# The SHORT WAVE Magazine

2/9

VOL. XVII JANUARY, 1960 NUMBER 11


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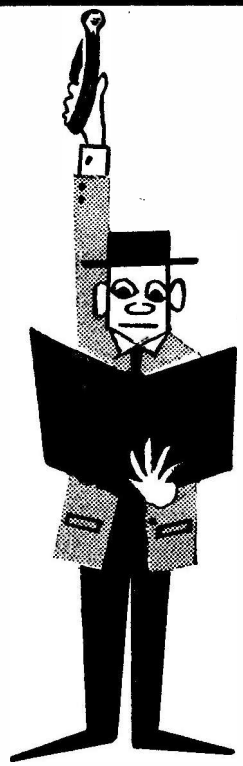

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Vol. XVII JANUARY, 1960 No. 195


CONTENTS




*Managing Editor:* AUSTIN FORSYTH, O.B.E. (G6FO)

*Advertisement Manager:* P. H. FALKNER

*Published on the first Friday of each month at 55 Victoria Street, London, S.W.1.* *Telephone: Abbey 5341/2*

*Annual Subscription: Home and Overseas 33s. ($5·00 U.S.) post paid*




AUTHORS' MSS

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The SHORT-WAVE Magazine

## EDITORIAL

### Construction

*It is widely held that nowadays radio amateurs use more commercial equipment than gear they design and build themselves. Certainly, whereas even 20 years ago it was essential to home-construct much of one's apparatus, today there is no need to build anything at all — it can all be bought off the shelf, ready to go on the air. There is nothing wrong with this; indeed, in many ways it is a very good thing that such an approach to Amateur Radio is possible.*

*But, it is argued, this convenience has had the effect of killing " the art of home-construction "— whatever that may be — because nobody needs to build if he can buy. It is not our intention here to argue the case one way or the other. What we know is that there is still a great deal of very excellent constructional (and design) work done by U.K. amateurs, either from published designs or from their own experience and knowledge. It is, in fact, entirely possible, even with the exacting standards of today, to design and build a complete amateur-band station which could be just as effective as one using mainly commercial equipment.*

*To try and prove the point, and to give some positive encouragement to the large body of constructors in our midst, we have decided to open a home-construction competition, the conditions of which are set out on p. 485 in this issue. These conditions are exacting — there would be no point in having such a competition if they were not — but are nevertheless well within the capacity of the competent radio amateur.*

*It may well be that we shall get few entries, or even none at all in one or two categories, but the outcome will prove to what extent station building for its own sake is still in vogue in this country.*

★ ★ ★ ★

*And now it is for us to wish our readers and our trade friends, at home and overseas, a happy and prosperous New Year, with the hope and in the belief that 1960 will be another vintage year in the progress of Amateur Radio.*

Austin Forbes G6FO.

# Travelling Wave Tubes

## THEORY, DESIGN, CONSTRUCTION AND OPERATION

**A. P. O. COLLIS**
*(English Electric Valve Co. Ltd.)*

*The urgent need for stable and power-gain devices for operation at UHF and SHF has stimulated a great deal of research and development in the field of valve manufacture. This has led, in the first place, to the production of valves of the conventional pattern capable of a useful performance on frequencies much higher than previously considered possible—into the centimetric region. But an even more remarkable and important result is the appearance of the travelling-wave tube (T.W.T.) which not only takes the frequency much higher and has specially desirable characteristics of its own, but having tolerable manufacturing limits, is a feasible proposition to make for quite high RF output powers. This interesting article discusses the T.W.T. as a practical RF device.*
*—Editor.*

IN the last 20 years the microwave region of the radio spectrum, *i.e.* frequencies above about 1,000 mc, has become more and more important for commercial and military communication. It was soon found that the conventional radio-frequency valve did not operate well at these high frequencies. The reasons for this are well understood. As the frequency is raised the inductance and capacity of the electrode leads become relatively large and also the time of transit of electrons from cathode to anode becomes comparable with the time of one cycle. These two effects produce a serious degradation in the high frequency performance. By making the leads short and the interelectrode spacings microscopic it is possible to make valves which give useful gain up to 3,000 mc, but these are difficult to manufacture and tend to be unreliable.

Considerable effort has gone into developing devices which would overcome these difficulties. Any practical device, particularly for communication, must be very reliable with a life in excess of 10,000 hours and cheap, *i.e.* easy to make. In December 1943 Kompfner, after a year's work at Birmingham University, tested the first sample of a type of valve now known as the travelling wave tube (T.W.T.). This valve showed promise as a solution to the problem. Later work, particularly by Pierce at the Bell Telephone Laboratories, produced by 1946 a commercially usable tube. Today there is a wide range of types available and equipment designers and users are realising the unique advantages of this valve.

The properties of the T.W.T. are such that it finds immediate application in microwave telephone and television links. These links, which can carry at once several television programmes or more than 1,000 telephone channels, require very wide bandwidths. The trend is for more and more channels per link and since T.W.T.'s can be made with bandwidths greater than 1,000 mc their adoption in such equipment is increasing rapidly.

T.W.T.'s can be classified into the same broad categories as conventional valves. In any given frequency range there is normally a low-noise valve with an output of about one milliwatt, corresponding to an RF triode or pentode; an intermediate type giving about 0·5 watts output; and a power T.W.T. with an output of about 10 watts or more. Special tubes are also made with outputs of several kW's. Such valves are available for use on frequencies from 500 to 50,000 mc. Thus, their potential range of application is enormous.

### Theory

It can be shown mathematically that if a beam of electrons is arranged so that it moves in the field associated with an RF wave and at nearly the same velocity then interaction between the two will occur. This is not difficult to understand if we consider a particular point on the wave, where the field has a maximum positive value, for example; this will appear to advance at a speed called the phase velocity. It is to this that we refer when we talk of "the velocity of a wave." If an electron, in the field at this point, is also moving at the wave velocity, then it will remain in a constant field and be acted upon by a constant force producing acceleration or retardation.

This is illustrated in Fig. 1 which shows an RF field moving from left to right with velocity V, and an electron beam travelling with the same velocity. An electron in region A will experience a force tending to accelerate it while an electron in region B will be retarded. Thus as the beam travels to the right electrons will tend to collect in bunches at the points of

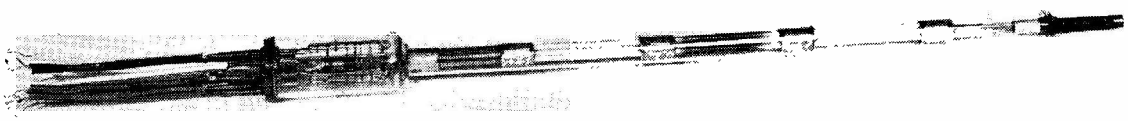


**Photo B. Method of supporting the helix in a travelling-wave tube. Quartz or ceramic rods are clamped round it.**

zero force marked $0_1$, $0_2$, $0_3$, etc.

In this particular case the kinetic energy lost by those electrons which are retarded is equal to the gain in K.E. of those accelerated. But suppose that the electron beam has a velocity a little greater than that of the wave. The process is still the same and the electrons are bunched and pulled into step with the wave. This time, however, we can imagine that those electrons which are retarded in region B have to be retarded more than before to make them bunch at $0_2$ and those in region A have to be accelerated less. More energy is lost by those electrons retarded than is required to accelerate the electrons in region A and there is a net loss of beam energy. From the Principle of the Conservation of Energy it follows that this appears as additional wave energy, *i.e.* amplification of the wave has occurred.

## Description

A travelling wave tube consists of :

(1) An electron gun to produce an electron beam,

(2) Some method of keeping the beam focussed, usually a magnetic field,

(3) A "slow wave structure." A freely propagating wave will travel with a velocity equal to that of light. From the theory of relativity, it is not possible to accelerate an electron to this speed. Thus, the wave velocity must be reduced to a value to which the electrons may be accelerated using reasonable voltages. An arrangement to do this is known as a "slow-wave structure,"

(4) A collector to collect the electrons once they have passed through the system,

(5) Some means of coupling the RF energy into and out of the slow-wave structure.

(6) Attenuation to prevent oscillation.

A T.W.T. is illustrated diagrammatically in Fig. 2. The main components will be described separately : The slow-wave structure shown is a helix. This type is used almost without exception today, it being very simple to make.

Once introduced on to the helix the wave travels along the wire. Thus in one revolution the wave covers a distance $2\pi a$ (Fig. 3(a)) in time $t$,

$$\text{where } t = \frac{2\pi a}{c} \text{ and } c = \text{velocity of light.}$$

In this time the wave has travelled axially a distance $p$. Hence the axial velocity of the wave $V$ is given by

$$V = \frac{p}{t} = \frac{pc}{2\pi a}$$

$$\frac{c}{V} = \frac{\text{wave velocity}}{\text{axial velocity}} = \frac{2\pi a}{p} \quad \ldots\ldots\ldots\ldots (1)$$

Taking typical figures of $p = 0{\cdot}02$in. (50 turns/inch) and $2a = 0{\cdot}12$in. as for E.E.V. tube type N1013,

$$\text{then } \frac{c}{V} = 18{\cdot}8 \quad \ldots\ldots\ldots\ldots (2)$$

The velocity of the electron beam is given by

$$\frac{c}{u_o} = \frac{505}{\sqrt{V_o}} \quad \ldots\ldots\ldots\ldots (3)$$

$u_o$ = electron velocity

$V_o$ = Accelerating voltage, *i.e.* the DC voltage (with respect to the cathode) applied to the helix.

Remembering that the axial wave velocity

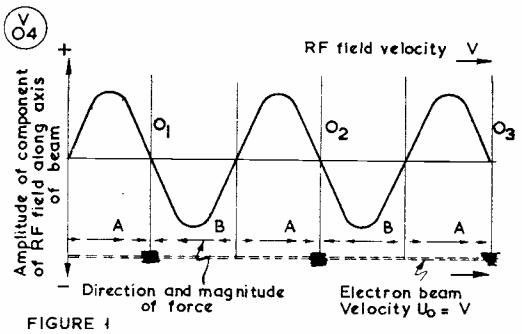



**Fig. 1. Basic theoretical conception for a T.W.T. When an electron is moving at the wave velocity, it remains in a constant field.**

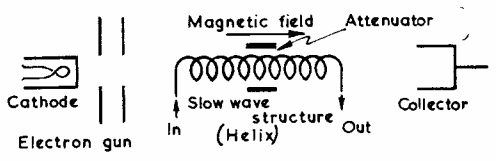



FIGURE 2

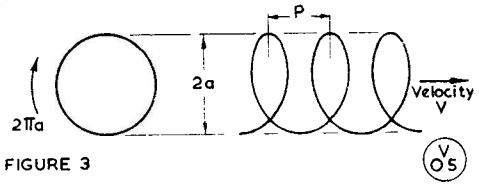



FIGURE 3

**Fig. 2. Block schematic of a travelling-wave tube, showing the essential electrical layout. The heart of a T.W.T. is the "slow wave structure," explained in the text. Fig. 3 Travel of the wave along the helix.**

must be approximately the same as that of the electron, *i.e.* $V = u_{\parallel}$, and substituting the value given by formulæ (2) in (3) we get :

$$V_o = 720 \text{ volts}$$

This is a value which can easily be obtained in practice. Typical values are 500v. for a low noise tube, 1,000v. for an intermediate T.W.T., and 2,000v. for a power tube. Typical helices are shown in photograph A below.

These helices are very fragile, being wound from wire as thin as ·003in. (3 mills) dia. The variation of pitch should not exceed ·0002in. and they must be held quite straight over their length of 8 inches or more. Such toerances pose problems in assembly. A common method of supporting the helix is shown in photograph B, in which three straight quartz or ceramic rods are spaced 120° and clamped around the helix—*see* p.459.

## The Electron Gun

The electron guns used in low-noise and intermediate tubes are very similar to those used in cathode ray tubes except that they are designed to give greater currents. Typical figures are 250 $\mu$A for a low-noise tube and 4 mA for an intermediate tube. A gun of this type is shown in photograph C, on the page opposite. Normally in this type of gun the cathode has roughly the same diameter as the desired beam. The gain is a function of the ratio of beam to helix diameters. The ratio used, about 0·8, is a compromise between obtaining the required gain and the difficulty of getting the beam through the helix with no interception if there is too little clearance

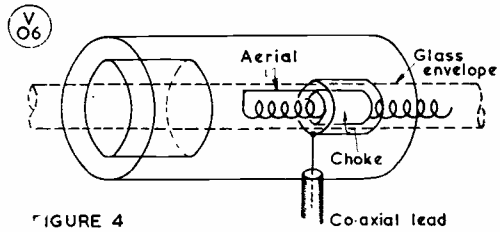



FIGURE 4

**Fig. 4. Coupling to a T.W.T. The antenna (marked "aerial" here) couples through the glass of the protecting tube into a coax cavity placed round the outside of the tube.**

between the two. In practice cathode diameters are generally found to be between about ·025in. and 0·1in. The various accelerating anodes are accurately held in position by sealing to glass supports. The final electrode is extended to form a drift tube whose diameter is the same as that of the outside of the helix. This is inserted between the ends of the helix support rods which are then clamped. This

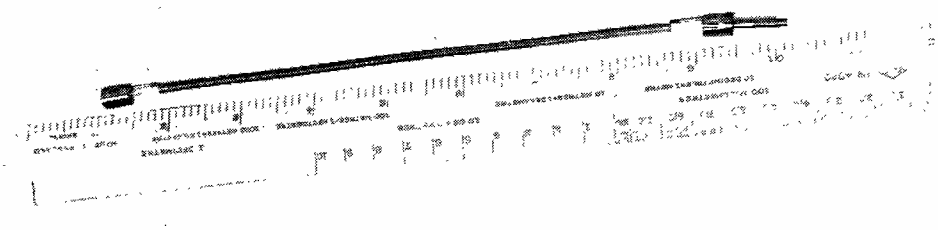


**Photo A. Typical helix construction for a travelling-wave tube. These helixes are very fragile and are wound with wire as fine a 3 mills.**

ensures the accurate alignment of the gun and helix.

Power tubes take even higher current, about 50 mA. To obtain this current a cathode much bigger than the final beam diameter has to be used and the beam converged to the required size before being sent through the helix. This is done to keep the cathode current density to a reasonable figure. Suppose that in a power tube taking 45 mA the beam dia. is 3 m.m. This gives a current density of more than 600 mA/cm$^2$ a value at which an oxide coated cathode would have only a short life. However, by making the cathode 6 m.m. dia. the current density is reduced to 150 mA/cm$^2$, a value at which long life can be obtained. The electrodes of the gun have to be designed so that the beam, which of course initially has the same diameter as the cathode, is reduced to the required value.

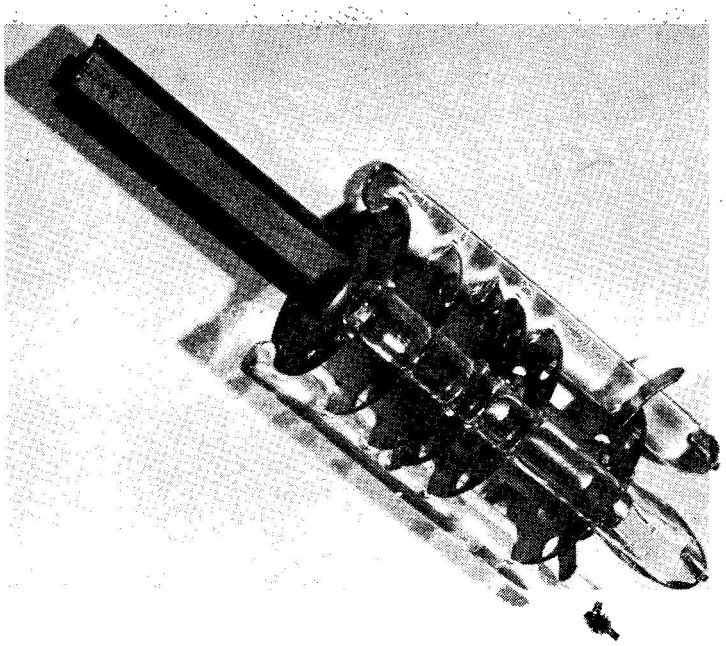


**Photo C. The electron gun used in the construction of travelling-wave tubes. They differ only from those for normal CRT's in that they are designed to give greater current.**

**Focussing**

In narrow beams of electrons such as used in these devices, the mutual repulsion of the closely packed electrons tend to make the beam diverge and increase in diameter. A system producing an inward radial force on the electrons has to be provided to maintain the beam at the correct diameter to pass through the helix. There are several methods by which this may be done. The oldest and still most used is the uniform axial magnetic field produced by a solenoid. A typical example with a valve inserted is shown in photograph D. This is wound with ·001in. aluminium foil with ·00025in. insulation between turns. By this means the weight and size of solenoid to produce the required field of 500 gauss is kept to a minimum. Such a solenoid would consume about 160 watts (20 volts 8 amps DC). This large power consumption together with the consequent heat is the big disadvantage of solenoids.

Permanent magnets have been used quite successfully to provide the field. Such a magnet has a large stray field and this means that valves cannot be placed close together or near any other magnetic material. Valves have also been focussed using periodic magnetic fields. Unfortunately, such systems are not easy to make and are temperature sensitive. Also as yet, it has not been found possible to make a low-noise tube work satisfactorily by this method. Development is in hand by many manufacturers to overcome these difficulties.

**Coupling**

Another problem is to introduce the signal on to the start, and to remove the amplified signal from the collector end of the helix. This is often done by the method shown in Fig. 4.

A loop of wire known as the antenna is taken from the end of the helix back to a cylindrical choke placed around the outside of the helix assembly. The antenna couples through the glass into a coaxial cavity placed around the outside of the tube. A coaxial cable is connected to this cavity and forms the external connection.

**Attenuator**

Brief mention has been made previously of the attenuator which is needed to prevent the valve oscillating. Small reflections of the signal inevitably occur at the input and output antennæ. If a small percentage of the signal at the output is reflected back into the valve, the reflected signal will travel back down the

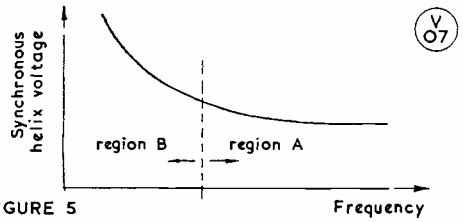



FIGURE 5

Fig. 5. Helix potential against frequency. T.W.T's are usually designed to work in the A-region, enabling wide bandwidths to be obtained — see text.

helix with little or no loss to the input. If this reflected signal is sufficiently large and of correct phase then, as in ordinary valves, oscillation will occur. By introducing a very "lossy" section over a short length of the helix, usually about the centre, all reflected signals are absorbed, and oscillation prevented. There is some loss in amplification but not complete absorption of the wanted signal as might be expected. The attenuator is so placed that the input signal has had some interaction with the beam before the attenuation occurs. The beam with some electrons now accelerated and some retarded drifts through the attenuating region little affected while the original signal is attenuated. The modulated beam excites a new wave on the helix immediately after the attenuator and this wave is then amplified. The attenuator is often made by putting a resistive film of carbon on the rods supporting the helix. This may be seen in photograph B as the dark area in the middle of the helix assembly.

## CHARACTERISTIC CURVES

### Helix Voltage Characteristics

The velocity of the wave along the helix varies with frequency and as already explained the electrons must have about the same velocity as the wave. This velocity is determined by the helix-cathode potential difference. Thus the helix voltage required will vary with the frequency. The characteristic curve of helix potential against frequency is plotted in Fig. 5. It will be seen that there is a region A where the helix voltage varies only slightly and a region B where the voltage varies rapidly with frequency. T.W.T.'s are usually designed to work in region A where the helix voltage for maximum interaction is independent of frequency. This explains the very wide bandwidths of 2:1 or more which can be obtained with these valves without adjustment.

To obtain the greatest interaction between beam and wave, the helix voltage must be adjusted to the correct value, called the "synchronous helix voltage." The variation of gain with helix voltage is shown in Fig. 6.

The way the low-level gain, *i.e.* the gain for small signal input, and the power vary with frequency is shown in Fig. 7. Again, it should be emphasised that these figures are taken

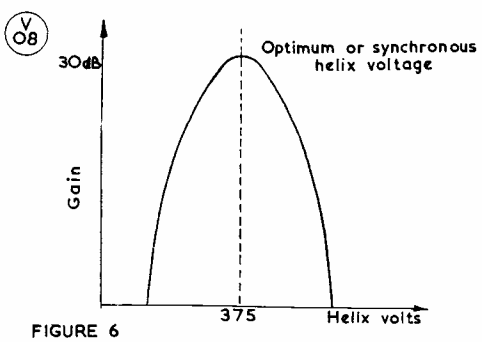



FIGURE 6

Fig. 6. Showing the variation in gain with helix voltage.

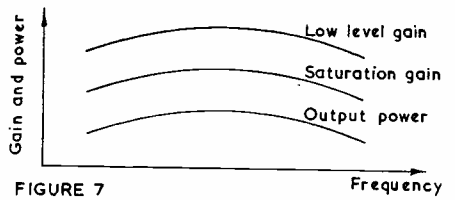



FIGURE 7

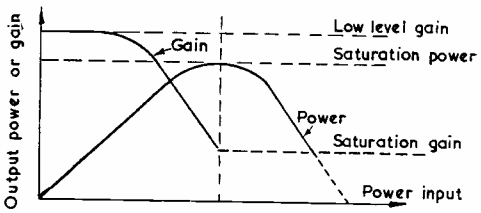



FIGURE 8


Fig. 7. The power variation with frequency. Fig. 8. As the power input is increased beyond the optimum, the output falls off.

### Table of Values

Fig. 9. Typical Power Supply for S-Band Amplifier

| | | | | | |
|---|---|---|---|---|---|
| | C1 | = 0.5 μF | | V2 | = QS 150/15 |
| R1 | R2 | = 33,000 ohms, 1w. | | V4 | = QS 75/20 |
| | R3 | = 3,300 ohms | F1, | F2 | = 2 amp. fuse |
| | R4 | = 500 μA meter shunt | | F3 | = 150 mA fuse |
| | | | | F4 | = 13 amp fuse |
| | R5 | = 10,000 ohms | | T1 | = Std. pri.; 450-0-450v., 0-5v. secs. |
| | R6 | = 270,000 ohms | | T2 | = Std. pri.; 0-22v. sec. |
| | VR1, VR3, VR4, | | | LP1 | = Pilot lamp |
| | VR5 | = 100,000 ohms var. | | M | = 0-100 μA FSD meter |
| | VR2 | = 250,000 ohms var. | | MR1 | = 13G3 rect. |
| | SW1, SW3 | = DPDT switch | MR2, | MR3 | = 16HT40 rect. |
| | SW2 | = SPST switch | | | |
| V1, | V3 | = QS 95/10 | | | |

without any adjustments and that the frequency range involved may be 2:1. For example, a valve may be operated as RF input amplifier to a receiver covering 1.000—2.000 mc, *no* tuning adjustments being required. This is a remarkable property not possessed by any rival device, and when one remembers the complicated mechanism of sliding contacts and plungers required to tune at these frequencies when using conventional apparatus the advantage becomes apparent.

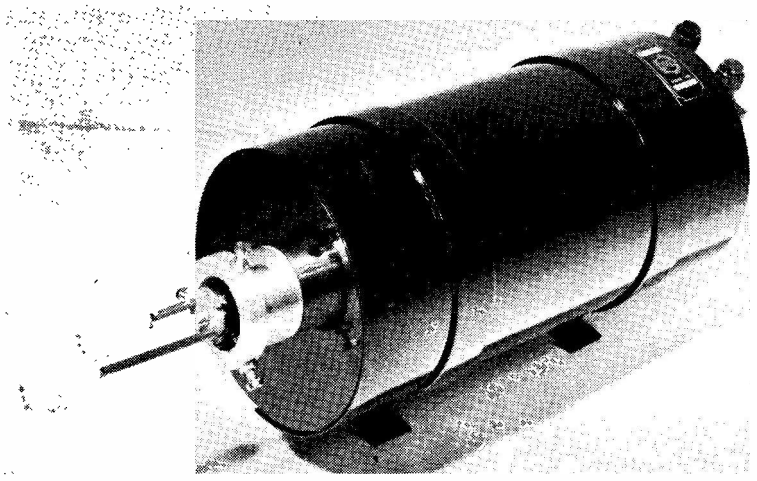


**Photo D. For the focussing system in a T.W.T. an axial magnetic field produced by a solenoid is most used. The magnetic force required is a field of 500 gauss, the weight and size of the solenoid being kept down by use of a fine winding for the coil.**

## Power Characteristics

A saturation condition is reached as the power input is increased as in normal valves. However, unlike these, as the power input is further increased the power output actually falls, as shown in Fig. 8.

To obtain maximum power output a definite input power is required. It will be seen that the gain also falls if the input signal exceeds a certain value. In fact, if the power input is sufficiently high the gain will become negative, *i.e.* attenuation occurs. This property can be used to protect some following device such as a crystal mixer. A mixer can easily be damaged by a very strong signal, perhaps from a nearby radar transmitter. If the mixer is preceded by a low-noise travelling wave tube a large amount of protection is automatically obtained as the saturation or maximum power output is about 1 mW. which is not enough to cause damage.

## Gain Variation

Another useful feature of the travelling-wave tube is the ease with which the gain may be varied. Varying the helix volts as shown in Fig. 7 is one possible method. Another method is to vary the beam current, the gain (in dB) varying as the cube root of the beam current, which may be controlled merely by varying the grid voltage of the electron gun.

over

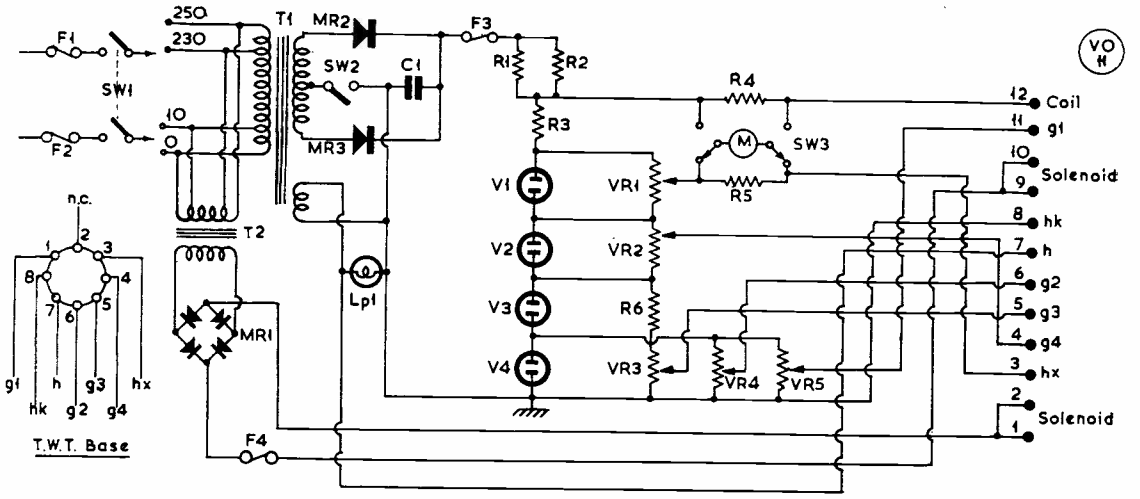



**Fig. 9. Power supply and connection layout for an S-band low-noise amplifier using an English Electric travelling wave tube Type 6861.**

### Special Characteristics

A most important characteristic of a tube designed to be the first stage in a receiver is the amount of noise it adds to the signal. Amateurs who work on the 144 mc band will know of the effort spent in designing stages which will introduce the least noise. The quality of a valve in this respect is measured by its noise factor $F$, usually expressed in decibels, defined as

$$F = \frac{\text{Signal/Noise ratio at Input}}{\text{Signal/Noise ratio at Output}}$$

For a perfect valve this ratio is unity, *i.e.* F=0 dB. A good T.W.T. at 3,000 mc will have a noise factor of about 6 dB. This compares very favourably with the noise factor of other valves which may be 15 dB or worse, an improvement of at least eight times.

The noise in the tube comes from the random fluctuations in electron velocity and emission density of the beam and low-noise tubes employ special guns designed to reduce this to a minimum. These guns have several subsidiary accelerating electrodes which have to be adjusted for the minimum noise output.

### Operation

To illustrate the practical use of these tubes, a brief summary of the steps necessary to get a low-noise tube in operation will be described.

Suppose that it is proposed to add a T.W.T. RF stage before the mixer in a receiver operating at 3,000 mc, a suitable tube being the E.E.V. type 6861. This has a typical noise factor of 6·5 dB, a gain of 25 dB and covers the frequency range 2,700—3,500 mc. A suitable power supply circuit is shown in Fig. 9.

The valve is first plugged into its solenoid as in photograph D, the current through which has been set to give the required field of 525 gauss. The coaxial output and input connections are made to the valve and the heaters switched on.

The voltages should be adjusted approximately to the typical values as stated on the data sheet and the grid voltage, which is used to control the beam current, set at zero. After two minutes switch on the HT.

The tube has now to be adjusted in its solenoid until the tube and magnetic axes coincide, when the beam will pass through the helix to the collector. Slowly increase $grid_2$ voltage until a little helix current is obtained. One end of the tube is now moved about by the adjusting screws on the solenoid (see photograph D) until the helix current drops to a minimum. The collector or beam current may now be turned up to the operating value of 150 $\mu$A, taking care that the helix current does not exceed 5 $\mu$A. A slight realignment may be necessary to reduce the helix current to its normal value of 1 $\mu$A or less.

The helix voltage is then adjusted for maximum output from the receiver using any weak signal. With no signal in, the gain of the receiver is increased until an output reading is obtained from the noise. The remaining two gun electrodes, grids 3 and 4, are now adjusted for least output, *i.e.* minimum noise.

The T.W.T. is now adjusted for optimum operation and requires no further adjustment.

### Acknowledgment

The author wishes to acknowledge with thanks the permission of the General Manager of the English Electric Valve Company Limited, for the publication of this article.

## AMATEUR RADIO EXHIBITION
## SOME FURTHER NOTES

The review of the Amateur Radio Exhibition which appeared on pp.426-427 of the December issue of SHORT WAVE MAGAZINE necessarily went to press before the end of the Show—so it was not possible to cover certain final details. This Exhibition is promoted, organised and managed by P. A. Thorogood, G4KD, as a private undertaking entirely on his own account—and a very good job he makes of it, too. The total through the doors this time was 8,504 compared with 9,526 last year; the drop of one thousand in the attendance was a little disappointing, but can be attributed partly, at least, to bad weather, and bad weather reports, particularly for the northern part of the country. On the other hand, more catalogues were sold this year than last and the commercial stand-holders (who, of course, pay for their accommodation at the Exhibition) reported themselves as generally well satisfied with business done.

In connection with the various visitor competitions organised for the Exhibition, the Eddystone 888A receiver presented by the organiser was won by SWL F. H. Vivian, of Parkstone, Dorset. The contest run by K.W. Electronics for a name for their new SSB Transmitter (reviewed on p.426, December) produced "K.W. Viceroy" as the choice, and the firm has awarded K.W. credit vouchers to 11 of the entrants who all suggested this name. The competition at the Taylor stand was for a Signal Generator Type 68A and was won by R. Purdom, of Burnham-on-Sea, Somerset.

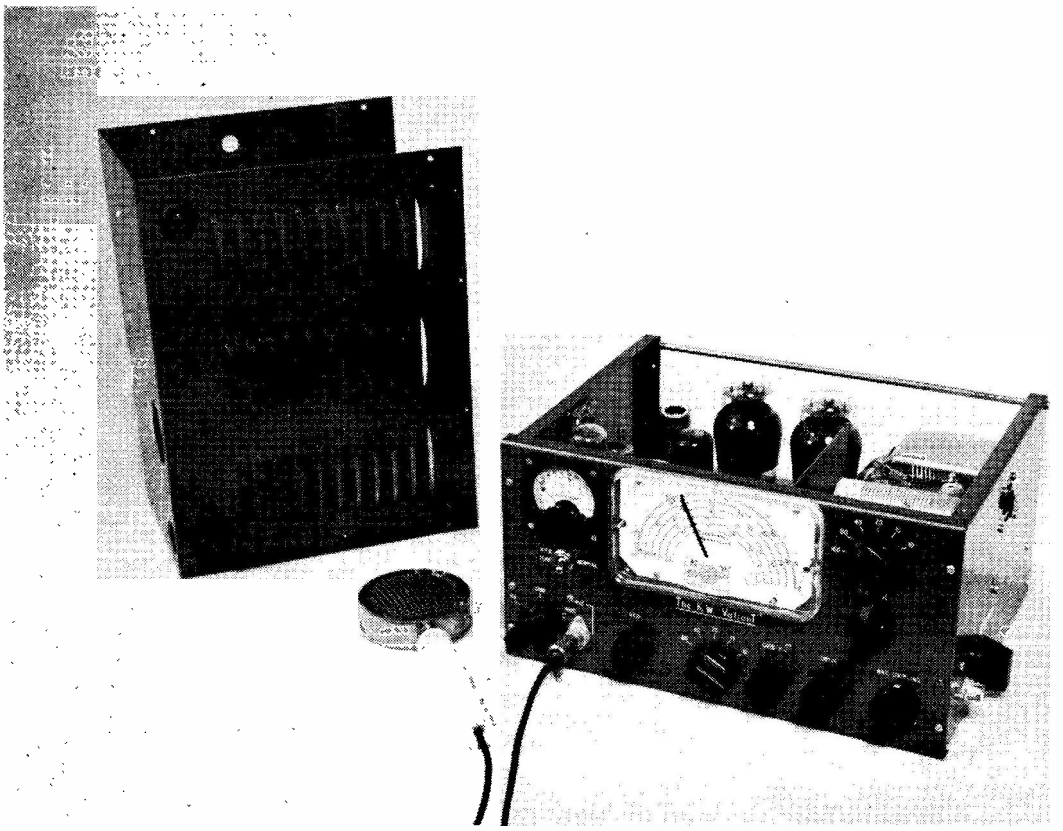
# Discussing the K.W. "Valiant"

## SIX-BAND FIXED OR MOBILE CW/PHONE TRANSMITTER

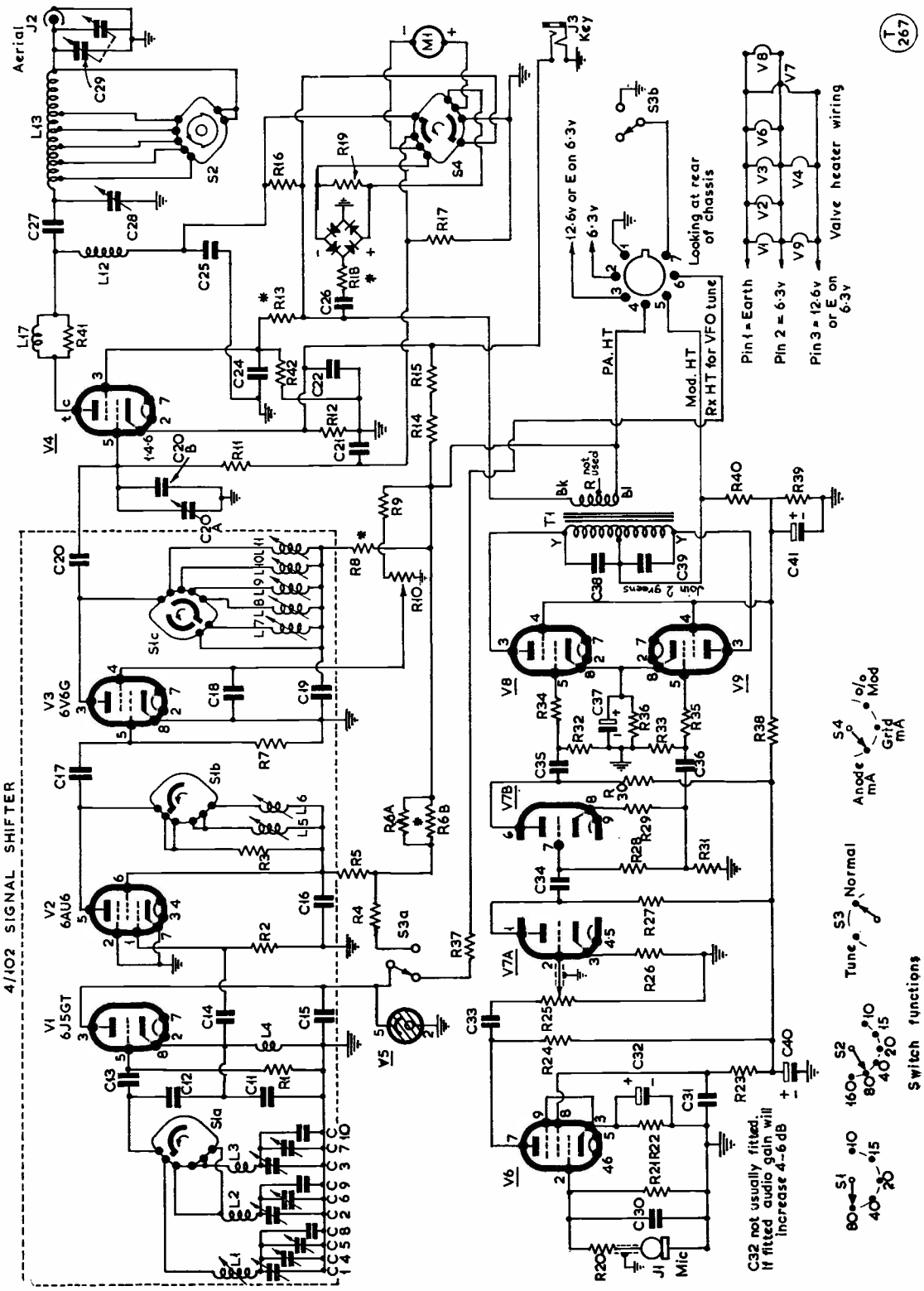
THE new K.W. Electronics "Valiant" is an exceptionally attractive piece of apparatus from several points of view — although very compact it is capable of 25 watts RF output fully modulated, with six-band performance, and it can be used either as a fixed-station transmitter or as a mobile rig, for which gimbal-type mounts are provided on the cabinet.

Because it is designed for this dual role—calling for two different types of power supply —the Valiant is not self-powered. On the bench, it can be run off any available power unit capable of giving up to 425v./150 mA for the modulator and 470v./200mA for the RF side, with LT at either 6·3 or 12·6 volts for the heaters. This is for full-power operation. HT voltages down to 300v. may be used on modulator and RF section, with correspondingly reduced output.

The model as illustrated here was supplied to us factory-built and tested, with the 160-metre modification incorporated, to give the full coverage 160-10 metres inclusive. When it is stated that for a size overall of 12in. wide by 9½in. deep by 6¼in. high, and a total weight of just over 16 lbs., an RF output of fully 25w. can be obtained on five bands and a good 8 watts on Top Band, it will be realised that the Valiant is a sound proposition as the transmitter for a very good mobile installation. The PA output is at low impedance, so that



**General view of the K.W. Electronics "Valiant" six-band transmitter, with the cover removed. On the right-hand panel are the 160-metre change-over switch and the aerial connector. This transmitter will give 25 watts RF output, fully modulated, on all bands 10-80 metres, and is suitable for either fixed station or mobile working. The switches are in the 80-metre position.**


4/102 SIGNAL SHIFTER
Aerial J2
Key J3
M1
S2
S4
S3b
Looking at rear of chassis
12·6v or E on 6·3v
6·3v
PA. HT
Mod. HT
Rx HT for VFO tune
Pin 1 = Earth
Pin 2 = 6·3v
Pin 3 = 12·6v or E on 6·3v
Valve heater wiring
V1 6J5GT
V2 6AU6
V3 6V6G
V4
V5
V6
V7A
V7B
V8
V9
T1
S1a
S1b
S1c
S3a
S3 Tune Normal
S4 Anode mA Grid mA % Mod
S1 S2 Switch functions
J1 Mic
C32 not usually fitted. If fitted audio gain will increase 4-6 dB
T 267

**Circuit complete of the K.W. Electronics "Valiant" six-band transmitter, designed for bench or mobile operation. It requires an external power supply, as explained in the text.**

any sort of current-fed aerial system can be loaded up using the normal pi-coupler tuning procedure.

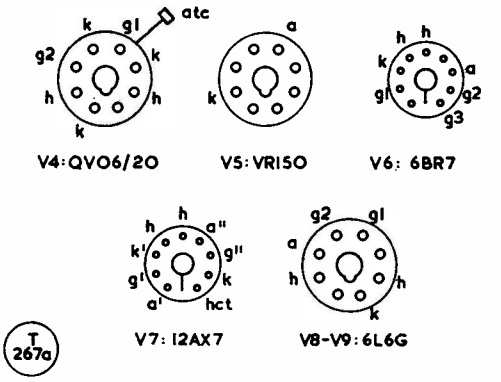
As shown in the circuit diagram, the VFO is a standard Geloso 4/102 unit, with a QV06-20 as PA, modulated on plate-and-screen by a pair of 6L6's; this ensures full modulation at the maximum safe carrier input, which can be up to 60 watts or so with 470-500v. on the plate of the RF amplifier. The 4/102 "signal shifter" gives ample drive for all bands, and there is a variable drive control, R10 in the circuit diagram, for correct adjustment of PA grid current from band to band.

## Panel Controls

In a mobile transmitter, normally a band is set up and left so set for an operating session, the only transmitter adjustments called for being small frequency changes—if the aerial will accommodate them, or can be resonated from the operating position. The front-panel controls of the Valiant include VFO/PA band selector switches, VFO tune, Drive adjust, PA tune, with a separate selector switch (on the side of the panel) for 160-metre working; this switch also brings in the series resistor for cutting power to 10 watts on Top Band. Additional panel items include a VFO-net switch and a meter-range selector switch; as is now usual in the K.W. Electronics transmitter designs, one position of this latter is for the modulation-level indicator circuitry, enabling the depth of control to be read off on the meter dial as an (approximate) percentage of modulation.

On the rear chassis drop is the power inlet socket and the keying jack. The microphone —which can be any standard crystal type— plugs in on the front panel, and the aerial socket is on the right hand wall of the cabinet.

When used either mobile or as a fixed station




**Base connections for the valves used in the K.W. Valiant.**

## Table of Values

| Circuit | of the K.W. "Valiant" Transmitter | |
|---|---|---|
| C1, C20 = | As fitted Geloso 4/102 | R6A, R6B, R34, R35 = 47,000 ohms |
| C20A = | 15 $\mu\mu$F | R8, R13, R36 = 250 ohms |
| C20B = | 22 $\mu\mu$F | R37 = 10,000 ohms 2w. |
| C21 = | .001 $\mu$F | R9, R11, R18 = *See table* R39 = 47,000 ohms 1w. |
| C22 = | 3 x .001 $\mu$F | R40 = 4,700 ohms 5w. |
| C24 = | .0036 $\mu$F | R10 = 35,000 ohms R41 = 33 ohms |
| C25, C27 = | .0018 $\mu$F, 1000v. | R38 = 22,000 ohms R42 = 100,000 ohms 1w. |
| C26 = | .01 $\mu$F, 1000v. | pot meter L1, L11 = As fitted Geloso 4/102 |
| C28 = | 270 $\mu\mu$F | R12 = 33,000 ohms |
| C29 = | 560 + 560 $\mu\mu$F | R14, R15 = 68,000 ohms L12 = RF choke |
| C30 = | 100 $\mu\mu$F | R16 = meter shunt L13-L16 = Geloso 50w. pi-tank assembly, modified 160m. |
| C31, C35 = | | R17 = 470 ohms |
| C36 = | 0.1 $\mu$F | R19 = 100 ohms L17 = 5 t. 18g. on R41, APC |
| C32, C37 = | 25 $\mu$F, elect. | R20, R30, R31 = 100,000 ohms V1-V3 = As fitted Geloso |
| C33, C34 = | 300 $\mu\mu$F | R21, R25 = 1 megohm 4/102 |
| C38, C39 = | .005 $\mu$F | R22 = 1,000 ohms |
| C40, C41 = | 8 $\mu$F 450v. elect. | R23 = 2.2 megohms V4 = QV06-20 (6146) |
| R1-R3 = | As fitted Geloso 4/102 | R24 = 470,000 ohms V5 = VR-150/30 |
| | | R26 = 4,700 ohms V6 = 6BR7 |
| R4 = | 15,000 ohms 2w. | R27, R28 = 470,000 ohms V7 = 12AX7 |
| R5, R29 = | 2,200 ohms | R32, R33 = 220,000 ohms V8, V9 = 6L6G |

*Note:* Coil L13 incorporates L13-L16.

## Voltage Dropping Resistors

| V. / R. | Normal | 300 | 350 | 400 | 450 | 500 | 570 |
|---|---|---|---|---|---|---|---|
| R6 | 2–15k 2w in Para'l. | 2–15k+ 3.3k,2w in Para'l | 2–15k+ 4.7k,2w in Para'l | 2–15k 2w, in Para'l. | 2–15k 2w in Para'l. | 2–15k 2w in Para'l. | ONE 15k,5w ONLY |
| R8 | 3.3k 2w | 3.3k 2w | 3.3k 2w | 3.3k 2w | 3.3k 2w | 3.3k 2w | 6.8k 5w |
| R13 | 27k 2w | 27k 2w | 27k 2w | 27k 2w | 27k 2w | 27k 2w | 33k 3w Carbon |
| R18 | 33k 1w | 18k 1w | 22k 1w | 27k 1w | 33k 1w | 39k 1w | 43k 1w |

Note: HT voltage on modulator section not to exceed 425v. Values of R6A, R6B, R13, R18 vary with applied HT voltage. Select values as table above.

transmitter, external on-off control and change-over switching must be provided — as would normally be the case when working with alternative power supplies.

### VFO Stability

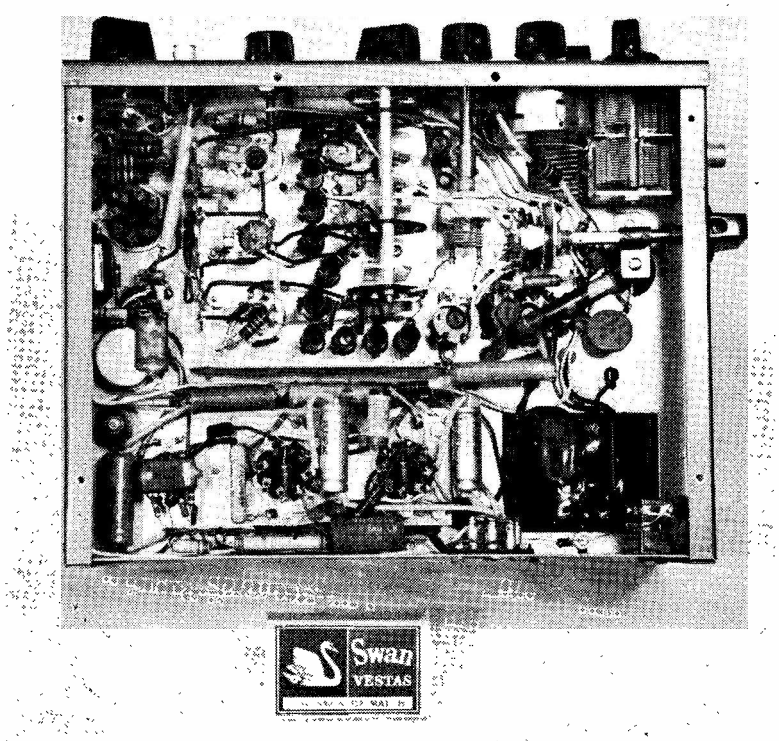
In the past, the Geloso Signal Shifter, or VFO, designs have been open to criticism for instability or " judder " when used mobile, or otherwise where the mounting has not been too rigid. So long as the cabinet is mounted so that the whole transmitter " moves as one," carrier stability in the Valiant is quite adequate, even on the higher-frequency bands. It is possible to shake the note by knocking the transmitter about—but it should never be treated like that anyway. Careful instructions about stable mounting are given in the manufacturer's leaflet, and if these are followed, there should be no complaint about " judder " under mobile conditions.

The RF stability of the Geloso 4/102 is inherently good and it will be noted that in this Valiant design in which it is incorporated, a voltage stabiliser is provided for the oscillator stage.

### Audio Side

The speech-amplifier/modulator is a voltage multiplier arrangement, with a 6BR7, as first stage, into a 12AX7 driving the 6L6's. The audio gain control is R25, but this is *not* brought out to the front panel — a normal setting is about two-thirds in, a hole in the cabinet providing for pre-set adjustment by screw-driver as may be necessary. The audio side gives an excellent speech characteristic and, as already mentioned, the 6L6 modulator will swing the PA fully at maximum carrier input.

Using a normal bench power supply having adequate smoothing and regulation, the carrier was absolutely quiet and hum-free ; it was not possible to detect any change in beat-note quality or background at resonance tune on the monitor receiver when switching the audio side in and out.




**Under-chassis view of the " Valiant " as built and supplied from the factory. The Geloso 4/102 unit is upper centre, and the fixed-ratio modulation transformer lower right. On the right-hand panel is the 160-metre switch, with the aerial output connecter alongside. At lower left can be seen the audio gain-control (see text) and second from the right along the upper row of knobs is the PA drive control potentiometer.**

### RF Section

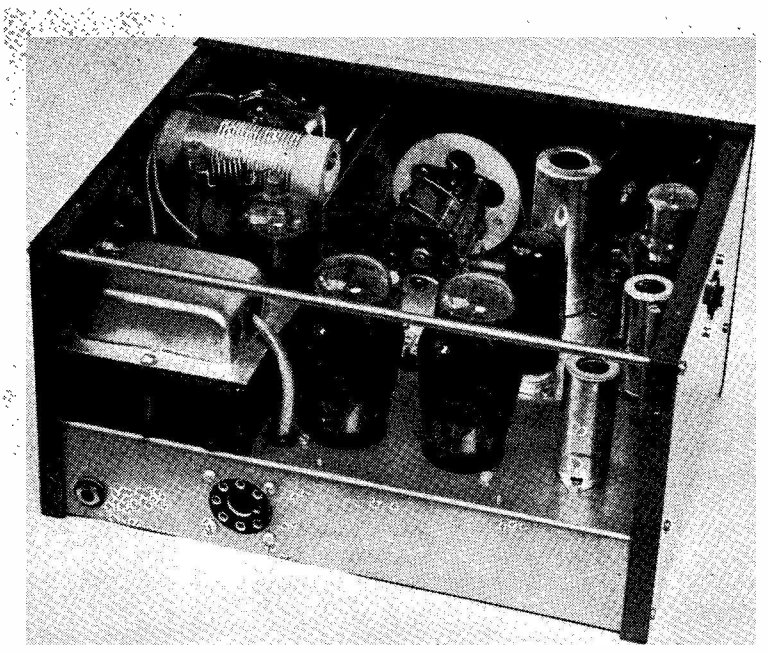
This is, of course, essentially the Geloso 4/102 followed by the QV06-20 (6146) RF amplifier in which standard Geloso 50-watt RF components are used. There are some modifications involved in order to cover Top Band, and these must be applied both to the VFO (two stages) and the PA.

The 160-metre modification is fully covered in a secondary instruction sheet issued with the transmitter, together with some suggestions about feeding a whip type of aerial for mobile operation.

As shown by the photographs, assembly is on a rigid chassis, against a clearly and very neatly marked front panel, with side members having a stiffener across the rear top edge. The final enclosure is a U-shaped cover secured by self-tapping screws. There is ample ven-

tilation and, with only the U-cover removed, the transmitter is fully accessible for servicing.

Finally, as a test for stress and component reliability, the transmitter as illustrated here was left running at full load on 20 metres while this article was being written. Set on 14·1 mc. into a calibrated RF load consisting of a non-inductive 75-ohm resistor and ammeter, with BBC modulation into the microphone and the monitor receiver tuned to the carrier, the RF ammeter reading was 0·6 amps at the commencement of the test period. At its conclusion, the carrier was in beat with the receiver and the RF current reading a shade under 0·6 amps; the modulation level indicator was still reading the 100% level to which it had been set at the start of the run. The cover above the modulator valves was hot and the whole cabinet distinctly warm; the cover was quickly slipped off and the temperatures checked; they were found to be well within acceptable limits all round, with the PA section cooler than might have been expected after such an exacting and protracted test. Switched on again from dead cold a few hours later, all the readings repeated at the same frequency.



**Half-rear view of the "Valiant," showing general arrangement above chassis. Nearest are the push-pull 6L6's for the modulator, with the fixed-ratio modulation transformer at left. The QV06-20 PA stage is at upper left, and the APC on the plate of the valve is clearly shown against the tapped Geloso 50-watt coil unit. The variable condenser assembly at centre rear is the Geloso 4/102 VFO tuning control. The slotted spindle for the audio gain control R25 is near the right-hand panel.**

The K.W. Valiant is available either in kit form (in two versions, for 10-80 metres or 10-160 metres) or factory wired and tested. The six-band model as shown here costs £43 15s., or by £10 19s. deposit and 12 instalments of £3 3s.

### CORRECTION — "HALF-WATT TRANSISTOR TRANSMITTER"

In the circuit Fig. 4 on p.405 of our December issue there should be a connection to earth shown from the junction of R2 with one side of T1 secondary. G3JRH wishes to emphasise that, for proper results with this transmitter, it is essential to obtain the transistors exactly as specified.

### COLUMBIA'S "OUR MAN IN HAVANA"

In this new and amusing picture, the plot requires that "Our Man in Havana" (played by Alec Guinness) should have the assistance of a radio operator to handle his secret service traffic. The gear arrives in packing cases and, when it is set up, the transmitter turns out to be (you've guessed it!) a T.1154 which, incidentally, is not in working order. It seems that the T.1154 has become a standard prop in stage and screen sequences where something that looks like a British transmitter is needed. This is in sharp contrast to the sleek-looking American equipment provided at police headquarters in "Our Man in Havana."

### FULL DETAILS, PSE!

Readers who decide to take out a direct subscription to SHORT WAVE MAGAZINE would help our Office staff considerably if, when remitting their 33s., they would be good enough to state whether *(a)* It is a new subscription, or *(b)* A renewal of a current subscription, and *(c)* If a renewal, the month in which it became due (if our renewal reminder slip is not used).

Similarly, readers who notify a new call-sign, or a change of call-sign/address, for the "New QTH" page are particularly asked to mention if they are *direct subscribers*, so that the card index can be corrected. Of course, we accept "New QTH" entries from all readers, whether they are direct subscribers or bookstall buyers, but in the case of the latter no card index action is needed.

# CRT Monitor Unit

## FOR PHONE MODULATION CONTROL

**D. PRATT (G3KEP) and D. NOBLE (G3MAW)**

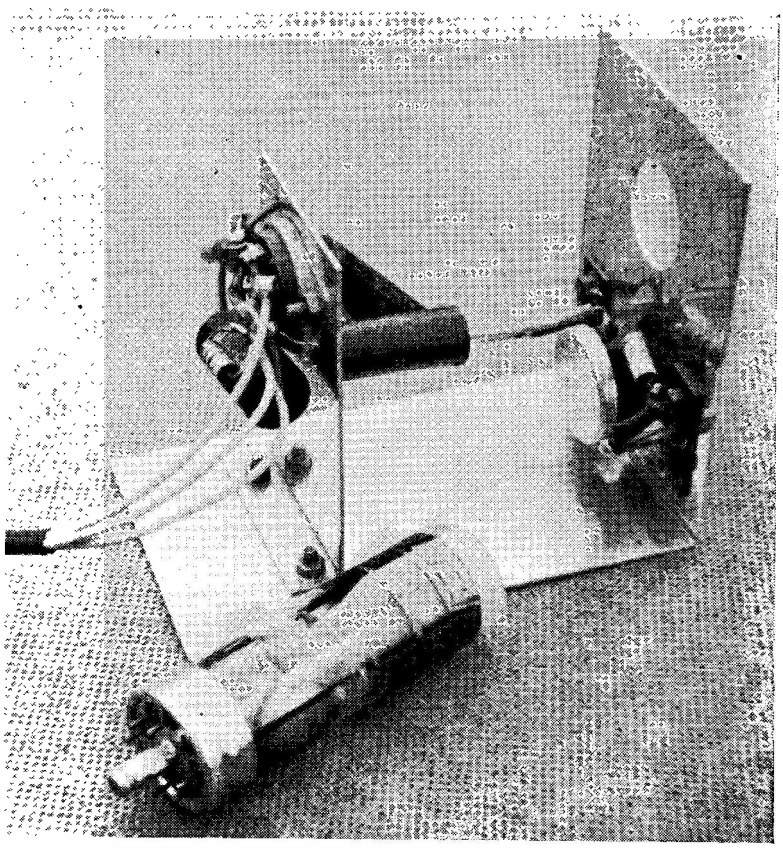
WITH the ever increasing number of stations on the amateur bands, it is necessary to take every possible precaution to avoid excessive interference to stations on adjacent frequencies. Common causes of interference include over-modulation and sideband splatter. Sidebands can be attenuated by inserting a low-pass filter in the modulator, or by a suitable modulator pre-amplifier circuit designed to eliminate the modulation frequencies above, say, 5 kc. Splatter, however, is caused by the modulation waveform cutting off on the peaks. This may be due to over-modulation, but it may also be caused by insufficient filtering after a speech clipper, or by a clamper valve conducting due to insufficient bias from the grid drive. Modulation approaching, yet not exceeding, 100 per cent is desirable for good communication efficiency. It is, therefore, very useful to be able to keep an eye on the modulation level with a suitable monitor.

Only a very simple monitor is required, and can be built quite easily. The suggested circuit is shown in Fig. 1. While surplus tubes, *e.g.* VCR97, 3BP1, etc., can be used, a much higher EHT is required. Also, a focus control would be needed, and this would tend to complicate the device. However, the Cossor 1CP1 (and equivalents) as used here is self-focusing. This tube is only 1 inch in diameter, which makes for a very compact little unit; it can be run off any readily available power supply. In fact, in many rigs there will, no doubt, be sufficient space internally for the monitor — although for experimenting, it may be advantageous if the unit is built on a small sub-chassis as shown in the photograph. Chassis details of the model can be deduced from the photograph below.

### The Circuit

The 1CP1 is self-focusing, and the brilliance is controlled by the value of the cathode bias resistor, R3. It could be replaced by a variable potentiometer but this was not considered necessary. The anode is connected to the HT line, as are also the returns of the deflector-plate load resistors, R1, R2. The RF input to the Y-plate is taken to the harmonic check point of the transmitter, *i.e.* through the condenser C1 to the aerial socket. The audio from the modulator is applied to the X-plates. Its connection to the unit requires a lot of attention as the audio voltages are much greater than the 75-ohm RF voltage on the Y-plate.

The total value of the voltage divider circuit (R) should be 250,000 ohms per 150 volts of audio. The isolating condenser C should be at least equal to ·004/R in Farads.



**The cathode ray Modulation Monitor can be built up on a simple chassis, with the only variable control — the potentiometer R in the circuit of Fig. 1 — on the front panel to the right, below the tube, a Cossor 1CP1 with one-inch face.**

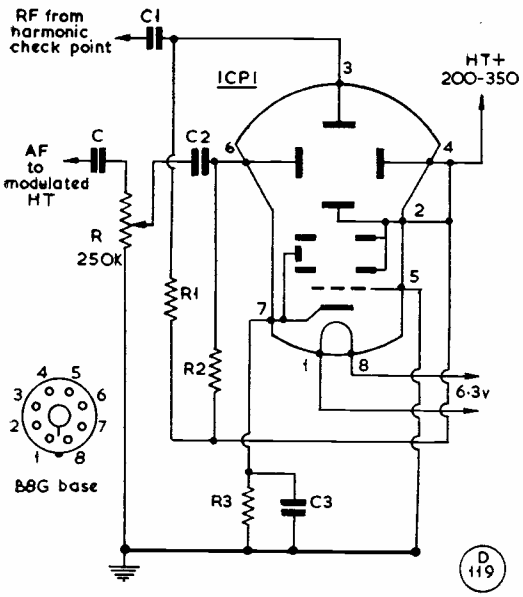



**Fig. 1. Circuit of the CRT Modulation Monitor Unit, values for which are: C1, C2, 0.1 μF; C3, 1.0 μF; C, see text; R, 250K; R1, R2, 2.2 megohm; R3, 470K. The tube is a Cossor 1CP1, having a one-inch diameter face.**

*Example:* Assume PA stage has an input of 10 watts, and the modulating impedance is 18,000 ohms. The approximate audio power required for 100 per cent modulation would be 5 watts.

$$W = \frac{V^2}{R}$$

$$\therefore \quad V = \sqrt{W \times R}$$

$$= \sqrt{5 \times 18{,}000}$$

$$= \sqrt{90{,}000}$$

$$\therefore \quad V = 300 \text{ volts}$$

$$\therefore \quad R = \frac{250{,}000 \times 2}{0{\cdot}004} = 500{,}000 \text{ ohms.}$$

$$C = \frac{}{500{,}000} \text{ Farads} = {\cdot}008 \ \mu F.$$

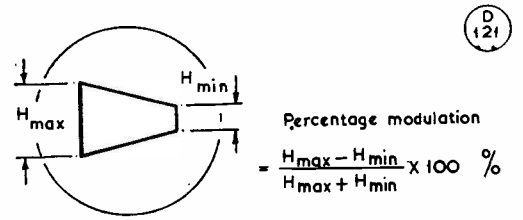



**Fig. 2. The percentage modulation on a carrier is calculated from the measurements shown in this diagram. With a steady tone — such as a VFO/Rx heterodyne beat picked up from the speaker acoustically by the microphone — it is possible to get a "steady picture" to enable measurements to be made. These are facilitated by having a transparent scale on the face of the tube.**

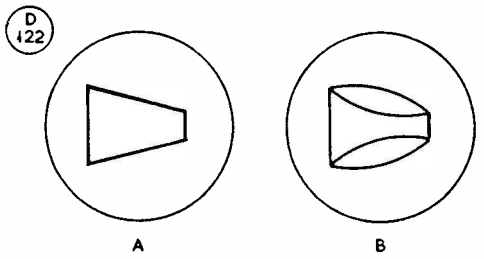



**Fig. 3. For modulation levels of the order of 60%, the trace should be much as the left-hand sketch. If the coupling between the RF source — PA tank or aerial tuner — is incorrect, a "bellied-out" pattern similar to the sketch on the right will be obtained. The coupling adjustment through capacity C should be such as to give a pattern with straight sides.**

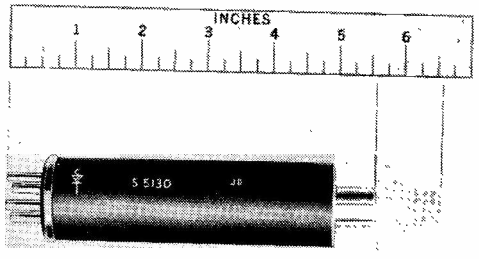
The display given by this unit is of the trapezoidal type. This is shown in Fig. 3A. Phase shift in the modulated amplifier is shown in Fig. 3B; this was actually induced due to capacity in the connecting leads so these must be kept separate.

Non-linearity in the modulated amplifier gives curved sides, and over-modulation causes the shortest side of the trapezium to close up completely.

The unit described has been used at the writers' station for some time, and it has been found to be indispensable for monitoring the speech transmission as it is radiated.

## THE "NEW QTH" PAGE

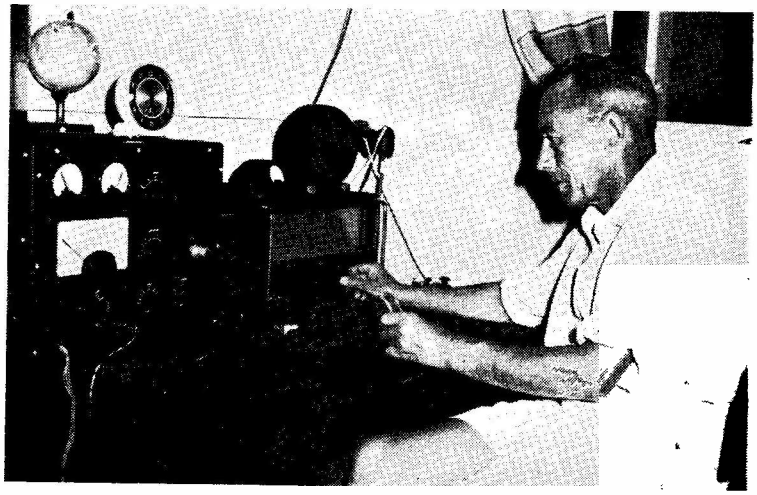
Readers are reminded that all new-issue call-signs, or changes of call-sign address, should be notified to us for publication under "New QTH's" and subsequently in the U.K. section of the *Radio Amateur Call Book*. This ensures appearance in the only directory to the radio amateurs of the whole world.




**For many years, the 866 and its equivalents have been regarded as the standard for high-voltage rectifiers. But it can now be replaced by the S.5130 silicon rectifier, which not only requires no heater current or warm-up period but is physically smaller than the 866. The S.5130, handled by the New York factors Ad. Auriema, Inc., is capable of giving 300 mA continuously under a peak inverse voltage of 10,400v. It fits comfortably in the palm of your hand!**

# DX COMMENTARY

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



ZB1A/G8FG

## CALLS HEARD, WORKED and QSL'd

THE key word for the month is "erratic"—all the bands have been up and down, and certainly not a patch on the previous period. The week-end of the *CQ* Worldwide Contest unleashed complete chaos on the most popular bands, conditions being quite good at the time, but so many stations were batting away at high speeds that sorting out the DX was very, very difficult.

It seems that we in Great Britain are suffering from a particular hazard these days. It may be imagination, but we have the impression that the number of stations in Europe has increased much more rapidly than the number of stations that we can really call DX. Therefore, since the single-skip conditions are prevalent for so much of the day, there are long stretches when all bands sound rather like Forty, with extremely strong short-skip stations predominating.

Furthermore (it's a pity to have to say this, but truth will out) there are surely more bad notes and bad operators concentrated within about 1200 miles of the U.K. than anywhere else in the world. For this reason, the short skip becomes a double hazard for us. CW stations with T7 downwards, phone stations with distortion and over-modulation, and operators behind both who really haven't a clue . . . exasperation is the order of the day, especially at week-ends.

It is *not* imagination, nor rose-coloured spectacles, that tells us of the conditions in 1948 and 1949, when one could cover the whole of the 14 mc band at various times of day and hear very little *except* DX. Nowadays, throughout the entire hours of daylight, the DX is one, two or three layers down below the non-stop clutter of short-skip stuff, much too much of which is of the dirty variety.

It seems impossible to suggest a remedy . . . even better receivers and better beams have not helped much. The fact of the matter must be that we were very lucky ten years ago, much of the QRM being dormant at that time.

### Heresy ?

While tuned in to the voice of discontent, we should like to put forward another purely personal opinion—that Contests, in their present form, have had their day and should be scrapped. We can almost hear the eyebrows going up in some quarters, but never mind—unrepentant, that's us.

These mammoth affairs covering the whole of one or two week-ends are relics of the days when it was necessary to have such a contest in order to stir up a worth-while amount of activity on the bands. Nowadays a 48-hour (or even a 24-hour) stretch of doing nothing but trying to work practically every station audible on every band and exchanging a five- or six-figure group in the shortest possible time surely represents the most mammoth waste of effort we could ever involve ourselves in.

What do they tell us? What do they prove? Only that the operator, or operators, of a certain station have the ability to crash on, with either a mike or a bug as their weapon, reaching a stage of complete exhaustion rather later than any of the other fellows similarly occupied. Flogging oneself to death must be a rather similar sensation.

Well, there it is—we've said it, and we are quite unrepentant. Maybe the Rude Letters will start to flow, but if everyone who held the same views were also to write, we would take a bet that they would outnumber the others by 100 to 1.

Destructive criticism, you may

say. Well, let's be constructive and suggest that these "flat-out" contests, whether worldwide or national, would reveal more about efficiency and operating ability if they were confined to *four hours* or thereabouts. And that they would reveal still more if one had to exchange something more intelligent than a mere signal report and serial number. If you have any suggestions for a good contest, let us have them—but we are convinced that there are far too many 24-hour, 48-hour and two-week-end affairs taking up time and band-space.

These are your Commentator's personal views and nothing else . . . what are yours?

**DX Gossip**

Much of the interesting material which we have been able to present, month by month, under this heading, has come as the result of a mutual exchange scheme with Don Chesser, W4KVX, whose excellent publication *DX* has reached us weekly by air mail. We therefore give due prominence to the very sad news that W4KVX recently had a disastrous fire which destroyed his shack, his radio gear and much of his printing equipment.

It is understood that most of his addressograph plates were salvaged, and that the Ohio Valley Club are using them and sending a copy of their own bulletin to all the regular recipients of *DX*—a fine gesture and a manifestation of the genuine Ham Spirit. We hope to be able to announce by next month that W4KVX is re-organised and carrying on his excellent work.

Strange new one — VK9XN (28235 kc AM) claiming to be on St. Margaret Island, Indian Ocean, near Christmas Island. No more news as yet . . . The Tokelau Islands (ZM7) may well have been and gone by the time you read this: W5PQA was expecting to arrive there and open up on CW and SSB around December 23. VR2DA was to be with them, and expected to handle the CW side. In case they are still on, the frequencies are 14040, 21040 and 28040 kc (CW); 14305, 21405 and 28605 kc (SSB).

Last month we had a last-minute flash concerning Willis Island, whence VK4IA was said to be operating. Now we hear that VK6DL (ex-VR3B) says that his company furnishes the men who staff the island; that none of them is an amateur; and that, so far as he knows, there is no activity there. Next, please!

Around publication date there may be some activity from Galapagos in the form of HC8JU, operated by HC1JU and another operator. CW, AM and SSB, 14, 21 and 28 mc . . . XW8AL active on various bands, XW8AC on 28 phone; XW8AI is QRT and bound for Guadeloupe and an FG7 call.

EAØAF expects to be putting Spanish Guinea back on the air, mostly Sundays and Mondays, from January 1 onwards . . . "ZA1AL," recently noted by several 'chasers, was as phoney as pigeons' milk . . . "TI9AB" is in the same category.

KC6PE has been on AM phone (28 mc) from the Eastern Carolines . . . MP4TAF is a useful one (Trucial Oman) to be found between 1400 and 1700 GMT, often on 14345 CW . . . VQ5FS hopes to operate SSB from the Sudan during January, and also from the Vatican City in late March . . . KP6 (Palmyra) on SSB is another project, worked on by a KH6 and two W7's.

Tannu Tuva seems to come up nearly every month. Current flash is that UAØKYA is definitely there; he operates on 21 mc CW with a rough, drifting signal . . . BV1USB has been very active of late on CW . . . JT1AB, not on very regularly, is at least keeping Central Mongolia on the active list.

VP2SL will be making an expedition to Montserrat, February or March . . . VU2ANI, the Andamans expedition, should be on the air by publication date—14, 21 and 28 mc CW and phone

**FIVE BAND DX TABLE**
**(POST WAR)**

| Station | Points | 3.5 mc | 7 mc | 14 mc | 21 mc | 28 mc | Countries |
|---|---|---|---|---|---|---|---|
| G3FXB | 823 | 75 | 132 | 225 | 223 | 168 | 264 |
| G2DC | 802 | 86 | 118 | 236 | 198 | 164 | 264 |
| G5BZ | 790 | 66 | 121 | 267 | 206 | 130 | 276 |
| G3FPQ | 772 | 72 | 104 | 220 | 215 | 161 | 246 |
| G3DO | 686 | 24 | 47 | 248 | 188 | 179 | 275 |
| GW3AHN | 662 | 16 | 55 | 203 | 240 | 148 | 262 |
| GI3IVJ | 608 | 39 | 62 | 168 | 178 | 161 | 226 |
| G3ABG | 584 | 55 | 88 | 186 | 132 | 123 | 212 |
| W6AM | 566 | 40 | 68 | 296 | 96 | 67 | 296 |
| G2YS | 532 | 73 | 92 | 164 | 120 | 83 | 182 |
| G3LET | 486 | 37 | 95 | 185 | 119 | 50 | 204 |
| G3IGW | 461 | 46 | 75 | 113 | 119 | 108 | 165 |
| G6VC | 451 | 38 | 59 | 156 | 112 | 86 | 185 |
| UR2BU | 446 | 18 | 42 | 143 | 136 | 107 | 180 |
| GM2DBX (Phone) | 427 | 34 | 31 | 160 | 102 | 100 | 176 |
| W6AM (Phone) | 425 | 23 | 62 | 280 | 49 | 31 | 280 |
| G3FPK | 414 | 36 | 82 | 126 | 100 | 70 | 161 |
| G3JZK | 408 | 17 | 60 | 94 | 137 | 100 | 187 |
| UR2BU (Phone) | 341 | 5 | 16 | 102 | 116 | 102 | 154 |

| Station | Points | 3.5 mc | 7 mc | 14 mc | 21 mc | 28 mc | Countries |
|---|---|---|---|---|---|---|---|
| G6TC | 331 | 20 | 70 | 128 | 71 | 42 | 146 |
| G8DI | 317 | 33 | 62 | 91 | 73 | 58 | 128 |
| G3LHJ | 311 | 13 | 39 | 98 | 113 | 53 | 147 |
| G2BLA | 304 | 33 | 57 | 71 | 74 | 69 | 120 |
| G3DNR | 289 | 10 | 23 | 90 | 82 | 84 | 129 |
| G3MCN (Phone) | 285 | 4 | 8 | 62 | 139 | 72 | 173 |
| G3BHJ | 272 | 8 | 27 | 37 | 128 | 71 | 156 |
| VO2NA | 262 | 19 | 35 | 108 | 64 | 36 | 117 |
| G3WP | 260 | 17 | 34 | 80 | 24 | 105 | 141 |
| G2DHV | 258 | 22 | 29 | 128 | 59 | 20 | 143 |
| G3NOF (Phone) | 241 | 1 | 14 | 28 | 103 | 95 | 138 |
| W3HQO | 227 | 3 | 8 | 76 | 110 | 30 | 155 |
| G3JFF | 210 | 12 | 52 | 107 | 35 | 4 | 113 |
| G3MMP | 193 | 5 | 26 | 45 | 57 | 66 | 93 |
| G3NAC | 184 | 6 | 21 | 50 | 74 | 33 | 94 |
| G3JSN | 175 | 26 | 31 | 36 | 47 | 35 | 73 |
| VQ4GQ | 173 | 1 | 10 | 72 | 59 | 31 | 106 |
| G3DNF | 156 | 7 | 31 | 45 | 41 | 32 | 68 |
| G3IDG | 144 | 15 | 15 | 41 | 36 | 37 | 65 |

*(Failure to report for three months entails removal from this Table. New claims can be made at any time)*

. . . VU2AK, VU2NR and VU2RM will all be officiating.

**Trans-World Safari**

News reaches us of what may turn out to be the biggest and longest DX-pedition of them all—a Trans-World Safari due to start from Durban on December 31, and to last for 21 months! The organiser, not an amateur himself, recently toured U.S. manufacturers with a view to securing suitable equipment, in which, we gather, he was successful. The intended route is something like this: Durban, Bulawayo, Northern Rhodesia, Belgian Congo, Uganda, Sudan, Tangier. After a visit to Europe they turn across Asia, arriving at Singapore around the end of 1960. Then comes Australia, thence to Panama and the whole of South America, and finally a publicity tour of North America.

This expedition will involve the driving of two Willys four-wheel-drive trucks for some 70,000 miles each; the crew of six are travelling first for the adventure involved, and secondly with the idea of shooting several miles of film, possibly for TV. The radio has, it seems, been added as an afterthought, but it should be none the less interesting for that. *Wanted:* A top-flight operator for the trip!

SWL Peter Day (Sheffield) and others inform us that 9N1GW has been heard (14305 kc SSB, S9). He will be there for two years or so . . . G2DC says the frequency is 14318, and times 0500, 1000 and 1300 GMT . . . Also from G2DC—the VU2ANI DX-pedition is not now expected to be on before January 5, and will be signing /VU5 for a month.

ZL4GA asks G5BZ to pass on the news that he will be working from the Blue Mountains from January 16, signing ZL4AT/P or ZL4GA/P—also, if ZL4CK goes with him, ZL4CK/P . . . Leo, of BV1US, whose home call is K2MZM, tells us that he will be operating HL9KJ from January onwards.

And now an interesting collection of news from VK3AYR (ex-GM3KJB): VS4FC very active, 14 mc CW, 0800 onwards . . . VR1B active on 14 CW again . . . VR3W is the most active of the Christmas Island gang, 14175 kc phone . . . VR4BW, active on 14 phone and CW, but often /MM and not ashore . . . VS5GS—20 watts at present, but going QRO soon . . . ZK1BS—back shortly after a vacation . . . ZK2AB—working 14 phone, mostly to the States. U.K. stations might get him around 0900 Tuesdays . . . FU8AC—comes and goes, but heard working FK8's on 21 phone occasionally . . . FW8 and ZM7 activity promised early in New Year . . . FO8AC—14155 phone, 1000 GMT . . . CR9AI—21 mc phone and genuine . . . VK2APX/LH—on 14085 CW, 0900 . . . HL9KJ, 14 phone, HL9KT and 9TA, 14 CW—all 0800 onwards. Thanks to VK3AYR for a meaty paragraph!

**News from Overseas**

DL2BC (Sgt. J. Akehurst, 212 Signal Sqdn., BFPO 36) would like reports from SWL's on his 14 mc signals. He operates there with many transmitters, but all of the same type (Canadian Marconi No. 52) and would appreciate reports for comparison purposes. He is ex-DL2VM and 5A4TZ, and would like to hear from ex-DL2VC, 2BG, 2VK, 5A4TD and ZC4CS.

Peter Windle (VU2XG and G3HVG) left Ceylon, where he was VS7XG and 4S7XG, in July 1954, and from 1956 to 1958 he was in Pakistan, where he had all his gear but no ticket. Now he's in Bombay and has just received the call of VU2XG; he will be running about 40 watts on 28, 21 and 14, and naturally hopes to work his father (G8VG) as often as possible, but looks forward to meeting all his old friends. Peter will be there until June or July 1961, and when he gets his aerial up on the roof of the seven-floor block where he lives, he should start getting out.

W6AM (Long Beach) is mostly chasing new phone QSO's and phone QSL's. His score is already 280 confirmed on phone! At the other end of the scale, he comments on some 5-watt "Citizens' Banders" (business radio on 11 metres). After working a customer 30 miles away, he had QSO's of 2000, 1700 and 1500 miles—all business contacts and dscussions! (Perhaps he was using his rhombics on the 5-watters?) Anyhow, it just goes to show that you can't keep a DX man down . . .

Ham Whyte of VE3BWY is getting very keen on Top-Band work, and hopes to make some contacts in this direction during the winter. For more details, *see* Top-Band section.

VO2NA (Goose Bay) tells us that the active officers of the Club there are VO2AA, 2ES, 2FS, 2GB, 2RC and WØWWH/VO2. VO2RN is a new member, and VO2MK has departed for VE2. VO2NA himself is back on the air now that summer activities are over, and will be reporting again.

**Top Band DX**

Priority must be given this month to an extraordinary report from G2AAM (Derbyshire), who received a Japanese SWL card on a CQ call on 1875 kc (November 24). G2AAM returned this card to the JA with an IRC, asking him to add the call of the station replying to his CQ. This was duly furnished (it was OK1AEH). Since G2AAM was using 3·8 watts at the time, it is a most exciting piece of DX work. His aerial is 132 feet long, slung between two 50-ft. masts, and 500 ft. above sea level.

No more Trans-Atlantic contacts are reported as yet, but W1BB's bulletin gives the following news: W6KIP/ZL3RB schedules

**WPX LADDER**

***(Starting Date : Jan. 1, 1957)***

| Station | Worked | Confirmed |
|---|---|---|
| G3DO | 492 | 421 |
| G3ABG | 305 | 243 |
| G3LHJ | 303 | 202 |
| G3MCN | 302 | 250 |
| G8DI | 287 | 250 |
| G2BLA | 275 | 188 |
| G3ABG (Phone) | 250 | 169 |
| G3MMP | 200 | 121 |

(NOTE: *This Ladder will be replaced from next month's issue by the WPX Marathon scores, starting from* ***January 1, 1960****. There will be two categories —* **CW only** *and* **Phone only.** *Prefixes worked — no confirmations asked for.)*

have been resumed — ZL3RB heard the W6 first go . . . VP3AD will be on 1801 kc alternate Sunday mornings—January 10 is the next . . . OD5LX will be on, looking for W's and using 450 watts . . . SWL D. Powell in Gibraltar has already reported W1BB's signals in three different test periods to date.

VE3BWY (ex-G6WY) worked W6AMO, 6KIP and K6HXT—also some WØ stations on phone . . . W1BB has been hearing the W6's regularly, but no Europeans as yet . . . Stations known to be active from this side include DL's, OK's, HB9's, OD5LX, 5A2CV and 5A2CW and, of course, many G's . . . W1JNO, after much listening on 2182 kc, thinks that conditions are already much better than last season.

*Late Flash:* G3FPQ (Elstead) worked VE2AZT on December 6, when even W1BB was not audible, but we understand that Stew was not on the air that week-end . . . G2DC (Ringwood) reports that VE2AZT appeared on that morning at 0645, but faded out shortly after. Also that 5A2CV is having Tx trouble, but has logged G2KK, G3ERN and GM6IZ. ZB1AH has moved his QTH but will be back on the band as soon as possible.

**Top Band — Other News**

G3LNR (Nottingham) recently worked GD3UB, GM2HIK, 3KHH, 3CEA, 6IZ and 6RI, DL2AH and DJ2HC. G2NJ (Peterborough) mentions that G3NIA is active from Hunts., for those who want that county. He recently received a QSL from G4RJ/P (Scilly Is.) for a *daylight* QSO, and has worked DL1CF, GC3HFE and GD3UB.

G3LEV (London, S.W.16) has claimed his WABC and says that he has heard HA5TU calling CQ on 1850 kc — scores of stations called him but he didn't come back. G3NPB (Malton) joins our ladder with 36 worked and 22 confirmed . . . he started up on October 1 with a CNY-2 and an 80-metre Windom with a counterpoise, which he recommends.

G3MCY (Tangmere) says, rightly, that the Top Band has never been included in the CW/Phone band-plan. By all means let's have a "gentleman's agreement," he says, but let's know first of all what it is! And he adds that on the other bands (except 80) the plan permits the use of both CW and phone in the HF portions. Parting crack: "I am sure that I like G2VV's idea, but *what is it?*"


**Every now and again we get an interesting photograph from our old friend Stew Perry, W1BB, well known all over the world for his outstanding performances on the 160-metre band. But here Stew (back to camera) is not operating on Top Band; he is taking a novice in his licence examination for the F.C.C. That loop on top of the AR88 is for directional reception on 160 metres.**

G3NFV (Ashtead) raised DJ2HC and EI8J . . . G3MXJ (Gravesend) added GD3UB and GM3KAI (Berwick) to his total . . . G3IGW (Halifax) worked ZB1FA and suggests that DL, HB and OK are no longer DX for this band, since they are now being worked by the TTx boys!

G3CNM (Cheadle Hulme) mentions HA5X as a suspected pirate (the same as "HA5TU," mentioned opposite?); he worked HB9T as early as 1700 GMT at 579, and also collected EI9J (2245). Another SWL report was received from D. Powell, an SWL in Gibraltar, who is always listening on One-Sixty.

**Eighty Metres**

Very little news of activity on 3·5 mc, but we may as well sort out what there is. G2YS (Filey) worked UA9CM; heard UN1KAB and UO5KAN . . . G3LET (Westcliff) worked VS9OM (2100), 4X4KK and UO5AA . . . G5BZ (Croydon) raised PI1MID, UB5 and UR2 for new ones on the band . . . G3JSN (Watford) collected OY2H, CN8JX, UR2, UB5 and UQ2 on CW, UA1DZ, I1, OHØNC, LX1DV and other Europeans on phone—mostly in the contests.

G2DC found that even W and VE were difficult to work, but new ones included UR2, UQ2 and the like. Others were ZC4, VE1 and 2, W1, 2, 3, 4 and 8.

**Forty Metres**

By contrast, there has been quite a lot of activity on 7 mc; not with much result in the way of real DX, it is true, but at least things are being stirred up. The W's come in exceptionally late these mornings—around the time of writing we are logging them at 579 until 0900 GMT and after.

G2DC had some frustrations; a sked with VS9OM at 2000 GMT failed because G2DC couldn't hear him, although he was received in Kent, giving G2DC a 579 report.

On December 9, W6GTI said that Europe was being received over there in fine style between 1400 and 1500 GMT, but apparently no one could hear him.

(For the benefit of the newcomers, we had better explain that the long path to W6 was wide open on Forty a few years back—mostly during December and early January—and at least half a dozen G's could be heard working W6's through the European QRM most afternoons at 1400 or 1500. In 1952, according to the G6QB log, these contacts were still being made (with W6DFY and W6GAL) in mid-February. The peak time became very sharp by then, and one could work them at 1545 but not at 1600 . . . a touchy business altogether.)

Reverting to G2DC—he worked quite a few new ones for the band, including ET2US, 5A3TR, UC2, UR2, and also a bunch of PY1, 2 and 6. UF6, UG6 and UH8.

G3JSN, mostly during the Contests, worked CT, EA, SM, UP2 and OHØNC on phone; SVØ, VP9BO and W9 on CW. Heard but not worked were HZ1AB and 4X4 on phone. G3NAC (Yatesbury) heard a UA3 working JA2CL (539) around 2145 GMT on 7068 . . . but his aerials were down and he couldn't join the party.

G3IGW says 40 metres is "in excellent shape" and that W's can be worked for 14 hours on some days; on CW he raised UP2, UI8 and UL7. G3MXJ used the band quite a lot and raised VP7BB/MM (off Crete), UD6AM, 5A2CV and VE6AAE/SU in the Gaza Strip. G3MXJ runs 35 watts to a 66-ft. Zepp. Others heard were VP9AK, AP4M, KG1AQ, CO2GR, EA6 and CT1.

G5BZ (Croydon) worked TF3AB and WA2HUU/VO1; G3FPK (London, E.10) winkled out PJ2AE; G6VC (Northfleet) worked SVØWI and UD6FA, but missed OD5LX and TI2LA.

G3LET hooked a long-path W6 at last—W6RW at 1520 GMT; others worked were EA9AP, HZ1AB (1830), VQ4HT, VK3YD, VP7BB/MM (Red Sea) and VS9OM. Heard: AP4M and ZE2KL (1800), KR6MD (1500) and JA2XW (2200). *Yes*, all on Forty!

G3MJL (London, W.7) raised VE6AAE/SU and got his QSL six days later; other DX was PY, W, VE, UA9, TI2CAH, 4X4KL, 3A2BA, OHØNB and lots of U's. Heard, but not worked: YV3BA, VP9AK, VQ3CF, AP4M, OY8RJ and EA8CU.

Peter Day (Sheffield) logged KL7CDF (0550), TI2CAH (0600), SVØWI and HZ1AB (2300), all CW; on phone he heard ZC4JB and HZ1AB (both around 2300).

Compare this 7 mc report with those of a year ago, and you'll see what's happening to conditions. They should continue to improve for some time now, but the QRM is always with us—and there's no reason why *that* should not increase, too!

**Twenty Metres**

Most of the reports on this band are short and sweet . . . the short-skip still makes it less popular than Fifteen and Ten, it seems. There's plenty of DX there most of the time, though, and seldom a dull moment.

G3LHJ (Newton Abbot), using CW and a dipole, raised CR7IZ, YV5AFR, ZE8JO, ZL4CK and 7G1A; GW3AHN (Cardiff) worked VP4WI; G2YS heard FR7ZD and UPOL8.

G3MBL (North Finchley) collected VS9OC; G3NOF (Yeovil) worked SVØWB and ØWS (both on SSB) and ZB1JM (AM); G3FPQ scooped 9N1GW (SSB) for his first G.

G2DC had skeds with VQ8BBB, but with no result. It's disaster even to send that call-sign, and the wolf-pack arrives automatically! Other QSO's were with KR6MG, JA1VX, HH7PZ, KG1AO, XZ2TH and ZA1AL. The latter was active several days on the same frequency, but G2DC fears he is a "stinker." . . . We gather that he is, too!

G3JSN thinks a beam is necessary before one can work any good DX phone on Twenty—unless one goes SSB! He raised PY8SB on phone, 7G1A, OX3RH and UA9 on CW. G3IGW worked UI8KBA; G3LET snagged FY7YF, JZØPC, VP4WI, ZD1AW and ZS7M.

G5BZ's log is a little longer and includes KH6ALU, KL7CDF, LA3SG/P, VE8GC/8, VS9AZ, YV5AFR and 5AK, ZD1AW,


**Impression of the station in operation on the HF bands from the Horticultural Hall during the Amateur Radio Exhibition in November last. The aerials were erected over the Sunday before the opening by a "fatigue party" provided by the Crystal Palace & District Radio Club, of which G3FZL is honorary secretary.**

ZE8JI and 8J1AA.

**Fifteen Metres**

This band has been more popular, and probably better, than Twenty, and some good DX has been there for the taking. Phone and CW have been running neck and neck, and a strong SSB contingent of DX stations is building up.

GW3AHN swopped CW with HZ1AB, KL7, KP4, KR6GF, KZ5's, OA4BP, UAØSK, TI2CMF and VS9OM; and phone with CE's, CO's, HH2NV, OX3KW, VP2AR, VP5BL, 5DM and 5EM, VP6JK, VQ4RF, YV5AJK and 9G1AA.

G3LHJ stuck to phone and raised CR9AK, EL8A, FB8CD (Comoros), HH2NV, HZ1AB, VS6EJ, VS9OM, VU2BK and 2RN, ZD1EO, ZS7L, ZS's, VK's and ZL's . . . G2YS worked FE8AH, ST2AR and 4X4DH . . . G3MBL collected JA1BD and ZL2AAG.

G3DNR (Broadstairs) added HZ1AB and KP4KD to his list, plus 9G1, VQ2, ZB2, ZL, VQ4 and so on—all phone. CW fetched in OX3RH and UAØAZ (Dickson Island). G3FPQ raised UAØLA and ØLO, both on phone. G3NAC worked CW with VQ6NG, UP2KCB and SVØWJ.

G3NOF was very active on phone and his list includes FA2VB, FK8AT, HZ1AB, OY2Z, SVØWJ, VK's, VQ4FB, VS6's, VU2BK, ZB2A, ZC4RK, ZD3E, ZL's, 3A2BA and 9G1BA.

G2DC noted a considerable increase in commercial QRM, but worked two new ones—HP1AC and 7G1A; others were CR7IZ, HZ1AB, KR6MD, 6JM and 6GF, KZ5TD, UA9, UAØ, VK9XK, ZS3D, ZP5AW, TI2CMF, YV5ABH and PY2ZZ.

G3JSN says this is his best band, and finds it amazingly easy to work ZL's on phone and CW around 0830. Sometimes they are the only stations to be heard. Others worked were (phone) VS9AE, FQ8AF, 9G1AA, ZD2AMS and FE8AR; (CW) OX3RH, W7GTA and KL7CDF.

G3FPK made his DXCC on this band with the aid of UN1AH (CW); G5BZ rounded up BV1USB, KR6GF, KL7CDF, PJ2AN, TI2CAH, VS9OM, YA1AO and others. G3LOL (Cleethorpes) reports for the first time. In his first week since putting up a 67-ft. dipole with 66-ft. feeder he worked FQ8AJ. VK3AZY, VQ2EZ, UF6KPA (all CW) and 5A3TA, VP5BL and VS9OM on phone.

**Ten Metres**

In some ways, *Ten* seems to have been the best band of the lot—not for exotics (which only interest the few connoisseurs, after all!) but for good solid DX QSO's.

GW3AHN's phone reached the ears of PJ3AB, UL7HB, VQ4DW, 9G1AA and 1BA. G3LHJ worked CW with CR7IZ, FE8AH, HK3TH, JA3AG, OD5LX, UAØSK, VU2BK, VU4A (?), XZ2TH, YA1AO and ZE3JO (shows what a Contest will do to stir up the CW end!) Phone raised VQ4DT and 4RF, and VK2AKV.

G2YS also has a good CW list, with FQ8's, UL7HB, VP4LA, SVØWI, OD5LX, OQ5IG, XZ2TH, YA1AO, YV5DE and 5A3TR. G3MBL with 30 watts of phone and a two-element beam raised CR7EO, MP4QAO, RA9HAA and 9CAR, VK2AKV and ZD2HJG.

G3WP (Chelmsford) worked UL7FA, UL7HA, VS9OM and VU4A. The latter gave QTH as Laccadive Is., and had a T6 note, chirpy and unsteady. Said QSL to Box 102, Bombay. Rather uncertain, we feel! G3WP received a card from LX3PF for his 101st on the band.

G3DNR collected CR6DB for a new one, plus 9G1, FA, OQ5, VQ4, ZS and VE's—all phone. G3NAC put up a "very bad dipole," seven feet high, indoors, and fed it through a Z-match. With 60 watts it raised IT1GO and VQ4DT.

G3NOF's long list includes CR5SP, CT3AN, FQ8AT, KP4's, PJ3AB, RA9, RN1, RP2, TG9AD, UL7's, VP4LF, VP3MC, VQ4DT,

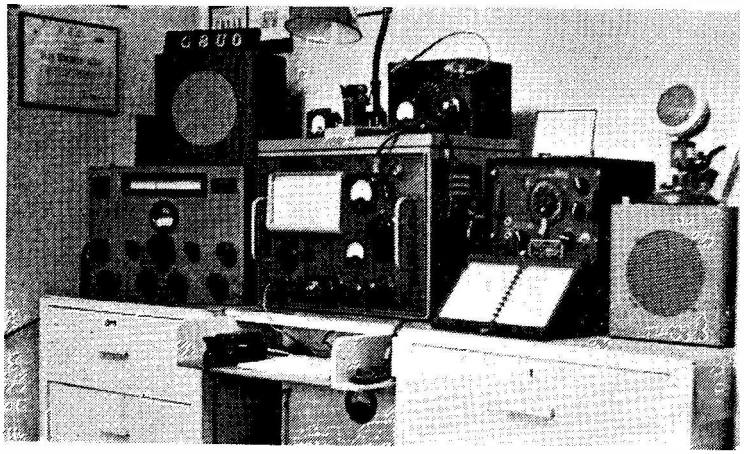
**TOP BAND COUNTIES LADDER**

***(Starting Jan. 1, 1952)***

| Station | Confirmed | Worked |
|---|---|---|
| G2NJ | 98 | 98 |
| G6VC | 96 | 96 |
| G3FNV | 94 | 95 |
| G3JHH | 94 | 94 |
| G3KEP | 86 | 86 |
| G3KOR | 84 | 90 |
| G2CZU | 81 | 83 |
| GM3AVA (Phone) | 72 | 74 |
| G3APA | 70 | 83 |
| G3MCY | 69 | 70 |
| G3LHJ | 68 | 74 |
| G2CZU (Phone) | 67 | 68 |
| G6QN | 64 | 76 |
| G3LEV | 64 | 74 |
| G3KEP (Phone) | 62 | 64 |
| G3NFV | 61 | 66 |
| G3FS (Phone) | 61 | 61 |
| G3LEV (Phone) | 60 | 68 |
| G3LNR | 50 | 56 |
| G2AAM | 48 | 53 |
| G3MXJ | 47 | 54 |
| G3JFF | 35 | 38 |
| G3NPB | 22 | 36 |
| G3NKH (Phone) | 20 | 32 |
| G3JRH/A (TTX) | 20 | 24 |

*(Failure to report for three months entails removal from this Table. New claims can be made at any time.)*

**W5RG of Dallas, Texas, has a Mosley 21 mc compressed beam mounted on a 40-foot tower.**



**Station of G8UO, Keighley, Yorkshire, who was licensed in 1937. He was "artificial aerial" 2ARU in 1933, and started as an SWL some years before that. G8UO is CW-only and his key is a German Army standard pattern, obtained through Desert Rat connections in North Africa. The shack is in the roof-space, and the transmitter is essentially a Geloso VFO with a pair of 807's, built into an ex-T.1403 cabinet, with a CR-100 receiver. The aerial is an indoor folded dipole.**

VQ8AD, XW8AC, ZD2AMS, 9G1AA and 1CX, and the usual VE's, VK's, W's, ZL's and ZS's.

G2DC thought *Ten* was the only band that really came up to scratch, despite the Russian "rock-'n'-rollers." (Incidentally, we were told that they produced their distinctive signals by means of printed circuits on a base of fruit jelly!) New for G2DC were FE8AH, UP2KKI, W5EZB/KG6, XZ2TH and 9K2AD; others were CR7, CE's, FQ8, HI8CM, OD5LX, ST2AR, VP6RG, YV5KL, UL7, ZD6DT, XE1RY, 7G1A, 9G1AA, 1BV and 1CX.

G3JSN worked phone with VE2AIG/SU and got his card direct; RN1AAA and 1AAB were among the readable fruit-jellies; also worked, HK7AB, K6EFN, 9G1AA and 1BA, and VQ4DT.

G3IGW had some nice CW contacts, with F2CB/FC, FE8AH, FQ8's, IP1ZGY, OA4FM, UG6KAA and three UL7's. Phone was exchanged with FQ8AT, HH2RS, HI8DM and 8JBD, HP1AC, HZ1AB, KZ5SW, MP4QAO, XE2BM and 2DO and ZB2A.

G3FPK collected some new ones, including CR5SP, LZ1WD, HZ1AB, MP4QAO, OQ5LL, RH8AAD, RP2ABA and VS6BJ—plus "the usuals." On CW he worked UL7HB. G6VC caught up with TG9US, YS1IM, YV5ABH, HC1FO, FQ8AT, VP2AR and 9G1AA on phone.

G3LET's log shows ET2US, FQ8HA, OQ5IG, UL7FA, VK9XK, YV4CI and 7G1A. G5BZ lists, among many "lesser fry," FE8AH, EL4A, ET2US, OQ5IG, VU2BK and YA1AO.

### The CQ Contests

We haven't many scores yet, but the following are worth quoting: *Phone Week-End:* CN8JF, 566,328; G3FPQ, 565,080; G3IZW (multi-operator), 130,000; GM3BCL, 119,016. 21 mc only, KH6DLD, 92,870; GW3CDP, 38,514. *CW Week-End:* G3FPQ, 507,000; G2DC, 297,330; G8DI (7 mc only), 8,712; G3FTQ (14 mc only), 10,608; G3WP (28 mc only), 1242.

### WPX Marathon

Many correspondents have commented that the WPX Marathon for 1960, as announced last month, is a Good Idea in that it makes it possible for some of the "new boys" to compete on more or less equal terms with everyone else. In some senses they might even have an advantage, since some of the Old Timers won't feel like having to start all over again in order to winkle out YU4's, SM1's, HA3's and so on. We hope to see some G3N's quite high in the list.

One thing we did not make clear: there will be two lists, one for **CW only** and one for **Phone only.** *CQ*, the original sponsors of the WPX scheme, do not mix phone and CW in their lists, and it seems a good thing that we should work on the same terms. Send in your lists for the first few days of the year so that we can at least *start* a ladder in the February issue.

### Miscellany

G2AUD (Bletchley) writes to say that he heard RA1AB telling a W "the NBFM stations of the USSR cause us a lot of trouble. In two or three weeks I think they will be allowed to operate only between 29 and 29·7 mc." G2AUD's comment—what price "N" BFM?

G3FPK says he heard G4ZU remarking that these Russian signals are "Wrotham" quality if one listens to them on a wide-band FM receiver. What a pity there isn't room on the bands for such modes of transmission! As G3FPK says, "with so many receivers now available, it's a pity that more are not fitted with means of receiving NBFM. After all, many have SSB provision in the form of product detectors—so why not discriminators?"

GW3AHN says he will not enter the WPX Marathon, but hopes to sit back and watch others piling up vast scores. He hopes that some G3M... or G3N... stations will be represented near the top of the ladder.

G2YS, on the other hand, deplores anything which tends to make the Old Timers try to re-work rare DX, which may shut out the "new boys" and QRP types.

G3JSN, now revelling in the joys of QRO (120 watts) after five years with a maximum of 10 watts, agrees with our earlier remarks about contests, and disapproves of these 48-hour affairs. He puts up the suggestion that the occasional contest on two bands only (say 3·5 and 7 mc), with a running time of twelve hours or so, would be interesting.

**Fifth European DX Contest**

The WAE DX Contest for 1960, about which we received pretty short notice, is almost upon us. This year it will be *CW only* and will run for a total of 72 hours over two week-ends. *Times:* January 9, 1100 GMT to January 10, 2300 GMT; January 23, 1100 GMT to January 24, 2300 GMT.

The rules are as last year: exchange a six-figure group comprising RST and the running number of the QSO, starting with 001. Bands, 3·5 to 28 mc. Multiplier for European stations derived from the countries in the ARRL DXCC list, plus W/K 1-Ø; VE 1-8; VK1-8; PY 1-9; CE 1-9; ZL 1-5; ZS 1, 2, 3, 4, 5, 6; VO1, 2; JA 1-Ø; UA9 and Ø.

Log sheets may be obtained from DARC DX-Bureau, Fuchsienweg 51, Berlin-Rudow, Germany, by sending a large self-addressed envelope and two IRC's (five for air mail reply).

Contest logs must be mailed not later than March 31, 1960, to the same address.

And so we sign off from this month's Commentary, and the last for 1959 and the Nineteen-Fifties. May 1960 and the Nineteen-Sixties bring better DX, clearer bands and more enjoyable QSO's to all of us. With this thought in mind, we wish you a Happy New Year and a Happy New Decade!

Thanks again to everyone whose co-operation makes this monthly commentary possible. Correspondents have been more numerous than ever this month, which has necessitated a lot of compression . . . but even if only a few words appear to acknowledge your report, please believe that it *is* none the less appreciated.

Next month's deadline is **first post on Friday, January 15.** This gives you a week longer than usual, but don't forget the date on that account. Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And so, for now, 73, BCNU, and Happy Days in 1960.

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*Stop Press:* Just as this issue was going down, per G2DC we had a couple of hot ones: HC8JU was due to open on Galapagos Is. on December 26, remaining there till January 10 — 14, 21, 28 mc, with SSB phone on 21445 kc. And if you heard or worked HC9JU/MM, that was all right, too.

Also, W5PQA is *en route* ZM7, and expecting to start up by about January 4.

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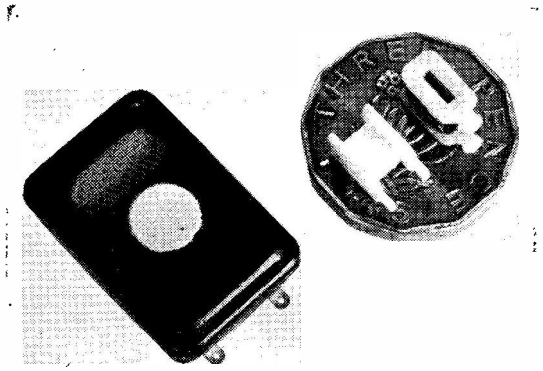
**CARDS IN THE BOX**

Cards are held for the following, for whom we have no forwarding address: G2AOC, G3AWX, G3BOL, G3BRG, G3DSF, G3DSP, G3IJG, G3ML, GM3HWW, and GW3INN. Send a large s.a.e., with name and call-sign, to: BCM/QSL, London, W.C.1. This is the only address for the QSL Bureau we operate, through which we give full both-way service to any direct subscribers who care to use it, and one-way service (clearance of cards in for) all U.K. amateurs, irrespective of whether they are subscribers.

**RETIREMENT OF DR. R. L. SMITH-ROSE**

The Radio Research Station at Slough has, under Dr. R. L. Smith-Rose, C.B.E., D.Sc., its director for many years, earned itself an international reputation for its detailed studies on the propagation of radio waves, while recently the work of the Station has been extended to researches beyond the ionosphere. Dr. Smith-Rose is due to retire in October next, and the Dept. of Scientific & Industrial Research announces that he is to be succeeded by Mr. J. A. Ratcliffe, C.B.E., F.R.S., who is at present head of the Radio Section of the Cavendish Laboratory, Cambridge.



**Miniature self-energising balanced armature type microphones are now being manufactured, designed for use with transistor amplifier units. The coil formers, which are extremely small are injection moulded in a substance called styron polystyrene, produced by British Resin Products, Ltd.**

**A.R.R.L. INTERNATIONAL DX CONTEST**

The phone section of this Contest is over the week-ends February 5-7 and March 4-6. The CW section takes place on February 19-21 and March 18-20. The rules and conditions of entry will be covered in "DX Commentary" in our next issue, as the A.R.R.L. preliminary announcement reached us too late for this one.

**F.O.C. ANNUAL DINNER**

The annual dinner of the First Class Operators' Club was held in London on November 28, with G5LC in the chair and an attendance of 38. The toast of "Overseas Members" was replied to by GM3IAA/VS1AA, VK3ACS and WØFQY. The dinner was such a success that the Aldwych Brasserie has already been booked for 1960.

**PHYSICAL SOCIETY'S EXHIBITION**

The annual exhibition of the Physical Society takes place at the Horticultural Halls, Vincent Square, Westminster, London, S.W.1, during the period January 18-22. It is not open to the general public, admission being members only and by invitation.

**"ALL-BAND CW/PHONE TRANSMITTER"**

**The concluding part of this article by G3CCA will appear in the February issue. The previous parts were in the October, November and December issues.**

# SLOW SCAN TELEVISION

## NOTES ON AN INTERESTING AMATEUR TRANSMITTING SYSTEM

*Communicated by the British Amateur Television Club*

A RECENT announcement by the B.B.C. with reference to the transmission of TV pictures *via* Trans-Atlantic telephone has stimulated considerable interest in this country, and in America, as to the possibility of exploiting similar ideas in amateur circles.

"Slow scan" or "low frequency" television offers an interesting, novel and inexpensive diversion for radio and television amateurs alike. However, the methods at present employed by the B.B.C. require the original live pickup to be transcribed on to motion picture film and then scanned at a rate of approximately one hundredth of the normal speed, the signals being sent by land-line to the receiving end. Here the picture is reconstituted on to film running at a speed in keeping with the transmission, and, after processing, presented at the standard speed *via* the normal B.B.C. transmitting channels.

Before the B.B.C. announced the system that they are now using, some original work had already been done in the U.S.A. and the U.K. on devising a system of recording and transmitting pictures using media available to the radio amateur. Such a system, of course, precluded the use of motion picture film together with the necessary chemical processing. Two systems have appeared in amateur circles almost concurrently. The American system, developed by WA2BCW, using an amplitude modulated sub-carrier system, was demonstrated on the B.A.T.C. Stand at the Amateur Radio Exhibition last November. The other method, which is nearing completion in the U.K., has been developed by G3AST and employs an FM/AM composite system to achieve the same ends.

### Method of Approach

The two philosophies upon which these investigations have been based are somewhat different, in that the American conception required that the system devised should be compatible with an amateur radiophone transmitter and, as an incidental, that it should be possible for the picture information to be transcribed directly on to standard domestic magnetic tape.

As the exchange of picture information from club to club and member to member within the clubs is obviously the most rewarding, the line adopted by G3AST was that, first and foremost, the system should be compatible with direct tape recording, "on the air" transmission of pictures being considered more incidental, and the prerogative of the licensed members.

As a result of these two different philosophies, an entirely different approach has been followed, although it is anticipated that it will be possible to evolve a suitable "reader" which will be compatible with both systems.

### Exhibition Demonstration

As the U.K. system was not sufficiently advanced to demonstrate in time for the Amateur Radio Exhibition, B.A.T.C. members produced a tape reader which worked in conjunction with American tapes. These were flown over from New York especially for demonstration purposes at the Exhibition.

The difference in mains frequencies between the U.S.A. and the U.K. has resulted in some dissimilarity between the two systems. To reduce the possibility of "humbars" it is necessary in both countries that the line oscillator frequency be directly related to the supply mains frequency. This has resulted in a line frequency of 20 c.p.s. (U.S.A.) and 25 c.p.s. (U.K.). The system demonstrated at the Exhibition comprised a 20 c.p.s. line frequency and a 120-line picture, which results in a read-out time of six seconds.

Synchronising pulses for line and frame are positive-going, *i.e.* approximately 30% higher than peak video modulation. Synchronising pulses correspond to bursts of full sub-carrier modulation, and are approximately $1\frac{1}{2}$ milliseconds long for line sync., and 15 milliseconds corresponding to frame sync.

Synchronising pulses in this country are, by convention, negative-going, *i.e.* zero carrier output, and although the equipment on view operated from an "upside-down" format, it is anticipated that later models will be compatible with the "upside-down" American sub-carrier system and the alternative British system now under development.

A wide band FM system is used with a carrier frequency in keeping with the medium employed and deviating the frequency approximately 40% either side of the resting carrier to cover the whole tone range from black to peak white. Synchronising pulses would be of negative polarity and be inserted as periods of "zero frequency" during synchronising. Maximum high frequency deviation would extend to peak white, and therefore the synchronising pulses would follow the British convention of being "blacker than black."

There are a number of advantages in the FM system not enjoyed by the sub-carrier AM technique, in that the whole carrier range is available for synchronising pulses and, in addition, the picture information, which would be sensitive to changes in recording density (on tape), is transmitted at constant amplitude. Changes in recording density would be insignificant when compared with the amplitude of the synchronising pulses.

The picture aspect ratio adopted by WA2BCW is 1:1; however, the British format is likely to follow the more conventional 4:3 ratio.

### Sub-Carrier Modulation

During the transmission of a picture using slow-scan technique, it is necessary to have a response in the "video" channel down to DC. It is for this reason that a sub-carrier is necessary. The American system, employing a 2 kc sub-carrier, requires that

the output from the PEC or other photo-sensitive device be modulated or chopped at a sub-carrier frequency.

A special device is now available in America for this purpose but, as it is not generally available in this country, it would be necessary to resort to a ring bridge modulator. This alone involves a number of stability problems. Some work is in hand in this country to investigate the possibility of chopping the electron beam at the scanning tube rather than resort to chopping at a later stage.

Using an FM system, it is still necessary to chop the electron beam of the cathode ray tube in order to preserve a response in the video amplifier down to DC. The output is full wave rectified at a high level (10 to 20 volts) and then fed, after processing, into a converter using the wide-band FM system.

**Signal Detection**

Detection of the two systems would obviously be quite dissimilar, for whereas the sub-carrier AM system merely requires rectification (preferably full-wave), the FM system has to be fed to a counter discriminator. It has been proved, however, that quite simple discriminator circuits can yield satisfactory results.

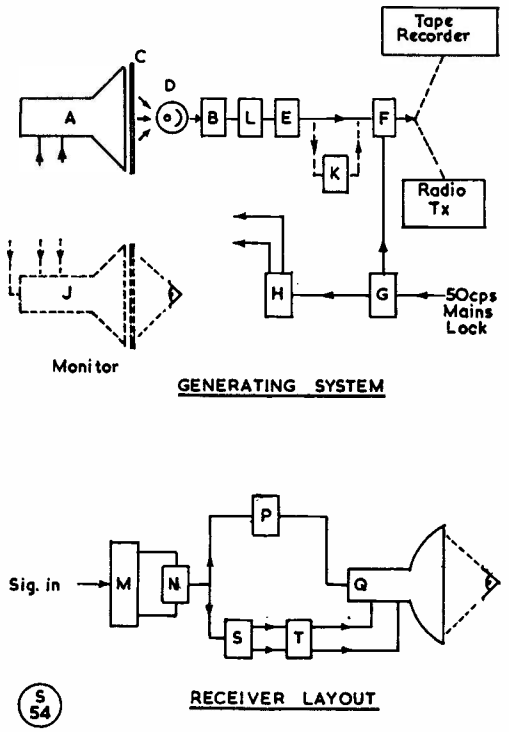
**Outline of System Demonstrated**

The main elements of the American system are defined in the block diagram.

*Transmitter:* A slow-scan raster, using a phosphor of short persistence, is developed by the cathode ray tube (A). The intensity of the light impinging upon the photo-electric device (D) varies in amplitude in sympathy with the density of the transparency (C) placed on the face of the cathode ray tube. Output from the cell (D) is amplified in the DC pre-amplifier (B), and, after modulation (L), is fed to the main video amplifier (E). After insertion of the synchronising pulses at (F), the output from the video amplifier is fed to a domestic tape recorder or an amateur transmitter. The line and frame synchronising pulses generated in the pulse unit (G) are used to trigger the scanner cathode ray tube time bases (H) and are also inserted into the carrier envelope at the video sync. mixer, as described above. Closed circuit tests can, of course, be carried out using a second cathode ray tube with a long persistence phosphor connected in tandem with the scanning cathode ray tube. This is shown as item (J) on the block diagram.

Using the British system, it would be necessary to de-modulate the chopped video signal coming out at (E) and pass it through an AM/FM converter prior to insertion at the sync. mixer (F). The converter unit is shown as (K) and the necessary connections dotted in to indicate their significance.

*Receiver:* Low impedance picture signals from a tape recorder or loudspeaker are fed into a push-pull loudspeaker transformer (M). A DC signal is obtained from the high impedance winding by the push-pull rectifier (N). The rectified signal is fed to (i) a DC amplifier (P), and thence coupled to the cathode ray tube grid (Q), and (ii) the synchronising separator (S) triggering the line and frame time bases (T) coupled to the cathode ray tube deflection coils.




**Block schematic of the slow-scan television system demonstrated by the British Amateur Television Club at the Amateur Radio Exhibition in November. It is based on an American design by WA2BCW, who provided TV tapes which were flown over the Exhibition. In this country, a somewhat similar system, devised by G3AST, is under development.**

## MOBILE MATTERS

### AMATEUR RADIO MOBILE SOCIETY MEETINGS

A meeting of the Amateur Radio Mobile Society will be held on January 30 at the Small Hall, St. Bride Foundation Institute, Bride Lane, Fleet Street, London, E.C.4, commencing at 3.0 p.m. There will be a lecture on a subject of mobile interest, some films, a small exhibition of mobile equipment and the opportunity for general discussion on mobile matters. Refreshments will be provided and G3NMS, the A.R.M.S. station, will be on Top Band to talk-in visitors.

In the spring the first A.R.M.S. Rally of the year is to be held, devised as a test both of radio efficiency and motoring skill, *i.e.* rally driving. The date for this event will be announced later—the site will not be announced at all, as part of the test will involve finding the meeting-place (somewhere between London and Birmingham) by associating information provided beforehand with clues obtainable only over the air from the Rally control station.

Those who may be interested in attending either of these meetings should write to: G. E. Storey, G3HTC, hon. secretary, A.R.M.S., 10 Avon Road, Sunbury-on-Thames, Middlesex, enclosing an s.a.e.

# S W L • • • • • •

**READERS' APPARATUS — MOBILE SWL — OLD TIMERS — DO-IT-YOURSELF — GEOPHYSICAL STATION QSL**

THIS instalment of "SWL" might almost be entitled "Over to You," since it is definitely the listeners' own section, based entirely on details supplied by them. The response to our little questionnaire in November has been far greater than expected, and the results appear in tabulated form on pp.484-485.

No attempt has been made to place them in any sort of order, of merit or otherwise, or lined up with the number of countries heard or verified. (Actually the order is alphabetical, but in two sections—those that arrived early and the rest, which were not so early!)

A bewildering variety of receivers is spread around the shacks of our SWL's. Perusal of the table shows that in this cross-section there are 32 users of surplus receivers (often more than one per station), converted or otherwise; that 21 of those who replied use honest-to-goodness communication receivers; another 21 use converters of one type or another, along with their main receivers; six use broadcast receivers; and only five claim to be using home-built gear. The latter figure surprises us quite a lot.

The diversity in aerial systems is tremendous, with an electrically-rotated Minibeam at one end of the scale and 12-ft. indoor affairs at the other. A surprising number of readers manage to run to two or more aerials, the second one nearly always being a dipole for one band or another.

The most popular of all seems to be our friend the "67-ft. wire," within a foot or so. We wonder just how long some of the "long wires" may be, especially since an amateur on One-Sixty was heard describing his own aerial as a "100-ft. *long* wire." (It is, of course, short for that band.) Perhaps one day we can spare the space for a detailed round-up of some of these rather vague aerial types.

So much for the table; the rest you may extract by perusing it carefully yourself. Meanwhile we quote some of the many comments which could not be included in tabulated form, most of which are worth passing on.

**The Extras**

*M. Nisbet (Croydon)* writes: "As for your section on 'Extras'—you have given a veritable *carte blanche* to junk collectors. If you want gadgets, buy ½-cwt. of electronic scrap for ten bob and your station would hardly be dull." And, on the subject of Clubs, "It has been said that Club members band together in cliques; this is true and only natural—a Club should cater for all tastes so all types of people go, to meet others with similar likes and dislikes . . . the newcomer must go at least four times to the Club of his choice; he will then have time to get to know everyone and really settle down."

*A. Griffiths (Solihull)* is puzzled by the "WA" call-signs heard from the U.S.A. and asks what their significance is. It's simple—two districts, the second and the sixth, have already run right through the W's and right through the K's, so they are on the way through a third lot the WA's. These same two districts use "WV" as their novice prefix instead of the "KN" used by the others—and *see* p.422, "DX Commentary," December issue SHORT WAVE MAGAZINE.

*D. Critchlow (Doncaster)* actually lives in a village called Rossington, which is *below* sea level—he says this rules out the rare DX except on ten metres. (We should have thought Ten might well be the poorest band under those conditions.) His father is busy building a rival to his own gear—a 15-valve double-superhet.

**Mobile SWL**

Previous correspondence on listening mobiles is added to by *B. W. Rous (Canterbury)*, who toured Sussex on his push-bike with a week's equipment and a mobile receiver using miniature valves and a car-radio aerial! Next year he hopes to tour Devon and Cornwall, but the distant target is the R.A.E. and a call-sign.

*P. Waters (Hornchurch)* converted two RF-26 units by re-winding the RF, mixer and oscillator coils *without* the help of a GDO or any other test gear. Results have been excellent, he says, on 21 and 28 mc. As they cost less than £1 each, he thinks this is the quickest way for those with limited means to get on the HF bands efficiently.

**Shorts**

*A. Nielson (Glasgow)* would like to see a table of the countries heard by listeners on each band—also a separate section covering SSB . . . *S. W. C. Harbour (Peterborough)* wants to know if the recently-released No. 10 Crystal Calibrator can be used by SWL's who are aspiring amateurs. They certainly can, with some simple modifications: an article on the subject is on p.490 . . . *M. Reynolds (Nailsea)* wants to see some articles on small and simple aerials—something on the lines of a TV aerial, suitable for loft mounting. We suggest that one line of experiment is the winding of enamelled wire round a length of fat clothes-line—the equivalent of a 67-ft. wire can be produced within a length of 20 feet or less. More about this in a future issue, though. In the meantime, a useful article on this general subject appeared in the April, 1958 issue of the MAGAZINE.

**Another Old-Timer**

*J. W. Bickmore (Silver End, Witham)* has been a listener for 39 years and was personally acquainted with the now almost legendary P. P. Eckersley, who handled the pre-broadcasting transmissions from 2MT at Writtle. He remembers the B.B.C.'s first relay of an American station (he was using a crystal set and LF stage at the time). Since then, J.W.B. has graduated through a seven-valve superhet (a novelty in the early 'thirties!) and practically every type of set you can imagine. Right now he has an R.1155B, R.1155N and R.208.

It is grand to hear that this real Old Timer is at

last aiming at the 1960 R.A.E. and although he thinks it is thirty years too late (which may or may not be true), we wish him luck and many years of happy transmitting to balance half a lifetime of listening!

He has two grouses—the chaps who gabble their call-signs so that they can't be identified, and the long time taken by some firms to answer queries about the apparatus they are trying to sell.

**One From Michigan**

*P. J. Kavaleski* (*Hancock, Mich.*) shows an attractive QSL card from which we gather that SWL means "Sure Will Listen!" He uses a National NC-109 and a Hallicrafters SX-100, and monitors all amateur and broadcast bands. He would very much like to correspond with SWL's in England who are interested in swapping magazines, photographs, QSL cards and tape-recordings. His address is Route 1, Box 188-B, Hancock, Mich.

**SWL Alwyn Richards of Cwmbach, Aberdare, South Wales, has been an active short wave listener since 1956, specialising in 40-metre phone, on which band he has heard 62 countries. His main receiver is a National 81X and aerials are 20- and 40-metre dipoles.**

**Do It Yourself**

*G. T. Fripp* (*Clifton*) wants a home-constructors' receiver, amateur bands only, which has a nice cabinet and generally *looks* good. As he says, a nicely-finished receiver gives people the impression that radio amateurs are not just "hooker-uppers" with wires trailing everywhere. (But are they, or aren't they?)

From the Army Wireless Reserve Amateur Radio Society's news-letter, "*Broadcast,*" we quote the following useful hint: Excellent crystal-controlled converters for 21 or 28 mc can be made from an RF-26 unit by converting the local-oscillator to crystal control and re-winding the RF and mixer grid coils. If the existing 7·5 mc IF is unsuitable, replace the output transformer with an RF choke and a 50 $\mu\mu$F coupling condenser, and use any IF you like.

**Transmitter Turned SWL**

A reversal of the usual chain of events is recorded by *John G. Carlson* (*South Shields*), whose interest in radio goes back to 1921. He heard the first contacts with New Zealand, made by 2OD and 2NM (no official G prefix in those days!) and became G6QC in 1926. In 1936 he turned it in for various reasons, but started again in 1949 as G4WG, but through lack of time he gave up that call in 1952.

Since then he has joined the ranks of SWL's once more, having built a communication-type receiver. SWL Carlson recalls that his very first licence was for the 8-metre band only . . . and that he and G6QT, some five miles distant, worked on 8 metres for a long time—in 1926!

**The Initiation**

What was it that started *you* as a listener to the amateur bands? In the case of *Malcolm Healey* (*Horsham*) the answer was simple—G3GOZ lived two doors away and was frequently heard on the parents' radio. So the SWL-to-be started wondering "Who *are* all these people using a lot of numbers and calling each other 'OM' and talking about R5 and S9 and so on?" A local dealer helped him with some bits and pieces (museum-pieces!) and thence he advanced through the usual stages. He has sent in a photograph and detailed description of his gear, which we haven't space for this time . . . we hope to reproduce it in due course.

*C. N. Rafarel* (*Poole*) has settled down in his new QTH, aerials, poles and all. Reception seems very good, he says, but the aerials have to survive gales that they were never subjected to in Birmingham.

**Ambitious Station**

Although it appears in condensed form in the table, the gear used by *A. Fletcher* (*Stapleford*) is worthy of a detailed description, being somewhat unusual. Up to 30 mc, he uses a Collins 51J-3 and a Hammarlund SP-400-SX. To 100 mc, Hallicrafters S-36A; to 230 mc, a W.E. converter AM-913/TRC. A very selective Collins IF amplifier with a high-precision BFO is used with the SP-400-SX for SSB, and a pre-selector (6J4, 6AH6, 6AH6, 6C4) is available with the 51J-3 and the other receiver. An LM-18 frequency meter is also on the bench, and BC-1031-B or BC-1032-B panoramic adaptors are available for each of the main receivers. The 20 mc dipole mentioned in the table is for satellite reception—sputniks and luniks and such!

[over

**S W L • • • • • •**

*continued*

## SWL STATION DETAILS

| QTH | RECEIVER/s | AERIAL/s | COUNTRIES Logged | COUNTRIES Verified |
|---|---|---|---|---|
| Sidney and Howard Almond (Gatley, Ches.) | AR-88 | Dipole | | 65(P) |
| W. J. Atherfold (Southwick) | R.107, R.208 | Indoor | 90(P) | 29(P) |
| A. Beardsall (Beeston, Notts.) | R.109, 18, RF-24 | 67-ft. wire | 95 | |
| M. Box (Weymouth) | CR-100 | 66-ft., 100-ft. | 46(P) | |
| George Brown (Bishop Auckland) | R.107, R.1355, RF-26, RF-27 | 12-ft. indoor | 198(P) | |
| Malcolm Brown (Banbury, Oxon.) | R.1155B, 19, RF-24's | Long wire and 28 mc dipole | 85(P) | |
| Desmond Critchlow (Doncaster) | 9-valve home-built | 80-ft. | | |
| Goff Curtis (South Harrow) | S.740*, pre-selector, Q-Multiplier, FL8 filter | 70-ft. top with two Windom-type feeders | 273 | 120 |
| Ian Dufour (14) (Banbury, Oxon.) | R.107, R.208, HRO, RF-24's | 65-ft. wire, 21 mc dipole | 89(P) | 51(P) |
| R. Dunkley (Havant, Hants.) | CR-100 | 66-ft. wire | 106(BC) | 76(BC) |
| Peter Day (Sheffield) | 358*, RF-24, RF-26, RF-27, 2-metre Converter | Dipoles for 144, 50, 28, 14 mc, 100-ft. wire | 237<br>220(P) | |
| Brian Edwards (Hereford) | S.750 | 132-ft. wire, and dipole | 222<br>182(P) | 175<br>65(P) |
| S. Foster (London, S.W.19) | CR-100 | 40-ft. wire, 28 mc dipole | 102(P) | 11(P) |
| E. Godfrey (Merstham, Surrey) | 888+ | Minibeam, with electrical rotation | 163(P) | |
| A. L. Gray (Whitefield, Lancs.) | Hallicrafters S.20 | Long wire | 94(P) | 21(P) |
| Alan Griffiths (Solihull) | R.208 | Dipoles, 7, 14, 21, 28 mc | 114<br>111(P) | 7<br>7(P) |
| P. S. Haselgrove (Christchurch, Hants) | R.1116 | 80-ft. wire | 10(P) | |
| Roger Headland (Liverpool, 22) | BC-348Q, Minimitter Converter | 14 mc dipole | 217<br>171(P) | 122<br>60(P) |
| M. M. Herpels (Plymouth) | R.208 | 33-ft. Windom | 25(P) | 17(P) |
| Andrew Hewitt (Reading) | SX-28 | 67-ft. wire | 98(P) | 18(P) |
| Michael Jackson (Blackpool) | R.107, RF-26 | 150-ft. wire, dipole | 93<br>90(P) | |
| W. W. James (Errol, Perth) | National RCD | Long wire, 28 mc vertical dipole | 136(P) | 43(P) |
| Trevor C. Jones (Dudley) | BC-312M | 14 mc folded dipole | 96(P) | |
| S. Kennedy (St. Columb) | R.107, R.208 | 7 and 14 mc dipoles | 96 | 34 |
| A. J. MacRae (Ormskirk) | R.208 | Rotary dipole | 156<br>106(P) | |
| Malcolm Nisbet (Croydon) | CR-100, noise limiter | 40-ft. Windom | 69(P) | 34(P) |
| Brain Otter (Lincoln) | R.208 | 33-ft. dipole | 77<br>62(P) | |
| J. E. S. Paterson (Hatch End, Middx.) | Philco 3741 4-valve battery set | 21-mc dipole | 110(P) | 73(P) |
| Russell B. Pipe (Langford, Essex) | CR-300, Mullard MAS-375, RF25 | 132-ft. wire | 57(P) | |
| John Rabone (Wolverhampton) | BC set and R-Niner | 80-ft. wire | 46<br>42(P) | |
| A. Richards (Aberdare) | NC-81X | 7 and 14 mc dipoles | 131(P) | |
| Geoffrey Shucksmith (Barton-on-Humber) | 1-valve RCS | 50-ft. | 30<br>28(P) | |
| R. M. Tomlin (Gerrards Cross) | R.1155B, R-100 | 50-ft. wire | 105 | |
| Nigel Turner (Northampton) | BC-348, Converter | 132-ft. wire | 12<br>10(P) | |
| M. Whitehurst (Macclesfield) | R.208, O-V-1 | 66-ft. wire | 174(P) | 46(P) |
| John R. Beavon (Birmingham, 14) | R.208; 19 set with clipper/filter | 90-ft. wire, 60-ft. wire | 101(P) | 3(P) |
| Keith Bailey (Norwich) | AR-77E | 300-ft. wire and Z-match | 114<br>100(P) | 9(P) |
| John W. Bluff (Harrow) | 11-valve home-built, RF-24, RF-26 | 67-ft., 32-ft., 50 and 70 mc dipoles | 220(P) | |
| C. Britton (Bordon, Hants.) | R.208 | 40-ft. wire | 149(P) | |
| A. Fletcher (Stapleford) | Collins 51J-3 Hammarlund SP-400-SX. Hallicrafters S-36A. W.E. AM-913/TRC Converter. Pan-adaptors | 100-ft. wire, 20 mc dipole, VHF 2-el. beam | 120(P) | |
| A. Galey (Rothwell, Yorks) | S.840A*, 15-valve Rx, and R-Niner | Dipole for 7, 14, 21, 28; dipole for 3.5 and 1.8 | 213(P) | 3(P) |
| Timothy Garden (Worcester) | R.208, Q-Fiver and R-Niner with Converter | 66-ft. wire, 28 and 21 mc dipoles, 14 mc inverted-L | 127(P) | 19(P) |
| R. W. Howe (London, N.22) | CR-100 and 4-valve portable | 12-ft. whip | 40 | |
| Alan Harlan (Newcastle-upon-Tyne 3) | S.840A*, RF-26, Murphy 192 and 2-valve battery | 60-ft. wire 28 mc dipole | 40 am.<br>100(BC) | 4 am.<br>50(BC) |
| Jack Lippold (London, N.W.2) | S.740*, PCR-2 28 mc Converter | 50-ft. wire | 127(P) | 81(P) |
| R. Marshall (Sale) | S.640*, RF-26, Q-Multiplier | 67-ft. wire | 72(P) | |
| A. W. Nielson (Glasgow) | CR-100/7 | 33-ft. Windom | 188(P) | |
| L. R. Northway (Thatcham, Berks.) | R.1155 and RF-24 | 12-ft. whip | 124(P) | |

* Edison Receiver types

| QTH | RECEIVER/s | AERIAL/s | COUNTRIES Logged | COUNTRIES Verified |
|---|---|---|---|---|
| C. N. Rafarel (Poole) | S.680*, Geloso Converter and 50-200 mc Converter | Long wire & dipoles for 28, 21 and 14 mc | 224(P) | |
| N. Rimmer (Berkeley, Glos.) | Cossor b'cast and RF-26 | 33-ft. folded dipole | 74(P) | |
| B. W. Rous (Canterbury) | CR-100 | 200-ft. wire 14 mc dipole | 109(P) | 44(P) |
| Trevor Shackleton (Sowerby Bridge) | BC-348L and RF-24, SX-25 | 67-ft. wire, 134-ft. wire | 53(P) 10(CW) | 9(P) |
| L. Bramma Smith (London, S.E.27) | 358X * | Indoor dipole | 184(P) | |
| R. Bramma Smith (London, S.E.27) | R.208 | Indoor long wire | 143(P) | |
| Dave Stanton (Rushden) | R.1155A, R.208 and RF-26 | 50-ft. wire and 14 mc dipole | 149(P) | 40(P) |
| S. H. Stephenson (Morden) | HRO | Long wire and folded dipole | 193 | 168 |
| A. W. Tideswell (Stoke-on-Trent) | Hambander and pre-selector | 68-ft. wire and 20-ft. vertical | 193(P) | |
| Peter Waters (Hornchurch) | R.107, RF-26 | 100-ft. wire 14 and 28 mc dipoles | 75(P) | |
| Clive D. Willment (Chalfont St. Giles) | S.680X* and cascode, 2-metre Converter | Long wire 2-metre dipole | 120(P) | |

## QSL From DM3IGY

Quite a few listeners who copy CW have heard "CQ de DM3IGY" on exactly 28000 kc, followed by a request for QSL's and reports. We now have a letter from *S. H. Stephenson* (*Morden*), who sent a QSL and received a long letter in reply. All reports, however brief, are welcomed, but of course to be of real value they should cover longer periods, giving details at intervals of, say, 15 or 30 minutes. "Failure reports" are also valuable—that is to say details of times at which the station is inaudible. Collaborating amateurs are promised a full report on the analysed results. Address for QSL's: Geophysikalisches Observatorium, Collm, near Oschatz (Saxony), East Germany. The operator is DM2AIM.

In conclusion, we should like to wish all our SWL readers a Happy New Year, with the best of listening during 1960. We suggest that they all start logging, from now on, every *prefix* that they hear, as opposed to countries (meaning that G2, G3, G4 and so on are all different, as are W2, K2, WA2, WV2, although all in the same area). In the next instalment we will introduce them to "WPX" and its SWL equivalent "HPX." Meanwhile—just log them all, with time, band and full callsign.

All letters for the March instalment of "SWL" must be in our hands by **Friday, January 29,** addressed c/o The Editor, SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1.

## SOUTH TRINIDAD AMATEUR RADIO SOCIETY

We are asked to announce that the VP4's, with a total of 22 members, have formed themselves into the South Trinidad A.R.S., the Hq. address being c/o K. Robertson, 70 St. James Street, San Fernando, Trinidad, B.W.I. VP4LP and VP4LQ have been working U.K. stations on 40-metre phone, and there is activity on all HF bands. DX contacts are usually difficult, due to the high level of QRM from W stations.

## PRIZES FOR HOME CONSTRUCTION

**We are giving three cheques of £25 each for the best photographs received by April 15 next of an entirely home-constructed U.K. amateur band transmitting station — to include receiver, transmitter, power supply, aerial system and frequency meter.**

**— Entries are to include full descriptive notes and circuitry, with a record of DX worked on any two of the HF bands 7 - 28 mc.**

**— The three prizes will be awarded in the following categories:**

**(*a*) For a station running the full 150 watts input,**

**(*b*) For a station running not more than 75 watts,**

**(*c*) For a station running 25 watts or less.**

**— Within these three power categories, all stations entered must be capable of working both CW and Phone on at least two of the HF bands 7, 14, 21 and 28 mc.**

**— Except at the discretion of the judges, modified surplus does not count as "home construction." However, any parts from surplus equipment can be incorporated, and the discretion of the judges will be exercised as to how far surplus equipment has been used. Kit construction is excluded.**

**— All apparatus shown in the photograph(s) must have been constructed by the entrant, any published design used being quoted.**

**— The record of DX worked will not be taken as a deciding factor in making awards, which will be strictly for the best entirely home-built station in the three power categories.**

**— Final decisions will rest with The Editor, and it is a condition of entry that all material sent in for the competition shall also be offered for normal publication at The Editor's discretion. Any such material published will be paid for in the usual way.**

**All entries must be clearly marked "Home Built Station Competition" on the envelope and on each sheet of manuscript, with name and call-sign and category entered. Entries are to be addressed to: The Editor, SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1, to arrive by April 15, 1960.**

# VHF BANDS

A. J. DEVON

**Aurora Opening, December 5—**
**Conditions Generally Poor—**
**Station Reports and News—**
**Tabular Matter Up-to-Date—**

JUDGING from the correspondence, there seems to have been more than a suspicion that A.J.D. was dodging the column last month, or taking an easy, or having some unearned leave—or something. The truth is far different. We were heavily pressed for time and space and, due to a combination of circumstances which would take too long to explain here, it was found necessary to drop "VHF Bands" for the December issue—in any event, there was not a great deal to report. While it is gratifying to know that the feature was missed, your A.J.D. offers his apologies to those who may have been disappointed.

It cannot be said that the level of mail is very heavy for this month, either—we are in the winter doldrums, though there have been some interesting openings of short duration with, on December 5, a good Aurora manifestation, lasting from about 1500 or so until late in the evening, certainly up to 2000. Activity was very low, but the following are known to have been on: G2CIW, G3BLP, G3JAM, G8VZ, GI3GXP, GI5AJ, GM2FHH, GM2FXN, GM3HLH/A, GM4HR and PAØEZ. According to G3JAM (Woodford, Essex), who worked GI3GXP and all four GM's between 1600 and 1700, the beam heading varied from 023° to 030° with the usual Aurora characteristic on the note. GM2FHH (Aberdeen) was the outstanding signal, but he put out many fruitless calls, as the activity was so low.

With the possible exception of the week-end of November 22, at no other time during the period have GDX conditions been in any way exceptional, though, as already mentioned, there have been short openings, coinciding always with a rapid increase in barometric pressure.

There is nothing to be derived from the barograph trace for the week ending December 6; it was mainly very low, with an almost regular undulation. G3JAM says that he noticed peculiar conditions on Top Band on the previous night, and it was this, as much as anything, that brought him on two metres the following evening in time to catch the Aurora.

The presence of Aurora can often be deduced from the behaviour of TV and Band II FM signals, especially if one is in a low-signal area; it is usually not detectable where the signal level is high and steady, as naturally indirect reception effects tend to be masked in such areas.

### VHFCC Elections

There have been a number of claims since November, and we are glad to be able to confirm the following: R. E. Short, G3GNR (Amersham), VHFCC Certificate No. 255. Certificate No. 256 goes to J. D. Heys, G3BDQ (St. Leonards), whose 100 cards included 51 from EU's and 49 from U.K. stations, 10 countries being represented, including LX, OZ and SM. G3BDQ started on two metres in June '58, and had to work 160 stations to get his 100 QSL's.

J. B. Kay, G3CO (Dartford), gets Certificate No. 257; though eleven countries have been worked, cards are held from only seven. G3CO gets the "phone-only" endorsement on his Certificate—but remarks that a CW endorsement would probably be of greater rarity value! He started on two metres exactly three years ago, and his first 100 stations were worked by June '57, but it took until April '59 to collect the first 100 QSL's, by which time 220 stations had been worked.

VHFCC Certificate No. 258 is awarded to M. A. Lube, DJ1EH (Essen), who sent a nice selection of cards covering DJ/DL, G, ON and PA. Another European claim is that from R. Teyrowsky, OE8RT (Klagenfurt), who gets No. 259; his selection of QSL's included 16 DJ/DL, three HA's, 35 I's, 19 OE's, six OK's, and 29 YU's; the number of Italian and Yugo-Slav stations is particularly interesting. Lastly, for this time, W. C. King, G3FRF (London, S.W.9), is awarded VHFCC Certificate No. 260, he having received 102 cards from 106 stations QSL'd—which is much better than the average return.

### TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1959

Starting Figure, 14

*From Home QTH Only*

| Worked | Station |
|---|---|
| 42 | G5MA |
| 39 | G3HBW |
| 34 | G3JWQ, G3KPT |
| 30 | G5ML |
| 29 | G2CIW |
| 26 | GW3ATM |
| 22 | G3AYC, G3GSO |
| 19 | G3HWR, GW3MFY |
| 18 | G3CO, G3ICO |
| 14 | G3DLU, G3IOE |

*This Annual Counties Worked Table opened on September 1st, 1959, and will run till August 31st, 1960. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. The first claim should be a list of counties with the stations worked for them. The list can be added to as additional counties accrue.*

### Points from Letters

G2CIW (Birmingham) says he didn't "discover the Aurora" until 1930 on December 5, which only gave him half-an-hour or so of it, but he worked GM2FHH for a new one with "an amazing S8 signal," and heard the two GI's who were on. G3GSO (Derby) worked three more counties for the Annual, but says activity has been very low; he is now using a new converter which runs 6AM4 pre-amp, ECC84 cascode, EF54 mixer in the earthed anode configuration, and an EC52 osc. with stabilised HT, the IF being 8 mc; this arrangement is giving good results and is quieter than the old one.

G4LX, at a new QTH in Newcastle, says he will not be active again for some time, and puts in his last claim for the Tables for the time being—he is now at 9C in Countries. G3CO (Dartford) likewise puts in claims which have been taken into the tabular matter herewith.

G2RY (Bridport) suggests that, in order to produce activity, people should call CQ on various beam headings during the first quarter of whatever hour they can be on—this would save listening time, enabling one to "get on with constructional work, reading the *Magazine* and household chores" during the other 45 minutes. G2RY remarks that, as a backwoodsman, he would prefer this regular quarter-hour calling procedure to be on CW—he already hears too many weak and unresolvable phone carriers.

G2RY wonders if this regular quarter-hour calling idea of his is worthy of consideration—we think it is, and would recommend its adoption forthwith.

G5MA (Great Bookham, Sy.) mentions an interesting QSO with GW3LJP in Llandrindod Wells, and thinks it is probably the first-ever VHF contact between Surrey and Radnorshire from home stations; Bob has, of course, worked GW/P from Radnorshire often, as have others.

Another to report packing up on VHF for the winter is G4JJ (Barnsley), who will be on again at Easter with the /A call—in the meantime, he gets up-to-date in Counties, with 28C worked for the All-Time. G3KPT (West Bromwich) moves in all the Tables shown this time. G3JAM (Woodford, Essex) reports two contacts with GW3MFY—the first one being 219/439 and the second 549/569. G3JAM discusses a number of purely technical points, including some desirable modifications for the CR-100 to improve its performance as an IF/AF amplifier following a converter; these will be dealt with on a future occasion. He remarks that G3KMP (Hastings) is always receivable in Woodford, unlike G3BDQ, who can only be heard when conditions are right.

Through G3NOF, we have a report that UR2BU, Tartu, Estonia—and *see* p.423, December—is now calling and listening west during 1800-2100 on the first Tuesday each month, his freq. being 144·18 mc, CW. It will probably not be until towards the spring that we shall again have the conditions to make a U.K. contact even a possibility—unless one of those Tuesdays happens to be an Aurora night.

### Doings at Jodrell Bank

After some enquiry, we have been able to establish that the frequency used on the Telescope for the successful Venus echo test was 408 mc—at the time, the distance of Venus from the earth was 30 million miles, giving a total path-time for the echo of about 5½ minutes. Apart from their purely radio interest, investigations of this sort are of great importance in establishing certain

## TWO METRES

**COUNTRIES WORKED**

**Starting Figure, 8**

| | |
|---|---|
| 18 | G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, OK, ON, OZ, PA, SM, SP) |
| 17 | ON4BZ, (DL, EI, F, G, GC, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, SP, 9S4) |
| 17 | G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, LX, ON, OZ, PA, SM, SP) |
| 16 | G3CCH, G3GHO, G3HBW, G5MA |
| 15 | G2XV, G3FZL, G4MW, G6XM |
| 14 | G2FJR, G2HDZ, G3AYC, G3FAN, G3HAZ, G3IOO, G3JWQ, G3KEQ, G3WS, *G5BD*, G6LI, G8OU |
| 13 | G3BLP, G3DMU, G3DVK, *G3GPT*, G3KPT, G5DS G6XX, GM3EGW, PA0FB |
| 12 | EI2W, F8MX, G2HIF, G3GFD, G3GHI, G3WW, G5CP, G5ML, G6RH, G8VZ |
| 11 | G2AJ, G2CIW, G2CZS, G3ABA, G3CO, G3JZN, *G3KUH*, G3LHA, G4RO, G4SA, G5UD |
| 10 | G2AHP, G2FQP, G2HOP, G3BDQ, G3BK, G3BNC, G3DLU, G3EHY, G3GSE, G3GSO, G3JAM, G3KQF, G3MED, G5MR, G8IC, GW5MQ |
| 9 | G2DVD, G2FCL, G3DKF, G3FIJ, G3FUR, G3IUD, G4LX, G8DR, G8GP, GC3EBK, GM3DIQ |
| 8 | G2DDD, G2XC, G3AEP, G3AGS, G3BOC, G3EKX, G3GBO, G3HCU, G3HWJ, G3KHA, G3MPS, G3VM, G5BM, G5BY, G8SB, GC2FZC, GW3ATM |

## SEVENTY CENTIMETRES

**ALL-TIME COUNTIES WORKED**

**Starting Figure, 4**

| Worked | Station |
|---|---|
| 32 | G2XV |
| 27 | G3HBW, G3JWQ, G3KEQ, G5YV |
| 26 | G6NF, GW2ADZ |
| 23 | G3BKQ, G6NB |
| 20 | G3HAZ |
| 19 | G2CIW |
| 18 | G3IOO |
| 16 | G2CIW*, G3LHA, G3MED |
| 15 | G4RO |
| 14 | G2DDD, G2HDZ, G3FAN, G3KPT |
| 13 | G3MPS |
| 12 | *G5BD* |
| 10 | G2OI, G3AYC, G3IRW |
| 9 | G5DS |
| 7 | G2HDY, G3JHM, G3LTF |
| 6 | G3JMA, G3KHA, G3WW |
| 5 | G3FUL, G3IRA, G3IUD, G5ML |
| 4 | G3JGY |

***On working four Counties or more on the 70-Centimetre band, a list showing stations and counties should be sent in for this Table, and thereafter new counties worked notified as they accrue***

* New QTH

## TWO METRES

### ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14

From Fixed QTH Only

| Worked | Station |
|---|---|
| 78 | G5YV (787) |
| 76 | G3CCH |
| 73 | E12W |
| 76 | G6NB |
| 70 | G5MA, G6XM |
| 68 | G3BW, G3GHO |
| 66 | G3HBW, G3IUD (302), G3KEQ, *G5BD* |
| 64 | G3BLP |
| 63 | G2FJR (542) |
| 62 | G3FAN (760) |
| 61 | GM3EGW (232) |
| 60 | G2OI (402), G3DMU |
| 59 | G3EHY, G4SA |
| 58 | G3IOO, G8OU |
| 57 | G8SB, G3HAZ (535) |
| 56 | G3WW (770), G5DS (654) |
| 55 | G2HDZ (495), G2HIF, G5BM, GW5MQ |
| 54 | G8VZ |
| 53 | G2AJ (519), G3JWQ (461), G3LHA (387), G4CI |
| 52 | G2NH, G3FZL, G6RH, G6XX, GW2ADZ |
| 51 | G5ML |
| 50 | G3ABA, G3GSE (518) |
| 48 | G3FIH, G6IA (487) |
| 47 | G2CIW (282)*, G3DKF, G5WP |
| 46 | G4HT (476), G5BY, *G6YU* |
| 45 | G2AHP (647), G2DVD (362), G2XC, G3BJQ, G3GFD, G5JU |
| 44 | G3BK, G3DVK (282), G8DA |
| 43 | G2DDD, G2FCL (322), G3BA, G3COJ, G3DLU*, G3HWJ, G3KHA (262), *G3KUH*, G3WS, G4RO, G5DF |
| 42 | G2HOP, G3BNC, G3IER, G3KPT*, G6CI (220) |
| 41 | G2CIW (138)*, G2CZS (282), G2FQP, G3DO |
| 40 | G3CGQ, G5MR (366), G8KL |
| 39 | G2IQ, G3GBO (434), G3LTF, G3VM, G8IL (325) |
| 38 | G3APY, G3CKQ, G3HTY, G3KQF, G8VN (190) |
| 37 | G3FNW, G2FZU (180), G3DLU, G3MAX, GC3EBK (260) |

fundamental astronomical measurements. And it has now been found that the travel of radio waves through the regions beyond the ionosphere, *viz.* the Van Allen Belt, is affected by scintillation, in much the same way as the visible stars twinkle. All very astonishing, and full of problems for the radio astronomer.

It seems likely that in future Jodrell Bank will not be used for the observation of such comparatively local radio sources as satellites or moon rockets, as there are now several smaller radio telescopes, in being or projected, which are just as suitable for that particular purpose. A new one is in hand for the Radio Research Station at Slough.

| Worked | Station |
|---|---|
| 36 | G2DCI (155), G3CXD, G3DLU*, G3IIT, G6CB (312), G8IP |
| 35 | G3AYC, G3FYY (235), G3GSO (266), G3HCU (224), G4LX |
| 34 | G3AEP, G8IC, GM3DIQ |
| 33 | G3CO (303), G3FUR, G3HHY (125), G8DR (287) |
| 32 | G3HIL, G8QY, G8VR, GC2FZC |
| 31 | G3HXQ, G3KPT (180), G5RP |
| 30 | G2AHY, G3FRY, G3GOP (208), G3GVF (129), G3JAM (236), G3IRA, G3KEF (110), G5NF, GW8UH |
| 29 | G3AGS, G3AKU, G3FIJ (194), G3IOE |
| 28 | G3ICO, G3ITF, G4JJ/A, G8DL, GM3BDA, GW3ATM |
| 27 | G3CVO (231), G3DAH, G3ISA (160), G3LTF/A, G6GR, G13GQB, GW3GWA, GW3MFY |
| 26 | G2BRR, G3CFR (125), G3MED, G3SM (211), G3YH, G4MR (189) |
| 25 | G3JHM, G3JMA, G3JXN (220), G3MPS, G5SK, G6PJ |
| 24 | G3FD, G3FEX (226), G3FXG, G3FXR |
| 23 | G3CWW (260), G3HSD, G5PY |
| 22 | G2DRA, G3AGR (135), G3ASG (150), G3BPM, G3HWR, G5AM, G8NM |
| 21 | G2AOL (110), G3BDQ, G3DVQ, G3IWJ, G6XY |
| 20 | G3EYV |
| 19 | G2HDR, G3GCX, G5LQ (176) |
| 18 | G3DBP, G3JGY, GC2CNC |
| 17 | G3EGG |
| 16 | G3FRE, G3MLS |
| 15 | G3IWA |
| 14 | G2DHV, G3CYY |

***Note: Figures in brackets after call are number of different stations worked on Two Metres. Starting figure for this classification, 100 stations worked. QSL cards are not required to verify for entry into this Table. On working 14C or more, a list showing stations and counties should be sent, and thereafter added to as more counties accrue.***

* New QTH

It seems likely that in future Jodrell Bank will not be used for the observation of such comparatively local radio sources as satellites or moon rockets, as there are now several smaller radio telescopes, in being or projected, which are just as suitable for that particular purpose. A new one is in hand for the Radio Research Station at Slough.

### London VHF Dinner

We are asked to announce that the London VHF Group's annual dinner will be held on Saturday, February 13, at the Bedford Corner Hotel, Tottenham Court Road, London, W.1, to which all VHF enthusiasts are invited. The time is 7.0 for 7.30 p.m., and tickets are 12s. 6d., obtainable from P. A. Thorogood, G4KD, 35 Gibbs Green, Edgware, Middlesex—who would appreciate early booking.

### The Tabular Matter

This is complete with all claims to date—but there are probably a lot of gaps that need filling. In particular, we would like to have more claims, from the newer stations especially, for Annual Counties, as this table is in one sense a record of the year's work.

And if we get sufficient lists, we would like to run Calls Heard more regularly; while we have been assailed for not publishing the Two-Metre Activity Report, the fact of the matter is very few lists have been received.

### Dead-Line

It must be **Wednesday, January 20,** for the February issue, with everything VHF addressed to: A. J. Devon, "VHF Bands," *Short Wave Magazine,* 55 Victoria Street, London, S.W.1. And, needless to say, a Very Happy New Year to all who follow this piece, with your A.J.D.'s thanks to those who were kind enough to remember him with the Season's Greetings. With you again on February 5, all being well.

# IMPROVED CHASSIS FORM

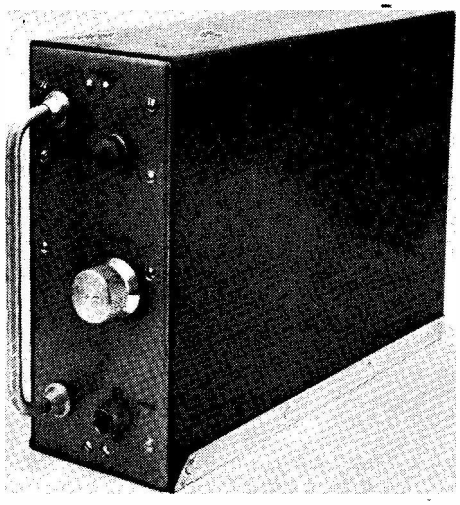
## FOR THOSE WHO LIKE CONSTRUCTIONAL WORK

**H. N. Kirk (G3JDK)**

THE recent articles in SHORT WAVE MAGAZINE on various converters were read with interest, the result being a decision to construct a crystal-controlled job for 21 mc; results of sorts had been obtained with modified RF Units and other odd bits of surplus equipment. These results, whilst being useful and instructive, were felt not to be top-line.

One advantage of the popular RF series of Units was the facility of being able to plug-in the units as required, and it was decided to include this in the new physical design. Circuit details are not given because the constructional idea shown here can be adapted to any favoured circuit—sufficient to say that, electrically, the design shown in the photograph has the usual RF, crystal oscillator and IF stages. When in use, the unit is rock-steady on frequency and even considerable physical shock fails to affect its stability or performance.

The converter is constructed on an aluminium chassis measuring 8in. x 2½in., the rear apron carrying the IF output socket and power supply plug. In use, the unit fits into a case attached to the side of a BC-348—pushing the unit home connects both plugs automatically. The crystal oscillator section is contained in, and completely screened by, a small rectangular can—in this case a dust cover from a rotary switch, but any small can with a close-fitting lid would do. The RF amplifier circuit is also built into a can—the aerial peaking condenser and co-axial input plug fit through into this can *via* the front panel.

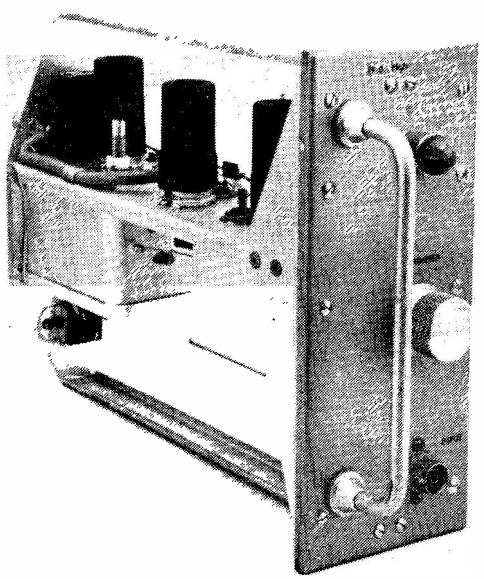


**Finished appearance of the very neat 21 mc converter designed and constructed by G3JDK. This general form of construction — see text and another photograph — can be applied to many items of amateur equipment.**

The IF output coil is contained in the small TV type IF can, in this case the circuit not needing to be screened.

It will be seen that great use has been made of small low-loss feed through insulators, a feature that enabled the writer to make direct connections for RF, HT and heater lines, and incidentally provided readily accessible test points.

A dial light and a TU type handle completed the job, which is pleasing to look at and efficient in use—and more, it is so different from the stereotyped box chassis that brands most constructed gear as "home-made." The amount of aluminium used is small and the construction is simple—in fact the only trouble you may have after constructing a unit on these lines is convincing people that you haven't bought it!



**Construction of a converter unit — this one happens to be for the 21 mc amateur band — on the lines discussed by G3JDK. The tuned circuits associated with the RF and oscillator sections are mounted beneath their respective valve-holders, in screening containers. Construction is from ordinary sheet aluminium, bent up to the required shape and dimensions.**

### LECTURE COURSE — "SERVO CONTROL SYSTEMS"

A course of ten lectures, entitled "Linear and Non-Linear Servo Control Systems," is being given at the South-East London Technical College, Lewisham Way, London, S.E.4, on Wednesday evenings, 7.0 - 9.0 p.m., commencing on January 20. Applications to enrol can be taken any evening, 6.30 - 7.30 p.m. after January 15, at the College. Syllabus and other details from the Head of the Dept. of Electrical Engineering & Applied Physics, at the address given.

# CRYSTAL CALIBRATOR NUMBER TEN

## MODIFICATION AND USE

*From Notes by G3ATL*

THIS very accurate and reliable instrument was designed to work in conjunction with and take its power supplies from the Army 62 Set. It was decided that in view of the low-consumption valves used—1T4, 1R5, 1T4—it should be possible to make the Calibrator work from a battery power supply, so that it would be of use for portable or mobile operation as well as for fixed-station working.

The diagram shows only the essential circuitry involved in the modification, the dotted sections being those that are discarded, as follows:

Having removed the instrument from its case and taken off the knobs to get the chassis away from the front panel, extract RV1 (6 ohms), R19 (22 ohms wire-wound) and R20 (30 ohms w/w) and join the lead from the potentiometer slider direct to the choke L11. Next, disconnect the neon (which is used in the original to produce an LF modulation) and the divider network around V2, which will be found under the neon socket—R3 and R4, both 47000 ohms —and take a lead from L1 direct to the HT line, as shown in the circuit here.

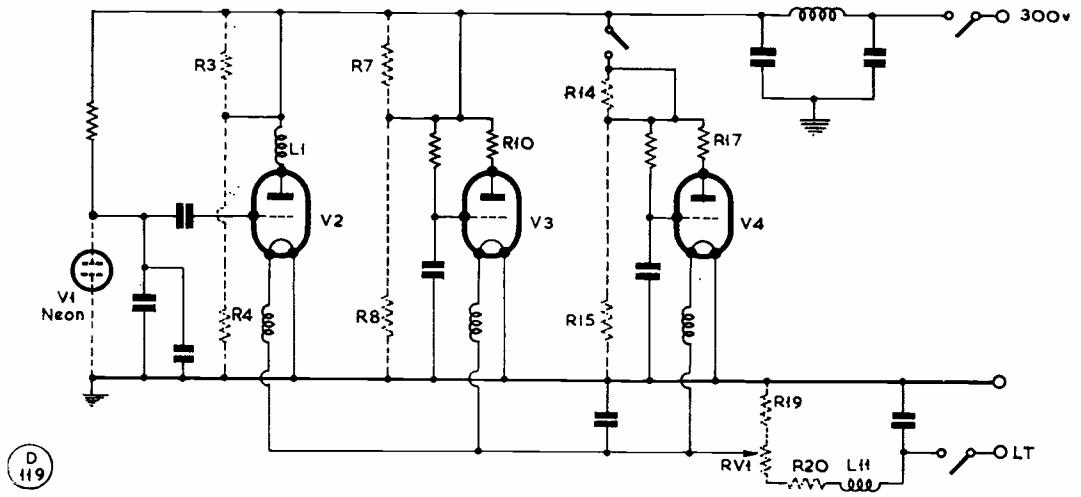
The V3 anode voltage divider network—R7, 47000 ohms and R8, 4700 ohms—is also discarded, and the 1000-ohm anode load resistor R10 connected direct to HT, as indicated. Similarly, R14 (47000 ohms) and R15 (2200 ohms) are taken out and R17 is connected to the switch contact in place of R14. Another desirable change is to remove the existing aerial-earth sockets and replace them by a single coax socket.

### Power Supply

Though the valves have 1½-volt filaments, 3v. must be applied at the LT feed point because there is a 1½-volt drop across the heater chokes. The HT can be from 60 to 90 volts. A suitable composite battery could be used, with an additional 1½-volt section in series for the LT side. These batteries could be held in a container fitted to the back of the cabinet, the leads going through the grommeted hole.

Having reassembled the instrument in its case and fitted a carrying handle or strap, the calibration should be checked against the 500 kc bar which is built in for the purpose.

Accuracies to one kc can be obtained, with beats up to at least 30 mc, making this instrument a first-class buy for anyone requiring an accurate general-coverage frequency meter.




**Skeleton circuit of the Type 10 Crystal Calibrator, with items to be removed shown dotted. This circuit is only to indicate the modifications discussed in the text. The full circuit is given in the manual issued with the Calibrator.**

## COASTAL RADIO SERVICE EXTENSIONS

The Post Office has strengthened the ship-shore radiophone service by the addition of VHF equipment at Humber Radio and Land's End Radio, covering the sea approaches within 40-50 miles of these two stations. The operating frequencies are: Calling channel, 156·8 mc; Traffic channel, 157·35-161·95 mc, as directed by Coast Station.

## PASSING OF A PIONEER

The death is reported of John Binns, aged 75, who is said to have been the first ship's radio operator to make a "real" distress call. This was when he was Marconi operator of the liner *Republic*, in 1909. She was in collision with an Italian ship off the New England coast. John Binns called CQD —it was not even SOS in those days—and help was forthcoming before the *Republic* went down.

# THE OTHER MAN'S STATION

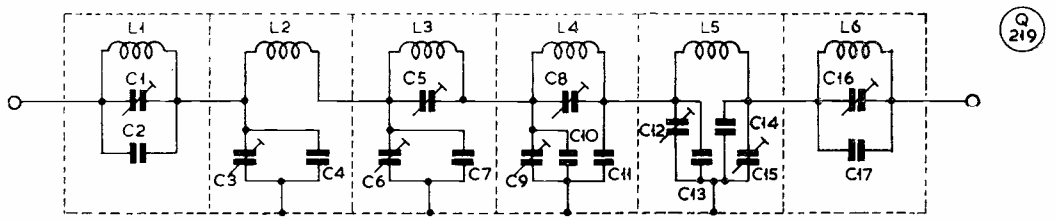
## G2VV

THIS photograph of the station of G2VV—owned and operated by J. N. Roe, Regal Flat, Thames Street, Sunbury-on-Thames, Middlesex—was taken three months ago. But the history of G2VV goes back much further than that—to 1927, when he was first licensed under the AA call of 2BUW, this becoming G2VV two years later. At that time, operation was with a maximum input of 5 watts from batteries; nevertheless, WAC was duly achieved.

To the right in the photograph we see the home-built 120-watt CW transmitter, for 10, 15, 20 metres only; this is band-switched and consists of an EF80 buffer following the Wilcox-Gay VFO, two 5763's as frequency multipliers, and pair of 807's in parallel in the PA, with a 6L6 clamper. At centre is a Collins TCS6 modified for CW/Phone working on 160, 80, 40 metres, the two transmitters thus covering between them all bands from Top to Ten. G2VV uses either a straight key or a Vibroplex semi-automatic. The receiver is an HRO with a modified front end, and on it is the field strength meter and modulation indicator.

Since 1954, all operation, on all bands, has been with what G2VV calls "a bent 68 ft. end-fed aerial," which is only 17 ft. above ground. Nevertheless, some very good DX has been worked on this unpromising arrangement, including four European countries on 160 metres, and many certificates are held.

G2VV, who is an active and experienced operator, will be well remembered as the contributor of several practical articles to SHORT WAVE MAGAZINE.




**This is a low-pass filter of 95 ohms in-and-out impedance with a cut-off at about 30 mc. By using the values given, and screening each section, a similar unit could be constructed as a filter for an amateur-band transmitter operating up to 10 metres.**

## FILTER UNIT DESIGN 12

On p.435 of the December issue of SHORT WAVE MAGAZINE, we mentioned this unit, which is a low-pass filter of 95 ohms impedance with a cut-off of about 30 mc. The details have been supplied by G3IUX, and the circuit is given herewith, together with values. The appropriate official Air Ministry publication is A.P. 56152.

### Table of Values

Circuit of the Design 12 Filter

| | | | |
|---|---|---|---|
| C1, C16 | = 20.2 $\mu\mu$F | C8 | = 9.9 $\mu\mu$F |
| C2, C13, C17 | = 25 $\mu\mu$F | C11 | = 50 $\mu\mu$F |
| C3, C15 | = 19 $\mu\mu$F | C12 | = 13 $\mu\mu$F |
| C4, C7, C10, C14 | = 60 $\mu\mu$F | L1, L6 | = 0.35 $\mu$H |
| C5 | = 15.8 $\mu\mu$F | L2, L4, L5 | = 0.88 $\mu$H |
| C6, C9 | = 24 $\mu\mu$F | L3 | = 0.80 $\mu$H |

# NEW QTH's

**This space is available for the publication of the addresses of all holders of new U.K. callsigns, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section 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.**

**G3HSX,** Amateur Radio Club, R.A.F. Station, Stanbridge, Leighton Buzzard, Beds.

**G3MWL,** W. M. Lane, 45 Church Road, Yatton, nr. Bristol, Somerset.

**G3NJZ,** R. W. Modral, 1 Lady Anne Road, Sherburn, Co. Durham.

**G3NKF,** E. Barker, 55 Aubrey Street, Middlesbrough, Yorkshire.

**G3NKR,** M. A. Rowlands, 21 Hanbury Road, Clifton, Bristol, 8.

**G3NME,** P. G. Turton, 26 Oxford Road, Acocks Green, Birmingham 27. *(Tel.: Acocks Green 0977.)*

**G3NNH,** P. A. Sharp. 62 Dornoch Avenue, Sherwood, Nottingham. Notts.

**G3NOP,** D. J. Peacock. 15 Staff Quarters, H.M.B.I., Hatfield, nr. Doncaster, Yorkshire.

**G3NOT,** D. J. Tanner, c/o W/Os' & Sgts' Mess, Army Apprentice School, Harrogate, Yorkshire.

**G3NOU,** W. S. Dunning, 4 Southland Avenue, West Hartlepool. Co. Durham.

**G3NOY,** H. A. Heath. 12 Hazelton Close, Marlbrook. Bromsgrove, Worcs. *(Tel.: Bromsgrove 3991.)*

**G3NPT,** G. Bell, 10 Grove Hill. Hessle, E. Yorkshire.

**G3NPW,** J. Marsden, 42 Courtwick Road, Littlehampton. Sussex.

**G3NPZ,** T. J. Griffiths, 73a Park Road, New Barnet, Herts. *(Tel.: BAR 4144.)*

**G3NQD,** Mrs. G. L. Western, 118 Salisbury Avenue, Barton, Torquay, S. Devon.

**G3NQL,** R. C. J. Pope, 2 Rosebery Street, Rowbarton, Taunton, Somerset.

**GI3NRF,** R. J. Sloane, 55 Market Street, Omagh, Co. Tyrone.

**G3NRO,** P. Gill, 34 Orchard Drive, Rowcroft Barracks, Ashford, Kent.

**G3NRV,** C. P. Little, Ivy House, Wangford, Beccles, Suffolk.

**G3NSG,** J. Tyas, 2 Craven Street, Barnoldswick, nr. Colne, Lancs.

**G3NSZ,** D. Roberts, 4 Hopfield Road, Moreton, Wirral, Cheshire.

**G3NTD,** A. Marsden, 4 Bader Rise, Mattersey Thorpe, nr. Doncaster, Yorkshire.

**G3NTI,** R. Blain, 1 Mill Bank, Ness, Neston, Wirral, Cheshire.

**G3NTJ,** Blackburn Amateur Radio Club, Corporation Park Hotel, Reridge Road, Blackburn, Lancs.

**G3NTM,** W. T. Brown, 31 Beaufort Road, Kingston-on-Thames, Surrey.

**G3NTT/T,** J. G. Denny, 73 Stone Street, Tunbridge Wells, Kent.

**G3NTU,** P. J. Davis, 45 Broad Street, Bridgtown, Cannock, Staffs.

**G3NTW,** Dr. I. L. Wilkinson, 59 Chawn Hill, Stourbridge, Worcs. *(Tel.: Stourbridge 5628.)*

**G3NUD,** V. L. Butland, 43 Dollis Park, Church End, Finchley, London, N.3. *(Tel.: Finchley 7262.)*

**G3NUG,** E. N. Cheadle, 127 Wise Lane, Mill Hill, London, N.W.7. *(Tel.: MIL 5553.)*

**GI3NUM,** J. S. McKinley, 15 Bachelors Walk, Lisburn, Co. Antrim.

**G3NUN,** A. E. L. Brown, 18 Upper Road, Parkstone, Poole, Dorset.

**G3NUV,** K. L. Bond, 59 High Street, Bushey, Herts. *(Tel.: BUShey Heath 2886.)*

**G3NVH,** R. A. Clement, 85 Green Lane, Coventry, Warks.

**G3NVK,** R. Winters, 64 Victoria Street, Melton Mowbray, Leics.

**G3NVO,** N. Vincent, 103 South Terrace, South Bank, Middlesbrough, Yorkshire.

### *CHANGE OF ADDRESS*

**G2ANB,** R. Brand, 78 Broad Walk, Hockley, Essex.

**G2BLZ,** C. W. Strong, 12 Spring Lane, Ightham, Kent.

**GI2DTB,** R. Graham, Ambleside, Inver, Larne, Co. Antrim.

**G2DTO,** N. Hales, 17 Ashbourne Road, Mitcham, Surrey.

**G3BFP,** J. N. Headland, 13 Tollers Lane, Old Coulsdon, Surrey.

**G3CZY,** P. B. West (ZC4PW), BM/ONLV, London, W.C.1.

**G3DIV,** P. J. Pollard, 2 Hailsham Road, Polegate, Sussex.

**GW3DZL,** I. C. Elias, 123 Cockett Road, Swansea, Glam.

**G3FKH,** D. Roberts, Patstead, Beam Wireless Station, Dorchester, Dorset.

**G3GPE,** K. Smethurst *(ex-GI3GPE)*, c/o Amateur Radio Club, R.A.F. Station, Locking, Weston-super-Mare, Somerset.

**G3HKX,** D. W. Wooderson, 75 Mount Road, Bexleyheath, Kent.

**G3HQI,** K. R. R. Bowden, 71 Lily Hill Road, Bracknell, Berks.

**GW3IEM,** D. M. Lewis, 37 St. Albans Road, Brynmill, Swansea, Glam.

**G3JKU,** J. J. Forbes, 249 Brighton Road, Lancing, Sussex.

**G3KJW,** P. E. W. Allely, 22 Shaw Hall Avenue, Newton, Hyde, Cheshire.

**G3KKW,** W. Willins, 65 Knighton Way Lane, Denham, Uxbridge, Middlesex. *(Tel.: UXB. 6089.)*

**G3LOV,** M. J. Francis, Farmcote, Lipsham Close, Banstead, Surrey. *(Tel.: Vigilant 6495.)*

**G3MKU,** A. F. Bower, 1 Archery Square, Walmer, Deal, Kent.

**G3MXO,** D. V. Walters, 160 Yardley Fields Road, Stechford, Birmingham, 33. *(Tel.: STE 2760.)*

### *CORRECTION*

**G3CQE,** W. M. Brennan, 11 Hammond Way, Norwich, Norfolk. NOR.42.R.

# THE FOURTEENTH MCC

## *The Magazine Top-Band Club Contest*
## *November 14-15 : 21-22, 1959*

ONCE again we are pleased to be able to report a record entry and record scores for this increasingly-popular Contest, which continues to attract more and more Clubs to do battle during the two traditional week-ends in November. This, the Fourteenth MCC, was the liveliest and best of the whole series—a statement endorsed by practically every Club taking part.

Last year we had 50 Clubs participating, of whom 45 sent in their logs on time. This, the 1959 event, saw at least 60 Clubs on the air, and 54 logs were received by the due date.

This large entry, together with the fact that the three-hour periods were made one hour later than in previous years, pushed the scores up to record level, many of them showing an increase of roughly 100 on last year's figures.

**Stourbridge (G3BMY)** scored a resounding victory this time, having previously won the 1956 and 1957 events and scored an equal-second in 1958. Making quite sure of it for 1959, G3BMY emerged with a score of 662 and a clear lead of 54 points over his nearest challenger.

**Aldershot (G3KMO)** scored a well-deserved second and **Harlow (G3ERN)** third, with only seven points between them. **Bailleul (G3IHH),** another veteran of MCC, came just nine points behind Harlow for a hard-fought fourth place.

| | | |
|---|---|---|
| **1st :** | **Stourbridge (G3BMY)** ... ... | **(662)** |
| **2nd :** | **Aldershot (G3KMO)** ... ... ... | **(608)** |
| **3rd :** | **Harlow (G3ERN)** ... ... ... | **(601)** |

Fifth, sixth and seventh came **Gravesend** (G3GRS), **Chester** (G3FNV) and **Surrey** (G3BFP), all old hands at the MCC game and consistently good performers. **Crystal Palace,** who won the event last year from G8GP, did not put in an entry for this contest at all.

The rest of the scores appear in Table I, from which it will be seen that there was a pretty tight pack from second place right down to twenty-eighth. All credit, therefore, to the many Clubs who knew very well that they were unlikely to win, owing to the difficulties under which they worked. These included unfavourable geographical location, poor situation radio-wise, not-so-good aerials, and many other hazards. Whether their final placing be up or down on previous years, they all enjoyed the contest, even if they had to work hard to get where they did.

This year we have not tabulated the "non-Club" contacts separately, since at any rate with the first twelve stations) they made no difference whatever to the placing. With so many active Clubs, the single-pointers made up a very small percentage of the total scores, but served as useful gap-fillers during dull moments. There wasn't much time for one-point QSO's except for the inevitable pre-arranged contacts with local Club members.

Sixty Clubs, at least, are known to have been on the air during the two week-ends. The winner could (theoretically) have worked 59 in each of the four sessions, which would have given a score of 708 points—had each one been available for all four sessions. In actual fact, the winner made 630 points from Club contacts, which implied working an

**For the fourth year running, G3BMY for the Stourbridge and District Amateur Radio Society appears in the MCC first three. And this year, he wins again, with the resounding total of 662 points, more than 50 points ahead of his runner-up G3KMO. Last year, G3BMY was equal-second with Coventry, after having been winner in 1956 and 1957. We must think up a rule to make it more difficult for G3BMY!**

average of 52½ Clubs on each day. Actually, G3BMY worked 50, 54, 55 and 51 in the four sessions.

Single-point QSO's were made to the tune of 32 by G3BMY, 21 by G3KMO, 23 by G3ERN and so on down the scale, averaging something around the 20 mark.

### Comments

Operating was pretty good on the whole, with one or two exceptions that earned acid comments from some of the contestants. Notes were good, too, but not all by any means T9x—there were quite a few T9c's among them. How *do* some people produce those chirps? As always, there was an unnecessary mass of QRM between 1820 and 1860 kc, but the astute operators moved around and found quiet areas on the fringe of the crowd. G3BMY, as in the last few years, had his transmitter VFO ganged with the receiver tuning, and was thus able to be on the right spot all the time with the minimum of fiddling.

The new identification system worked excellently, despite the remarks of a few Jeremiahs who wrote in to tell us that it would be a flop. Non-Club stations were easily identified, and only a small number of them tried to be clever by inventing a serial number starting at 01! There seems to be no need to alter this year's general procedure for future events.

Now a few remarks from competing Clubs, many of whom spared a little time when making up their logs to add some comments. "Good heavy contest QRM, but not so much shipping interference . . . contacts short and snappy" *(Aldershot)*; "More dirty notes evident this vear" *(Bailleul)*; "Numbers in place of names made it more snappy" *(Chester)*; "Occasional pile-ups on a clear frequency when a single CQ was put out . . . others (most of whom we had worked) would follow suit on the same frequency" *(Overstone)*; "If one-pointers give a Club station call, they might at least finish the QSO—not leave us high and dry and waste our time" *(Hastings)*.

"Misunderstanding sometimes caused by using 'BK' without stating which call is being acknowledged" *(Salisbury)*: "Operators quickly gaining

*TABLE I*: POSITIONS AND SCORES

| | CLUB | CALL | POINTS |
|---|---|---|---|
| 1. | Stourbridge | G3BMY | 662 |
| 2. | Aldershot | G3KMO | 608 |
| 3. | Harlow | G3ERN | 601 |
| 4. | Bailleul | G3IHH | 592 |
| 5. | Gravesend | G3GRS | 578 |
| 6. | Chester | G3FNV | 569 |
| 7. | Surrey (Croydon) | G3BFP | 568 |
| 8. | R.A.F. A.R.S. (Locking, Som.) | G8FC | 565 |
| 9. | Sheffield | G4JW | 552 |
| 10. | Coventry | G2ASF | 545 |
| | Overstone | G3KQH | 545 |
| 12. | Wirral | G3CSG | 541 |
| 13. | Hastings | G6HH/A | 536 |
| 14. | Mitcham | G3NFA/A | 524 |
| 15. | Medway | G2FJA | 513 |
| | Salisbury | G3FKF | 513 |
| 17. | Nottingham | G3EKW | 511 |
| 18. | Liverpool | G3AHD/A | 501 |
| 19. | Norwich | G3JGI/A | 498 |
| 20. | Leeds University | G3LUU | 496 |
| 21. | Greenford | G3JVL | 489 |
| 22. | Barnet | G3FFA/A | 487 |
| 23. | Bradford G.S. | G3MHB | 483 |
| | Danbury | G3MWD | 483 |
| 25. | Stevenage | G3ILA | 474 |
| 26. | Grafton | G3AFT | 467 |
| 27. | South Shields | G3DDI | 464 |
| 28. | Clifton | G3GHN | 463 |

| | CLUB | CALL | POINTS |
|---|---|---|---|
| 29. | Wolverhampton | G8TA | 441 |
| 30. | Crawley | G3FRV | 428 |
| 31. | Harrow | G3EFX/A | 426 |
| 32. | Grimsby | G3IYT | 415 |
| 33. | Acton, Brentford and Chiswick | G3IIU | 409 |
| 34. | Edgware | G3ASR | 406 |
| 35. | Thanet | G3DOE | 403 |
| 36. | Stoke-on-Trent | G3GBU | 397 |
| 37. | Rugby | G3BXF | 341 |
| 38. | Harwell (A.E.R.E.) | G3HS/A | 324 |
| 39. | Derby | G3ERD/A | 323 |
| 40. | Leicester | G3LRS | 287 |
| 41. | Hartlepools | G3IDV | 283 |
| 42. | Port Talbot | GW5VX | 269 |
| 43. | East Kent | G3LTY | 268 |
| 44. | Wellingborough | G3KSX/A | 258 |
| 45. | Ainsdale (Lancs.) | G2CUZ | 229 |
| 46. | Blackpool | G3NJN | 216 |
| 47. | Deal | G3KUK | 213 |
| 48. | Wanstead and Woodford | G3BRX | 189 |
| 49. | Ravensbourne | G3HEV | 162 |
| 50. | Preston (Lancs.) | G3KUE | 161 |
| 51. | Exeter | G3JW/A | 155 |
| 52. | Cornish | G2AYQ | 131 |
| 53. | Scunthorpe | G3CCH/A | 126 |
| 54. | Wolverton | G3LCS/A | 111 |

experience and we look forward to next year" *(Leeds University)*; "Thoroughly enjoyed our first Club contest" *(Danbury)*; "Make it Club contacts only in future" *(Stevenage)*; "Too many stations using 'BK' without call-signs, others not bothering to give final 'R'" *(Harwell)*; "We heard and called several Club stations with no results, so the QRM must have been bad in places" *(Port Talbot)*; "It seems that stations can work one another in the heavily-populated areas of the Midlands and North and are not worried about looking further afield" *(Cornish)*.

We are not quoting the Clubs (at least fifty of them) who simply said "Most enjoyable contest, and looking forward to next year," or those (nearly all of them) who wrote "General level of operating excellent"—so take those remarks as read.

**Second in this year's MCC were the Aldershot group, G3KMO, scoring 608 points, and operated by G3IQE (left) and G3KMO. Consistently a steady, well operated signal, they had full BK and used a 270 ft. end-on aerial with a BC-348 receiver.**

## Shorts

A few more remarks, not so much concerned with operating or methods, are worthy of comment. **Wanstead** think that Wanstead Time was different from GMT, as they heard stations still working well after 2000 hrs. (So did the official invigilators—and points were scrubbed accordingly!) Wanstead missed the second Saturday altogether, because of aerial trouble during a storm.

Excellent idea from **Grimsby:** they staged a competition between old-timers and newly-licensed members on an equal time basis per session. The OT's won, but by a narrow margin, and the new-timers gained valuable experience.

**Crawley** thought the number system liable to abuse, as the numbers could be "faked" after the first session. They suggest the use of a running serial number as well!

**Nottingham** had aerial trouble on the 21st, and lost valuable time . . . **Wellingborough** had Tx trouble on the first day . . . **Mitcham** had TVI and BCI trouble but took it in their stride and cured it instead of going QRT.

**R.A.F.A.R.S.** found the first two hours of each day pretty smooth, with contacts flowing at twenty per hour; then the time came to look around for the left-overs. **Surrey** had to pull the aerial down in the dark hours of the 21st, finding it too short. So they used 138 ft. on the first week-end, 130 ft. on the 21st, and 136 ft. on the 22nd!

**Chester** forecast that within the next ten years Clubs will be entering two or more stations with teams of four official operators and loggers and scores of over one thousand (not if we know it, they won't!)

Summing up the various Club comments, the monitoring stations and the judges agree with them all; it was a fairly-run, hard-working contest, with operating skill paying greater dividends than a terrific signal, although the latter did help considerably. It was hard luck on stations right at the perimeter of the activity (G2AYQ, GW5VX and GM3BSQ, for example) that their calls often went unheeded in the tight mass of strong signals from the more central stations. But those who *did* work these weaker stations each session were up among the winners, so there's a moral in that. G2AYQ's log shows that he worked G3BMY in all four sessions, and that tells its own story.

## Statistics

Up among the first fifteen stations, **Chester** made a nice climb from 22nd last year to 6th this time; **Overstone** go up from 29th to 10th; **Mitcham** from 23rd to 14th. Balancing these improvements, we regret to say that there were some equally heavy falls, such as **Salisbury** (7th to 15th); **Clifton** (12th to 28th); **Grafton** (13th to 26th); **Stoke-on-Trent** (14th to 36th); and so on. Of course, many Clubs were operating with different gear, different operators and even from different locations. Then, again, many of them treat it as a method of training their own younger operators, and don't go all-out with the idea of winning—and who can say they are not right?

But with the general pattern this year of increased scoring, those Clubs just mentioned as falling down the list had actually made higher totals than their last year's figure. For instance, **Stoke-on-Trent** were 14th last year with 394; this year they were 36th with 397. **Clifton** bettered last year's score of 414. and turned in 463 on this occasion—but they fell

from 12th to 28th despite that. **Hastings** increased last year's figure by nearly 100 (444 to 536), but came 13th instead of 9th.

### Potted History

For the benefit of the many Club members who think that MCC has become stereotyped by being in its present form from time immemorial, we have prepared a very brief summary of its full fourteen-year history. In fact, the rules did not come to resemble the present set-up until 1953, since when they have remained fundamentally the same, with minor changes only.

The first of the series, in 1946, ran for nine days (November 16-24), but with a limit of 20 hours of operation during those nine days; contacts were allowed with all stations, and a multiplier based on the number of call areas worked was in force. G2YS (Coventry) managed to multiply 209 contacts by six; actually *nine* prefixes were on the air—G, GC, GI, GM, GW, DL, EI, OK and OZ.

The second, in 1947, was on similar lines, but with 30 hours of operation permitted. G2JL (West Cornwall) pulled this one off with 179 contacts and a multiplier of seven; this time no fewer than ten prefixes were available—G, GC, GD, GI, GM, GW, DL, LA, OK and OZ.

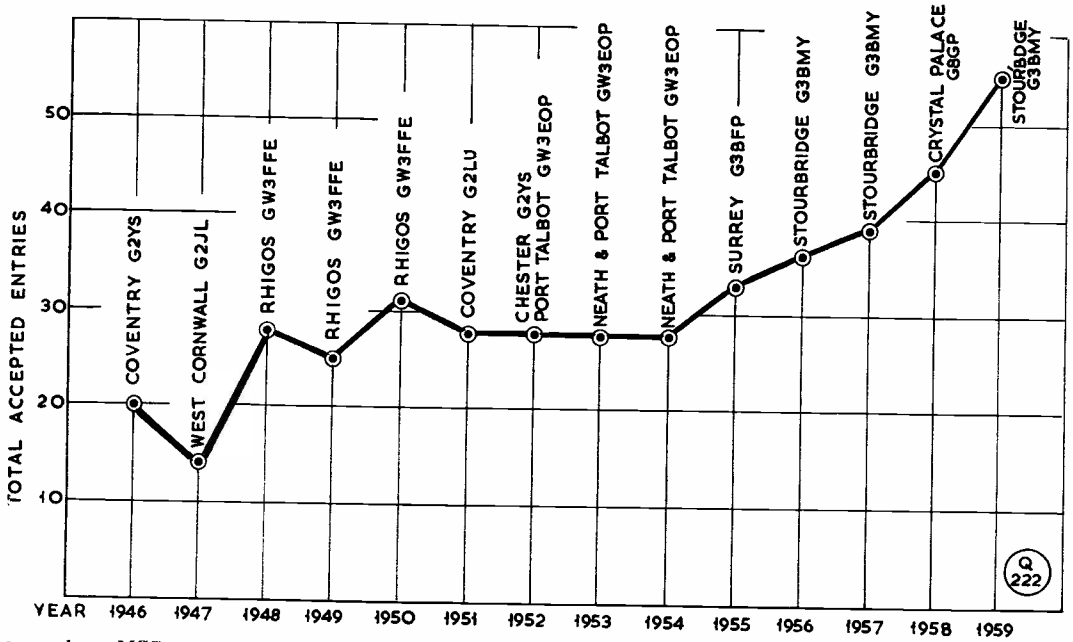
By 1948, it had come to be thought that some of the more remote stations, especially in GC, GI and GM, were finding it too difficult to score points, so it was decreed that a contact outside one's own prefix zone should score *two* points. This made things especially rosy for the GW stations, and GW3FFE (Rhigos) scored a win, working seven prefixes. In 1949, with the rules unchanged, he repeated this victory, with a multiplier of eight; and in 1950 he pulled off the hat trick with a multiplier of eleven! They were G, GC, GD, GI, GM, GW, DL, EI, HA, OK and OZ.

The general feeling by now was that these rules were unduly favourable to the GW stations (but GW3FFE put up a fine show, since with only single

*TABLE II*

**ROLL OF HONOUR : 1946-1959**

| Year | 1st | 2nd | 3rd | Total Entries |
|---|---|---|---|---|
| 1946 | Coventry | Cheltenham | Grafton | 20 |
| 1947 | W. Cornwall | Warrington | Coventry | 14 |
| 1948 | Rhigos | Coventry | Wirral | 28 |
| 1949 | Rhigos | Neath | Coventry | 25 |
| 1950 | Rhigos | Neath | Coventry | 36 |
| 1951 | Coventry | W. Cornwall | Surrey | 28 |
| 1952 | Chester, Neath | — | Clifton | 28 |
| 1953 | Neath | Chester | Surrey, Salisbury | 28 |
| 1954 | Neath | Clifton | Surrey | 28 |
| 1955 | Surrey | Sheffield | Nottingham | 34 |
| 1956 | Stourbridge | Bailleul | Harlow | 36 |
| 1957 | Stourbridge | Coventry | Aldershot | 39 |
| 1958 | Crystal Palace | Coventry, Stourbridge | — | 45 |
| 1959 | Stourbridge | Aldershot | Harlow | 54 |




This curve shows MCC progress over the 13 years since the inception of the "Magazine Club Contest" in 1946. Variations in the rules and the conditions of entry over the years are explained in the text. MCC has always kept up with the times, though it is generally agreed that the rules now meet the views of the majority.

points allowed for his contacts he would still have been very near the top.) However, a change was due, and 1951 saw the first truly Inter-Club affair. Nine days, Club contacts only, and each Club could be worked once per day! G2LU (Coventry) pulled this one off.

In 1952 came the first shortening of the duration, MCC being reduced to eight days between the hours of 1830 and 2230. It gave us a spectacular dead-heat between G2YS (Chester) and GW3EOP (Neath).

The next year, 1953, came into the present shape of things, with four days (two week-ends) and 16 hours of operation (1430-1830). With the present scoring system, Neath (GW3EOP) won this event with 393 points. Next year, 1954, with rules unchanged, they repeated the performance, with a score of 402.

**The last time Harlow appeared in the First Three in MCC was in 1956, and on this occasion they are again in third place, 7 points behind Aldershot and 9 points ahead of Bailleul. Operators were G3LIT (nearest camera), G3JVI (centre) and G3ERN, whose callsign was used.**

In 1955, again with sixteen hours of operation (but now between 1500 and 1900) Surrey (G3BFP) scored 453 and won. But it was felt that even sixteen hours was too long a period, so in 1956, for the first time, they were cut to twelve. Four days, 1600-1900, and Stourbridge (G3BMY) pulled off the winning score of 431.

The 1957 and 1958 contests were run on exactly similar lines, between the same hours, but in 1957 G3BMY had improved his score to 486, and in 1958 Crystal Palace (G8GP) burst into the picture with a massive total of 546.

The current contest, 1959 Model, saw two changes —first, the later hours (1700-2000 instead of 1600-1900) and the use of Club numbers instead of exchange of QRA/QTH. Apart from attracting the record number of entries to date, it naturally also gave us the record score of 662.

From the foregoing it is clear that many experiments have been carried out and innovations tried during the history of MCC—at all times we have attempted to keep the Contest up-to-date and the rules practical—but it is also obvious that the present formula appears to be the successful one, as the steadily-rising entry list since 1954 will also testify. Next year we confidently expect 65 or 70 Clubs to be taking part, and if we receive 60 logs on time we shall be maintaining the present tendency!

### Judges' Remarks

For the benefit of those operators heard "chipping" others about contacts made after time, let it be said that all through the years MCC has always been closely monitored—not so much with the idea of finding fault, but *(a)* To get an impression of how the Contest is going and *(b)* To make sure that any out-of-hours working that might take place carries the penalty of disallowed points. It is the business of the invigilators to check all contacts made or in progress immediately the closing hour strikes. There is no need, therefore, for even polite recrimination over the air about operators apparently trying to squeeze in a quick one! It is all taken down and used in evidence . . .

The logs were extremely well prepared this year, except in one respect . . . a surprising number of Clubs sent in a log (in many cases beautifully typed) without a clue as to their own identity and call-sign! Just the log—no more. This necessitated a certain amount of detective work at the judging end and wasted a few precious minutes each time.

Some people commented that no column had been set aside for the QTH's of non-Club stations . . . but no one said that these were to be shown in the log in any case! They were to be *copied*, certainly, according to the rules, but nothing was said about the necessity of including them in the logs. This *was* indeed a slight oversight — but we have the feeling that such stations will not be included in future contests at all.

Thanks to the following Clubs for perfect typewritten logs which were a pleasure to work on: G3BMY, G3ERN, G3IHH, G3IDV, G3LRS, G3ERD/A, G3BXF, G3IYT, G3FRV, G3JVL, G3LUU, G6HH/A, G2ASF, and G3BFP. Also for beautifully-prepared handwritten efforts from G3KQH, G3NFA/A, G3FKF/A, G3EKW, G3MWD, G3JLA, and G2CUZ. Apart from a very few really bad ones (who shall not be mentioned), all the others were considered good—those selected for mention were outstanding.

In addition to the stations listed in Table I, Clubs known to have been taking part included G2BOF,

G2FPR, G3MCD/A, G3MSZ and GM3BSQ. A log was received from Cheltenham, G3GPW, too late for inclusion in the table. Their claimed score of 468 (unchecked) would have put them in 26th place.

Thanks, once again, to all competing Clubs who made this MCC such a successful event. Most of them will be with us again, no doubt, in the next Contest, for which we predict an even bigger entry and even fiercer rivalry.

Club Secretaries please note that the deadline for their next Activity Reports is **Friday, January 15.** Address them to "Club Secretary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Meanwhile, a Happy New Year to all secretaries, officers and members—may your own Club flourish during 1960.

## CALL BOOK PUBLICATION CHANGE

The *Radio Amateur Call Book*, published from Chicago and now in its 38th year, has always been the only directory to the call-sign/addresses of the radio amateurs of the world. As such, it has now reached monumental proportions — more than 730 pages and a weight of over 2 lbs.—in spite of being printed three columns to a page on thin paper. Like the London Telephone Directory, it has had to be divided to make it more manageable. The Chicago publishers have therefore decided to make the *Call Book* a two-part publication. One section will be U.S.A. only, and the other section the rest of the world outside the United States. The American-only will appear quarterly — winter, spring, summer and autumn ("fall")—and the Foreign (or non-American) section half-yearly, in March and September, to coincide with the spring and autumn issues of the American section. Therefore, the full or all-world edition, combining the two sections, will only be available (in two separate volumes) twice a year. The cost of the American-only section will be 41s. 6d. and of the Foreign-only section 25s. Our price for the two together—available in the spring and autumn —will be 60s. post free. The U.K. call-sign/address listings will, of course, appear in the 25s. Foreign-only section, together with the listings for all other countries of the world outside the United States. We are responsible for the compilation of the U.K. listings in the *Radio Amateur Call Book* and, as they will be appearing half-yearly, they will be right up-to-date at the time of publication.

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