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# *The* SHORT WAVE *Magazine*

VOL. XI

OCTOBER, 1953

NUMBER 8



WORLD WIDE COMMUNICATION

# H. WHITAKER G3SJ

10 YORKSHIRE STREET, BURNLEY Phone 4924

**CRYSTALS.** 1000 Kc. Bliley, Valpey or Somerset, standard  $\frac{3}{8}$  in. pin spacing, 20/-. 1000 Kc octal based for B.C.221, 30/-. Top band, to your own specified freq.,  $\frac{3}{8}$  in. British or  $\frac{3}{8}$  in. U.S.A. fitting, 20/-. Top band U.S.A., 3 pin (Collins), 22/6. Top band, your old crystals re-ground and etched to the new allocation 1800/2000 Kc at approximately 7/6 per crystal. New frequency allocation for light craft and coastal services, all frequencies available, 2104/2527 Kc including distress freq. 2182 Kc,  $\frac{3}{8}$  in. British, 20/-. ditto 3 pin U.S.A., 22/6. Also available in Ft. 243  $\frac{3}{8}$  in. pin spacing to special order only at 17/6.

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with geared drive Radio Cond. Corps, 4/-, 3 gang BC453 complete with all gearing new and boxed 5/6. Radio Condenser Corps. 3 gang .0005 with osc. section (465 kc. IF) ceramic insulation 5/-. Eddystone TX type 26 pf. 1,000v. 60 pf. 1,000v. can be ganged, 2/6, 24/- per doz. 50 pf. 1,000v. with 3 in. spindles, 3/-, Cydon ceramic insulation 250 pf., 5/-. Radio Condenser Corp. 3 gang 30 pf. with geared drive Micalox insulation 1,000v. TX type, 7/6. Hammerlund TX type 1 000v. 30 pf. 60 pf. 100 pf. 120 pf., 7/6. 50 + 50 pf. split stator, 8/-.

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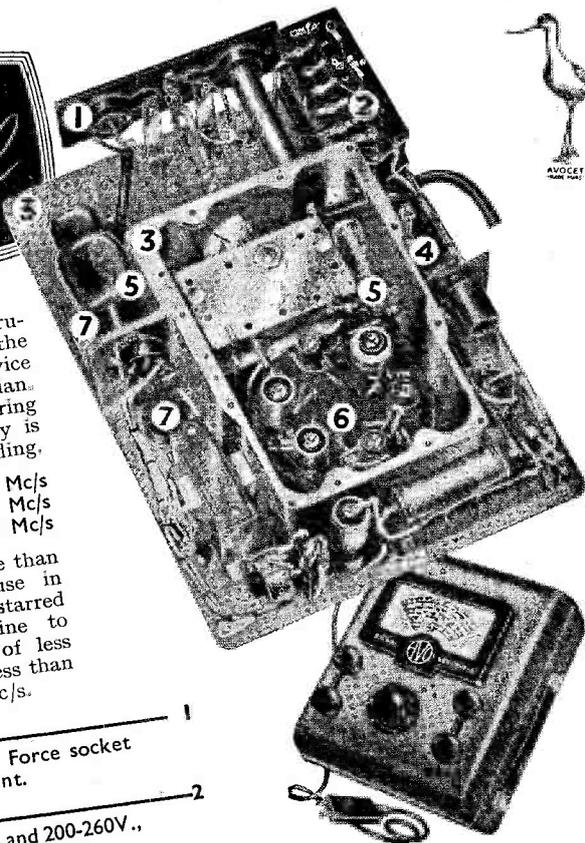
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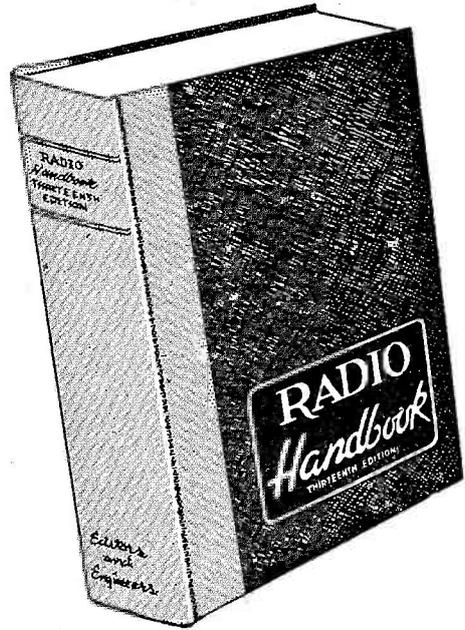
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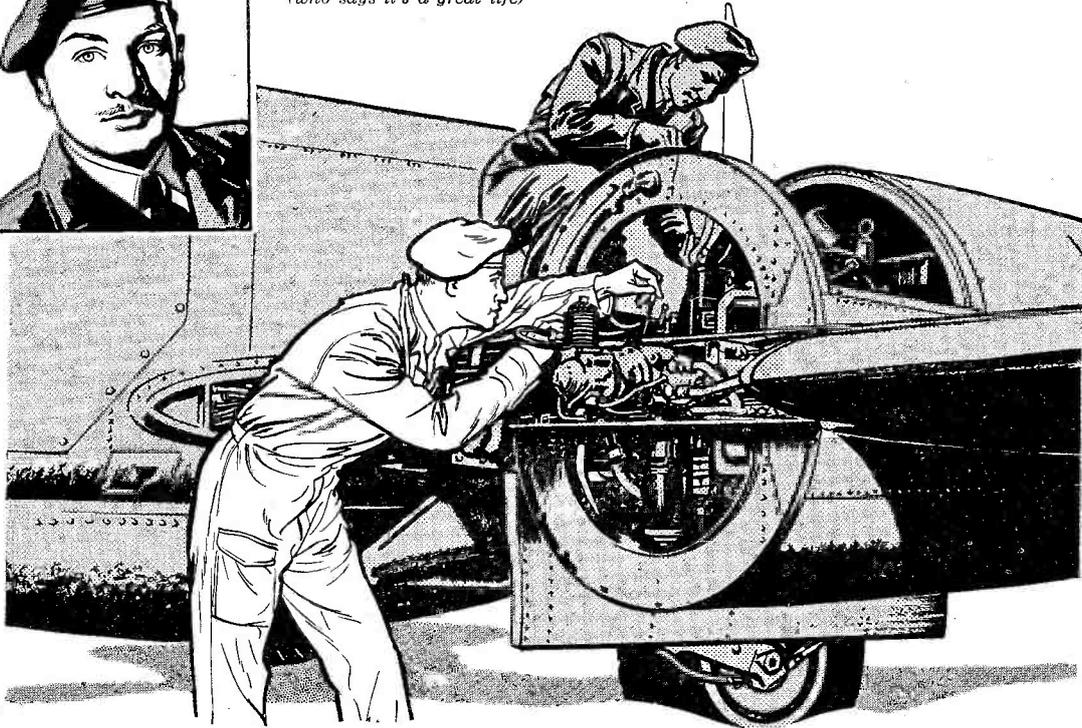
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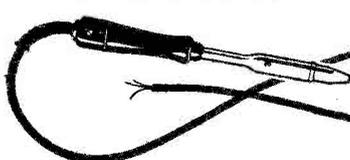
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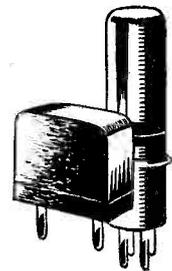
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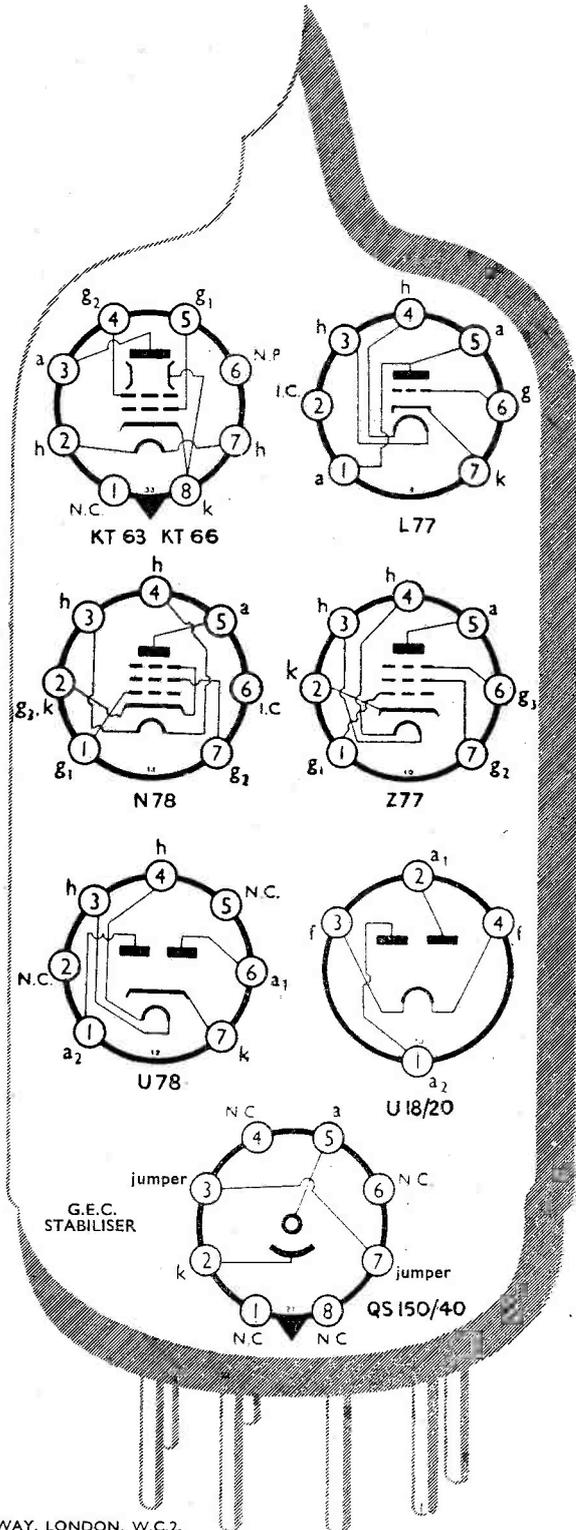
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# SHORT WAVE MAGAZINE

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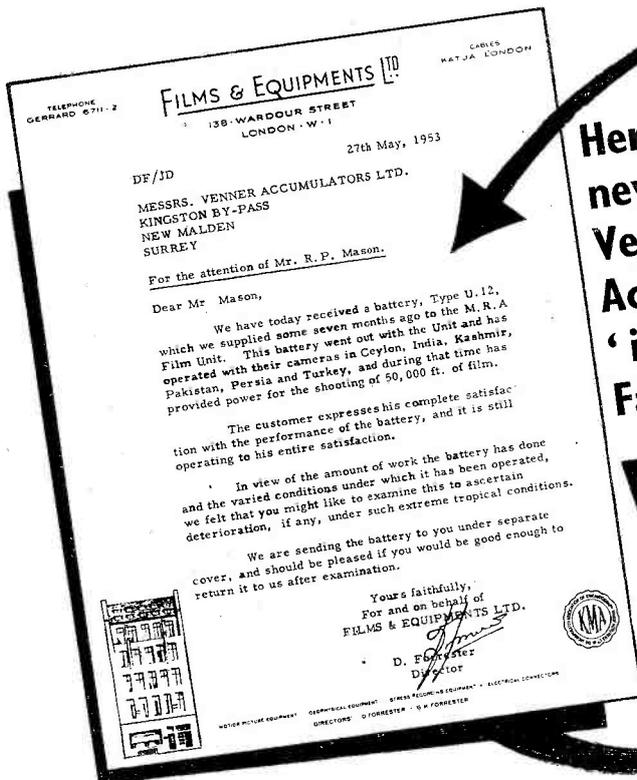
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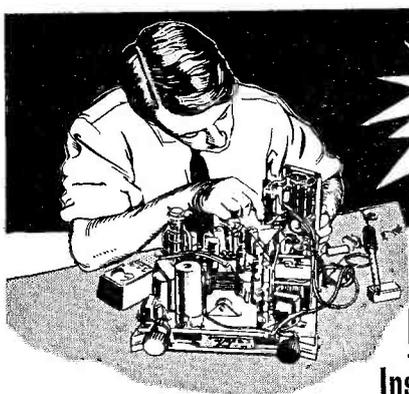
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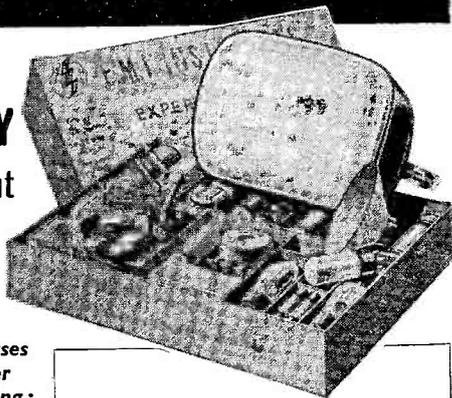
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# The SHORT WAVE Magazine

## E D I T O R I A L

### **Adjustment**

*Some comments elsewhere in this issue focus attention, once again, on the modern meaning of the old Amateur Radio term DX. Twenty years ago, it nearly always meant the Antipodes, or QSO's with VU, W6 or ZS1 — almost irrespective of the band on which the contact took place.*

*In this more enlightened era — and in the Amateur Radio sense it is enlightened, and becoming more so — DX can mean a G working a GM on 160 metres in daylight, a contact with a European on two metres, or a point-to-point QSO of a hundred miles or so on 70 centimetres. All these things are now happening, and they are always noteworthy as DX for the bands on which they occur.*

*While it is true that the post-war transmitting licence recognises our status as Communicators rather than Experimenters, there are very clear indications that a great many amateurs (mainly under the pressure of bad conditions and QRM on the HF bands) are reverting to their traditional role as Experimenters — and this applies to the newly-licensed just as much as to the old hands.*

*At a reasonable estimate, there must now be not less than one thousand licensed British operators who make VHF their first interest, often to the exclusion of activity on any other band. And on VHF it can truly be said that each individual has to find his own feet, building all his gear and getting it to work before he can communicate with anyone.*

*Apart from this particular aspect of Experimental Radio, there is also the fact that, all over the country, there is a great deal of quiet bench-work going on for all bands, from 160m. to the VHF's. Indeed, it can be said that the only people who are "not getting much out of" Amateur Radio just now are those who sit hopefully on the HF bands waiting for a New One to appear. But even they can claim, justifiably, that DX for them means Difficulty with a very thick D — so that they too are making their contribution.*

*Which all goes to show how versatile, flexible, self-adjusting and personally-rewarding Amateur Radio can be.*

*Austin Fobyl  
G6FO.*

# GP Test Instrument

## CONSTRUCTING A GENERAL PURPOSE CHECKER WITH MANY APPLICATIONS

W. N. STEVENS (G3AKA)

*This article describes the design and construction, and some of the applications, of a simple but versatile unit for radio test purposes. The instrument as illustrated here can be used for IF alignment, signal tracing, amplifier checking, condenser testing, establishing continuity and similar circuit functions.—Editor.*

THE instrument about to be described is a self-contained unit, easy to build, which will be found invaluable to constructors who cannot afford expensive test equipment yet like to service their own gear properly.

The component parts are by no means critical and a wide range of tolerance can be permitted. In fact most of the components can be found in the average constructor's "spares box."

In spite of the simplicity of the unit, it will be found that, in conjunction with an ordinary multi-meter, it will enable most radio breakdowns to be diagnosed. It is therefore a useful piece of equipment to have available, and is extremely compact.

The unit is divided into four sections :

- (1) The RF Oscillator, or pre-set Signal Generator.
- (2) The Audio Oscillator.
- (3) The Signal Tracer.
- (4) The Condenser Checker.

### The RF Oscillator

The circuit around V1 is a series-fed Hartley oscillator, pre-tuned to 465 kc. It is, in fact, "an IF liner." The frequency is set by L1, C1 and C2. L1 is common to both anode and grid circuits so that when oscillation takes place, the potential developed across the anode section of the coil causes the oscillating current to flow through the whole coil.

The RF choke is to prevent the RF from filtering into the HT supply line (which could cause instability) and it therefore takes the easier path offered by the grid circuit. C3 is the usual grid blocking condenser, being of such a value that, although it will pass the RF currents, it is not large enough to enable squegging or self-modulation to take place.

In order to prevent self-modulation, the grid leak R1 is kept low. This also reduces the harmonic content of the output, which is highly desirable inasmuch as it is easy to be misled by beat notes caused by a harmonic heterodyning.

The valve could, of course, be made self-modulating. But in single-valve oscillators of that type the AF modulation would cause a shift of RF frequency because the grid circuit would be common to both RF and AF circuits.

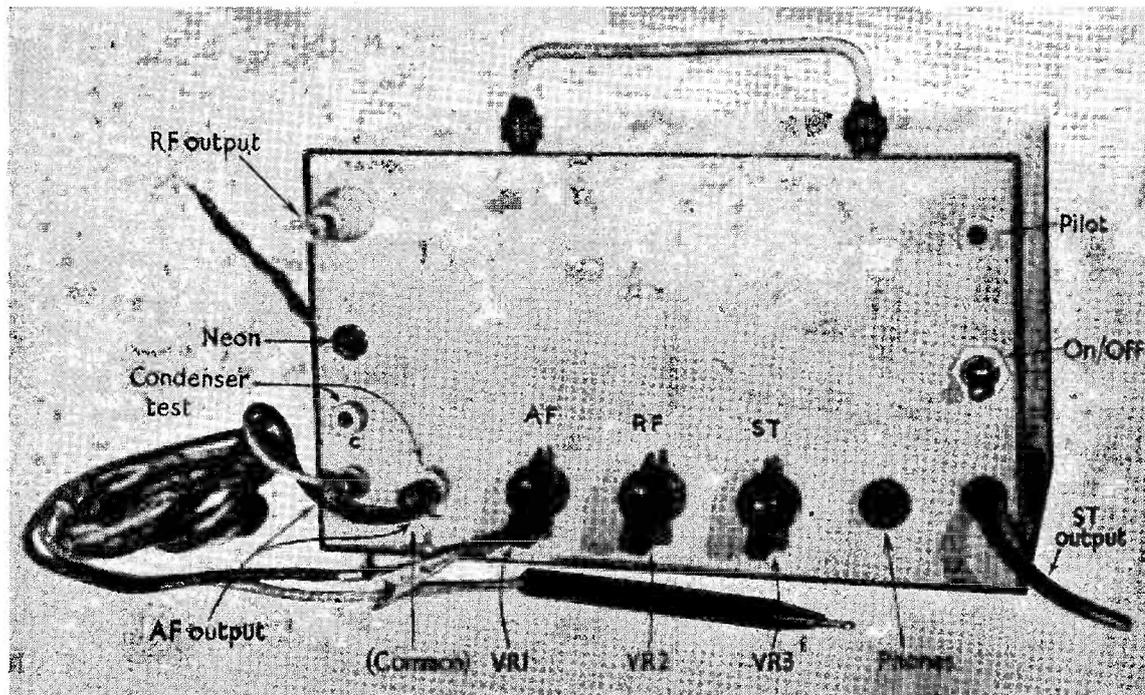
The output of the RF oscillator is taken to an attenuator network, comprising C4, C5 and VR1. To prevent heavy damping of the coil L1, the coupling condenser C4 is kept low in value (100  $\mu\mu\text{F}$ ). The series condenser C5 is inserted so that when testing anode circuits the HT is not shorted to earth through VR1. Full output is obtained with the slider of VR1 at the C4 end and minimum output when at the C5 end. In practice it may be found that some RF output can be obtained with the slider at the minimum position, due to the self-capacity of the components and wiring. This should not be sufficient to necessitate screening the components.

### The Audio Oscillator

The audio oscillator could hardly be simpler. Apart from the valve (V2), the only components are a standard AF inter-valve transformer, blocking condenser C6 and grid leak R2. None are critical and a wide choice of values is permitted. The oscillator will provide an AF output of around 1,000 c.p.s., but if required, the note can be adjusted by shunting, experimentally, condensers across the primary of T2 until the note desired is obtained.

As with the RF oscillator a controlled output is provided through the attenuator network—blocking condenser C7 and potentiometer VR2. It will be found that the frequency of the note will vary slightly according to the setting of VR2. This is inevitable in such a simple arrangement, but the change in note is small enough to be insignificant for practical purposes.

Both V1 and V2 have on/off switches ganged with the attenuator controls (VR1 and S1; VR2 and S2) in the interests of simplicity. Thus it is possible to obtain (a) An unmodulated RF signal of 465 kc—V1 only in operation; (b) A modulated signal of approximately 1,000 c.p.s.—V2 only; or (c) A 465 kc signal modulated at 1,000 c.p.s. with both V1 and V2 in operation.



Front view of the Test Instrument described in the article. Though a simplified design, it has a wide range of useful applications in the station and on the bench.

Modulation of V1 is obtained because the HT supply for this valve passes through the anode circuit of V2. Since the anode current of V2 will vary at 1,000 c.p.s. it follows that this modulation frequency will be present at the anode circuit of V1. Hence the anode circuit of V1 will have both an RF and AF component.

### The Signal Tracer

This section has also been kept as simple as possible. V3 operates as a straightforward amplifier, the input control and on/off switch being combined as with the previous sections. In most circuits it is usual to include a small diode or metal rectifier. This was tried in the original model but later discarded when it was found that it made no difference to the operation of the circuit; the explanation is that the grid/cathode circuit of V3 in practice acts as the diode needed for detection.

### Condenser Checker

This is a normal leakage tester, using a small neon lamp and series resistor shunted across the HT supply. Voltage for the valve anodes is supplied from a conventional metal rectifier

supply, giving around 150 volts DC output. Smoothing requirements are not much, and if necessary the values of the condensers C10 and C11 could be reduced. Valve heaters are supplied from a small heater transformer T1.

### Construction

Little need be said in regard to the construction of the test unit. Layout is far from critical and the disposition of the main components can be clearly seen from the photographs. In the original model, type B9G triodes were used for V1 and V2, whilst another B9G type valve (EF50) was used for V3. In practice any triodes (or RF pentode for V3) that happen to be on hand may conveniently be used.

The few components needed for the unit are also not critical in value and quite a wide tolerance from the values specified is permissible. The smoothing choke L1 may be replaced by a 2,000 ohms, 5-watt resistor if required. This would effect a saving in space and, if a suitable choke is not to hand, in cost. The metal rectifier can be any suitable type delivering between, say, 100-200 volts DC output. The series dropping resistor R5 will

depend on the type of neon used for condenser checking. The value may be anything between 100,000 ohms and one megohm. A little experimenting will soon show the best value to use.

The front panel photograph of the completed unit shows a ceramic feed-through insulator at the top left hand corner of the panel. This is the output terminal of V1, the RF oscillator. The lead from this terminal to VR1 should be screened.

Below this terminal can be seen the neon bulb. This is mounted on a small bracket so that the bulb just protrudes slightly through the panel hole for inspection when making condenser and continuity tests.

Below the neon are three sockets. One is the common chassis socket; the other two being for the AF oscillator output and the "hot" end of the condenser test circuit. In other words, when using the condenser checker, probes are used with the socket marked "C" and the common negative socket. For AF output, the probes are connected to the socket marked "AF" and to the common negative socket. Quick change-over can be made using ordinary instrument jack plugs, one being plugged permanently in the common negative socket.

Input to the signal tracer V3 is made through a length of coaxial cable, which runs through the front panel to the slider of VR3. At the free end of this run of coax an insulated probe should be fitted. An ordinary test probe would be suitable.

If the three valves are lined up along the front portion of the chassis and the three corresponding potentiometers are placed in line with them below chassis as shown in the photographs, the remaining components will fall neatly into place.

The panel, of course, fits into the front section of the box. The sizes may be adjusted one way or the other to suit individual convenience. The carrying handle is a worthwhile addition as this makes for convenient handling of the instrument.

### Testing

The various sections of the unit should be tested individually on completion of construction. To check the operation of the audio oscillator (V2) connect a pair of headphones across the output sockets. Switch on S2 and adjust VR2, when a loud audio note should be obtained. If the circuit fails to oscillate, try reversing the connections to the T2 primary or secondary (whichever is more convenient).

To test the signal tracer, inject the signal from the oscillator into the V3 input, with headphones plugged into the jack socket in the V3 anode circuit.

The condenser checker can be tested simply by shorting out the condenser test terminals momentarily with a short piece of insulated wire, (or, safer, with a resistor of some 100,000 ohms). The neon should glow brightly.

The RF oscillator can be pre-aligned to 465 kc in several ways. The easier method is to line it up on a receiver already set to a known IF of 465 kc! Using loose coupling, inject the output of the oscillator into an IF amplifier grid and tune the receiver to a strong broadcast station. If convenient, the oscillator output may be injected into the aerial socket of the receiver. In either case, adjust trimmer C1 until resonance is reached—this being indicated by "zero beat." This alignment is best carried out during a break in the transmitted programme. In some cases, the zero beat indication may be observable without any direct coupling to the receiver, this being dependent on the actual voltage applied to the anode of V1 and the sensitivity and screening of the receiver. If no direct coupling is used, a short length of wire should be attached to the ordinary RF oscillator output terminal.

The oscillator can also be aligned on a receiver which has an IF other than 465 kc, providing it can tune to 465 kc. The procedure here is to inject the oscillator output into the aerial socket of the receiver, tune the receiver to 465 kc and switch on the BFO. The trimmer C1 is then adjusted for zero beat.

### Operation—The IF Liner

A receiver (with an IF of 465 kc) may be lined up aurally (listening for maximum "hiss"), or by connecting an output meter in the usual way, or by connecting a voltmeter across the bias resistor of an AVC-controlled valve. In the latter arrangement, the IF transformer cores should be adjusted for *minimum* reading. Alternatively, the receiver S-meter may be used as an indication if one is fitted.

Although some form of direct indication is more accurate, perfectly satisfactory results can be obtained by the simpler method. However, if the receiver has a crystal filter, it is advisable to use some means of visual indication for alignment.

If the IF transformers are well off resonance quite tight coupling between the oscillator and the receiver may be required. Sufficient indication is usually obtained by connecting a short

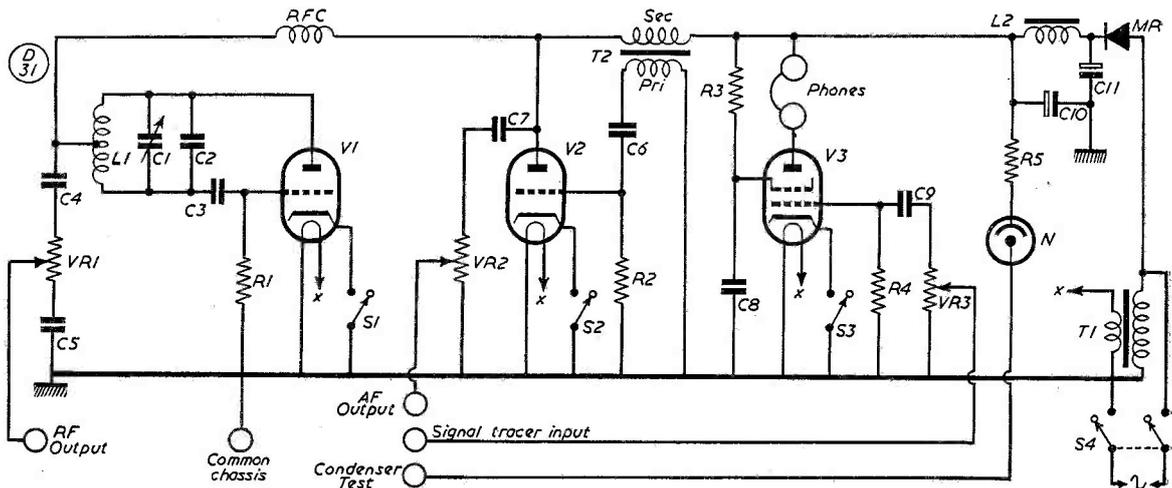


Fig. 1. Circuit complete of the GP Test Instrument, the applications of which are discussed in the text.

length of flex from the oscillator output terminal and wrapping the free end round the grid lead of the final IF amplifier in the receiver. The coupling is slackened off as the IF transformers are brought into line, the final adjustments being made with the test oscillator as far away from the receiver as will provide an audible indication. The attenuator control VR1 may be adjusted to check that the audible hiss is, in fact, due to the RF oscillator and not merely the receiver's own local oscillator hiss !

**Using the AF Oscillator**

This section of the test instrument has, of course, many different applications. Generally speaking it is of use in checking circuits in audio amplifiers and any other apparatus where a note of constant pitch is required for indication of valve stage gain, amplification, continuity, average depth of modulation, and so forth. The output of V2 may be applied to pick-up sockets to test audio sections of receivers, to check inter-valve couplings and numerous other purposes which are fairly obvious.

**Applications of the Signal Tracer**

This function of the instrument is especially valuable. Briefly, it is used to trace RF or AF signals through the various stages of a receiver. Thus, by progressive application of the test probe to the defective receiver, the stage at which a fault has developed can easily be determined.

Starting at the front end of the defective

**Table of Values**

Circuit of the Tester Instrument.

R1 = 47,000 ohms.	Valves,
R2 = 1 megohm.	V1, V2 = Any convenient triodes.
R3 = 100,000 ohms.	V3 = Any convenient RF pentode.
R4 = 4 megohms.	N = Neon lamp.
R5 = 100,000 ohms (see text).	T1 = Heater transformer, to suit V1, V2 and V3.
VR1, VR2, VR3 = 1 megohm potentiometers.	T2 = AF inter-stage transformer, ratio 5:1 or similar.
C1 = 60 μμF, variable compression type.	MR = Metal rectifier, to provide about 150 volts DC output.
C2 = 60 μμF.	S1, S2
C3 = 250 μμF.	S3 = Switches ganged with VR1, VR2 and VR3.
C4 = 100 μμF.	S4 = DPST on/off switch.
C5 = 0.002 μF.	
C6 = 0.01 μF.	
C7 = 0.01 μF.	
C8 = 0.01 μF.	
C9 = 250 μμF.	
C10, C11 = 4 + 4 μμF., electrolytic.	

receiver, the probe is applied at the aerial terminal. At this point it should be possible to hear at least one local broadcasting station in the headphones — possibly several will be heard, all jumbled up. With the probe applied to the grid of the first tuned stage it should be possible to select one or two stations by tuning the receiver in the normal manner.

As the probe is advanced along the receiver—working from grid to grid—signal strength in the headphones should become progressively louder. When the AF stages are reached, the receiver volume control and/or the signal tracer gain control should be reduced accordingly ; the amount of reduction necessary to maintain a constant volume level will provide a fair indication of stage gain. It may sometimes be advisable to mute the receiver loudspeaker or



Interior view of the instrument described in the accompanying article. The disposition of the main parts is shown and the unit is self-contained for power.

disconnect it, otherwise misleading results may be obtained.

Naturally, so simple a device as the signal tracer described will not be so efficient or as sensitive as the more elaborate circuits often used for this purpose, but it will be suitable for checking most receivers with commonplace faults. A defective stage is, of course, reached when signals in the headphones disappear or become very weak. Also, as previously indicated, should signals remain at roughly the same level from one stage to another (excluding a diode detector stage, naturally), this indicates that stage gain is low and that the last stage probed is not operating at full efficiency.

### The Condenser Checker

The condenser checker provides a means for determining the condition of fixed paper, mica and similar type condensers. With the condenser under test placed across the test outlets, the neon should be carefully observed. If it glows continuously, the condenser is short circuited or is leaking very heavily. If the neon does not glow or flash at all, the condenser is either open circuited or has lost

capacity. A good condenser will cause the neon to flash momentarily as the test probes are placed across the condenser. Should the neon flicker continuously this indicates a leaking condenser. Note that it is *not* possible to check electrolytic condensers on this tester.

The condenser checker unit can also be used for other purposes, the most obvious being as a continuity tester for point-to-point checking and for testing windings of chokes, transformers and the like.

The application notes given above will serve to show some of the uses to which the unit can be put. Considering that most constructors will be able to build the unit from odd bits and pieces already in the spares boxes it is an extremely versatile piece of equipment and one which will be in almost continual use in one or more of its functions. It will make future constructional jobs easier and will provide a means of approximate checking for many of the more usual breakdowns in receivers, amplifiers and other equipment. It can be built in a few hours and will save considerable time in the future when that receiver suddenly "packs up."

# Speech Clippers and Their Operation

DISCUSSING HIGH AND LOW LEVEL SYSTEMS

W. SCHREUER (VK2AWU)

*To the progressive phone operator, the theory of limiting over-modulation and the design of speech clipping systems are always of interest—provided not too much is lost in the transmission by their use. This article discusses various practical clipping systems and gives some useful advice on setting up and adjustment.—Editor.*

THIS article is a summary of theoretical and practical investigations by the writer, originally searching for a device which would prevent overmodulation and its distressing effects, no matter at what level the microphone was addressed or how the gain control on the speech amplifier was set. It was soon realised that a speech clipping system, properly designed and intelligently used, could be of definite advantage in establishing or maintaining communication with other stations under adverse conditions.

## Fundamental Problems

Overmodulation is equivalent to severe distortion of the modulation envelope, resulting in the production of high order harmonics not present in the original modulation. Consequently, the frequency bandwidth of a signal which is overmodulated is considerably wider than one which is not, and it is obvious that overmodulation must be avoided at all costs on the overcrowded amateur frequencies. On the other hand, when the modulation on voice peaks is kept below the 100% mark, the average modulation of the carrier will seldom

exceed 30% even with careful articulation, and this is hardly satisfactory to the individual operator, again in view of the crowded state of the long-distance amateur bands. Speech clipping is probably the most effective means of increasing the average percentage of modulation of a transmitter *without* overmodulation on voice *peaks*.

Clipping or instantaneously limiting the amplitude of the individual AF peaks to a value just sufficient to give 100% modulation by itself is insufficient. The distortion and, therefore, the high order harmonics produced by the clipping process are exactly the same as those due to overmodulation! However, when the clipper is followed (as it always should be) by an effective low pass filter greatly attenuating all frequencies above 3,000 c.p.s., the desired result is achieved. Such a filter, or combination of filters, must be reasonably free from undesirable transient effects, which would tend to nullify the clipping process and also result in additional distortion. This requirement also applies to other components, particularly AF transformers, which may be in use following the clipper.

## High Level Negative Peak Clipper

The disastrous results of overmodulation are generally taken to be caused by excessive negative peaks of the modulation envelope abruptly reducing the RF signal to zero. (As will be shown later, this is not necessarily the case.) At first glance, the high level negative peak clipper appears most attractive owing to its simplicity and the absence of need for tedious adjustment. However, this form of clipper and associated filter must be treated with extreme caution if good results are to be obtained.

Fig. 1 shows the well known series type clipper. Possibly less well known is the use of resistor R which, in the writer's opinion, should always be present. The transition from the conducting to non-conducting state of the diode V is rather indefinite, and resistor R ensures that the clipping action on the negative peaks commences slightly below the 100% mark, at a depth of  $100 \frac{R - R_L}{R} \%$ , where  $R_L$

is the equivalent resistance of the PA stage being modulated.

It is probably not generally appreciated that the series clipper should not be used when high impedance output valves (pentodes or tetrodes) are employed in the modulator. The action of the series clipper would periodically open-circuit the load on the modulation transformer,

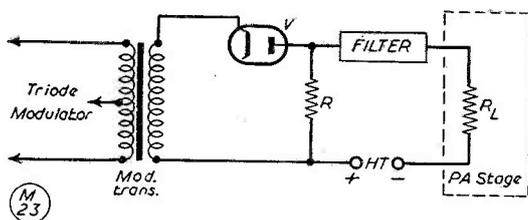


Fig. 1. A series clipper for use with triode modulators. V is the clipping diode, and can be a 5R4GY, 5U4G or similar; RL is obtained by dividing HT volts by plate amps (not mA), and the value of R is twenty times the calculated value of RL.

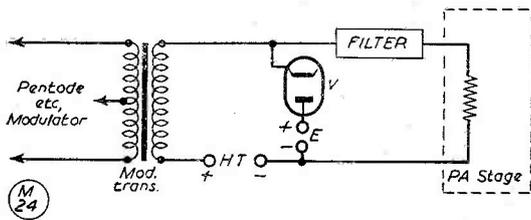


Fig. 2. Shunt clipper for use with pentode or tetrode modulators. The value of  $E$  is approximately the HT voltage divided by 20.

resulting in the production of high voltages, thus endangering the modulator valves and the transformer insulation. The shunt clipper shown in Fig. 2 is free from these disadvantages. In this the bias  $E$  on the anode of the clipping diode  $V$  ensures that clipping starts at a negative modulation depth of  $100 \frac{HT - E}{HT} \%$ . The voltage  $E$  may be obtained

from a potentiometer across an HT supply, or the anode of the diode can be returned to the top of a cathode bias resistor of an RF or AF stage. The resistance between the clipper diode anode and earth should not exceed 500 ohms.

Mercury vapour rectifiers should never be used as high level clipping diodes; owing to the difference between striking and burning voltages they can produce severe additional distortion. Hard valves, like the 5R4GY, are more than adequate for the highest HT voltage likely to be used. A separate, well insulated, filament supply must of course be employed.

One definite requirement for the correct functioning of the high level system is that the PA stage be capable of linear modulation in the positive direction to well above the 100% mark, otherwise overmodulation, *i.e.*, flattening, results on the positive peaks, with the usual bad effects on the transmission. Many PA stages may fail in this respect, particularly those employing small valves which are being operated near their maximum ratings.

### Practical Tests

The writer made some investigations of the performance of 807 valves operating with 260 and 650 volts on screen and anode respectively. The worst valve of a batch of eight would only modulate up to 110% in the positive direction, while the figure for the best was 130%. It is clear, therefore, that only "over-size" PA valves are suitable for the high level system. A PA stage consisting of a pair of

807's, modulated by another pair of 807 valves, capable of 120 watts AF output, cannot be regarded as a safe arrangement with high level clipping. The easiest way round the problem of upward modulation is probably the use of a modulator only just capable of 100% modulation, and this is considered later.

Possibly the worst aspect of the high level system is the design and construction of a suitable low pass filter. Practically any filter consisting of inductance and capacity will produce transients of its own when subjected to sudden, steep wavefronts. This basic feature is very much accentuated in this case owing to the abrupt change of source impedance caused by the clipping action. At first glance, a sharp cut-off filter seems desirable, but unfortunately the sharper the cut-off, the larger the unwanted transients. A single section sharp cut-off filter (m-derived type) must generally be considered unsuitable, although a fortunate combination of circumstances may make such a set-up workable. The safest method appears to be the use of a fairly large number of filter sections, at least four, each of rather gradual cut-off (constant-K type), and prove the performance by means of an oscilloscope under working conditions. The filter inductances should be of relatively low "Q," say about 10, and if iron cored, should have a core with a large air-gap to avoid the possibility of other peculiar effects, *e.g.*, change of inductance during the modulation cycle.

High level negative peak clipping can be made to work satisfactorily, but the intending user should expect trouble initially as a matter of course.

### Low Level Clipping

This method of clipping, taking place at voltage rather than power level, is free from the drawbacks of the high level system, though it possesses a few problems of its own. Clipping must be symmetrical, *i.e.*, must take place on both positive and negative AF half cycles, since otherwise the clipping action would be lost in subsequent stages due to AC coupling. Quite apart from this consideration, symmetrical clipping is advantageous as it eliminates the problem of the upward modulation capability of the PA stage.

The filter problem, though it exists, is very much easier than with the high level system. Considerable filtering can be obtained initially with resistor-capacitor combinations, which are free from transient effects; the RC sections are then followed by a simple LC filter to

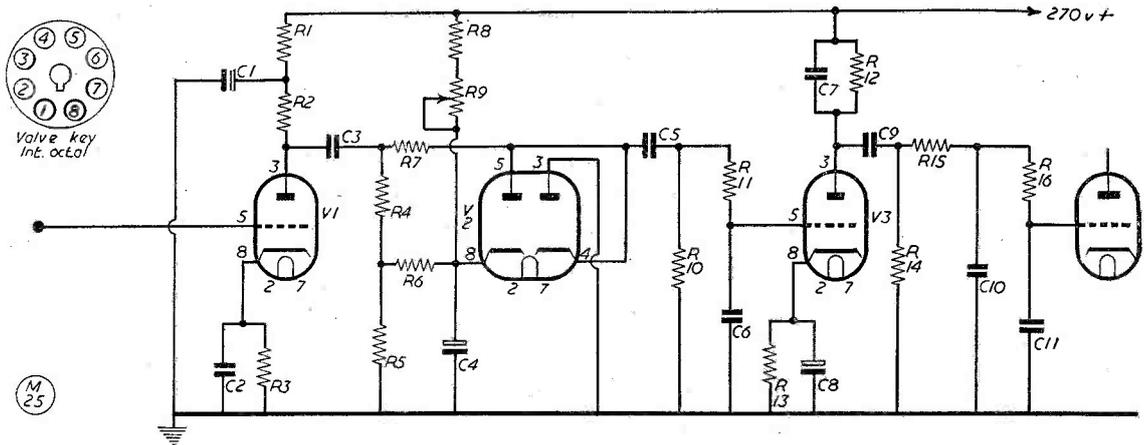


Fig. 3. Low level clipper circuit suggested by VK2AWU, the operation of which is discussed in the text. V1, V3 can consist of the two halves of a 6SN7, or separate 6J5's, as may be available.

achieve the desired sharp cut-off. The requirements for the LC filter are not very severe ; it operates with constant source impedance and the clipped input is already partially filtered by earlier RC sections, so that the possibility of unwanted transients occurring is rather remote.

Fig. 3 shows a typical low level clipper arrangement. In this both positive and negative peaks are clipped by the double diode V2 which receives its bias from the voltage drop across R5 and R6. The clipping level is variable between 5 and 10 volts by means of variable resistor R9. Adjustment of R9 does not alter the amplification of the system ; this is desirable for ease of adjustment for correct operation. Four stages of RC filtering are shown, namely R11 with C6, the parallel combination of R12 and the anode resistance of V3 with C7, R15 with C10, and R16 with C11. The peak output at the junction of R16 and C11 is approximately 20 to 40 volts, depending on the setting of R9. (maximum resistance gives lowest output). The four RC filter sections are probably sufficient by themselves for portable stations and stations remote from others. In the more usual case of dense amateur population, an additional LC filter should be employed in one of the subsequent stages of the audio system. This LC filter could with advantage be located on the secondary side of the modulation transformer, so as to reduce the undesirable effects of the inevitable, if slight, harmonic distortion due to the output stage of the modulator.

When thermionic diodes are used as shown in Fig. 3, the level at which clipping takes place should not be less than a few volts, say

### Table of Values

Fig. 3. Circuit of the Low Level Clipper system.

C1 = 8 $\mu$ F, 350v.	R1, R2 = 10,000 ohms, $\frac{1}{2}$ w.
C2, C8 = 25 $\mu$ F, 25v.	R3, R5 = 1,000 ohms, $\frac{1}{2}$ w.
C3, C7 = .01 $\mu$ F, 350v.	R6, R13 = 1,000 ohms, $\frac{1}{2}$ w.
C4 = 25 $\mu$ F, 50v.	R4 = 100,000 ohms, $\frac{1}{2}$ w.
working.	R7 = 27,000 ohms, $\frac{1}{2}$ w.
C5, C9 = 0.1 $\mu$ F, 350v.	R8 = 25,000 ohms, 5w.
C6 = 220 $\mu$ F, 350v.	R9 = 25,000 ohms, 5w.
mica.	pot. meter.
C10 = .001 $\mu$ F, 350v.	R10, R14 = 270,000 ohms, $\frac{1}{2}$ w.
C11 = 150 $\mu$ F, 350v.	R11, R16 = 120,000 ohms, $\frac{1}{2}$ w.
mica.	R12 = 4,700 ohms, $\frac{1}{2}$ w.
	R15 = 22,000 ohms, $\frac{1}{2}$ w.
	V1, V3 = 6J5, or $\frac{1}{2}$ each 6SN7. V2 = 6H6.

3, in order to avoid excessive asymmetry of clipping due to contact potential and also hum pick-up. For lower levels of clipping, Germanium crystal diodes should be employed; the G.E.C. type GEX 55 is particularly suitable, for levels as low as  $\frac{1}{2}$  volt.

The bass response of the AF system following the clipper must be good, at least four times better than actually required. Inadequate bass response causes tilting of the tops of the clipped waves and this must be avoided if the benefits of speech clipping are not to be lost. There is no difficulty in obtaining adequate bass response, but the modulation transformer must be of good quality and this is bound to be costly. For good results, the response of the modulation transformer should be at least -3dB at 50 c.p.s.

Some confusion appears to exist in amateur circles as to the required power rating of the modulator output valves when low level speech clipping is employed. It is certainly true that the actual AF power output is increased considerably by speech clipping, but the peak conditions for 100% modulation are the same as for a set-up without clipping. The power out-

put of any valve is likewise limited by the maximum permissible peak voltage and current values, and the manufacturer's rating is based, for convenience of comparison, on a continuous sine wave signal. The power output for a square wave signal would be 57% greater, as a result of better efficiency. It follows, therefore, that the nominal power rating of the modulator need be no larger with speech clipping than without, the increase in actual power output being obtained through greater efficiency and utilization.

### Self Clipping Modulators

This term may be applied to modulators with power outputs barely sufficient for 100% modulation. Though more desirable than the high level system, this method possesses some of its disadvantages, but also has the advantage of extreme simplicity. Self clipping modulators can be divided into two types, namely, those with grid limiting and those with anode limiting.

Clipping due to grid current limiting is really a special version of the low level system, though initial RC filtering is impossible. The whole of the filtering requirement must be accomplished on the secondary side of the modulation transformer, and the filter operates at constant impedance level. In the usual push-pull modulator set-up, clipping is symmetrical which is desirable; rather less desirable is the fact that the modulation transformer is subjected to clipped unfiltered waves and the production of transients is a distinct possibility.

Clipping due to anode limiting is similar to the high level system, but clipping is symmetrical with push-pull modulators, and, therefore, the problem of the upward modulation capability of the PA stage does not exist. There may be appreciable change of impedance with clipping, depending on the modulator valve characteristics, and the problem of unwanted transients is a real one. As with grid limiting, the modulation transformer has to handle clipped, unfiltered waves.

### Frequency Response

It is generally recognised that, for voice transmissions, the frequency range from 300 to 3,000 c.p.s. is adequate and even desirable. The upper limit is too low to permit clear reproduction of sibilants, but then the high selectivity of the modern communication receiver does not allow this in any case. With speech clipping, the required high frequency cut-off is produced by the filter, or combination

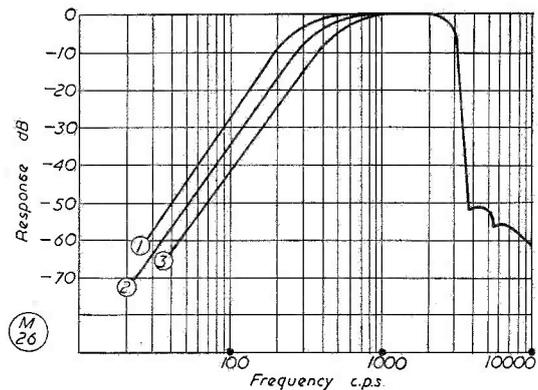


Fig. 4. Typical response of an AF system. Bass attenuation is produced by three RC coupled stages, and treble attenuation by two RC stages and two "m-derived" LC sections. Curve (1) is when there is virtually no clipping effect; Curve (2) is for 6 dB of clipping and Curve (3) represents 12 dB of clipping.

of filters, following the clipper. The bass response is best adjusted by trial, for most natural sounding reproduction, by proper choice of inter-stage coupling capacities, with the speech amplifier gain at a level giving no, or negligible, clipping. It was shown earlier that the bass response following the clipper must be better than actually required, so that all bass attenuation must take place ahead of the clipper. In any case, it is obvious that inessential low frequency components should be kept out of the clipping circuit, in order to avoid the production of harmonics of unwanted frequencies by the clipping process.

From theoretical considerations, which were later confirmed by experiment, it is of advantage to be able to reduce the bass response as the degree of clipping is increased, and front panel adjustment of the bass characteristics is desirable. Fig. 4 shows a typical response curve, taken at an amplitude well below clipping level, which has been found to give satisfactory results. This curve includes the estimated characteristics of the microphone in use.

### Degree of Clipping

This is solely a function of voltage gain or amplification ahead of the clipper, once the clipping level is set to give 100% or slightly lower modulation. It is conveniently expressed in decibels, e.g.,

Degree of clipping

$$= 20 \log \frac{\text{Actual gain}}{\text{gain required to give 100\% modulation on occasional voice peaks}} \text{ dB}$$

The writer's experience with speech clipping

agrees fairly well with other published results on the subject. 6 dB of clipping produces just noticeable distortion locally, with appreciable increase in the apparent depth of modulation, while at a distance distortion is not noticeable and readability improved. 12 dB of clipping is unpopular locally owing to distortion, but is definitely helpful for long distance work under bad conditions, though distortion may be noticeable. Reports received for still higher degrees of clipping were inconsistent, and it seems that 12 dB ( $4 \times$  gain) is the limit of usefulness, with 9 dB ( $3 \times$  gain) as a reasonable working figure for long distance communication.

### Conclusion

This article is merely a write-up of some brief notes made over the last two years and

is intended only to be a summary of the necessary considerations for the design and operation of successful speech clipping systems. In general, low level systems, though relatively tedious in construction and adjustment, are more easily got going. In any case, the use of an oscilloscope is almost essential for checking the depth of modulation under working conditions and the simplest way to monitor the bandwidth is with the help of a local station possessing a selective receiver. Performance checks with an AF generator and an oscilloscope are instructive and helpful in setting up a system, but do not tell the whole story, particularly where the production of unwanted transients are concerned. The final answer is best left to the nearest local station!

It is hoped to give a detailed description of an AF system incorporating speech clipping at some future date.

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## Two-Band Radiating System

### CONSTRUCTIONAL DETAILS AND TUNING PROCEDURE

J. G. HOBBS (G2QG)

*What was in effect the first part of this article appeared exactly a year ago (October, 1952) in which the author described an aerial which can be resonated on two adjacent bands. In these notes are given some further details, dealing with the constructional problems involved in providing a weather-proof tuning unit mounted in the run of the aerial and controlled from the operating position.— Editor.*

THE previous article (see SHORT WAVE MAGAZINE, October 1952) dealt in a simple manner with the technicalities of this aerial, and if the principle is understood free rein may be given to individual ingenuity and imagination in the construction of a similar unit. In general, the design is so simple that it may be said that any difficulties encountered can be traced to the choice of unsuitable components. The present article, written for those who have neither the time nor the inclination to design the unit themselves, describes the "20/10" assembly used by the author, which has given every satisfaction, although at times it has been

grossly misused, and in the physical sense has been exposed to the appalling weather conditions experienced in this country during the last two years.

It is probably necessary at this juncture to justify the nomenclature "20/10." It will be evident that owing to the versatility of the system in regard to band combination, some form of identification is essential. It is suggested that the wavelength of the fundamental mode followed by the wavelength of the other selected band, should be used to differentiate between the various combinations. Thus, an aerial 33 ft. long operating as a half-wave dipole on 20 metres, and its selected harmonic mode operating on 10 metres, would be known as a "20/10." A ten-metre wire 16.5 ft. long operating as a half-wave dipole, with the second selected band operating as a compressed dipole on 20 metres, would be known as a "10/20." In this manner a true picture of the type of aerial used can be obtained.

The photograph shows clearly the general construction of the unit. The framework or chassis is made up from five separate items, the dimensions and drillings being shown itemised from 1 to 5 in Fig. 1. The main carrier plate (Item 1) around which the assembly is built is a piece of aluminium  $3\frac{3}{4}$  in. x  $1\frac{1}{2}$  in. x  $\frac{1}{8}$  in. The relay, which is the heaviest component, is mounted directly on this plate, suitable holes being drilled and cut where necessary. The other items marked

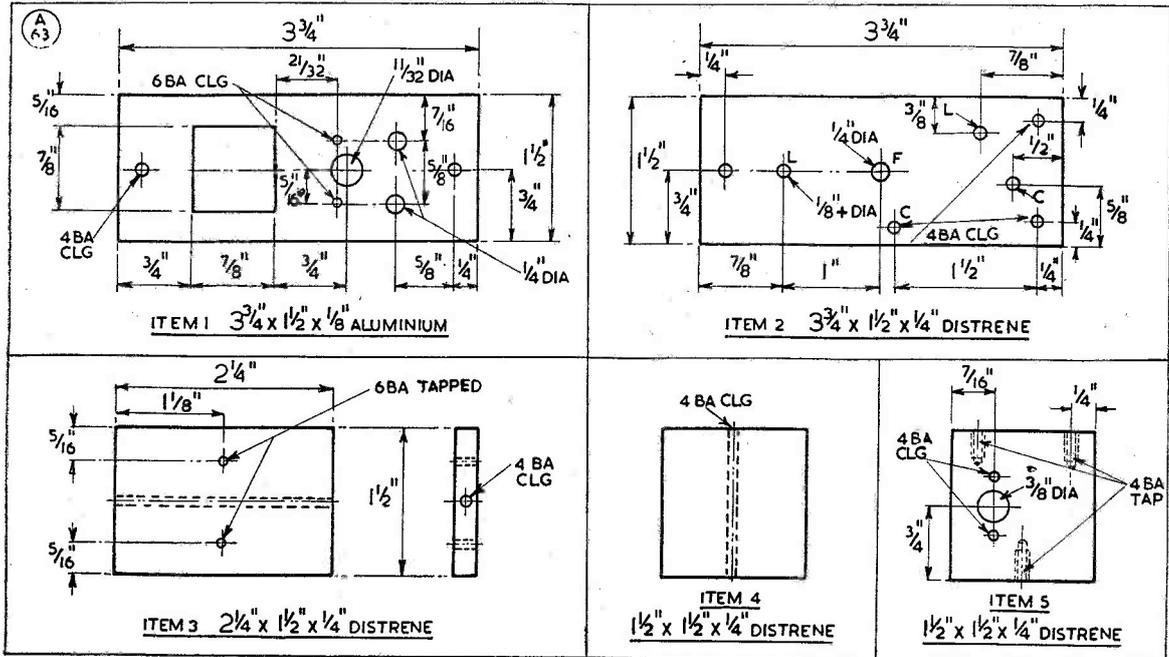


Fig. 1. Detail drawing of mountings for the change-over unit.

2—5, are cut from 1/4 in. material of good electrical characteristics, the whole being screwed and bolted together to form a rigid structure. The top plate (Item 2) not only carries the inductance forming the auto-transformer, but also the padding capacity, and the method of constructing and mounting these components will be examined in some detail.

**Coil Construction**

The coil, of 1/8 in. copper, is wound on a 1 1/4 in. former, which is then extracted. This leaves the latter of slightly larger diameter (approximately 1 3/8 in.) due to the elasticity of the copper. The turn spacing is then adjusted by hand, to be roughly equal to twice the wire diameter. It may be found that the particular sample of copper being used is too hard and "springy," making it extremely difficult to wind and set. If this be so, it should be brought up to red heat and immediately plunged into cold water, when it will be found to be quite soft and pliable. The two ends of the coil are then pushed through holes of slightly larger than 1/8 in. diameter which have been drilled in the top plate.

When the coil is in the required position, the ends, which should have been thoroughly

cleaned before being passed through the insulating material, are then tinned with solder. The action of the heat during this and subsequent soldering will be found upon cooling firmly to hold the coil in the correct position.

It will be appreciated that as the tuned circuit handles peak modulation power, the circulating current is of some magnitude; therefore, the connections from the coil to the condenser should be of generous cross section, of the same weight as the inductance itself. Similarly, the condensers (of good power factor) must be capable of withstanding the peak modulation voltage (which for conventional systems is twice the peak carrier voltage). Fortunately this problem is not as formidable as it sounds, considering that the

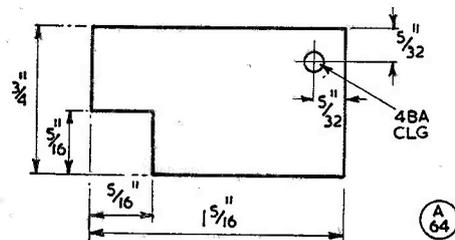


Fig. 2.

transformer is loaded by two half-wave elements, which constitute an equivalent resistance of approximately 5,000 ohms. Even so, much trouble was experienced with the prototype model in finding a suitable condenser, as the physical size had to be small. Several commercial types were tried, but all failed. (In fairness to the manufacturers it must be said that they were grossly overloaded, and the only reason for mentioning the subject at all is to warn the would-be constructor).

### Condenser Mounting

Eventually, it was decided that the most satisfactory solution was to build the padding condenser as an integral part of the unit. Four plates of the dimensions shown in Fig. 2 were cut and trimmed with the aid of shears from old variable condenser vanes of the receiving type. After drilling and cutting as indicated, they were then flattened (the anvil of a vice suits the purpose), paying particular attention to the edges, which tend to curl during the cutting process. They are then mounted in the following manner:—

Two  $\frac{3}{8}$  in. 4BA cheese headed brass screws complete with soldering tags are inserted into the 4BA clearance holes shown (marked C) in the top plate, with the heads and soldering tags located on the underside. A 4BA half nut is put on one of them and tightened down. A plate is placed on the other one and held flat against the insulating top plate by a 4BA whole nut. The condenser is then built up by placing plates on alternate sides, bolting each down with the aid of a whole nut.

The variable trimming capacity is a surplus

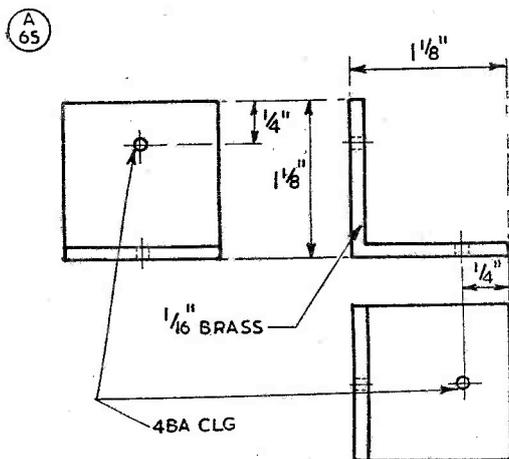
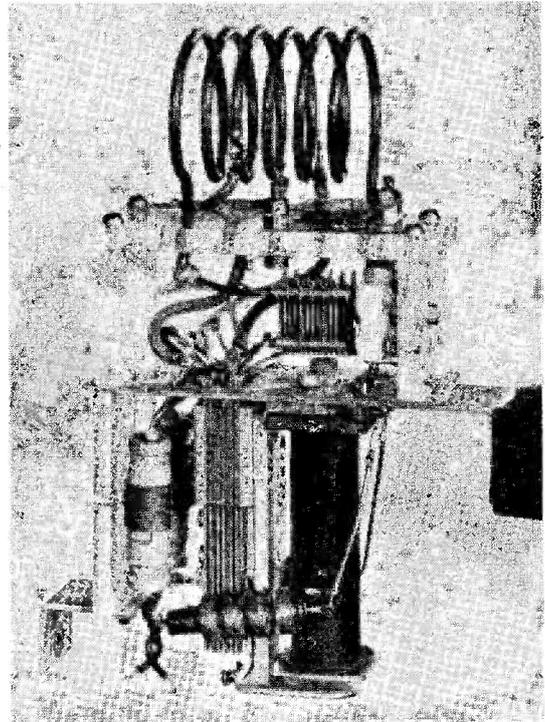


Fig. 3.



The change-over unit complete, as described by G2QC and constructed from the details given here.

component of American manufacture, the important thing about this item being the comparatively wide spacing between the plates, which is of the order of  $1/12$  in. Naturally with this spacing the difference C max to C min is not very great, and in the particular example used was a measured  $17 \mu\mu\text{F}$ . It may be thought that this value is too small to be of practical use — not so, for in practice tuning is accomplished by adjusting the padding capacity until the tuning comes within the range of the trimming condenser. This latter component is mounted at the side of the unit, on Item 5 Fig. 1, immediately beneath the padding condenser. The condensers described are quite capable of handling maximum permissible transmitter power ratings.

The tubular series blocking condensers are held by a clip screwed to Item 3 Fig. 1, using the 6BA tapped holes shown. A 4BA clearance hole is drilled through the long dimensions of Items 3 and 4 and a length of 4BA studding  $4\frac{1}{4}$  in. long passes through the fixing bracket Fig. 3 and Items 3, 1, 4 and 2 Fig. 1 in that order, the whole being secured by 4BA nuts at each end of the studding. Item 5 is secured to the top plate by two  $\frac{1}{2}$  in. 4BA

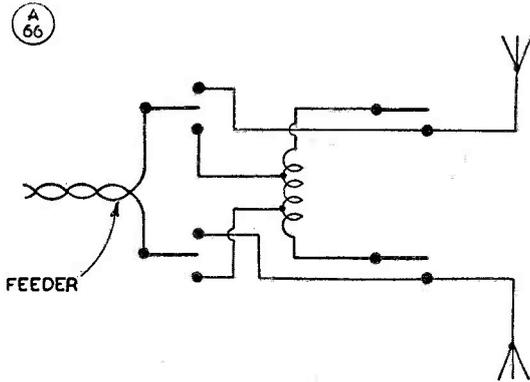


Fig. 4. Circuit of the change-over system.

screws tapped into it, as can be clearly seen in the photograph, and the bottom is secured in a similar manner by one 4BA screw which passes through the second fixing bracket, Item 1, and into a 4BA hole tapped in Item 5. This completes the assembly.

**Wiring Sequence**

There are of course several ways of wiring up the relay contacts, and as it is of some importance the best method is shown in Fig. 4. The centre point earthing of the auto-transformer is arranged by a short length of

wire from the transformer to the 4BA studing, which is earthed *via* the feeder screen, case and fixing bracket. The short wave HF chokes which carry the DC energising current to the relay are suspended in the wiring; this can be seen in the photograph. These components must be capable of carrying the current demand of the relay without overheating, and should be of sectionalised winding construction to reduce strays.

The transformer details were given in the previous article, and it is not necessary to repeat them here. The value of padding capacity required by the tuned secondary on the lower frequency bands may be unrealisable by units using the method of construction outlined here. High quality condensers are happily fairly easy to obtain in the range 50-100  $\mu\mu\text{F}$ , and it is suggested therefore that the required tuning capacity be built up from one of these, shunted if necessary by the form of condenser described above, adjusted to bring the tune point to within the range of the trimmer.

**Weatherproofing**

If one possesses some Perspex sheet, or similar material, the weatherproof case can be tailored to fit the unit, with the proviso that it must be made *really weatherproof* by painting

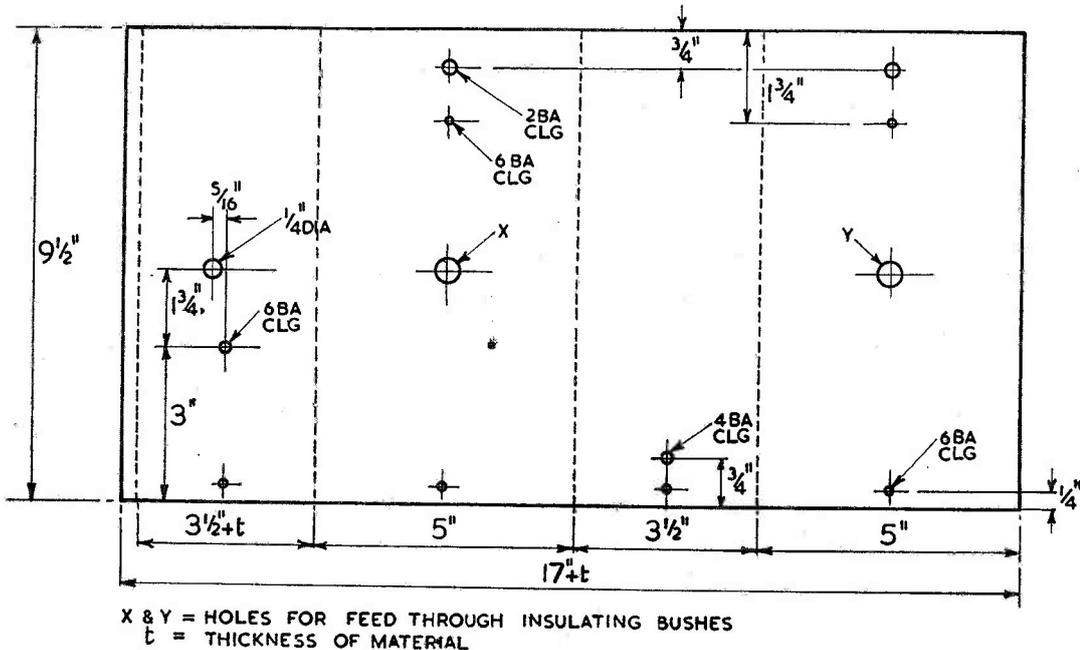


Fig. 5.

A 66

A 67

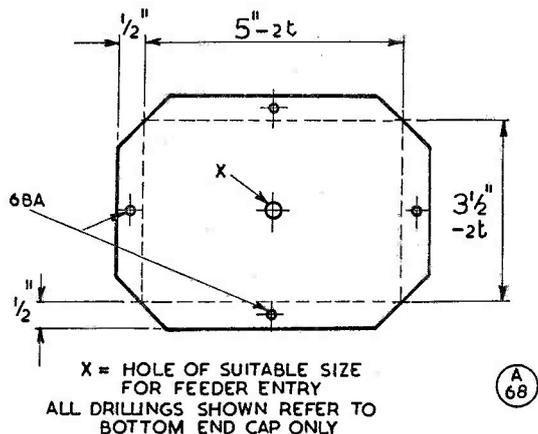


Fig. 6.

the joints, cable entry, screw holes and so on, with thick Distrene varnish; thus, an excellent job will result. Perspex, however, can be very expensive if purchased at other than scrap value, and an alternative is described below.

The material used, 28 gauge tinplate, has proved quite satisfactory in operation. The dimensions given are the minima for this material, and no attempt should be made to decrease them if the efficiency of the unit is to be maintained. A sheet of 28 gauge tinplate  $17\frac{1}{4}$  in. x  $9\frac{1}{2}$  in. should be marked out, drilled, and bent along the dotted lines as shown in Fig. 5. The free edges are then trimmed and sweated together, forming the waterproof joint of an open ended box. Two end plates are then made of the same material, Fig. 6, bent along the dotted lines, and one of them inserted into the top of the box and soldered round the edges. The supporting lugs of 2 in. x  $\frac{1}{2}$  in. x  $\frac{1}{8}$  in. brass are then firmly bolted to the top of the box, Fig. 7. The weatherproof feed-through bush insulators can now be mounted in the positions indicated, and the unit placed inside the box with the coil towards the top. The aerial leads from the unit are soldered to the inside tags of the feed-through bushes and the unit itself bolted into its final position by means of 4BA bolts passing through the sides of the case and into the holes in the fixing bracket. A hole large enough to admit the feeder cable is drilled in the centre of the second end plate, and the end of the feeder prepared by stripping off about 4 in. of the screening, leaving the two insulated conductors free. The insulation is removed from these, exposing about  $\frac{1}{8}$  in. of the conductors, which are then tinned with solder. The prepared end of the feeder is pushed through the

end plate from the inner side as far as the screening, which is then soldered to it. The feeders are now soldered to the series blocking condensers, and the end plate inserted into the bottom end of the case, and secured by 6BA nuts and bolts. This completes the unit except for painting the outside of the case with a waterproof paint, paying particular attention to any point where moisture is liable to enter. It is advisable, however, not to paint the feed-through insulator, or at least to keep the paint well away from the conductors carrying RF current.

### Tuning Process

The completed assembly can now be erected in the open, in such a position that the unit can be reached for tuning purposes. The feeder is lightly coupled into the transmitter, which is then tuned on the fundamental mode. Coupling is increased until the transmitter is loaded correctly, and the voltage distribution along the aerial checked by means of a neon lamp. On the assumption that everything is satisfactory, power is switched off from the transmitter, the relay switch is operated, the coupling reduced, and the transmitter changed over to the harmonic frequency. Using a screw-driver which has both handle and shank insulated, the trimming condenser is adjusted through the hole provided in the side of the case. Resonance can best be checked with the aid of a neon. It should be remembered that for one complete revolution of the tuning capacity, two separate tuning points should be apparent, indicating that the condenser is not limiting. The hole through which the trimmer was adjusted may now be sealed, and the unit is completed.

In conclusion it must be said that the particular unit described above belies its title, as with the coming of the 21 mc band it will perform efficiently on *three* bands—14, 21 and 28 mc.

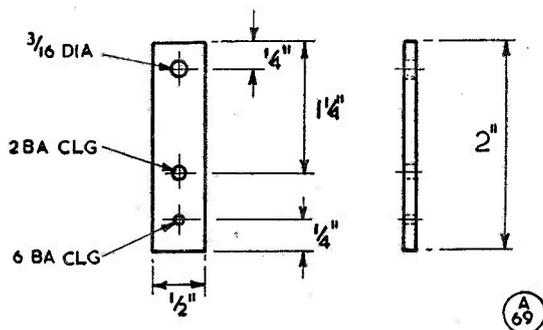


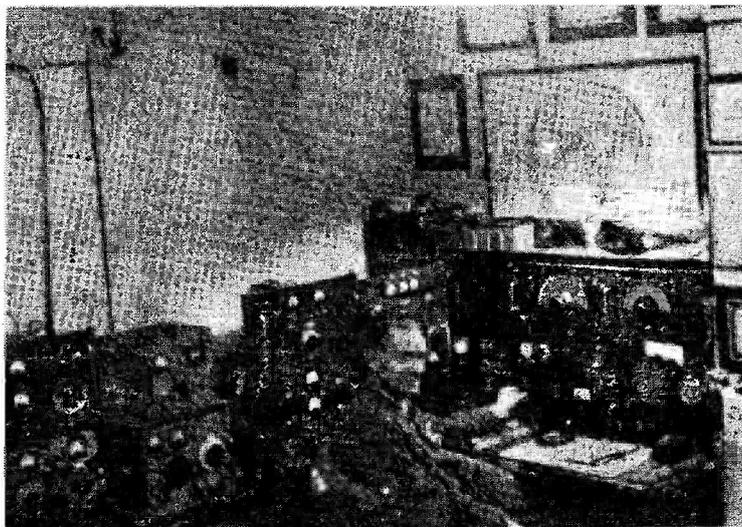
Fig. 7.

# DX COMMENTARY

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

IN the course of a very interesting letter, one of our leading DX-chasers reprimands us this month for not providing enough *advance news* of DX activities. The theme of his letter, in fact, is "How can we poor people work VQ7UU and VQ9UU and the rest of them if you don't tell us beforehand where they are going, and on what dates?" The short answer, of course, is that the "poor people" referred to will just have to listen for the DX like the rest of us! We do tell you about forthcoming activity when we happen to know about it ourselves (which is only part of the time); but quite a number of the fraternity who move about have now discovered that it does *not* pay them to stir up the publicity in advance! If they go off into the blue without a word, they still get plenty of QSO's, and the general atmosphere is a little more comfortable than it would otherwise be.

But when this same correspondent continues "Why pad out your Commentary with all this Top-Band nonsense and pretend that it is DX?" we feel that we really must take a much stronger line. It is by now a cliché that "DX is where you find it," and that it has really nothing to do with distance measured in miles. Among all our countless readers, we doubt whether there are more than *ten* whose outlook on radio is the supremely narrow one that keeps them listening on the DX bands, all through their spare-time hours, merely looking for "New Ones." (There might be ten of them, or it might be as low as five).



GSLH

## CALLS HEARD, WORKED AND QSL'd

By comparison, we have several hundreds, or probably thousands, of readers whose idea of DX is much broader. They derive equal pleasure from working a new county on the Top Band or from having a midnight chat with a W4 when they thought the 20-metre band would be dead; and they don't go into a relapse and stay away from the office if they happen to miss VQ7UU. We shall try to keep a sense of proportion at all times, and, while advance news of expeditions and of new exotic stations will always be published as soon as we get it, we shall *not* fall over backwards or burst any blood-vessels over this aspect of DX. The Top-Band news features largely in this Commentary, these days, because it forms the bulk of our mail; and therefore we know that a large number of readers must be interested in it.

In short—our job is to Report the News as it comes in. At present it is coming in very well, but not much of it is concerned

with super-DX, new countries, expeditions and the like. The bulk of it deals with the normal activities of keen DX-men who are making the best of this bad period by using whichever band gives them the most amusement. Therefore, the emphasis on QRP work on Top Band may continue for a few more months . . . and don't blame your Commentator for it!

### The Month's DX

Round about mid-September there was a great improvement on the DX bands, and even 21 mc came to life with a roar. We were amazed to find that band full of W's one evening at about 1600 GMT, but we found 14 mc even better at the same time (as one would expect), with W6's and 7's sounding almost like their real selves instead of the astral bodies we have become used to. It's a *pleasure* to derive actual physical pain from a W6 piercing the eardrums!

It looks as though we must

expect our good conditions (if any) to come in short bursts. Most enjoyable when they arrive—but pretty exasperating if you only hear about them afterwards.

**DX on Twenty**

One good period arrived towards the end of August, when we heard a pack forming for AC3SQ on about 14100 kc. The time was 1800 GMT, and at the same moment YV5AB and VP8AJ were in full cry lower down the band. By the way, we have it direct from AC3PT that he and AC3SQ are the only two AC3 stations—so that the “AC3NP” everyone was chasing a while back is a pirate.

Another piece of Horse’s Mouth News is that PX1YR is now legitimate. He is, of course, the one and only native of Andorra who is interested in Amateur Radio, and *not* an expedition.

G3AAM (Birmingham) cheered himself up with two new ones, both on phone, on September 14. They were VU5AB (1600) and KAØIJ (similar time). QTH’s

Nicobar Is. and Iwojima. ‘AAM heard VR4AE on CW the same day, around noon, but didn’t raise him. We received KB6AO the following day at 1300 GMT. And we hear from G5BZ (Croydon) that several of the gang were calling KB6AY. ‘BZ didn’t get him, but raised VR2AS on September 15. Others since last month were VQ9UU (both Amirante Is. and Bird Is.), VS9UU, FD4BD and some lesser fry.

G3GUM (Formby) reports DUICE one afternoon, also FI8AD, VS1FN and some South Americans, as well as VQ9UU and VS9UU. G3ABG (Cannock) worked CEØAA, FP8AP, FP8AQ (Sahara) and CR6CS, and tells us that VS1FZ (ex-G2ATM/3FYN) wants U.K. contacts with his B2. Hours are 1500-1700 GMT, with an extension to 1830 on Saturdays. Frequencies 14020, 14056 and 14094 kc.

G3JWR (Scunthorpe) got home and found his ticket waiting for him. During tea he “memorised” the call, and within an hour or so he had his first three QSO’s—with DL, W3 and W4! Since then many other W’s have been worked, also VE, OY, OD, CT2 and the like—all with 22 watts.

G3CMH (Yeovil) found the band much improved, and raised KV4AA, SU and WØ on CW. Phone brought in ET2ZZ, OD, SV, TA, VS1, ZD4 and 4S, among others. G4ZU (Croydon) registered with FB8UU, VQ7UU and VQ9UU, and says he was told that CEØAA answered him several times, but he didn’t hear him through the London QRM! A card has arrived from NE1NMC, and one is said to be on the way from VK1HM.

G6VC (Northfleet) has been testing a 14-mc Ground Plane, but finds it two points down compared with a folded dipole. He raised OY2Z, PJ, FQ, JA8, CP, VP6, HR, VP5, TI and other nice ones. G2YS (Chester) did nicely with JA1AL and 8AA, VS1FZ, CEØAA/MM, VP8AJ and VP6UN. Gotaways were ZC5VS and SV3AC (?)

**DX on 21 mc**

News of 21 mc is not particularly startling, but it certainly has

**DAYLIGHT CONTACTS ON 160 METRES**

August 22-23, 1400-1600 GMT

MDT No. 2

Miles	Stations
360	GM3ANG—G3CKC/A
350	GM3ANG—G3SD
280	GM3IGW—G5JU*
270	GM6FB—G5JU
230	G3PU—G2MJ
220	GM6FB—G3ITY
220	G3US—G3PU
220	GM3OM—G2YS
210	G3PU—G3IVH/A
205	G2AOL—G6GM
200	G2YS—G2JF
200	G3PU—G3IQO
200	GM6FB—G2MJ
200	GM3IGW—G3FOO
200	GM6FB—G8OK
200	GM3IGW—G8OK
185	G2YS—G2AOL
180	G2FIX—G3US
180	G2YS—G3PU
180	G2HDT—G6GM
170	G2YS—G6GM
170	G2FIX—G3IVH/A
170	G2YS—G2HAJ
160	G3CMH—G5JM
160	G3CMH—G2YS
160	G3BEC—G2YS

\* Called each other but no contact

been open, which makes a nice change. G2BJY (West Bromwich), who sticks to the band through thick and clear, found it very poor, but worked GC3EML and GM3EOJ for two new ones! G3CMH raised KV4AA, TI2TG and YO5LC on CW, with phone bringing in CE, KZ5, PY, VQ4, YI and ZD4. Gotaways were HP1CC, HK, TF, VP6 and ZD9AA.

G3GUM has coaxed his score up to 80 with SV1SP, but was badly hurt by three Gotaways—DU7SV, HC1JW and KG4AU. At 2230 on September 12 he heard TI2TG working ZL3JA, and peaking 589 in the process.

**RECEPTION REPORTS ON 160 METRES**

August 22-23, 1400-1600 GMT

MDT No. 2

Miles	Receiving Station	Transmitting Station
375	G3PU	GM3OM
365	G2AOL	GM3IGW
360	G2AOL	GM6FB
300	W. Iball	GC3EML
225/250	G3HIS	G4IV
	G3HIS	GM3EFS
	G3HIS	GM3IGW
	G3HIS	GM3OM
	G3HIS	GM6FB
	G3DCJ	G5JU
	DL2PT	G3HRW
M. Dransfield	GM3OM	
220/225	G3HIS	GI6YW
	W. Iball	GM3OM
	W. Iball	GM3IGW
	M. Dransfield	G6GM
	R. Iball	GM6FB
R. Iball	GM3IGW	

'GUM insists that the band has not been dead; it is only patronised by the old reliables, who, naturally, can't keep it populated *all* the time, and the crowd doesn't get on and make itself heard.

G3WP (Brightlingsea) is back on the DX bands after trying his luck on VHF, and says it's a treat to hear short-skip Europeans on 21 mc! His score is up to 26.

G5BZ raised HC1MB, KG4AU, KV4BD and KZ5CP, all on phone, putting his score up to 74. G3HCU (Chiddingfold) has also been on phone, and has collected CN8, KV4, VQ4, W, ZD2, ZS and ZS7 in the course of a few days, as well as several short-skipppers.

GM2DBX (Methilhill) is yet another phone man who has turned to this band, now proudly establishing himself at the bottom of the ladder with a score of 2! This also puts him into the Five-Band Table, with a Phone-Only figure.

#### MDT No. 2

The second *Magazine Daylight Test* (MDT No. 2) on the Top Band was held on August 22 and 23, between the hours of 1400 and 1600 GMT, and produced some very interesting results. Conditions were rather better this time, and although the actual number of stations making really long-range contacts was small, the QSO's themselves were numerous. (After all, it only needs ten stations on the band to make 45 contacts possible!)

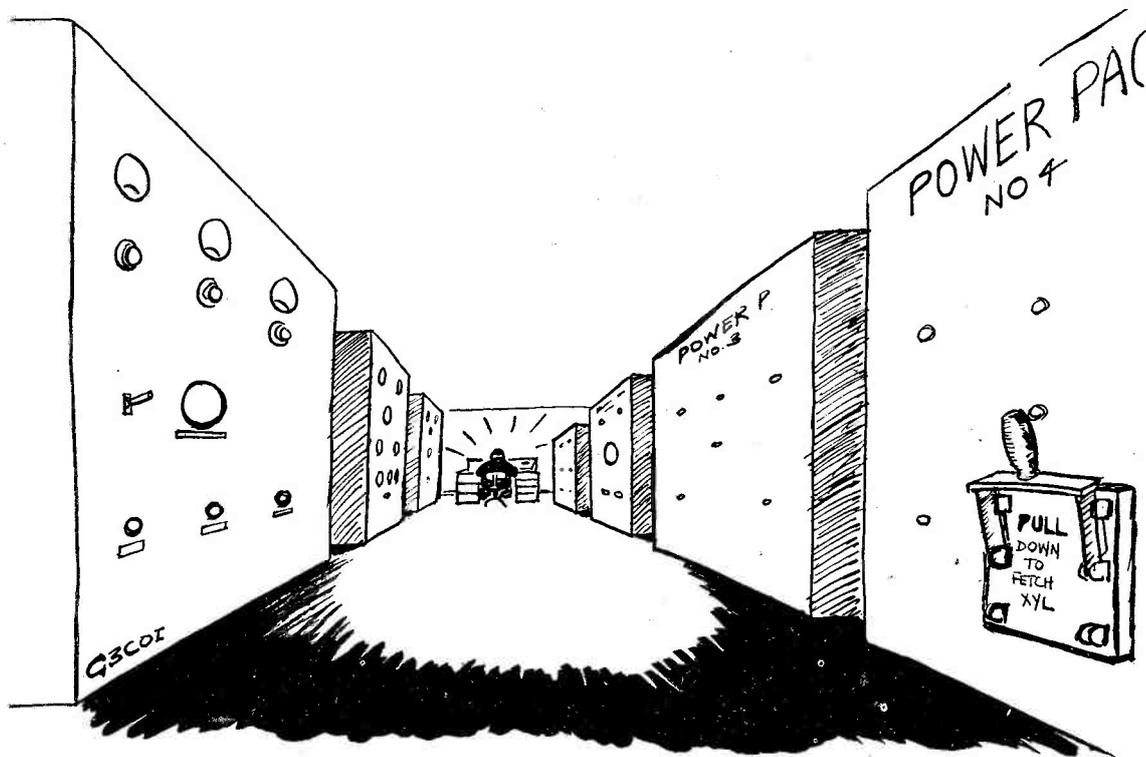
There has never been any suggestion of making a "contest" out of these tests, but we couldn't resist the urge to draw up tables showing the best distances covered, and these—one for two-way contacts and one for reception—tell their own story.

The longest hop in the former table was achieved by GM3ANG (Shetlands), who worked G3CKC/A (Durham) and also G3SD (Newcastle) for the second longest. After him, the other

GM's figure largely in the table, as might be expected. The best ranges among the G's were achieved by G5JU (Birmingham) and G3ITY and G2YS (both Chester), others above the 200-mile mark being G3IQO (Liverpool) and G3PU (Weymouth).

Contacts between 100 and 160 miles were so numerous that it has not been possible to include them in the table. The fact remains that we had some twenty QSO's at ranges in excess of 160 miles, during two *daylight* periods of two hours each.

Here are some comments from those taking part in the tests: G2HDT (Burton-on-Trent)—"Despite a small CC rig on 1820 kc only, a thunderstorm on Saturday, and phone QRM on Sunday, it was a Good Thing and I thoroughly enjoyed it." G5JU—"No contacts made on the Sunday; spent most of the time listening, but heard nothing beyond the 130-mile mark." G2NJ/A (on a houseboat in



"Calling CQ Top Band, Any Phone Station . . . ."

Hunts.) — “Reached Yeovil, G3CMH, at 150 miles, on the Sunday afternoon. Hope you will run more of these very interesting tests.” G16YW (Belfast), with his aerial still tied to the back fence, worked G4NS, GM3OM and G2MJ, hearing several others.

G3CFG (Herts.) raised three stations over the 100-mile mark; G3IQO (Liverpool) made one 220-mile contact and heard seven or eight at over 200 miles. GM6FB (Paisley) thought conditions good, but found the noise-level high. He says that there is a good path from Paisley to Belfast (110 miles) over the entire 24 hours, with signals never less than 569.

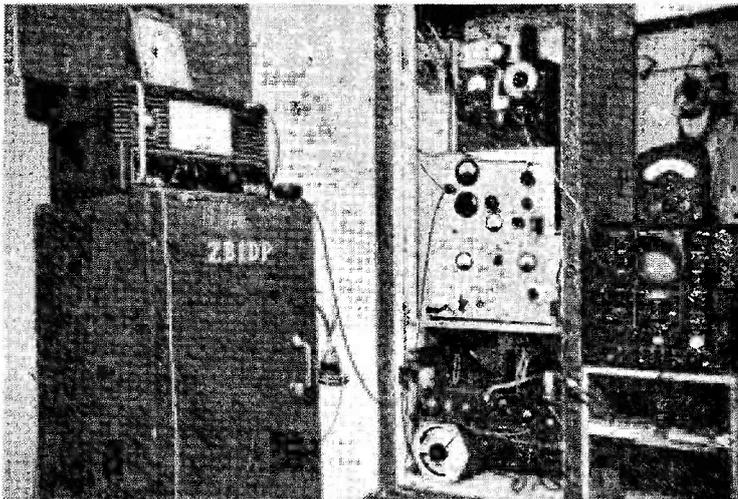
### The Receiving Side

One of the most successful stations on the receiving side was G3HIS (Derbyshire), who was heartbroken at not being able to transmit during either period. He heard lots of stations at ranges over 200 miles, all round the compass from G4IV (Truro) and G16YW (Belfast) to the GM's, and down the East Coast to G2JF in Kent.

G3DCJ (Lands End) also had no transmitter for the band, but listened and heard G5JU for his best DX, with GC2CNC (175 miles) as runner-up. DL2PT (near Dusseldorf) heard G3HRW (Yarmouth) working a station described as G3GGN in Yorks.—but as G3GGN is in Sussex, we still don't know the truth of this one. If it was G3GGN that was heard, he was, of course, somewhat further from DL2PT than was the Yarmouth station.

M. Dransfield (Nottingham) kept watch on the Sunday, and logged stations up to 245 miles (GM3OM), taking in all points of the compass from London to Devon, and Dorset to Scotland. His log contains ten stations at over 100 miles.

W. Iball (Wigan) found GC3EML at roughly 300 miles, G2HAJ (Hants.) at 200, and G8TS (Surrey), G3ERN (Essex) and G3IUL (Middx.)—all at nearly 200, in addition to the GM's at well over that distance. His brother, R. Iball (Worksop) also sent in a good log, his best being GM3IGW at 225 miles and



ZBIDP, Malta, G.C., is equipped for all bands 3.5 to 144 mc, the main transmitter using an 807 as PA with 50 watts input, Clamp modulated by a 6V6. The two-metre PA is a 10w. 832, and the main receiver a modified S.640 with a converter for 144 mc. The S.640 modification consists of the addition of a second mixer and IF strip at 115 kc, making it a double superhet, with a 500 kc crystal calibrator also incorporated. Aerials at ZBIDP consist of a 14 mc 3-ele beam fixed on the U.K., with dipoles for 21 and 28 mc; for 144 mc, a rotatable 4-over-4 is used.

GM3OM at about the same distance. The list shows that he heard stations from all round the country, best ranges being to the GM's mentioned as well as to GM3EFS and 6FB, G16YW, G6GM, GI3CVH, G8TS and G3GGN.

It should be noted that those enthusiasts who happen to reside roughly in the centre of the British Isles stand a good chance of 200-mile ranges in several directions, but a poorer one of achieving the really long ranges. The GM's, of course, are nicely placed for runs of “300 plus,” but there is no chance of all-round coverage in the way of 100-mile contacts to the East, West or North—with the solitary example of the station in the Shetlands.

Quite a lot of people have been surprised by the results obtained in these daylight tests, and if they have the effect of stirring up more daylight activity, then it is all to the good. Far too many Top-Band users have been holding their horses until 2230 or later, under the impression that there was no point in using the band for anything but local phone contacts during the earlier parts of the day.

G2YS reminds us that during the first MCC (1946) G3LP, of

Cheltenham, worked D2CH, near Kiel, in daylight. That 500-mile record still stands.

### Top-Band DX

Some real DX work is also going on; some of the W's can be heard over here practically every morning, and it is beginning to look as if they *could* be heard here all through the year.

Meanwhile, activity in the direction of New Zealand is boiling up. We have known for some time past that a few W's, mostly 9's and O's, have been getting through, but we had the good news, a few days ago, that W1BB has at last made a two-way contact with ZL. Stew has accordingly applied for the very first Top-Band WAC Certificate, with cards from FA8BG, ZC4XP, EI9J, KV4AA, HC1JW and ZL3RB. Certainly an outstanding achievement in Amateur Radio history. (Those fellows standing at the back, there, who laughed when we first mentioned Top-Band WAC's, can now turn their faces to the wall . . . .).

W1BB had it from W2WWP that he had worked ZL1WW in daylight one morning on a pre-arranged sked, so he decided to get in on the job. After several

## 21 mc MARATHON

(Starting July 1, 1952)

STATION	COUNTRIES
DL7AA	84
G3GUM	80
VQ4RF	79
DL2RO	75
G5BZ	74
G2WW	73
G2BJY	69
G6QB	68
G4ZU (Phone)	63
G2BW	62
G2YS	61
G3TR (Phone)	57
G3DO	56
ZS2AT	54
G8KP	50
VK2AWU	47
G6QX	46
G3CMH	44
G3FXB	40
G8OJ	37
G3HCU (Phone)	34
G2DPY	32
G3ABG	32
G3WP	26
G5FA	26
GW3CKB	19
G8VG	17
G2DHV	10
GM2DBX (Phone)	2

tries, during which he heard ZL1WW (and the ZL also heard him, but there was no contact), 'BB finally worked ZL3RB, 1WW and 1AH, in that order, on August 19.

QSO's began at 0955 GMT and continued until 1035—still quite early morning by EST. W2WWP and W9NH were also successful, and the ZL's heard by one or other of this trio were 1AH, 1NX, 1WW, 2ACV and 3RB.

Meanwhile, taking advantage of the season's possibilities in this direction, we have a new series of organised tests between ZL1AH on the one hand, and G6GM

(Holsworthy) and G6CJ (Stoke Poges) on the other. Up to October 9, ZL1AH will have been on 1876 kc, calling at 0600-0605, 0610-0615 and so on (times GMT), with the G stations calling him in between. The period from September 28 until October 9 seems to be the most favourable for the Antipodes, and all stations concerned have aeriels which gave at least a sporting chance of results being obtained. What results there were will be reported in our next.

## Other Top-Band News

G2AOL (Otford) has raised 65 out of his 72 counties with 2 watts or less. He is chasing the QRP 200 Award, and thinks it will take him roughly another two years (this involves working a total of 200 counties on 1.8, 3.5 and 7 mc.)

DL2PT (BAOR) asks us to explain his appearances on the Top Band, which have puzzled many people who have worked him. He was licensed in 1949 (Top Band included), and then spent some time in ZC4. On returning to Germany he applied for, and was issued with, his old licence, with exactly the same conditions and frequencies as before! He had no idea that Top Band had, meanwhile, been struck off their list, so he used the band normally and in good faith. He has no regrets and makes no apologies—and, as he says, lots of G stations now have their DL2 cards, "due to a wonderful misunderstanding." He is now applying for special permission to use the band during the winter DX tests.

Incidentally, one station mentioning a recent contact with DL2PT is G2NJ/A, who made it from his houseboat on the river in Hunts.

We have a "late flash" from G2YS, who operated with GW3GIZ/P in Merionethshire on September 13, from 1100 to 2000 BST. This rush trip was highly successful, and 63 contacts were made in 27 counties, including GM3IGW at 1535, and two other GM's. QSO's ranged from Scotland right down to Devon in the South-West and Kent in the South-East—and *all in daylight*. The big trouble was phone QRM,

and 'YS says that they had one or two phone contacts but found the chaps "so long-winded and flannel-eared" that they went back to snappy operating on CW. All contacts will be QSL'd in due course.

G3HIS (Ashbourne) has changed from crystal to VFO, and will be rejoining the chase shortly . . . . G3HTI (Cleethorpes) has notched up 65, though still lacking Beds. and Hunts. His aerial has been down for some time, but he, also, will soon be back . . . . G3CFG (Harpenden) is a newcomer to the band, and likes it very much. He is now in the WABC chase and will be sticking to it for some time . . . . G3JBU (Northampton) is an even newer recruit, having been licensed only four weeks when he wrote. He was not lucky in "MDT," but will doubtless be around the band for the next one . . . . GM3IGW tells us that GM5RI/P has now obliged with Wigtown and Kirkcudbright! And the GW3GIZ/P contact gave 'IGW his last Welsh county. He finds that he has now worked two different stations in at least 63 counties, so probably 'IGW is the first to claim a *second* WABC! His phone score is mounting, too.

G3AKY (Sheffield) sends a specimen of the little maps on which he keeps track of WABC progress: just a simple outline map of the country with the county boundaries traced. When there is known activity in a county he shades it lightly; when it has been worked he fills in the shading in full. We should like to reproduce them, but space and other considerations don't allow it. 'AKY has now worked 62, but can't yet raise 60 cards.

## W6 on Top Band

A stop-press note from G3GUM tells us that W6KIP will be on the band this winter, trying hard for the first W6/Europe QSO. The frequency will normally be 1999 kc, but he can also use 1901 kc, and wants interested parties to make skeds. 'KIP will be using both a Vee-Beam and a balloon from a location in the desert.

GM3EFS (Alexandria) and others plead eloquently with us to abandon any form of One-Watt

WABC which will necessitate QSL-ing all over again. 'EFS, in fact, is not so much worried about the QSL situation as about possible abuses, such as making contact on 10 watts and reducing afterwards. In any case, what we really want to know is what the band is capable of under normal operating conditions.

We have been thinking about this business all the month, and the present view is that there should be no organised affair on one-watt lines. Those who like the idea of QRP are welcome to try it for themselves, and, naturally, we will be glad to report their doings. If enough interest builds up for the One-Watt idea, we will certainly run a separate ladder for the contacts made; but we do *not* propose to issue a special certificate, or ask for more QSL cards.

If T/B ops. want something that is really hard to go for, we will consider a WABC Certificate with a special endorsement for 80 Counties.

#### Other Bands

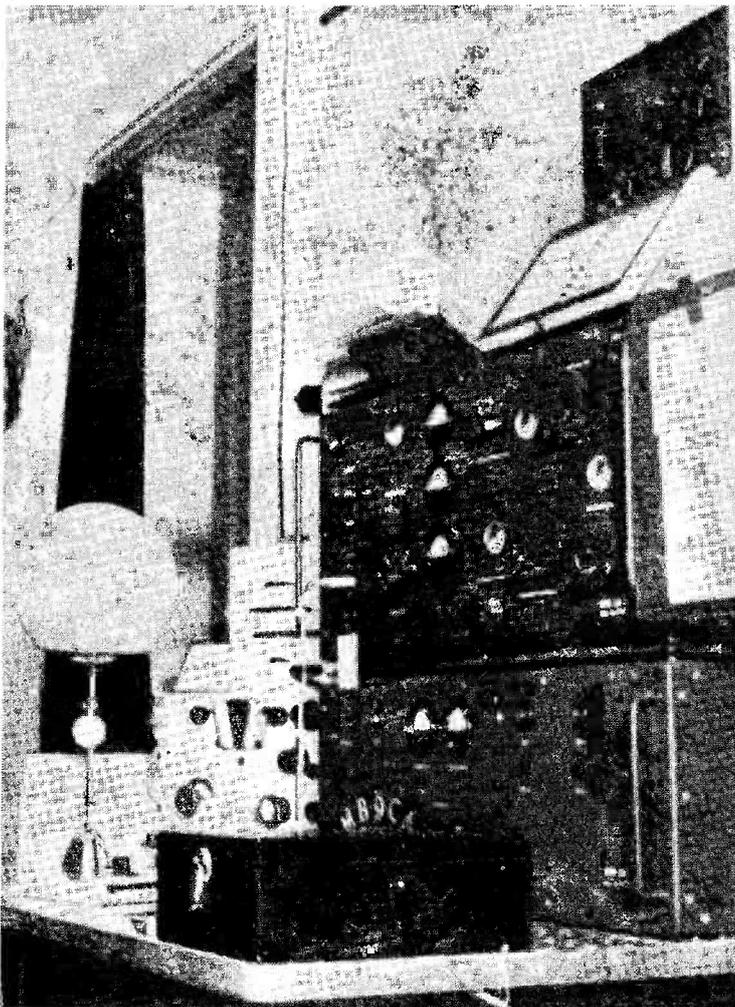
Only one letter seems to mention *Eighty* this month; G3FOO (Wirral) tells us that he raised OY5S on CW. Regarding *Forty*, he worked 9S4AB, 9S4AZ and CN8EG, all with the usual 10 watts. G5BZ didn't spend much time on *Forty*, but notched up PZ1WX.

G2AOL has also been on with 10 watts, and was surprised but pleased to work UA3AF! G3IOR works mostly *Forty* CW, and has now got to WAC and 44 countries. With his 25 watts he has recently raised LU, PY, ZL, VE and W, and finds the band wide open between 0530 and 0700 GMT. The QRO ticket arrives next month, so 'IOR should be well away then. He, too, worked a Russian on the band—UA9KAJ.

G3CMH had a few late nights on *Forty* and worked PY's and W's, with such Gotaways as LU7KD, KP4KD, KZ5CP and PY7MD.

#### General Notes

PY2AJ asks us to publish his new QTH, which is J. R. Baccarat, Rua Guaibe 103, Santos. GW3IYI (Llanelly) passes on the news that



The 100-watt rig at MB9CA, Unterbergen, Carinthia, who runs a BC-342 for receiver, with a 40-metre Window.

ZC4XP is now returning to the U.K. and that the Cyprus QSL Bureau will be run by ZC4FB at Box 216, Famagusta, Cyprus. ZC4FB is active almost daily on 7010, 7028, 14020 and 14056 kc.

GC3EML (Jersey) suggests earlier Trans-Atlantic Top-Band tests and says he hopes to get across long before December 20. We mentioned last month that several W's are going to be on regularly in the autumn, and, of course, it's up to those who fancy their chances to get weaving on this side. But the dates of the *organised* tests have been fixed and must stand. 'EML adds that

some more Ten-Metre activity would be a good thing—he worked HE9LAA on the band recently. A QSO with VK9GW on 21-mc phone was another Good Thing.

#### Possibilities

G2RO that permanent traveller, is visiting *all* British Colonial Territories in an almost non-stop series of tours taking him into 1955. The first covered ZC4, VS9, VQ3, 4, 5 and 6; the second took him to VQ2, ZE ZD6, VQ1, 4 and 8. It seems (we have this from KV4AA) that the next will see him off to VP2, VP6,

### TOP BAND COUNTIES LADDER

(Starting Jan. 1, 1952)

Station	Confirmed	Worked
GM3JDR	82	82
GM3IGW	81	84
GM3EFS	81	83
G13HFT	79	80
GM3OM	79	79
G16YW	79	79
G6VC	77	79
G8KP	77	77
G2NJ	75	76
G5LH	75	76
G3ELZ	73	76
OH3NY	73	75
G3HIS	70	73
G4XC	69	72
G3HDQ	69	70
G6ZN	68	72
G3ESY	68	68
G3IAF	65	73
G3BJU	65	68
G4FN	64	68
GM3EHI	63	68
G3HTI	63	65
G3GZJ	63	63
G2AOL	61	72
G3IQO	61	67
G3HIW	61	66
G3AKU	61	63
G3FNK	60	69
G6KP	60	67
G13CVH	60	64
G3BRL	60	61
G3IBL	60	60
G3AFL	60	60
G2YS	58	71
G3AKY	53	62
G2BJN	52	55
GW3CKB	48	61
G3ABG	46	60
G3ITY	41	52
G8JC	41	52
G3FTV	38	53
G3DO	30	39
G8VG	29	36
G3DVQ	27	30
G3NA	24	31
G3HWH	20	41
G5FA	20	38
G3FZS	20	33
G3CFG	13	35

VP1, VP3 and VP8, in that order, starting in November. April, 1954, should cover VS2, VS6, VS5, ZC5 and the like. The receiving gear is whatever he can borrow at the particular QTH being visited; the transmitter runs 15 watts on 14020 kc.

Needless to say, such tours do not leave a great amount of time (and, we should say, energy) for operating on the amateur bands—but they do at least offer some interesting possibilities.

#### News from Overseas

VS2CJ (Penang) mentions, for those prepared to dig down several layers, that the VS2's and a few VS1's run a Sunday net on *Forty*, beginning at 0230 GMT. It includes several fairly high-powered rigs, and he thinks some of the "Forty Fans" might possibly find a clear path one Sunday. The net operates regularly, every Sunday.

G3ELW writes from Vera Cruz, Mexico (of all places), where he is expecting to be for three years. He forwards a photograph of one of the two transmitters he constructed for the Vera Cruz Foundry. Reception there is very poor, but he will shortly be on the air from Mexico City, which is 7000 feet above sea level. The exhaler will only be a B.2, and the frequencies 14028 and 14103 kc—but no call-sign mentioned as yet.

VP6AM (St. Michael, Barbados) is none other than our old friend G3CDR, which call has now been "loaned" to the Post Office once more. VP6AM, as he says, will be an interesting change from VS6HR, although the problem will be to get up a good radiator with which to scatter his 27 watts. However, Geoff got a 569 from Washington using the gutter as an aerial. . . He adds that VP6 licences are to be reviewed and "tightened up" shortly.

ST2UU (Khartoum) sends a few notes about his long trip (see last month) and says that his next

will be taking place in late September or early October. He adds, to scotch some of the rumour-mongers, that Afghanistan and Nepal are *not* to be visited. (We hear rumours of ZD3UU this time.) QSL's for the VQ7-VQ9-FB8-VS9-I5 trip should be rolling off by now, and all concerned can take it that an *accurate* log was kept . . . last year YA3UU received all sorts of cards for QSO's that never happened! Along with all the excitement came the arrival of a junior 2UU, name of Graeme, and weight 8½ lbs.

ST2AR and ST2HK also write from Khartoum to point out that they have been keeping up the amateur end in the Sudan for the past year or so, and in doing so have worked more than 300 G stations without the necessity of calling CQ. They find the operating standard pretty high, but suggest that G's who have already worked them might hold back a bit and give the new ones a chance.

MD5RM is back in England by now, and he tells us that this means, also, that ZB1RM will not be heard again. Latterly he has found things pretty quiet on 21 mc, with 15 watts to an 807 tripler! Those who are short of a card from MD5RM should write to D. A. McBright, 3 Sydney Road, Richmond, Surrey.

From Tuttingen in Wurttemberg DL1IX puts in a nice list of U.K. stations heard on 160 metres during the late evenings of August 22 and 23. Ranking as EDX in this list are GM's, 3EGW, 3IGW, 3OM and GW5BI.

That just about empties the bag of this month's news. Note next month's deadline—**first post on October 14**. The following one will be first post on November 11. Address everything to "DX Commentary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Until then, 73 and BCNU.

#### INDICATOR UNIT TYPE 95

Readers who may possess circuit details of the Indicator Unit Type 95, and possibly also information on its conversion to a CRO, are asked to get in touch with: A. J. Cogill, 13 Acacia Avenue, Windsor Park, Gwelo, Southern Rhodesia.

#### LOOK OUT FOR VS1FY

VS1FY is G3HUD, Margaret Holden, of W.R.A.F. Admin., R.A.F. Changi, Singapore. Her father is G5HU, of Sheffield, one of the Old Timers. It is nice to hear of these family traditions in Amateur Radio.

# Simple Auto-Keyer

AN EL-BUG WITHOUT  
VALVES

L. BLACKIE (G3DIJ)

*While operators of the old school always in the end go back to a straight GPO-type Morse key for CW working, there are many others who are interested in knowing how they can send good Morse easily. Certain types of electronic key are so designed that it is just not possible to send inaccurately spaced characters, any faults in sending then being due to incorrect manipulation rather than bad formation. In the interesting design described here, valves are not used, the automatic dots and dashes being obtained by means of condenser-controlled relays. The nett result is a smooth working, but possibly rather noisy, auto keyer, easy to construct and adjust.—Editor.*

PROBABLY the greater part of all amateur communication is carried out on CW and a large proportion of operators have resorted to semi- or fully-automatic keying systems. No doubt there are many operators using straight keys who would like to use an automatic keyer of some kind but are deterred due to the cost of the commercial product or the complexity of the average electronic keyer.

This state of affairs was that existing at G3DIJ a couple of years ago, but a stroke of good fortune in the shape of WØFID brought to notice a circuit for an electronic keyer which looked too simple to be of much use. In practice, however, it has proved to work as well as the more complex type of keyer. Difficulty was found in obtaining several of the original component values stated, but with a little juggling of values standard parts were made to fit—suffice it to say that it was built from the “junk-box.”

In the circuit under discussion *no valves* are required, their place being taken by a pair of metal rectifiers and the total power supply requirement consists of a standard 45v. layer-type battery. It is possible to put the complete circuit, including the battery, into a box measuring no more than 4" x 4" x 6" which, it will be admitted, is a unit of extremely small dimensions.

Components needed are: Three potentiometers, three condensers, two resistors, two metal rectifiers and two relays. There are no

special considerations, the parts being wired in where they fit, and the only control which need be visible is VR3, which is the speed control, the other two—VR1 and VR2—being pre-set.

## Operation

With the paddle in the “Dot” position C2 charges, a current passing through VR1 and RY1 which operates the keying contacts; a current also passes through R2 and charges C3, and when the charge is great enough RY2 operates to open the contacts, which takes the battery out of circuit. C2 continues to discharge through both relays until the charge is reduced sufficiently to allow the relays to become normal again. VR1 is adjusted so that RY1 falls out before RY2, the action producing the spacer between dots. This action continues to repeat itself so long as the paddle is held in the “Dot” position. The adjustment can be made such that each dot and each spacer are of equal length. No current can pass through SR2 because it is the wrong way round.

With the paddle in the “Dash” position C1 charges, current passing through SR1 and SR2. The current passing through SR1 and VR2 operates RY1: the current passing through SR2 charges C2 and also C3 (via R2) which, as before, operates RY2, which brings the battery out of circuit.

Due to the greater capacity of C1 with C2 RY1 continues to hold for a longer period of time, VR2 is adjusted so that RY1 falls out before RY2 and the adjustment of this control can be made such that each dash is three times the length of each spacer. This

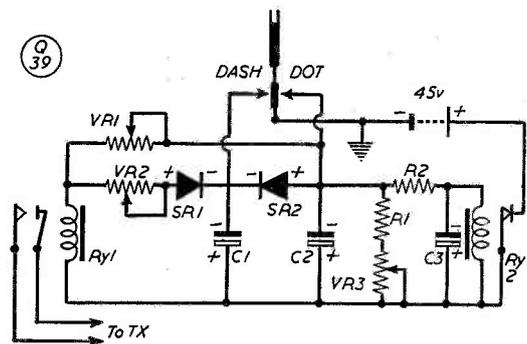


Fig. 1. Circuit of the relay-operated automatic key described by G3DIJ. Values are: C1, 32  $\mu$ F; C2, 16  $\mu$ F; C3, 2  $\mu$ F; R1, 2,000 ohms, 1w.; R2, 10,000 ohms 1w.; VR1, 20,000 ohm pot/meter; VR2, 50,000 ohms; VR3, 10,000 ohms; SR1, SR2, metal rectifiers of any type giving 30 mA or so at 50v. or more; RY1, 2,000-ohm relay, normally open; RY2, 2,000-ohm relay, normally closed.

action repeats itself so long as the paddle is held in the "Dash" position.

Obviously it is impossible to clip either dots or dashes because once the condensers acquire their charge (a process which is almost instantaneous) the battery is disconnected by RY2 and it does not matter what is done to the "paddle" because it is no longer in circuit, and the discharge through RY1 will continue for the correct length of time. At the same time it is impossible to run dots and dashes into each other, *e.g.*, if the paddle is put into the "Dash" position and then moved over to "Dot" before the dash has completed itself, the keyer will produce a complete dash, a correct spacer, and only then will it begin to send dots. The same thing applies working from dots to dashes. The operation is thus fully automatic, and dots and dashes are self-completing.

The purpose of R1 is to prevent shorting the battery out (by turning VR3 right up) and it limits the maximum battery drain and speed of keying. VR3 is the speed control; R1 and VR3 form a bleeder for either dots or dashes, the lower the value the greater the current drain and hence the shorter the relay operating time, and *vice versa*.

### Paddle Construction

The keyer was built on a small shallow chassis, all components being wired above it, and the paddle was fitted straight on to this. A small metal bracket is mounted on the chassis and a six-inch piece of hacksaw blade is bolted to it as shown in the drawing. The contact block was obtained from a small relay. The finger-grip is made of two pieces of perspex which sandwich the hacksaw blade and are stuck with Bostik; this results in a finished grip which looks like black glass and the hacksaw blade running through it is invisible; it is also quite light. The parts of the hacksaw blade which make contact with the bracket, and also the dot/dash contacts, should of course be thoroughly cleaned.

Some difficulty was experienced with the paddle vibrating when released suddenly, which resulted in a jumble of dots and dashes, but this was counteracted by simply fixing a piece of rubber at either side of the paddle near to the grip, thus damping out any tendency towards vibration without stiffening the movement unduly.

### Conclusion

In two years of use the keyer has given little trouble and the *same* 45v. battery continues in

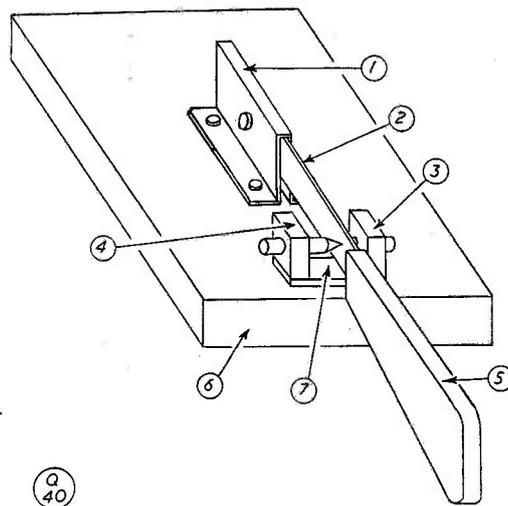


Fig. 2. Construction of a suitable paddle for the auto-keyer, as suggested by G3DIJ. Parts are: 1, paddle mounting bracket; 2, springy tongue (*e.g.*, hacksaw blade); 3, dot-contact assembly; 4, dash-contact assembly; 5, finger grip; 6, mounting chassis; 7, insulated contact mounting board.

service. The most important items are the relays because they must have sensitive and rapid movements if high speeds are to be effected; if high speeds are not required the normal GPO type of relay with the L shaped armature will operate in a satisfactory manner. It will probably be found that the relay adjustments will affect the keyer performance so it is as well to experiment a little. The relays used in the existing keyer are a British teleprinter type for RY2 and an American type (similar to those found as muting relays in the BC624) for RY1; both have 2000 ohm coils. Under these conditions the operation is completely reliable at speeds of 20-35 w.p.m., the approximate speed range being between 20 and 50 w.p.m.; the latter figure cannot be determined exactly due to inability to use the keyer at speeds in excess of about 35's. Using sluggish relays the speed range can be expected to be between approximately 10 and 25 w.p.m.

The testimony as to the effectiveness of the little keyer described here lies in requests made by at least a dozen stations "for the dope," both within and without of the British Isles. Certainly nothing could be more effective in its simplicity.

### CORRECTION — "PANORAMIC RECEPTION"

G2DYV points out that the value of the potentiometer R32 was omitted from the table on p.411 of our September issue; it should be 250,000 ohms.

# Beam Direction Indicator

PUTTING MAGSLIPS TO WORK

A. G. WOOD (G5RZ)

*This practical article in effect completes the mechanical design for the 12-element beam described by our contributor in the November, 1952 issue of SHORT WAVE MAGAZINE. It shows how a remote indicating device, to give beam headings with map presentation, can be constructed using Magslips to transfer the beam direction to a pointer working across an illuminated map. The principles are dealt with in sufficient detail to allow the system to be applied to almost any rotating beam installation.—Editor.*

It is always a good thing when operating on VHF to have some means of indicating the direction in which one's beam is headed. This becomes vital if the beam is remote controlled and out of sight of the operating position.

In the November, 1952, issue of *Short Wave Magazine* appeared an article by the writer dealing with the construction of a 12-element stacked array, and covered in the article was a description of the indicating device employed, making use of a potentiometer.

Whilst this system has served its purpose and given no trouble over a year of operating it was never felt to be the best solution to the problem, and the ensuing passage of time has enabled a much-improved and more definite form of indicating device to be planned and constructed.

The heart of the system makes use of a pair of Magslips. In this connection very little appears to have been written about these devices, whereas the various types which can be unearthed on the surplus market, by a diligent search of the trade advertisements, appears to be legion.

Basically the Magslip is a small motor, the stator of which is connected delta fashion and placed in parallel with an exactly similar motor at some remote distance, electrically speaking. There is no mechanical connection between the two units. The rotor winding will vary according to the phase of the supply for which it is intended, but this is also similarly con-

nected to the rotor of the remote unit and excited by a suitable voltage of alternating current. With the power on any mechanical rotation applied to the rotor of one unit will be faithfully reproduced at the rotor of the other—that is, one rotor follows the other, electrically—the amount of torque available in most cases being quite ample to operate some form of indicating device.

## Choice of Unit

The particular type finally secured by the writer (for less than £1 the pair) is described as a "Magslip Hunter 3" Mk. II reference AP6548." It measures 7" x 3½" and has six terminals brought out to a red bakelite base at one end. The rotor has three flying leads and is therefore obviously intended for 3-phase operation, but nevertheless tests quickly showed that connecting up two of the rotor leads and applying 50 volts of single-phase AC produced quite satisfactory operation. This particular model has a spring-loaded self-centering device attached to the spindle. With this removed it was found that about six complete revolutions were possible before the flying leads twisted to too great an extent. Since only one, or slightly more than one, complete revolution is required this is no handicap.

It was a simple matter to connect the transmitter Magslip to the base of the mast, but as the exact method employed will differ at each installation it would be pointless to describe the method employed by the writer. Care should be taken to see, however, that the mid-swing position of the mast corresponds to the mid-swing position of the Magslip, so that ample play on the flying leads is available

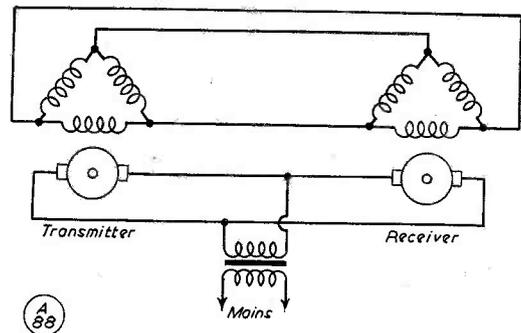


Fig. 1. Basic circuit for Magslip operation. With AC power on, nothing happens until the "transmitter" rotor is moved, whereupon the phase change causes the "receiver" rotor to shift to exactly the same extent in order to restore the balance. Hence, the Magslip principle enables mechanical motion to be transmitted electrically and, as shown in this article, one obvious application is to the design of a remote beam-direction indicator.

in either direction. The idea is, of course, that the rotation of the beam drives this Magslip; then, with power on, the position taken up by its rotor is reproduced at the operating position.

Fig. 1 shows the basic circuit for connecting two Magslips together and Fig. 2 the complete wiring circuit at the writer's station. It will be seen that six leads are required to connect the control unit to the mast unit and these supply power to the beam motor and to the relay operating the reversing gear, in addition to the indicating device.

### Direction Indicator

The indicating device can be of any desired dimensions, but for convenience a size of 12" square was chosen and consists of a box to this measurement in plywood,  $7\frac{1}{2}$ " deep. The box, which is suitably finished off with varnish or paint, houses the receiver Magslip which is carried on a light framework and so positioned that the spindle is exactly in the centre of the square and somewhat below the level of the top of the box. Fitted into each corner is a miniature batten holder carrying a 4 volt 0.3 amp. flash-lamp bulb, for illumination purposes. These lamps are intended to operate on a standard 6.3 volt filament supply and for the sake of long life are wired up in series-parallel.

All leads are brought out to convenient terminals mounted on one side of the box, there being six in all. A cardboard mask is prepared and cut to fit into the top of the box and rests on a small wooden ledge glued to the inside of the box and recessed about half-an-inch below the top. This mask has an 11" circle cut out of the centre and effectively screens the four lamps from view.

The sequence from this stage onwards is: The opaque indicating dial; the rotating pointer which is screwed or bolted to a reducing collar fitted to the end of the rotor spindle; four wooden strips or separations fitted around the inside edge of the box and of sufficient depth to allow clearance between the pointer and a sheet of clear glass to cover the top of the box; the glass finally held in position with four strips of beading.

### Map Coverage

The choice of presentation rests very largely with the individual, and if a suitable map can be secured printed on one side only, of the desired scale and large enough to cover the area of 12" x 12" with the home QTH located in the exact centre then this could be utilised very satisfactorily. If, on the other

hand, such a map is not available and the constructor has any leanings towards cartography then a dial similar to that produced at G5RZ can be fairly simply constructed. A scale of 40 miles per inch was chosen, and on squared paper two circles inscribed measuring 11" and  $10\frac{3}{4}$ " diameter. Around this  $\frac{1}{4}$ " rim the degrees of the compass are carefully plotted in 5° units. Within the  $10\frac{3}{4}$ " circle and using the centre as the home QTH an outline map was drawn using plots taken from a convenient atlas. A small hole was punched out at the centre to accommodate the spindle carrying the pointer and the major towns were marked in before glueing the map over the cardboard mask. An additional refinement was to add circles corresponding to 40, 80, 120 miles, outwards from the centre, which is the station location. Thus it will be seen that a radius of 215 miles can be covered in all directions. The DX hounds are advised to use a scale of 100 miles per inch, but then would have to be content to omit town names and substitute counties, which doubtless would suit them equally well!

### Setting Up

Aligning the pointer to the beam when the whole arrangement is set up can be achieved by loosening the set-screw holding the reducing collar to the rotor spindle—this can be done at any time by removing the plywood or hardboard back of the instrument — or else by setting the pointer correctly on the spindle before tightening up and, of course, before

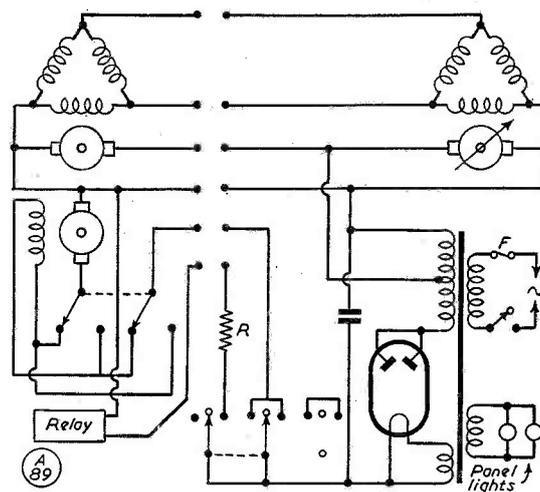


Fig. 2. Practical circuit arrangement for the beam-direction indicator described by G5RZ, using a pair of Magslips. These are readily available as surplus, at various ratings, and should of course be bought as a transmitting-and-receiving pair.

fitting the glass front. If the pointer is reasonably well balanced there will be sufficient friction in the rotor bearings to prevent it from swinging out of alignment during the times when the power is switched off. In any case, so long as the swing is not too great it will pull back into the correct phase when AC voltage is applied to the indicating circuit.

The lamp circuit can either run from a

suitable tapping of the transformer supplying power to the Magslips, in which case the indicator is illuminated only when the beam is ready for rotation, or else from the heater supply to the receiver.

The total cost of the whole job should not exceed 30s. and represents a worthy return for the small outlay and the time spent on construction.

### XTAL XCHANGE

Those wishing to exchange crystals are invited to make use of this space, which is free. Notices should be set out in the form below, headed "Xtal Xchange—Free Insertion," and all negotiations conducted direct.

G3EJR, 40 The Oval, Mirehouse, Whitehaven, Cumb.  
Has 5910, 6370, 8007, 8111 kc crystals,  $\frac{1}{2}$ -in. spacing, also 6450 kc,  $\frac{3}{4}$ -in., all U.S. types. Wants 7500 kc crystal and any frequency 8011-8022 kc in FT-243 mounting.

G3IDG, 95 Ramsden Road, Balham, London, S.W.12.  
Has QCC Type P5 crystals 1809.5, 1922.5 and 1941 kc, certificated. Wants same type 8047.3 to 8069.5 kc.

SWL, 3 Marlboro Grove, Ripon, Yorks.  
Has 100 kc bar,  $\frac{3}{4}$ -in. mounting, and 455 kc IF crystal. Wants 1000 kc bar.

### DL's AT THE GERMAN RADIO-TV SHOW

In connection with the German Radio & Television Exhibition at Dusseldorf during the period August 29-September 6, the D.A.R.C. had two amateur stations in operation. DLØAR ran 10 watts on 40- and 80-metre CW, working 18 countries; one of their British visitors was GW3ZV, who gave them a schedule when he got home again. DLØFA was a more ambitious undertaking, running 150 watts on the 80-metre phone band; the transmitter itself was located about a mile away from the Exhibition site, and operated by control line. As is usual on these occasions, the great difficulty was reception through the barrage of electrical interference, and many of the weaker stations known to have called DLØFA and DLØAR could not be read through it. According to our report from DL1IX (one of the operators on DLØAR) many foreign visitors came to the amateur stand, and the whole undertaking is felt to have been well worth while. And a note for the anxious—QSL cards will be coming along in due course, including cards for those SWL's who sent reports.

### "PRACTICAL CAPACITY TESTER"

Arising from this useful article in the September issue of *Short Wave Magazine*, G3DXI (Skegness) makes a number of suggestions which, from his own experience with a similar instrument, would make it even more versatile. These are: (1) A neon connected between HT + and a third test terminal would enable a condenser placed between the latter and earth to be tested for leakage; (2) Using a 1 mc

crystal confers two important advantages—(a) signal output at 1000 kc and its harmonics for calibration purposes, and (b) the lower oscillator frequency allows C2 to be made much larger, thus increasing the range of the unit; (3) By terminating the points X-X (*see* original circuit, p.403) at a coax socket it is possible, by using a short length of coax cable, to measure condensers *in situ*, provided that one side is earthed and remembering to balance out the coax cable capacity by the "set-zero" condenser C1 in the unit; (4) If one side of the test circuit is earthed down, C1 and C2 can be mounted direct on a metal panel or chassis; (5) Within limits, inductance can also be measured, or roughly checked, by calibrating settings of C2 against various coils of known inductance value. All this will probably be of considerable interest to those constructing the Tester—as well as to the author of the original article!

### NEW ADCOLA IRON

A new addition is announced to the range produced by Adcola Products, makers of Soldering Instruments and Equipment. It is an iron for use on super-fine work, such as soldering of hair springs of measuring instrument movements, miniature rectifiers, deaf aids, and similar delicate items. It is fully insulated for any voltage range up to 250 volts.

### PRICE CORRECTION — UNIVERSAL AVOMINOR

With reference to the advertisement in our August issue, we are asked to state that the price of the Universal Avominor (*see* p.321) should be £10 10s., and not as given in the advertisement.

### CARDS IN THE BOX

Cards are held at our QSL Bureau for the operators listed below. Please send a large s.a.e., with name and call-sign, to: BCM/QSL, London, W.C.1, when they will be forwarded on the next G clearance. If publication in our "New QTH" feature and in the *Radio Amateur Call Book* is also required, that should be mentioned when claiming the cards.

G2AVX, 2BRT, 2FLA, 3CWB, 3INO,  
3INW, 3IVX, 3IYO, 3ICJ, 3ICU, 3JDT,  
3KXG, 4UX, GM2BXL, 3IVZ, 3IWU,  
3JBM, GW3JBH.

FEW who will be reading these lines will need to be told that once again we have had good spells of favourable EDX and GDY conditions—but not for Q.C. No. 2—with a correspondingly high level of activity, and even some QRM in certain areas—but not during Q.C. No. 2!

The week-end September 12-13 produced a sensation with the appearance, under good EDX conditions, of HB1IV on 144.7 mc, operating /P (as the call-sign indicates) from Mt. Pilatus. This is a craggy-looking peak in the neighbourhood of Lucerne, given as 7,000 ft. a.s.l., with the actual summit accessible. The pin-point, for those who may want to calculate distances, is 46° 57' N, 8° 10' E, and for a convenient check, the near-enough distance from Birmingham would be 620 miles.

Having got started on the Friday evening, 11th, when he worked ON4BZ and some other Europeans, HB1IV went on to QSO a large number of G stations over the week-end; in the South, he was a workable signal all the Sunday morning. There were several operators on HB1IV, the station being provided by HB9IV. It is the very first time any real VHF DX has ever been worked from Switzerland (excluding some odd sporadic-E occurrences when we had five metres). On this occasion, the HB signals penetrated as far North as G5YV (Leeds) and were heard on the East Coast by G5BD (Mablethorpe) and G6LI (Grimsby). But with them QSB was severe and signal strength low, not more than S6 on peaks. On the other hand, ON4BZ was with them practically the whole time—so that in spite of his altitude HB1IV was not getting much further with a really solid signal than the Midlands and the South of England. There is also some evidence that during the session his signals were “passing over” ON and northern F, as he was not an easy QSO from these areas.

HB1IV is thought to have worked some 30 G's in all, and at the moment of writing it is not quite clear who made the G/HB “First.” At present, it looks like

# VHF BANDS

A. J. DEVON

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Many G's Work HB1IV,  
September 12-13—

Survey of DX Conditions—

Large Movements in the Tables—

Many EDX/GDY Contacts  
Reported—

High Activity and Good  
Openings during September—

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G6OU (Basingstoke) at 1530 GMT on September 12—is there any advance on this, please?

Incidentally, HB1IV had laid on this /P trip for what he thought was going to be the European VHF Contest, which this year is supposed to be organised by U.S.K.A., the Swiss amateur society—but at the last moment, apparently, the contest was “postponed” by U.S.K.A., to a date vaguely said to be October 18. As no rules or dates have ever been circulated, it looks like a Poor Show, not at all in keeping with all the good resolutions and solemn discussions at the recent Region 1 I.A.R.U. banner-convention at Lausanne. Even if something is scrambled through just as we go to press, it looks as if the European contest is a write-off for this year. However, it was the suggestion that there might be one that brought on HB1IV, so to that extent we can be grateful to U.S.K.A.

## Some Seventycem Notes

The outstanding 430 mc report this month is from G3BKQ (Blaby, Leics.), who has been able to make some splendid GDY contacts during the period—see Activity Report. These results represent quality as well as quantity, for not only has he worked G3FAN (Ryde, I. of W., 135m.) but also no less than twelve 70-centimetre stations in the London area. The thrice-weekly schedules G3BKQ-GW2ADZ and G3BKQ-G3IOO are now conducted on phone, the distance being about 85 miles. On occasions, the G3BKQ-G3IOO path is found to be better on 70 cm than on two metres.

G3BKQ himself attributes these excellent results to a new 48-element array on 430 mc, which has been in use since the middle of August. It is of all-metal construction, carefully matched, the feeder being 350-ohm open-wire line terminated at each end with  $\frac{1}{4}$ -wave stubs; metallic  $\frac{1}{4}$ -wave insulators are used to support phasing wires and transformers on the aerial. This array immediately gave a good lift in signal strength, and G3BKQ now awaits an EDX opening.

G4RO (St. Albans) has also been busy on 70 cm, finding September 12-14 a good period, as it was on Two, with plenty of activity on 430 mc. He had some good GDY contacts, and heard G2XV (Cambridge) and G3IOO (Oswestry).

G4CG (Wimbledon, S.W.19) puts in a calls h/w list for the 430 mc band—see Activity Report—and GW2ADZ (Llanymynech) writes to put us straight on several points. He is using, for 70 cm, a 3B/401J as a “power doubler” giving 12 watts RF out, his aerial is a 32-element stack, and the receiver an SEO type to the design by G4LU (see *Short Wave Magazine*, June 1948); this gives a rock-steady T9 note. GW2ADZ lists a number of VHF “Firsts” for both bands, which will be taken into our lists on their next appearance. It is high time we were showing 70 cm progress and first-contact tables—this will be

done as soon as there is an opportunity to devil out the details.

### Survey of Conditions

The good dates are well marked, both in the reports and in the VHF weather data elsewhere in this issue. Apart from the September 12-13 week-end, G5YV gives: August 14/15, August 18/20, 27, and September 12-13—good to GM and GI; August 27—to West and South-West; August 11, September 6/7—good for DL, ON and PA; and September 6/7—to Scandinavia. Additionally, he and ON4BZ have held their schedule every evening at 2300 without a failure.

G6LI (Grimsby) in a very detailed report covering weather and conditions as well as results, gives August 12, with August 16-23 fair; September 1, when a rain front sweeping down NW-SE gave a fine example of working GDX along the fringe dividing a "ridge" from a "trough"; September 6, when the band opened again, with F3LQ and a shower of DL's arriving around 2000—G6LI thinks that these conditions may have affected the East Coast area only, as nobody else appeared to be working or hearing them; DL1LB was a solid S9, with PA and more DL's worked later. On September 7, good signals were audible from the North-East, then OZ2FR at 1945, followed by SM6ANR at 2000, then OZ3WK at 2125; OZ8JB and SM7BE were heard later, with a long, slow fade. At 2150 on the 7th, GI's arrived at G6LI and GI2ARS (Kilkeel, Co. Down) was worked; then at 2220 GM3IBV (Larkhall, Lanarks.) came in with a fair signal. All this shows the extent of the coverage and the possibilities there were on September 7. The next good occasion on the East Coast was September 12/13.

In the West, G3DLU (Compton Bassett) gives September 5 as very good, and for G3GHO (Roade, Northants.), on every evening and most mornings, the very best dates were August 9-10, 14, September 1, 6, 8 (to the North), and September 12/13. For G5MR (Hythe, Kent) September 5 was good, with East Anglians, normally heard but rarely, coming in

well. In Colchester, two GI's in QSO with one another were heard by G3FIJ on September 7. On that same evening, G2CZS (Chelmsford) worked EI2W for an S9+ signal and "went to bed happy."

For EI2W (Dublin) the very best dates were September 7/8. On the 7th, he was being called by stations from all over the South and South-West of England; PAØFB and PAØFC were received in Dublin, the latter at R5, S8. During these two evenings G5TZ/A in the Isle of Wight was a wipe-out signal in Dublin, and EI2W was able to make possible a QSO between G5TZ/A and GM3IBV. Strenuous efforts were made by several G's, notably G4SA and G5TZ/A, to get EI2W into touch with the Continentals—but, alas, no joy.

During September 7/8, things were also good for GW8UH (Cardiff); in spite of the local screening, stations to the North could be heard, and on the 8th, the Continentals reached South Wales; F8GH was worked, with F9JI (Amiens) and ON4BZ heard.

GM6WL/P was out in the Mull of Galloway, Wigtownshire, on the 7th, 9th, 12th and 13th of September, and besides making the GM/GI "First" on 70 centimetres with G13FWP/P in Co. Down, also gave a number of G's a new county on Two Metres. GI3GQB was another station worked on 70 cm, on the 12th.

Some interesting stations on, in addition to GM6WL/P, have been GD3UB, heard testing on Two, and EI6A (Wicklow), worked by G6NB and heard by G6RH (Bexley). And EI2W gives GD3IBQ. So it has all been very exciting.

### Activity and The Tables

Naturally enough, the periods of good conditions and the generally increased activity (which can really be interpreted as "the better results") occasioned thereby brought in a huge mail this month, which of course we were very pleased to see.

It also brought in no less than 93 claims for the Tables! A far greater number than ever we have had before and, with a large spread of Calls H/W lists as well,

it took your anxious (and often puzzled) A.J.D. more than some time to get everything sorted out and into place. But it is hoped

## TWO METRES

COUNTIES WORKED SINCE  
SEPTEMBER 1, 1952

### Final Placings

Starting Figure, 14

Worked	Station
59	G6NB*
56	G5YV*
49	G3GHO*
47	G3BLP*
45	G2HDZ, G3IOO, G3WW*
42	G2XV, G4SA, G5DS
41	G3FAN
40	G5MA
39	G5BM, G5ML
38	G2FJR
37	G2AHP, G4RO
36	G3CCH
35	G3HBW, G3HJV
33	G6TA
32	G8IL
31	G8DA
30	G2FCL
28	G2HOP
27	G3GJZ, G6YU
26	G3GVL, G3ISA, GC3EBK
25	G3DO, G3HCU, G3HXO, GW8UH
24	G3FIJ, G3WS, G5MR, G6CI
23	G2DCI
22	G3AGR, G3IUD
21	G8VR
20	G2CZS
18	G2DDD, G3EOH, G3IRA, G3YH
17	G6MI
16	G3IWI, G3JMA
15	GM3DIQ
14	G2BRR, G3DMK

Note: This Annual Counties Worked Table opened on September 1st, 1952, and closed on August 31st, 1953. The listing above represents the Final Placings for the Year in Annual Counties Worked.

\* Cards for Annual 40 Counties Worked Certificate.

that that has been achieved to everybody's satisfaction.

Annual Counties for 1953 closed with 54 stations in the list, and Bill of G6NB the undisputed leader after a sharp skirmish with Harold G5YV. Congratulations to them both on a very fine showing. This year's result compares with 47 stations entered in the 1952 Table, when G3BW led with 56C. Barely 20 of the stations in the 1952 list appear in this year's placings; in other words, there has again been a large turn-over, with some 30 operators appearing in 1953 who were not featured in 1952 Annual Counties. Of the individual results, it is interesting to find that some operators—G3FAN, G3WW, G5MA and G6YU—managed fewer this year than for 1952. On the other hand, among those showing better scores for 1953 than in 1952 are G2FJR, G3ISA, G4SA, G5YV and G6TA.

The new (1953-'54) Counties Table gets away to a good start this month, with 16 stations already listed as having worked 14 or more counties, actually in the first fortnight of September only, which shows just how conditions were during that period. Undoubtedly, many others will also have made the qualifying score, and we hope to see their claims in due course. Indeed, all VHF operators are asked to send in regular claims for Annual Counties, as it is a useful and interesting yardstick of progress. Never mind if you feel you cannot catch up with the giants—get in where you can, and keep looking for new ones to work. Though "local Derbys" naturally develop, and there is some keen competition up at the top, Annual Counties is *not* a contest, but a test, of equipment, operating ability, and general VHF know-how. And that is the way we want to keep it.

### The Countries Table

G4MW (Cambridge) makes a first-time claim which puts him right in the lead with G6NB (Brill, Bucks.), also at 15C in Counties Worked. With Bill getting GI at last and HB1IV helping them both, this is a fine performance. There were so many claims this

## TWO-METRE ACTIVITY REPORT

(Lists of stations heard and worked are particularly requested for this section, set out in the form shown below.)

### G6RH, Bexley, Kent.

**WORKED :** EI2W, F3LQ, 8MX, G2AHP, 2ASF, 2ATT, 2BVW, 2DDD, 2FCL, 2FJR, 2FOP, 2FTL, 2HGR, 2KF, 2NM, 2PU, 3AVF/P, 3DVK, 3EGV, 3EPW, 3FAN, 3FIJ, 3FUW, 3GAV, 3GHO, 3GHU, 3GRJ, 3IOO, 3NL, 3WW, 4GT, 4OU, 4RO, 4SA, 5DT, 5JU, 5MR, 5TP, 5TZ/A, 5YV, 6AG, 6AG/P, 6CH, 6NU, 6XX, 8KW, 8SC, GW2ADZ, 8UH, HB1IV.  
**HEARD :** EI6A, F8GH, G3ABA, 3AGA, 3HAZ, 6MI, 8MW, G13GOB, ON4BZ, PE1PL. (August 24 to September 13).

### G6NB, Brill, Bucks.

**WORKED :** DL1LB, 3VJ, 6EP, 6FX, 6SV, 9LT, 9MZ, 9QV, EI2W, 6A, F3LQ, G2BAT, 2FCL, 2FO, 3AGA, 3AUS, 3BJD, 3BW, 3FGE, 3FKO, 3YH, 4GR, 5TH, 5VN/A, G13GOB, GM3IBV, 6WL/P, GW2ACW, 2ADZ, 3CKB, 3ENY, 3GWA, 8UH, HB1IV, LA1KB, 8RB, ON4BZ, 4HN, 4YB, OZ2FR, PA0DSW, 0FB, 0FC, 0FS, 0JOB, 0KS, 0WO, PE1PL, SM6ANR. (DX worked August 11 to September 13).

### GW3GWA, Wrexham, Denbighshire.

**WORKED :** G3ERD/P, 3IUD, 3MY/P, 5BM, 6LI, 6NB.  
**HEARD :** G2BVW, 2FXK, 2FZU, 2HCG, 3BLP, 3IAI, 4MW, 4SA, 5TZ/A, 5UD, 6VX, 8OU, 8VN. (All since August 14).

### G3BLP, Selsdon, Surrey.

**WORKED :** G2DCI, 3BW, 3IOO, 3IUD, 5VN/A, G13GOB, GM6WL/P, GW2ADZ.  
**HEARD :** EI2W, G13FJX, GW2ACW, HB1IV.

### GM3DIQ, Stevenston, Ayr.

**WORKED :** EI2W, G2FZU, 5YV, G13FZO, 3GOB, 5AJ, GM2BUD, 3BDA, 3DDE, 3FOW, 3FYB, 3FVX, 5VG, 6LS, 6WL/P, 6ZV.  
**HEARD :** G2DKH, 4FA, 5BD, 6RH, 6NB. (August 7 to September 13).

### G2CZS, Chelmsford, Essex.

**WORKED :** EI2W, G2CNT, 2DDD, 2FCL, 2FJR, 2FOP, 2XV, 3ABA, 3BNC, 3CFK, 3CGQ, 3CZY/A, 3GBO, 3GHO, 3HAZ, 3IT, 3IOO, 3ISA, 3IUK, 3WP, 4PV, 5AM, 5ML, 5YV, 6AG/P.  
**HEARD :** F8GH, G2BMZ, 2FXK, 2FZU, 2HF, 2JF, 3BA, 3DIV, 3GVC, 3SM, 3WW, 4KO, 4SA, 5JU, 5MR, 5RZ, 5YK, 6CH, 6NU, 6XX, 8SC, ON4BZ, 4YB, PA0FB, 0FC. (July 20 to September 9).

### EI2W, Dublin, Eire.

**WORKED :** EI6A, G2BMZ, 2CYN, 2CZS, 2DDD, 2DSW, 2DVD, 2HCI/P, 2HDZ, 2HGR, 2HOP, 2TZ, 3BNC, 3CVK, 3CZY/A, 3EPW, 3FAN, 3FIJ, 3FRY, 3FXK, 3GHO, 3GOP, 3GVC, 3WS, 3WW, 4GR, 4MW, 4SA, 5BM, 5DS, 5MA, 5TH, 5TZ/A, 5YV, 6ML, 6NB, 6RH, 6WF, 8OU, GD3IBQ, G12ARS, 3FZO, 3GOB, 5AJ, GM3DIQ, 3FOW, 3FYV, 3IBV, 6WL/P, GW2ADZ, 3CKB, 8UH.  
**HEARD :** G3A0O, 3BLP, PA0FB, 0FC. (August 13 to September 13).

### G4SA, Drayton, Berks.

**WORKED :** DL6EP, EI2W, 6A, G2AHP, 2ATT, 2ATK/P, 2BAT, 2DDD, 2FCL, 2FJR, 2FZU, 2HCG, 2HCI/P, 2HGR, 2XV, 3ANB, 3A0O, 3AUS, 3AVO, 3BGR, 3BKQ, 3BNC, 3BVU, 3CZU, 3CVK, 3CZY/A, 3DLU, 3DVK, 3FAN, 3FMO, 3FUH, 3GOP, 3GZM, 3HAK, 3HWF, 3HYH, 3IAI, 3IOO, 3IRA, 3NL, 3WW, 4GR, 4RO, 5BM, 5LK, 5ML, 5RZ, 5TZ/A, 5YV, 6AS, 6NB, 6OU, 6RH, 6TA, 6WF, 6XX, 6YP, 8IL, 8MW, 8SC, 8SY, 8VN, GW2ADZ, 3CKB, 8UH, HB1IV, PE1PL. (September 1 to 15).

### G4OU, Sheerness, Kent.

**WORKED :** G2JF, 3AFY, 6AG, 6CH, 6NB, 6NU, 6OU, 6RH.  
**HEARD :** DL3JV, G2BYF, 3GSP, 4OT, 4RO, 4SA, 5BP, 5NF, 5TZ/A, 6PG, 8OU, ON4HC, 4UD, 4YB, PE1PL.

### G3GHO, Roade, Northants.

**WORKED :** EI2W, F8GH, G2AHP, 2ATK/P, 2CZS, 2DDD, 2DVD, 2FCL, 2FJR, 2FXK, 2FZU, 2HCG, 2HGR, 3AVO, 3BA, 3BKQ, 3BNC, 3BVU, 3BW, 3CGQ, 3CZY/A, 3DLU, 3FAN, 3FIJ, 3FMO, 3FOS, 3FUW, 3GHU, 3GWB, 3IOO, 3IUK, 3JMA, 3NL, 3WS, 3YH, 4RO, 5BC, 5ML, 5MR, 5RZ, 5YV, 6NB, 6PG, 6RH, 6XA, 8VN, GM6WL/P, GW8UH, HB1IV, ON4HC.  
**HEARD :** DL1LB, 3FM, 6EP, F3LQ, G2ABD, 2AIW, 2AJ, 2CPT, 2FNW, 2FO, 2FTS, 2HF, 2XV, 2YB, 3AGS, 3ANB, 3BLP, 3BYW, 3CZU, 3DIV, 3DJX, 3FMI, 3FUL, 3GBO, 3GHI, 3GSE, 3GVC, 3HVB, 3HWF, 3HWJ, 3HXS, 3HZK, 3IT, 3IUD, 3IWJ, 4GR, 4JJ/P, 4MW, 4SA, 5BD, 5GX, 5JU, 5LK, 5MA, 5SK, 5US, 6AG, 6CI, 6WF, 6WU, 6XX, 8OU, 8SC. (September 1 to 15).

### G3ISA, Beckenham, Kent.

**WORKED :** G2CZS, 2DD, 2DIO, 3AEX, 3BKQ, 3CFK, 3FOS, 3FYV, 3GAV, 3HAZ, 3HVO, 5BC, 5TZ/A, 5YV, 6AG/P.

**HEARD :** F8MX, 9CQ/P, G3AUS, 3BNC, 5NF. (August 1 to September 1).

### G2DHW, London, S.E.13.

**WORKED :** G3BEX/P, 6AG/P, 6PG.

**HEARD :** F9CQ, G2AHP, 2BAT/P, 3APY/P, 3CGQ, 3DIV/P, 3EGV, 3FD/P, 3GHI, 3GSE, 3HWJ, 3ISA/P, 6JK/P, GW8UH. (During August only).

### G3FYY, London, N.W.2.

**WORKED :** G2AHP, 2HDZ, 2WA, 3BEX/P, 3CNF, 3GRJ, 3GSE, 3GWB/P, 3ISA, 3JKW, 5BM, 5DS, 5MA, 5UM, 6AG/P, 6XH. (All August 7 to August 30).

### G2DVD, Slinfold, Sussex.

**WORKED :** EI2W, G2CNT, 2DDD, 2FJR, 2HCG, 2MV, 2PU, 2TP, 2UN, 3AGA, 3BEX/P, 3BNC, 3CJY, 3CZY/A, 3EJU/P, 3FAN, 3FD/P, 3FOU, 3GHI, 3GHO, 3GSE, 3GOP/P, 3GVF, 3GWB/P, 3HCU, 3HZV, 3HZK, 3IAM, 3IEK, 3IT, 3ISA/P, 3PW, 4GR, 5BC, 5DS, 5FF, 5LQ, 5ML, 5NF, 5RW, 5TZ/A, 5WW, 5YV, 6AG/P, 6OU, 6TA, 6WF, 8SC. (August 16 to September 13).

### G3FIJ, Colchester, Essex.

**WORKED :** EI2W, F8GH, G2CPT, 2CZS, 3ABA, 3ANB, 3APY/P, 3BRW, 3CFK, 3CJY, 3CZY/A, 3DIX, 3GHO, 3INU, 3PW, 4OT, 4PV, 5ML, 5SK, 5US, 5YV, 6NB, 6NU, 6OU, 6RH, 6XX, 8SK, GW2ADZ, HB1IV, PA0FB, 0FC, PE1PL.

**HEARD :** G2AHP, 2BCB, 2BMZ, 2DDD, 2FJR, 2HCG, 3AUS, 3BKQ, 3BNC, 3CCH, 3FD, 3IEK, 3IOO, 3WW, 5MR, 5NF, 6GR, 6LT, 6PG, 8DL, 8SY, G13FJX, 3GOB, GW8UH.

### G3WP, Brightlingsea, Essex.

**WORKED :** G2BCB, 2CZS, 3BRW, 3CGQ, 3FIJ, 3GHO, 3INU, 3VI, 3WS, 4OT, 6NB, 6WU.

**HEARD :** G2AHP, 2BMZ, 2FJR, 2FOP, 2JF, 2PU, 3APY/P, 3BEX/P, 3DJX, 3FD, 3GDR, 3GHI, 3HWF, 3HXS, 4MW, 5DC, 5NF, 5MA, 5TZ/A, 5YV, 6AG/P, 6WX, 6YP, 8A0/MM, 8DV/A, 8OU. (June 26 to September 9).

### G3GSE, Kingsbury, Middx.

**WORKED :** F3LQ, 8MX, 9CQ, G2BRR, 2DD, 2DDD, 2DVD, 2FF, 2FTS, 2RD, 2WA, 3AGA, 3BEX/P, 3BVG, 3CJY, 3CZY/A, 3DIV, 3DIV/P, 3EGV, 3FD, 3FD/P, 3FIH, 3FXG, 3FYY, 3GBO, 3GVC, 3GWB/P, 3ISA/P, 3JMA,

3MI, 4IB/P, 5BD, 5MR, 5TD, 5TZ/A, 5YV, 6JK/P, 6LR, 6OU, 6XX, 8DL, 8SC, 8W8UH.

HEARD: EI2W, G2BAT, 2FCL, 5UF, 5YK, 6VX, GW2ADZ.

G3HHY, Solihull, Warwickshire.

WORKED: G2ATK, 2ATK/P, 3DJQ, 3HAZ, 6XA.

HEARD: G2DCI, 2DCR, 3BLP, 3CWV, 3FAN, 4SA, 5JU, 5ML, 5YV, 6NB, 6XS, 6XX, GM6WL, GW2ADZ. (Week-ends September 5 and 12 only).

G3EPW, Bury, Lancs.

WORKED: EI2W, G2BNZ, 2CYN, 2DCI, 2FJR, 2HCJ/P, 2HGR, 3AGS/P, 3A0O, 3APY, 3APY/P, 3BFJ, 3CUZ, 3CXD, 3ERD/P, 3FKY, 3GNC, 3GNJ, 3GMX, 3GWB/P, 3GXR, 3HVP, 3HYH, 3IOO, 3IWI, 3JAZ, 4JJ/P, 5BM, 5TZ/A, 5YV, 6AG, 6LC, 6MI, 6QT, 6RH, 6XX, 8IZ, GW3ENY, 3GWA. (August 11 to September 15).

G3YH, Bristol.

WORKED: G2YB, 3FKO/P,

3GBO, 3GHO, 3HBW, 3HSD, 6AG/P, 6NB.

HEARD: G2AHP, 2DVD, 2HDZ, 2PU, 2XV, 3BKQ, 3BLP, 3CGQ, 3DJX, 3DLU, 3EGV, 3FAN, 3FIH, 3FKO, 3FMO, 3GNJ, 3GSE, 3HAZ, 3HWF, 3ION, 3WS, 4RO, 4SA, 5BM, 5MA, 5TP, 5TZ/A, 5US, 6AB, 6RH, 6VX, 8DL, 8OU, GW3EJN, 8UH. (August 15 to September 15).

G3DLU, Compton Bassett, Wilts.

WORKED: G2FJR, 2FZU, 2PU, 3BKQ, 3BU, 3CGE, 3CVK, 3DKZ, 3FAN, 3GHO, 3HSD, 3HWF, 3IIM/A, 3ION, 3WW, 4SA, 5BD, 5BM, 5HB, 5YV, 6XX, 6ZH, 8IL, 8MZ, 8OU, 8SC, GW2ADZ, 8UH.

HEARD: G2AHP, 2BMZ, 2CPT, 2DCI, 2FTL, 3AGA, 3AUS, 3BNC, 3CQC, 3GOP, 4AP, 5ML, 5RW, 5TZ/A, 5UD, 6CW, 6NB, 6WF, 8DL, 8DM, GW2ACW, 3EJM/A. (August 14 to September 16).

G3WS, Chelmsford, Essex.

WORKED: EI2W, G2DD, 2JF, 2UN, 2YB, 3AGA,

3AJP, 3CCH, 3CPT, 3CZY/A, 3GBO, 3GDR, 3GHI, 3GHO, 3GLP, 3HVO, 3INU, 4PV, 5BC, 5BD, 5IG, 5JU, 5QL, 5YV, 6AG, 6WU, 6XX, 8LN, 8SK, 8VZ, HB1IV, ON4BZ. (All August 15 to September 12).

### 70-Centimetre Band Only

G3BKQ, Blaby, Leics.

WORKED: G2BVW, 2DD, 2FKZ, 2FNW, 2HDU/P, 2HDZ, 2RD, 2WJ, 2XV, 3A0O, 3APY, 3FAN, 3FFC, 3FP, 3FZL, 3GDR, 3GZM, 3GZM/P, 3HAZ, 3HBW, 3IOO, 4AP, 4RO, 5CD, 5DT, 6NE, 6YU, 8KZ, 8QY/P, GW2ADZ.

HEARD: G6YP. (All August 24 to September 15).

G4CG, London, S.W.19

WORKED: G2RD, 3FP, 3GSM, 6NF, 6YP.

HEARD: G2DD, 2FKZ, 2HDY, 2HDZ, 2QY, 3BKQ, 3GDR, 3GZM/P, 3HBW, 5CD, 5DT, 8KZ, 8VR. (September 12 to 13 only).

conditions—and the dates are not picked out of a hat, as some may think. However, let us see what happened over September 26-27 (Q.C. No. 3) and hope for a better break for the final one, Q.C. No. 4, during the week-end October 24-25. Anyway, do come on, and let out a few calls.

### Some of the Sayings

"I find I am averaging 85 hours' operating a month on two metres; surely such optimism deserves results!" (GM3DIQ). . . . "G5YV is the most reliable 200-mile station on the band" (G8DL). . . . "Chasing HB1IV was at least one station using LF band practices and VFO technique, starting up on each G working HB1IV before the QSO was complete" (G5YV). . . . "In Cheltenham we are at present experiencing trouble with cross-modulation of a police radio link working near the edge of the band. I wonder if any other two-metre operators have had the same difficulty?" (G5BM). . . . "I take back all I said about GI" (G6NB). . . . "I propose to claim a new record—the only station that had HB1IV come back to a CQ call!" (G4MW). . . . "My stack is now about six feet lower and it makes a tremendous difference to reception; in fact, the only consistent DX is G6NB" (G3IWI). . . . "One of these days the band is going to open wide and then there will be quite a different outlook on the Quick Contests" (G2AHP). . . . "Two metres seems to be occupied by old men who pack up promptly at 11.0 p.m. on Saturday nights; I am not a youngster myself, but I certainly do not feel the need of bed when there is the whole of Sunday to follow" (G3FY). . . . "Would you consider sponsoring a movement to attack VHF at dawn and during the early mornings? I'm fed-up, a bit, with the conception that Two Metres keeps everybody out of bed at night" (G6LI). . . . "Have been active mainly in the early mornings, 0700-0745 BST, running skeds with G3GHO, G3GBO, G3HBW and G8DA; several others have been heard or worked at this hour" (G3YH). . . . "The VHF Weather Report is

month that suddenly the appearance of Countries Worked has quite altered. More than 40 stations are shown as having worked 8 or more different countries, not only reflecting great credit on the operators concerned, but also proving what actually can be done on VHF in the way of EDX when conditions serve. (Your A.J.D. has always maintained that such results would be possible when European activity gave us the opportunities; here is the proof).

Taking some individual performances in the Countries table, it is fair to say that EI2W will have to work very hard to get further up, as he is at such a considerable disadvantage geographically for EDX; he was most unlucky to miss the chance of a PA contact on the evening of September 13, when PA0FC gave him so unnecessarily long a call that it was eventually lost in QSB. (Evidently PA0FC was hearing EI2W). G3GHO (Roa de, Northants.), who only needs SM to get into the front row, and G5YV, who has heard but not yet worked LA, are doing very well as runners-up to the leaders. Stations lower down entering Countries Worked for the first time this month are G3CCH, G3FIJ, G3IOO, G3WS, G5MR and G6XX. Tnx, HB1IV!

### Quick Contest No. 2

The less said about this the better, almost! The week-end August 22/23 was—as the "VHF Weather Report" Table on p.496 shows only too clearly—just about the deadest time for the whole of the period! (It's positively uncanny). With conditions so completely flat, and correspondingly little activity, it is not surprising that only five entries were received. This does not justify a table, but we owe it to those who took the trouble to put in entries to cover their results.

G5YV (Leeds) made 3,250 points with 27 contacts, seven of them being at 15-pt. ranges, with a good bonus from ON4BZ, who is worth a solid 60 points to Harold in these events. G2FCL (Shiple, Yorks.) scored 73 points with eight counties worked, making him 584 total; his best QSO was with G4SA (Drayton, Berks.). G2FJR (Sutton Bridge, Lincs.) made 520 points, also with 8 counties worked; G3GBO (Denham, Bucks.) had 14 QSO's, all one-pointers except for G3DIV (Eastbourne) and G5YV, making him 224 points; and G2DHV (London) worked a single local station!

For years now, our carefully chosen Contest dates have coincided with the worst possible

## TWO METRES

## ALL-TIME COUNTIES WORKED LIST

Starting Figure, 14  
From Fixed QTH Only

Worked	Station
63	G5YV, G6NB
61	G3BLP (630), G3BW
59	G3EHY
57	G2OI (349)
56	G8SB
55	EI2W (180), GW3MQ
54	G2HIF (200)
53	G2AJ (519) G4CI
52	G2HDZ (398), G2NH, G3WW, G4SA
51	G5BM
50	G3ABA, G3FAN, G3GHO, G5DS (503)
48	G5BD, G5MA
47	G5WP, G6XX (210)
46	G4HT (476), G5BY, G6YU (205)
45	G2XC, G3IOQ, G5ML (264), G6XM (356)
44	G3BK, G3CCH, G3HAZ (194)
43	G3BA, G3COJ, G4RO, G5DF
42	G2FJR, G3GSE (424)
41	G2AHP (416), G2FQP, G3DMU, G6CI (167)
40	G3CGQ, G5JU, G8KL, G8OU
39	G2IQ, G3VM, G8DA, G8IL (325)
38	G2FCL (222), G3APY, G3HBW
37	G2FNW, G2FZU (180), G3GBO (414), G6TA (277)
36	G3CXD, G6CB (312), G8IP
35	G3FZL, G3HCU (224), G3HWJ
34	G2DDD (158), G3BKQ, G8IC
33	G3BNC, G3WS
32	G2FVD, G8VR, G8QY
31	G3HXO, G5MR (174), G5RP
30	G2HOP, G3GOP (208), G3FRY, G5NF, GW8UH
29	G3AGS, G3AKU, G3BJQ, G3FIJ (194)
28	G8DL, GM3BDA
27	G2DVD, G3DAH, G3FIH, G3ISA (160), G6GR
26	G3AEP, G3CFR (125), G3DO, G4MR (189)
25	G5SK
24	G3FD, G3FXG, GM3EGW
23	G3CWW (260), G3DLU, G3IUD, G4LX, G5PY, G6PJ, GM3DIQ
22	G2CZS, G3AGR (135), G3ASG (150), G3BPM, G3HIL
21	G2AOL (110), G3IWI, G3SM (180), G6XY
20	G3EYV, G3IRA, G3YH
19	G3FEX (118), G3GCX, G5LQ (176)
17	G3JMA
16	G3FRE, G3HSD, GC2CNC
15	G3IWA
14	G2DHV, G3GYY

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 are worked.

one of the most valuable items published anywhere at present; congratulations to G3EGB, to whom it must represent an enormous amount of work" (G2AOL). . . . "I am off to GM on a fortnight's holiday with no /P gear" (G5MA). . . . "Now inflicting a brand-new beam in all directions and so far results satisfactory; us new boys on Two are trying hard" (G4OU). . . . "To test the effectiveness of the VHF bands, I suggest a county-to-county, or country, relay with a message starting, say, in London and routed through Wales, Eire, Northern Ireland, Scotland, Isle of Man, and back through the Midlands to London" (EI2W).

## Some Individual Reports

G3GBO (Denham, Bucks.) now has a new receiver in use, running 6AK5 RF connected as a triode and inductively neutralised, EC91 2nd RF connected GGT, a 12AT7 with one half as GGT RF and the other as mixer, and a 6J6 connected as an "18 times" oscillator to give an IF of 17-19 mc into the S.640. He finds this a very superior arrangement.

G3CCH (Scunthorpe, Lincs.) writes after two years' activity on 144 mc, with claims for the Tables. His transmitter runs an 829 in the PA, with an 8mc crystal and multiplier chain, and the beam is a 3-over-3 at about 40 ft., with the disadvantage of a feeder run of 90 feet. On the receiving side, he has two CV66's as GGT RF, feeding into a mixer coupled to a home-built superhet capable of tuning from 12.5 to 145 mc. Also available is a panoramic receiver; G3CCH remarks, incidentally, that he always uses the GGT connection, as it is the easiest to get to work properly.

GM3DIQ (Stevenston, Ayr) succeeded in raising G5YV over the week-end September 12-13, and during both evenings was hearing G6NB at RST-589—but no reply to "dozens of calls." G5BD was received at 579, and G2FZU (Ilkeston, Derbys.) worked for a new county.

G8DL (Christchurch, Hants.) runs 100w, to a QQVO6/40, into a 5-ele Yagi, and his receiver is

6J6-6J6-6J6 to a BC-455. He suggests, and so many will agree with him, that all 2-metre stations should always use CW for at least a short period during their sessions on the air. He adds the rather crafty crack that this could only apply to those capable of sending and receiving Morse!

For G5BM of Cheltenham, the best contact of the month was GM6WL/P, with EI2W also worked several times at high signal levels—which makes G5BM wonder why he cannot hear the GI's; he asks for schedules with any interested GI. In the other direction, the Continental DX being worked by so many others was conspicuous by its absence behind the iron curtain of the Cotswolds.

G4MW (Cambridge) does not consider it necessary to live on a hill-top to work DX, as indeed his own results abundantly prove. He is only 36 ft. a.s.l., with a beam 40 ft. to the top section. But it is also true to say that most of the Cambridge group have a clear get-away in most directions, and, in fact, as we have seen from the VHF Weather Report, low-lying stations are often favoured during periods of exceptionally good conditions. What it boils down to, therefore, is that height does not matter a great deal, though local screening does.

G3IWI (Liverpool) is putting up a new 12-element stack for Two and a 16-ele job for 430 mc, for which band he has a tripler running on 432.95 mc, but no receiver as yet. G3IWI remarks that he is most disappointed with his QSL response—only 24 cards in for 51 sent out.

G2AOL (Otford, Kent) says that his gear is nothing like so good as he would like, and his receiver produces more than he has been able to raise. G2DDD (Littlehampton, Sussex) claims for the Tables and presumes, correctly, that a QSO with EI2W scores both as a county and a country. (To add to the interest, and because of the increasing activity in Eire, we have always taken in EI counties for the purposes of our Tables).

Guy of ON4BZ (Brussels) was glad to have had CW contacts with HB1IV on September 12 and

13, and during that week-end he also had many solid DL, G and PA QSO's. G3FRY (Cheltenham) makes a claim for the Tables, and says he is now in his correct Zone, at 145.39 mc. G3GOP (Southampton) has been doing a lot of /P work, and from sites within 10 miles of Southampton, has had contacts with 69 different stations in 19 counties, running only 6w, to a little QVO4/7 and a 12-ele "portable stack."

As G3GJZ (Newmarket) will be moving his QTH early in the New Year, he is not making any more alterations to the gear. GW3GWA in Wrexham got his 4-ele Yagi outside at 15 ft., fixed to fire SE, and promptly worked G5BM, G6LI and G6NB.

At G5ML (Coventry) they have gone in for two stacks of skeleton slots with reflectors, at a height of 45 ft., with 300-ohm feeder. So far, the slot-job seems to be very good in some directions compared with the previous 16-ele stack, but inferior in others. At

any rate, good progress is being made in the Tables, with nearly 270 different stations worked.

G3EPW (Tottington, Lancs.) writes to report himself in, though actually he has been on Two Metres for about 12 months. He runs 15w. to an 832, the beam being a 5-ele Yagi, with 0.2-wave spacing and delta-matched to 300-ohm tubular feed line; his receiver is 6J6 RF into 6J6 mixer with a 9002 oscillator, into an HRO. Activity is most evenings from 1900 onwards. G2FJR (Sutton Bridge, Lincs.) knocked off HB1IV with an indoor beam firing straight at two water-tanks in the preferred direction! G3HHY (Solihull, Warks.) is now on Two Metres, but at present operation is during university vacations only; he has a good location and will shortly have 150w. in the PA. The receiver at G3HHY is a 26-valve job, entirely home-built, with three RF stages in the front end of the converter for Two.

G3BLP (Selsdon, Sy.) says he joined the HB1IV queue on the evening of the 12th, but failed to get him; as it never occurred to Johnnie that the HB might still be there on the Sunday morning, he missed him altogether. However, by way of consolation, G1GGQB and GM6WL/P were worked, and G13FJX heard. G3GHO (Roade, Northants.) says he will henceforth be on every evening during TV hours, using CW only, and hopes to hear a lot of others doing the same.

G3GSE (Kingsbury, Middx.) advances three notches in Counties with G3AGA (Falmouth), G5BD (Mablethorpe) and GW8UH (Cardiff), bringing his grand total to 424S in 42C. For him, the September openings seemed to have been better to the West than to the Continent, as he was getting at good strength stations in westerly directions which normally are only workable under very good conditions. But all attempts to attract the attention of EI2W have so far failed.

On one occasion recently, G3FYF (London, N.W.2) was hearing ON4BZ at good strength, working G5YV, when Guy could not even be resolved at G5MA, on the south side of London.

### QUICK CONTEST No. 4

Week-end October 24-25. Rules on p.239, June issue. Come on, and let out a few calls!

G3IRA (Swindon, Wilts.) has a new 4-over-4-over-4 which he finds a great improvement over the old 4-ele Yagi—as indeed it should be. His PA is a pair of 8012's running 25w., to be increased to 100w. shortly. Another station with a new beam is G4SA (Drayton, Berks.) now doing very well—as all who have heard him will testify—with a 16-element stack at 47 ft., which, says G4SA, "Is proving a very useful piece of radiating equipment." He has had S9 contacts with DL, EI, GW and PE1PL, while HB1IV gave him S7-8.

G3WP (Brightlingsea, Essex) found that he had heard as many signals in ten days, September 4-14, as during the whole of the previous three months put together. He has given up the CC converter for a tunable SEO job using a 12AT7 worked 51-153 mc, giving a 7 mc IF on 146 mc. G3FIJ (Colchester) still maintains the week-day lunch-time schedule with PE1PL and G4HQ/A; he is anxious to open schedules with other stations on both 144 and 430 mc, and would welcome suggestions.

G2DVD (Slinfold, Sx.) is back again on Two and is running an 829B at 90-100w., with a 4-element Yagi; the receiver is an RME VHF152A into an HRO. G2DVD says that the one thing that does strike him after his two years' absence from VHF is the greatly increased activity, and the much better conditions at the times he has been on.

G2CZS (Chelmsford) putting in claims for his "year of 5 months on the band" runs a 6J6 as RF pre-amp. in front of a ZB3-type converter, the latter having been slightly modified by changing the 954 mixer for a 955 triode, with a surprising improvement in noise-factor. As the G2CZS beam is only 10 yds. from a busy main road, his big difficulty is ignition QRM. G3JMA (Harlow, Essex) has been making progress in Counties, and has recently air-

### TWO METRES COUNTIES WORKED SINCE SEPTEMBER 1, 1953 Starting Figure, 14

Worked	Station
38	G5YV
36	G4SA
28	G3GHO
27	G6XX
23	G2AHP
21	G4RO
20	G2FCL
19	G5ML, G6TA
18	G5BM
17	G3EPW, G3WS
16	G2DVD
15	G2AOL, G5DS
14	G3FIJ

Note: This Annual Counties Worked Table opened on September 1st, 1953 and will run for the twelve months to August 31, 1954. All operators who work 14 or more Counties on Two Metres are eligible for entry in the Table. The first list sent should give stations worked for the counties claimed; thereafter, additions claimed need show only stations worked for each county as they accrue. QSL cards are not required for entry in this Table.

tested an 832 tripler to the 430 mc band, with which he has been able to cross-band with several of the 70-centimetre stations.

G3IOO (Oswestry) puts in his Table claims and was another DX contact for HB1IV, with RST-589 signals both ways. On 70 cm, G3IOO is preparing for more power, using a QQEO6/40.

We were very glad to hear from G6XX (Goole, E. Yorks.) again, after rather a long time, with claims that put him well up in the Tables; he has a total of 210S worked on Two Metres. G6XX is good DX for a large number of stations and runs a G2IQ-BC348 receiver, with a 12-ele stack at 45 ft. (his site is

only 15 ft. a.s.l., however!), and the transmitter valve sequence is EL91-EL91-QVO4/7-832 into an 829 as PA with 65-70 watts input.

Alan of GW8UH (Cardiff) found the August-September conditions much better than during June-July, and he was there for the good openings of September 7/8. An interesting point here is that regular schedules G2BMZ-GW8UH, 74 miles, and GW8UH-G8OU, 140 miles, are maintained, and phone working is always possible, irrespective of conditions. Alan holds the GW/F "First" for a QSO with F9JY (Nr. Cherbourg) way back in July '52. This, and the "Firsts" recently claimed by others, will appear in the next listing. And in the meantime, GW8UH is after GC3EBK for the GW/GC "First," the latter often being heard in Cardiff.

DL2US (Celle, Hanover) hopes to get on Two Metres shortly, as he is G3HII at home. ZB1BZ (Malta, G.C.) is still there 2000-2200 GMT every evening, and has also been running a schedule with G6RH 1800-1830 — but with nothing to report as yet. Bad luck; nothing is more disheartening than hours of "sharsh" with no signals. But ZB1BZ, who now has 110w. on 144.13 mc, has not given up hope of working into G and intends to stick to it until something *does* happen. FB!

### Trophy for G5MA

All VHF operators will be delighted to hear that the Irish VHF group has decided to award its 'perpetual trophy to Bob Munday, G5MA, of Ashtead, Surrey, in recognition of his outstanding /P work on the two-metre band. Well, this is certainly credit where it is due. The cup is to be handed over by EI2W at a little ceremony to be arranged in London about November-time.

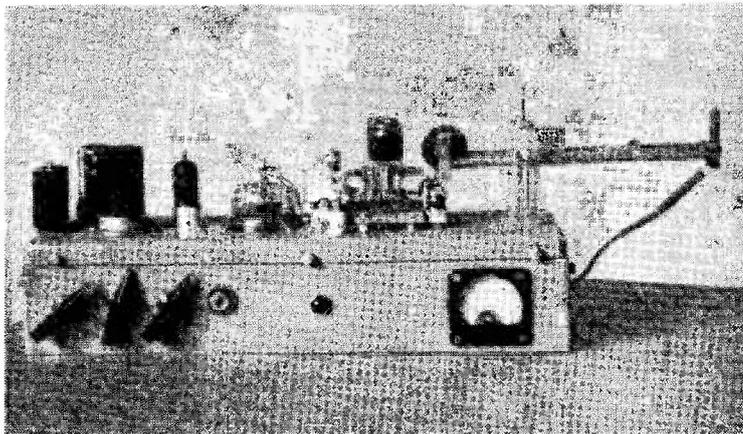
### In Conclusion

And that brings us to the end of a long story for this month; though one of the most exhausting offerings your A.J.D. has ever made in terms of hours put in, he hopes that readers will find this "VHF Bands" as interesting

## SEVENTY - CENTIMETRE STATIONS — Sixth List

CALL	LOCATION	FREQ. (mc)	EQUIPMENT
DL3FM	Mulheim-Ruhr	434.2	Tripler, 32-ele stack, SEO Rx
EI2W	Dublin	432.54	Tripler, 16-ele stack, (? Rx)
G2BFT	Solihull	433.17	Tripler, 16-ele stack, (? Rx)
G2BVT	Leicester	432.60	Straight PA, 5-ele Yagi, Special Rx
G3CNT	Cambridge Airport	435.2	Tripler, CC Rx, 12-ele stack
G2DDD	Littlehampton	435.6	Tripler, 16-ele stack, CC Rx
G2DHV	Lewisham	434.97	Tripler, CC Rx, 16-ele stack
G2FCL	Shipley, Yorks.	433.134	Tripler 15E, G2DD C'vrtr., 6-ele Yagi
G2FKZ	London	435.95	<i>no details</i>
G2FNW	Melton Mowbray	?	Tripler, 5-ele Yagi (? Rx)
G2HCG	Northampton	434.00	<i>no details</i>
G2MV	Kenley, Surrey	435.22	<i>no details</i>
G2RD	Wallington, Surrey	435.57	<i>no details</i>
G2WJ	Great Canfield, Essex	436.00	Straight PA, CC Rx, 16-ele stack
G2XV	Cambridge	435.10	Tripler, CC Rx, 12-ele stack
G3ABA	Coventry	?	Tripler, 16-ele stack (? Rx)
G3A00	Denton, M'cr.	433.13	Tripler, 4/4/4, CC Rx
G3AYT	Hyde, Ches.	433.13	Tripler, City Slicker, CC Rx
G3BKQ	Blaby, Leics.	434.05	Tripler, 48-ele stack, CC Rx
G3CGQ	Luton, Beds.	434.10	<i>no details</i>
G3DA	Liverpool	432.6	Tripler, 6-ele Yagi, CC Rx
G3EOH	Enfield, Middx.	436.03	Tripler, G2DD C'vrtr., 12-ele stack
G3EUP	Swindon, Wilts.	433.9	Tripler, 3 stk'd dipoles, CC Rx
G3FAN	Isle of Wight	435.80	<i>no details</i>
G3FFC	Leicester	?	Tripler, 16-ele stack (? Rx)
G3FIJ	Colchester	435.18	Tripler, SEO Rx, 5-ele Yagi
G3FP	Sidcup, Kent	436.04	<i>no details</i>
G3FZL	Dulwich, S.E.22	435.24	Doubler, CC Rx, 12-ele stack
G3GDR	Watford, Herts.	435.39	<i>no details</i>
G3GOP	Southampton	435.00	<i>no details</i>
G3GZM	Tenbury Wells, Worcs.	?	Tripler, 16-ele stack (? Rx)
G3HAZ	Northfield, Birmingham	435.00	Tripler, SEO Rx, 4/4 Yagi
G3HBW	Wembley, Middx.	434.61	Tripler, 12-ele stack, CC Rx
G3HHY	Solihull, Warks.	433.93	Straight PA, 21-valve Rx, 4-ele Yagi
G3HTY	Kidderminster, Worcs.	?	Tripler (? beam array and Rx)
G3IAL	Northampton	433.80	<i>no details</i>
G3ILI	London, S.E.22	434.97	Tripler, 6-turn Helix, R.1294 mod.
G3IOO	Oswestry, Salop.	432.54	Tripler, 16-ele stack, SEO Rx
G3IOR	Hellesdon, Norwich	?	Tripler, SEO Rx, 4-ele Yagi
G3IRA	Swindon, Wilts.	436.05	Tripler, SEO Rx, 8 d'ples stk'd
G3IUD	Wilmslow, Ches.	432.41	Tripler, CC C'vrtr., 6-ele Yagi
G4AP	Swindon, Wilts.	436.50	Tripler, CC Rx, 3 stk'd D'ples
G4RO	St. Albans, Herts.	434.16	Tripler, 16-ele stack, CC Rx
G5CD	Hendon	435.66	<i>no details</i>
G5DS	Surbiton, Surrey	435.61	Tripler, G2DD C'vrtr., 16-ele stack
G5DT	Purley, Surrey	436.02	<i>no details</i>
G5YV	Leeds	432.72	Tripler, 8-ele stack, G2DD C'vrtr.
G6CW	Nottingham	?	<i>no details</i>
G6NF	Shirley, Surrey	435.47	Straight PA, 5-ele Yagi, SEO Rx, ASB8 cavities
G6RH	Bexley, Kent	434.7	Tripler, 16-ele stack, ASB8 C'vrtr.
G6YP	London, S.E.5	435.75	<i>no details</i>
G6YU	Coventry	434.10	Tripler, CC Rx, 16-ele stack
G8OY	Birmingham	?	Tripler, 24-ele stack (? Rx)
G8SK	Enfield, Middx.	433.15	Tripler, G2DD C'vrtr., 8 1/2-waves stk'd
G8YR	London, S.E.22	435.0	Tripler, SEO Rx, 12-ele stack
GW2ADZ	Llanymynech, Mont.	432.84	Doubler, SEO Rx, 32-ele stack
GW5MQ	Mold, Flint.	432.58	Tripler, 3-ele Yagi (? Rx)
ON4UV	Fayt-lez-Mange, Nr. Charleroi	434.7	Straight PA, CC Rx, 32-ele beam

This list is incomplete as regards some stations known to be equipped for the 70-centimetre band. All 430 mc operators are asked to forward details for inclusion in this Table, under the headings given.



The two-metre transmitter at G3EMU, Canterbury, is built on a narrow chassis 15 inches long, the valve sequence being EC52 8 mc CO—EF50 72 mc—EL42 144 mc—832 144 mc—pair 8012 triode PA driven to 40 watts, with a tuned line tank circuit.

and as stimulating as he has while compiling it. Our sincere thanks to all those many correspondents who, to make it possible at all, wrote in for this issue.

For the November issue, the dead-line is abominably tight—

**October 16 certain**—with everything addressed to: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. Looking forward to being with you again on November 6.

### GOING BACK A BIT

Looking through a copy of *Modern Wireless* dated July 1923, it is very interesting to see the advertising for what in those days was the radio surplus from the 1914-'18 War! (Some of it, we might add, is still being sold, and very good stuff it is, too). Among the manufacturers in that issue whose names are still to be found in the radio press are Cossor, Dubilier, Ediswan, Igranic, Marconi, Mullard, Peto-Scott and Weston. And there will be many of our Old Timer readers who will remember the hallowed name of M. Raymond, of Lisle Street, where as boys we used to go for our crystal detectors and sets of condenser plates. The firm of Universal Electronics, our well-known advertisers in current issues of *Short Wave Magazine*, trade from the same address—27 Lisle Street, London, W.C.2—as that at which the "Lisle Street tradition" was started by Raymond's more than 30 years ago.

### THE DX ZONE MAP

Readers should note that we can still supply our *DX Zone Map*, which is a five-colour Great Circle map of the world centred on the U.K., suitable for wall mounting, and a handsome addition to the decorations at any station. The *Zone Map* not only gives the distance and true direction of all parts of the world relative to the U.K., but also shows the

### TWO METRES

#### COUNTRIES WORKED

Starting Figure, 8

- 15 G4MW (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, ON, OZ, PA, SM),
- G6NB (DL, EI, F, G, GC, GD, GI, GM, GW, HB, LA, ON, OZ, PA, SM).
- 14 G3GHO, G5YV.
- 13 G3BLP, G3CCH, G6XX
- 12 G2HIF, G3WW, G5BD, G6LI, ON4BZ.
- 11 G2AJ, G2HDZ, G2XV, G3ABA, G3IOO, G5UD.
- 10 G2FOP, G3BK, G3EHY, G3GHI, G4RO, G4SA, G5DS, G5MA, G6RH, GW5MQ.
- 9 EI2W, G2AHP, G3FAN, G3FIJ, G6XM, G8IC.
- 8 G2XC, G3BNC, G3GSE, G3HCU, G3VM, G3WS, G5BM, G5BY, G5ML, G5MR, G8SB.

### QUICK CONTEST No. 4

**Week-end October 24-25. Rules on p.239, June issue. Come on, and let out a few calls!**

Zone areas, with the prefix listings for each Zone. A world time-scale enables the time relative to GMT to be worked out for any part of the world. The cost of the *DX Zone Map*, third revised edition, available for immediate delivery, is 6s., post free, sent in a postal tube to avoid damage in transit. Order on The Circulation Manager, *Short Wave Magazine*, Ltd., 55 Victoria Street, London, S.W.1.

### TELEVISION SOCIETY LECTURES

Among interesting meetings in the forthcoming programme of The Television Society is a lecture on "Converters for VHF and UHF Television," to be given on Thursday, November 26, at the Cinematograph Exhibitors' Association, 164 Shaftesbury Avenue, London, W.C.2, commencing at 7.0 p.m. The honorary secretary of the Society is G. Parr, Esq., M.I.E.E., of the same address, from whom tickets can be obtained by non-members for all Television Society lectures.

### BRADFORD TECHNICAL COLLEGE

We are asked to state that a three-year evening course in Radio Servicing and a two-year course on TV Servicing have been arranged for those taking the City & Guilds examinations in these subjects. Applications for enrolment and full details can be obtained from: The Principal, Technical College, Bradford.

## VHF WEATHER REPORT

PERIOD AUGUST 13 TO  
SEPTEMBER 16

A. H. HOOPER (G3EGB)

*Once again, the Report shows a very interesting correlation between results as reported in "VHF Bands" and the EDX/GDX to have been expected on the strength of the propagation conditions which actually developed over the period. But it is also evident that some good opportunities were missed, due probably to lack of EDX activity at the material times; in this connection, more EDX schedules—on the lines of the G5YV/ON4BZ undertaking—would be very helpful in proving the long-distance paths.—*

EDITOR.

GOOD at first, then a poor spell and finally an excellent fortnight. The thundery low, ending the last reported period, soon drifted away to the north-east, and the present session starts with a curved belt of high pressure over the British Isles. A gradual change set in from August 17, and for the week from August 20 a series of depressions, moving eastwards over Scotland, determined our weather. By the evening of August 26 a ridge of high pressure had extended north-eastwards from the Azores to our south-western coastline and subsequently developed eastwards over France into Germany as an anticyclone. Unfortunately, this favourable belt lay to the south of the British Isles and most U.K. districts were affected from August 30 by another series of depressions passing to our north until September 3, when a ridge arriving from the south-west slowed down and intensified into an anticyclone covering most of the British Isles. It gradually drifted eastwards with its major axis North/South, and by the evening of September 5 encompassed PA, DL and Scandinavia as well. This eastward extension continued, and during September 8, LA and SM reverted to a cyclonic circulation, leaving an irregular belt of high pressure lying from the Balkans, over Europe and Great Britain, to longitude 20°W. During September 9 the passage of a weak cold front over the British Isles introduced a vigorous and markedly cooler air-stream. Another anticyclone drifted north-eastwards over the British Isles during September 12, 13, and by the following evening had reached Scandinavia. For the last two days a shallow low with daytime thunderstorms marked the return of unsettled weather.

### Interpretation

From the results of radio-soundings reported in *The Daily Aerological Record* of the Meteorological Office, London, the coarse MRI structure over East Anglia has been deduced. The heights above mean sea level (MSL) at which marked changes (discontinuities) in MRI gradient occur are shown in Fig. 1, and it can be seen that there were two main spells of favourable conditions. There was, for example, a

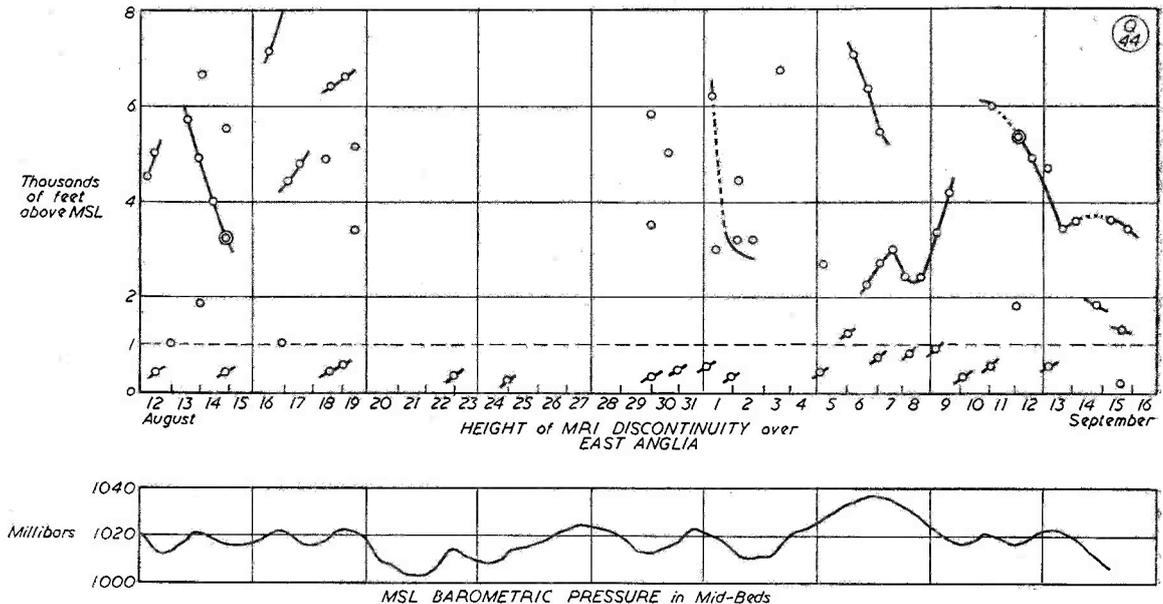
"reflecting" layer sinking steadily over East Anglia during August 13-14, with a fluctuating layer, mainly between 2000 and 3000 feet, during September 6-9. The low level discontinuities associated with nocturnal radiation cooling can also be seen.

A similar study has been made of radio-soundings over other areas of the British Isles in an attempt to ascertain the extent of the reflecting layers shown in Fig. 1. Continuing the good spell from the end of the last period, the evening of August 13 brought a reflecting layer over all areas of the British Isles. Thereafter conditions were patchy for three weeks, and the main features were GDX possibilities for the South-West, South and South-East on August 16, 31, September 1, and for the South-West and South on August 18, 19, September 3. Conditions then began to build up, and on the evening of September 5 a discontinuity at between 5000 and 7000 feet developed over all areas excepting the North-West. By the following evening it had settled to between 2000 and 3000 feet, and was extending, at 6000 to 7000 feet, over the North-West. On September 7 the process continued, and all areas had a strongly marked layer below 2500 feet. This represented peak conditions for GDX, for except in the South and South-West, it had risen by the following evening to about 4000 feet, while September 9 found it at 5000 feet in the South and South-West and only weakly above 7000 to 8000 feet elsewhere. The evening of September 10 brought a layer at over 6000 feet in the South, and sloping downwards to 4000 feet in the North. For the next two evenings levels of between 3000 and 5000 feet were found. The layer appears to have moved away North-Eastwards with the associated anticyclone, for on September 13 it had disappeared from over our Western districts and by the next day was found over East Anglia only. Thereafter, in an unsettled cyclonic circulation, only weak isolated discontinuities were observed.

Table 1 is partly prepared from the weather charts in the *Daily Weather Report* of the Meteorological Office. As usual, all entries are for the evenings of the dates quoted.

Enhanced propagation over inland paths is associated with radiation cooling at night-time in the surface layers of the atmosphere. The layer within which super-refraction occurs lifts as saturation sets in, first at the surface and then through a progressively greater layer. The second line of the Table shows, as far as can be judged, the time of onset of saturation on the evenings when the effect was significant. Where the time is after midnight it is still placed under the pre-midnight date. It can be seen, for example, that enhanced conditions developed on the evening of August 17 until midnight, that there was a spell of five good evenings from August 24, and that each occasion of the spell from August 30 lasted for a progressively longer period each night.

The remaining lines of Table 1 show the occasions when MRI discontinuities are thought to have extended out from East Anglia, in the stated direc-



Showing the reflecting layers which formed over East Anglia during the period August 12 to September 15. The good conditions developing at the beginning and towards the end of the period are readily apparent. Those occasions when they are thought to have linked up with certain paths out over the Continent can be ascertained from Table I.

tions. to the countries indicated by prefix. Open paths to intervening countries are implied. On August 13, for example, the South-Eastern path to Belgium was open, while on August 16 it opened further, as far as Southern Germany. It was not until September 5 that all the paths listed became open simultaneously.

Certain entries are in heavy type and are underlined. The dates so stressed correspond, for easy reference, with occasions of particularly significant MRI discontinuities in Fig. 1. Evenings with exceptionally marked radiation are shown in the same way, while country prefixes similarly stressed show when the reflecting layer aloft is thought to have been especially effective.

**Some Practical Possibilities**

Certain effects are not brought out by the display. It appears possible for GM stations to have spanned the North Sea to northern DL on August 13, and to OZ on August 14. A similar possibility appears likely for September 13. Unlike earlier periods, there were no occasions when the GM/GI path was alone in being open. During the period August 17-19 there was an anticyclone centred over Eastern Germany. A vertical cross-section along the eastern path from the UK for August 17 shows a discontinuity at above 9000 feet over East Anglia, above 7000 feet over PA, just above 5000 feet over western DL and then rising slightly, further to the East. On the following evening a height of about 6500 feet applied over most of the path. On the evening of August 19 it no longer appeared over East Anglia, but over PA had settled to 3500 feet, rising East-

wards through 5000 feet (western DL) to 8000 feet. On a similar previous occasion, with no discontinuity over East Anglia, QSO's with DL were achieved.

**The September Conditions**

The anticyclone which led to the peak conditions of early September is of particular interest. It began as a small cell of high pressure well to the South-West of the British Isles, which travelled along the Channel during September 4 and intensified over the Low Countries to cover G, GM and a large portion of Europe. A widespread discontinuity appeared over France, the Low Countries and Germany as early as September 3, reaching maximum intensity on the evening of September 5, and fading during September 8. This is apparent in Table 1. Over the UK the first overall coverage was for September 6, although at a rather high level to the North-West. The evening of September 7 was really excellent, with a marked layer lying mostly below 2500 feet. This represented peak conditions, for, although still well marked, the surface was tilted 24 hours later, at 4500 feet in many areas, sinking to 1600 feet in the South-West. By September 9 traces remained only in the South and South-West. Although peak conditions did not coincide in the two areas, the intervening date of September 6 yielded good conditions simultaneously over them both. The fade-away of conditions over the Continent appears associated with a continued eastward drift of the main anticyclone, which set in very late on September 7. By this time a second high pressure centre was developing over Eire in a ridge extending westwards across England, and it was with this off-shoot system that the excel-



conditions appear to have been poor for the first half of this period when judged by the incidence of reflecting layers aloft. For this reason, together with the distance involved, it seems possible that super-refraction may have occurred. The degree of refraction on a given occasion is determined by the rate of change with height, or lapse-rate, of radio-refractive index. As the radio-soundings over East Anglia are near the mid-point of this path, an examination was made of the computed lapse-rates. The figures shown in Table II resulted.

Table II

		July 16- July 29	July 30- Aug. 12	Aug. 13- Aug. 26	June 10- Aug. 26
Average increase of MRI, "M" units	MSL-1,000 feet	32.7	28.4	31.8	—
	MSL-4,000 feet	133	131	133	132.9

We see from Table II that the average increase of MRI through the first four thousand feet over the last three months is 133 units, that the average value for the fortnight preceding and following the period was the same, and that for the favoured period a slight improvement was noted. This

difference is small, and one cannot say that any of the three shorter periods is significantly different. The corresponding figures for the first thousand feet, where changes are invariably greater, show a reduction in mean M-lapse during the favoured period of about 11 per cent., and by including one extreme case, it can be brought up to about 16 per cent. for the remaining 13 occasions. The departure of individual cases from the mean is rather greater over this period, than over those adjacent, and the author wonders whether G5YV, in noting signal strength from evening to evening, found August 5 and 12 relatively poor. It will be interesting, too, to learn whether QSO's took place *consistently* during the fortnight from August 13.

On August 9 propagation at 70 cm between Cambridge and London appears to have been excellent. On both this and the previous evening the discontinuity associated with radiation cooling was noted as being particularly marked. Over the Continent on August 10 the reflecting layer was of the low-level type, at about 1500 feet, although substantially higher over England, and accounts, probably, for the G2WJ/DL3FM contact on the 430 mc band.

The writer is indebted to the Director, Meteorological Office, London, for permission to use information obtained from the official publications mentioned.

### AERIAL SYSTEMS — IN 1923

In the early days of popular radio, big business was done in aerial masts and mast assemblies, as everyone had an outside aerial. Some were high and neat and taut, others drooped from an angle pole—but the aerial was the outward and visible sign of affluence and progress, much as the numerous H-assemblies are nowadays for those who aspire to a TV receiver. Back in 1923, The Wilkinson Motor & Engineering Co., of Kilburn (*est. 1900*) offered a 50-foot mast, complete with all accessories, for £4 15s. It was a high price, but it was a *de luxe* job.

### THE PROPERTIES OF RADIO MATERIALS

An important factor in the progress of radio communication has been the development of new materials and their use in new devices of improved performance. The principal classes of radio materials are conductors, semi-conductors, dielectrics and magnetic materials. Knowledge of the properties and behaviour of conductors is well advanced and suitable materials in this class are available for almost every required service. The properties of the other three classes of materials are not so well understood and a great deal of work remains to be done before their behaviour in all conditions can be completely predicted.

Radio Research Special Report No. 25, *Selected Problems in the Preparation, Properties and Application of Materials for Radio Purposes*, has been produced by the Radio Materials Committee of the Radio Research Board. It is based on the work of several groups of experts who have studied the present state of knowledge of ceramics, organic polymeric dielectrics, magnetic

materials and semi conductors. The report is divided into sections dealing with these materials, each section outlining existing knowledge and stating the research problems which most urgently need attention if the material is to be fully exploited for radio purposes.

Published by H.M. Stationery Office, 1s. 7½d., post free, for the Department of Scientific and Industrial Research.

### BCI IN THE EARLY DAYS

The radio periodicals of 30 years ago had a great deal to say about "Interference with Broadcasting"—mainly by ship stations using broadly-tuned spark transmitters on nominal wavelengths of 450 and 600 metres. In coastal districts, the problem was quite a serious one, and led to the design of wavetraps and acceptor-rejector circuits "so that the concerts could be received in comfort." Exactly the same principles can be applied in certain cases of TVI, by fitting a wavetraps at the input end of the TV receiver.

### SMALL ADVERTISEMENTS

If you have anything worth selling, or something you want to buy at a bargain price, you should use our Small Advertisement columns, which guarantee you wide coverage of the Amateur Radio market. Set out your advertisement clearly in as few words as possible and using the customary abbreviations and send it, with remittance, to: Advertisement Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. If you have any doubts as to how much it costs, send it in just the same and the charge will be notified by return.

# NEW QTH's

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

- E13K**, E. Larkin, Thomastown Cross, Donaghmore, Dundalk, Co. Louth.
- G2AWQ**, S. Anthony, 53 Stafford Road, Ruislip, Middlesex.
- G2BBN**, G. A. Banham, 7 Abbots View, Bury Estate, Kings Langley, Herts.
- G2DBI**, J. A. Pateman, Bennett's Cottage, Whipnade, Dunstable, Beds.
- GM3FGQ**, F/O. M. Gibbs, R.A.F. Station, West Freugh, Stranraer, Wigtownshire.
- G3HOY**, J. Parkin, 78 Hayburn Avenue, National Avenue, Hull, E. Yorkshire.
- G3HPH**, L. W. Newport-Gwilt, 8 Kensington Park Gardens, London, W.11.
- G3IPQ**, R. F. Lloyd, Rose Cottage, Downend, Nailsworth, Glos.
- GM3IPU**, J. T. Forrester, 20 Spylaw Park, Kelso-on-Tweed, Roxburghshire.
- G3IUX**, E. Rose, 70 Schneider Road, Barrow-in-Furness, Lancs.
- G3IVB**, L. R. Beeson, 131 Whitehall Road, Bordesley Green, Birmingham, 9.
- G3IXS**, A. J. R. Sloney, Portland House, Highland Grove, Work-sop, Notts.
- G3IZG**, J. Wells, 91 Park Road, Blackpool, Lancs.
- G3IZT**, K. R. Coates, 132 The Northern Road, Great Crosby, Liverpool, 23.
- G3JAH**, E. D. Evans, 6 Winton Avenue, South Shore, Blackpool, Lancs.
- G3JAK**, A. Todd, 72 Seventh Row, Ashington, Northumberland.
- G3JAY**, A. C. Richards, 26 Clent Road, Handsworth, Birmingham, 21.
- G3JBU**, B. Hayes, c/o 7 Western Terrace, Northampton.
- G3JCG**, L. J. Wilson, 57 St. Aidan's Road, Berwick-on-Tweed, Northumberland.
- G3JCR**, K. J. Smith, 32 Lodge Avenue, Kenton, Harrow, Middlesex.
- G3JCW**, B. E. Greville, Ling-Crag, Buxton Road, Chinley, Derbyshire.
- G3J CZ**, W. E. Rymer, 15 Broadway, Northstead, Scarborough, Yorkshire.
- G3JDB**, F. R. J. Burnham, 80 St. Margaret's Grove, Twickenham, Middlesex.
- G3JDD**, R. G. R. Dobson (*ex-Y12FD*), 130 Fairholm Road, Newcastle-on-Tyne, 4.
- G3JDD/A**, R. G. R. Dobson, R.A.F. Station, Watton, Norfolk.
- G3JDM**, P. J. Wright, 63 Probert Road, Oxley, Wolverhampton, Staffs.
- G3JDN**, P. D. Lucas, 48 Hanworth Road, Earlswood, Redhill, Surrey. (*Station at 42 Heston Road, Earlswood, Redhill, Surrey.*)
- G3JDO**, H. Martin, 41 Wreigh Street, Hebburn, Durham.
- G3JEG**, G. B. Marston, Ripple Dale, Riding Mill, Northumberland.
- G3JEL**, 2a Jackson Road, Holloway, London, N.7.
- G3JLM**, G. P. Walford, 71 Fourth Avenue, Garston, Watford, Herts.
- G3JMB**, J. Brooker, 103 Hazlewick Road, Three Bridges, Crawley, Sussex.
- G3JON**, J. Bell, 25 Edale Road, Sheffield, 11. (*Tel.: Sheffield 61281*).
- G3JRB**, L. R. Leer, 129 Haydon's Road, Wimbledon, London, S.W.19. (*Tel.: LIBerty 6082*).
- G13JRW**, R. W. Semple, 18 Upper Cavehill Road, Belfast.
- G3JTA**, J. Tullett, 67 Sheppall View, Bedwell East, Stevenage, Herts.
- G2FVH**, T. Brown (*ex-GM2FVH*), 14 Ladbroke Square, London, W.11.
- G3AAE**, J. D. Kay, 18 Fairfield Way, Barnet, Herts.
- G3CNY**, G. L. Blunn, 37 Burnham Avenue, Oxley, Wolverhampton.
- G13CWY**, E. S. Wilson, Dunlochan, Whitehead, Co. Antrim.
- G3DSK**, R. A. Lord, 22 Elizabeth Crescent, East Grinstead, Sussex.
- G3EIX**, P. J. Naish, Barrowdale, Baydon, Marlborough, Wiltshire.
- G3EQU**, J. E. A. Mortimer, 11 Prince's Avenue, Greenford, Middlesex.
- GM3FAX**, F. D. Christie, 95 Finlay Drive, Dennistoun, Glasgow, E.1.
- G3FOT**, K. E. Broughton, 25 Redworth Road, Shildon, Co. Durham.
- G3FS**, H. G. Whitmore, 135 Faraday Avenue, Sidecup, Kent.
- G3FTJ**, Sgt. F. Billsberry, 86 Married Quarters, R.A.F. Station, Wattisham, Ipswich, Suffolk.
- G3HPW**, A. Milner, 21 Brooklyn Way, West Drayton, Middlesex.
- G3HTB**, M. P. Squance, 118 Wolfreton Lane, Willerby, Hull, E. Yorks.
- G3HTB/A**, M. P. Squance, 145 Old Bank Road, Dewsbury Yorkshire.
- GM3IMR**, Mrs. F. D. Christie, 95 Finlay Drive, Dennistoun, Glasgow, E.1.
- G3VR**, W. Wilkinson, 136 Spencer Road, Bradford, 7, Yorkshire.
- G5RW**, R. B. Williamson, 69 Stanton Road, Ilkeston, Derbyshire.
- G6UH**, H. E. Smith, 198 Mill Hill Road, West Cowes, Isle of Wight.
- G8LZ**, E. J. Bonner, 11 Sutton Road, Maidstone, Kent.

## CHANGE OF ADDRESS

- G2FRY**, A. Shillito, 89 Beechdale Road, Bilborough Estate, Nottingham.

**C**RYSTAL-GAZING is always a fascinating occupation—if one knows where to find the right crystal and how to gaze. One would like to find the correct channel for looking-in on Amateur Radio in twenty-five or thirty years' time, because the feeling is that it will bear very little resemblance to the present-day set-up. After all, in spite of all the progress on short and ultra-short waves, we still have the same bare framework that we had thirty years ago. Chaps still call other chaps up, talk about how much wire they have suspended from their sticks, change from one microphone to another—and all this on gear which is, basically, much the same as that of the 'twenties. And lest you should disagree with this and say that the present-day TVI-proofed job is *not* like your TP-TG of 1925, let us put things in perspective by asking you to compare, say, an aircraft and possibly even a bomb with those of the early 'twenties. By comparison with those changes our stuff looks pretty static.

#### PORTABLE ?

We have always been somewhat cynical about much of this so-called "portable" operation. On the big organised Field Days one finds stations happily signing "/P," although they could barely be packed into a medium-sized caravan. Our rude rejoinder is "Portable? By whom?" So it comes as a pleasant change to find one or two small Clubs holding weekend outings at which some really portable goings-on are noted. Anything that cannot be carried on the back of a bicycle (with or without petrol-driven attachments) is *out*, for a start; and this goes for both receiver and transmitter. Now, lots of people can make a nice little 5-watt transmitter that you can hide inside a large grape-fruit; but if they want to use the thing in really portable form they have to take out their AR88, complete with power-supply, to go with it. Make no mistake about it—the owner of a home-built portable receiver that really works is a much



cleverer chap than his transmitting counterpart. We hear very little of trans-receivers these days—why?

#### THE NEW IDIOM

Strange how few of us really converse naturally when we are on the air. If you are honest with yourself, you will admit that—through the microphone—it often sounds like someone else talking. If you can't admit that, then you are one of the exceptions! Perhaps that is why it is so difficult to visualise a fellow-amateur until one has really met him face to face; the modest, short ones sound bumptious and tall, and the learned ones sound diffident. You can never tell. Most people, our researches prove, continue to speak in their natural tone of voice, but say lots of things that are really rather foreign to their normal conversation. Maybe this explains why one or two really outstanding personalities have become famous through broadcasting—they are the rare people with the facility of remaining perfectly natural although confronted by that mike and the hidden audience of unknown hundreds, thousands—or millions. We are rather beginning to think that the same applies to amateurs, for one who sounds really *natural* is so pleasing to listen to that he compels attention.

#### THE THINGS WE SAY

Apart from the sort of "personality" we show over the air, we all get in the habit of using rather meaningless phrases—or, at

any rate, phrases with the *wrong* meaning. For instance, the simple sentiment "I can't think of another single thing to say" is nearly always modified to "Well, there doesn't seem to be a terrific lot more here." Also, invariably, the statement "There's nothing worth telling you about the rig here" is followed by a detailed description lasting for anything from ten minutes upwards. And perfectly sensible folk who wouldn't dream of saying such things when off the air will gabble along about their "Six Victoria Six" driver and their two "Six London Sixes" in the modulator. We have even heard of an "Eight Ohio Seven," which is almost incredible and, of course, quite wrong! We make no apologies for referring to this at some length, because one sometimes wonders whether the services of a psychiatrist are not necessary. There must be *some* good reason for it all?

#### DX-PEDITIONS

It is doubtless a tribute to the amateur's persistence that the only way in which he can now work new countries is by inducing other amateurs to go out and "colonise" them! The recent effort by CE3AG/CE0AA on Easter Island is a typical enterprise, and a very fine example of the amateur spirit. One does wonder, though, why "country" boundaries have been allowed to acquire such importance. Suppose we had divided up the surface of the earth into ten-mile squares—then the Maritime Mobiles, now so shockingly neglected by the DX hunters because "they don't count," would have been the most sought-after people in the world. Their crossing of a new ten-mile boundary, every hour or so, would have brought them into recurring demand, even if the after-effects might have driven the QSL Managers mad. At present we feel that things are all wrong. Why, several people who have already worked Nepal wouldn't even have had a mild thrill from a QSO with Hillary and Tensing on the summit of Everest—*it wouldn't have been a new one!*

## The Other Man's Station

# DL2RO



THERE can be few DX operators of pre-war years who did not at some time encounter either Y-DCR, AI2KX, VQ6DCR, G2DC, or VU2FO and, since the war, have not heard or worked J4AAC or DL2RO. All these calls have been vigorously operated by Major J. Drudge-Coates, one of the world's best-known DX men, who started in April 1923 with an 0-V-1 receiver, standard equipment in those days.

It was in January 1924 that he came on as Y-DCR from Rawalpindi in North-West India, with 40 watts to a de-based AT50, running SEO as a one-lung Hartley. With this transmitter, a twice-weekly schedule was kept on 45 metres, for nearly two years, with Eric Megaw, 6MU, of Belfast, N.I., himself a famous Old Timer, now active in other spheres of radio and radar. In 1926, Y-DCR became AI2KX under the revised call-sign system, and a little later, with a posting to British Somaliland on the Anglo-Italian Boundary Commission, VQ6DCR was established; owing to transport and power supply difficulties, actual transmitting activity was somewhat restricted under this call, but many reception reports were sent to British amateur stations. The licensing of VQ6DCR involved much official head-scratching, it being thought that the operator intended, secretly, to "intercept Government transmissions"—for which the "network" consisted of four antiquated 1½-kilowatt spark transmitters, readable aurally (on the buzz) up to about half-a-mile away!

During the period 1930-'37, G2DC was the call

in use, first at Farnborough in Hampshire and later in Liverpool. Very active on all bands, G2DC had a high reputation as a successful DX operator. Even what was then VHF was tried, and in the early 1930's G2DC/P from the "Cat & Fiddle" near Buxton worked GW6AA/P on Snaefell in the Isle of Man over a distance of 130 miles, which at the time was the British record for the old 56 mc (five-metre) band. In 1938 came a posting back to India, and VU2FO was established at Jubbulpore in the Central Provinces, again becoming a very well-known DX call-sign. With the outbreak of war in 1939, the VU2FO transmitter was rebuilt and put into use on one of the Army's own wireless networks, on which it was kept in regular operation for several years after.

Major Drudge-Coates himself had the misfortune to spend the latter part of the war in a Japanese prison camp in Rangoon—but he got his own back in 1946, when he went to Japan with the British Occupying Forces. Of course, an immediate application was put in for a licence, at that time to the Americans as the issuing authority, and J4AAC emerged—with the normal U.S. one-kilowatt ticket! But only about 150 watts was ever actually used, and even at that there were considerable difficulties owing to mains variation from 115v. AC down to 85 volts when the peak load came on; this was partly overcome by arranging with the local switching station to shut down on one section altogether when J4AAC wanted full mains voltage! Operation on all bands 28-3.5 mc continued until May 1947, and in

December of that year G2DC was reopened at home, this time at Bulford Camp on Salisbury Plain. By July 1951, the location had become Hamburg and the call-sign DL2RO; it is from there that you can now work Jack Drudge-Coates, after all his wanderings and the varied experiences they have brought him, always with the Amateur Radio possibilities used to the fullest advantage.

The gear shown here includes two transmitters, the one with the light front panel being a Table-Topper, completely band-switched, with wide-band couplers, and running 130w. CW or 80 watts on phone, using 813's. The circuitry of the rack-built transmitter conforms to the same general arrangement; modulator units and power packs are in separate cabinets, and independently metered. There are two main receivers, an AR88D for 21 and 28 mc only, and a Super-Pro for the other bands, on which it shows a much better signal-noise ratio than the AR88. Receiving aeriels are separately coupled into each receiver through a matching network; for transmission, aeriels at present in use

consist of 137 ft. and 68 ft. Zepp-fed systems, with a ground-plane for 21 mc.

Relay control is used throughout, with transmitters, receivers and aeriels selected by switch control, and thereafter change-over is effected by a single flick-switch. Operation is on CW mainly, using an old straight key which has given years of faithful service. The DX operating record for DL2RO to date is 149 countries worked, with 68C on the 21 mc band, and high places in several of the recent DX contests.

But as he himself puts it, "DL2RO is always ready for any sort of QSO that comes along—ragchew, postage stamp, rubber stamp, or as you like it—on CW or phone on any band, and always QSL's 100 per cent." There he is in the picture, an old *qua-hai* of the Royal Signals, a Ham in the best and fullest meaning of that misused word, still as active as ever, and as keen as on the day on which he heard his first amateur signal on his first 0-V-1 receiver, more than 30 years ago.

#### TELEVISION SOCIETY TRANSMITTER

The Television Society are to instal an experimental 405-line TV transmitter at the Norwood Technical College later this year; it will radiate on 427.0 mc for vision and 423.5 mc for sound, under callsign G3CTS/T. The station will be operated for "educational purposes" and for the benefit of members wanting to gain experience in VHF reception. To this end, a standard adaptor is being designed to enable G3CTS/T to be seen on ordinary TV receivers. The honorary secretary of The Television Society is: G. Parr, Esq., M.I.E.E., 164 Shaftesbury Avenue, London, W.C.2, and membership is open to all interested in TV engineering, either professionally or as amateurs.

#### THE G.E.C. BRT-400D

This improved BRT-400 is a 14-valve superheterodyne with a frequency range of 150-385 kc and 0.51-30.0 mc in six switched bands, with a constant aerial input impedance of 75 ohms. There are six selectivity positions, overall bandwidths at the narrowest selectivity for 6 dB attenuation being 5.5 kc for phone and 500 cycles for CW. With the crystal filter phasing control an interfering signal only 1 kc away can be attenuated by at least 45 dB. The local oscillator drift is well below 5 kc at 30 mc when the set has warmed up. The BBC has installed 30 BRT-400D's at Crowsley Park, near Reading, which is within the Caversham Park "compound" of the BBC's monitoring and news gathering service.

#### T.C.C. TANTALUM ELECTROLYTIC CONDENSERS

The need for an electrolytic condenser capable of working in extremes of temperature ranging from  $-50^{\circ}\text{C}$ . to  $+100^{\circ}\text{C}$ . has become increasingly apparent. It is also desirable that this requirement be achieved without increasing the physical size above that of the smaller electrolytic condensers now available.

After extensive research T.C.C. have successfully produced a tantalum electrolytic condenser of unique construction. This little known natural element possesses several characteristics which lend themselves admirably to this particular use, *viz.*, inherent inertness and freedom from corrosion. These two features increase the working reliability and the shelf life of a condenser. The latter is such that a condenser can be put into immediate operation without preliminary re-ageing.

An important feature of the T.C.C. Tantalum Condensers is the substantially neutral electrolyte which they contain. This means, in effect, that were they to suffer mechanical damage *no corrosive injury would be done to other components* or to the chassis itself.

At this stage there is available an 8  $\mu\text{F}$  100v. DC working condenser in an aluminium tube, the ends of which are spun on to Neoprene bungs, and having tinned copper wire terminations. The insulation resistance of these condensers compares favourably with that of a paper dielectric condenser, and their power factor is approximately .02 at room temperature.

(Telegraph Condenser Co., Ltd.)

#### THE YOUNGEST EVER!

Recent notes about Our Younger Readers have, as we rather expected, brought forth a report *in re* the latest American child prodigy. Bobby Patrick, of Dalton, Penna., we are told, has duly passed the regular F.C.C. examination, and is now on the air with a 75-watt transmitter, under a KN call. His age? *Nine!* We give up.

#### CHANGE OF ADDRESS — HENLEY'S

We are informed that, with immediate effect, the address of their Glasgow Branch is: W. T. Henley's Telegraph Works Co., Ltd., 149-153 North Street, Glasgow, C.3 (Tel.: Glasgow Central 1771).

# The Month With the Clubs

## Birmingham & District Short Wave Society

On September 20 the Society held its Annual Field Day at Sutton Park. Results will be announced and discussed at the October meeting, to be held on the 12th. There will also be a discussion on a subject to be raised by one of the members. All visitors will be welcomed, and further details of the Society's activities may be obtained from the Secretary.

## Cambridge University Wireless Society

In preparation for another year's activity after the summer vacation, the workshop has been reorganised, and the partly rebuilt transmitter has been on the air with considerable success. First lecture of the term will be on October 12, when Mr. J. M. Carter, of Wright & Weaire, will talk on Tape Recording. Members of the University interested in radio are invited to contact the Hon. Sec. (see panel).

## Chester & District Amateur Radio Society

Plans for October include a lecture by G3ITY on the 15th, Elementary Lesson (RAE) No. 2 on the 20th, and a lecture by G3FOO on the 27th. November 3 is the date of the next RAE Lesson (No. 3). The winter programme has been drawn up mainly for the benefit of members taking the Exam., and the Elementary Lectures will be given on the first and third Tuesdays of each month. Morse practice has been arranged for every Tuesday.

All Clubs are reminded that the Eighth MAGAZINE CLUB CONTEST will be in full cry shortly after the publication of our next issue, and that the necessary organisation therefore needs examining almost at once.

The operating periods have been reduced somewhat this year, and MCC, instead of running for eight or nine consecutive evenings, is condensed into two week-ends. Otherwise the rules are basically the same as last year.

On Saturday and Sunday, November 14 and 15, and again on Saturday and Sunday, November 21 and 22, Clubs will be doing battle between the hours of 1430 and 1830 GMT. The latter parts of these periods will NOT be daylight hours, and there should be no limitation of the U.K. ranges which can be covered; even during the first part of the period (roughly 1430-1630 GMT) it should be possible for nearly all the participating Clubs to make contacts with each other. (See this month's "DX Commentary" for some idea of the ranges recently obtained on the Top Band during daylight hours, even in the summer.)

We are looking forward to an entry list of at least 30 Clubs for this event, and it would be a healthy sign if several NEW entries were received this year. By the time this appears in print the Rules will have been circulated to all Clubs known to us as being active; if any honorary secretary has not received his copy, it can be obtained on application.

Next month's deadline for this feature is **first post on October 14**. Club Notes should be addressed to "Club Secretary," SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1.

And here are this month's reports, from 24 Clubs.

## Edinburgh (Lothians) Radio Society

Meetings take place on alternate Thursdays, the October dates being the 8th and 22nd, at 25 Charlotte Square, Edinburgh. A full programme of lectures, visits and social activities has been prepared for the coming session, and visits to Kirk o'Shotts are fixed for October 11 and 18. New members will be welcomed at any meeting.

## Nottingham & District Short Wave Club

Meetings are held on Mondays and Thursdays, 7 p.m., at Woodthorpe House, Mansfield Road, and the technical and Morse classes have recommenced after the summer break. During the summer visits were paid to the main Telephone Exchange in Nottingham, and also to the local Power Station. The winter programme includes lectures, demonstrations, construction and operation of G3EKW; all interested persons are welcomed.

## Willesden Radio Club

New premises have been acquired at Scout House, Willesden High Road (near bus garage), and the Club has re-opened with an election of officers. G3EQM is Chairman, and G3GZW Secretary. Meetings will be held on alternate Wednesdays, from September 30 onwards; technical lectures and Morse classes have been arranged, and Junk Sales are to be held once a month. In addition, the Club Transmitter G3BFZ will be on the air in October.

## Wanstead & Woodford Radio Society

This Club meets at Wanstead House, The Green, E.11, and increased attendances have been noted at recent events—a demonstration of Tape Recorders among them. The AGM will be held on October 27, and all members are requested to attend. Morse classes continue with great enthusiasm, owing to the passing of RAE by

some members—all the entries passed. More constructional work is planned for the next few months.

#### **Spenn Valley & District Radio & Television Society**

Forthcoming events are as follows: October 7, talk on "Radar, 1939-1945," by G4AD; October 21, "Ham Radio in USA," by Capt. R. E. Perry, USAAF, Burtonwood; November 4, Visit to Viking Lamps, Bradford. At the opening meeting of the season, on September 23, G5GK gave a lecture and demonstration on the Panda PR-120 V.

#### **QRP Research Society**

Principal event of the month is the "Kaleveld Cup" Contest, running from 0001 on October 3 until 2359 on October 11. Full details appear in "QRP," the Society's monthly journal.

#### **Clacton Radio Club**

At recent meetings of the Club, the transmitter and receiver lent by G3HSM were on the air. The Tx, a CO/PA, is built inside an R.103A receiver, making a compact QRP station. Four members of the Club were successful at the RAE; Morse practice continues, and it is hoped that some new calls will be allotted shortly. Meetings are on alternate Fridays at the Laxfield Guest House, Beach Road.

#### **Lancaster & District Amateur Radio Society**

At the September meeting a Film Show was staged, films covering, among other subjects, the Manufacture of Solder, and the 1952 NFD. Members of the Barrow Club were welcome visitors. On October 7 there is a Junk Sale, and in November a talk on Two Metres by G3BAP. More members are turning up, and it is hoped that the winter months will see a steady increase.

#### **Norwich & District Radio Club**

At the August meeting the Club heard an interesting lecture on Sound Recording, by Mr. R. Williamson. On October 9 there is a visit by a representative of



Amateur stations are laid on for all sorts of occasions, these days. Here is the Nottingham & District Short Wave Club's display at the Sherwood Garden Party, when G3EKW/A was able to make a number of demonstration QSO's on 80-metre phone.

Rees-Mace Marine Radio, and on the 23rd there will be a talk and demonstration on Radio Control. Visitors and new members will be welcomed.

#### **Acton, Brentford & Chiswick Radio Club**

Weekly meetings are held at the AEU Rooms, Chiswick High Road—every Tuesday at 7 p.m. The Club Tx, G3IUU, is then on the air on 80 and 160 metres. Winter Morse classes and general instruction are now under way, and all are welcome, transmitters and SWL's alike.

#### **Hounslow & District Radio Society**

The autumn session opens on October 1 at 7.30 p.m., and thereafter the meetings will be held the same time every Thursday at the Grove Road Junior School, Hounslow.

#### **Grafton Radio Society**

The new session started on September 18, and October dates include G6CL (Historical Talk) on the 9th, Mr. H. Hill (Negative

Feed-Back) on the 16th, and a talk on Amplifier Design on the 23rd. There are still a few vacancies for the RAE course, with Morse instruction, run in conjunction with the local Education Authorities. Classes are on Mondays, 7.30 p.m., at Grafton School, Eburne Road, N.7.

#### **Leicester Radio Society**

Some interesting lectures have been planned for the winter, and a complete programme of forthcoming activities may be obtained from the Hon. Sec. New members and visitors will be welcomed at the Club Room, Holly Bush Hotel, Belgrave Gate, at 7.30 p.m. on the second and fourth Mondays. Members who cannot attend meetings are asked to contact the Hon. Sec. with regard to the Annual Dinner and Dance, to facilitate the plans for this event.

#### **Slade Radio Society**

The recent visit to Sutton Coldfield was so popular that another has been arranged for October 16.

On October 17-18 a double "Midnight D-F Test" will be held to conclude the season. TV enthusiasts will be interested in a lecture on projection television, with demonstration, on October 30.

#### South Manchester Radio Club

Future lectures include the Mullard Film Strip on CRT's (October 23) and a talk on a Home-Built Tape Recorder (November 6). The AGM will have been held by the time of publication, and also the Annual D-F Contest, arranged for October 4.

#### Cannock Chase Amateur Radio Society

At the September meeting there was a lively discussion on TVI, opened by G3CKY, and two members were congratulated on having passed RAE. On October 1 there will be a discussion on MCC plans, and final arrangements will be made for the Dinner and Dance to be held on October 15.

#### Merseyside Radio Society

This Club considers that remote control of models is somewhat neglected on Merseyside; and started its October programme with a lecture on this subject (October 3), which will again be featured at the meetings on the 17th and 31st. These will be held at Larkhill Mansion, Muirhead Gardens, Queen's Drive, Liverpool 13, at 3 p.m. Morse classes will be held on alternate Wednesday evenings—8 p.m. at St. James' Church Hall, Moscow Drive, tea being provided.

#### Stockport Radio Society

Past meetings have been well attended in spite of the holidays, and recent events have been the Region 1 Field Day, and a Bucket-and-Spade Party at St.

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

ACTON, BRENTFORD & CHISWICK: R. G. Hinds, 51 Rusthall Avenue, Bedford Park, London, W.4.  
 BIRMINGHAM: F. C. Cook, 67 Regent Road, Handsworth, Birmingham, 21.  
 BRIGHTON: R. T. Parsons, 14 Carlyle Avenue, Brighton, 7.  
 CAMBRIDGE UNIVERSITY: R. C. Marshall, St. John's College, Cambridge.  
 CANNOCK CHASE: C. J. Morris, G3ABC, 58 Union Street, Bridgtown, Cannock.  
 CHESTER: N. Richardson, 23 St. Mary's Road, Doleston, Chester.  
 CLACTON: R. J. Appleby, G3INU, 95 Oxford Road, Clacton.  
 EDINBURGH (LOTHIANS): L. Stuart, 38 Caledonian Crescent, Edinburgh.  
 GRAFTON: A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middx.  
 HOUNSLOW: R. J. Parsons, 16 Cypress Avenue, Whitton, Middx.  
 LANCASTER: A. O. Ellefsen, 10 Seymour Avenue, Heysham.  
 LEICESTER: W. N. Wibberley, 21 Pauline Avenue, Belgrave, Leicester.  
 MERSEYSIDE: B. Trueman, G3CJG, 141 Ince Avenue, Liverpool, 4.  
 NORWICH: D. Youngs, 53 Salisbury Road, Norwich.  
 NOTTINGHAM: N. D. Littlewood, 129 Standhill Road, Nottingham.  
 QRP RESEARCH SOCIETY: J. Whitehead, 92 Ryden's Avenue, Walton-on-Thames.  
 SLADE: C. N. Smart, 110 Woolmore Road, Birmingham, 23.  
 SOUTH MANCHESTER: M. Barnsley, G3HZM, 17 Cross Street, Bradford, Manchester, 11.  
 SOUTH SHIELDS: W. Dennell, G3ATA, 12 South Frederick Street, South Shields.  
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, nr. Leeds.  
 STOCKPORT: G. R. Phillips, G3FYE, 7 Germans Buildings, Buxton Road, Stockport.  
 SURREY (CROYDON): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.  
 WANSTEAD: C. Stevenson, 45 Dacre Road, London, E.12.  
 WILLESDEN: E. C. Mitchell, G3GZW, 5 Princess Road, Kilburn Park, London, N.W.6.

Annes. October meetings, on the 14th and 28th, will be at ATC Headquarters, St. Petersgate, Stockport.

#### Surrey Radio Contact Club (Croydon)

Meetings are on the second Tuesday of the month, 7.30 p.m., at the Blacksmiths' Arms, South End, Croydon. At the next, on October 13, G6CL will be the speaker, probably supported by G2MI and G6LJ. Visitors will be welcomed. On November 10 there will be a demonstration and talk on the Metropolitan Police Radio System.

#### Brighton & District Radio Club

In future this Club will concentrate on making up its programmes from within, and will discontinue the more advanced type of lecture which is only available from outside sources. On October 20 there will be a talk on Constructing a Simple Receiver, especially for the young members now in the Club. The Hon. Sec. would like to remind

some members that they are fast becoming strangers, and that their support is still sought by the Committee.

#### South Shields & District Amateur Radio Club

Their participation in the Corporation's Annual Flower Show—as noted in our August issue—was a great success, due evidently to careful organisation and the enthusiastic co-operation of Club members. Apart from G3ELP/A working phone on 20 and 80 metres, there was some enterprising planning on the sound recording side; the Club's own "mobile recording unit" toured the town to get descriptive material for a 60-minute tape, played back at the Show. Messages were specially recorded by the Mayor of South Shields and by Philip Slessor of the BBC. G3ELP/A made about 60 contacts in the U.K. and Europe, and the station being fully TVI-proofed, it was able to operate without interference with, or from, the TV receivers being demonstrated by local dealers on the stands near-by.

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Regular ionospheric recording began at Slough in 1931. Since then, as knowledge and technique have grown, the scope and frequency of the measurements have been expanded. For the past few years the results of these measurements have been compiled in tables and circulated to the Post Office, the BBC, radio communication companies, shipping lines, airlines, scientists, engineers and others concerned with radio transmission. A large quantity of detailed material, however, has not been available before now except in small amounts and on special request.

The complete results make up nearly eight hundred tables of data obtained from observations at the Radio Research Station, Slough, from 1930 to 1946 and at Burghhead, Scotland from 1941 to 1946. The tables show the gradual building up of measurements and

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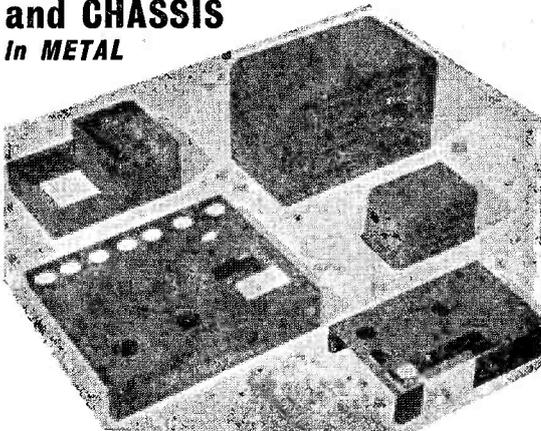
Because of the expense, it is not possible to publish the tables in printed form. Arrangements have been made to make photo copies available. These may be consulted at the Technical Information and Documents Unit (T.I.D.U.) of the D.S.I.R. at Cunard Building, 15 Regent Street, S.W.1. (Telephone: *Whitehall 9788*) or by arrangement at the Radio Research Station, Ditton Park, Slough (Telephone: *Slough 20391*).

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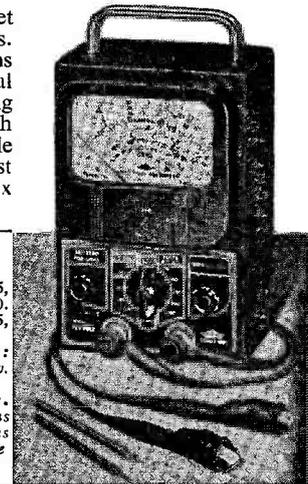
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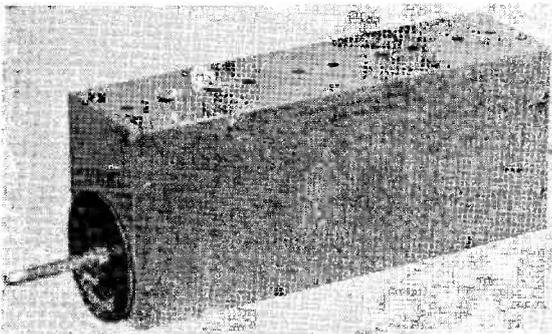


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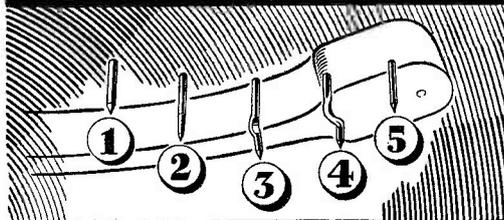
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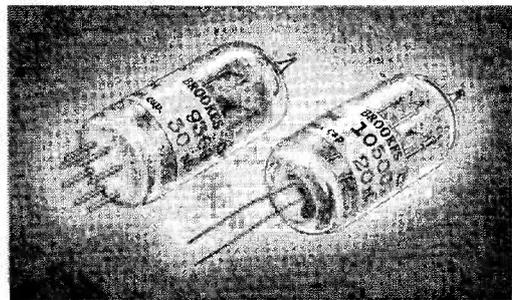
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**WANTED:** ET4336 Tx., condition immaterial; also spares for same. Wanted: 813's, 805's, TZ40's, BC221, AR88. **FOR SALE:** HRO Mx, 4 B/S coils, power/pack, £25; HRO Mx, 4 G/C coils, needs slight attention, £18; UM3, £3/10/-. Breaking for spares AR88 (no panel). Send your requirements. — Box 1305, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**URGENTLY WANTED: MANUALS OR INSTRUCTION BOOKS, DATA, ETC., ON AMERICAN OR BRITISH ARMY, NAVY OR AIR FORCE RADIO & ELECTRICAL EQUIPMENT.—HARRIS, 93 WARDOUR STREET, W.1.**

**RCA MODULATOR, 7-valve, AC powered, push-pull KT66 output, £7 (plus carriage). Few BC454's, original cartons, brand-new, £3 each (carriage paid). Magazines, books, Terman, etc., as new. Offers for clearance.—G2FZU, 18 West End Crescent, Ilkeston, Derbys.**

**EDDYSTONE S740 For Sale, together with plug-in type S-meter; only 18 months old and hardly ever used, £40; both in excellent condition. QTH Leicester.—Box 1308, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**HALLICRAFTERS SX28, £40; valves: 12AT7, 12AU7, 8/-; 6J6, 6SJ7, 7/-; 7C7, 4/6; 5-band 150-watt coil turret, £4.—7 Woodcroft Crescent, Hillingdon, Middlesex.**

**FOR SALE:** HRO and coils, SX28, Hallicrafter, Labgear Preselector and Converter for 5-10-20 metres.—Saracens Head, Daventry (Phone 351).

**G5NN's, 150-w. 28 mc rack-built telephony transmitter, which is complete though partially dismantled, containing over £100 worth modern components, is for disposal for £25, including working and spare valves, crystals, moving coil and ribbon microphones.—Brownstacks, Beeches Close, Kingswood, Surrey.**

SMALL ADVERTISEMENTS, READERS—*continued*

**F**OR SALE: Marconi CR100 Receiver, perfect condition, £25; or exchange with cash for Hamnerlund Super-Pro, or SX28.—Jones, Moreton, Ongar, Essex.

**BC** 221 with 230v. power/pack, metal cabinet, £18; 145 VFO, £3; RF25, 10/-; RF27, 35/-.—Box 1309, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**W**ANTED: Teletype Machine, preferably in working order, for experiments.—Seymour, Hackmans Gate, Worcester (*Blakedown 101*).

**C**NY1, Tx/Rx, mains/battery, Xtal/VFO, 807 final, 160/80/40, Rx normal superhet covering broadcast. All units in mint condition; maker's manual. Exchange S.640 or similar. Cash adjustments, or offers?—Box No. 1307, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**F**OR SALE: R1155A with p/p output stage, mint condition, plus complete kit for 160-metre converter, £16 (carriage extra). S.A.E. for list of gear for disposal. **WANTED:** VR101, 6Q7.—Box 1310, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**C**OSSOR DB Scope, perfect, £20; two 813's, perfect, £5.—Shannon, Mill'O Cart, Johnstone, Renfrewshire.

**F**OR SALE: 1155 Receiver, complete with power/pack and speaker, £10 or nearest offer.—Ewing, 107 Airedale Avenue, Chiswick, W.4.

**C**OMPLETE: 28, 21, 14 mc DX Phone Station; 3 beams, test gear, spares. Exchange only for vintage 4-seater potent sports car; any year considered.—Box No. 1311, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**S**ALE: Signal Generator, type BC-3, £12; Magnetrans, type 725A, new, 50/-; Valves 808, 15/-; 866, 8/6; 818, 15/-; IB24, 35/-. Crystal Monitor, Type 4, £3 10s. 0d. (plus carriage).—1 Howletts Lane, Ruislip, Middlesex.

**A**NY reasonable price paid for *Bulletins* (August 1926, May and October 1934); *QST* before November 1923; *CQ* (1945/6); 102 odd pre-war *Practical Wireless*. Most *Radio* (single copies or quantities equally acceptable); *Amateur Radio* and *Popular Wireless* from No. 27. Any *Break-In*, *R/9*. Early *Call Books*, amateur handbooks, etc. Have some magazines exchange/sell. Will pay overseas amateurs in English magazine subscriptions.—G3IDG, 95 Ramsden Road, London, S.W.12.

**F**OR SALE: Canadian VRL Receiver in mint condition, little used, complete with handbook and about 50% spare valves, not modified; coverage 1.2-28 mc; £30, o.n.o.—Box No. 1313, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.E.1.

**E**DDYSTONE 750, in good condition, little used, £40; also Connoisseur 2-speed Record Player, fitted Connoisseur super-lightweight pick-up with two heads, unused, as new, £22.—P. Fancourt, 37 St. Paul's Street, Stamford, Lincs.

**H**T.9 HALLICRAFTERS Tx in first-class condition, with coils for 20-40 and 80; and also Hallcrafters HT 18 VFO/NBFM to work with above. Manuals for both units included. This outfit can be seen and tested on the air. Price £120 or near offer.—Beckett, Manor Farm, Brimington, Nr. Chesterfield.

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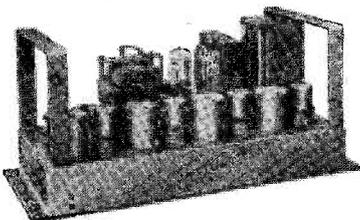
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**S**ALE: S640 Receiver; perfect condition; one owner; manual; £16 (carriage paid).—G2FMP, 36 St. Luke's Road, Horninglow, Burton-on-Trent.  
**S**CR522 Tx, air-tested, less 832's, £2 10s. 0d.; G2IQ converter, £2 10s. 0d.; 6-volt vibrator packs, Masteradio, new, 10/- each; 230v./12v. 1A, transformers, 0-120 microammeters, 5/- each; Taylor signal generator, £5; R1147B, new, £2. Other items to clear — space required. S.A.E. list.—J. B. Armstrong, 40 The Oval, Mirehouse, Whitehaven, Cumberland.

**E**DDYSTONE S750 as new. Recent work check-over. £37 10s. 0d. with matching speaker.—G. Sumner, 654 Liverpool Road, Ainsdale, Southport.

**N**EW BOXED VALVES: 1—803 and base at 45/-; 1—829 and base at 70/-; 6—805, 4—815, 7—35T, 1—930, at 30/-; 6—6L6M, 1—814, 1—837, 2—884, at 12/6; 1—836, 5—866A, at 15/6; 18—7193, 5—RK34 at 3/-; 2—VS110A, 50—6J5, 9—6H6, 24—6SH7, at 5/-; 10—EL32, 5—1626, 24—6AC7, 10—801A, at 6/6; 5—U19, 6—8011, 5—KT8C, at 10/-.—123 Hamill Road, Burslem, Staffs.

**W**ANTED: Petrol-driven Charging Engine, 12 to 18 volt, preferably with self-starter. State make, price, condition, to BM/Edgar, London, W.C.1.

**S**ALE or EXCHANGE: Mullard B.100 Cathode Ray Tube Unit, for Valve Tester, or best offer? —Edwards, 89 Victoria Road, Birkenhead.

**W**ANTED: Hammarlund Receiver and Class-D Wavemeter; also R107 in any condition. All letters answered.—G3FDY, Station House, Ancaster, Nr. Grantham.

**1**45/392 MASTER OSCILLATOR, mains pack, unmodified, working, £6.—N. Chapman, 14a Kettering Street, London, S.W.16.

**A**MATEUR CLEARANCE.—Genuine Bargains, all subject to inspection and buyer to collect in each instance: (a) T.1131 ex-RAF Tx, very FB reconditioned job, fitted new valves throughout; in process conversion to ten metres; about 5 cwt. excellent gear; £40. (b) Canadian C.43 Tx, 300-600 watts; CW, ICW and Phone; 813's in PA; new and unused; no power unit; £30. (c) R.1132 ex-RAF Rx, complete with power unit, £7 10s. 0s. (d) Wilcox-Gay CO Doubler Unit, as new, £2 10s. 0d. Near offers carefully considered. Must clear.—G2DS, 39 Knoll Road, Bexley, Kent. (Bexleyheath 754).

**R**OTHERMEL De-Luxe Crystal Pick-up, 35/-; Gramophone AC Motor Unit with turntable, 35/-. Condition as new. Guaranteed.—Parker, Woodlands, Cropston, Leicester.

**W**ANTED: AR11 Transceiver; condition immaterial; also B2 outfit, complete, in good order.—Johnson, 35a Birdhill Road, Woodhouse Eaves, Loughborough.

**S.R.** TAPE RECORDER for sale, as new, complete with Acos microphone and two reels, £30.—J. C. Foster, College Engineer, Wye College, Nr. Ashford, Kent.

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SMALL ADVERTISEMENTS, READERS—*continued*

**F**OR SALE: BC221-M, 125 kc-20 mc; in canvas case with calibration book and set unused spare valves. In immaculate condition and hardly used. Also BC348M Receiver in perfect order.—Offers to Pennicott, 6 Priory Road, Chichester, Sussex.

**A**R 77E, £27, BC342, 17 (or offers?) Both Rx's in good condition; buyers collect. Set of CR100 IFT's with xtal and BFO, £2; 36 QST's from 1936 to 1940, 30/-.—Batey, 95 Kenilworth Crescent, Enfield, Middlesex.

**G**2FXI QRT, selling all equipment: Modern valves and gear at junk prices; all home-built includes Rx, 150w. Tx, etc.—39 Tolworth Rise, Surbiton.

**E**DDYSTONE S.640; splendid receiver, 6BA6 RF stage, highly sensitive. First £18 secures.—G3GCO, 31 The Crescent, Donnington, Shropshire.

**H**RO-5T: 4 bandspread coils, 1 broadcast coil, home-made p/pack and L/S, £33; delivery in London area. Also 100 kc xtal and 1000 kc xtal with suitable coils, £1 lot; 3.5 mc xtals without holders, 3/6 each; Q.C.C. xtal in varigap holder, 3950 kc, 10/6.—Parry, 50 Goddington Lane, Orpington. (Phone 2710).

**A**MATEUR selling station: Woden transformers, chokes, complete power units and numerous other items at half cost; G.E.C. Television, 9in., £20; TR1621C with CV82 Type 105 Oscillator, £2; BC625A, £3; BC624A, £3; TCS12, 10w. on 160, 100w. on 40 and 80, £10 (no power unit); TU5B, £1; TU7B, 15/-; 6SA7's, boxed, 6/-; pair DA41's, £2; CV235, pair, 15/-; 866's, pair, 30/-; Taylormer 81C and adaptor 313C (cost £23) for £14; 6X5G/GT, boxed, 5/-; octal valves, mixed, unboxed, 10 for £1. Carr. extra. S.A.E. for list, offers considered.—Ellett, Meppershall, Shefford, Beds.

**C**OMMUNICATION Rx. 1155, modified; Miniatures in RF, IF, filter NL; RF, IF, AF gains; three-position selectivity; S-meter, Top Band; £14 o.n.o.? Oscilloscope, £12, o.n.o.? S.A.E. details. 28 mc Converter for above Rx, 6AK5, 6J6, VR150, £4, o.n.o.—M. S. Gotch, Bridgett's, Widdington, Essex.

**S**ALE: SX16 Hallicrafters, 550 kc-60 mc; variable selectivity and xtal filter; recently re-valved and aligned; instruction manual; £20.—25 Stanford Road, Shefford, Beds.

**S**ELLING UP: Eddystone S640, little used, excellent condition, £18; valves, 2/- each; power units; transformers; meters; components, etc. Lists free.—G3FCZ, 98 Staplehurst Road, Sittingbourne, Kent.

**A**R 88LF, good condition; trimming tools; handbook; £40. AR88 wave-change switch (new), £3. AR88D, main dial, 10/-; AR88LF output transformer, 10/-; LF choke, 7/-.—Box 1315, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**S**ALE: Eddystone 750, re-aligned Sept. by Webbs, perfect, £45. WANTED, with manual, Model S.504, must be perfect; consider part-exchange.—Box 1317, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**B**ARTER or SELL HRO Senior, unmodified, re-aligned, re-crackled, manual, coils—BS 20, 40, 160 and MW. WANTED: CR100 with manual.—G3EQM, 10 Standard Road, N.W.10.

**S**ALE: Army 12 Set, spare PA valve, mint condition. Offers? BC348, built-in p/pack, £12.—G3HFP, 16 Hall Street, St. Helens, Lancs. (Phone 4556).

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**B**C.348 internal p/pack, good appearance and working order, £19 (c/p). TCS.12, internal p/pack, moderate appearance, good working order, £8 (c/p).—Box No. 1314, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**S**TEEL RACK and Operating Table, 1500v. 350 mA and 500v. 170 mA power supplies, 250-watt 20-metre PA; many spares; £12 lot (buyer collects). UM2, unused, 62/6 (carriage paid).—G3DCQ, 8a Sunnysdene Avenue, Highams Park, E.4.

**M**UST SELL: Radiovision Commander, Wilcox-Gay VFO, BC-455B, new; power/packs, scope, over 100 valves; loads gear. Stamp for lists.—G3HBP, 22 Caistor Street, Ingrow, Keighley, Yorks.

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## R.C.A. Transmitters ET.4336 and ET.4332

Complete with Speech Amplifiers MI 11220, Wilcox Gay V.F.O. and Crystal Multiplier and all tubes.

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**HALLICRAFTER BC.610.** Complete with Speech Amplifier, BC.614E, Aerial Tuning Unit BC.939A, all Tuning Units, Tubes and Coils.

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**ARMY 12 TRANSMITTER 25 WATTS.** Frequency coverage 1.2-17.5 Mc/s. Phone or C.W. built-in Modulator, complete with all Tubes.

**RECEIVERS AVAILABLE.** RCA, AR88 LF and AR88 D, Hallicrafter SX.28, S.27 and National H.R.O. Frequency Meter BC.221 Modulated and Unmodulated available from stock.

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Scale	FSD	Size	Type	Fitting	Price
500 micro A		2 1/2"	MC	Flush	20/-
5ma		2 1/2"	MC	"	7/-
10ma		2 1/2"	MC	"	10/6
30ma		2 1/2"	MC	Proj.	7/-
100ma		2 1/2"	MC	Flush	10/6
200ma		2 1/2"	MC	"	8/-
300ma	(100)	2 1/2"	MC	"	10/6
300ma		2 1/2"	MC	"	7/-
500ma		2 1/2"	MC	"	9/-
1A		2 1/2"	TC	Proj.	9/-
2A		2 1/2"	TC	"	8/-
3 & 3.5A		2 1/2"	TC	"	7/-
6A		2 1/2"	TC	Flush	8/-
20-0-20A		2 1/2"	MC	"	8/-
20A		2 1/2"	MC	Proj.	8/-
50A	50c	2 1/2"	MI	Flush	10/6
50A	50c	2 1/2"	MI	Proj.	30/-
6ma	(500uA)	2 1/2"	TC	Flush Metal	17/6
(45/50/55c)	(Freq.)	7"	230v.	Proj.	75/-
15v.		2 1/2"	MI	Flush	10/6
15-0-15v.		2 1/2"	MC	"	10/6
150v.		2 1/2"	MC	"	10/6
250v.	500c	2 1/2"	MI	"	17/6
2500v.		2 1/2"	EL	"	30/-
3500v.	(5ma)	3 1/2"	MC	Proj.	17/6

**EARPIECES.** H.R., 2/9 ; RX. 76, with 1/ECH35, 1/EF39, 1/EA50, 3 gang, 160pf. cond., etc., 25/-, less valves, 10/6 (carr. 2/-). **TRANS.** 230v. input, 300v. 30ma and 6.3v. Ia output, small, potted, 9/-.

**CONDENSERS** (High Voltage). 750pf and 500pf, 15kVw Ceramic in sealed case, 5/6. .02 8kVw met. tube, 2/6. BC 610, Tank Coils, 5 types, each, 5/-. Eddystone Tx types "P" and "Q," Ceramic on 5 pin hor. base, New, 3/6. **DYNAMOTORS.** Hoover, 24v. to 1230v., 200ma, 20/-, 6v. D.C. to 280v. D.C., 80ma, soiled, 8/6. Jacks, 9 Igranic CC DP, in lidded box, 10/-.

L.U. 51, Short Wave Turret coil assy, 8 position, 3/6. Neons, S.B.C., S.Ct. or D.Ct. or Octal (100v.) or Midget MBC, 2/-.

**MOTORS.** Gram Collaro AC37 110/250v. 3/8" dia. spindle, New, 30/-. **PRE-AMPS.** Type 6048 with 2xEF50, 17/6, less valves, 8/6. **RECEIVERS, ETC.** VR91 Pre-amp cpte. with Power Pack (5Z4G), 230v., 50c input, New, 50/- (Carr. 5/-). RX25 (TR1196) with 2/EF36, 2/EF39, 1/EK32, 1/EBC33, 2/465KCS, IFTs, 27/-.

Trainer Type 64, 230v., 50c input, 9 valves, virtually an amplifier, in black metal case, New, 70/- (Carr. 8/6). Power Unit, 599, 100/250v., 50c input, Trans. 300-0-300v., 40ma, 15v. 3a, 6v. .6a, Met. Rec., 12v. 8a, and 6X5G, 45/- (Carr. 5/-). Power Pack 247, 230v., 50c input, 580v. 200ma, D.C. smoothed output and 6.3v., 3A A.C. (5U4G rec.) in neat blue case, 50/- (Carr. 7/6). P.U. 266. Similar case but hi-ci, with 5U4G, VS110 and LT met. rec., 25/- (Carr. 7/6). R1155 BFO boxes, less valve, 4/-. Amplifier A1271, with EF36, relay and LF trans, 7/6. Mobile RX (Ex-Police) Xtal controlled 80/100mcs. Grey metal case, 10 x 8 x 7". Valves RK34, 2/KTW63, 3/954, 2/D63, KT63, 35/- (Carr. 6/-). Less Xtal and Power supplies. Waveform Gens. containing 2/ECC33, (6SN7S), 1/EF50, 1/EA50, 21/-.

IND. 186, with 3/EF50, 1/EA50, 1/5Z4G, Y63, and Power Pack, 350v., 100ma, D.C. smoothed, 6.3v. A.C. (Twice), 50c 230v. input, 45/- (Carr. 3/-). Mod. Unit 69, 230v. input, valves: 3/EA50, 6/SP61, 2/EB34, 1/5Z4, 345v., D.C., 200ma. Power Pack with Choke/Conds. New, 60/- (Carr. 6/-). Test Set SE2, 230v. 50c input. With 500 microammeter, 2/615, 2/EA50, 1/VCV172, 1/VR137, 1/6X5, 160/230mcs. New, in metal lined case, 50/- (Carr. 10/-). P60. 300/800mcs. Valves: 4/EF54, 1/6J5, 1/6Q7, 2/VR92, 2/RL18. IFTs on polystyrene formers, 55/- (Carr. 8/-). **RECTIFIERS.** HW 270v., 80ma, D.C. (Metal), 6/-.

HW 12v., 3/4 D.C., 2/6. **RELAYS,** G.P.O. Multicontact 12v. overload, Trip Type, 3/6. Relay 12/24v., actuating toothed bakelite wheel, 3/6. **TRANSFORMERS.** EMI. Input 110/245v. Outputs 350/0/350 120ma, 6.3v. 4A and 5v. 2A, Drop thru, with fuseholders, 16/6. Filament, Mains to 6.3v., 1 1/4A, 6/9. **POTENTIOMETERS,** w/w 20k 3" dia. 3/6, 500k ganged, carbon, 3/6. **KNOBS.** instrument, black, 1 1/4", 6d., Pointer, 9d. Octal plugs, 1/3. Dust cores on brass threaded rod, 4d. PT15 valves, 10/-.

U.S.A. Threaded co-ax plugs, 9d.

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Output 250 volts. 60 mA. Weight 5 lb. Suitable for Car Radio or Electric Razors. 22/6.

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VCR139A. 2 1/2 in. Brand new in original cartons, 35/-, carriage free.

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A.C. 200/250 v. 50 cycles, 2,000 r.p.m. Ideal for Tape Recorders. Gram. Motors, Timing Mechanisms, or Switch Movements, etc. Size 2 1/2" x 3 1/2" x 2 1/2". Brand new, 10/6 each.

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15 v. (50c) a.c. M.I. 2 1/2 in. Flush Panel Mounting	12/6
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3,500 v. M.C. 3 1/2 in. Projection	21/-
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500 Microamp M.C. 2 1/2 in. Round Panel Mounting	15/-
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10 M/A. M.C. 2 1/2 in. Flush Panel Mounting	12/6
30 M/A. M.C. 2 1/2 in. Round Panel Mounting	7/6
30 M/A. M.C. 2 1/2 in. Flush Panel Mounting	12/6
50 M/A. M.C. 2 1/2 in. Square Panel Mounting	7/6
200 M/A. M.C. 2 1/2 in. Flush Panel Mounting	12/6
500 M/A. M.C. 2 1/2 in. Flush Panel Mounting	12/6
AMP. METERS.	
1 Amp. T.C. 2 1/2 in. Projection	7/6
3 Amp. T.C. 2 1/2 in. Square Panel Mounting	7/6
6 Amp. T.C. 2 1/2 in. Flush Mounting	10/-
20 Amp. M.I. 2 1/2 in. Round	12/6
15 Amp. M.I. (50c) Projection	35/-
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M.C. = Moving Coil. M.I. = Moving Iron. T.C. = Thermo-Coupled.  
All Meters are Brand New and in original cartons.

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Manufactured by Parmeko and Sound Sales for Admiralty. 4 valves, PX25, 2-AC/HL, M.U.14, Output Matching and 33 and 150, 100/250 v. A.C. COMPLETE IN STEEL GREY AMPLIFIER CASE £12 10 0  
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354	8/-
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5U4	8/6
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1622 (6L6)	11/-
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6R7	8/6
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6SA7GT	8/6
6SQ7GT	8/6
6S7	7/6
6SH7M	7/6
6SK7GT	7/6
6SL7GT	9/-
6SN7GT	9/-
6SC7	10/-
6S57	7/6
6V6GT	7/6
7C5	8/6
7A7	8/6
7C7	8/6
7H7	8/6
7B7	8/6
7S7	10/-
12A6	7/6
12C8	7/6
12S5	8/6
12K9GT	8/6
12K8GT	8/6
12Q7GT	8/6
12SA7GT	8/6
12SQ7GT	8/6
12S67	8/6
12SH7	7/6
12S17	8/6
12SK7	8/6
12SR7	7/6
14A7	8/6
25Z6GT	8/6
25Z5	8/6
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EF54 (VR136)	6/-
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EB33	8/6
EF36	6/6
EF39	6/6
EK32	6/6
EP91	9/-
EL32	7/6
EF50 (Red Syl)	10/-
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SP2	8/6
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DK40	9/-
UL41	9/-
UY41	9/-
4D1	4/-
8D2	4/-
9D2	4/-
15D2	10/-
R3	8/6
D41	5/-
D42	5/-
D63	5/-
KT2	5/-
KT61	8/6
KTW61	7/6
U17	8/6
U19	10/-
U52	8/6
Y6	8/6
P2	4/-
MU14	8/6
PX25	12/6
KT33C	10/-
KT66	12/6
GU50	12/6
XP (1.5)	4/-
XH (1.5)	4/-
VU11	4/-
VU133	4/-
VU120A	4/-
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7475 (V570)	7/6
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CV66	6/-
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U22	8/6
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TP22	8/6
TH233	10/-
41MP	7/6
42SP7	6/-
2155G	4/-
MS/PENB	7/6

### INDICATOR UNIT TYPE 182A

Unit contains VCR517 Cathode Ray 6 in. tube complete with Mu-metal screen, 3 EF50, 4 SP61 and 1 5U4G valves, 9 wire-wound volume controls and quantity of resistors and condensers. Suitable either for basis of television (full picture guaranteed) or Oscilloscope. Offered BRAND NEW (less relay) in original packing case at 79/6, plus 7/6 carriage.

### VCR517C BLUE & WHITE 6 1/2 in. TUBE

This tube replaces the VCR97 and VCR517 without alteration and gives a full blue and white picture. Brand new in original cartons, 35/-, carriage free. Three months' guarantee.

### 25/73 TR1196 RECEIVER

This unit is complete with 6 valves, 2 EF36, 2 EF39, 1 EK32, 1 EB33 and 465 kcs 1.F.T.s. Circuit and conversion data supplied, 25/-, in new condition.

### PYE 45 Mc/s STRIP, TYPE 3583 UNITS

Size 15 in. x 6 in. x 2 in. Complete with 45 Mc/s. Pye Strip, 12 valves, 10 EF50, EB34 and EA50, volume controls and hosts of Resistors and Condensers. Sound and vision can be incorporated on this chassis with minimum space. New condition. Modification data supplied. Price £5. Carriage Paid.

### SPECIAL PRICES FOR SETS

10 EF50 (Ex-Brand New Units) 6/- each	50/-	Set
10 6A6 valves	80/-	"
6K8G, 6K7G, 5Q7G, 5Z4G, 6V6G (or KT61)	6/6	"
1R5, 5S, 1T4, 1S4 or (3S4 or 3V4)	37/6	"
TP25, HL23/DD, VP23, PEN25 (or QP25)	30/-	"
6K8G, 6K7G, 6Q7G, 25A6G, 25Z5 (or 25Z6G)	25/-	"
12K8GT, 12K7GT, 12Q7GT, 35Z4GT, 35L6GT (or 50L6GT)	37/6	"
12SA7GT, 12SK7GT, 12SQ7GT, 35Z4GT, 35L6GT, 50L6GT	37/6	"
PX25, KT33C, KT66, GU50	12/6	Each
PX25's Matched Pairs	25/-	"

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2/-

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**SHORT WAVE**  
*Magazine*

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