**—Next meeting is on February 16 at the Jolly Waterman, 8 p.m. On February 26, in conjunction with the University Wireless Society, there will be a demonstration of Amateur Television at the Cavendish Laboratory (8.15 p.m.). All those interested should contact the Hon. Sec. or G2FJD. The AGM is fixed for March 16.

**Coventry Amateur Radio Society**—Social events have included a Junior Ops' Party, a Sausage-and-Mashed Supper and the usual Christmas festivities. There still remains the Annual Dinner, arranged for March 16 at the Hare and Squirrel. Regular meetings are on February 12 and 26, at the BTH Social Centre, Holyhead Road, 7.30 p.m. Subjects are Plastics and Super-Modulation.

**Neath-Port Talbot and District Amateur Radio Club**—Now that the MCC excitement is over, members are settling down to the normal winter programme. Candidates are again being prepared for RAE, and a programme of films and film-strips is being arranged. It is also hoped to organise a Club Contest. Meetings are on alternate Wednesdays, Royal Dock Hotel, Briton Ferry.

**Bradford Amateur Radio Society**—Both February lectures will be by the Vice-President, G2AKU. On the 13th he will deal with Aerials and Propagation, and on the 27th with Frequency Measurement.

**Wakefield and District Amateur Radio Society**—The Top Band transmissions of Slow Morse are being resumed on 1850 kc every Monday, Tuesday, Thursday and Friday, 9 to 9.30 p.m. Several listeners to the previous series are now licensed. Plans are also in hand for a Club Licence, as an experiment.

**Northampton Short-Wave Radio Club**—This Club now possesses a licence and current activities consist mainly of building gear for Club use. A good workshop is available to members, and the Clubroom is open every Friday night with the first Friday of the month devoted to lectures, demonstrations and so on. On other Fridays members are free to build equipment, test it or just natter! Visitors welcome at all times.

**Isle of Man Amateur Radio Society.**—Roughly half of the holders of GD call-signs are members of this Club, but they are so dispersed that it can only exist as a social concern. Arrangements were made at the last meeting for the AGM and Dinner, the premier event of the year. The Club call GD3FLH may soon be heard on the air again.

**South-West Essex Radio Society.**—They held their "Annual Sausage Sizzle" on January 17, and many members also accepted an invitation to visit Grafton at their Headquarters. Membership has increased during the past few weeks, but there is still room for more, and the Hon. Sec. will be glad to hear from prospective members.

**World Friendship Society of Radio Amateurs.**—This Club has recently promoted an activity known as "The Bedfast Club" through which it is hoped to assist bed-ridden enthusiasts to set up a receiving station. This venture is open for contributions in "Cash or Kind," first from WFRSA members and ultimately by any amateurs who care to associate themselves with the scheme.

Regular correspondence with "Bedfast" amateurs is also welcomed. All who can help in any way are asked to get in touch with the Secretary—QTH in panel.

**Derby and District Amateur Radio Society.**—The AGM was held on January 3, and the following officers elected: President, A. G. G. Melville, F.R.C.S.; Chairman, W. A. Mead; Hon. Sec., and Treasurer, E. Shimmin; Assistant Sec., F. C. Ward; Contest Sec., A. J. Smith.

**Birmingham and District Short Wave Society.**—The AGM was held in December, and new officers elected. The Treasurer's report and accounts were put before the meeting on January 8, when future events were also discussed. Next meeting is on February 12 at the Clubroom, Colmore Inn, Church Street, at 7.45 p.m., when there will be a Junk Sale. Talks on the constructional aspect of transmitters and receivers are to be given in the near future. Note change of Secretary: new QTH in panel.

**South Manchester Radio Club.**—Mr. M. I. Wilks, G3FSW, who

has been Secretary for so long, has been forced to retire owing to other commitments. Please note QTH of new Secretary, in panel.

**Aberdeen Amateur Radio Society.**—This Club still has no permanent Headquarters but it is hoped that 1951 will see them settled down. Meetings are now held on the second Friday, preceded by a half-hour Morse class under the guiding hand of GM3ALZ. Last regular meeting took the form of a talk on Two-Metre Converters; February 2 is the date for a Dinner and Social.

**Barnet and District Radio Club.**—Recent meetings have included the AGM, a talk on TV by G3FMG and a talk on Test Gear by G8KO. Lectures and demonstrations have been arranged for alternate weeks, meetings in between being devoted to Junk Sales, discussions and work on the Club Tx, G3FFA. Club night is Wednesday, 7.45 p.m.

**Chester and District Amateur Radio Society.**—Some members recently made a recording, giving information about the Club, for inclusion in the "Voice of America" amateur radio programme. The

#### NAMES AND ADDRESSES OF CLUB SECRETARIES REPORTING IN THIS ISSUE

**ABERDEEN:** G. M. Jamieson, 66 Elmfield Avenue, Aberdeen.  
**BARNET:** C. J. Spencer, G3GRA, 31 Byng Road, Barnet.  
**BIRMINGHAM:** W. V. Shepard, 174 Grishorpe Road, Selly Oak.  
**BRADFORD:** V. W. Soven, G2BYC, Rushwood, Grange Park Drive, Cottingley, Bingley.  
**BRIGHTON:** R. T. Parsons, 14 Carlyle Avenue, Brighton 7.  
**CAMBRIDGE:** T. A. T. Davies, G2ALL, Meadow Side, Comberton, Cambridge.  
**CHESTER:** W. Lloyd, 124 Tarvin Road, Chester.  
**CLIFTON:** W. A. Martin, G3FVG, 21 Brixton Hill, London, S.W.2.  
**COVENTRY:** K. Lines, G3FOH, 142 Shorncliffe Road, Coventry.  
**DERBY:** E. Shimmin, Leafmoor Mount, Derby Lane, Derby.  
**DORKING:** J. Greenwell, G3AEZ, 7 Sondes Place Drive, Dorking.  
**EDINBURGH:** A. G. Bruce, 89 Marchmont Road, Edinburgh 9.  
**EXETER:** E. M. Wills, G3EAZ, Moor View, Wreford's Lane, Exeter.  
**GRAFTON:** W. H. C. Jennings, G2AHB, Grafton L.C.C. School, Eburne Road, London, N.7.  
**HULL:** J. R. Borrill, 321 Priory Road, Hull.  
**ILFORD:** C. E. Lagen, 44 Trelawney Road, Barkingside, Ilford.  
**ISLE OF MAN:** H. Grist, GD3FBS, Broadway House, Douglas, I.O.M.  
**KINGSTON:** R. Babbs, G3GVU, 28 Grove Lane, Kingston, Surrey.  
**LEEDS:** L. H. King, G3CML, 14 Clarence Street, Bramley, Leeds.  
**LINCOLN:** G. C. Newby, G3EBH, 10 Addison Drive, St. Giles, Lincoln.  
**NEATH AND PORT TALBOT:** W. R. Petheram, GW3CIJ, 7 Tynyrheol Avenue, Tonna, nr. Neath, Glam.  
**NEWBURY:** A. W. Grimsdale, G3CJU, 164 London Road, Newbury.  
**NORTHAMPTON:** V. R. Hartopp, 22 Purser Road, Northampton.  
**PORTSMOUTH:** R. Short, G3AFF, 76 Roman Grove, Portchester.  
**READING:** L. Hensford, G2BHS, 30 Boston Avenue, Reading.  
**R.E.M.E.:** J. A. Theobald, G3EQM, Hazebrout, Arborfield, nr. Reading.  
**ROTHERHAM:** J. K. Wright, 124 Netherfield Lane, Parkgate, Rotherham.  
**SHEFFIELD:** E. Walker, G2LT, 11a Welwyn Close, Intake, Sheffield.  
**SLADE:** C. N. Smart, 110 Woolmore Road, Birmingham 23.  
**SOUTH MANCHESTER:** E. Taylor, G3BVP, 12 Marton Avenue, Didsbury Park, Manchester, 20.  
**SOUTH WEST ESSEX:** L. G. Barratt, 367 Rush Green Road, Romford.  
**SOUTHWICK:** E. Basilio, 111 Vale Road, Portslade, Sussex.  
**STOKE-ON-TRENT:** J. R. Brindley, G3DML, 45 Rosendale Avenue, Chesterton, Newcastle, Staffs.  
**SURREY (CROYDON):** S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.  
**WAKEFIELD:** W. Farrar, G3ESP, Holmcroft, Durkar, Wakefield.  
**WANDSWORTH:** M. M. Wallace, 13 Auckland Hill, London, S.E.27.  
**WANSTEAD:** T. W. S. Roots, Wanstead House, The Green, London, E.11.  
**W.F.S.R.A. ("Bedfast Club"):** J. Woodward, 6 Council Houses, Rode Heath, Stoke-on-Trent.  
**WORTHING:** R. Forge, G3FRG, 2 The Plantation, Worthing.



G3CMH is the official station of the Yeovil Amateur Radio Club, and in this photograph G3BEC is at the key, with the treasurer F. W. Parkhurst at the back on the receiver. In the foreground is D. L. McLean, a well-known SWL and the very active and enterprising secretary of Yeovil A.R.C. The G3CMH transmitter runs 6L6-807-807 at 50 watts and it can be operated on CW or phone on all bands 28 to 3.5 mc. So far, some 33C have been worked in 8Z and 5 continents.

AGM will be over by the time these notes appear, and full information about future events will be available next time.

**Clifton Amateur Radio Society.**—Main event during December was the Christmas Party, at which the Club Championship Cup was presented to R. Brooker, G3HBI. The Construction Contest was won by H. Atkinson. January events include a Junk Sale, a talk on Pulse Technique and Radio Theory Classes.

**Dorking and District Radio Society.**—Meetings are held every Tuesday evening at 7.30 p.m., 5 London Road, Dorking. January events included three general meetings, a lecture on Amateur Operating and a Tape Recorder demonstration. February 6 is booked for a lecture on Radar. The Club Tx, G3CZU, is being completed and a new PA stage has recently been put into operation.

**Grafton Radio Society.**—G3AFT is now operating on two metres as well as the Top Band, and is still looking for contacts with other Clubs on any Monday, Wednesday or Friday evening. Forthcoming events include a Junk Sale, lectures and demonstrations, and a QSL card display. Visitors and new members will be welcomed at any meeting.

**Kingston and District Amateur Radio Society.**—Activities were resumed on January 3 with a talk on Operating Procedure by G2ACA and G3GVU. Future events will be talks on Mobile VHF Communication and Television. Next Club meetings are on February 14 and 28, with Morse and Theory classes on the other Wednesdays. All will be welcomed at Penrhyn House, 5 Penrhyn Road, Kingston.

**Lincoln Short-Wave Club.**—Future programme: February 7, Debate on High or Low Impedance Transmission Lines; February 21, Radio Construction—Soldering; March 7, Demonstration, with Oscilloscope, on Radio Fundamentals. It is hoped to organise a Lincolnshire Hamfest on Sunday, April 29, at the Great Northern Hotel, 1.30 p.m. There will be accommodation for 85—fuller details later.

**Newbury and District Amateur Radio Society.**—The 1951 programme has been mapped out, and is to include an Amateur Radio Exhibition for three days in March; later in the year it is hoped to participate in the Arts and Handicrafts Section of the local Festival of Britain Exhibition. Meetings are held on the last Thursday, 7.30 p.m. at the Railway Hotel, Greenham Road, Newbury.

**Portsmouth and District Radio Society.**—The first issue of the Club magazine made its appearance in time for Christmas. Officers for the coming year have been elected, and thanks given to those retiring, for making the past year a most successful one for the Club. G2DZT has donated a trophy to be awarded each year to the member who has helped the Society most.

**R.E.M.E. Radio Club.**—This body has been formed from Army personnel at the R.E.M.E. Headquarters at Arborfield, near Reading. There are about twenty members, many of whom are out after their own "tickets." The Club is on the air on the Top Band, using the call G3EQM/A, and has applied for its own licence. Members will be welcomed from other camps in the garrison.

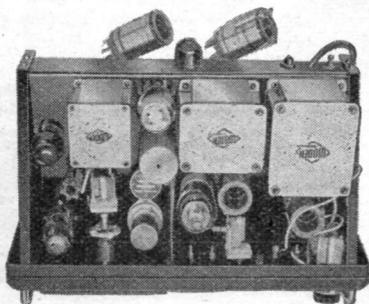
**Rotherham and District Radio Club.**—The President and Chairman were re-elected at the AGM, and the annual report showed an average weekly attendance of 22 for last year. Meetings are held at the Oddfellows Hall, Westgate, Rotherham, every Wednesday at 7.30 p.m., and there is a regular net on Sunday mornings, 1100 GMT on 3603 kc.

**Sheffield Amateur Radio Club.**—The first Annual Dinner was held on January 10, and members welcomed Mr. Ray Ragheb,



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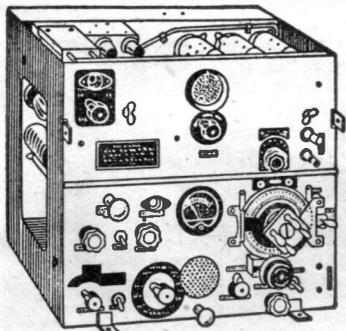
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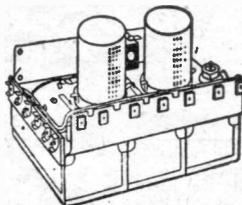
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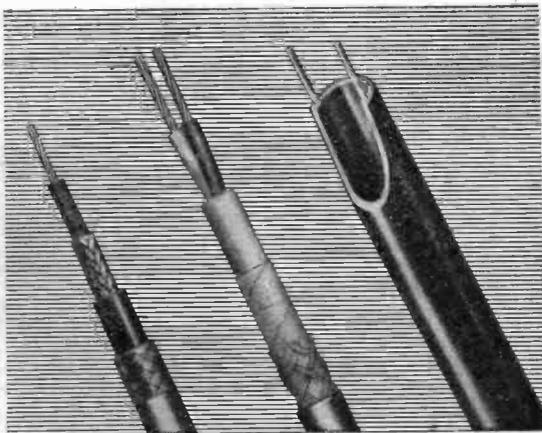
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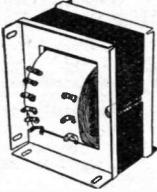
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**WANTED**—Hallicrafters S38 or S38A, for use aboard ship. Offers to G3GFF, 68 Capel Gardens, Pinner, Middlesex.

**ET4332** RCA Phone/CW Tx, VFO/Xtal, 813 final, takes only 6 watts audio input. Less outer case. Bargain at £20. Buyer collect. Also 840 receiver, perfect order, £17. Duncan, 23 Noran Avenue, Dundee.

**FOR Sale.** 1224A with eliminator and accumulators, also MK18 receiver in cabinet, and receiver Type 21, 9 valves, not working; £5/10/0 the lot. Box No. 876.

**BRAND** new genuine Vibroplex "Blue Racer" D70/-, or exchange brand new J36 jug; pair new HK24G 12/6 each. Pair new 35T 17/6 each. G2CNN, Fairfields, Studland, Dorset.

**GOING QRO?** Modernised T1131 rack cabinet, £3. T1131 power unit, 1000v 500 mA, 6.3v 7.5v, £8. T1131 modulator: 150 watts from P/P TZ40's, modified for m/c Mic., £8. Modulator supply, 300v 6.3v 7.5v, £3. All with valves. Assembled, wired as a going concern, £20. Buyer collects. Herrington, 3 Longford House, Brangbourne Road, Bromley, Kent.

**FOR Sale.** Double superhet Rx, 18 valves 66 mc—1.8 mc, mechanical vernier drive and S-meter illuminated, Crystal calibrator, amp. AVC, 6W P/P output, stabilised supplies, variable selectivity, audio filter, BFO, muting, aerial matching, less speaker, 110-250v. As new, offers. 5-inch oscilloscope, push-pull X and Y deflection, flat response DC to 1.5 mc, automatic sync., TB 10cs—120 kc. Built-in 50v vertical TB. Offers? Hill, 2 Bedford Place, Maidstone, Kent.

**VALVES**, unused surplus. Eimac 35T, 28/6. 4074A (RK34) 18/6. 4061A 12/6, TP22 6/6, 6H6 4/-. CV63 VHF triode 7/6 (three), CV1137 E-series triode 6/6 (four), CV1135 VHF triode 7/6 (three), SP210 6/- (three) ATP7 (V226) Tx pentode 10/- (two), CV1199 large stabiliser 9/- (four). G6DH, 25 Lancaster Gardens, Clacton, Essex.

**B2**, perfect, complete crystal coils P/p, £15. R. Robbins, G3FSL, 36 Sunnyside Gardens, Uppminster, Essex. (Uppminster 4857).

**RCA** frequency meter 2-20 mc, brand new, W/spares, manual, case, £10. Variac 250v 7½ amps. £5. MCR1 Rx, P/p, perfect, w/circuits etc., £7. Bendix 100 watt Tx, 4 ECO's, 807 B, 2/807 final, new, mod. details for 10, 20, 40, 80 metres, switched, £8/10/0. Exchanges. Box 878.

**STEEL** lattice tower, 18 ft., complete with motor drive for beam. Also cradle for 28 mc beam. Write G8ML, 117 Fairview Road, Cheltenham.

## SMALL ADVERTISEMENTS

## READERS'—continued

**V**ALVES. 6AC7, 6K7, 6N7, 12A6, 12K8 and many other 6.3 and 12.6 volt types, at bargain prices. S.A.E. list. All letters answered. Rolph, Sandpits Farm, Lakenheath, Suffolk.

**R**-19C/TRC-1 FM Rx 70-100 mc, 18 valves, 115V 60 c.p.s., internal speaker and cooling fan, thermostat, meter, squelch relay, in transit/operating table, chest, circuit, £7/10/0. ARR-1/ZB VHF Rx, 4 valves, modified per *Short Wave Magazine* for 144 mc, and spare chassis, and TS1/ARR-1 test oscillator for above, gold plated coaxial cylinders, aerial and canvas cover for cabinet, £4 the three units. Command gear: 2 RX's BC454 and BC455, 3-6 and 6-9 mc, 6 valves and 1 dynamotor. BC458 Tx 5.3-7.1 mc, 4 valves, dynamotor and xtal. BC456 modulator, 3 valves and dynamotor, control box. Total 17 valves, 3 dynamotors and 1 xtal. All unmodified, £7. Carriage extra, send no remittance in first instance. Box 877.

**S**HORT Wave Magazine, Vols. IV, V and VI bound with index, £1 each. Vol VII not bound 15/- Dalby, Green Lane, Lea, Gainsborough. (Tel.: 2097).

**A**TTRACTIVE modern self-contained commercial table-top transmitter for sale. Six valves, all Woden chokes and transformers, input 40 watts key, 25 watts phone on three bands. Transmitter can be loaded into dipole or into any length of wire strung around room. Ready for immediate air operation, with 4 new Q.C.C. crystals. Transmitter given owner WAC with indoor wire. First £25 secure. G5KA, 30 Albemarle Crescent, Scarborough, Yorks.

**HRO** Mx bandsread coils, P/P, book, £15. 60W CW/phone Tx: 6F6 VFO, 6V6 buff, 807 PA: Mod. 6J5, PP 807's. 2 power packs, 600v each. All in cabinet 20ins. x 11ins. x 12ins., £12. S.A.E. details. Liverpool area. Box No. 879.

**DB20** preselector or other type wanted. Full details to G6BS, 96 Hinton Way, Gt. Shelford, Cambridge.

**RC**A ET.4336 Tx, spares at half list prices. State your wants. J. Holland, Bk. 64 High Street, Cleethorpes, Lincs.

**F**INAL LIST OF EQUIPMENT OF THE FLATE G6SB, Pinner. No reasonable offer refused, to clear. (1) Universal Avomnir; (2) Modulator, standard 8½in. panel, designed for 6SJ7-6J5-p/p 6V6, xformer to single 807, no valves; (3) BC1255A heterodyne monitor; (4) Leach Relay 102, 12v., suitable keying; (5) ½-do. miniature relays; (6) CV1199-NS2; (7) Multi-tap LF transformer, 1 : 3 to 1 : 1; (8) 866A's; (9) 7124, 8028 kc crystals, ½-in. mounting; (10) Elliott 0-500 mA m/c meter, 4½in. diam., fwd or panel mntg.; (11) Ernest Turner 0-2 amp Model 505 thermoammeter, 2½in. diam.; (12) Premier transformer, pri. 200-240v., to 2-4-6 volts; (13) Standard panels and chassis, drilled and partly wired, 10½in. panel and chassis 807's mod xformer 6000 (CT) to 5600 ohms. Sundry 10½in. panels with strong 12½in. chassis, others with 10in. chassis. 10½in. panel with 10in. chassis, Rx foundation; (14) 3-Elc. wide spaced 2-metre beam; (15) Telescopic mast, tripod base, height to 20 ft., (16) Bucketful 3in. plastic links; (17) Quantity wire—heavy stranded copper and steel (guy wire), coax, twin and triple PVC; (18) 100-watt modulation transformer. Offers and Enquiries to: G. P. Anderson, G2QY, 16 Latimer Gardens, Pinner, Middlesex. All S.A.E. letters acknowledged.

**F**OR Sale, Eddystone 640, excellent condition, nearest £18. Wanted, HRO manual, buy key. G3GSS, 44 Gores Lane, Formby, Liverpool.

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**PROP. PITCH MOTORS.** New, U.S.A. Type, will turn any mast or beam. 6/30 volts, 3/6 amps, reversible, 10,000 to 1 reduction gearing. A.C./D.C. £2/2/6. D.C. £1/17/6. Carriage 5/-. VALVES. 807, 6/-; 6X5, 5/-; 6J5G, 3/3, EA50, 2/-.

**DURAL TUBE.** 1in. x 16s.w.g. 8d. ft., ½in. x 16, 7d. ft. ½in. x 20, 4d., ½in. x 18, 3d., small stocks, please state alternatives. Carriage extra.

**FEEDER.** 300 ohm HD, 70 ohm 5d. yd. carr. extra.

**COPPER WIRE.** 12 to 44 SWG, enam., DSC.

**LEWMEX and LITZ.** see previous ads.

We stock Eddystone, Denco, components.

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**SMALL ADVERTISEMENTS****READERS'—continued**

**A**S new, Regentone ARG99 Autogram, £29. Also Cossor 494, 3 wave mains radio £5. Taylor meter 85A £9. E. C. Green, 42 Queen's Road, Slough, Bucks.

**F**OR Sale. 50w phone/CW Tx, 3.5 to 28 mc, rack built by late G6HP. Switched xtal osc., 807 PA, separate tank coils, pre-amp mod., power supply, excellent condition, bargain. Offers up to £20. All letters answered. Box 880.

**T**WO Marconi high-fidelity miniature moving iron pick-ups with auto stop mechanism and transformers. £3 each, or £5/10/0 the pair. G3BYV, 51 Kenworthy Road, Homerton, London.

**E**DDYSTONE 504, 10-550 metres, 2 RF, xtal Etc., FB condition. Complete speaker, phones. £25. M. Norton, 1 Emily Street, West Bromwich, Staffs.

**AR88D** with cabinet speaker, spare set of valves, convertor socket, £45. Mul-lard oscilloscope, £15. 20 watt amplifier, 3 inputs, £9. 28 mc transmitter, with modulator and power supply, fully metered, £15. Test meter, AC mains, covers AC/DC, resistance and capacity ranges, £9. Phone: *W*allington 3528.

**W**ANTED, Hammerlund Super Pro coils. Types SA111 (2), SA112 (1), SA114 (2), SA115 (1), SA117 (2), SA118 (1), 1st IF SA166 (1). Figures in brackets indicate quantity required. Cain, 14 West End Terrace, Stranraer.

**AR88LF** immaculate performance and appearance, absolutely as new, buyer collects. £40. Clare, Main Road, Sproatley, Nr. Hull.

**E**XCHANGE T1154, new valves, OK, for battery receiver R1224, R1116 etc. or cash offer? Williams, 12 Arrowery, Hammer, Whitchurch, Salop.

**M**ILNES HT unit, new, ideal self-change bias pack for Tx, £3/10. R1116 receiver, good working order, £5/10/0. carriage extra. Yeo, Eberly Dairy, Newport, Barnstaple, Devon.

**E**DDYSTONE 5/10 converter. Hallicrafter S.22. Phillips 12 volt car radio. Xtals 7153, 7180 kc. Offers? G3ATL/A, Hugglescote, Leicestershire.

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**B2** complete in case £10/10/0. R103A complete, £4/10/0. Q5'er complete £2. All first class condition. G3AZT, 25 Lawford Road, Rugby.

**W**ANTED, Hallicrafters S38 receiver, reasonable. For Sale: 6P28, EL33, EBC33, 2 stage pre-amp with power (Sutton) 50/- lot. All new. Box 881.

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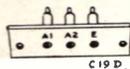
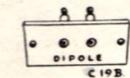
**W**ANTED. 829, 829B, 832, QVO4/7. Det. 12 etc. "City Slicker" or 144 mc aeriels. VHF equipment. For sale or exchange, R208 10-60 mc, £7. 144 mc field strength meter. Offers? G2CYN, 8 Grainger Av., Prenton, Birkenhead.

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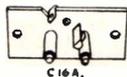
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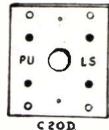
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**THE "MONTROSE" MULTIMETER.** By Taylor Electrical Instruments Ltd. Moving iron, robust, moulded case, simple for home or workshop. Ranges, 0-6.30-150-3000, 0-30 mV, 0-300 mA-sa., A.C. and D.C. A 1.5v battery is fitted internally, for circuit tests. - Size, 3.2 1/2" x 3.1 1/2" x 1.7 1/2". Weight 7 oz. Price only 42/-. All orders in strict rotation.

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**U.S. ARMY MIDGET LIGHTWEIGHT HEADPHONES** 200 ohms. Suitable for desk-audio, etc., 7/6 pair.

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**RECEIVER TYPE 25.** The receiver portion of the T/R 1196. Covers 4.3-6.7 Mc/s and makes an ideal basis for an all-wave receiver, as per "Practical Wireless," August, 1949, issue. Complete with valves types EF36(2), EF38(2), RK32 and EBC33. Supplied complete with necessary conversion data for home use. Only 22/6. Chassis only, 8/6.

**SPECIAL COIL PACK OFFER.** Limited quantity of brand new manufacturers' surplus, 3-wave-band, superhet coil packs. Iron cored, size 4 x 3 1/2 x 2" deep. Complete with circuit. a bargain at 25/- only.

**SPECIAL VALUE IN MAINS TRANSFORMERS.** Parmeko 250-0-250, 90 mVA 6.3v 3a, 5v 2a, half shrouded, drop through type. Electrostatic screen. Price 15/- only, plus 9/- post. Limited quantity.

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**BAKELITE RECEIVER CABINETS.** An extremely advantageous purchase, enables us to offer the following— Attractive brown bakelite cabinet, size 15 x 8 1/2 x 7 1/2", complete with chassis drilled for standard five-valve superhet, back, 3-wave glass dial and back plate. Chassis and cabinet are designed for 8 1/2" speaker, and all standard components. Price complete is 25/- only. Limited quantity.

**I.F. TRANSFORMERS.** Manufacturer's surplus. Iron cored, 465 K/Cs. Size 4 x 1 1/4 x 1 1/4". Pair 8/6. Whilst they last!

**RECEIVER TYPE 21.** The receiver portion of the W/8 21 operating from 4.2-7.5 Mc/s. Double superhet from 18-30 Mc/s. Incorporating B.F.O. and crash limiter. Valve line-up 7-ARF12 (VP24) and 2-AR8 (HL23D1). Absolutely brand new, complete with circuit. Only 45/- complete. 1/4vator poer unit for above, brand new, 17/6 only.

**R3515 I.F. STRIP.** A complete I.F. unit, comprising 6 8P61 I.F. stages, tuned to 13.5 Mc/s, 1 EA50 diode detector, and 1 EF36 or EF39 output of video stage. A few modifications only are required to adapt this unit which will give pictures of extremely good quality. Price complete with valves, and fool-proof modification instructions, is 45/-, plus 5/- packing and carriage. Limited quantity only.

**R3547 RECEIVERS.** Absolutely brand new, in sealed manufacturer's packing cases. Incorporating 15 valves type EF30, 2 of 8P61, EF36, EBC33, 3 of EB34. Complete 45 Mc/s. I.F. Strip, motor, dial and drive, pots, etc., etc., 28 only, plus 10/- packing and carriage. Whilst they last!

**VERY SPECIAL.** H4/200 EHT pencil rectifiers, brand new, 2,400v 3 mA, only 15/- each.

**ALSO.** The very latest slider pots, as used in all the latest T.V. receivers. Bank of 4, comprising 2 of 10K, 1 each of 100 ohm, 500 ohm. Only 6/- complete. Not repeatable.

**FREQUENCY CONTROL CRYSTALS.** By American G.E. Co. Octal base fixing. Following frequencies only: 2,500 k/c, 3,500 k/c, 4,600 k/c, 6,200 k/c, 8,000 k/c, at 7/6 each only.

**ELECTROLYTIC OFFER.** By leading manufacturers. All metal can. 16 x 1 1/2" 500 v.w. can size 3 1/2" x 1 1/2", 3 for 10/-, 32 μF 450 v.w. (550v surge) BE37F, can size 4 1/2" x 1 1/2", 3 for 13/6. Also 16 μF 500 v.w. size 2" x 1", 3 for 7/6. 8 μF 500 v.w. type CT650, can size 2 1/2" x 2 1/2", 3 for 7/-. Post paid.

**TYPE 25 R.F. UNIT.** Brand new, converted from new R.F.24, 19/8. (Carriage and packing 1/6.) This unit can now also be supplied modified to cover R.F. 26 frequency (for Midlands T/V), brand new, at 25/-.

**RECEIVER R.1355.** Has five stages of I.F. with diode detector. Complete with 8 valves VR 65, and 1 each 5U4G, VU 120, VR 92. NEW and UNTESTED. ONLY 55/- (carriage, etc., 7/6).

**R.3084 RECEIVER.** Incorporating 7 EF50, 2 EF54, 1 EC52, 1 VU39A, 1 HVR2, 1 EA50, plus 30 m/c/s. I.F. Strip. Guaranteed absolutely brand new in maker's original packing case. 75/- (Plus 10/- carriage and packing.) This receiver is ideal for conversion to vision receiver.

**A.M. UNIT, TYPE 159.** Incorporating EF50, EL37, 8H61 and EA50 coils, relay, and many condensers and resistors. The whole in metal box 8 1/2" x 6 1/2" x 3 1/2". New bargain at 15/-, carriage paid.

Send stamp for current Component List. Probably the most comprehensive in the trade

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