

The SHORT WAVE Magazine

VOL. XX

SEPTEMBER, 1962

NUMBER 7



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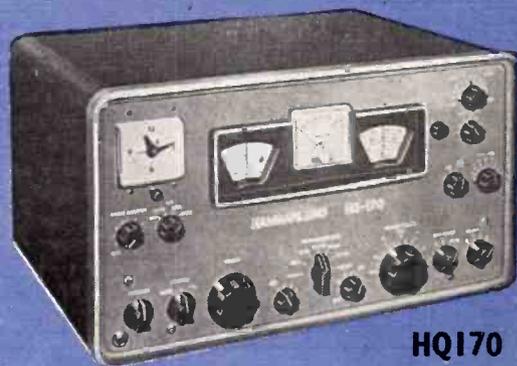
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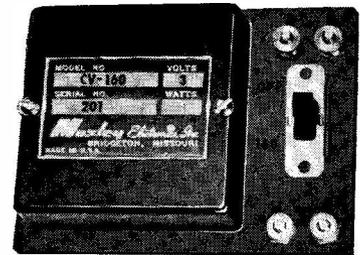
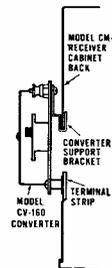
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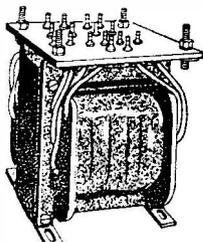
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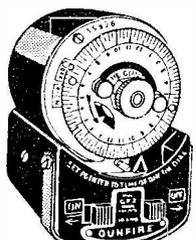
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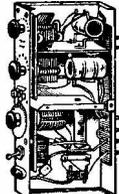
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The SHORT-WAVE Magazine

E D I T O R I A L

Competition

With the contest season upon us once more, it is worth considering one of the less-obvious aspects of contest activity. It can be argued that competition would be unnecessary—and even undesirable—in that perfect state to which, but for the frailties of human nature, we might already have succeeded. For two thousand years of recorded history, clever men have been trying to change human nature, with no signs of success. Therefore, it is reasonable to suppose that the competitive element will remain one of the dominant factors in nearly all fields of human activity and endeavour, of which Amateur Radio is one.

There are those who maintain that in Amateur Radio the competitive spirit should be discouraged; and they can advance many good arguments to support their contention. But as in any other sphere, in Amateur Radio it is competition that is the spur to progress. Indeed, it can be shown that the competitive element is a good thing for our progress. For thus is the practice of the art improved and developed to the ultimate benefit of all concerned—including those who have no particular interest in competitive activity for its own sake. Therefore, do not let us deride those who take a serious part in contest activity.

*Austin Fobler
G6FO.*

WORLD-WIDE COMMUNICATION

HYBRID RECEIVER FOR MOBILE OPERATION

IN CAR, BOAT OR CARAVAN—
USING LOW-VOLTAGE HT
VALVES AND TRANSISTORS

J. A. H. SPRATT, M.I.R.E. (G3KWG)

This receiver is called "hybrid" because it is a general-purpose design for the LF end of the spectrum, covering broadcast as well as two amateur bands, 1.8 and 3.5 mc; its upper frequency limit is 4.0 mc. Intended originally for MM working, it is part of a complete Tx/Rx assembly. Since one of the features of the design is the use throughout of a single 12v. HT valve type capable of satisfactory operation at this low plate voltage, and with transistor AF output, the receiver has obvious applications for amateur-band mobile or portable working—it can be run direct from a 12-volt accumulator as the sole source of power. It is intended in a future article to describe the accompanying 1.8-4.0 mc transmitter.—Editor.

THE receiver to be described was designed for use in the Marine Radiotelephone Service, and for mobile stations using the communication band 1.6 to 4.0 mc. There are many features which make the receiver suitable, if not ideal, for use by the mobile amateur station wishing to work on 160m. and 80m., with the BC bands thrown in. Facilities for CW reception are included, together with a built-in audio output meter (which was intended for direction-finding null indication and Consol navigation pulse counting). There is a spare triode section available for use as a conventional S-meter if required.

There are many of us who still prefer valves for RF work, because of the large number of standard coils available and the ease of obtaining excellent sensitivity and selectivity. The 12-volt HT valve ECH83 used in this design performs very well for low signal amplification, whilst transistors for the audio output and driver stages permit adequate loudspeaker power of good quality.

The receiver is not at all touchy, is not over-critical on lay-out, uses only one type of valve to simplify the spares problem, and is not wasteful of components. There is protection against burning-out the transistors and electrolytics by accidental reversal of the battery connections, and provision for either negative or positive earth as required. The receiver is also easily changed for use with 24-volt DC supplies, this being useful for marine, emergency or field day purposes. The consumption from a 12-volt battery is approximately 1 amp., which is very

reasonable and will not leave you with a battery too flat to start the car after a couple of hours' listening—an experience quite a lot of mobiles have had using 250-volt valves with their attendant rotaries or vibrators. There are the further advantages of no nasty hash from the said rotaries or vibrators and considerable saving in size and weight.

Circuit Description

Referring to the block diagram Fig. 1, it will be seen that the receiver is a conventional superhet, with the rather novel feature of using the same valve throughout the RF and IF amplifier stages.

There is a tuned RF amplifier V1A, followed by a normal mixer, V2A, two IF amplifiers working at 465 kc (V3A, V4A), diode detector and diode AGC detector (semi-conductor diodes), followed in turn by an AF amplifier, V3B. Finally, a transistor driver TR1 and power output stage TR2 completes the line-up.

Reference should now be made to the circuit diagram, Fig. 2, for the detailed circuit description and design points. It will be noted that some components are returned to the negative rail and not direct to chassis. This is important if the facility for either positive or negative earth selection is required.

The RF amplifier, V1, is a triode-hexode type ECH83, with the hexode portion strapped as a pentode. The triode is not used in the original design, so the electrodes are strapped to earth. Grid current biasing is used, via the AGC network, R2, R5. Both anode and grid are tuned, and it will be noted that a 300 $\mu\mu\text{F}$ gang has been employed at VC1, to keep the dynamic impedance, and hence the gain of the RF circuits high. The coils used are "Stabcoils" (*Electroniques, Felixstowe, Ltd.*), and

TECHNICAL SUMMARY

<i>Ranges:</i>	(1) 1.6 to 4.0 mc (2) 550 to 1500 kc (3) 150 to 400 kc
<i>Sensitivity:</i>	1.8 mc, better than 5.0 μV . 3.6 mc, better than 2.0 μV . 30% modulated signal at 400 c/s. on CW, better than 1.5 μV .
<i>Output:</i>	50 mW for above sensitivity figures
<i>Signal-to-Noise:</i>	At least 10 dB for above sensitivity figures
<i>Image Rejection:</i>	At least 60 dB (Range 1)
<i>IF Rejection:</i>	At least 80 dB (Range 1)
<i>Intermediate Frequency:</i>	465 kc
<i>Selectivity:</i>	6 kc bandwidth —6 dB 20 kc bandwidth —40 dB 40 kc bandwidth —70 dB <i>Taken at 3.8 mc</i>
<i>Oscillator Drift:</i>	After 60 seconds warm-up time drift does not exceed 800 c/s in any further five minute period
<i>A.G.C.:</i>	70 dB change of input signal increases output by 6 dB
<i>Power Consumption:</i>	12.0 volts 1.15A, or 24.0 volts 0.75A

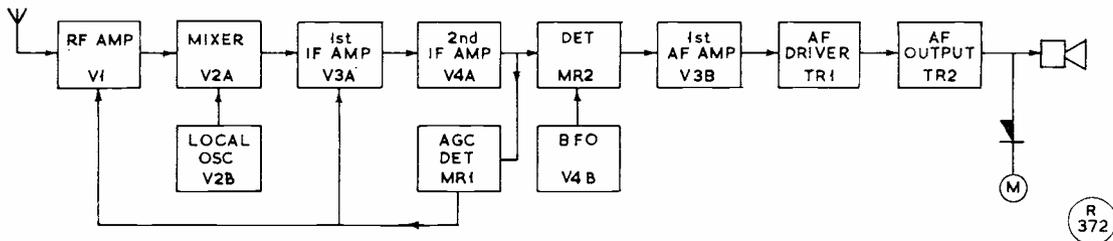


Fig. 1. Block diagram of the receiver designed by G3KWG and fully described in the article. It is intended for general coverage up to about 4.0 mc, and can thus be used mobile/portable on both amateur LF bands. A feature of this design is the use of a single valve type, the ECH83, in all valve stages, suitable for operation with no more than 12 volts HT. The audio output side being transistorised, only a 12-volt accumulator supply is required to power the receiver. Other uses of this design are as a navigation aid for yachtsmen and as the receiver section of a complete radiotelephone installation for ship-shore working in the "trawler band."

their excellence makes them worthy of more mention. They have high Q, and a built-in trimmer, allowing a very neat layout with considerable economy of space.

For the frequency changer stage, V2, another ECH83 is used, conventionally with the hexode as mixer, grid current biased by R1 and C2, with the triode as local oscillator. Series-feed is employed for the triode, due to the low HT. Padders are supplied with the "Stabcoils" and, due to the trimmers being ceramic n.t.c. types, the drift is very small. Oscillator drift at 3.8 mc after one minute warm-up time does not exceed 500 c/s per further five-minute period. After thirty to fifty minutes, depending on ventilation, drift is negligible. In all cases, the oscillator frequency is signal frequency plus 465 kc. Decoupling of the mixer anode was found necessary and is provided by R4 and C6. It was found that no spurious resonances were present in the RF and oscillator coils when out of circuit, so no shorting contacts are required on the wavechange switch; thus, the switch is a simple three-wafer unit having double-pole three-way contacts on each wafer. The new "Trolex" (A. B. Metals, Ltd.) type was used because of its small size and low cost. No AGC was applied to the mixer, to keep oscillator pulling down to minimum.

The 1st IF amplifier, V3A, is a pentode-strapped ECH83 hexode section, grid current biased via the AGC line. No decoupling was necessary. The 2nd IF amplifier, V4A, is similar to the first, except that no AGC is applied, so as to allow maximum drive to the AGC diode and consequently a maximum of control. The stage is grid current biased by R6 and C9, whilst decoupling of the stage is provided by R7 and C11.

The IF transformers, also supplied by *Electroniques*, are ferrite potted, giving a very high dynamic impedance and good selectivity. Use of average type IF transformers is allowable, but there will be approximately 6 dB loss of gain.

As the AGC detector, MR1, a GEX13 or similar germanium diode, is used. It is fed directly from the anode of the 2nd IF valve to reduce sideband screech when tuning, and to allow the AGC to be operative with the BFO switched on, without reduction of sensitivity due to AGC being developed by rectification of the BFO output. The AGC is applied in series with the respective coils of the RF

and 1st IF amplifiers to their grids, and gives a characteristic such as to reduce the change of output power by 6 dB for a 70 dB change of input signal level. The time-constant is an optimum for telephony working, having a short attack and fairly long discharge (about two seconds).

Next, diode MR2, a GEX13 or similar germanium type, is the second detector, its circuitry being conventional. The DC component is isolated from the volume control, RV1, thus preventing noise of operation after a short period of life.

V4B is the BFO, being the triode section of V4; at first appearance it is unusual, but analysis will show that it is a series-tuned Colpitts oscillator (Gouriet-Clapp), with L2 tuned by C17 and the phase-splitting capacitors C16 and C18. The unit is another from *Electroniques*, and L2, C16, C17, C18 and R11 are supplied complete in a standard small can, about $\frac{3}{4}$ -in. square. R12 is the anode load, and S2 applies HT to the BFO. This oscillator, due to the inherent stability of its type, and the high-Q coil, has very little drift. The output is stray-coupled into the detector diode by a turn of wire round the diode lead (designated C19 in the circuit).

The 1st AF amplifier is V3B, the triode section of the 1st IF stage. It is grid current biased by C20, R13 and RC coupled into the following stage. A gain of approximately 6 dB is realised, but the main advantage is the high input impedance which reduces loading on the diode detector and, in turn, reduces damping on the last IF transformer.

TR1 is the transistor driver amplifier; there is a degree of negative feedback through R18, which increases the input impedance and helps stabilise the gain of the stage against changes of current gain, either through temperature change or transistor replacement. The stage runs at about 3 mA, and is thermally stable to temperatures in excess of 50°C. T10 is the driver transformer.

A Class-A audio output stage, TR2, gives about 1.5 watts into a 3-ohm speaker. The stage has some NFB through R23, but this is more important for thermal stability. The stage is adjusted by RV2 to run at about 400 mA standing current, and is thermally stable under these conditions; however, a good heat sink should be used to keep the transistor within dissipation limits, especially if high ambient temperatures are to be experienced.

The HT rail is decoupled by R16, C22 and C23;

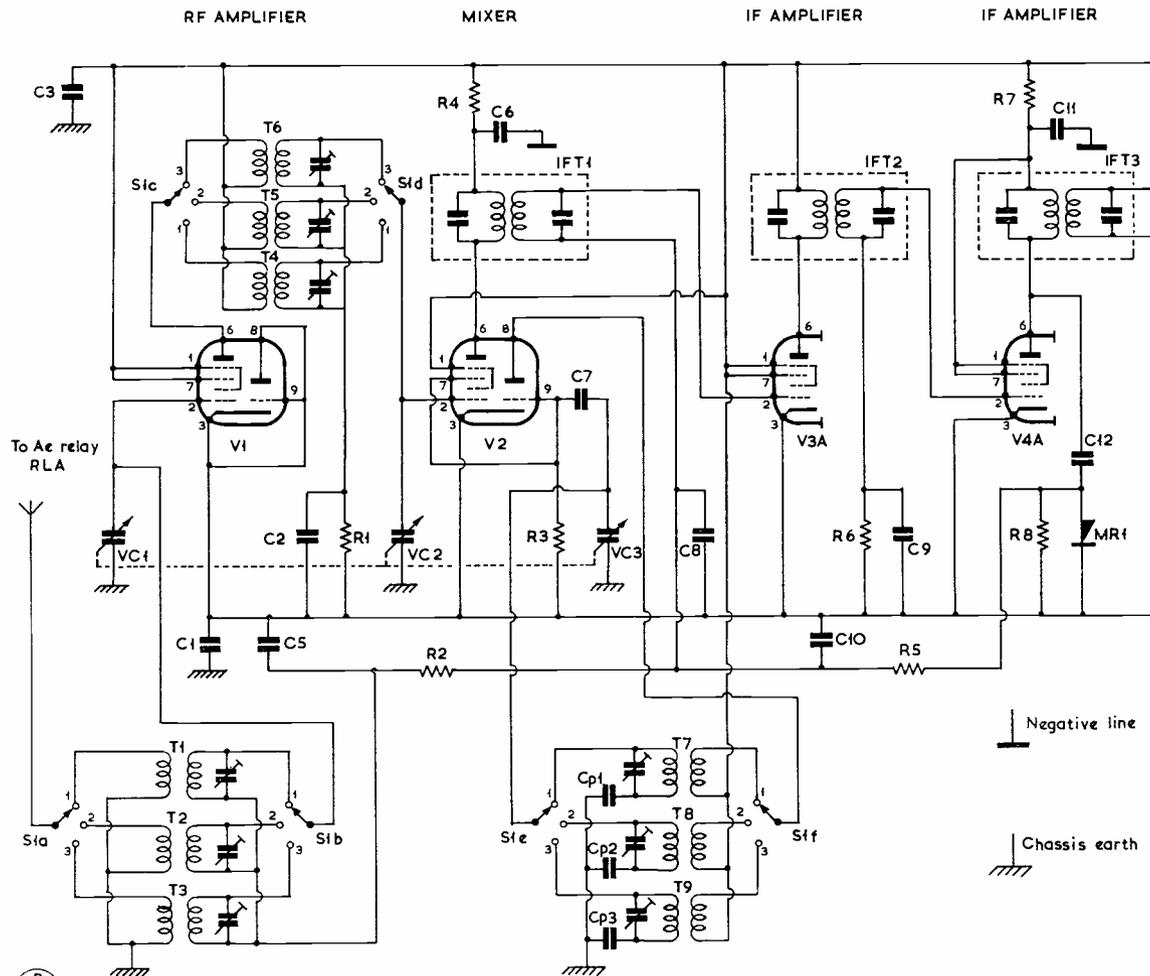


Table of Values

Fig. 2. Circuit of the LF Band Mobile Receiver

- C1, C3 = 0.1 μ F, 150v. met. paper, 20%
- C2, C4, C5, C6, C9, C11, C15, C20 = .01 μ F, 150v. met. paper, 20%
- C7 = 47 μ F, cer. or silver mica, 20%
- C8, C10 = .04 μ F, 150v. met. paper, 20%
- C12, C13, C14 = 100 μ F, cer. or silver mica, 20%
- C16, C18 = .0011 μ F, in L2 BFO assembly
- C17 = 430 μ F, in L2 BFO assembly
- C19 = 2 μ F, turn of wire round lead from IFT3 to MR2 (see text)
- C21 = 0.25 μ F, 150v. met. paper
- C22, C23 = 50 μ F, 50v. elect.
- C24 = 100 μ F, 50v. elect.

- CT = 4-40 μ F trimmers, with respective coils
- CP = Padders, with respective coils
- VC1, VC2, VC3 = 300 μ F, 3-gang, Electroniques or Jackson Bros.
- R1, R6, R8 = 1 megohm, $\frac{1}{4}$ -w.
- R2 = 100,000 ohms, $\frac{1}{4}$ -w.
- R3, R11 = 47,000 ohms, $\frac{1}{4}$ -w.
- R4, R7 = 2,200 ohms, $\frac{1}{4}$ -w.
- R5 = 2.2 megohm, $\frac{1}{4}$ -w.
- R9, R12, R14 = 22,000 ohms, $\frac{1}{4}$ -w.
- R10 = 270,000 ohms, $\frac{1}{4}$ -w.
- R13 = 10 meg., $\frac{1}{4}$ -w.
- R15 = 10,000 ohms, $\frac{1}{4}$ -w.
- R16 = 47 ohms, 1w.
- R17 = 8,200 ohms, $\frac{1}{4}$ -w.
- R18 = 10 ohms, $\frac{1}{4}$ -w.

- R19 = 560 ohms, $\frac{1}{4}$ -w.
- R20 = 10 ohms, 2w.
- R21 = 470 ohms, $\frac{1}{4}$ -w.
- R22 = 22 ohms, 6w.
- R23 = 0.5 ohm, 90 ins. 30g. enam.
- RV1 = 0.5 megohm potentiometer, carbon, with switch
- RV2 = 500-ohm w/wound linear potentiometer
- S1 = 3-wafer, 2-pole, 3-way, Trolax Electroniques
- S2 = SPST on-off, BFO
- S3 = On-off, with RV1
- M1 = 0.1 mA m/c
- PL = Pilot lamp
- T1-T9 = Aerial, RF, Osc. coils; long, MW and trawler band, for 300 μ F gang, Electroniques "Stabcoils"
- IFT1-IFT3 = 465 kc IF xformers, Electroniques
- L2 = BFO assembly HSO-460, Electroniques
- T10 = 12 v. driver xformer, type TT11, Repanco
- T11 = 12v. o/p xformer, type TT12, Repanco
- V1, V2, V3, V4 = ECH83
- TR1 = GET102, or OC71, OC72, OC84
- TR2 = NKT452, or OC16, OC26, OC28, OC29, OC35
- MR1- MR4 = GEX13, or OA79, OA81 or similar (100v. p.i.v. at 500 mA)

Note: Resistors are all composition, except where stated. All condensers and resistors can be "Radiospares" types, as obtainable through radio/TV service agencies and dealers.



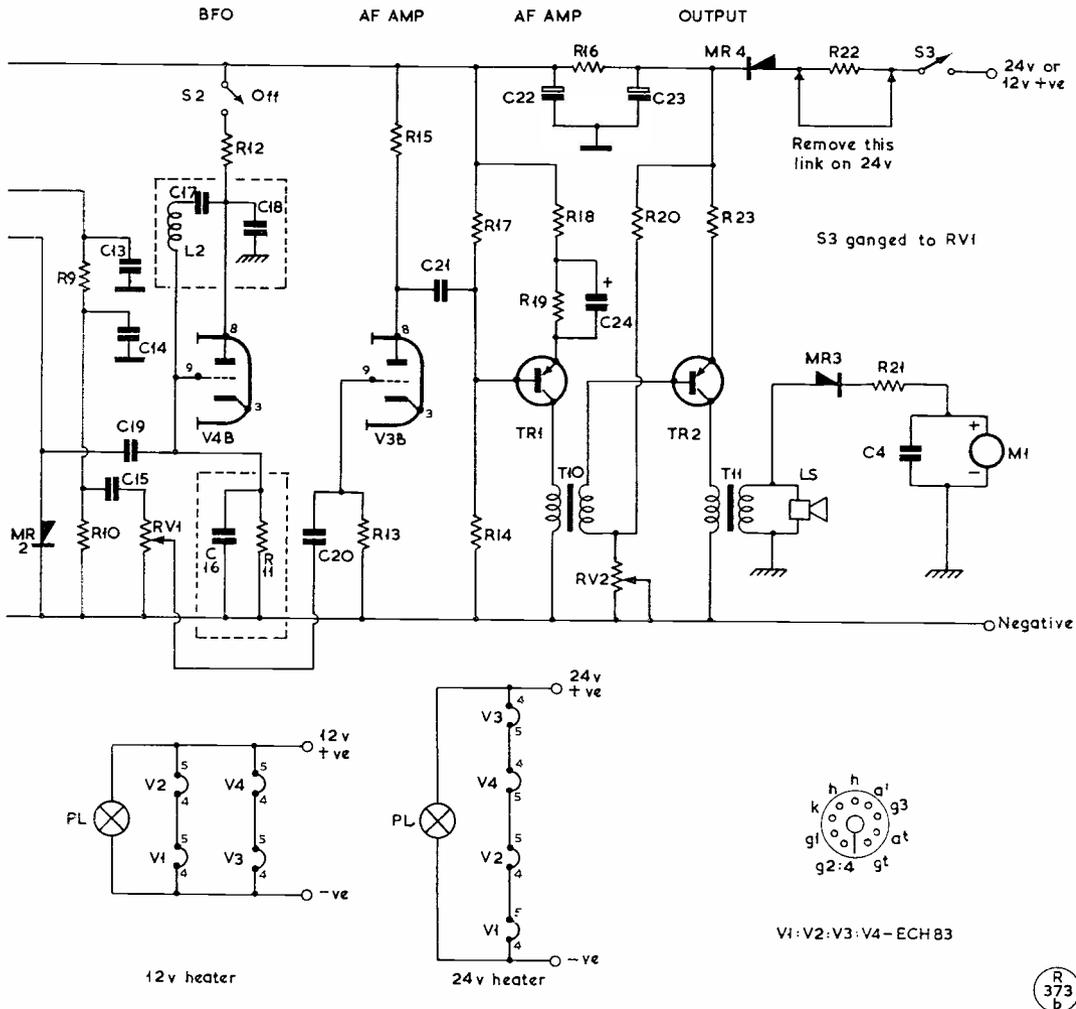


Fig. 2. The circuit of the G3KWG Hybrid Receiver, in which full use is made of the 12-volt ECH83 triode-hexode. The rectifier arrangement on the output side is to give a meter indication when using the receiver with certain navigational-aid systems, and can be omitted if normal amateur operation only is envisaged. Because the maximum HT allowable on the ECH83 is only 12.6 volts, a series resistor R22 must be put in the HT line if the set is to be operated off a 24-volt DC system (as often fitted in yachts and small marine craft). The diode MR4 is to protect the receiver against accidental reversals of polarity, and the earthing system allows for either positive or negative earth connection. With an RF stage and two IF amplifiers, sensitivity and selectivity are adequate, and there is ample audio output from the transistor AF amplifier. Measured figures on this interesting design are given in the tables.

these also reduce any high amplitude spikes that may be on the line, which could possibly "punch-through" the transistors. The diode MR4 is an SX631, or equivalent, silicon rectifier, so connected that it can only conduct when the battery connections are correct. If reversal of polarity occurs, the diode is biased back, effectively cutting off the supply, and thus preventing damage to the electrolytics and transistors. R22 is the series dropping resistor for 24-volt working, and may be omitted if not required.

C3 and C1 decouple the positive and negative lines, respectively, to the chassis, which is main earth. Depending on the vehicle, you connect either line to chassis, or if you have a floating system, then isolation from earth. DC-wise, is provided.

Construction

The receiver is not over-critical as to layout, and follows normal practice, as can be seen by reference to Fig. 3, in which the layout of the prototype is given.

The aerial, RF and oscillator coils are in their own screened sections, with the IF's following in logical sequence. In general, tag-boards are used for components, and the layout is such that the IF and detector components will all go on a standard board. This makes for a very neat layout, and ease of construction, since the tag-boards can be wired-up before insertion. The orientation of the valve bases is also indicated, so that optimum positioning can be obtained.

[over



Table I

ALIGNMENT SUMMARY		
BAND	FREQUENCY	TUNE
1	1.8 mc	T7, T1, T4
1	3.6 mc	CT7, CT1, CT4
2	600 kc	T8, T2, T5
2	1,400 kc	CT8, CT2, CT5
3	170 kc	T9, T3, T6
3	340 kc	CT9, CT3, CT6
2*	465 kc	IFT3, IFT2, IFT1

* Tune to 550 kc, inject at grid V2A, local Osc. shorted. Trim for maximum output keeping generator output as low as possible. Repeat adjustments until no further improvement can be obtained. Generator dummy load 200 $\mu\mu\text{F}$ in series with 10 ohms.

The tuning drive is probably best obtained by positioning the gang so that the spindle comes through the front panel. Use a Muirhead drive, or an epicyclic in conjunction with a large knob. The pointer can fairly easily be fitted to either type of drive, and a semi-circular scale can be used. The size of the scale will depend upon the available front panel space, but a reasonable coverage would be about 5 ins. diameter. Another method, which involves less panel space, is a slide-rule scale. This requires a drum drive, and if a fly-wheel is used on the tuning knob, the whole system can be made to operate smoothly. The original receiver was built in a box 10 ins. deep, with front panel 14 ins. x 10 ins. However, this box also houses a transmitter (to be the subject of a later article). The actual chassis space of the receiver was 10 ins. x 6 ins., no particular effort being made to conserve space. The front panel area occupied by the receiver was about 9 ins. x 9 ins., this including a 3-in. diameter speaker and a 5-in. diameter scale.

If the receiver is required for dash mounting on a car, then a very small package can be made using the slide rule form of scale and an external speaker, in the normal manner of car radios. It is suggested that an aluminium chassis be used, as this makes for considerable ease of hole-cutting and drilling. However, there is no objection to the use of steel for the main chassis, but it would be advisable to make the coil box and screens of aluminium, so as to keep coil loss at a minimum. One should endeavour to do all drilling and cutting before the assembly and wiring are started. This makes things considerably easier and prevents damage to components, which can occur when the drill slips—and this lesson was learnt the hard way! The output transistor TR2 should be mounted on the main chassis, or a suitable heat sink, using the supplied mica washer and insulating bushes. Ensure that there are no burrs or sharp edges to the holes, otherwise the mica washer will be punctured, and the collector will be connected to chassis, with not very pleasing results when the power is applied. Consequently, it is wise to check with an ohmmeter that the collector is indeed insulated from chassis.

As far as parts are concerned, it will be noted that a manufacturer is suggested for most of them. This has been done in case anyone wishes to make a Chinese-copy—however, there is no reason why the junk box should not be given a good hammering, or any other source of supply. *Radiospares* items can be obtained from practically any retailer, while *Electroniques (Felixstowe), Ltd.*, Bridge Road, Felixstowe, supply direct. A lot of traders stock *Repanco* items. The wave-change switch is obtained in its separate piece parts, i.e. wafers, spindle and index plate, spacers and studding, from *Electroniques*, and then assembled with the required spacing to suit construction layout.

Alignment and Test

Before applying power, make a wiring check to ensure that the circuit diagram has been faithfully followed, and that no obvious clangers have crept in. Then set RV2 so that all the resistance is in circuit. This is important, because if the control is at the wrong end of its travel, you will overdrive the base and burn out the transistor TR2. Make the usual continuity checks to ensure that there are no dead shorts on the HT line; this could save you a burned-out series diode. Now switch on the power, and adjust RV2 to give 400 mA collector current for TR2. If the *Repanco* output transformer is used, then the current can be adjusted for 1.4 volts drop across the transformer, should no current-measuring device be available. The next stage is to check the current through TR1, which should be of the order of 2 to 4 mA. If a different type of transistor is used in this stage, then it may be necessary to alter the value of R14 to give the right value of standing collector current through TR1; adjustment of R14 will control the current.

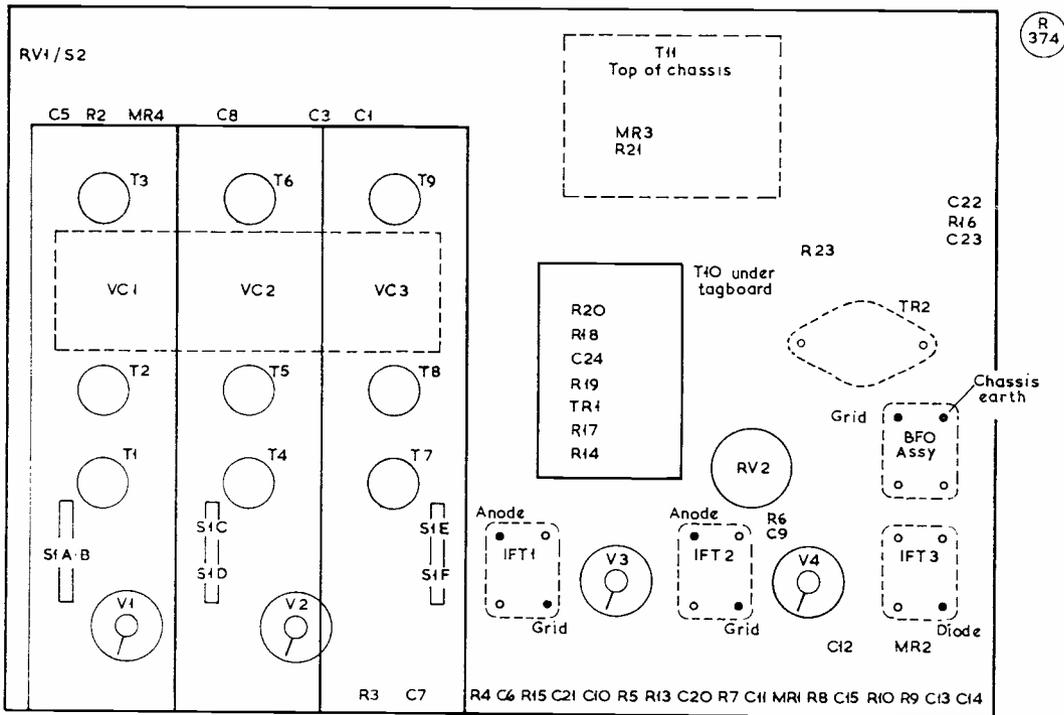
From now on, the alignment follows normal procedure for a superhet. First, short-circuit VC3, and inject the signal generator, through a condenser of .001 to .01 μF , to the grid of V2 hexode (pin 2), at a frequency of 465 kc, peaking IFT3, IFT2 and IFT1, in that order, for maximum on an output meter

Table II

AUDIO SIGNAL VOLTAGES	
MEASUREMENT POINT	VOLTAGE
V3B Anode	8.0 mV
TR1 Base	8.0 mV
TR1 Collector	840 mV
TR2 Base	140 mV
TR2 Collector	1.3 volts

The above figures taken under the following conditions:

- Output 50 mW into 3-ohm load,
- Input 20 mV injected at top of volume control,
- AF generator frequency 400 c/s,
- Volume control fully clockwise,
- Measurements taken on sensitive valve voltmeter,
- 100 mV injected across volume control gives 1.5 watts output with distortion less than 10%.



R 374

Fig. 3. Layout adopted by G3KWG for the receiver discussed in the text. This is for guidance only, as it should be explained that the assembly as used by G3KWG is actually a transmitter/receiver, with the Tx section enclosed in the same cabinet. The essential constructional details are given in the text.

or on the internal meter. Keep the signal generator level as low as possible, so as not to bias back the AGC too heavily. Repeat the peaking to ensure correct adjustment, and then switch off the modulation of the signal generator. Switch on the BFO and adjust the slug of L2 for an approximate 1000 c/s note in the loudspeaker. Then remove the short from VC3 and the signal generator from pin 2 of V2. Should pre-aligned IFT's not be used, then it will be necessary to follow full procedure of injecting at V4A grid and tuning IFT3; then inject at V3A grid, and so on. With pre-aligned IFT's and no circuit errors, no difficulty should be experienced in punching a signal through from V2. If no signal generator is available, then peak on noise, or try connecting an aerial to pin 2 of V2.

When the IF is correct, the next step is the front end alignment. Once again, one should follow normal practice, remembering to adjust the slugs at the lower ends of the bands and trimmers at the upper ends, repeating the adjustments until no further improvement is obtained. (A summary of the alignment procedure is given in Table I.) With a signal generator, this is quite an easy job, despite many fears to the contrary by those who have never tried. Things become a little more difficult without a signal generator, and one has to make do with a crystal calibrator or, failing all else, to the time-honoured method of using broadcast and amateur stations. If calibration cannot be obtained by any other method,

then a useful way is to mark the scale in arbitrary divisions, e.g. 1-100, then identify all the stations you can, such as Home, Light, Third, Hilversum and such, and note the scale reading, listing the station frequency alongside. Then, using a piece of graph paper, plot the points obtained, forming a curve by interpolation and extrapolation. This method will enable you to obtain a good degree of accuracy, although one should beware of extrapolation at the

Table III

RF AND IF SENSITIVITIES		
BAND	FREQUENCY	INJECTION POINT SENSITIVITY
IF	465 kc	V4A grid 4.0 mV
IF	465 kc	V3A grid 200.0 μV
2	*465 kc	V2A grid 30.0 μV
1	1.8 mc	V1A grid 15.0 μV
1	3.6 mc	V1A grid 7.5 μV
1	1.8 mc	Ae terminal 5.0 μV
1	3.6 mc	Ae terminal 2.5 μV

*Tuned to 550 kc with local oscillator shorted.

Above figures taken under following conditions:

- (a) Signal generator modulated 30% at 400 c/s,
- (b) Dummy aerial 200 μF in series with 10 ohms,
- (c) Output 50 mW into 3-ohm load,
- (d) Signal to signal-plus-noise ratio better than 12 dB,
- (e) Volume control fully clockwise.

Table IV

VOLTAGE DATA

VALVE OR TRANSISTOR	ANODE OR COLLECTOR	GRID OR BASE	CATHODE OR EMITTER	SCREEN
V1A	11.5	—	0	11.5
V1B	0	—	0	—
V2A	10.5	—	0	11.5
V2B	11.5	—	0	—
V3A	11.5	—	0	11.5
V3B	9.5	—	0	—
V4A	10.30	—	0	10.3
V4B*	10.5	—	0	—
TR1	0.5	9.25	9.5	—
TR2	1.4	11.0	11.5	—

*B.F.O. switched on

Measurements taken under no-signal conditions relative to negative line. Meter AVO Model 8 (20,000 ohms/Volt) on 25v. DC range. Voltage drop across MR4, 0.8 to 1.0 volt.

Battery Voltage, 12.8 volts; Unsmoothed Voltage (C23) 12.0v.; Smoothed Voltage (C22) 11.5v.

ends of the bands, since the tuning law tends to alter rather sharply. On Band 1 there are some broadcast stations at the lower end: Scheveningen Radio on 1900 kc approximately; Distress and Calling on 2182 kc; MSF Standard Frequency Transmission on 2.5 mc; and 3.5 to 3.8 mc is the 80-metre amateur band.

To make the scale look professional, draw the arcs for the bands in Indian ink, using a pair of spring-bows; then mark in the calibration points radially, using a rule (no freehand work whatsoever). Then mark in the calibration figures, keeping these to a minimum, unless you are artistically inclined! A good-quality cartridge paper should be used, or obtain some Joynson's paper from your nearest printers. Finally, cover with a piece of $\frac{1}{8}$ -in. thick perspex cut so that the index for the Muirhead will anchor properly (if this drive has been used) and screw to the front panel. If you are going to use the equipment on a boat, or under damp conditions, then given the scale a good coat of clear varnish, which will prevent the paper cockling, and the ink from running. The same principles apply if a slide-rule scale is used.

For a good-looking cabinet and front panel, take it to your nearest garage that does spray work and get them to spray it, or, alternatively, one of the new Aerosols of cellulose should make a good job. Finally, use transfers for lettering, and the finished product should stand you a good chance of winning the Constructor's Cup in the local Club competition.

Operation

As can be seen from the sensitivity figures, the receiver has a performance equal to, or better than,

that obtainable with receivers like the ubiquitous R.1155. Controls are kept to a minimum, so that even the XYL can operate the equipment (although this may not be considered an advantage). Good results have been obtained on aerials from a "piece of wire" up to one 200 feet long, end-fed. Low consumption and versatility of power supplies should prove useful for the LF band man, either for main station, mobile or emergency use, or in boat, car, caravan or under canvas.

The writer wishes to make grateful acknowledgment to colleague J. E. Johnson, who undertook most of the donkey work on the equipment, and also assisted with the manuscript.

SPECIAL-ACTIVITY STATIONS

Any further notices to appear under this heading should reach us by *September 14* for the October issue.

GB3SRA, Wood Green, N.22, Sept. 7-8: The Southgate & District Group will operate an exhibition station at the Wood Green Horticultural Society Annual Show, Town Hall Park, N.22. All bands 10-160m. will be worked, and a special QSL card is being issued.

GB3LY, Lymington, Sept. 14-16: The Lymington & District Amateur Radio Society will be at the Hordle Church Fête, Everton Road, Hordle, Lymington, Hants., with their station, running AM/CW/SSB on 7-14-21 mc, using a Heathkit DX-100U and SB10 transmitter, into a Mosley TA33-Jr. beam. Contacts will be confirmed by an appropriate card, and the QSL address is: A. H. Trigell, G3JAF, 130 Everton Road, Hordle, Lymington, Hants.

GB3ENF, Enfield, Sept. 14-15: The Enfield group will operate their exhibition station at the annual Enfield Show, held in the Town Park, Enfield, Middlesex. Bands worked will be 40-80-160m. and two metres. QSO's are to be confirmed by special card, and the QSL address is: J. D. Harris, G3LWM, 107 Cozens Road, Ware, Herts.

G3IUB, Birmingham University, Sept. 28 - Oct. 1: On the occasion of the Freshmen's Conference, working all bands 10-80m. and possibly two metres. Birmingham Univ. Radio Society will also welcome any newcomers interested in Amateur Radio. Contact R. G. Fenby, G3PLS, hon. secretary B.U.R.S., 24 Leopold Avenue, Handsworth Wood, Birmingham, 20 — or in the Society Room on the top floor of the Students' Union.

GB3RES, New Eltham, London, Oct. 20-21: Operated by the Cray Valley A.R.S. on behalf of the Royal Eltham Scouts in connection with the International Radio Jamboree, using all bands 10-160m. and two metres. QSL address: S. W. Coursey, 49 Dulverton Road, London, S.E.9.

"Short Wave Magazine" can be obtained to order through newsagents in practically all countries

INDOOR AERIALS FOR MULTI-BAND WORKING

PRACTICAL RESULTS FROM A
LONG EXPERIENCE

J. N. ROE, M.I.R.E., F.R.S.A. (G2VV)

Truly, the subject of Aerials is inexhaustible. Our contributor has always worked his full share of whatever is going on all bands in the way of DX—but using only end-fed aerials, entirely indoor. Over the years, much of the equipment—mainly modified surplus—with which he has achieved these results has been described in

DURING thirty-three years of amateur activity, the writer has always favoured the single end-fed wire type of aerial—see *SHORT WAVE MAGAZINE*, November 1946, page 552—because of its adaptability for multi-band operation. Over the years almost every type of aerial system has been used on one or more bands. Each has demonstrated the possibilities of peak performance on *some* bands, but still the end-fed radiator has held pride of place. These comments and the following details are in no way intended to minimise the excellent performance possible when using modern arrays, but such installations normally require a fair amount of space and represent varying degrees of financial outlay.

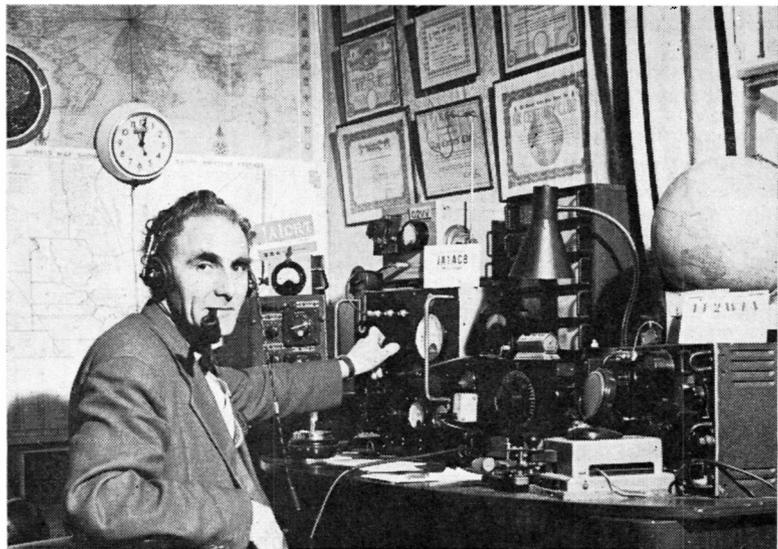
Up to the year 1953 facilities at G2VV, in so far as outdoor space was concerned, were ample for the installation of most types of outdoor aerial systems. However, in 1954 the picture changed completely when it became necessary to move to another QTH. This was a single-storey building, 20 feet in height, having virtually no outdoor aerial space! Fortunately, there was a loft running the full length of the house which offered a gleam of hope that some sort of internal aerial might be conjured into the available space. The main factor to be considered was that operation was desired on all bands from 1.8 to 28 mc. The maximum horizontal loft dimension was 35 feet, which would allow the use of a 33-ft. Windom. Past experience had shown that this aerial could be made to work reasonably well on the HF bands, but would not offer a satisfactory solution for LF band operation. Remembering sound text-book advice, it was realised that an end-fed wire should, wherever

SHORT WAVE MAGAZINE. Here he discusses some of the indoor aerial arrangements used, and the results obtained. His article will not only be of great interest to those with limited (or even non-existent) outside facilities, but will also surprise some who have elaborate outdoor systems.—Editor.

possible, run in a straight line and be devoid of sharp angles. Indeed, the writer has frequently stressed these points himself but, when adverse situations arise, the unorthodox must often be attempted. With Sir Winston Churchill's famous war-time words, *In Defeat—Defiance*, in mind, it was decided that a 68-ft. wire should be bent in to the available roof space.

The result is shown in Fig. 1. It will be seen that an acute angle is present at point B, with a further wider angle at position C. (The figures given for the length of each section are approximate.) The lengths were not predetermined or selected—they represent accidental proportions governed entirely by the physical construction of the building. The geographical situation of the aerial was determined by the same conditions. Before discussing ATU arrangements and results obtained, it may be of interest, at this stage, to consider the installation shown in Fig. 2.

At the beginning of 1961, G2VV moved yet again to another QTH nearby—but still without outdoor aerial space! The new building comprised two storeys *plus* roof space with a total height of 30 feet. Although the internal roof space was less favourable than at the previous location, a 68-ft. end-fed wire was unhesitatingly installed! The maximum available



The station of G2VV—James N. Roe, 53 Thames Street, Sunbury-on-Thames, Middlesex—well known not only for the useful practical material he has contributed to "Short Wave Magazine," but also for his success in working the real DX using only indoor antennae. The article by G2VV discusses the practical problems, and possibilities, of using transmitting aerials indoors.

horizontal length, at the roof top, being only 20 feet resulted in even more bends and angles than before. Lengths given and geographical sitings are accidental as described for the original aerial.

Installation Notes

The actual wire used in each installation was a length of thin polystyrene covered lighting flex. Originally this was to have been a temporary measure but, in view of results obtained, no change to a heavier gauge wire has been made. The aerial wire is supported in the roof space by passing it through insulated screw eyes which are secured to the roofing timbers within an inch or so of the tiles. Angles are as gradual as possible (quite impossible at some points!) and care was taken not to run the wire back on itself in a parallel fashion. Spacing from electrical wiring in the roof was kept at the maximum possible — an important BCI/TVI factor. Entry of the lead to the room below is simply through a small hole in the ceiling. Making this hole (from below) can be a tricky job if one happens to strike upon the woodwork!

Importance of Aerial Matching

The results obtained, from 1.8 to 28 mc, have been surprising and encouraging. Requests have been received asking for the secret of indoor aerial working. There is no "secret"! The answer is a simple one — correct matching between aerial and transmitter. This is applicable to every type of aerial, from the poorest single wire to an elaborate array, and at whatever the operating frequency happens to be. Any transmitter, however efficient it may be, depends upon correct aerial matching for its maximum performance. It is quite surprising that this factor so often receives scant attention in some amateur stations. The excellent advice relative to this subject given in *SHORT WAVE MAGAZINE* for February 1962, p.644, is strongly endorsed here for the attention of newcomer and old-timer alike.

Equipment Details

For (A1 only) HF Band operation on 14, 21 and 28 mc, the transmitter and ATU used at G2VV were fully described and illustrated in *SHORT WAVE MAGAZINE*, June 1960, pp.176-183. The LF bands (1.8, 3.5 and 7 mc) are covered by a modified Collins TCS transmitter (A1, A3), as detailed in *SHORT WAVE MAGAZINE* issues, April 1959, pp.64-68; May 1959, pp.129-131; and July 1962, p.236. The TCS self-contained aerial coupling circuit loads the transmitter to the indoor aerial satisfactorily at 3.5 and 7 mc. For 1.8 mc operation, a 500 μF variable condenser is used in parallel with the TCS coupler, being wired externally, between the aerial terminal and ground. The aerial is tuned against ground at all frequencies. Normal inputs used are 80 watts on the HF bands; 40 watts on 3.5 and 7 mc; and 10 watts on Top Band.

Operational Results

Initially, when the indoor aerial was tried out it was felt that, somehow or other, an outdoor aerial would eventually have to be installed. The results

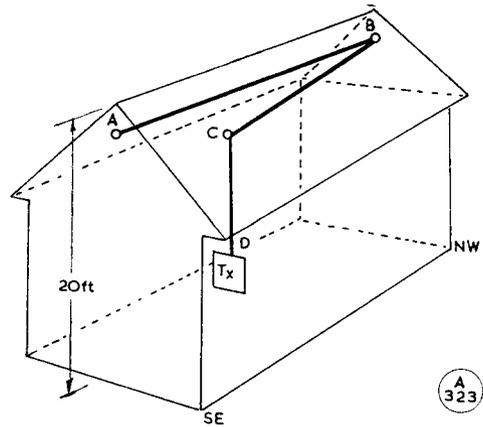


Fig. 1. The first G2VV indoor-aerial layout. Dotted lines represent far side, and the approximate lengths between points are: A-B, 35 ft.; B-C, 20 ft.; and C-D, 13 ft., making a total of 68 feet from the ATU. The wire can be held on insulated screw eyes attached to the woodwork, right under the roof.

obtained have removed such thoughts from mind, and what was considered as a make-shift idea in the beginning has developed into a fascinating field of experiment. Stations equipped with QRO transmitters, outdoor arrays and the like *should* be able to work almost any other station! It is quite a different matter to attempt and maintain consistent DX working with any type of indoor aerial.

During the last seven years of continuous operation at G2VV, it has been proved that it is possible to compete very favourably with other stations having all the advantages. Careful checks have been kept during DX operating sessions. A further point of interest noted during DX contacts is that practically

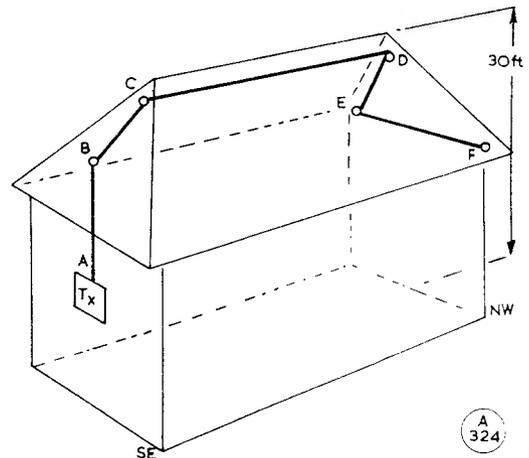


Fig. 2. Another G2VV indoor installation. Approximate lengths between points are: A-B, 10 ft.; B-C, 15 ft.; C-D, 20 ft.; D-E, 13 ft.; and E-F, 10 ft., making up the total of 68 feet into the ATU. As in the Fig. 1 case, insulated screw eyes are used to carry the wire, and point E is placed so that the run between D and E slopes down across half the width of the building, with the final length running back to the near wall, between points E and F. Believe it or not, arrangements like this can produce DX — if the system is properly tuned.

no change in readability or strength has been received from the other station when the transmitter input was increased to 100 watts (from the normal 80 watts). This is an important factor where BCI/TVI has to be considered, for it should be remembered that an indoor aerial can be troublesome to nearby receivers. However, the problem is not insuperable, and careful siting — determined by experiment — during installation will certainly pay dividends.

When in contact with a DX station, the writer has noted reports given to other U.K. stations who are known to have a QRO transmitter and good outdoor aerial facilities. Some surprising results have quite frequently emerged when the said DX station has been raised from G2VV, with similar RST reports being received. Contacts are quite often made when the man with the outdoor aerial has failed. In fact, many DX stations will hardly credit that an indoor aerial *is* being used! One W station — after hearing that the transmitter was running with an input of 80 watts and no outdoor aerial — said he was ashamed to admit that he was using one kilowatt and a 4-element beam, reports being 599 both ways!

It would seem reasonable, on the face of it, to expect weaker signal reports when using an indoor aerial. But with 75% of DX contacts this is not the case.

As to the directional properties of this type of installation, one is left a little undecided. Careful observations have been made and map references have been built up. Reference to the photograph (SHORT WAVE MAGAZINE, February 1962, p.642) will give some idea of the general areas covered. Certainly, maximum reports have been received from Alaska, Canada and North America, on the one hand, and from Europe, Russia and Japan on the other. During good conditions on 21 mc in 1960, S9 reports were received from VK contacts, and in one afternoon JA1, 2, 3, 5, 6, 9 were worked, with received reports of between 559 and 589. Combined results on 14, 21 and 28 mc have produced many contacts with the Pacific area, all South America, New Zealand and Burma. In all, over 100 countries have been worked.

Perhaps the most difficult area to cover consistently has been the African continent, but the majority of countries there have been raised. In the other direction, reports from TF and OX have always been good. Antarctica has been worked on many occasions on both 14 and 21 mc.

Less time has been spent on the LF bands, but North and South America QSO's are frequently possible on 7 mc. Operation on 3.5 mc has been confined mainly to European countries, due to the astonishing QRM always present on this band. On 1.8 mc, phone is used for local chats with an occasional distant QSO, such as an S9 report from Birmingham! Using CW, the score stands at DL, HB, OK, OH and YU on Top Band.

Mention should perhaps be made that the present QTH is situated about 300 feet from the river bank, the radio room being above a busy road. Man-made static is *always* present on *all* bands! The conditions are not exactly ideal for Amateur Radio work.

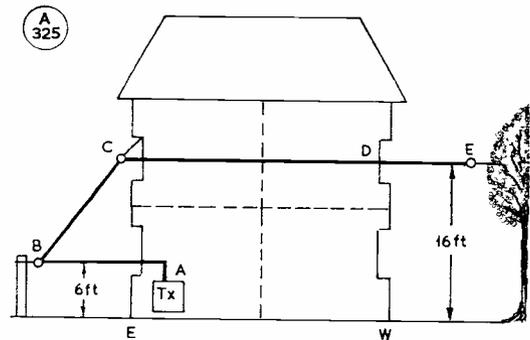


Fig. 3. The G2VV/A arrangement. Two-storey cottage with an upper landing having windows at each end. The lengths here are A-B, 10 ft.; B-C, 18 ft.; C-D, the indoor section, 30 ft.; and D-E, 10 ft., again making the overall length of 88 feet to the ATU.

Others may find themselves in a much more favourable location for indoor aerial experiments.

Installation at /A Station

In Fig. 3 details are given of an aerial arrangement (part indoor, part outdoor) used at times during holiday periods. The location of this QTH is high on a cliff top, overlooking the sea, on the South Coast. An upstairs landing runs the full length of the cottage, with a window conveniently placed at each end! The transmitter used at this site is the Type A Mark III — see SHORT WAVE MAGAZINE, December 1948, pp.707-711, with a maximum input of 10 watts. Operation is confined to 1.8 and 7 mc, CW. Quite reliable work has been carried out on these bands, with good all-round European coverage.

Conclusion

The main purpose here has been to present facts to encourage those — in particular the newcomer — who find themselves with inadequate facilities for outdoor aerial installations to “have a go” with an indoor radiator. The results quoted are factual, confirmed by letters and QSL cards, and serve to indicate what can be achieved in difficult location circumstances.

Finally — as always — the best possible aerial should be employed, outdoors for preference; but if it cannot be external — make it indoor. After all, problems exist to be overcome!

THE NOVEMBER R.A.E.

We are informed by City & Guilds that several more local examination centres have agreed to take sittings for the R.A.E. to be held on November 2. The total is now 49 such centres, covering practically the whole country. As it is not possible to list them all, intending candidates should apply to the local office of their Education Authority for information, quoting “Subject No. 55 — R.A.E.”, and noting that the final date for accepting entries is October 1st; none will be taken after that. The sitting fee is 30s., payable at time of entry. And good luck!

• • • The Mobile Scene • • •

OVER 2,000 AT DERBY RALLY — THREE MORE EVENTS SCHEDULED —
INCREASING MOBILE ACTIVITY

BY the time this appears in print, three events will have taken place (Stockport, Polesdon Lacy and Harewood) which we hope to be able to report in the October *SHORT WAVE MAGAZINE*, together with two later Rallies scheduled for September — see calendar. The last one slated for this Rally season is at Weston-super-Mare on Saturday, September 22.

Experience so far has suggested that Saturday events are not very popular, and one can see many reasons for this: Not everybody can get away on a Saturday from work or business responsibilities; it is usually a shopping day on the domestic front; and it is, more often than not, that chores about the house are done on a Saturday.

While it is to be hoped that the attendance at Weston will belie all this, it has to be recorded that the **Southern Counties** event on a recent Saturday, held in conjunction with the Southampton Show—with all the attractions and amenities of an exhibition ground—failed to draw the crowd normally attending the Rallies previously organised for a Sunday at Beaulieu. The number of cars actually fitted mobile was 35, and the organisers report only “limited success.” This is no reflection on G2FGD and his group, as, from their point of view, the Saturday date this year was strictly an experiment.

On the other hand, even though the weather was only fair, the **Derby Mobile Rally** on **August 19** was again an unqualified success, with an estimated total attendance of 2,400 people and 140 vehicles fitted mobile; of these, 120 were on Top Band, and 20 on two metres. The 160m. talk-in station G3ERD/A worked 60 of the /M's, and G3EEO/A had six mobile contacts on two metres. This event is always organised rather on the lines of a fair, with plenty of interest for everybody—such as an archery contest; treasure hunt for the children (with “some very good prizes,” the programme said); a display of radio-controlled model aviation (with the aircraft flying under somewhat turbulent conditions); and a remarkable demonstration by the dogs and their handlers of Derby Borough Police, which caught the attention of everybody present. These events were in addition to a film show for the juniors, a prize draw and a junk sale, a demonstration by the Red

Cross, and displays by police radio cars and motor-cycles, and of go-karts of the local Kart Club. The programme ran to a time-table starting at 2.0 p.m. and finishing at 7.0 p.m. and went strictly according to plan. Good arrangements had been made for the supply of refreshments and a public-address system kept people informed about what was going on. The organisation was in the hands of G3FGY and a committee of the Derby & District Amateur Radio Society—and among the visitors was Mr. A. T. Lee, a founder-member in 1911 of the original Derby Wireless Club, whose own pre-1914 call-sign was XDB. (In those very early days, all amateur call-signs were three-letter, incorporating an “X” to indicate “experimenter”—and experimenters they were, too!—*Editor.*) The event on August 19 was Derby's fifth organised Mobile Rally. We may be sure that they are planning another one for next year.

With the end of the Rally season looming, there are three more events yet to come:

September 9: National Mobile Rally, Woburn Abbey, near Luton, Beds. For details see p.299, August issue.

September 16: Lincoln Club Mobile Rally, at North Hykeham, near Lincoln—details as p.299, August.

September 22: *Saturday* event at Weston-super-Mare, Somerset, gathering at Beach Lawns at 1.30 p.m.



General view of one of the parks for the Derby Mobile Rally on August 19. This was again a very well-attended event, in quite reasonable weather. The final count was no less than 140 vehicles actually fitted mobile, some 20 of which were on two metres. The total estimated attendance was 2,400 people.

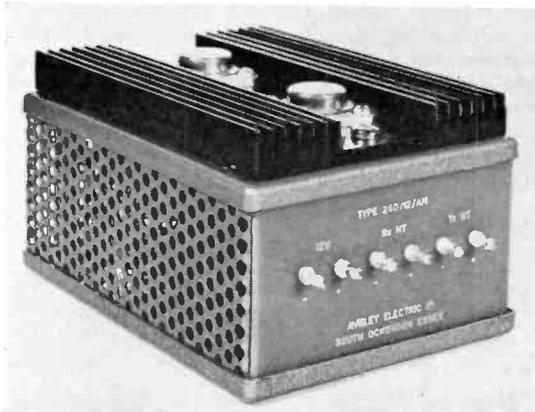
Top Band talk-in by G5UG, and on two metres by G2FQP/A. There will be a competition for mobiles, involving tests of driving, navigating and rig efficiency (160m.). As Weston is a seaside town and normally has good weather in September, the occasion should be a pleasant one, even for those with no interest in radio. Plans include the possibility of a dinner on Saturday evening, with the Hq. station G8FC of the R.A.F. Amateur Radio Society, at Locking, open to visitors on the Sunday morning, 23rd. For further details and overnight bookings, contact either G3KMM, G5DV or G5UG, all QTHR, with s.a.e.



F3DJ/M of Paris is mobile in his Mercedes. He holds Mobile Century Award No. 1 of the Amateur Radio Mobile Society, and is a well-known Continental /M operator.



The Derby Constabulary gave considerable support to the Mobile Rally there on August 19. Above: The radio-equipped police car and motor-cycle on view, and open for inspection. Below: The team who gave a wonderful display of how police dogs tackle and hold a suspect.



The new Aveley 130-watt DC/DC Converter uses CTP-1508 power transistors and from a nominal 12-volt input will give maxima of 425v. at 300 mA, and 265v. at 100 mA. The input-to-output efficiency is about 75% and the weight only 2½ lb. This HT supply unit is thus very suitable for the more ambitious mobile rigs, running around 100w. input on the HF bands. Full filtering is provided and both HT outputs can be used together up to the limit power rating of 130 watts.



At the Derby Mobile Rally on August 19, left to right: G3FUR, W0CJW (from Omaha), W5WRr (from Texas), and G3GUD.

More than 80% of all licensed U.K. amateurs are regular readers of "Short Wave Magazine"

BASIC ELECTRONIC KEY

SIMPLE EL-BUG KEYING UNIT FOR THE CW OPERATOR

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

The sending of Morse is to some an art and to others a penance—while between these two operating extremes the great majority manage as best they can. But there can be no doubt that any CW man derives as much satisfaction as his listener from the ability to send steady, rhythmic Morse over a wide range of speed. A bad operator is often difficult to read at 10 w.p.m., whereas a really good one can be easy reading at 25's. This article discusses an automatic keying device which—if properly adjusted and practised with—will enable anyone (almost) to send (practically) perfect Morse. But you still have to learn to finger the paddle!—Editor.

SINCE the very first electronic keyers were described (and instantly christened "El-Bugs"), more than ten years back, a tremendous variety of circuits and layout for these units have appeared. Complexity has varied from a simple device using nothing but relays, through a fairly straightforward transistorised design, to fearsome arrangements employing a dozen valves and incorporating memory circuits, automatic correction and many similar refinements. They all require someone to manipulate the paddle with a certain amount of know-how, and they are all capable of producing Morse code, exactly as the great Samuel visualised it when he started the whole thing off.

On the other hand most of them (we say "most" advisedly) can also produce the most horrible travesties of the code, with dot-dash ratios all wrong,

mark-space ratios anything but correct, and, of course, H's with five or six dots and many other unrecognisable letters. But don't blame the tools . . . it's the operator in 99 per cent of these cases, and El-Bug technique has to be *learnt*. Even the ordinary mechanical bug (which must be near to celebrating its fiftieth year of use) still churns out the most fiendish noises when in the hands of—well, an inexperienced operator. The two devices have one thing in common, though—it is possible to send perfect code on them; with the mechanical bug you can spoil it by sending at a different speed from that for which the key is set, whereas on the El-Bug you can *only* send at that speed, for it won't take any other.

The mechanical bug sends your dots for you at a constant speed, which can only be altered by moving the weights; but you have to make your own dashes, and fit their speed in with that of the dots. Thus, if you send more slowly than the natural speed it is set for, you will get long dashes and short, fast dots.

The El-Bug forms both your dots and your dashes for you, and if it is correctly set up—the crux of the whole matter—you can alter its speed by moving a single control, and the dot-dash ratio, together with the mark-space ratio, will remain perfect over a wide range of speeds. You cannot set it for a fast speed and then send slowly on it (as our "lid" so often does with a mechanical bug). If it is set for a fast speed, that is the *only* speed at which it will produce any kind of Morse at all. And that is the most important difference between the two types.

Basic Circuit

The first El-Bug circuit to combine simplicity and effectiveness was devised many years ago by Bo Brondum-Nielsen, OZ7BO, and this same circuit is still the best for the beginner to tackle. Early versions of the OZ7BO key used two separate triodes and high-speed relays, but the unit described herewith is very small and compact, and needs only a single 12AU7 and two ordinary GPO telephone-type relays, which are quite fast enough for speeds up to 30 w.p.m. If you want to go much above that, something

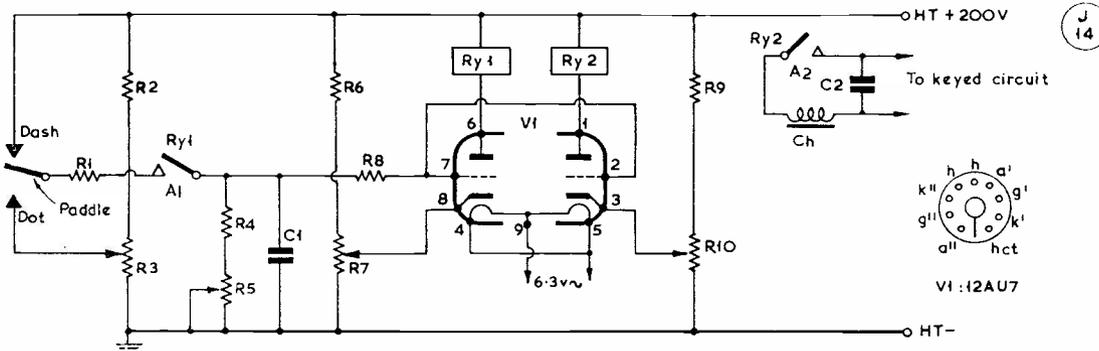


Fig. 1. Circuit of the El-Bug, in which a twin-triode (12AU7) is used to operate relays Ry1 and Ry2. The A1 contact of Ry1 breaks when the coil is energised, whereas A2, actuated by Ry2, makes and performs the actual keying function. R5 is the speed control and R3 sets the dot-dash ratio. Full information as to the operation and setting-up of this automatic keyer is given in the article.

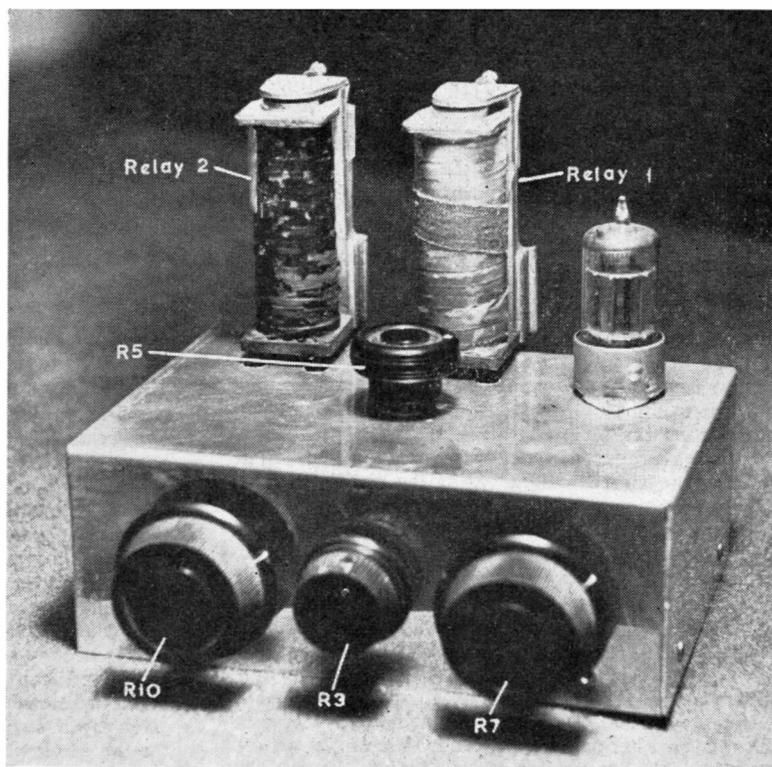
faster in operation will be needed, and then slow-speed work is apt to become tricky, short of introducing circuit complications.

Fig. 1 shows the full circuit. Considering V1 as two separate triodes, with their grids tied together, the "right-hand" triode operates the relay Ry2, in its anode circuit, to close the contacts A2, in the keyed circuit; and the "left-hand" triode operates relay Ry1, in its anode circuit, to *open* the contacts A1, in its own grid circuit, to maintain the sequence of dots and dashes. Remember that A1 will open when Ry1 is energised; V1 is biased off by R7 so that no anode current flows, hence the A1 contacts are closed. Voltage is applied, by the paddle, from either the dot or the dash contact (at carefully-set relative potentials) to the grid circuit. Then, according to the setting of R5, and hence the time-constant of R4, R5, R8 and C1, the grid will go positive enough, after a certain interval of time, to energise Ry1, open the A1 contacts and start the operation all over again. This is the basic principle of practically all valve-operated El-Bugs.

In case any reader thinks that an extra pair of contacts on Ry1, wired so as to close when A1 opens, could be used for keying, it had better be pointed out that there would then be no control over the mark-space ratio, which would prove to be horribly wrong (the spaces are far too short). Hence the need for the other half of the triode, separately biased by R10, in order to operate the A2 contacts for the actual keying.

Inevitably, the two controls R7 and R10 will interlock somewhat in their action, but the initial trickiness in setting-up is compensated for by the fact that, once it has been done properly, there should be no need to alter the settings, and it might even be a good idea to remove the knobs from those two controls.

The use of a high-speed relay for Ry1 will cause very tricky operation by breaking the circuit *too* fast; and even a GPO type sometimes works more



The El-Bug (automatic Morse keyer) as constructed by G6QB. When properly adjusted it enables correct Morse Code to be sent, over a wide range of speed, with the minimum of manual effort. However, as the text makes clear, operating an El-Bug has to be learnt, just like other methods of keying, and the result on the air can only be as good as the operator makes it.

comfortably with a little intentional slowing down by judicious "slugging" or loading of the contacts. Whatever type is used, the contacts are closed for a very high proportion of operating time, and only "flick" open for a barely perceptible interval.

Wiring of Controls

To make the setting-up of all controls logical, it is suggested that the four potentiometers be wired in the following manner: R3, R7 and R10, all arranged so that when they are turned fully clockwise, the slider is at earth potential. Thus, they can be said to be "fully in circuit" when turned clockwise—in other words, each of them is entirely in circuit with regard to the slider, in the case of R3 from the dot contact, and in the cases of R7 and R10 from the two cathodes.

R5 is wired in circuit only as a variable resistance, not as a potentiometer, and should be so arranged that the minimum resistance is in circuit when it is turned fully clockwise. This being the speed control, it is natural to have an *increase* in speed as it is turned clockwise.

Setting Up

Before connecting the unit to the power pack, the paddle and the keyed circuit, the controls (*see*

Table of Values

Fig. 1. Circuit of the Basic El-Bug

C1, C2 = 0.1 μ F	R6, R9 = 50,000 ohms
R1 = 1,000 ohms	R7, R10 = 10,000 ohms variable, wire wound
R2 = 25,000 ohms, 2-watt	R8 = 2 megohms
R3 = 5,000 ohms variable, wire wound	Ch = <i>see text</i>
R4 = 200,000 ohms	Ry1, Ry2 = GPO type 2,000 ohm relays
R5 = 1 megohm, variable	V1 = 12AU7

photograph) should be set as follows: R5 (top centre) about halfway; R3 (front centre) fully anti-clockwise; R7 and R10 (front right and left) both around the halfway mark.

Now connect the 6.3 volt and 200 volt supplies, and the paddle. Hold the latter in the "dash" position (conventionally to the left, as with the ordinary mechanical "bug") and both relays should start clicking and sending a steady series of dashes. Adjust to a good medium speed by means of R5; then, if the dashes are either too light or too heavy (bearing in mind that the extreme case of the former is for the relay Ry2 not to operate at all, and for the latter for it to close and stay closed!) adjust R7 and R10, particularly R10. At this stage it will help if the output terminals are connected to a keying monitor or even to the VFO of the transmitter (but *please* do not test on the air!)

Having produced a steady sequence of dashes of roughly the right "weight," shift the paddle over to the dot position. If no dots are produced, first try adjusting R3, but it should still be near the anti-clockwise position. Then manipulate R7 and R10, which interlock somewhat in their action. Somewhere around their centre settings a position should be found which gives dots of the right speed, and comparable weight, to the dashes.

It should be found that R7 will have the major control over the relative *weight* of the dots and dashes; whereas R10 will affect their relative *speeds*, as well as altering the weight. The whole art of setting-up the unit consists of finding the precise balance between R7 and R10, which gives (a) dashes equal to the length of three dots, and (b) dots equal to the length of a space between them. Having once found this setting, it should not be necessary to touch these controls again, since the speed control R5 will give a wide range of speeds without upsetting either the mark/space ratio or the relation of dots to dashes.

R3 also comes into the picture somewhat; if you have arrived at a satisfactory setting for both R7 and R10, any alteration of R3 will upset it, but another one *can* be found, balancing all three controls against each other.

Fine Adjustment

Fig. 2 shows how perfect dots and dashes stand in relation to each other. The unit (usually called a "baud") from which we start is both the length of a dot and the length of a space. The dash occupies three of these units, being three times as long as a dot. But note this: a dot plus a space (two units) is exactly *half* as long as a dash plus a space. Hence four dots, plus the final space to complete the sequence, take precisely the same time as two dashes plus *their* final space. In other words, an "H" and an "M" (plus final space) take the same time.

So if you send a continuous series, "HMHMHMHM," the rhythm should be constant, each "dit-dit-dit-dit" taking the same time as the following "dah-dah." Adjust a continuous sequence so that you could beat time, with your foot, to the

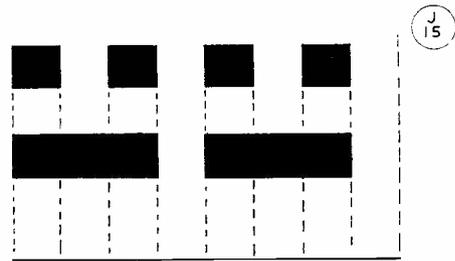


Fig. 2. This diagram shows four perfect dots compared with two perfect dashes. It will be seen that, when the space following them is included, an "H" and an "M" are identical in length. This is the basis of the setting-up procedure explained in the text.

rhythm "didididi-dah-dah" and you will have the correct dot-dash ratio and a reasonably correct mark-space ratio. This is hard to explain, but in practice is much easier than other methods of carrying out this adjustment. (It can also be done by observing the current passing in the anode circuit which includes Ry2, by means of a suitably-damped meter, and adjusting so that the current on dashes is precisely 50 per cent greater than that on dots—since, over a period of eight bauds, four dots occupy four and two dashes occupy six. And if you adjust the bias on the right-hand half of the triode, by R10, so that Ry2 closes permanently, the reading should be *twice* that given by a string of dots, since current now passes for the whole period of eight bauds.)

Any sparking or arcing in the circuit being keyed will upset the operation of Ry2 (and also annoy the neighbours!) so a key-filter is necessary. The conventional audio choke and fixed condenser, as shown in Fig. 1, will take care of this requirement. The value of the choke Ch. must be chosen to suit the particular circuit conditions—e.g. whether cathode or grid-block keying—but the condenser will normally be 0.1 μ F or thereabouts.

Erratic behaviour of dots, if it is encountered, is usually due to bouncing of the relay contacts, and this can often be corrected by the use of a blob of solder on the end of the uppermost contact of Ry1—the one against which the moving contact touches when it "breaks" from the lower contact. Various "fiddles" with relays are permissible, bearing in mind that any radical alteration in their operating time will necessitate a complete re-setting of the controls. Generally speaking, the standard GPO 2000-ohm relays will *not* give any trouble on account of bouncing.

The final stage is one of practice, for which good monitoring is absolutely essential. A specially-made oscillator is well worth while, although keying the VFO and monitoring on the receiver is permissible. But any El-Bug let loose on the air before its owner is really the master is a complete pest, and this should be avoided at all costs. Send *slowly*—12-15 w.p.m.—to start with, until the feel of the thing has been mastered. Then it will be no trouble to speed up a little. Finally, remember that there is now no such thing as a nice long dash to show your

"individual fist." Try sending a long dash and you merely get two regulation ones! And you need only hold the paddle in the dash position for the length of a dot . . . it will still send a dash.

Constructional Note

The building and wiring is greatly simplified if the two relays are mounted right at the rear of the chassis; their own bolts hold them down, and clearance holes are drilled for the tags attached to the coils — but the tags from the contacts themselves project downwards, clear of the chassis at the rear. The contacts of Ry2 go direct to two tags on a 12-way tag-strip mounted at the rear. Those from Ry1 go, in one case, through a small hole back under the chassis, to connect to R4, C1 and R8, and in the other case, externally *via* the 1000-ohm resistor R1

to the tag connection for "paddle."

The paddle itself may be made from brass strip and perspex, or it may be an ordinary mechanical bug key with the weights removed, the dot contact adjusted so that the vibrator is inoperative, and, of course, separate leads brought off from the dash and dot contacts. This part of the operation can be left to the ingenuity of the individual reader. Even two micro-switches mounted back-to-back can be used, and in one extreme case two such switches were mounted side by side, dashes being sent with the first finger and dots with the middle finger (avoiding all confusion with the operation of an ordinary bug key).

So go ahead — but not until you can send the kind of Morse the inventor first thought of . . . and practise until that goal has been reached, before letting it loose on the air.

THE SMALL ADVERTISEMENT PAGES

In this issue of SHORT WAVE MAGAZINE we have largest spread of small advertisements of amateur interest that we have ever printed — *see* pp.385-392. It is certainly by far the greatest number to have been published in this country since the War, and probably at any time in the past. A considerable variety of attractive items is offered, and there will be a scramble for more than a few of them. There are also many interesting "wants," and suggested exchange deals. If there is ever anything *you* want to buy, sell or exchange in the field of Amateur Radio, you cannot possibly do better than use our Readers' Small Advertisement section — the cost is only 3d. a word, with a minimum charge of 5s.

VETERANS ON THE AIR

From the 1962 call-book section of the New Zealand amateur periodical *Break-In*, we get it that the membership of the ZL Old Timers' Club — meaning those who have held a licence for 25 years or more and are still active on the air — is now no less than 196 under the ZL prefix alone! The proportion of licensed radio amateurs per 10,000 of population has always been higher in New Zealand than in any other country in the world. The Grand Old Man, as the president of the ZL Old Timers' Club is styled, is Hugh Simpson, ZL3CF.

ARRANGING R.A.E. COURSES

Those interested are reminded that even if no course of instruction for the Radio Amateurs' Examination (City & Guilds Subject No. 55) has yet been organised locally, it is often possible to get one started on application to the Principal of the nearest Technical College or Evening Institute. These institutions exist for the purpose of providing adult education by part-time evening work, and as this

comes under the Education Authority, fees are usually nominal. Some authorities will agree to start a class with as few as six students, but the normal stipulation is a dozen. The real difficulty is more often that of finding suitable instructors. A local science teacher who happens also to hold an amateur licence himself is the ideal R.A.E. instructor.

MEASURING HOVERCRAFT SPEED

One of the practical problems associated with the development of Hovercraft for commercial purposes has been that of measuring speed accurately. A hovercraft cannot tow a log-line, as a ship does, nor can it use an airspeed indicator, like an aircraft. Accordingly, Marconi's have developed a device which may be described as Doppler Radar, the first of its kind for use in hovercraft. Called the Hovercraft Speedmeter, it consists basically of a low-power 40mW CW doppler radar working in the 14,000 mc band and using a klystron; a pencil beam is directed over the stern of the craft, at an angle of 45° to the water; the frequency of the signal returned to the reflector differs from the transmitted frequency by an amount which is proportional to the velocity of the hovercraft. This difference frequency lies in the audio range — and it is simply a matter of calibration to show the differences as speeds on a meter scaled 0-100 knots. Of course, a good deal of complicated and highly ingenious electronics is involved in getting the final result, and this note is only to explain the principle of operation. The accuracy of the system, incidentally, is better than 3%.

SALFORD ELECTRICAL INSTRUMENTS

The London Sales Office of Salford Electrical Instruments, Ltd. has been moved to Brook Green, Hammersmith, London, W.6 (Tel.: RIVerside 5246).

"Short Wave Magazine" is independent and unsubsidised and has a world-wide circulation among Radio Amateurs

DX COMMENTARY

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

A SMALL storm in a very large tea-cup began to brew in mid-July, immediately after the ARRL's dictum that phone contacts below 14100 kc would not count for DXCC credit. Since W0MLY, on his DX-pedition, was the only station likely to be affected, this shot was apparently aimed at his SSB operation on 14001 kc. There were obviously some CW operators who objected to this on principle, but the fact remains that Dick caused no more QRM than if he had been on CW—in fact, far less, since the replies (after a slight shambles on the first day) were out of the CW band, and the great pile-up of CW stations in the 14000-14010 kc sector was avoided.

On the other hand, there were some very strong feelings in the other direction; so much so that on the very day the ban was imposed (July 13) there was a world-wide round table of well-known SSB types operating on 14020 kc as a "public protest." This was well carried out; the reason for it was stated; and the net passed their apologies to DX stations on the frequency, but "no apologies to ARRL." (And they were enthusiastically QRM'd by a group of CW stations!)

Letters continue to fly back and forth, including some pretty vitriolic ones making reference to the "great Hartford Fathers." However, we now hear that the decision was *not* authorised by ARRL Headquarters, and we are told that the Editor of *QST* (John Huntoon, W1LVQ) would welcome letters of protest! All we can add



W5KMZ

CALLS HEARD, WORKED and QSL'd

to this is that, in Amateur Radio, as in so many other spheres of human activity, it seems terribly difficult for good old honest commonsense to win the day.

As an indication of the way the wind blows, the following is quoted from *The DX-er* (Northern California DX Club): "One of the biggest and most constant rhubarbs in the DX world today is the DXCC. Most of the DX-ers feel the ARRL has them over the barrel, and bad feelings are generated all around because of it. Why not let the DX-ers themselves, through duly elected officers, control DXCC policy and DX policies in general—under the sponsorship of the ARRL?" And there follows an interesting suggestion concerning the formation of "DXCC International," which could be joined by DX clubs all over the world.

DX-ploits

ZL4JF will probably QRT from Campbell Is. about September 10.

However, he will be going to the Kermadec Is. for about one year, starting early in November . . . Some CE's were supposed to be running an expedition to Easter Is. (CE0) during August; anyone find them? . . . PJ5MB will be on from Sint Maarten, roughly two weeks from September 3, operator K9KDI (possibly some FS7 activity also); 14020 CW, 14125 and 14340 kc SSB.

CR8AB may be operating again from Timor in December . . . VR2DW will be signing VR1K (Ellice Islands) shortly . . . Danny Weil has left Tahiti and has shown up as ZK1BY from Rarotonga (Cook Is.); his operation from Manihiki will be with the same call.

The two main DX-peditions of this summer: W0MLY returned to the States after working for two months from eight countries and making several thousand contacts. For the record, the countries were TJ8, TL8, TN8, TR8, TT8, TZ2, TY2 and 5V4.

Gus of W4BPD, however, is still going strong. Having operated from Chagos as VQ9A/8C, he went on to St. Brandon Is., where he was signing VQ8APB. Next stop Mauritius (with VQ8BI) and then to Rodriguez (VQ8AIR) for about 30 days. Other possibilities—Agalega, Comoro, Tromelin, YA, 9N, AC3, AC5 and VK9 (and, we gather, 4W1 has been added).

ZC5DO is said to be on 14330 kc SSB (crystal) . . . The Trinidad Is. sortie (PY0NG) did not come off as promised, but there is now talk of another attempt, in September or October . . . A real funny one, if you like—YZ3A/P gave his QTH as "Dhamzvol in Velda Group" and said QSL to Aptd 221, Apian Waye, Cairo. They do choose them sometimes, don't they? Another odd call—9NT5O, said to be W6RTK operating from Nepal.

There is still some gentle VQ1 activity—VQ1GDW, mostly SSB, and VQ1BS, CW. Both will be there for some time . . . VR4CV is still around on CW but very elusive . . . VR5AR also reported, both CW and SSB, but probably QRT by the time this appears.

The Overseas Mail

VS1KP (RAF Changi) tells us that the club station has now moved to an air-conditioned shack and will shortly be on the air again, with 150 watts CW and AM. But there's no room for the 350-ft. long wire at the new QTH, although it is hoped to have a beam up shortly. Most of the present operators will be returning home in September; VS1KQ becomes GI3KYZ, VS1KP will be G3MDA and VS1KT will be G3MHE (both at St. Mawgan, Cornwall). VS1KY and IGC will be left in charge.

VS1GC himself tells us that he runs daily skeds with VR3L on Christmas Island. The VR3's laid on a DX-pedition to Canton Island during mid-August, signing VR3L/VR1, and were working into Europe and the U.K. by August 21. VR3L and 3S were the party, and kept hard at it on SSB, AM and CW. Their MC was VR3O, who had a lot of EU

clottery to control. VS1GC says that 21 mc seems to have folded up completely out there, but 14 mc keeps very steady and gives solid QSO's into the U.K. (short path after about 1700 GMT). Nev recently visited Rangoon and met XZ2VK, 2KN and 2DW in

the Electronics Laboratory of the Burma Research Institute.

ZB1BX (G3KXF) reports that he is active, but that conditions have been far from good. 21 mc provided a few openings into South Africa and South America; 14 mc carried more activity and

MDT (Magazine Daylight Test—August 12, 1962)

TOP BAND, 1000-1200 GMT

This test, arranged almost on the spur of the moment and with practically no advance publicity, attracted far more support than had been expected.

The following were active during the period, all reported as heard or worked by other stations: GI3JEX, 3NZZ, 6TK; GM3COV, 3DZG, 3KDT, 3NHQ, 3NRB, 3OM, 3PBA, 3PAE, 6RI, 8CH; GW3FVC/A, 3LDH; G2ARN, 2FIX, 2IK, 2PU, 3AHE, 3BJD, 3BMY, 3CHN, 3CMJ, 3CTM, 3DCV, 3GRL, 3HVX, 3IEF, 3IGW, 3IMV, 3IXE, 3JUZ, 3LHJ, 3LYW, 3MBN, 3NBL, 3NBP, 3NEO, 3NHE, 3NNA, 3NNF, 3NPB, 3NRL, 3NRV, 3NXQ, 3OGY, 3OHN, 3OJK, 3OLI, 3OLN, 3OLU, 3OQT, 3OSW, 3OUF, 3OUV, 3OVL, 3OWR, 3OYI, 3OZF, 3OZY, 3PCR, 3PHO, 3PIM, 3PKS, 3PLQ, 3PMI, 3PPB, 3PPU, 3PQA, 3PSB, 3PSH, 3PU, 3PWK, 3XP/A, 3PYI, 3RAU, 3REP, 5RI, 5WW, 6MC and 8ON.

At least eighty QSO's of over 100 miles were reported, and from these we can only quote some of the best—not to make a competition out of it, but to show what was happening in different parts of the country.

THE LONGEST HAULS

	Approx. mileage
GM3PBA (Dumfries) — G3OLN (Cheltenham)	230
GI3NZZ (Kilkeel) — G3GRL (Nottingham)	208
GI6TK (Co. Down) — G3IGW (Halifax)	190
G3OUF (London) — G3CHN (Kingsbridge)	176
G3PQA (Epping) — G3IGW (Halifax)	175
GM3OM (Stirling) — G3IGW (Halifax)	170
G3NEO (Sheffield) — G3PU (Weymouth)	180
G3OZF (Nottingham) — GM3PBA (Dumfries)	200
G3OZF (Nottingham) — G3NPB (Hexham)	150
G3PHO (Sheffield) — G3MBN (Bath)	140
GM3NHQ (Alloa) — GM3COV (Thurso)	160
G3OWR (Grantham) — G5RI (Hexham)	160

Comments

A surprising number of GM stations were active, but naturally they did not make themselves heard in the southern half of England . . . The band was packed with 579/589 signals from distances of 50-60 miles (G3NNF). GI3JEX was a solid 559 in Sheffield, but not raised (G3PHO). Much unnecessary QRM caused by stations answering from short distances (G3OLN). Willing to come on every Sunday in September at the same times (GM3OM). Time chosen is ideal, apart from the vacuum-cleaner brigade (G3GRL). Worked GM3COV (about 250 miles) just after the test finished (GM3PBA). Only called stations over 100 miles, and every one of them came back (G3OUF). Loudest and most consistent station was GM3NRB, 599 all the time; best long-distance signal was G3IGW (GI6TK). Found lots of chaps calling CQ and not listening very well (G3PLQ).

Summary

Most of those who took part were rewarded by at least three contacts of 100 miles or over; some, as shown in the table, achieved 200 miles or more. Everyone asks for a repeat performance; this will be arranged and announced next month.

Thanks to all those who sent in logs, comments and check logs. It has not been possible to quote from every letter, on account of space, but they were all appreciated.

more DX, with several pile-ups on occasions. On 7 mc the rarest catch was LX3DX. Den says he is planning extensive activity on the three LF bands this winter and will appreciate replies (and reports) from England.

General News

Although founded a year ago, the ASA (American States Association) has not attracted much publicity. It consists of 100 American amateurs (two in each State) who undertake to abide by the ethics of "good sportsmanship," to which the organisation is dedicated, and to make it easy for foreign amateurs to achieve their WAS with minimum effort and QRM. DX stations who QSO and QSL all 100 members of ASA are awarded a certificate. Special calling frequencies are used for each band, and a strict code of operation and ethics prevails . . . full details from WSIGJ, 2153

FIVE BAND TABLE

Station	3.5 mc	1.8 mc	7 mc	14 mc	21 mc	Countries Worked
G3FPQ	107	23	138	262	252	290
G2DC	101	12	143	283	268	304
G3FXB	87	9	155	272	265	304
G2YS	75	20	96	178	125	201
G3DO	55	10	51	273	222	298
G3JWZ	52	9	62	107	77	132
G3IGW	51	25	99	131	127	184
G3NFV	49	16	39	85	118	164
G3KMQ	42	11	64	160	72	?
G2BLA	39	9	73	94	96	146
GW3CBY	35	15	53	75	31	95
G3NYQ	30	11	38	32	17	53
G3NOF	25	2	18	177	183	229
G3LHJ	23	11	47	131	172	201
G3PEK	22	8	32	58	17	66
GW3AHN	21	1	68	262	280	305
G3PLQ	19	10	11	18	16	74
G3IDG	17	9	24	49	62	90
G3PEU	14	4	10	119	63	131
G3BHJ	11	1	29	63	165	180

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

University Boulevard, Houston 25, Texas.

The WAVO Award (Newfoundland) is now within the reach of foreign amateurs, after a change of rules, and involves working 30 or more stations in Newfoundland (which includes Labrador). Details from Awards Committee, SNRA, Box 1226, St. John's.

Radio Society of East Africa issues three awards—Worked All VQ Areas (cards from VQ1 to VQ9, including 10 from VQ2, 5 from VQ3/5H3, 5 from VQ5 and 20 from VQ4); The Radio Society of East Africa Award (25 points to be scored from at least four of the VQ areas); and the Heard All East Africa Award, similar to the above, but for SWL's. Details from Awards Manager, RSEA, Box 5681, Nairobi.

Three from Pakistan . . . WAT (Worked All Tigers), WA-AP (Worked All Pakistan) and APDX (Pakistan Day Contest). Full particulars for all of these from AP5CP, Dacca Signals, Dacca 6, East Pakistan. (The Tigers Amateur Radio Club, sponsoring these awards, came into being on Pakistan's Independence Day — August 14, 1962.)

The Scandinavian Activity Contest, an annual event, will be held on September 15-16 (CW) and September 22-23 (Phone). Stations outside Scandinavia, call CQ SAC and exchange numbers as usual. Six prefixes form the multiplier—LA, LA/P, OH, OHØ, OX, OY, OZ, SM/SL. Full gen. from Traffic Dept., EDR, Box 335, Aalborg, Denmark, this year's organisers.

Comings and Goings

GD3JDK (RAF Jurby, I.o.M.) has been posted to Malta and will once more be using his old call, ZB1VJ. His Tx and Rx are already *en route*, but he regrets that the 273-ft. Vee-beam can't be sent there . . . so it will be back to the old ground-plane and, possibly, a Quad.

G3REU (RAF Digby) will be leaving for Christmas Island at the end of September, and will be on the air from there as soon as his gear arrives.

VS1DX has now become G3RFB

(RAF Colerne, Wilts.) and will soon be on all bands, AM and CW at first, followed by SSB. He says his main interests are "nattering, and gaining experience through construction and testing."

ON4QX and the OSA Group (Antwerp) duly did their stuff from LX3DX, making over 1800 QSO's; ON4QJ remained there for an extra week, while ON4QX went down to Monaco and operated 3A2CZ, where he made nearly 800. Bob says "the OSA Group will go every year in July, somewhere in Europe, and we have a licence as M1, but some of the operators have no time, or not enough money." Very interesting QSL situation: All must go to Box 331, Antwerp, or *via* UBA, and ON4QX says "We will *not* accept IRC's, as we are not business-QSL hams."

G6LX, who does more travelling than most, holds the call VE3DQN, which enables him to operate from the U.S.A.; but, even more interesting, he has been granted a licence in India as VU2DQN—on the strength of the reciprocity agreement between VU and VE! (It would be impossible for a G to get a VU ticket on the grounds of holding a U.K. licence.)

G3LWS went QRT from Richmond, Yorks., on August 9, and will be leaving early in September for Cyprus, where he will be 5B4CZ. When he gets settled, he expects to take over the 5B4 QSL Bureau from 5B4IP, and it will then be operative from Box 216, Famagusta. All bands will be covered, CW and SSB.

G3HPA/DL2WY has now moved to Sydney and expects a VK2 call-sign very soon. He and his family will be there for quite a while and he has taken his entire station—will be looking especially for G's and DL's, whenever conditions permit.

Top Band Topics

The MDT (*Magazine Daylight Test*) on August 12 exceeded all expectations, with some eighty stations active, and QSO's of over 200 miles achieved. It is reported separately, on p.361.

The real DX is by no means

dead. G3PPF (Wallasey), operating GW3PPF/A near Cardiff, heard W3GQF between 0300 and 0400 on August 5; the W was apparently running a sked with G3PHO, but no QSO's resulted.

G3NXJ (Worcester) listened in the early mornings (except Sundays) right through from January until the end of June, and logged DX all the time—mostly W1 and W3. He has now started up again, and during the first half of August found conditions even better. He, too, heard W3GQF on August 5 (569) and two W1's working each other. (In July he logged W2KQT working VP8GQ, but couldn't find the VP.) G3NXJ says that the pattern suggests that about once a fortnight there are usually two good mornings, close to each other, and then the band goes off for a week or ten days.

GM3COV (Caithness) has achieved the maximum score (98/98), which has taken him six years—after working 61 counties in his first six months. He will now spend more time listening and calling, instead of just lying in wait for new ones. GM3KLA (Shetland) is up to 84/88, but just couldn't make Sark through the QRN.

G3MBW (Leeds) says GM3JEQ/P, near Loch Lomond, started a pile-up on August 13 . . . G3PGN (Basildon) worked EI8J and GM3PBA, with 599 reports, on August 8 . . . G3PLQ (Salisbury) still heads the G3O/G3P Ladder, but is now off to sea . . . G3OWR (Grantham) lost his half-wave and is now trying out a bent device which seems promising — OK's have been worked.

GI6TK (Co. Down) reports lots of GI activity, including a net on 1915 kc, Sundays at 0900 GMT. GM's join in, and others are welcome . . . GM3PBA (Dumfries) hears lots of unidentified phone stations around lunch-time and suspects that some of them are in the London area. He calls distances up to 100 miles "local," and thinks that 200-250 miles is always workable *if people listen* (and, of course, if QRM permits).

G3PPU (Basingstoke) worked his first GC and was thrilled when



For the International Games for Paraplegics at Stoke Mandeville Hospital, Aylesbury, Bucks., during July 22-29, on the initiative of G2FQW (Worthing) an amateur station was established signing GB3SMG; it was also arranged, through the co-operation of the Post Office, for a special dispensation to be given allowing SM2BZU (seen in this photograph, and a patient at Stoke Mandeville) to operate GB3SMG when designated local G's were present. As matters turned out, G2FQW himself was unable to come up from Worthing, and the work of getting GB3SMG on the air was undertaken by G2AUD, G3BMZ and G3IEF, assisted by others locally. After overcoming some TVI trouble successful operating sessions on 80-metre phone produced a large number of QSO's with SM2BZU on the microphone, as pictured here by G3CAG.

it proved to be Sark . . . And G2HFD (Blackheath), who ran the Sark sortie, reports that he found things disappointing on account of summer conditions and fish-fone; he only worked eight stations on Top Band.

G5PP (Coventry) recalls that during a recent trip to Scotland, he was in a three-way mobile QSO —GW8ML/M, G13CKC/M and GM5PP/M . . . and the time was *mid-day!* The GW-GM distance was around 300 miles and reports were 5 & 8 both ways. This must be some sort of a record for an "all-whip QSO."

G3PHO (Sheffield) is yet another who heard W3GQF on August 5; he was peaking at 579, working W6KIP and apparently hearing ZL3OX. W1AW and K4HJJ were also heard in Sheffield. G3PHO now only needs

the rarer GM's and GI's to achieve the total score possible on the band; he uses a half-wave bent "five times round the garden" and varying in height from six to thirty feet.

The DX Bands

For much of the past month there has been only one DX band —14 mc, of course. But at times 21 mc has broken through, even to the extent of being wide open. The 7 mc band is not to be sneezed at, although the daylight hours have been making it more difficult to use. However, the main thing is that a seasonal improvement in conditions is now starting to make itself felt, which might ease the load on 14 mc in the months to come.

G2DC (Ringwood) comments: "It really does pay to have a look

round when there appears to be nothing on. We have all experienced that nice bit of DX that came up on what appeared to be a dead band, and the other evening I decided to browse around on 21 mc CW between 2000 and 2130. There was no sign of activity when I started, but it suddenly opened up and, in quick succession, I worked CE, CX, PY, LU, HC, HP, HK, KG4, YN and CP!"

Twenty Metres

The SSB mode seems to have accounted for more DX than CW, with AM on this band practically nowhere these days. GM3JDR (Golspie) worked SSB with CE5EF, CR6, CX, EL5A and 6A, GC2HFD/A (Sark), G5KW/JY, HK, KS6KU/KS6, WA6IJF/KJ6, KB6BZ, KC6BK, PJ2AA, PY4RT/7, VK, VP8GQ, VQ9A/8C, VR3S, VU, WØMLY/TZ2, ZD8JP and 5V4MY—to pick only the best out of a long list. A burst of CW activity gave him G5KW/JY, PX1BE, VK6WT, VP8GQ, VQ9A/8C, VU2BK and 5V4MY.

G3KMQ (Shaftesbury) has put up a Mosley TA-33 Jr. and his score has gone up to match; recent additions (CW) were 5V4MY, 5T5AD, VQ9A/8C, ET2, VP8GQ, VP5, VS9 and quite a few more.

G2DC (Ringwood) raised one all-time new one (VQ9A/8C) as well as 5V4MY, 5T5AD, EP2BQ, FP8CB, JA, KH6's, TY2MY, VP3MC, VP5MW, WØMLY/TZ2, ZK1BY, 4U1ITU and 6O1ND. G2VV (Sunbury) collected 5V4MY, HZ1AB, ST2AR, JA5FQ and VK3TL. Both these reports refer to CW.

G3PEU (RAF Wyton), on SSB, worked HK4PX, KB6BZ, KH6, OHØ, PY4RT/7, VE7, VP9, VR3S, VU2RX, XE1AE, YV, 5N2, 9G and 9M. G3POI (London, S.E.22) registered on CW with AP5HQ, DU1OR, KV4CI, TI2CMF, HC1DC, KG4BF, LA8SE/P, SU1IM, VP5NQ, VK6WT, KP4's, VQ4's and the like. AM activity fetched in 5B4GY, 9M2AD, ZB1, VU2TN and F3UE/FC.

G2YS (Rickmansworth) spent a few odd moments on CW, and

raised VQ9A/8C, HC1DC, HK7ZT, EP2BQ and KR6BK. On SSB he worked EP2BQ, MP4BBW, VQ5FS and VQ2AF. G2HFD, signing GC2HFD/A from Sark, worked 58 counties on SSB, some of the best being VR30, KG4AO, FG7XT, 9M2MC, 9G1's, KR6BK, PZ1AX, VE7 and 8 and many W's. He says there is a "potential amateur" resident on the island.

GW3AHN (Cardiff) found FP8CB, JA's, VQ9A/8C and VQ9A/MM, and 5V4MY on CW; SSB fetched in KR6DI, PY4RT/7, WØMLY/TZ2, VS1, VE8, VQ9A/8C, VR30, ZD8JP and 5V4MY. G3FPK (London, E.10) also worked both modes, with CW raising AP5JA, VQ9A/8C, VR5AR, 3A2BZ and 5V4MY; SSB, CE1EK, CR9AK, HH9DS, KG4AO, W5AKM/KG6, K6SKU/KS6, KX6DC, PY4RT/7, WØMLY/TZ2, VP2GAB, VP7NS, VQ1GDW, VQ9A/8C, VS1, VU and 5V4MY.

G3LPS (Blackburn) stuck to CW and accounted for TY2MY, 5V4MY, 6W8DE, 6O1MT, AP5HQ, FP8CA, VP8GQ, WØMLY/TZ2, VU2LNZ, VQ9A/8C, JA's and JAØWW/MM (off the Philippines).

G3NOF (Yeovil) exchanged SSB with HH2PW and 9S, HV1CN, KG4AO, LX3MA, MP4QBB, PY4RT/7, VQ4, VS9, WØMLY/TZ2, 5V4MY, ZP5OG and 9G1EB. G3DO (Sutton Coldfield) worked SSB with KL7DBG/KS6, WA6LFK/KJ6, VQ9A/VQ8, VR30, WØMLY/TZ2 and 5V4MY. He says that VR5AA and 5AR have both been active on 14110 kc (SSB) with good signals around 0700.

Fifteen Metres

Very little traffic on this band, but those who persevered were rewarded. G2DC, on CW, raised CE, CP, CR7, CX, HC, HP, HK, KG4, TT8AL, VQ9A/8C, VU2BK, VS1FJ, 9U5A and 9U5BB.

GW3AHN, also on CW, kept his end up with CE, CP, CX, HC, HP, OHØ, LU, PY, TT8AL, VQ2IE, VQ9A/8C, VQ9A/MM, VS1KP, 5T5AD, 9K2AD, 9Q5JR and 9U5DS. In addition, he made it on SSB with FA2VX, VQ9A/8C, ZS's and 9Q5PR.

G2YS, in a quick sortie, worked

HP1AC, and G2VV raised one new one—6W8DD. And G3LPS, during an even shorter stay, worked 3V8CA.

Forty and Eighty

G2DC tried out his new ground plane on *Forty* and was happy to work CP5EZ, HC1CU, PY5OF and 7UDU, UA9, UD6 and most W districts . . . G3OSW, on the same band, winkled out 3A2BZ, UA9 and WA2; on *Eighty* he connected with VE1ZZ, ZB1BX, YO3FD and UA1FJ.

G2YS, with CW, raised KV4CI, VP9AK and UI8LB on *Forty*, 4X4DH on *Eighty* . . . and G3PHO, on *Eighty* CW, worked VE1ZZ several times, plus CT2BO, UB5, UC2 and a K2 (running only 25 watts for these contacts).

G3LPS, on *Forty* CW, worked PY7LJ, LU2ACH, UA9DN and 9DT, plus the usual W's and VE's.

Our Heading Photograph (p.360)

W5KMZ is from the Lone Star State—Olen J. Howell, of 14 East Cleveland Street, Baytown, Texas—and runs a QRO Sideband rig, mainly on 3803 and 14320 kc, with a p.e.p. of just the 2 kW. The gear includes a Collins 32S-1 as driver and an SX-101A receiver. The aerials being a doublet for 80m. and a Cubical Quad on 20m. All the HF/DX bands can be worked, from 3.5 to 28 mc, with a separate aerial system for each band. The PA runs a pair of 4-400A's, taking 4000v. on the plate and requiring forced-air cooling.

DX Shorts

Turkey: TA4RZ has "permission" to operate but no "licence." And he recently went QRT for political reasons . . . *Saipan*: This KG6 department now counts separately from Guam; KG6CF and 6RA (OM and XYL) are operating thence, on SSB . . . *Ruanda and Burundi*: Both still use the 9U5 prefix. 21 mc AM seems the most popular mode with them, and we gather that 9U5PE and 5PC are in Ruanda, 9U5DM, 5DS and 5JH in Burundi; many others are active.

Italian Islands: I1SVZ expects to be on SSB from IC1, IE1, IP1,

IS1 and IT1—but he will answer calls on AM or CW . . . *Aland Is.*: Much OHØ activity recently, by OH2BT, 2BZ and 5TK; SSB and CW . . . *Kuria Maria DX-pedition*: VS9APH reports that the VS9 boys may “do a Kamaran” from this rare spot, October or November. (A later note suggests that another Kamaran Is. operation is also possible.)

WØMLY Expedition: As already stated, this is all over, and Dick is back in the States. But we hear that he did intend to visit 5T5 and possibly another spot. Unfortunately a fire, when he was in Mali, resulted in the total destruction of the gear—hence his smart return. He did a fine job, and the spectacular ending of it was a pity.

Rockall: G3JZK has virtually fixed this one up—for next Spring. There is room for one or two more in the team, qualifications being as follows: Free for the whole of May or June, living on St. Kilda and waiting for the weather; plenty of patience; operating and, if possible, athletic ability! Meanwhile, we have heard a very terse report to the effect that Angus, ZD2AMS, “has access to a helicopter and is prepared to have a bash at Rockall.”

Bechuanaland: ZS6BBB will be in ZS9-land with a KWM-1 some time during the autumn . . . *Monaco*: 3A2BZ was DL9KP—operation now over . . . *Tonga*: VR5AR has been finding the band open to Europe in the mornings and has been on 14110 kc, SSB and CW . . . *Saipan*: K2QGC /KG6 plans a DX-pedition there (from Guam Island) in the near future.

Snippets

From G3IDG: Why is it always “Your sigs,” in the plural? Most people only have one of them (there are exceptions, of course). And why “Ur sigs RST . . . ?” What else would RST be used for, except for a signal report? Why not just “UR 579?”

Also G3IDG: A case recently arose where a DX station

appointed a W as his QSL manager. The W failed to fulfil his obligations and now ignores requests from the DX operator even to return the logs! The ex-DX man had asked for these so that he could deal with the QSL’s himself . . . so, why in the name of reason did he need a QSL manager in the first place?

From G2VV: Heard at LF end of 14 mc, July 16, 0910 onwards: A 589 signal sending “This is a test transmission for signal strength — station located on island of Etmar Atoll and listening for replies this frequency — call-sign ZK17.” This was repeated with listening periods; G2VV and G2BB both called him, but ND.

From G3FPK: Has it on the best authority that the famous ARRL *Bulletin 604* (concerning phone operation below 14100) was broadcast over W1AW unauthorised by the ARRL directors, who first heard of it when they began to receive startled phone calls and letters. The ARRL are perfectly at liberty to make any regulations they please in connection with their own awards, but this one seems to have been done in a high-handed manner without due regard to all the circumstances of the WØMLY operation.

From G2DC: Gus is having the time of his life. Almost everyone must have worked him as VQ9A/8C in the Chagos Is. He was leaving there on August 12 for St. Brandon (VQ8APB) and then via Mauritius to Rodriguez (VQ8AIR) ending up in Agalega by about the time the next issue is due out . . . Danny Weil had to waste a lot of time in Tahiti and give up Starbuck and Flint Is. because of licensing troubles. But the Cook Is. and Manihiki (ZK1BY from both) are all right.

The Big Contests

Book these dates—either to cancel all engagements (if you like these things) or to stay off the bands (if you don’t).

The *CQ Worldwide DX Contest* will run from October 26-28 (mid-

night to midnight) for the Phone Section, and a month later, November 23-25 (again midnight to midnight) for the CW half. Note the change in starting and finishing times—that 0200 business is now scrapped.

Rules are substantially the same as last year, except that the points value for contacts between North American stations has been increased to two points (to try to wake up the Caribbean area). And the minimum operating requirements for 21 or 28 mc have been reduced to 8 hours. The rules will be published next month, in the hope that there will be better U.K. representation this year. The organisers are still puzzled, as we are, as to why the G area can’t put up as many entrants as countries like HA, SP, PA or SM . . . perhaps this year we might do better?

And the *VK/ZL/Oceania DX Contest* comes earlier still: October 6-7 (1000-1000) for the Phone Section, and October 13-14 (1000-1000) for CW. For the rest of the world, stations will score two points for VK or ZL contacts, one for Oceania contacts outside VK and ZL. Final score, total QSO points multiplied by the sum of VK/ZL call areas worked on all bands.

Signing Off

Acknowledgments and thanks, this month, to the WGDXC *Bulletins*, W4KVX’s *DX Magazine*, the NCDXC’s *DX-er* and, as usual, all our correspondents who unflinchingly supply up-to-the-minute news. And, as we embark upon a season of more DX, more contests and (it is to be hoped) better conditions, we look forward to an even larger volume of news and general comment. Deadline for the next issue is **first post on Friday, September 14**—and for the following one, **October 12**. Don’t miss the boat, and address everything to “DX Commentary,” *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. And now, 73, Good Hunting and—BCNU.

The Readers’ Small Advertisement section of “Short Wave Magazine” establishes the second-hand value of all commercial apparatus

THE CERTIFICATE ISSUES

NOTES AND COMMENTS ON THE LATEST LISTINGS

SINCE the appearance of the last Certificate-Issue List, on p.141 of the May SHORT WAVE MAGAZINE, a further 81 Awards, no less, have been made. Except for the VHFCC issues — dealt with separately in "VHF Bands" for August—the latest certification is reported herewith.

WBC, involving the working of 50 U.K. counties and open to overseas claimants only, continues to be an award attractive to foreign operators. Some of the claims, as well as the claimants, are confused by the fact that quite a number of G's still do not include the county on their QSL card—we are often asked to confirm a county location. This should not be necessary, as the question could easily be answered by recourse to the local public library — and surely practically every town in the world must have a local public library with at least a gazetteer in the reference section. However, U.K. operators should make sure that their county name *does* appear on their cards.

Another popular Award, not too difficult but still requiring some getting (especially by low-power stations), is WNACA ("Worked North American Call Areas"). The present listing shows an interesting cross-section of claimants, the U.S. and Canada being excluded from this one—though we are often told that it is as difficult for a W4 or W5 to make WNACA as it is for, say, a VP4 or an XE; however, the line has to be drawn somewhere.

FBA ("Four Band Award") continues to cause a certain amount of confusion as to what is meant by the rule—we still get claims showing simply 20 countries worked on a variety of bands; or 20 countries worked on more than four bands; or a different lot of countries on the four bands. *Again*: What we want is a list showing the same 20C, each to have been worked on the same four bands; this is

not as easy as it sounds, and for the average operator involves pretty consistent activity 15-20-40-80m. if the same 20C are to be garnered on each. (Of course, any four bands may be chosen, e.g. 10-20-80-160m.) but the first four are the obvious ones for most stations with conditions as they are at the moment. However, SM7TV (FBA No. 235) used 7-14-21-28mc,

SHORT WAVE MAGAZINE DX CERTIFICATES

RULES

WNACA (Worked North American Call Areas)

Twenty-two cards to be held, for contacts with stations in ten U.S. Districts (W1-0); nine Canadian (VE1-8 with one 8 in Yukon, one in North West Territories); Alaska (KL7), Newfoundland (VO) and Labrador (VO). Contacts may have been on any band, phone or CW. Operators in W, VE, VO or KL7 are *not* eligible for this Award (321 WNACA Certificates issued to August, 1962).

FBA (Four Band Award)

Cards to be held with confirmation of contacts with 20 different countries, *each* country to have been worked on four different bands. Any four bands will qualify, e.g. 160-80-40-20, or 80-40-20-10, or 160-40-20-15 — and so on. Entrant's own country may count as one of the 20 countries. (248 FBA Certificates issued to August, 1962).

WFE (Worked Far East)

Eighteen cards to be held for 18 different countries selected from among the following: C (China), C3 (Formosa), C9 (Manchuria), CR9 (Macao), CR10 (Timor), DU (Philippines), FI (French Indo-China), HL (Korea), HS (Siam), JA/KA (Japan), KR6 (Ryukyu Is.), PK1-2-3 (Java), PK4 (Sumatra), PK5 (Dutch Borneo), PK6 (Moluccas), UA0 (USSR in Zone 19), VS1 (Singapore), 9M2 (Malaya), VS4 (British North Borneo), VS5 (Brunei), VS5 (Sarawak), VS6 (Hong Kong) and XZ (Burma). All or any bands count. (65 WFE Certificates issued to March, 1962).

WABC (Worked All British Counties)

Sixty cards to be held, from sixty counties of the British Isles, all to have been worked on the 160-metre band since January 1, 1952. Counties to be as shown in any standard atlas, *not* "administrative counties" such as the three Ridings of Yorkshire, East and West Sussex, County of Bristol, and so on. Isle of Wight counts as Hampshire — not separately. Isle of Man does score separately, as do all the Channel Islands. Scilly Isles also count separately. For London the L.C.C. area scores as one County. (282 WABC Certificates issued to August, 1962).

WBC (Worked British Counties)

Open only to claimants *outside* the United Kingdom and Eire. Cards to be held from 50 different counties of the British Isles, worked on any band 3.5 to 28 mc inclusive, phone or CW. The definition of U.K. counties is the same as for the WABC Certificate above. (288 WBC Certificates issued to August, 1962).

PRA (Polar Regions Award)

Claimants must be able to show cards as follows: (a) Arctic—QSL's from six of the areas Alaska, Canada, Finland, Greenland, Norway, USSR *all lying north of the Arctic Circle*, Jan Mayen and Spitzbergen (incl. Bear Is. and Hopen Is.) — making eight possibilities from which the six cards can be derived. Also (b) QSL's from any six of the following eight Antarctic areas: Antarctica, Falkland Is., Heard Is., South Georgia, South Orkneys, South Sandwich Is., South Shetlands and Macquarie Is. Cards must not be dated earlier than January 1st, 1955, and contact can be on any band, CW or phone. (26 PRA Certificates issued to August, 1962).

CONDITIONS

Claimants in the U.K. are required to send all cards in support, by registered post with a check list, when making their claims. Overseas claimants (*only*) should send either (a) A check list, without cards, duly certified by the Hq. of their national Amateur Radio Society, or (b) An uncertified check list, from which all or any cards may be called in for scrutiny by us. Cards are *not* required from overseas applicants unless asked for to verify a claim, and we can accept no responsibility for unwanted QSL packets. In no case will any Award be issued without proofs we consider to be good and satisfactory.

Claims, enclosing return postage (five IRC's in the case of overseas claimants) for all the above-mentioned Certificates should be addressed "DX Awards," Short Wave Magazine, 55 Victoria Street, London, S.W.1

and OH9NC (No. 236) the 15-80m. group of four. In his claim, G3LHJ (No. 238) shows Andorra as one of his 20C, with PX1PF the single representative worked on 7-28 mc inclusive. And DJ5VQ (No. 242) did exactly the same thing. Similarly, UA6LF (FBA No. 240) used 7-28 mc for all his contacts, 19C of his 20 countries being European — and he claims Estonia as a separate country; in view of the historical implication, we let that one pass! In the realm of the unorthodox, in the sense of making it rather more difficult, SP6FZ (No. 244) chose, among his 20C, JA and VU, and also shows OD5LX for the Lebanon worked on all four bands; SP6FZ used 7-28 mc., and all his contacts were made between January 1958 and December 1961. Likewise, 5N2JKO (No. 248) collected his lot on the 7-28 mc bands, the stations worked on 40m. being nearly all Europeans — which must mean something, if only in terms of DX interest to the EU's concerned.

WABC, the U.K. Top-Band only Award, remains as popular as ever and, as the list shows, there have been two more phone-only issues; the great majority of claims are with phone/CW contacts mixed, though some are CW only; the only endorsement we give is for phone-only. Several of the claims show the sterling work done by the DX-peditions, in particular G3JEQ, who has appeared as G13JEQ/P from several N. Ireland counties.

To gain his WABC No. 275, GM3PAE made 336 contacts, all inside three months, and to get his Yorkshire card had to work 14 Yorks. stations—he also remarks that WABC would be easier for GM's if only they would work one another! (Only 23 of his 336 QSO's were with other Scottish stations.) And in the course of these contacts, GM3PAE found he had

also worked seven countries on Top Band. GM3PBA (No. 282) says that it has taken him nearly a year to extract the cards, with 78C worked.

PRA and WFE, in that order, remain the most difficult of our Awards—as indeed the listings show (none at all this time for WFE). Incidentally, OH9NC (PRA No. 24) also gains WBC No. 268 and WNACA No. 308, as well as his FBA No. 236. And due credit to G3GSZ (PRA No. 26) for being one of the few G's to qualify for that Award.

Snags, and Compensations

During the period, we have had the usual crop of misunderstandings; incorrect or uncertified claims; packets of cards sent unnecessarily; claims without check lists; insufficient or no return postage at all enclosed; a flood of SWL claims from Mittel-Europa, apparently in the mistaken belief that we issue FBA's and WBC's to listeners; and tedious correspondence with well-meaning folk who do not understand that Certificate-issuing is a side-issue job, which must take second place to almost all other Magazine work.

But those are the occupational hazards. The other side of the picture is that seeing so many claims—and the covering letters that come with them—is itself of great interest, as they disclose so much in the way of incidental information. For instance, SM5VN (WNACA No. 307) is a captain in the Royal Swedish Navy . . . OE3RE (WBC No. 273) is the local district Judge . . . LA1K (WNACA No. 321) is the Club station of students of Trondheim Academy (or, as we would call it, Technical College) . . . DL2AB's WNACA No. 316 was gained on SSB contacts only . . . UR2BU's claim for WNACA No. 312

Short Wave Magazine

DX CERTIFICATES

The following have been issued since the publication of our last list, in the May, 1962 issue:

FBA

- No. 235 SM7TV (Kristianstad)
- 236 OH9NC (Rovaniemi)
- 237 G3KMQ (Shaftesbury)
- 238 G3LHJ (Newton Abbot)
- 239 PZ1AX (Paramaribo)
- 240 UA6LF (Rostov-on-Don)
- 241 G2GM (Torquay)
- 242 DJ5VQ (Waldbrockelheim)
- 243 GM3EOJ (Aberdeen)
- 244 SP6FZ (Bielawa)
- 245 HA9OZ (Miskolc)
- 246 MP4BBE (A wali, Bahrein)
- 247 W9WNV (Chicago)
- 248 5N2JKO (Zaria)

PRA

- No. 24 OH9NC (Rovaniemi)
- 25 SM7QY (Karlskrona)
- 26 G3GSZ (Wingate, Co. Durham)

WABC (Top Band only)

- No. 268 G3NNO (Leeds)
Phone No. 16
- 269 G3NYQ (Ilkley)
- 270 GW3CBy (Swansea)

- 271 GM3NXA (Bridge of Earn)
- 272 G3ORT (Basildon)
Phone No. 17
- 273 G3LAP (Stevenage)
- 274 G3CHN (Kingsbridge, Devon)
- 275 GM3PAE (Edinburgh)
- 276 G3PBC (Leicester)
- 277 G3NHE (Nr. Sheffield)
- 278 GM3NHQ (Alloa)
- 279 G3JFO (York)
- 280 G3OXI (Woking)
- 281 G3PLQ (Salisbury)
- 282 GM3PBA (Lochside)

WBC (Overseas only)

- No. 265 DL1QT (Krailing/Munich)
- 266 SM7TV (Kristianstad)
- 267 W1UOP (Needham, Mass.)
- 268 OH9NC (Rovaniemi)
- 269 W9WNV (Chicago)
- 270 W2EMW (North Syracuse, N.Y.)
- 271 UA6LF (Rostov-on-Don)
- 272 SM3CNN (Gavle)
- 273 OE3RE (Langenlois)
- 274 SM6CMU (Gothenburg)
- 275 EA1GH (Burgos)
- 276 VK4TY (Warwick, Queensland)
- 277 OK1XB (Benesev)
- 278 K1KPS (Cambridge, Mass.)
- 279 SM3CJD (Harnosand)
- 280 VK3AHO (Ky Valley, Vict.)
- 281 CR7IZ (Ibo, Port. East Africa)

- 282 DL3BP (Mainz/Rh.)
- 283 PZ1AX (Paramaribo)
- 284 ON4CE (Depanne)
- 285 5A3BC (Barce)
- 286 YO9WL (Cimpine)
- 287 UA9DT (Sverdlovsk)
- 288 DJ1OJ (Oberhenneborn)

WNACA

- No. 307 SM5VN (Saltsjoe-Duvnaes)
- 308 OH9NC (Rovaniemi)
- 309 PZ1AX (Paramaribo)
- 310 GM3PNR (Kilmarnock)
- 311 GI3CDF (Portadown)
- 312 UR2BU (Tartu)
- 313 VK3RJ (Box Hill, Vict.)
- 314 5N2JKO (Zaria)
- 315 GM3EOJ (Aberdeen)
- 316 DL2AB (BFPO 24)
- 317 GI3OQR (Dungannon)
- 318 UC2CS (Minsk)
- 319 YO9WL (Cimpine)
- 320 SM2ALU (Bergnaset)
- 321 LA1K (Trondheim)

Overseas claimants may send either (a) a check list, without cards, duly certified by the Hq. of their National Radio Society, or (b) An uncertified check list, from which any or all cards may be called in for scrutiny by us. U.K. claimants must send the relevant cards for each award.

All claimants must include sufficient return postage for the cards and Certificate—five IRC's in the case of overseas claims.

is certified by someone who describes himself as "Vice-President of Federation of Radio Sports Estonia" . . . G3CHN (WABC No. 274) is at the Decca Navigator transmitting station on Bolberry Down, near Kingsbridge, South Devon; he has excellent aerial facilities! . . . Both G15TK and G16TK represent Co. Down, and both appear in several of the WBC check-lists . . . K1KPS (WBC No. 278) is a doctor, living on a farm in Middlesex County, New Hampshire, but he practises over the State boundary in Cambridge, Mass. . . . ON4CE (WBC No. 284) is 74 years of age and only started on the air in August 1959.

Finally, may it again be repeated: We do *not* require packets of cards in support of claims from overseas applicants if a certified claim can be sent;

we must have a detailed check list; return postage is required, in the shape of five IRC's from overseas claimants; claims are dealt with in batches as time and opportunity allow; we cannot undertake correspondence with applicants, and it is for them to see that their claims are in order and fully in accordance with the conditions; we are unable to issue certificates to third parties confirming that claims have been examined and accepted unless a blank form is sent requiring only a signature, for return with the claimant's parchment. If these points are observed, things are a good deal easier—and it should be said that the great majority of claims, whether from U.K. or overseas operators, *do* reach us in proper order and are a pleasure to process. This is the justification for refusing to bother with those that do not conform.

SWL • • • • •

MORE ABOUT FRONT ENDS AND CONVERTERS — OSCILLATOR FREQUENCIES TO USE — R.A.E. HOPES AND SUCCESSES — READERS FORUM — NOTES AND COMMENT

IN the July instalment of "SWL" it was suggested that a modern front-end could be very easily built up as a separate unit, in order to try out its effect on old receivers, and also for the purpose of familiarising oneself with present-day practice in using crystal-controlled converters.

It was also suggested that those who tried such a unit and approved of its performance should then build the complete G3BDQ receiver, as described in the June and July issues. It has now been decided that, to avoid duplication of effort, there is little point in going ahead in full with the scheme, originally intended, of describing in this feature the various sections of a complete communications receiver . . . the G3BDQ design has filled the need and is exactly along the lines on which we should have worked.

SWL's therefore have several alternatives before them—to experiment with front ends (or separate crystal-controlled converters) in conjunction with their existing receivers; to rebuild the front part of their receivers in a "hotter" fashion; or to work at the IF side by means of Q-Multipliers, Q-Fivers and other "outboard" IF strips; or (the final decision) to build the complete G3BDQ receiver, leaving whatever they are using at present intact.

It is therefore proposed to discuss the various possible improvements separately, rather than to attempt to fuse them together into a complete receiver design. And still we have not finished with the all-important front end! The article on p.323 of the August issue of SHORT WAVE MAGAZINE took the subject a little further.

The Alternatives

Several different methods of tackling things are open to the individual SWL. A very simple Nuvistor front end (pp.252-253, July issue) may be made to cover either one band or (if the crystal frequency is correctly chosen) two. With plug-in coils and plug-in crystals, it can naturally be made to cover *any* band required—amateur or broadcast. Or you can build more than one of these converters, quickly pluggable for different bands.

It is gathered from correspondence that the most favoured scheme is to use the existing receiver as it stands for 1.8, 3.5 and 7 mc, and to precede it with efficient converters for 14, 21 and 28 mc.

One thing is certain—that there is now no kind of enthusiasm for *tunable* converters. There are several reasons for this, chief among which is the fact that a tunable converter is no good at all unless its oscillator is at least as stable as—and preferably better than—that in the receiver itself. Stability is everything these days, chiefly owing to the popularity of SSB. Added to this, if you are going to do all your tuning on a converter, you will need a degree of band-spread that compares well with that of the receiver itself; and also a dial which is not inferior to that of the main tuning control.

Thus there is a tremendous, and unnecessary, duplication of effort, all of which can be avoided by using a crystal-controlled converter and making use of the existing receiver's dial facilities, band-spread and (it is hoped!) stability.

When you use a crystal converter, the only additional tuned circuit you have to cope with is the input circuit; if you have to use an RF stage, there will be two of them, it is true, but they can be ganged. And this circuit, of course, does not have to be closely tuned for "search" purposes—it is simply operated as you would normally use the aerial trimmer. Possibly it will need peaking for the HF, centre and LF ends of the band you are on, but not much more.

Table 1 shows various examples of the choice of crystal frequency and tuning range. Note that you can always arrange things so that *two* amateur bands

can be covered by one converter—for instance, a 10.5 mc crystal and the 3.5 mc range on your receiver will give you both the 7 and 14 mc bands; and a 17.5 mc crystal with the same range would give you the 14 and 21 mc bands. Since it will generally be a fact that your own receiver is quite adequate on all other frequencies, it is probable that you will need only two crystals. (In many cases you may feel that the receiver is good enough on 7 mc—in which case you can choose one crystal to cover the 14 and 21 mc bands . . . 28 mc is not likely to awaken much enthusiasm during the next few years.)

Design Detail

An enormous variation in circuitry is possible, once you have decided on choice of crystal, tuning range, coil-changing *versus* switching, and so on. If you wish to do without an RF stage, probably the best bet is to use the circuit shown on p.253 of the July issue, with a Nuvistor mixer and a triode crystal oscillator. For alternatives, refer to pp.265-267 of the July 1961 issue, which include a pentode mixer and others using a pentagrid valve, a triode-hexode and a double triode. (Although the triode-hexode circuit shown uses a variable frequency oscillator, it is equally effective when the triode section is used as a crystal oscillator.) Needless to say, though, we recommend the most modern design, involving the Nuvistor.

For this one, the details for home-made coils have already been given. But should some of our readers wish to use ready-made coils, plenty are available. For *both* positions (L1/L2 and L3/L4) the so-called "aerial coil" from each manufacturer should be used—which consists of the main coil and a link winding of relatively low impedance.

For the L1/L2 coil, tuned to signal frequency (and talking now in terms of the 14 and 21 mc bands) the following would be suitable: Blue coil, Range 5 (*Denco* or *Maxi-Q*); Type HA, Range 3 (*Teletron*); Type PA, Range 4 (*Wearite*); Type HA, Range 7 (*Weyrad*); Type QA, Range 2 (*Osmor*). Doubtless there are several other suitable commercial types. For the L3/L4 coil, tuned to the same range as the receiver (which will be somewhere between 1.5 and 3.5 mc, according to your choice), use the same *types* but the following ranges: *Denco* or *Maxi-Q*, Range 3; *Teletron*, Range 7; *Wearite*, Range 5 or 6; *Weyrad*, Range 4 or 5; *Osmor*, Range 4.

For the choice of the precise tuning range used on the main

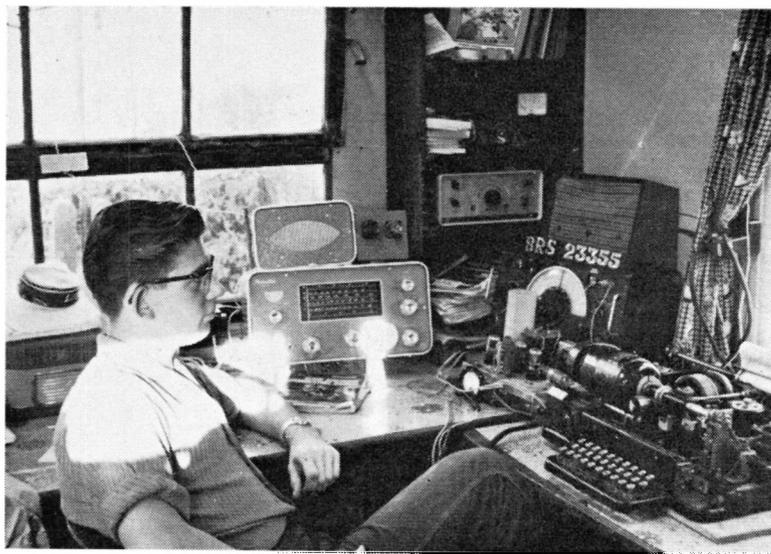
TABLE 1

TUNING RANGE OF CONVERTER (mc)	CRYSTAL FREQUENCY (mc)	TUNING RANGE OF RECEIVER RF SECTION (mc)
14.0-14.5 } 21.0-21.5 }	17.5	3.5 -4.0
14.0-14.5 } 7.0- 7.5 }	10.75	3.25-3.75
14.0-14.5	16.0	1.5 -2.0
21.0-21.5	16.0	5.0 -5.5
1.5- 2.0	5.5	3.5 -4.0
1.5- 2.0	9.0	7.0 -7.5

(NOTE: With a single 17.5 mc crystal the 14 mc and 21 mc bands can be covered without altering the tuning range of the receiver; with a 16.0 mc crystal the same two bands may be covered by using two different tuning ranges.)

receiver, much depends upon the latter and its efficiency. If it covers Top Band, then the 1.5-2.0 mc range will probably be satisfactory; but some do not, and then, to keep familiarity with the calibration and, in such cases as the HRO, to retain full band-spread, the 3.5-4.0 mc band will be a better choice.

Incidentally, for receivers which do *not* cover Top Band, a very efficient converter can easily be made up using the same circuit with either a 5.5 mc crystal (with the receiver tuning 3.5-4.0 mc, thus giving a range of 1.5-2.0 mc) or with a 9 mc crystal (the



We do not often hear of SWL's running teleprinter receivers, but here is one: R. V. Southern, The Bungalow, Steel Cross, Crowborough, Sussex. He and two SWL friends have been receiving RTTY for over a year; they have a Type 7B page-printer and two Type 3X tape printers (obtained for 35s. through a small advertisement in "Short Wave Magazine"). They have also built the G3BST RTTY Converter, and use an oscilloscope for setting up. Receivers to go with the T/P gear are an MR44/11 and R.1155, and they use a tape recorder for preserving the really interesting stuff.

receiver then tuning 7.0-7.5 mc and giving a similar range).

Recap

What this all boils down to is this: If you build a simple crystal-controlled converter for use with an old or "tired" receiver, you have given it a new front end, and turned its former RF section into its first IF. The second IF and other parts remain unchanged. But your new front-end is flexible enough, with plug-in coils, or switched coils, and a choice of crystals, to cover all sorts of bands roughly 500 kc wide—including even the Top Band, if this is not covered by the station receiver.

Having got the feel of the new technique, you can, if you wish, precede it with an efficient RF stage (again using a Nuvistor or one of the latest low-noise pentodes); similarly, you can eventually follow it, if you wish to scrap the receiver or use it for other purposes, with a specially-built IF amplifier, for which you will use a tunable first IF followed by a second mixer and a lower-frequency second IF.

The main thing is that the converter-cum-front end is a flexible unit, and once you have made it work efficiently you will have the means to rejuvenate almost any older receiver; or, alternatively, the nucleus of a complete home-built receiver. And, of course, there is always the alternative of building the complete G3BDQ receiver, as in the June and July, 1962, issues of SHORT WAVE MAGAZINE, of which this converter is really a part.

In the next instalment we shall be dealing with a Q-Multiplier and discussing means of improving the IF selectivity of existing receivers, which is another part of the same story.

READERS' FORUM

Two points are especially noticeable in readers' mail this month—first, the number of SWL's who have now passed the R.A.E. and are either awaiting the Morse test or have already acquired call-signs; and secondly, the number who mention "A-Level QRM" as having kept them off the air for a while. To the first we offer our congratulations, and to the second our hopes that their labours were rewarded with success. With the A-Levels out of the way, very little will now stand between *them* and the R.A.E.

Thus we have, as always, a constantly-shifting population; and it will happen (as it has happened so often in the past) that a new G3-- station reporting considerable DX successes will prove to be operated by an old friend from the SWL section. The progress of many such is watched with the greatest interest!

We also have our "perpetual SWL's"—a certain hard core who are frankly not interested in transmitting and would sooner go all-out in the reception department. This attitude is understandable for many reasons, and it is an undoubted fact that the average transmitting amateur hears far less than the successful SWL—he spends so much time putting his own signal outwards that he has less available for those coming in!

R. J. C. Coats (Cowie) hopes to be using the Nuvistor front-end ahead of his CR-100 by the time this appears in print. He has heard plenty of DX, but enquires whether stations using a DX suffix (such as WØMLY/TR8) count separately from an ordinary TR8. They do *not*—for WPX and HPX purposes the suffix serves as a prefix.

K. A. Randall (Fareham) is a newcomer, 17 years old, who started with a BC set on 14 and 7 mc and then bought an R.107; he hopes to hot it up with a converter shortly. B. R. Edwards (Hereford) is one of those who passed R.A.E., and he is now getting his CW up to scratch, after which he will be running a Heathkit DX-40U; he added several really rare ones to both lists this month, including Aldabra Is., Lord Howe Is., TL8, TY2 and most of the good ones that have been around. B.R.E. has been an SWL since 1954 and has had several receivers, but thinks the present AR88D "tops the lot."

Yet another R.A.E. success is P. Perretts (London, N.14), who reports to this section for the first and last time! He started in 1958 with an 0-V-0 and followed up with two BC sets, an R.109, a PCR, and is now playing with a transistorised top-band converter (from the June, 1962, SHORT WAVE MAGAZINE) and a crystal calibrator. The Nuvistor front-end is the next project.

R. Patrick (Derby) spends a lot of his time as news editor of the ATRL, preparing news tapes for members; he hopes to carry out another band-survey on 7 mc, listing the times of transmissions of the various BC stations operating in the amateur section of the band. And he reports that W7USA and KL7SOA/M operate from the World's Fair site in Seattle, 14 mc, 1830 to midnight, and can be reached at Box 6273, Seattle, Wash., U.S.A.

C. H. Miller (Tayport) asks us to explain the "A3" prefix, with special reference to A3FLG, an American in Germany; this must have been one of the stations in the MARS (Military Amateur Radio



HPX LADDER

(Starting January 1, 1960)

Qualifying Score—150

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
R. Griffiths (Ventnor)	642	M. Saunders (Malvern)	254
H. G. Shaw (Heswall)	631	N. H. Mæer (Sutton Coldfield)	254
R. J. C. Coats (Cowie)	547	W. S. Teanby (Scunthorpe)	252
A. W. Neilson (Glasgow)	542	B. Pack (Frome)	247
C. N. Rafarel (Poole)	447	L. F. Meikle (Hexham)	246
B. R. Edwards (Hereford)	409	M. Pettit (Teddington)	243
D. Edwards (Birkenhead)	409	G. Steedman (Huddersfield)	222
M. T. Bland (Oakham)	396	D. S. Radley (London, N.10)	219
R. K. Towers (Nottingham)	359	D. Douglas (Edinburgh)	213
R. K. Western (Torquay)	352	C. Miller (Tayport)	209
D. Gray (Easington)	346	R. Atkins (Brighton)	202
L. Birch (London, E.6)	331	G. Docwra (Brighton)	198
D. A. Whitaker (Waddington)	328	M. R. Warburton (Sale)	195
B. Curnow (Plymouth)	324	K. A. Randall (Fareham)	188
D. Bell (Nottingham)	320	D. Hayes (London, N.3)	172
M. Healey (Horsham)	314	B. J. Tarry (Warrington)	170
R. R. Loe (Colchester)	311	R. Mansell (Eastleigh)	158
M. Warrington (Burnley)	295		
P. J. Lennard (Wartling)	291	CW ONLY	
M. Pennington (Southport)	284	B. R. Edwards (Hereford)	465
P. Stevens (Donnington)	284	R. K. Western (Torquay)	443
R. Adams (Shoreham)	283	C. Harrington (Hounslow)	428
A. T. James (Exeter)	271	R. Ferguson (Glasgow)	351
W. J. Atherfold (Southwick)	265	P. J. Lennard (Wartling)	333
G. Ferriday (Donnington)	261	W. Ferguson (Glasgow)	325
P. Whipps (Enfield)	261	N. A. T. Hardy (Shepshed)	244
S. Foster (Lincoln)	258	P. L. Stevens (Donnington)	181
G. Lawrence (Leamington Spa)	255	P. Whipps (Enfield)	181
		R. A. McEwen (Stirling)	152

(NOTE: Listing includes only those who reported for this issue or for July. Failure to report for two consecutive issues will mean removal from the list. Next list—November issue, deadline September 28).

Service) network, who operate outside the bands (13995 kc, and so on).

P. L. Stevens (Donnington) says his main interest is now 14 mc CW, and he is going for R.A.E. in November; he explains the relatively small number of contestants in the HPX CW ladder thus: Most SWL's begin by listening to phone only; then some of them get interested in CW and inevitably reach the "magic figure" of 12 w.p.m. After this they are liable to acquire their own tickets and so vanish from the ladder!

G. W. Lawrence (Leamington Spa) had just received his R.A.E. pass slip when he wrote, but intends to remain interested in receivers. He makes appreciative remarks concerning the "Front End" articles, and now wants to see some on devices for improving selectivity, including half-lattice filters and Q-multipliers.

J. S. J. Craig (Horam) also listens from his "/A" location at Malvern College, and is all-out for R.A.E. in November; he is one of the few SWL's equipped for /M operation, using a home-built Top-Band receiver with a centre-loaded whip, fitted into his three-wheeler. Main interests are Top Band, Eighty and Two Metres.

More DX TV

C. N. Rafarel (Poole) has found the Sporadic-E "hunting season" in full swing again, and so apologises for his lack of reports on ordinary SW reception. On TV he has now received East Germany (Helpterberg on Channel E3); Norway (Kongsberg and another unidentified station on Channel E2);

SWL • • • • •

continued

and Yugoslavia (Belgrade on Channel E2a). He is still trying to receive Switzerland. Score to date is 52 stations in 20 countries! Bands IV and V are now being covered, and plenty of patterns and "monkey chatter" have been received, but no stations yet identified.

Another correspondent getting interested in DX-TV is R. K. Towers (Nottingham), who has been receiving TV stations on a small rhombic and a 106-ft. end-fed long wire working into an ATU; he heard odd bits of music and sound first, and then on June 3 found a very good negative-going picture (625 lines) on Band I. He inverted it by screwing the vision interference-limiter right in, slowed down the scan, and there was "Radiotelevisio Portuguesa"! This was on Channel 3, and Channel 2 had an interesting transmission on it at the time, with "TVE" on the test card (a Spanish station). After this, various French, Portuguese and Spanish stations were followed by a German programme with pictures of the Brandenburg Gate and the Berlin Wall. After all this, SWL



Aldo Bernasconi, of Claridenstrasse 6, Kilchberg, Zurich, is a Swiss SWL who has recently been in England. His Rx is an SX-38 and the aerial a 36ft. doublet — with which, he says, "he makes good DX's."

SWL • • • • •

continued

Towers embarked on a lorry trip which will take him through F, I, YU, SV, HB, OE, DL and ON . . . and when that's over, a two-metre converter is on the stocks.

M. Healey (Horsham) is trying to improve his CW speed, also rebuilding and reorganising his gear, and lastly having a shot at two metres! This, with the arrival of a junior op., has kept him busy without giving much time for actual listening; with a two-transistor straight receiver on two metres, he has already logged some stations (using a quarter-wave whip only).

W. S. Teanby (Scunthorpe) is yet another with an R.A.E. pass to his credit, so he, too, is "Morse-polishing," as he puts it — as well as repairing aerials and masts brought down in the February gales. *D. Hayes (London, N.3)* has quite a building project ahead of him, with a transistorised Q-multiplier, a mains filter, a Faraday static screen and a new receiver front-end.

S. Foster (Lincoln) has had A-level QRM, but has managed some interesting loggings on 14 mc between 2200 and 0200 GMT; in his first year as an SWL he has heard over 100 countries and filled one log-book, with over 2500 entries.

Mrs. Chris Kiddell (London, S.E.6) sends another interesting "omnibus letter," mostly concerning goings-on on the 80- and 40-metre bands. She asks for ZB1HC's call-sign . . . it is G3MIR; and also comments on the GB3SMG operation (from the Stoke Mandeville Games), when SM2BZU, a patient at Stoke Mandeville, was on the air; he has been made an honorary member of the RAIBC. Chris also has her grouse about SSB operators who remain Jacks and Bills and never give a call-sign . . . haven't we all!

Some of our regular correspondents have not shown up this month, owing to holidays and so on . . . we hope they will take due note of the paragraph below, and have their news and HPX claims in by the next deadline (*September 28*). There were several late reports this month — some so late that they could not be included — and we would remind all correspondents that we, too, have to keep to the Editor's deadline! So please don't be late!

Correspondence from short wave listeners is welcomed for this feature, the next appearance of which is in the November, 1962 issue. Good photographs of SWL stations can be used and are paid for on publication; prints must be sharp, and should be accompanied by adequate descriptive notes. The closing date is September 28 and all mail should be addressed: "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1.

NEW MINIATURE SOLDERING INSTRUMENT

While the need for light, miniaturised soldering irons — for such work as transistor, printed circuit, computer, and similar fine instrument assembly — has existed for some time now, and has been met by the production of very small low-voltage irons, it has been a different matter manufacturing such irons for normal mains voltages. The "Adamin" range of micro soldering instruments now includes two new models, the C10L, rated at 10 watts, and the C15L (15w.), which operate direct from the mains. An entirely new type of element construction enables the heater unit to be contained in a stainless-steel tube only 9/64ths of an inch in diameter. Light Soldering Developments, Ltd., believe that their C10L is the smallest mains-operated soldering instrument available anywhere in the world.

AMERICAN MAGAZINE SUBSCRIPTIONS

We are glad to be able to accept, on a sterling basis, readers' subscriptions (or subscription renewals) for American amateur periodicals such as *QST* (48s.), *CQ* (44s.) and *73 Magazine* (30s.). These are post free rates, by surface mail direct from the American publisher. We arrange the transaction by airmail, and now handle a large number of these subscriptions. Remit to Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1, stating the month with which the subscription is to start (if a new one). In the case of a renewal, please forward the renewal notice with the sterling remittance.

SCOUT RADIO JAMBOREE

As previously notified — see p. 325, August, for details — this year's Scout Radio Jamboree takes place over October 20-21, midnight to midnight. GB3BPH, with G2CAJ in charge, will be on the air on all bands. Top to two metres, from Baden-Powell House, Queensgate, London, S.W.7. It is hoped to commence operations with GB3BPH a few days before October 20, to deal over the air with any queries about the Jamboree. Further information from: A. Bryan, G2CAJ, 14A Coleherne Road, London, S.W.10.

NOTE FOR SUBSCRIBERS

For the information of those who wish to obtain *SHORT WAVE MAGAZINE* each month by post direct from us, the subscription rate is 36s. (\$5.25 U.S.) for a year of twelve issues, commencing with any coming month. Direct subscriber copies are posted in time for delivery (in the U.K.) on the day of publication, the first Friday in the month. Remit to Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1 We can also accept single-copy orders (P.O. 3s. 5d.) which should be posted not later than the Tuesday before publication date, stating clearly the month of issue, e.g., for the next issue, posting should be on Tuesday, October 2, with a note saying "October issue, pse." All this, of course, if you are unable to get a copy through your local newsagent.

VHF BANDS

A. J. DEVON

**Conditions Despondent, but
an Opening Possible**

The DX-Pedition Results—

More EDX by Meteor Scatter—

**Contacts on the Centimetric
Bands—**

WHILE it is still not possible to report anything in the way of big openings—the weather has been all against it, and nobody needs reminding about that—there have been a few GD_X flashes and in spite of the poor conditions for the time of year, activity has remained quite high. This was especially so when the expeditions were out.

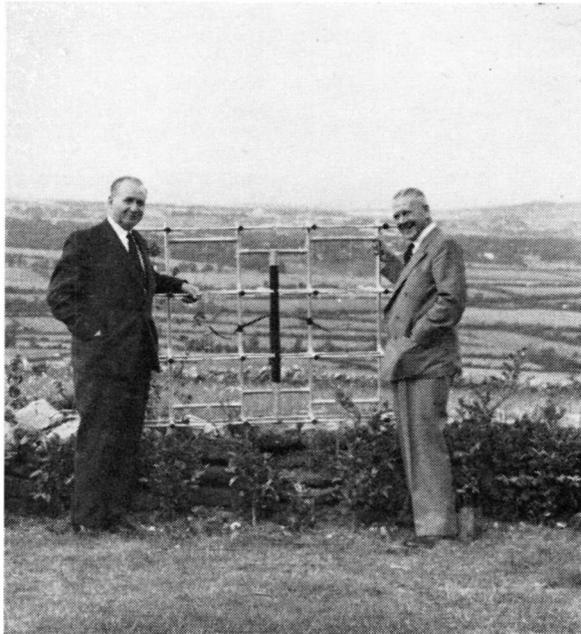
Apart from what may be described as the routine activity, we have very interesting reports on two highly specialised branches of the VHF art—QSO's by meteor scatter, and some remarkable communication results on the centimetric bands.

Taking the DX-peditions first, not everyone knew that GC3PBR/A would be available from Sark during July 21-22; G3HBR, G3MLS and G3PBR made the trip; as it was going to be "essentially a holiday," and it was not known when or from where they would be able to operate, it was decided to avoid anything in the nature of advance publicity. Running 20 watts to a QOV06-20, and set up at about the highest point of the Island of Sark, 400ft. a.s.l., they had a 5-ele Yagi,

transistorised modulator, and G3HBW's transistor Rx, all run off an inverter powered from a 12-volt acc. In rather poor conditions, some 30 stations were worked, mainly in the London area; the locals who came on were GC2FZC and GC3OBM of Guernsey, and GC2TR (Jersey). Their first QSO, appropriately enough, was with G3HBW (he having provided the gear) and those mentioned as "outstanding signals" are G2JF, G3JR (with his 12w. and an indoor beam), G3FZL, G3MPS and G6NB. All stations worked from GC3PBR/A will be QSL'd in due course; it is the first time a two-metre station has been operated from Sark, which of course scores as a county by our way of reckoning. And for the benefit of those who may contemplate mounting an expedition to Sark in the future, G3PBR says that the proprietors of the Beauvoir Guest House, Sark (Mr. P. Perks and his wife) can provide not only accommodation, but also local transport and the loan of a 12-volt accumulator

as primary power supply; in other words, they would be very glad to help anyone coming to Sark on a DX-pedition. Since the GC3PBR/A party used a transistorised inverter for getting power for the gear, the acc. played an essential part in the proceedings, and obviously it was very convenient having it available on site.

If the GC3PBR/A week-end sortie passed off comparatively quietly, nobody could say the same of the foray by G3BA/G4LU, signing GW3BA/P or GW4LU/P, through the rarer counties of Wales. Having made their wills, these two brave chaps bade their anxious families a cheerful farewell, and set off on a trip which has been graphically (and most amusingly) described by G4LU—they certainly had a time of it, what with the weather, cooking in the rain, and sleeping in their cars for six nights. It was strictly safari conditions, with no soft options, as the planned objective was to take a one-night stand in each of six counties, and



Recently, G5QA (right) visited EI2W and this photograph shows them and the 32-ele 70-centimetre array built by EI2W, with which Harry made the first EI/GW contact and many other subsequent EI/G QSO's on the 430 mc band—in fact, EI2W holds in all 19 VHF "Firsts" for EI, including several on the 6-metre band. The picture gives a good impression of the fine take-off from the new EI2W site.

to work as many stations as possible during the evening's operating. The only comfort they had was when, occasionally, the sun shone. The schedule and results came out as follows: July 29, Radnorshire, 70 stations worked; July 30, Breconshire, 66S; July 31, Carmarthenshire, 54S; August 1, Pembrokeshire, 30S; August 2, Cardiganshire, 58S; and August 3, Merioneth, 50 stations worked. This makes a total of 328 contacts for the six nights' work—and every single one was QSL'd by the end of the trip! To avoid the wearisome business of card filling after it was all over, QSL's were made out and posted as they went along—actually, they ran out of cards and

had to arrange for a fresh supply to be sent them *poste restante* at Dolgelly! Many of the recipients who have written in this time comment not only on the pleasure of getting their cards so quickly, but also on the high standard of operating by G3BA/G4LU—they certainly showed how it should be done. Both are, of course, very experienced operators, and this always tells under difficult or trying conditions.

There is not the space here to do this marathon effort full justice—but while G3BA/G4LU have earned the sincere thanks and admiration of so many VHF operators, we also know that they had a good time, in spite of the discomforts and the hazards; and G4LU remarks that they were still good friends at the end of it!

GM3IUB/P, September DX-Pedition

The Birmingham University group will start out on September 17, working from Cumberland that evening as G3IUB/P, and then on through the Lowlands of Scotland, making one-night stands in each of *nine* GM counties, from Lanark on the 18th, round to Roxburgh on the 26th, through Dumfries (19th), Kirkcudbright, Wigtown, Ayr, Midlothian, Berwick and Selkirk (25th). The frequency will be 145-78 mc, modes CW and phone, and operation will be 1830-2200 BST. Schedules can be made *via* G3NAQ (*QTHR*), asking for dates and times (which must be kept to the minute) and enclosing an s.a.e. Skeds cannot be taken after 2130 BST, in view of the close-down at 2200.

This is rather an ambitious undertaking on the part of the Birmingham chaps and will require not only the co-operation of the weather, but also some pretty sound background organisation if all is to go according to plan. Anyway, good luck to them, and may they (and we) also get a break with conditions.

Perseids Meteor Reflections

The Perseids appearance in August did not pass unnoticed by the exponents of the meteor-scatter technique, and some interesting results are reported.

OK2WCG (Brno), one of the dab hands, worked G3CCH (Scunthorpe) by MS on August 12, 0300-0330 GMT; on the 13th, OK2WCG made it with UR2BU (Tartu), 0100-0300, same mode, reports being S25 out and S26 in—the comment by OK2WCG is "Wonderful conds.!"—we should say so. The UR2BU contact produced his 16th country for OK2WCG, who has now had a total of ten QSO's, with seven countries, by MS. Though he has worked a number of G's *via* Aurora (and some, incidentally, have never QSL'd), many more have been heard, including G13GXP and G13OFT (by *Ar*); OK2WCG says he cannot understand why he could not raise them. He runs 800 watts to a pair of 4-125A's, into an 11-ele Yagi, and the converter is a 6CW4 CC job; frequency 144-412 mc. Now, OK2WCG wants MS schedules for the Geminids appearance in December, preferably with stations in EI, GC, GD and GI. (He can be reached by direct mail through A.J.D.)

Incidentally, though the OK2WCG callsign looks unfamiliar, he was previously OK2VCG and then OK2BDO; so, if you owe a card to any of these, Ivo would be glad to have it! He adds that he is getting ready for operation on 430 and 1290 mc, with plans for EME (earth-moon-earth) work on those bands—and he mentions that his collaborator in all this is OK2LG, who would also like MS schedules with U.K. stations.

Next is a letter from G3CCH (Scunthorpe), reporting his MS contact with OK2WCG, and the fact that though he heard SP5SM and SM5ADZ, there was no sign of UR2BU, with whom G3CCH also had a schedule. An interesting experience for G3CCH was to hear G3LTF by meteor backscatter, while the latter was calling UR2BU on his own sked; this was with the two G-stn. aerials aimed at the same meteor area some 600 miles away; G3CCH says this suggests that poorly-sited stations could work over shorter distances in spite of obstructions which would make tropospheric contacts difficult or impossible, e.g. by meteor backscatter,

SEVENTY CENTIMETRES

ALL-TIME COUNTIES WORKED

Starting Figure, 4

Worked	Station
38	G2XV
30	G3JMA, G3KEQ, G6NF
29	G2CIW
28	G3HAZ, G3HBW, G3NNG, G5YV
27	G3JWQ,
26	G3KPT, GW2ADZ
25	G3LHA
23	G3BKQ, G6NB
21	G3IOO
20	G3LQR, G3LTF
17	G3BA, G3JHM/A, G3MPS
16	G2DDD, G3MED
15	G2OI, G4RO
14	G2HDZ, G3FAN, G5UM
13	G6XA
12	G5BD
11	G3AYC, G3BYY, GW3ATM
10	G3HWR, G3IRW, G5DS
9	G5QA
7	G2HDY, G3JHM
6	G3KHA, G3NJO/T, G3WW
5	G3FUL, G3IRA, G3IUD, G3JHM, G5ML
4	G3JGY

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

G/GM working should be a feasible proposition. In other words, you use the meteor trail as you would the auroral curtain. But, as G3CCH says, for MS the emphasis is on the "right equipment"—which means plenty of power, with a high-gain beam; very accurate frequency setting, and highly stable signals; and, of course, a really good receiver. The other necessary ingredients are perseverance and luck! G3CCH himself seems to have all these *desiderata*!

The Centimetric QSO's

Last month we were able to report the first G2DDD/G3FEX results on the 1296 mc band. Since then, various other interesting things have happened. G3FEX/P, from a local hill-top, has worked G3FP in Thornton Heath, Sy., also on 23 centimetres, the distance being about 40 miles; a little later on the same day, August 12, he pushed on to G8AL (Chingford, Essex) at 58 miles. Signal levels were good, at R5 both ways. CW and phone being used, with crystal controlled gear and only a 16in. dish at the G3FEX/P end. The 70-centimetre band was used for cross-talk in setting up the circuit, and the proceedings were put on tape by G3FP, working at his base QTH.

Even more remarkable centimetric results have been turned in by G3IUD/G3NLZ. They are on a band many of us hardly know we've got—12 centimetres, or 2400 mc. G3IUD of Wilmslow, Ches., has worked G3NLZ of Manchester over a distance of 80 miles! At the moment of writing, we have no exact details, but presumably the QSO was set up over a line-of-sight path across high ground, because the QTH-to-QTH distance is a good deal less than 80 miles. At any rate, a 17in. paraboloid was used at each end, and the phone signal was S8 both ways, the radiated power being in terms of milliwatts only.

There are new records involved in these centimetric results, but we must get the technical facts established before they are written into the history. What is meant by this is that in addition to time, date, frequency and signal strength—all of which we accept and are

glad to know and to report—we also need some fairly full details as to apparatus used and, in the case of centimetric contacts over line-of-sight paths, geographical pin-points, so that distances can be checked and the path contour examined. What is meant by this is that by taking the appropriate gear up to the top of Snowdon, say, all sorts of things could be achieved on the centimetric bands (in fact, they have been) by pre-arrangement and a reliable cross-talk channel. We know what the result should be before the effort is made!

In Amateur Radio, what we are primarily interested in is point-to-point communication—which means working from your shack at home to your chum in his own back bedroom, wherever these two locations may be. By this token, therefore, what we are really concerned about on the UHF front

is QTH-to-QTH contacts, as have been achieved on 23cm. by G2DDD/G3FEX.

Some of the Gleanings

G3NJO/T is near Diss, Norfolk, and has worked about a dozen stations in 6 counties on the 430 mc band; he mentions G3LQR as his "guiding light." G2CIW (Birmingham) goes up two on the same band, having worked G3LHA/P in Rutland and Northants. And Gerry, G2XV (Cambridge), still firmly at the top of the 70 cm. All-Time, worked G3ILD (Co. Durham) for a new one—he says that G3ILD is putting out a terrific signal on 430 mc. G3MTI (Malvern) reports that he is still mobile-only, and converting for 70-cm. /M, but says that come the winter he will be back on two metres from the base QTH. EI2W/GI3FJA are testing the 430 mc path between Dublin



G5PP (Coventry) with his slot-fed array, as used /M/P. The photograph was taken at the Mull of Kintyre, Argyllshire, when G5PP/P was working GM2UU on two metres.

and Belfast, Harry's frequency being 433.186 mc.

G3JMA (Harlow) reports 70 cm. contacts with G3100 (Oswestry) and G3ILD—and he confirms what G2XV says about the latter's signal.

G3LHA/P on 430 mc. from Coventry, has been giving Northants, Rutland and Glos., about a dozen contacts having been made in the course of three outings. Ray says that before the winter he will make similar trips to at least five other counties; the gear he takes with him consists of a slot-fed 8/8 put up to 16ft., a G2DD-type CC converter (see SHORT WAVE MAGAZINE, March, 1953), the Tx running 18w. in a QQV03-20A PA. G3LHA has now worked 100 different stations on 70 cm. from the home QTH, and reports regular Midlands activity, especially after 6.0 p.m. on Sundays, when about nine stations in the district are on. All very interesting and encouraging—and probably rather surprising for those who imagine 430 mc is a dead band.

Looking now at two metres, Harry of EI2W informs us that EI9AC (Donegal) is on 144.2 mc; that EI3S (Dublin) is on again, 145.5 mc; and that GD3IWP is "a terrific signal (ON4BZ to note!)" EI2W also reports very good signals from the expedition stations GW3AOS/M. GW4LU

/3BA and GW3FRV/3IGM; he remarks that G3FZL and G5MA are getting into Dublin at great strength, but are not responding to calls! *Tut, tut...* the bad lads.

GW3MFY (Bridgend) gains several more for the Counties table, and has worked EI2A for a new one. G3NPF (Southend) now has 143S worked, remarking that beams are only turned his way when the EU's are getting into the U.K. G3NUE (Worcester) says that "an interesting sound" on two metres was G3LTF and his high-speed Morse on the Perseids MS tests. He confirms that early-morning conditions have been good at times, with the beacons coming in well; and G3OJY (Penzance) has been a strong signal, but unraisable. G3NUE has an ingenious auto-keyer device, which amounts to a 1 kc carrier shift (HF of 144.26 mc) obtained by keying across a 300 μ F condenser in series with the 6 mc xtal in the Tx; the keying is done by means of a suitably cut celluloid disc rotated by a small motor, the indentations actuating a spring-set taken from a relay; this device is in continuous operation during phone QSO's, the idea being to give distant stations an identification; G3NUE says that the slight carrier shift does not affect the phone output, the keying only being heard when the distant station's BFO is in. He would like reports (from distant stations) on its effectiveness.

G3BOC (Willaston) is one of the many to comment approvingly on the GW4LU/3BA effort, and says that though he worked them in the difficult Welsh counties, he has yet to get a QSO with Devon or Cornwall. G3GWL (Coleshill) goes up in the annual, and G2BHN (Yeovil) likewise moves up, with 197S now worked; he had an interesting duplex three-way involving G2BAT and G2BHW.

G5AM (Witnesham, Suffolk) reports that he is pretty active again on two metres, but has not worked any DX—very few of us have! Harold, G5YV (Leeds) managed to squeeze out another county, in the shape of GW3BA/P for Carmarthen, and is now at 84C in the All-Time; and Bill, G6NB (Brill, Bucks.) shares that hot seat with him, having worked the Sark

and Scilly Is. expeditions, and EI4BC/M. G2DHP/P has been active from Somerset, with a number of good QSO's, and is quietly compiling a separate /P score for the tables.

G5MA (Great Bookham, Sy.) reports a good month, and in his DX list appears F9EA/M, as well as F8GH and EI, GD, GI and GM—and Bob also got GC3PBR/A on Sark, putting him at 80C in the All-time. However, during August his schedule with GD3UB had only produced one contact in 14 nights.

G3PJK (Nr. Manchester) forwards scores for the 4-metre table. G3JMA reports a /P outing into East Yorks. with G3FCY and G5HB, when some 26S were worked from near Hull, including a number in the London area. G3OJY (Penzance) is undoubtedly the most active of the group down there, and provides us with a lot of very useful incidental information; he also explains how the local site factor could affect his reception of signals from the London area, even though he may be getting out well.

The Tabular Matter

Final placings for the 1961-'62 Annual will appear here next month—this is of course being written before August 31, the closing date—so please send in your final score by the September deadline. And, of course, the new Annual, 1962-'63, opened w.e.f. September 1, for which we shall be glad to have claims in the usual way; this Table could be started in October if enough claims come in—which means if conditions improved.

As a matter of fact, as this was going down, conditions were improving, very noticeably, and at the moment of writing, the feeling in A.J.D.'s old bones is that an EDX opening is on the way.

And by roughly when you read this, A.J.D. will probably be bending those bones about a bit, in a 28-tonner down the Channel, making for the area of GC... but all being well, we shall be back with you on October 5, for which the closing date must be **September 19 latest**, to the usual QTH. So, till then, *73 de A.J.D.*

FOUR METRES

ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8
From Home QTH Only

Worked	Station
26	G3EHY
22	G5FK
17	G3JHM/A
16	G3OHH
13	G3BNL
12	G3OKJ, G5DS
9	G3NUE, G3PJK
8	G3AYT

This new Table will record Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required.

Miscellany

INCIDENTAL INFORMATION, AND ITEMS OF TOPICAL INTEREST

(Almost anything can appear under this title)

Westinghouse have announced a new 5 kW (output) transmitter, operating in the VLF, LF and MF spectrum, which is wholly "solid-state" and uses no valves at all. Efficiency is said to be better than 90 per cent, and the whole thing is in a box 36 in. high, 22 in. wide and 18 in. deep.

(*"Collector and Emitter"*, Oklahoma)

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"My stony heart warmed to a man I met in a bar the other day. After some desultory conversation about books, reading, motor-cycling, art and so on, I asked him what he did for a living. 'Well,' he said, 'I suppose I'm what you might call a moron.'"

(*"Contact"*, Slade Radio Society)

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Kilowatt RF transistors are described by Don Stoner, W6TNS, in the August issue of *CQ*. Quoted figures for one "triple diffused mesa" type are: collector current, 10 amps; saturation resistance, 0.2 ohms; *alpha* cut-off frequency, 50 mc; and dissipation, 125 watts. A further figure of interest is the price—155 dollars—but these are early days.

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"I can't even operate mobile now when I fetch the XYL back from church . . . last time I did, they copied me at 9-plus on the electronic organ during the outgoing voluntary. Boy, you should have seen the black looks I got as the congregation came out."

(W8--- on 14 mc band)

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The transistor and its associated components are far too large and clumsy to last long in the world of communications . . . the new name to remember is the *solion*, a low-powered electro-chemical device which is already being used for a variety of purposes. Audio amplifiers, integrators, transducers . . . all these functions can be performed by a solion tetrode. Electrodes, electrolyte (iodine and potassium iodide) and diffusion barriers are all sealed into a small capsule. Current flowing between the electrodes is ohmic below a certain figure, and independent of voltage above that—and stability is claimed to be higher than that of transistors or valves.

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Sylvania are advertising (in *QST*, among other journals) a gas laser which generates continuous waves and is easily "pumped" by an RF generator operating around 27 mc. Output is in a narrow band

of the infra-red region, "with a band-width sufficient to accommodate as much information as all radio channels combined"—and the signal can be keyed or modulated. On the reception side a microwave phototube is available, which, with a laser as local oscillator, will act as a mixer and IF section and will demodulate coherent light signals over a given band-width. The possibility of *amateur operation* on such frequencies is mentioned in the advertisement.

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The Russian journal *Radio* (reports K3CUI in *QST*) now carries an SSB column, in which it is stated that the rules for the R6K (the Russian WAC) insist that all applications for this award must be on SSB. Incidentally, many European scientific journals (including *SHORT WAVE MAGAZINE*) find their way through the Iron Curtain in small numbers, after which they are censored and extensively photostat'ed—and then circulated to those who are deemed worthy of seeing them. One immediate result of this has been a sudden and increasing demand for our various Certificates and Awards, all made in English via the "Awards Manager, USSR, Box 88, Moscow." The censorship of scientific journals manifests itself in several curious ways, from which one can gain quite an insight into Russian policy . . . and the picture that emerges is not too pleasant.

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Last month's invitation to send in items of interest to this feature (see p.331, August) was misunderstood by one reader, who rode a very special hobby-horse (the alleged inadequate reporting of mobile rallies) and complained that one recent issue contained *six whole pages* devoted to SWL's, remarking "if you are so short of *padding matter* . . ." We wonder what our enthusiastic SWL following would think of that—they spend a lot of time demanding more space in *every* issue. And, anyway, why should anyone, ever, think that "*padding matter*" was necessary to fill these pages? The difficulty is to get everything in!

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Two amateurs=one QSO; three amateurs=one net; four amateurs=QRM!

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Those who use QSL's printed by their local publicity departments, or by firms in the trade, should make sure to put their own address on before mailing

them. One Wolverhampton amateur (who did not) had a return card addressed to "The Town Hall."

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CR8AB, working roughly 90 stations a day from Timor, was heard to ask "How many USA stations are there?" Perhaps someone gave him the correct answer (244,000 according to the latest *Call Book*) and that is why he went QRT.

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And then there was the innocent bystander who thought that International Ham-Hop was a new kind of dance and a possible successor to The Twist . . .

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Our licence states that it is limited to the reception of amateur and authorised broadcasting stations. A reader has brought up the interesting point of what is an "authorised" broadcasting station . . . would that include pirate medium-wave commercials operating from ships outside territorial waters? He also makes the point that SWL's should not copy commercial automatic Morse transmissions for the purpose of practice, neither can any of us listen

outside the bands to check on commercial occupancy. As explained in last month's Editorial, this apparently absurd regulation is forced on us, not by the GPO or even by the Government, but by international agreement at the 1959 Geneva ITU Convention, to which this country was a signatory. All sorts of anomalies can arise, and a lot of discretion would be called for in any case apparently involving a breach of the regulation. (How does one instantly shut one's ears to fish-fone, for instance?)

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"Here we are, grown men most of us, sometimes spending hours bawling into a microphone to attract the attention of someone thousands of miles away. If we do contact him, we follow up by sending a pretty postcard, then wait anxiously for weeks for another pretty (sometimes) postcard to come back. Having collected several hundred such cards, we then parcel them up and mail them to some foreign country, all the time getting ulcers wondering if they will ever be returned. After months, back they come, together with a larger piece of paper, for which we can buy a frame and hang it on the wall!"

(Letter from G3FPK)

OUTPUT STAGE NOISE LIMITER

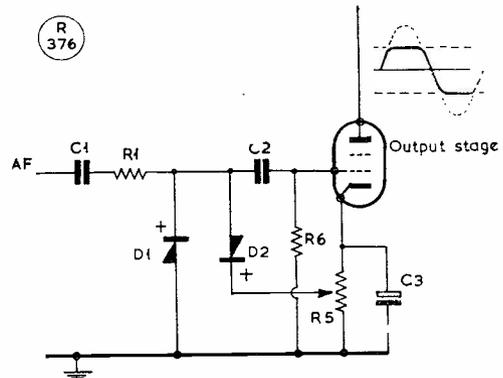
USING SEMI-CONDUCTOR DIODES

IN the March 1960 issue of *SHORT WAVE MAGAZINE* there appeared an unusual type of Audio Noise Limiter, working at the output end of the receiver, and giving both negative and positive peak clipping, at controllable level. This circuit (see p.41, March 1960) involved the use of a 6AL5, or similar double-diode, to produce the clipping effect.

A reader in Brighton has successfully adapted the circuit to use semi-conductor diodes instead of the double-diode valve—with a saving in space and components, as well as simplification. His arrangement is shown herewith, from which it can be seen that the original principle has been preserved. As before, the degree of clipping is controlled by R5, the wave-shape at the anode of the output stage being as indicated—spiky noises are cut right off, and general noise is held down to the peak audio level, as set by R5 and any preceding audio gain control.

Looking at the original circuit in the March 1960 issue, the items saved, in addition to the 6AL5 double-diode, are resistors R2, R3 and R4. The diodes now used are OA81's, and the other values are as follows: C1, C2, .003-.01 μ F; C3, .01 μ F, or as fitted; R1, 50K; R5, 500 ohms, clip-level control; R6, grid return resistor as fitted.

The limiter can precede the output stage proper, and some variation in values may be called for with particular receivers. While the same element



The modification suggested by G. Docwra (Brighton) using two OA81's instead of the double-diode valve in the original circuit on p. 41 of the March 1960 issue. The action is the same, the results just as good and, as before, the clipping level is directly controlled on R5.

numbering has been used as in the original circuit, which may be referred to for fuller information, that shown here could be tried even if the March 1960 issue of *SHORT WAVE MAGAZINE* happens not to be available for reference.

CORRECTION—"R.109A SURPLUS RECEIVER"

In this article, in the August issue, the value of R2 should have been given as 12 ohms, rated at about 10w. The actual value will depend somewhat on the output voltage under load.

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 U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

EI2AL, L. Powderly, 25 Victoria Road, Clontarf, Dublin, 3. (Tel.: Dublin 337995.)

EI3AL, T. P. Crowley, Site No. 7, Johnstown Road, Cabinteely, Co. Dublin.

G13KYZ, D. J. Clarke (*ex-VS1KQ*), c/o Sgts' Mess, R.A.F. Station, Ballykelly, Limavady, Co. Londonderry.

G3MDA, D. W. Beeden (*ex-VS1KP*), c/o Sgts' Mess, R.A.F. Station, St. Mawgan, Newquay, Cornwall.

G3MHE, V. J. Tointon (*ex-VS1KT*), c/o Sgts' Mess, R.A.F. Station, St. Mawgan, Newquay, Cornwall.

G13PWD, S. Williams, 37 Hazel Avenue, Dunmurry, Co. Antrim.

G3PZF, G. N. Dale, 18 Lezayre Road, Green Street Green, Orpington, Kent. (Tel.: Farnborough 54512.)

G3PZI, M. J. Whale, 31 Upfield, Croydon, Surrey.

G3RAB, Electronics Club, Collyer's School, Horsham, Sussex. (Tel.: Horsham 5306.)

G3RAL, Loughborough and District Radio Club, c/o Corporation Hotel, Wharnccliffe Road, Loughborough, Leics.

G3RBF, A. C. West, 1 Royal Close, Daventry, Northants.

G3RBH, J. A. Callow, 26 Ormesby Road, Normanby, Middlesbrough, Yorkshire.

G3RBJ, A. N. Payne, 15 Darnley Avenue, Horfield, Bristol, 7.

GM3RBO, I. G. Kerr, 77 Murraysgate Crescent, Whitburn, West Lothian.

G3RCA, T. O. Austin, 36 Gidlow Lane, Wigan, Lancs.

G13RCB, N. Kingsley, Mingarry, Glen Road, Craigavad, Co. Down.

G13RCH, J. J. Glendinning, 41 The Mount, Belfast, 5.

G3RCZ, G. T. Thompson, 134 Royal Oak Road, Baguley, Wythenshawe, Manchester, 23, Lancs. (Tel.: Wythenshawe 2897.)

G3RDC, A. Wood, Curlew Cottage, Cliff Road, Pett Level, Hastings, Sussex.

G3RDJ, R. W. Attenborough, Beech House, Chapel Lane, Epperstone, Notts. (Tel.: Woodborough 428.)

G3RDQ, D. C. Griffiths, 7 Chatsworth Road, Cheam, Surrey. (Tel.: Fairlands 5929.)

G3RDS, D. Moore, 10 Loftos Avenue, Blackpool, Lancs.

G3REN, V. F. Webb, 23 Oxford Road, Stanford-le-Hope, Essex.

CHANGE OF ADDRESS

G3AFC, P. Beresford, 186 Coombfield Drive, Darenth, Dartford, Kent.

G3BGJ, M. A. Sandys, 1a Blenheim Road, London, W.4.

G3FMN, T. W. W. Dearlove, 1 Fairlands Close, Velmead Road, Fleet, Hants.

G3GEW, H. Jordan, Avenis, France Lynch, Stroud, Glos.

G3GWD, M. C. Pavely (*ex-VQ4CW*), 11 Gwydor Road, Elmers End, Beckenham, Kent. (Tel.: BECKENHAM 3163.)

G3HHD, T. J. Hayward, Cedarwood, Middle Street, Nazeing, Essex.

G3HLV, J. A. Martin, 18 Cornwall Road, St. Albans, Herts.

G13JKE, G. W. Thomas (*ex-GW3JKE*), 7 Kilmakee Park, Gilnahirk, Belfast, 5.

G3KAJ, D. Jagger, 3 Hoad Terrace, Ulverston, Lancs. (Tel.: Ulverston 2553.)

G3KLL, B. Mercer, Hill Top Cottage, Hill Top, Delph, Oldham, Yorkshire.

G3KRD, W. J. Northcott (*DL2AR*), c/o Sgts' Mess, School of Artillery, Larkhill, Wilts.

G3LEV, A. W. Parker, No. 6 Flat, 13 Hopton Road, Streatham, London, S.W.16.

G3LGW, D. G. Spencer, Paladyn, Lyons Hall Road, Bocking, Braintree, Essex.

G3LUG, S. G. Gorham, 49 Lyndhurst Avenue, Rainham, Gillingham, Kent.

G3LWM, J. D. Harris, 107 Cozens Road, Ware, Herts.

G3LWS, E. H. Ross, 5B4CZ, P.O. Box 216, Famagusta, Cyprus.

GM3LYY, J. T. A. Johnston, Strathkyle, Munloch, Ross-shire.

G3MGC, R. M. Russell, 16 Barn Field Avenue, Forest Green, Nailsworth, Stroud, Glos.

G3MIX, F. L. Parsons, 96 Blackamoore Lane, Maidenhead, Berks.

G3MPM, D. C. Jewell, 49 Western Crescent, Boultham Park, Lincoln.

G3NAI, R. E. Norman, 9 Howley Grange Road, Halesowen (Worcs.), Birmingham.

G3NCE, R. A. Wilson, 3 Fire Service Headquarters, Pilgrim Street, Newcastle-upon-Tyne, 1.

G3OKP, R. T. Axtell, 24 Ferrers Avenue, West Drayton, Middlesex.

GM3PAK, M. G. Senior, 23 Marchmont Crescent, Edinburgh, 9.

G3PBI, A. J. Davies, 40 Spring Grove, Loughton, Essex.

G3PBO, R. Collins, 27 Downer Road North, Thundersley, Essex.

G3PBR, A. L. Green, 2 Watford Heath Farm, Watford Heath, Watford, Herts.

G3PCL, W. H. Ward, 8 Melrose Avenue, Crosby, Liverpool, 23.

G3PFL, W. J. Perkins, 51 Parkstone Avenue, Emerson Park, Hornchurch, Essex.

G3PVI, D. J. Gibbs, 47 Adur Avenue, Shoreham-by-Sea, Sussex.

G8FI, H. Hargreaves, 61 Exchange Street, Darwen, Blackburn, Lancs.

AMENDMENT

G3EMO, H. Ward, 24 Manor Way, Woolton, Liverpool, 25.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for October Issue : September 14)

(Address all reports for this feature to "Club Secretary")

ONE of the most rewarding of all Club operations is the active participation in a local Show of some sort—usually possible once a year. This month we spotlight the achievement of **Liverpool**, whose annual Amateur Radio exhibition formed a part of the very large Liverpool Show. The Show itself attracted over 103,000 visitors, and the Club's stand was packed out for the three days (July 19-21). GB2LS was operating throughout the period, and made 376 contacts with 42 countries. Home-built gear, radio-controlled models and many other aspects of the hobby were demonstrated; the public seemed very impressed, and the *Liverpool Echo* commented under the headline "Liverpool Show Gains World Acclaim—Through Amateur Radio."

And a very worthwhile dividend . . . the Club enrolled no fewer than thirty new members during those three days. This might be noted with profit by some of those Clubs which, despite their situation in quite populous areas, fail to add significantly to their membership.

Veteran Retires

For more than fifteen years your "Club Secretary" has been typing the name "C. N. Smart" against the club name **Slade**, until it has become almost a reflex action. But the best of friends must part, and now we hear that Charles Smart has decided to retire from office and become an ordinary member. Slade's comment, in their journal *Contact* is that he "has set a standard of efficiency and application to duty that has become a byword among our members, and indeed among many other radio societies." A glowing, but deserved tribute . . . and one which reminds us that we once printed a few sentences of advice to Clubs, to this effect: "If you have a good secretary, for goodness sake hold on to him through thick and thin. He may be the Club's most valuable asset, and you may not find another like him." So our salutes to C. N. Smart—and also to his successor, whoever he is going to be . . . and may he have at least fifteen happy years with Slade, one of the strongest of the Midlands group of Clubs.

And now, MCC! The panel starts the ball rolling for the 17th Annual *Magazine Club Contest*.

CLUB ACTIVITY REPORTS

Better organisation, increased training and increasing membership—that is the report from **Chesham**, where the technically-qualified non-amateurs attend

every week to help with training, and then become dedicated amateurs themselves. One recently-joined member gained his R.A.E. at the age of 60, with no previous technical or mathematical knowledge, and is now on the way with his Morse. This is a striking example of what can be achieved through and by the help of a local Club.

The D/F contest held by **Clifton** on July 21-22 was won by G3PJB, and four other teams found the transmitter; on July 29 five stations took part in a field day event on four bands, and the highest scorer was G3JKY/P. Booked for September 16—a low-power transmitting field day.

Cray Valley meet on the first Thursday and the fourth Tuesday of each month. At the request of a local Scout group, a station was put on the air at their fête, and a number of contacts made on Top Band.

The accent is on Transistors at **Derby**, where they will discuss the theory on September 12 and the practice on the 19th; on the 26th there is the sixth D/F League fixture (the final) and on October 3 the monthly surplus sale.

Three members out of four passed their R.A.E., report **Dudley**, who meet fortnightly at the Priory Hall. On September 14 (8 p.m.) they will have a talk on mobile activities by G6GR and G8CK, and on the 28th there is a Radio Quiz—SWL's v. Amateurs (Quizmaster G2DTQ).

Acton, Brentford & Chiswick, who meet on September 18 at the AEU Club, 66 High Road, Chiswick, will be hearing from Jim Barfoot about Transistorised Radio Control. **Burslem** will meet on September 19, when G3EHM will be talking on A Home Built Two-metre Rig. Prospective members will be welcome.

Cambridge, whose picnic at Houghton Mill attracted about 100 people and was well covered by the local Press, hold a second picnic (same place) on September 16. They have now settled down again to their regular Friday meetings at their headquarters in Corporation Yard, Victoria Road, plus a Wednesday meeting of the junior section. The local Education Committee have provided a fine assortment of tools for the use of the youngsters. The Club Tx is licensed as G3PKF.

Halifax are booked for Ragchew meetings on September 18 and October 16; in between them is the AGM, on October 2. **Hastings** have a talk by G6QB on "DX and How to Hear It" on September

11, and a description by G3MQT of his Transistorised All-Band Mobile Receiver, on September 25. (Meetings at 33 Cambridge Road, 7.30 p.m., and all holiday visitors welcome.)

At the AGM of **Lothians**, GM3LCP was elected president for the coming year. The new season will open on September 13 in the Board Room of the YMCA, 14 South St. Andrew Street, Edinburgh 2, with the presidential address; normal meetings thereafter on the second and fourth Thursdays.

Another coming AGM is that of **Midland** (September 18) which will be combined with an exhibition of home-built gear; this will be at the Birmingham and Midland Institute, Paradise Street. **Loughton**, at their last meeting, on August 17, heard a talk on Construction and Operation of Oscilloscopes by G3HWG. **Morecambe** will meet for a Junk Sale on September 5, and their October meeting (on the 3rd) will include a talk by A GPO engineer on The Problem of Interference.

Events held during the holiday season by **Northern Heights** included a "Pea and Pie Supper" in combination with the Manchester Radio Society, and the operation of an JA station from Warley Fête (including the driving of a mobile in the procession). Next two meetings are on September 12 (Simple Fault-Finding, by G3OGV) and September 26 (Ragchew).

North Kent will be meeting on September 13 with a visiting lecturer from Mallory Batteries, and on the 27th to hear John Black's talk on Scrambler Circuits. (Both in the Congregational Hall, Clock Tower, Bexleyheath, 8 p.m.)

The **Leys Amateur Radio Club** (Leys School) put on their annual show of equipment on Speech Day, and monitored all bands from Two to One-Sixty. (They sent photographs, but unfortunately not sharp enough for reproduction.) Receivers, ancillary equipment and so on were on view, with a looped tape describing the exhibit running continuously into a Motek recorder. Next year the two SWL's responsible for the exhibit hope that they will both have their



To coincide with the Stoke Mandeville Games effort over July 22-29, the Rhondda Valley Radio Society established GB3RCH at the Radyr Cheshire Homes, near Cardiff. In this group we see a number of prominent GW's, including (on the left) GW3PPF, GW4FW, GW2FKW and GW3PHH; and on right GW3NWS, GW3ITO, GW2FOF and GW3LII, with several SWL supporters. The transmitter was a Gelofo VFO-6146 PA job modulated by a pair of 807's, running 60w, and covering 10-80m. Receivers were a Gelofo 209 and an R.1155. A solid OSO was duly achieved with GB3SMG (the Stoke Mandeville station) on 80m. phone, and SWL Cliff Jones (in the wheel-chair) had an interesting week through the keenness and co-operation of the Rhondda Valley group.

tickets and will be able to demonstrate the transmitting side.

WAMRAC is the World Association of Methodist Radio Amateurs and Clubs, whose activities, naturally, are mainly social. A Circular Letter is published, and a "Wamfest" is being held in London on October 4. Nets are also organised (the G-Net is on Eighty); and their register of members aims to list all amateurs in the world who belong to the Methodist Church (see panel for secretary's QTH).

Wessex meet on the first Monday of every month at the Cricketers' Arms, Windham Road, Bourne-mouth (7.45 p.m.). October 1 is the date for a Bring-and-Buy Sale; November 5 for a film and lecture on London Transport. Morse classes and ragchews are held on other Mondays, at members' homes.

North Notts will have opened their new season with the AGM, on the day before publication date. Recent meetings have included a talk on Capacitors, by G3IOU, a Quiz Night, and a lecture on waveguide techniques and 3-cm. work. The club now holds the call G3RCW and is on Top Band most Tuesday and Thursday evenings.

Purley will be seeing a 90-minute programme of films (by G3NDF) on September 7; on the 21st G3DQY will talk about (and demonstrate) Pocket Paging Systems. **Southgate** report an alteration in their programme, and September 13 will now be the date for a talk on Model Control, with the Army Radio talk on October 11.

The annual display of members' apparatus will be staged by **Slade** on September 21, when the

THE SEVENTEENTH MCC

Dates are November 17/18 1700-2000 GMT each day, one week-end only. General form of Contest as last year. Rules and serial-number allocations in next issue. All clubs who have taken part in any of last three years' MCC will be allocated serial numbers; others wishing to participate this year should apply for inclusion. Full 17th MCC details in October issue.

competitions for the "Craftsman's Cup" and the "Enterprise Trophy" will be held.

Southampton had a talk by G3MDH on Frequency Measurement for their August event; the

Names and Addresses of Club Secretaries reporting in this issue:

ABERDEEN: G. A. Roberts, GM3NOV, 111 Great Southern Road, Aberdeen.
 ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, W.3.
 BRIDLINGTON: I. C. Purves, 10 Meadow Road, Bridlington.
 BURY: C. Turner, G8NL, 56 Sunny Bower, Tottington, Bury, Lancs.
 CAMBRIDGE: H. Lowe, 34a Verulam Way, Cambridge.
 CHELTENHAM: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham.
 CHESHAM: Capt. C. G. Stephenson, G3CLJ, 21 Lynton Road, Chesham.
 CLIFTON: E. Godsmark, G3IWL, 211 Manwood Road, S.E.4.
 CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley.
 CRAY VALLEY: S. W. Coursey, G3JJC, 49 Dulverton Road, London, S.E.9.
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23.
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
 DUDLEY: D. H. W. Pratt, G3MHS, 23 Kent Street, Upper Gornal, Dudley.
 ENFIELD: V. Croucher, G3AFY, 15 Nelson Road, London, N.15.
 EXETER: S. Line, 46 Roseland Crescent, Heavitree, Exeter.
 GUILDFORD: D. Hobden, 121 Great Goodwin Drive, Guildford.
 HALIFAX: G. Sunter, 24 Booth Fold, Luddenden Foot, Halifax.
 HARROW: A. C. W. Biddell, G3GNM, 114 Kingshill Avenue, Kenton, Middx.
 HASTINGS: W. E. Thompson, G3MQT, 8 Coventry Road, St. Leonards-on-Sea.
 ISLE OF WIGHT: J. Smith, 7 Browlow Road, Lake, Sandown, I.O.W.
 LEYS: T. Eyre, 22 Bents Drive, Sheffield 11.
 LIVERPOOL: H. James, G3MCN, 448 East Prescott Road, Liverpool 14.
 LOTHIANS: W. T. Sutherland, GM3JWS, 47 Great King Street, Edinburgh 3.
 LOUGHBOROUGH: M. Y. Hawkins, G3FIG, 22 Sibley Road, Barrow-on-Soar, Leics.
 LOUGHTON: J. A. Atkinson, G3OPA, 6 Rochford Avenue, Loughton.
 MELTON MOWBRAY: D. W. Lilley, G3FDF, 23 Melton Road, Asfordby Hill, Melton Mowbray.
 MIDLAND: C. J. Haycock, G3JDI, 360 Portland Road, Birmingham 17.
 MORECAMBE: K. J. Singleton, G3NLM, 8 Westmoor Grove, Heysham.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.
 NORTH NOTTS: E. W. Badger, G3OZN, 20 Tennyson Drive, Worksop.
 NORTH KENT: B. J. Reynolds, G3ONR, 49 Station Road, Crayford.
 PLYMOUTH: R. Hooper, 2 Chestnut Road, Peverell, Plymouth.
 PURLEY: E. R. Honeywood, G3GKF, 105 Whytecliffe Road, Purley.
 RAIBC: W. E. Harris, G3DPH, 4 Glanville Place, Kesgrave, Ipswich.
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.
 SCOTLAND: A. Barnes, GM3LTB, 7 South Park Terrace, Glasgow.
 SLADE: C. N. Smart, 110 Woolmore Road, Birmingham 23.
 SOUTHGATE: R. W. Howe, G3PLB, 162 Victoria Road, London, N.22.
 SOUTH HANTS: G. J. Meikle, G3NIM, 34 Victoria Road, Netley Abbey.
 SUTTON & CHEAM: F. J. Harris, G2BOF, 143 Collingwood Road, Sutton.
 TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.
 WAMRAC: Rev. A. Shepherd, G3NGF, 121 Main Street, Asfordby, Melton Mowbray, Leics.
 WESSEX: G. J. Fowle, 138 Surrey Road, Branksome, Poole.
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington.
 WOLVERHAMPTON: J. Rickwood, 738 Stafford Road, Fordhouses, Wolverhampton.
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.
 YORK: N. Spivey, G3GWI, 80 Melton Avenue, Clifton, York.

September meeting is on the 8th, in the Lanchester Building of the University (subject not stated). **Torbay** discussed the possible enlargement of their headquarters at the recent AGM, and now announce a 19-week lecture course by G3ABU, starting on September 11 (8 p.m. at Clubroom and each Tuesday thereafter). At their August meeting, G3ABU gave a talk on Aerials and Propagation.

Up at **Wirral** they will have a Junk Sale on September 19, and their AGM on October 3, as well as Junior Section meetings (at 6.30 p.m.) on both days and also on September 16. Re-decoration has been carried out during August, but the new season will be in full swing from September 6 (the eve of publication).

SSB, Principles and Practices, will be the subject at **Wolverhampton** on September 24. They also meet on September 10, but that meeting is "to be arranged" and no details are given. The club's AGM will be held on October 8.

Yeovil report lots of activity including a tour of Hinkley Point power station, near Bridgwater, and a visit to Taunton for a Mullard film show. There is also great keenness for mobile and portable activity on Sunday mornings, Top Band. Meetings continue every Wednesday at the British Legion Headquarters, 7.30 p.m.

Bury report that G3EJF and his wife G3JZP, who have helped the club for so long, have now moved out of the district. A suitable presentation was made, and Johnny and Jean departed for Catterick (whence we may well be hearing more from them). An R.A.E. class will start in the autumn, if twelve candidates are forthcoming, with G3PVG as instructor; G3MTL will look after the Morse side on Monday and Thursday evenings. See panel for QTH of G8NL, the new secretary.

Exeter held a Junk Sale in August, followed up by a talk on Transistors by G3PZD. Meetings are held on the first Tuesday, at the YMCA, St. David's Hill, 7.30 p.m. **Harrow** will be running their Junk Sale on September 14 and holding a Brains Trust on the 28th; the other Fridays will be practical nights. Here, too, there has been a change of secretary—see panel.

The Radio Club of **Scotland** report four recent meetings and mention that they now meet every Friday, 8 p.m. at St. Andrew's Hall, Glasgow. Subjects covered by the four meetings referred to were Beginners, SSB in the GPO, Nuvistor Converters and Amateur Radio in Sweden (the latter by SM7CJR).

For the next two meetings **York** will be hearing

CLUB PUBLICATIONS RECEIVED

We acknowledge, with thanks, the receipt of the following Club publications: **Reigate** (*Feedback*, July); **Crystal Palace** (*Newsletter*, August); **Hastings** (*Natter-Net Notes*, June/July); **Slade** (*Contact*, July); **WAMRAC** (*Circular Letter*, June and July); **RAIBC**, (*Radial*, August); **Purley** (*Splatter*, August); **Derby** (*Newsletter*, No. 3); **Dudley** (*Local Oscillator*, August); **Enfield** (*Newsletter*, July); **Guildford** (*Monthly Natter*, July); **North Kent** (*Newsletter*, July/August); **Wolverhampton** (*Newsletter*, August); **South Hants** (*QUA*, August).

tape-recorded lectures—concerning Receivers on September 13, and Transmitter Design and TVI on October 11. R.A.E. and Morse instruction will continue on Tuesday evenings.

Embarking on the first stage of their winter programme, **Bridlington** have arranged for their Juniors and SWL's to meet at the headquarters (Sea Cadet Hq, Applegarth Lane) at 7 p.m., before the main meetings, for Basic Radio Theory. The meeting proper is at 7.30 for 8 p.m. On September 12 G3OHT will be talking about Valve Data; on the 19th the secretary covers Colour Photography; and on the 26th G3GBH will discuss a simple crystal-controlled Tx.

Melton Mowbray will hold their AGM on September 20 in the St. John Ambulance Hall, Asfordby Hill; and at the following meeting (October 18) will hear a tape lecture on Transmitter Design and TVI. **Plymouth** propose to start R.A.E. classes again (at Dartmouth Technical College) and the club secretary would like the names of all those interested; the day of the week will be announced later. Support is also wanted for the proposed Dinner and Social Evening, which will not be held until after Christmas.

Sutton and Cheam will meet on September 18 (The Harrow, High Street, Cheam) to hear Tom Withers, G3HGE, on "VHF Equipment." **Aberdeen**, still meeting weekly, will hear about a Linear Amplifier (GM3NOV) on September 7; a Ground Plane Aerial (GM3ALZ) on the 14th; and a Broad Outline of STD (GM3ICS) on the 28th. September 21 is booked as a Ragchew.

Cheltenham ran another "DX-pedition" to some of the rarer Welsh counties, which was very successful. G5BK was also operated from the St. Mark's Flower Show, with the clubroom "open house" to all visitors. The AGM is on September 12, 8 p.m. in the clubroom at St. Mark's Community Centre.

Crawley will be running a Junk Sale (although they call it a "surplus equipment swindle") on September 26. **Reigate** report new call-signs in their midst (now 21 out of a membership of 40); the club has acquired for itself the call G3REI. The third Saturday is still the regular club night, but informal meetings have been arranged for the first Saturday—also at The Tower, Redhill.

Isle of Wight report that they are now meeting on the second and fourth Fridays at the Social Club, Lower St. James's Street, Newport. On August Bank Holiday they operated a station for the Jubilee Show of the Newchurch Horticultural Society; and they are now trying to find suitable premises, so as to set up a permanent station. A twelve-lesson R.A.E. course is available, and there are lectures at all meetings.

Leamington Spa—there is a move to set up a society in this town, and all interested amateurs and SWL's are invited to attend a meeting on September 28, 8 p.m. in the Oddfellows Hall, Warwick Street, to this end.

Loughborough report plenty of activity, with G3IPL and G3XP running Morse classes on Monday evenings (8 p.m.) and a Junk Sale proposed for September 7. In July, on the occasion of the Chief Scout's visit, GB3RAL was operated from Long

Whatton, and made 300 contacts on four bands, with six operators lending a hand.

RADIO AMATEURS' EXAMINATION COURSES OF INSTRUCTION

With reference to the note on p.325 of the August issue of SHORT WAVE MAGAZINE, courses of instruction for those wishing to take the 1963 R.A.E. are being arranged as listed below. In all cases, fees are nominal and inclusive. If your locality is not mentioned here, enquire at the local office of your Education Authority, quoting "City & Guilds Subject No. 55—Radio Amateurs' Examination," as numerous courses are arranged which are only advertised locally.

Barry (Glam.): At the College of Further Education.

Colcot Road, Barry; four hours a week, to include practical work and Morse instruction, Wednesday and Friday evenings. Apply immediately, either to the College or to: E. W. P. Jones, GW3HAW, 58 Westward Rise, Barry.

Bournemouth: At the Bournemouth Municipal College, starting in September. Apply: E. W. Popplewell, Bournemouth Municipal College, Lansdowne.

Bradford: On Wednesday evenings, 7.0-9.0 p.m., at the Technical College, Central Hall, Bradford, 5; lecturer, G3KEP. Further details from the General Office (25763) and registration at Carlton Grammar School, Sept. 10-12, from 7.0 p.m.

Bristol: Course in Morse and R.A.E. Theory, Mondays, 6.45 to 9.15 p.m., at the Bristol Technical College, Ashley Down, Bristol, 7. There is also a more advanced course offered, in Radio Communication, on Wednesdays, 7.0-9.0 p.m. Apply: Head of Department of Electrical Engineering.

Cambridge: At the Chesterton Evening Centre, Gilbert Road. Apply in first instance to the Adult Tutor. Morse instruction is being arranged by the Cambridge Club group.

Devonport: At the Technical College, starting in September. Those interested should get in touch immediately with: R. Hooper, hon. secretary, Plymouth Radio Club, 2 Chestnut Road, Peverell.

Durham: At the Technical College, Framwellgate Moor, Durham City. Apply in the first instance to the Head of the Engineering Dept.

Glasgow: On Tuesdays (Theory) and Thursdays (Morse), 7.0-9.30 p.m., at Allan Glen's School, Montrose St., Glasgow; course fee, 20s. inclusive. Instructors, GM3AXX, GM8MJ and GM6MS. Starting dates, September 11/13, enrolment immediate. Previous knowledge of radio neither assumed nor required.

Halifax: At the Percival Whitley College of Further Education. Apply in the first instance to the College ("attention Mr. Dougherty") or to Mrs. M. I. Shaw, G3OMM, 107 Norfolk Mount, Halifax.

London (Holloway): Organised by the Grafton

Radio Society, at Montem School, Hornsey Road, Holloway, London, N.7, on Mondays, repeated Tuesdays and Wednesdays, R.A.E. Theory 7.0-9.0 p.m., and Morse 9.0-10.0 p.m., commencing September 24; fee, 25s. inclusive. Apply in the first instance to: A. W. H. Wennell, G2CJN, hon. secretary, Grafton Radio Society, 145 Uxendon Hill, Wembley Park, Middlesex.

London (Ilford): At the Ilford Literary Institute, High School, Cranbrook Road, Ilford, on Wednesdays, 7.15-9.15 p.m. (R.A.E. Theory) and Mondays 7.30-9.30 p.m. (Morse); inclusive fee for both courses, 35s.; classes commencing September 24. Enrolment, September 10-13, 7.0-8.30 p.m. These classes have been running for the last 12 years, and more than 240 students have passed the R.A.E. Apply in the first instance, with s.a.e. to: C. H. L. Edwards, G8TL, 28 Morgan Crescent, Theydon Bois, Epping, Essex.

London (Northwood): At the Evening Institute, Potter Street School, Northwood Hills, R.A.E. and Morse courses, starting September 24; enrolment, September 17-19, evenings. Details from G. P. Anderson, G2QY, 16 Warrander Way, Ruislip, Middlesex.

London (Wembley): At the Evening Institute, Copland School, High Road, Wembley, on Monday evenings, Morse (7.0-8.0 p.m.). R.A.E. Theory (8.0-10.0 p.m.). Enrolment at the School, September 17-20, 7.15-9.15 p.m. each evening; classes starting

the week following, under the direction of A. J. Bayliss, G8PD.

Manchester: To be held at Openshaw Technical College, Whitworth Street, Openshaw, commencing at the end of September. Details from: M. Barnsley, G3HZM, Greenways, 11 Cemetery Road, Denton.

Margam (Glam.): At the College of Further Education, starting in September. Apply for details to: H. S. Hughes, GW4CG, hon. secretary, Port Talbot Radio Club, 20 Austin Avenue, Newton, Porthcawl, Glam.

Norwich: At Thorpe Evening Institute, St. Andrews School, Spinney Road, Thorpe St. Andrew, Norwich, on Wednesdays, 7.0-9.30 p.m. commencing September 19; fee, 10s.; enrolment week, September 10, 7.0-9.0 p.m. Further information from: G3IOR, via the Institute. The course is from fundamentals and assumes no prior knowledge of radio.

ZL AMATEUR FREQUENCY ALLOCATIONS

It is not always realised that there are some differences, from Region to Region on the world scale, in amateur frequency allocations. For instance, on Top Band the ZL's are licensed for 1875-1900 kc only; on 80m. their band goes up to 3900 kc: they also have an 11-metre band (26960-27320 kc), and a 6-metre band. 51-53 mc. In other respects, their allocations are the same as for the U.K.

SHORT WAVE (HULL) RADIO

G5GX

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EDDYSTONE 940 ...	125	0	0
EDDYSTONE 840C ...	58	0	0
EDDYSTONE 870A ...	33	0	0

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HALLICRAFTERS S120 ...	35	0	0
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HALLICRAFTERS HT40 TX KIT ...	32	0	0
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MOSLEY CMI. Amateur Bands ...	86	0	0

SECONDHAND EQUIPMENT

HALLICRAFTERS HT 33A. Linear PA. Up to 1 kW.	250	0	0
HALLICRAFTERS HT 37. SSB TX. 80, 40, 20, 15, 10	175	0	0
HALLICRAFTERS SX-100 ...	120	0	0
HALLICRAFTERS SKY CHALLENGER ...	9	19	6
NATIONAL NC 109. General coverage plus Amateur bandspread, complete with Xtal. Cal. ...	84	0	0
NATIONAL NC 188. General coverage plus Amateur bands ...	59	0	0
HEATHKIT 3" SCOPE ...	20	0	0
HEATHKIT ARR. Short Wave Receiver ...	13	10	0
MINIMITTER MR 44 ...	39	0	0
MINIMITTER AMATEUR BAND CONVERTER ...	12	0	0
MINIMITTER PA. Pair TT21's ...	12	0	0
PANDA PR 120. TX ...	65	0	0
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EDDYSTONE 840C ...	48	0	0
EDDYSTONE 840A ...	38	0	0
EDDYSTONE. 6v. Vibrator Unit. 640, 760, etc. ...	5	0	0
EDDYSTONE 358X. Power Unit ...	3	0	0
TIGER 200 TX ...	75	0	0
LABGEAR TOP BAND TX ...	17	10	0
ERSKINE LABORATORIES. 2 1/2" Scope ...	14	10	0
BEE NBFM ADAPTOR ...	1	10	0
STELLA FOUR TRACK TAPE RECORDER ...	29	0	0
G4ZU BIRDCAGE AERIAL for 20 and 15 ...	12	0	0
MOSLEY TA 32 JUNIOR. 2 Element Beam for 20, 15 and 10 ...	12	0	0
AERIAL ASSEMBLIES. 10 Rods of 10' to 3' with base in box ...	3	10	0
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SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

9d. per word, minimum charge 12/-. No series discount: all charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1

SITUATIONS VACANT

MALE Shop Assistant, London, W.C.2 district, with technical knowledge of Amateur Radio.—Box No. 2678, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

K. W. REQUIRES ENGINEERS for testing Viceroy's, Vanguard's, KW-77, etc. Interesting work. Progressive Company.—Write in confidence, giving details experience, present salary, etc.. Managing Director, K.W. Electronics Ltd., Vanguard Works, Dartford, Kent.

TRADE

BINOCULARS AND PERISCOPES wanted in exchange for Radio equipment.—Details to Busfield's, Astro-Marine Sales, 45/47 Eastborough, Scarborough, Yorkshire.

WANTED FOR CASH: Good clean communications receivers and SSB equipment. Please state price. — Short Wave (Hull) Radio, 30/32 Princes Avenue, Hull. (Tel. 18953.)

QSL's and Logs by Minerva. The best there are.—Samples from Minerva Press, 2 New Road, Brentwood, Essex.

QSL CARDS AND LOG BOOKS, G.P.O. APPROVED. CHEAPEST, BEST. PROMPT DELIVERY. SAMPLES.—ATKINSON BROS., PRINTERS, LOOE, CORNWALL.

WEBB'S LOG BOOK for recording signals heard and worked; 112 pages 9½ in. x 8 in., approved format, semi-stiff covers. Excellent value; 6s. 0d. post free, or callers 5s. 4d.—Webb's Radio, 14 Soho Street, London, W.1.

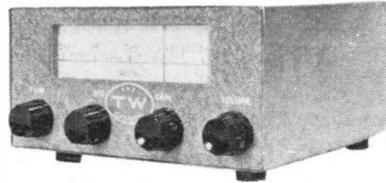
QSL CARDS: Buff, blue, pink, green, 100, 14s. 6d.; 250, 23s.; 500, 40s.; 1,000, 75s.—Samples (s.a.e.): Reilly, Panxworth, Norwich, 56.2.

RADIO AMATEUR COURSE.—A postal course for those wishing to take the Amateur Examination. A sound basic training in radio communication. Very reasonable terms. Send for brochure.—Premier School of Radio, BCM/Wireless, London, W.C.1.

WANTED FOR CASH: All types of radio equipment. — Details of Busfield's, Astro-Marine Sales, 45/47 Eastborough, Scarborough, Yorkshire.

VQ9A and four JA's were worked recently by G3NFV on 15m. with an INDOOR "JOYSTICK" Antenna 7 ft. 6 ins. long. (G3NFV operates from a bungalow!) GB3WRC exchanged 5 and 8/9 reports with GM2CPC on 40m. phone, using a "JOYSTICK" Antenna AT GROUND LEVEL! On 80m., G3CED gets as good as he gives, using an INDOOR "JOYSTICK" and a DX-40U. Detailed performance figures on request. The "JOYSTICK" is robust, weather-proofed and beautifully finished. De Luxe version, £4 10s.; Standard version, £3 10s.; carriage paid U.K.—Partridge Electronics, 17 Ethel Road, Broadstairs, Kent.—(Tel.: Thanet 62839.)

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IT'S **TRANSISTOR**
IT'S **THE "TOPMOBILE"**



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gns.

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COSSOR 339 Oscilloscopes, £12, carriage £1 good working order.
BSR Audio Oscillators LO50, £7/10/-, carriage 15/-.
AVO Roller Panel Valve Testers, £4/10/-, carriage 10/-.
METERS 300 ma, 2in. square, 6/6, post 1/-.
HEADPHONES type CLR, low resistance, 6/6, post 1/6.
RIBBED Pyrex glass 3in. aerial insulators, 9d., each, post 1/-; 6 or more free.
RECEIVERS. 68 set. 3 to 6 mc/s. Fair condition, 27/6, post 2/6. Also American 48 set. 6 to 9 mc/s., 42/6, post 1/6.
AERIALS. Seven 4ft. sections in steel carrying case with base and ground spike. Will make one 12ft. and one 16ft. whip, 20/- carriage paid. 45ft. throw out on reel, 3/-, post 1/-. 8ft. collapsible in two wired sections, 12 inches when folded, 6/-, post 2/-. Rubber covered Headset with lapel mike, low impedance, 6/-, post 2/-. Silicon Rectifiers 420 peak A.C. at 200 m/a, 2/-, post 1/-.
CLOCKS. Smiths 8 day bakelite cased, wall type, guaranteed 6 months, 42/6, post 2/6.
38 SET valve kit, 3 ARP12, 1 ATP4 in steel box, 3/-, post 2/-.
Mains Transformers, tapped primary. Outputs 6.3v. 1a. three times, 5v. 2a., 290.0-290 at 80 ma, 10/-, post 2/6. New.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges are for Mainland only.

Terms: Cash with order. Early closing Wednesday.

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SMALL ADVERTISEMENTS, TRADE—continued

MOHICAN HF Communications Receiver, excellent condition, £35. Communicator 4-metre Mobile Tx/Rx, good condition, £40. Marconi VHF Walkie-Talkie, converted for use on 4-metre amateur band, £40.—Box No. 2670, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

K. W.-TESTED Collins KWM-1 complete, £270. DX-100U. £60. CW Valiant, £16. Eddystone 888A (brand-new), £100; 888A, £75; 888, £60; 680X, £78; 750, £50; 840A, £32; Geloso G209-R, £60; AR88 (less cabinet), £25; Hallicrafters SX-140 (latest kit wired by K.W.), £42; Hammarlund HQ-170 (as new), £150. — K.W. Electronics Ltd., Vanguard Works, Dartford, Kent.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-. payable with order. Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, S.W.1.

WANTED: Immaculate CR100/8, CR300 and PSU manuals; 100% alignment essential. (Essex.)—Box No. 2668, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Minimitter MR44 with speaker, excellent condition, £30; 10/15-metre Bi-square, all-aluminium construction, £5. — G3NPZ, 73a Park Road, New Barnet, Herts. (Phone BAR 4144.)

SURPLUS TO NEEDS: One Eddystone 840C Receiver for sale, £45. — O'Keefe, 88 Barton Avenue, Rush Green Road, Romford, Essex.

SALE: HRO Senior, nine coils, power pack, £17. Transmitter, 50-watt, Geloso VFO, modulator, power supplies, £15.—G3ITK, 19 Aldersyde Street, Bolton, Lancs.

SALE: Command Rx 6-9 mc, 6v. V., BFO, RF gain. 2v. battery TRF, Denco coils, chassis, 1st class components, power pack. Call Books U.S.A./Foreign 1961; Amateur Radio Handbook, British New Edit.; Surplus Conversion Manuals, Vols. 1 & 2 —£10 the lot.—Box No. 2669, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Labgear LG.50 Transmitter, £35; and G8KW Multiband antenna with 97 feet of feeder, £5. — G3HRY, 99 A.M.Q., R.A.F. Locking, Weston-super-Mare, Somerset.

EDDYSTONE S.750 Rx with S-meter, excellent condition, £42. Also Grundig TK20 Tape Recorder, as new. What offers? — Dakin, Russ Farmhouse, Aller, Langport, Somerset.

R. 1155A with PSU, good condition, suit SWL, £12 10s., plus carriage. — D. Warburton, 14 Castle Road, Dollar, Clacks., Scotland.

VHF TW-2 and TW mains supply control unit, as new, £25. Two-metre PA, type AM913/TRC, ex-U.S. Army Sigs., contains two large silver-plated cavities, as new, with 4X150A, £15. — G5DF, 20 Church End Lane, Tilehurst, Reading, Berks. (Phone 67876.)

FOR SALE: AR88D, in excellent condition, £35.— T. Atkinson, 56 Baileyfields Road, Wetherby (Tel. 2982), Yorkshire.

MINIMITTER MR-44 double superhet, Q-Multiplier, product detector, etc.; mint condition, as new, hardly used, owing QRT; first cheque £30 secures. Prefer buyer collects, otherwise carriage extra. Also Woden UM3 mod. xformer, £3.—G4OV, Osborne, Lamberts Castle, Bridport, Dorset.

NEW HQ-180, £160. KW Viceroy, Series II, as new, £100. Hi-gain vertical, 10m.-40m., £9.— Davies, 5 Hillfield Place, Parclyn, Cardigan, N. Wales.

VIKING INVADER, as new, hardly used, complete with manual, only few months old, first-class SSB Tx, nearest to £200 (cost £285).—Box No. 2671, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELL: Gonset G76 (Model 3338) fitted 100 kc calibrator (Model 3269), also AC power supply with speaker (Model 3349) and DC Mobile power supply (Model 3350), all connecting cables, manual, etc. Original cartons, factory mint condition, and only used about three hours owing to business commitments, cost £360; offers invited for cash sale. First-class desk or mobile rig. Also sell HRO-60T cabinet with coil fronts, etc., engraved (cost £40), £10 to clear.—Write Box No. 2647, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COLLINS 75S1, fitted filter and crystal by Collins as extras; recent model absolutely factory mint condition, used only few hours cost £275 with extras; sell £200.—Box No. 2656, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

120W. CW Tx, £10. Power unit in bridge rectifier circuit using 4 x 5Z3—900v., 450v., 300v., fully smoothed, with swinging chokes, £4; or both for £12. Buyer collect owing to weight.—Lawn, 20 Croft Road, Godalming, Surrey.

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EDDYSTONE 940. De luxe finish	£125
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CR100/B28. Grey. Good condition	£22
R109A. New. No spares. With manual	ea £4 9s. 6d.	
T.W. cascade CONVERTER. New. 28-30 m/cs. I.F. 11 gns.		
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EDDYSTONE 750. Good condition	£45
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BIRKETT'S BETTER BEAMS. 8 element Yagi. Wide spaced for 2 metres, 59/- with 1" to 2½" adjustable bracket. 5 element, 39/6. Add on 3 element for fitting to 5 element, 19/6. All plus 3/6 carriage.		
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AERIAL MAST KITS. NB48', £15; NB36', 12 gns.; NB24', 7 gns. 14 feet x 2" O/D Dural Masts, 63/9 each; 16 feet x 2" O/D, 75/-.		All plus carriage.
Many other Bargains in RX and TX's at The Spot. Send SAE with enquiries. Carriage extra. TX and RX's mainly. Callers only. All on demonstration and tested before purchase. Part Exchanges		
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THE SPOT, 26 OSMASTON ROAD, DERBY		

SMALL ADVERTISEMENTS, READERS—continued

FOR SALE: Barker-Williamson 5100-B Transmitter with 51SB-B Generator; both in factory mint condition; as new; first-class American Tx of finest quality; original cost, £405; only used for about 10 hours; genuine offer requested. Also brand-new unused "Hy Gain 18HT" vertical tower; list price £55; offers invited? Also Webster Bandspanner, bargain, £5.—Box No. 2655, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Rx/Tx BC-659, £1 10s.; R.1466 Rx, £1 10s. Communications receiver covering 2-13 mc, £2. All fully valved. **WANTED:** FM Tuner (full details, please). Carriage extra.—Box No. 2672, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE 1959 NSU "Prima" Scooter, excellent condition, value £90 (s.a.e. details) for Eddy-stone 888A, 680X, 940A or SX-629. **SALE:** Manuals, 19 Set, 7s. 6d.; BC-1147A, 20s.; Class-D Wavemeter, 12s. 6d. Numerous Philips, Decca, Grundig manuals, 5s. each. Philips xtal microphones, 18s. BPL Signal Generator, £3. Pullin Series 100 Test Meter, 50s. AR88 Vibrator Pack, 25s. Many valves, s.a.e. list. BC-342 Dynamotors, 22s. 6d.; BC-454 Dynamotor, 10s. (both 14v. input). **WANTED:** 12v. at 65 watts approx. transistor supply or transformer.—G3LHA, 112 Attoxhall Road, Coventry.

WANTED: Minimitter Transmitter or similar.—G3PUR, 245 South Farm Road, Worthing (Tel.: 7416), Sussex.

FOR SALE: 4-metre radio-telephone B44, complete with crystals for the 4-metre band; excellent condition; 12-volt; ideal for mobile or fixed; £7 each, or £20 for three, including carriage.—G3NMY (Tel.: Cromer 2664 after 6 p.m.).

HAM WITH OWN SHACK and gear and flat, London area, is willing to share same with another amateur; no cash needed but must be licensed and actively interested in hobby; this might suit working chap. — Apply Box No. 2673, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TWO HRO RECEIVERS, HF and VHF, complete with coil set, speaker, power supply, phones, £25.—(Phone: LIV 2374 after 3 p.m.).

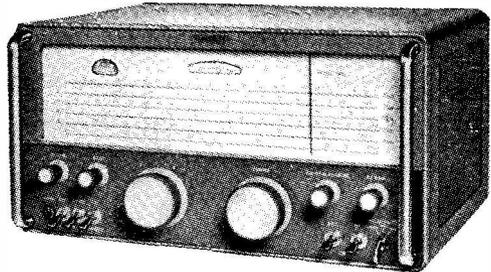
GOODMANS 10/12 loudspeaker in corner cabinet, £8. Stern FM Tuner, £4. Lenco GL58 transcription turntable and pick-up, £12. AVO Multiminor, £7. CR-100 coil pack, £1. GM3BQA 3-band Quad components, £5.—G3LAS, 12 Beech Avenue, Buckhurst Hill, Essex. (BUC 5335.)

BARGAINS! TA12 Tx converted 20, 40, 80 metres, 100 watts, parallel 807 pi-output, £3 10s.; power pack, £2 10s. TA12, converted 10 metres, £2. Speech amp/mod 807's, £2; power pack, £2 10s. Collins TCS Rx, £5; power pack, £1. Command Rx, 190-550 kc, £1 5s. Xtal. osc., 7 mc/1 mc, £1 10s.—Bevan, 71 Baker Street, Potters Bar, Middlesex. (Tel.: PR56074.)

FOR SALE: American Zenith Royal 1000-D 9-band Transistor receiver, perfect condition, £120 or best offer; must sell (owner going abroad).—Box No. 2674, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

REQUIRED: Copy of February, 1961 *Short Wave Magazine*. Would return after use.—Tucker, 17 Fernhill Caravan Park, Station Road, Wootton, Isle of Wight.

HOME RADIO OF MITCHAM FOR YOUR NEW EDDYSTONE RECEIVER



EDDYSTONE 870A ... £32. 2. 0
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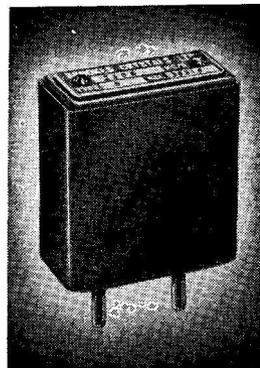
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SMALL ADVERTISEMENTS, READERS—*continued*

HALLICRAFTERS SX-17 Super Skyrider, 13-valve, two RF stages, crystal, bandspread, original manual, Hallicrafters 12-in. speaker, excellent condition. Offers? — J. M. Fell, 461 Chester Road, Northwich, Cheshire.

FOR SALE: Eddystone 358X, with PSU, speaker and manual, £12. HRO-MX, rebuilt with miniature valves, power pack built in, full set of coils, some BS and Manual, £15. Mullard one-valve Tone Control Unit, £1. *Ditto* 2-valve, £2. Williamson Output Transformer by Partridge, £2.—Wood, Windrush, Hail Weston, St. Neots, Huntingdonshire.

COMplete STATION: Top Band Tx, VFO/Cxtal, superior professional appearance, top quality mod., BC-312 Rx, 1.5-18 mc and 230v. PSU. Buyer collects, £18.—E. Line, 68 Middle Park Road, Selly Oak, Birmingham, 29.

WANTED: Collins 32S-1 and 32V-2. Also 75S-1, 75S-3 or 75A-4. Cash waiting, but must be in perfect condition. KWM-2, but not KWM-1, considered. — Details to Box No. 2675, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

4D32's (2), 80s. each; 4E27's (2), 40s. each; ventilated base, all brand-new. Hallicrafters S.27 cabinet, 30s. Carriage extra.—G3EWZ, 31 Greenbank Road, Hoole, Chester.

FOR SALE (due to impending move to London and less spacious accommodation): LG.50 Tx, relay controlled, as new, in original packing, £33 o.n.o.? CR-100 Rx, remote muting, noise limiter, manual, £13 10s. Control unit for the above with SWR meter and relay supplies (same size as CR-100), £2 10s. 8KW. trap dipole, yards of coax attached, £1 10s. New boxed 3KP1 tube with *Mu*-metal screen, £1. New Woden UM1 transformer, £1 10s. 4½-in. 100 μ A meter, £1. Heavy-duty Rx PSU, 250/300v. 500 mA, £1 10s. Various half-complete transmitters, IF strips, etc., all with working B7G or octal valves; all must be sold—at considerable sacrifice, if necessary. Offers invited. Delivery within 100 miles.—G3OYW, The Vicarage, Lostwithiel, Cornwall.

SHORT WAVE MAGAZINES, *QST's* and *RSGB Bulletins*, 1954-1961, complete with index, 10s. per volume, plus postage. WANTED: R.1132 or R.1392 receiver.—Hayes, 31 Beverley Crescent, Northampton. (Phone: 33944.)

TELEPRINTER(S) required: Type 3/7, not necessarily working condx., but complete. There must be printers, unused and hidden in dark corners. Why not sell and increase RTTY activity? All letters answered. W.H.Y.?—Cameron, GM3OGJ, 6 Cluny Avenue, Bearsden, Glasgow.

GELOSIO VFO (stabilised), 6146 PA Tx in professional cabinet, with LPF, meter, T/R switch, filament transformers and audio preamp., TVI-proofed, £9. Owner acquired new rig. 8-in. dual-cone speaker in BK (2 cu. ft.) cabinet, £6 10s. Offers considered.—Box No. 2676, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Panda Cub, good condition, £28.—Woodward, G3GYR, 77 Sandback Road, Rode Heath, Stoke-on-Trent, Staffs.

WANTED: AR88, must be good condition. **S**ALE: Six unused transformers, 210-250v. to 1450v. 120 mA, SP, 10v. 6A., 6v., 1A.; cost £5 5s. each; accept £2 10s. each, or £12 the lot. Six cooker-type rotary switches, 15 amp., 2P on-off, 7s. 6d. each.—E. J. Roe, 3 South Avenue, Coventry.

TIGER 150-watt Tx, as new, table-top, 3-band, less mod., cheap; or exchange good Rx. Buyer inspects and collects.—C. V. Stead, 2 Cliff Road Gardens, Leeds. (Phone: Leeds 55011.)

2-METRE Converter, G2YH, 21-23 mc IF. £5 10s. 2-metre Transmitter, 3-6J6, 5-watt, 8 in. x 3 in. chassis, £4 10s.—Acton, 20 St. Blaise Road, Four Oaks, Sutton Coldfield, Warks.

MOSLEY 2-element Tribander, £10 o.n.o.?—G3COI, 43 Mount Road, Penn. Wolverhampton, Staffs.

TYPE 3X Teleprinter, FB cond., with all power and signalling supplies, spare tapes, RTTY handbook; may be seen producing local copy; £10.—Stenhouse, 11 Hanover Road, London, N.15. (Tel.: TOT 0197.)

GETTING MARRIED—must sell: AR88D, ex-BBC Rx, immac. condition, S-meter, RCA manual, recently re-aligned and re-valved, £38, including spare set of valves and crystal. Also 150-watt Tx, 80-10 Phone/CW, £25.—P. Champion, 7 Leonard Road, Streatham Vale, London, S.W.16 (Pollards 4508.)

R.1155, modified, with output stage and power pack, working but appearance only fair, £4 (carriage extra).—G3FXB, 86 Cross Road, Southwick, Sussex.

FERROGRAPH 77 Mono & Stereo, as new, offered in exchange for Short Wave Receiver SX-62A or similar.—Gaunt, 16 Kingswood Crescent, Leeds, 8.

HRO, rebuilt front end (miniatures), BS coils, PSU, LS, handbook, £17 (carriage extra). WANTED: TU5B. — G3RB, 12 Atkinson Terrace, Newcastle-upon-Tyne, 4.

WANTED for HRO7R: One 160m. Top Band coil E. — EI3P, 1 Mount Mapas Villas, Dun Laoghaire, Eire.

BUSH VHF 90C, £15, or swap for S-38E, NC-60, Auto, instructions, 1962 *Coast Radio Stations* handbook, 12s. 6d. — Box No. 2677, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COMplete Mobile Rig, Minimitter Tx, control box, 160 and 40 whips, CNY Rx, vibrator, £18. DX-40U and VFO, £18. Kodak turret 8 mm. movie camera, carry case, UV filters, £18 o.n.o.? Consider exchange good 2-metre converter. — Meikle, 34 Victoria Road, Netley Abbey, Southampton (Hamble 2279).

R.109, good condition, 30s. Also Panda receiver, ex-works, £8 (carriage extra); s.a.e. for details.—Taylor, 65 Manchester Street, Heywood, Lancs.

WANTED: Eddystone 640, mint condition, perfect working order, preferably unmodified.—Particulars to: GW3LSB, Coed Derw Bach, Betws-y-Coed, Caerns.

LG. 300 RF section, £30, carr. paid. WANTED: McGuffie, Valve Voltmeter and Oscilloscope.—McGuffie, Royal Crescent, Stranraer, Wigtownshire.

GM2DBX going QRT, ill-health. For disposal: Woden transformers 1250-1000-0-1000-1250v., 750-0-750v. 250 mA; 500-0-500v. 150 mA; 350-0-350v. 120 mA; 2.5v. 10 amps.; UM3 modulation; also drivers and chokes; all at half-price, plus carriage, o.n.o.? Radiovision Commander Rx, Eddystone 504 Rx. 813's, 866's, £1; 807's, 5s., plus post. Many other pieces. — GM2DBX, Main Street, Methilhill, Fife.

SMALL ADVERTISEMENTS, READERS—continued

SALE: Brand-new QV06-40's, 25s.; also 813's, £1; D.B. 09 CRT, 30s.; ECR30, £1; 3BP1, 10s.; 5-band coil-link-switched PA coil turret, 100w.+, £3 10s. o.n.o.?—Box No. 2682, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED to buy or the loan of the following: Manual for BC-794; *QST*, April 1961; *QST*, Oct. 1958; information or manual for ART13 transmitter.—Brown, Pebdref, Caersws, Mont.

FOR SALE: 888A in good condition.—Sensible offers to: Ackley, 89 Mulberry Place, Ryhill, Wakefield, Yorks.

G2DAF Receiver parts and components, new, cost £80; Philpots, Eddystone, Electroniques, Cathodeon crystals, working and quite well-built; sell £45, or very good AR88D.—Box No. 2683, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Labgear LG.300 Transmitter, as new, spare 813, £40 o.n.o.? Also Mosley TA33-Jr, beam, £15 o.n.o.? — Cox, Trebell, St. Mabyn, Bodmin, Cornwall.

LG50, immaculate and new condition, hardly used, £30.—G3NPB, Springfield, Haydon Bridge, Northumberland.

BEDSIDE STATION for sale: K.W. "Vanguard," factory-built, relay controlled; Minimitter 38 receiver, trolley, £70 o.n.o.? Carriage extra.—G2FQW, *QTHR*.

EDDYSTONE 840C, 5 months old, unused, as new, bargain £42 10s., delivered.—Durk, 86 Oakwood Road, Sparkhill, Birmingham. (Tel.: Springfield 4362.)

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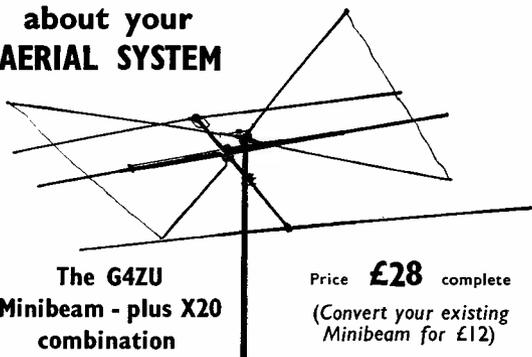
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WANTED: Good quality converter for Top Band work in conjunction with CR150, 2-60 mc (with or without PU).—G3MLH, Meridene, Princess Road, Kingsteignton, Devon.

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SMALL ADVERTISEMENTS, READERS—continued

WANTED: National One-Ten Receiver VHF.—Davies, 35 Kensington Road, Stockton-on-Tees, Co. Durham.

SALE: 50-watt Transmitter RF section; Gelo 4/102/V plus 5B/254M (min. 807), fully screened in TU case with 2 meters, £8; or W.H.Y., SSB? **WANTED:** Good BC-221 with original calibration charts.—G3KAJ, 3 Hoad Terrace, Ulverston, Lancs. (Tel.: 2553.)

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WANTED: BC-221 case, must be in good condition.—Box No. 2681, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Command Transmitter BC-696 or equivalent, 3 to 4 mc, unmodified, good condition.—G3ICH, 40 Pirehill Lane, Stone, Staffs.

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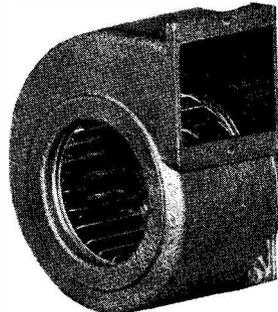
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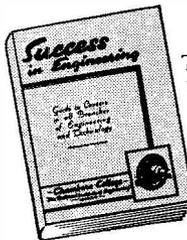
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