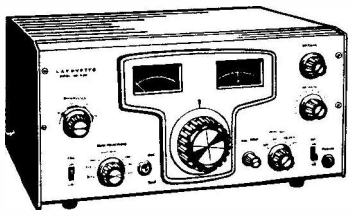
3/6

The SHORT WAVE Magazine

VOL. XXIV AUGUST, 1966 NUMBER 6

LAFAYETTE 10-80 Metre SSB/AM/CW Amateur Receiver



5 HAM BANDS PLUS WWV

3·5–4·0 Mc. 14·0–14·5 Mc. 28·0–29·7 Mc.
7·0–7·5 Mc. 21·0–21·5 Mc. WWV at 15 Mc.

75 gns.

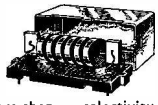
EXTRAS :

100 Kc/s. xtal **35/–**

Speaker Mate **55/–**

- Mechanical Filter for Exception Selectivity.
- 12 Valves Dual Conversion ● Automatic Noise Limiter.
- Product Detector for Selectable Upper and Lower Sideband Reception.
- Complete with Crystals for 80, 40, 20, 15 and 10 Metres.
- 100 Kc. Crystal Calibrator and Crystal BFO.
- "S" Meter-Calibrated in "S" Units 1·9 and to +40 dB.

MECHANICAL FILTER



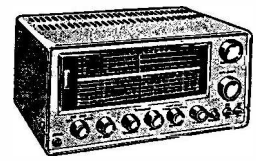
Ultra-sharp selectivity is achieved by means of a true mechanical bandpass filter in the 455 Kc. IF section. The filter consists of three sections—an input transducer, 6 non-corrosive nickel alloy resonators and an output transducer.

MODEL HA.350 Lafayette's newest and most advanced communications receiver. Dual conversion circuitry features an image and IF rejection of more than 40 dB. A product detector, providing selectable upper or lower sideband, solves the problems in SSB reception. Tunable preselector circuit gives sensitivity of less than 1 microvolt for 10 dB signal-to-noise ratio. Selectivity : Bandwidth of 2 Kc. at 6 dB down and 6 Kc. at 60 dB down using mechanical filter. Front panel 100 Kc. crystal calibrator reset control used in conjunction with the 15 Mc. WWV station assures accurate calibration. CHECK THESE SPECIFICATIONS! Audio output : 1-watt maximum. Speaker impedance : 8 ; 500 ohms (speaker not supplied). Front panel controls : Preselector ; Cal—On/off ; Band Selector ; Receive/Send ; Tuning Cal Reset ; Function—Off/AM/SSB1–CW/SSB2 ; RF gain ; AF gain ; ANL ; Phone jack. Valves : 6BZ6—RF amp ; 6BL8—Xtal controlled 1st mixer ; 6BE6—2nd mixer ; 6BA6—VFO ; 6BA6—1M amp.; 6BA6—IF amp ; 6AL5—AVC rectifier and AN noise limiter ; 6AQ8—product detector and crystal calibrator ; 6AV6—1st audio amplifier ; 6AQ5 audio output : 6BA6–BFO ; OB2—regulator. Silicon Full Wave rectifier. Size : 15"W. x 7½"H x 10"D. For 230v. 50/60 cps. AC. Wt., 25 lbs. Less Calibrator Crystal.

IMMEDIATE DELIVERY . PART EXCHANGES

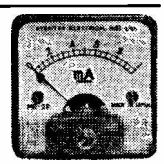
LAFAYETTE KT-340 COMMUNICATION RECEIVER

SEMI-KIT



Build this wonderful receiver and save pounds. Supplied semi-completed, main components ready mounted, RF section already wired and aligned. Full and precise instructions supplied. Specifications :—8 valves plus rectifier, 4 bands covering 550 Kc/s.–30 Mc/s. Incorporates 1 R.F. and 2 I.F. stages, 'Q' multiplier, B.F.O., A.N.L., 'S' meter, bandspread, aerial trimmer, etc. Operation 115/230v. A.C. Price **25 gns,** carr. 10/-.

CLEAR PLASTIC PANEL METERS



First grade quality, Moving Coil panel meters, available ex-stock. S.A.E. for illustrated leaflet. Discounts for quantity. Available as follows. Type MR. 38P. 1 21/32" square fronts.

50μA	32/6	1mA	22/6	200mA	22/6		
100μA	29/6	2mA	22/6	300mA	22/6	10v DC	22/6
200μA	27/6	5mA	22/6	500mA	22/6	20v DC	22/6
500μA	25/–	10mA	22/6	750mA	22/6	50v DC	22/6
50-0-50μA	29/6	20mA	22/6	1A DC	22/6	100v DC	22/6
100-0-100μA	27/6	50mA	22/6	2A DC	22/6	150v DC	22/6
500-0-500μA	22/6	100mA	22/6	5A DC	22/6	300v DC	22/6
1-0-1mA	22/6	150mA	22/6	3v DC	22/6	500v DC	22/6
						'S' Meter	29/6
						750v DC	22/6
						15v AC	22/6
						50v AC	22/6
						150v AC	22/6
						300v AC	22/6
						500v AC	22/6

Larger sizes available — send for lists

SWAN-350 10-80 METRE TRANSCEIVER

400 watts P.E.P. Complete with AC power supply consul, **£250** ex-stock. *S.A.E. for details.*

CODAR EQUIPMENT

MAIN LONDON AGENTS—ALL EQUIPMENT STOCKED

HAMMARLUND SP-600JX RECEIVERS

Dual conversion 540 Kc/s.–54 Mc/s. Few left only. In excellent condition at **£100**

	£	s.	d.
BUG KEYS	4	10	0
ELECTRONIC KEYS	16	10	0
MECHANICAL FILTERS as used in HA350	9	19	6
NUVISTER GRID DIP METER. 1·7–180 Mc/s.	12	10	0
KYORITSU GRID DIP METER. 360 Kc/s.–220 Mc/s.	12	10	0
LAFAYETTE DE-LUXE V.F.O. 10–80 metres	13	19	6
PARTRIDGE JOY-STICK AERIALS in stock			
FIELD STRENGTH METERS. 1–250 Mc/s.	3	12	6
TRANSISTORISED FIELD STRENGTH METERS. 2·5–57 Mc/s.	4	19	6

LONDEX COAXIAL AERIAL CHANGEOVER RELAYS

24v. DC. Complete junction box as used for TR 1985 TX. Brand new boxed, **39/6,** carr. 4/6.

SILICON RECTIFIERS

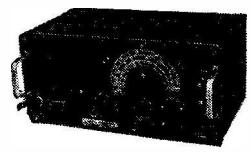
200 P.I.V. 200 mA	2/6
200 P.I.V. 6 amp	5/6
400 P.I.V. 3 amp (S.G.R.) ...	10/–
400v. P.I.V. 3 amp	7/6
1,000v. P.I.V. 650 mA ...	7/6
800v. P.I.V. 500 mA	5/6
400v. P.I.V. 500 mA	3/6
800v. P.I.V. 5 amp	7/6
70v. P.I.V. 1 amp	3/6
150v. P.I.V. 165 mA	1/–

Discount for quantities. Post extra.

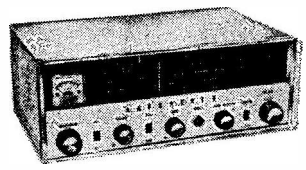
NATIONAL HRO COILS

Set of 9 general coverage coils, covering 50 kc/s.–30 Mc/s., **£10/10/–,** carr. 10/-, also HRO dials, **27/6.** P.P. 1/6.

PCR1–PCR3 RECEIVERS



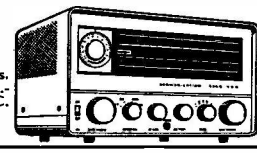
BRAND NEW CONDITION—FULLY TESTED AND CHECKED BEFORE DESPATCH. 3 WAVEBAND WITH R.F. STAGE—WONDERFUL VALUE.
PCR1 : 860–2080 metres, 190–570 metres, 5·6–18 Mc/s, unit internal speaker.
PRC3 : 190–570 metres, 2·2–7·3 Mc/s, 7·0–23 Mc/s. No internal speaker. Either model **£8/19/6,** carr. 10/6 with circuit. Plug in external power units for either above. 230v. AC, **35/–** or 12v. D.C., **19/6.**



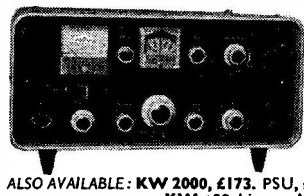
HAM-1. 4 BAND COMMUNICATION RECEIVER

Four wavebands covering 535 kc/s.–30 Mc/s. Five valve superhet circuit. Incorporates S meter, B.F.O., BANDSPREAD TUNING, BUILT-IN 4" SPEAKER, FERRITE AERIAL AND EXTERNAL TELESCOPIC AERIAL. Operation 220/240v. AC. Supplied brand new with handbook, **£16/16/–,** carr. 10/-.

HA.63 GENERAL COVERAGE RECEIVER



7 valves — Rectifier, 4 Bands 550 kc/s. —31 Mc/s. "S" Meter-B.F.O.-A.N.L.-Bandspread Tuning 200/250v. AC. Brand New, **24 gns.,** carr. paid.



K.W. EQUIPMENT

VESPA TRANSMITTER

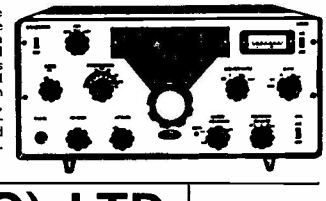
10–160 metres SSB, CW and AM, **£110.** Power supply, **£25.**

IMMEDIATE DELIVERY

ALSO AVAILABLE: **KW 2000, £173.** PSU, **£32. KW 2000A, £195.** PSU, **£40 KW 600** Linear Amp., **£115**

STAR SR.600 AMATEUR COMMUNICATION RECEIVER

New crystal controlled triple conversion de luxe 80-10 metre band receiver. Extremely high sensitivity, selectivity and stability. Special features include 3 I.F. stages, crystal controlled oscillator, 4 section L/C filter, "S" meter, B.F.O., A.N.L., 100 kc/s. crystal calibrator, etc. Supplied brand new and guaranteed. **95 gns.** S.A.E. for full details.



OPEN
9 a.m.—6 p.m.
EVERY DAY
MON. to SAT.

G. W. SMITH & CO. (RADIO) LTD.

3-34 LISLE STREET, LONDON, W.C.2

Phone : GERRARD 8204/9155 *Cables :* SMITHEX LESQUARE

PART EXCHANGES WELCOME

INDEX TO ADVERTISERS

SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXIV AUGUST, 1966 No. 274

CONTENTS

Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

Advertising: **Maria Greenwood**

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

Annual Subscription: Home and Overseas 42s. ($6.00 U.S.) post paid

Editorial Address: **Short Wave Magazine, BUCKINGHAM, England**

AUTHORS' MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

E. & O. E.

FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Idea? *Amateur Radio activity is on a world-wide scale and at the present time there can hardly be less than 250,000 AT stations on the air — with perhaps another 100,000 or so in various stages of suspended animation, retaining their interest and keeping in touch through the literature, itself an important sector of the field of radio publishing.*

In spite of the pressure of this activity and the global nature of our branch of the art of radio communication, the organisation of Amateur Radio, looked at internationally, is loose and indecisive, and therefore weak and ineffective. It is true that there is a body known as the International Amateur Radio Union but it has little real authority and is somewhat dominated by the stronger members—and, in any case, Russia and the Iron-Curtain countries generally are not subscribing members, which tends to invalidate IARU decisions affecting the use of our bands.

The need is, therefore, for a truly representative international body, with new aims and objectives, which will include as many as possible of the nations of the world irrespective of their political affiliations. As it would be impracticable to reconstitute the IARU (because of its restricted membership) or to form a similar new organisation from amateur resources (because large finance would be required) some other alternative must be sought.

A solution might be found to lie in making Amateur Radio, in the international context, one of the branch activities of UNESCO—the United Nations Educational, Scientific and Cultural Organisation. The advantages are manifold, and obvious. Operating under the charter of the United Nations, UNESCO is represented directly or indirectly in all the world's capitals, and is an international body of considerable authority. It disposes of funds totalling about £10m. annually, and one of its objects under its own charter is to promote collaboration among the nations by education, science and culture —and who could say that Amateur Radio is not at once educational, scientific and cultural, as well as being, by its very nature, almost forced to the ideal of international collaboration.

To be clearly identified with UNESCO would strengthen immeasurably the whole fabric of Amateur Radio, without in any way affecting the rights of individuals or the freedom of action of national groups within their own countries.

This idea has been put forward before. It is high time that something was done about it.

Austin Forsyth, G6FO.

WORLD-WIDE COMMUNICATION

TRANSISTOR SQUELCH UNIT

FOR RECEIVER SILENCING UNDER NO-SIGNAL CONDITIONS

G. R. KENNEDY, A.M.Inst.E. (G3OGK)

THIS article describes a transistor squelch which may be incorporated in any receiver with positive earth. It was originally designed by the author to be used in his two-metre T W "Communicator" and specific modifications for this tranceiver will be given, with a suitable construction plan.

General

A squelch circuit is one which mutes the audio side of a receiver until a strong signal is received, when the audio stage is switched on. The essence of a squelch is that it will not respond to noise received; will only switch on the audio with a carrier of specific strength; that the threshold level is precise and may be varied, and that the squelch will have a negligible effect on the audio performance of the receiver. The circuit described here has all these features. A squelch is very useful for mobile operation, since noise continually pouring forth from the speaker when driving and when monitoring a particular frequency can be very wearing, and if the audio gain is turned down, the station being sought might well be missed. For this reason, most commercial R/T's are fitted with a variable squelch, yet it seems rare to find one incorporated in an amateur-band mobile receiver. It is hoped that this circuit will take some of the fatigue out of mobile work for those with /M outfits, especially for those with cars—like the author's—which seem to be completely unsuppressible on the band in use !

Circuit

The circuit is shown in Fig. 1. The principle of operation is as follows: Diode D1 is in series with the audio signal. With no strong carrier, the cathode of D1 is held more positive than the anode; the diode is thus reverse-biased, and since it has been chosen to have a very high reverse resistance (about 50 megohms), the audio line is virtually interrupted. The anode potential is specified by the emitter potential of the emitter follower Tr3, which is due to the emitter current through R6. The cathode potential is derived from the collector potential of Tr4, which is in turn a function of its base/emitter potential. Now in the case of the T W "Communicator," the AVC line with no-signal is approximately at chassis potential (zero volts), and with an S9 signal, the AVC line goes positive to about +1·3 volts with respect to chassis. This is applied to the n.p.n. transistor Tr1 which is connected in the common emitter configuration. The collector potential swings positive in step wth the AVC line, but the potential is shifted well into a region negative with respect to chassis. The collector of Tr1 is directly coupled to the base of Tr2 which is also connected as an emitter follower—hence, the output at the emitter of Tr2 also goes positive for a received signal. This output is applied to the base of Tr4 and the diode D1 is switched as described before.

The purpose of Tr2 is to match the output of Tr1 into the base of Tr4, and to lower the impedance so that the fluctuating AC component of the AVC line due to noise can be efficiently filtered out, by means of R4, C3. The purpose of the emitter follower Tr3 is to specify the anode potential of D1, and to provide a low-impedance path for D1 when forward biased. A resistive potential divider was tried instead of using Tr3, but the audio component on the resting potential was found to switch the diode when the cathode was within 250 mV or so of the anode potential, and the squelch level was not precise. The collector of Tr3 is grounded to AC by C4. The capacitor C5 makes the switching of D1

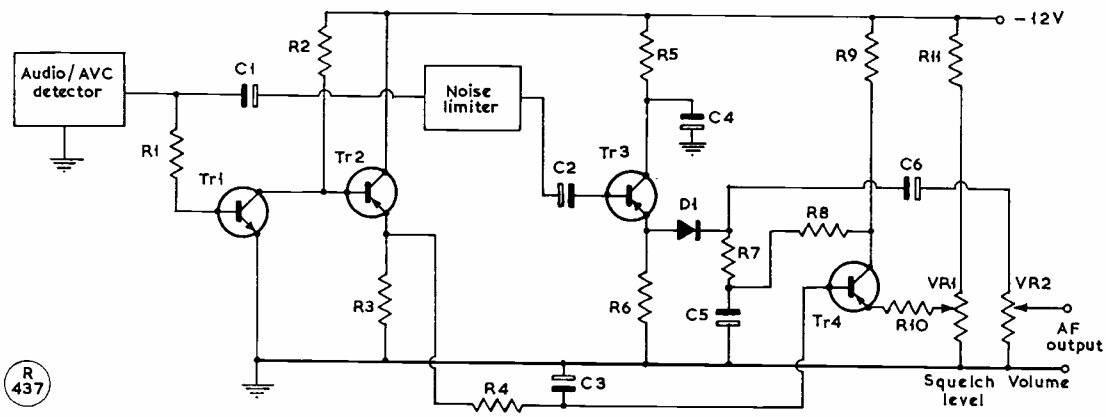
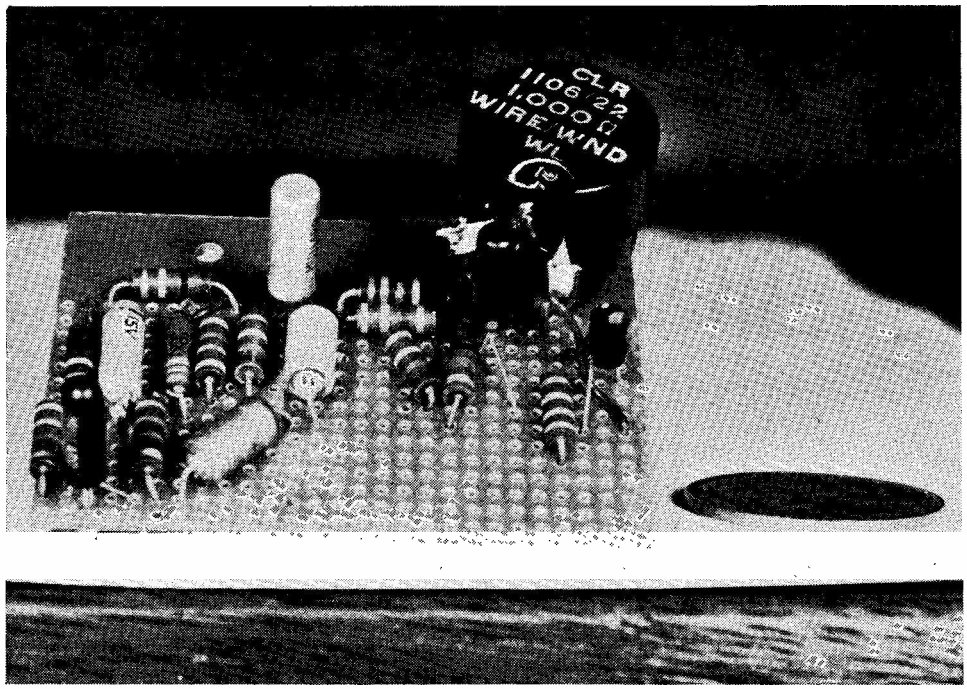


Fig. 1. Circuit of the Squelch Unit.



The squelch (noise suppressor) unit as described by G3OGK and built up on a small piece of "Veroboard"—the half-crown on the right is for size comparison—showing how handily this material can be used for general constructional work. The function of a squelch unit is to silence the receiver in the absence of signal—obviously a particular advantage in mobile working.

more precise, since it by-passes any spike potentials at the collector of Tr4 to earth, and with R8 it serves to give a slight "fade-in, fade-out" effect on the audio output of the receiver, protecting the audio driver transistors from any possibility of surge current damage. The capacitor C6 is essential to block the DC component from appearing on the volume control VR2. The time-constant of C6, VR2 aids that of C5, R8 in giving the slight fade effect. The squelch threshold level is set by VR1 which effectively alters the emitter/collector potential of Tr4 and this varies the sensitivity of the transistor to the controlling base potential. It should be noted that, as shown in Fig. 1, the squelch follows a stage which detects audio and AVC using the one diode.

Table of Values

Fig. 1. Circuit of the Squelch Unit

C1, C2, C6	= 8 μF	R9	= 15,000 ohms
C3, C4	= 20 μF	VR1	= 500-ohm w/wound potentiometer
C5	= 1·6 μF	VR2	= 100,000-ohm carbon potentiometer
R1	= 33,000 ohms		
R2	= 120,000 ohms		
R3, R10	= 1,000 ohms	D1	= OA202, *Mullard*
R4	= 330 ohms	Tr1	= OC140, *Mullard*
R5	= 6,800 ohms	Tr2, Tr3	= OC75, *Mullard*
R6, R11	= 4,700 ohms	Tr4	= OC202, *Mullard*
R7, R8	= 10,000 ohms		

Notes: All resistors rated ½-watt and all condensers 16v. working. Similar transistor types may be substituted.

The audio and AVC signals, if detected separately can still be utilised: the audio is applied to C2 and the AVC to R1. The noise limiter is optional, and the circuit left to choice, although the output must be AC coupled so that the standing emitter potential of Tr3 is not altered by different base biasing through the noise limiter. The transistor Tr1 is used to raise the AVC voltage to a region negative with respect to chassis. If a receiver circuit is used with a positive-going AVC line with signal, and the AVC line is already negative (say −1·5 volts standing) then Tr1 may be omitted, and the AVC line applied to Tr2 through a 47,000 ohm resistor. If the AVC voltage is negative-going with signal, then an extra common-emitter inverter stage will have to precede Tr1. The total consumption of the circuit on a 12-volt supply does not exceed 10 mA.

Construction

Whilst most people prefer their own method of construction, a layout is given in Fig. 2 for those who like to use *Veroboard*. This is slightly different from that shown in the photograph(s), but it gives a compact and fairly neat circuit board. The grade of *Veroboard* used by the writer was "Vero 0·10 Pitch Single-Sided Board," as it was found that *Radiospares* small half-watt resistors fitted well, as shown. (If only larger components are available, there are *Veroboards* having larger pitches.) Great

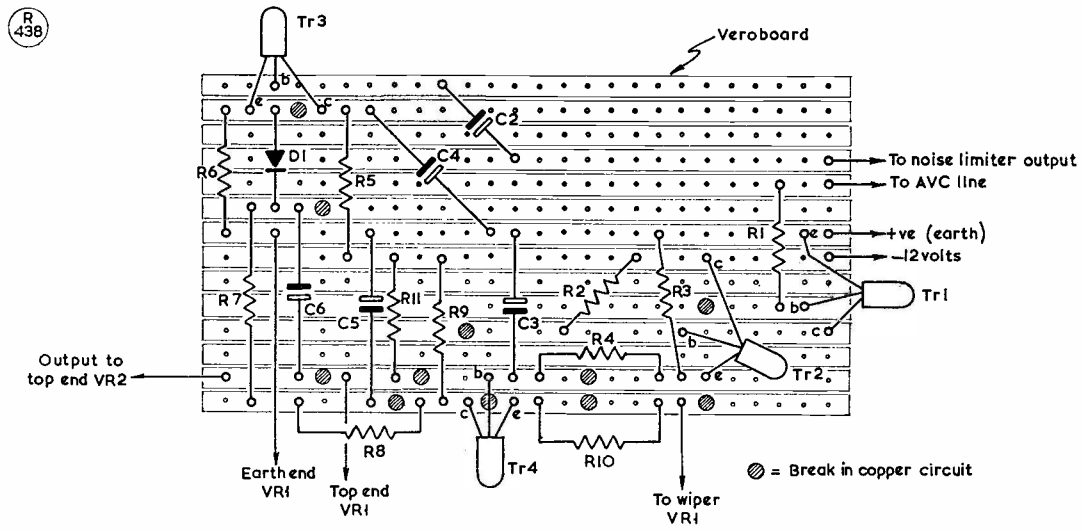


Fig. 2. Circuit Layout using "Veroboard."

care must be taken to use a good heat shunt when soldering the semiconductors, especially the diode. Breaks in the copper conductors were made with a small twist drill, but a special tool for the purpose can be bought from *Vero*. The part of the board not used may be drilled to take the potentiometer VR1, but care should be taken to see that the anchoring nut of the potentiometer does not short any copper strips carrying part of the circuit. If need be, a fibre washer may be used between the nut and the board, or more breaks may be made in the conductors than shown. In the author's case the board measured approximately $1\frac{1}{2}$ x $2\frac{1}{4}$ inches.

In the particular case of the T W "Communicator," the author mounted the board on the bush of VR1 as described above. A clearing hole for the bush was drilled in the front panel to the left of, and level with, the "PA Tune" knob, actually through the letters PA. Lead connections were made to the board before mounting, and lead-through insulators used to connect to the circuitry under the chassis. In the "Communicator," C1, C2, VR2 and the noise limiter are parts in the original circuit. The common AVC/audio connection is from pin 2 of the IF strip. There was a very slight reduction in high frequency audio response, but this was barely noticeable. The squelch was found to work with the BFO on, at a different setting of VR1.

T. Withers (Electronics) have asked the author to point out that any modification of the "Communicator," such as the addition of the squelch, will render any guarantee or liability null and void.

Conclusion

In use, the squelch has proved to be reliable and very handy for monitoring one particular frequency without the fatigue of ignition noise. The level can be accurately set by VR1, which works entirely independently of the volume control VR2. The squelch may be brought out of use by a complete rotation of the squelch level control VR1. When in, the squelch effectively silences the receiver, only noise generated internally in the audio stages coming through, which in the case of the writer's "Communicator" was virtually *nil*.

The sensitivity of the squelch was found to be as good as those used by the writer in commercial R/T's, and with careful setting was able to sense an S3 or S4 signal reliably.

F.A.M., SAVUNDRA and G3SDN

Practically nobody will need to be told that there has recently been a startling Insurance Co. crash. Quite a lot of people will know that the central figure, Emil Savundra, held the U.K. amateur callsign G3SDN, with a very elaborate DX-Phone station at his palatial house in Bishop's Avenue, Finchley, London. A few will know that he sponsored a group known as the International Radio Organisation, with himself as secretary-general—which, on the face of it, did have some worthwhile objectives. But very few will be aware that, even while the pressure on F.A.M. was building up, Savundra had ideas for forming a new U.K. transmitters-only society, to operate in direct opposition to the RSGB. As he has now removed himself to Ceylon, and asked for Singhalese nationality, presumably the Post Office will cancel his G licence.

September issue due out Friday, September 2.

FOLD-OVER MAST FOR BEAM SUPPORT

SELF-SUPPORTING A 20-METRE QUAD AT 60 FEET

P. G. DODD (9L1HX)

THE QTH here is an iron-ore mine, located about 50 miles north of Freetown in Sierra Leone. The mine is surrounded by bush, with plenty of room for putting up aerials, so it naturally followed that 9L1HX was accommodated in a house in the middle of the camp with a back garden smaller than many an English suburban lot. It is covered in trees and two pairs of power lines cross it diagonally. A ten foot high fence separates the garden from adjacent tennis courts.

The mast and beam had to meet the following specifications : (1) The beam to be at least 40ft. high to clear the trees ; (2) The mast and beam to be capable of being raised and lowered by one man ; (3) Be self-supporting because of space and too many obstructions to allow guy wires ; (4) Be semi-portable ! The accommodation plan out here requires that one person moves into a house when the occupant goes on leave, so more often than not one comes back to a different house on return from leave ! (5) Stand up to temperatures of 140°F. and humidity up to 96 per cent. The rainfall is over 100 inches a year, of which 70 falls in three months, plus the violent lightning storms, had also to be taken into account.

Most articles on the subject of aerial pole raising seemed to require the combined efforts of the local radio club but one in *QST* seemed ideal for the requirement. This design, by WØONM, is a 60-foot self-supporting mast capable of carrying a three element tri-band beam.

In the writer's case the mast had to be rotatable because no rotator was available and instead of filling the lower half of the mast with concrete as a counterweight it was necessary to have a separate removable counterweight in the interests of semi-portability.

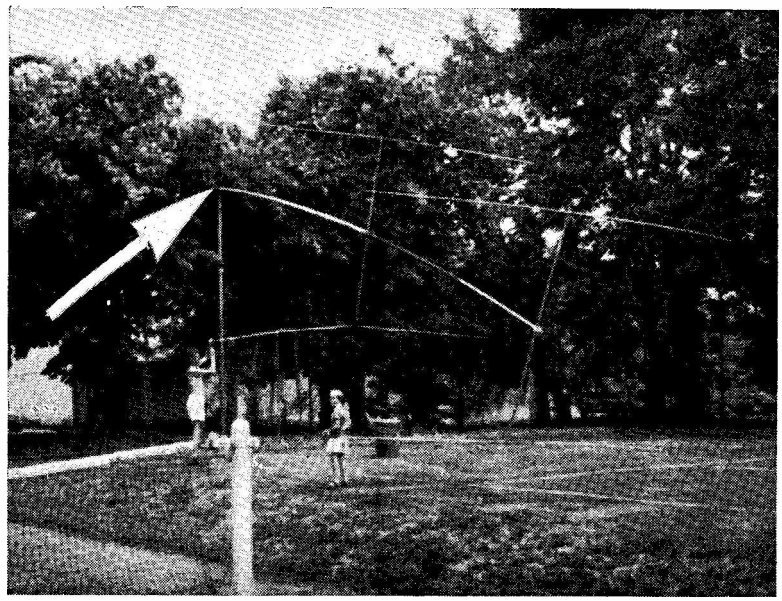
General Arrangement

The method of mounting the mast in a section of 8-inch casing set in concrete with sand between the casing and the 4-inch pole to act as a wind buffer also aided the semi-portable specification. When the mast has to be moved all the sand is extracted with a vacuum cleaner, and the pole pulled out !

Having decided what sort of pole to have, the next problem was where to put it. The only possible place for it to go was by the side of the wire fence and for the top part to be lowered into the tennis court—*see* picture below.

The lower sections of the mast and fulcrum were welded up at the workshops but the top sections were not welded to the 4-inch section, to keep it in the semi-portable category. The hole was dug to a depth of 4 feet as this was felt deep enough in very hard, rocky ground. The 8-inch casing was placed in position and set in a mixture of concrete and rock, then left for two days to harden. The fulcrum was fitted into the 8-inch casing and sand packed around, making sure that it remained vertical while the sand was poured in.

To allow the pole to be rotated the fulcrum pole had a clevis* bolted to it with a six-inch length of pipe having an inside diameter slightly greater than



The mast and beam head, as described by 9L1HX, in the lowered position. Not a very good picture against the dark background, but the general idea can be grasped. The arrow indicates the fulcrum point. By hauling on the (counterweighted) butt end of the mast, it is brought into the vertical—see sketches and other photographs.

* Clevis. A U-shaped iron at the end of a beam for attaching tackle.

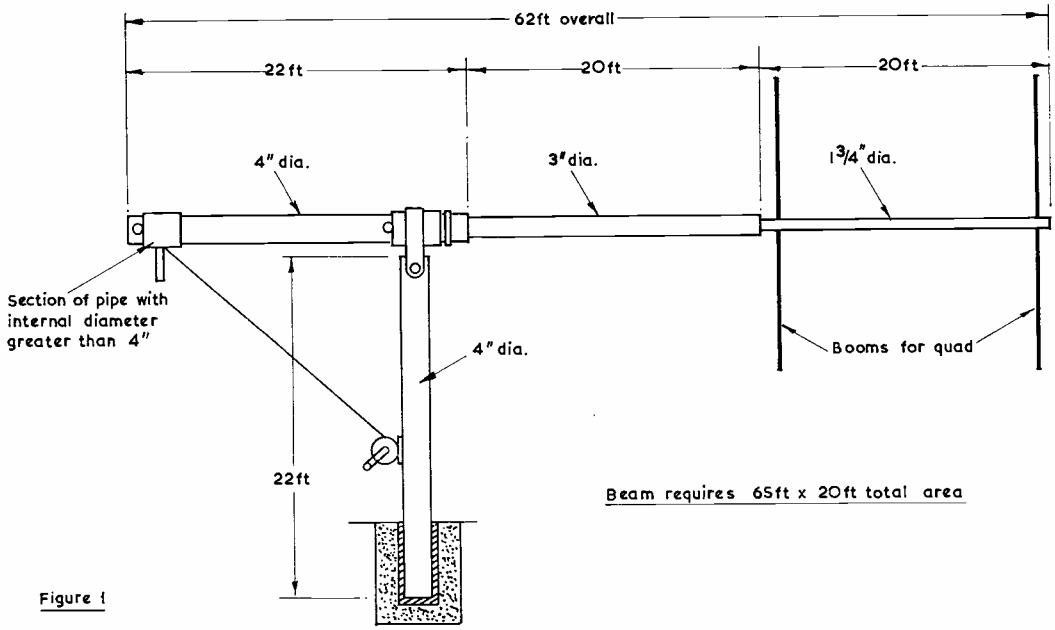


Figure 1

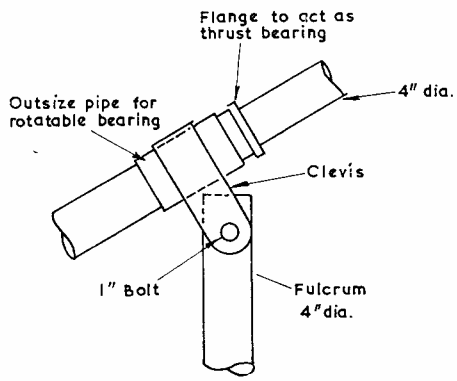


Figure 2

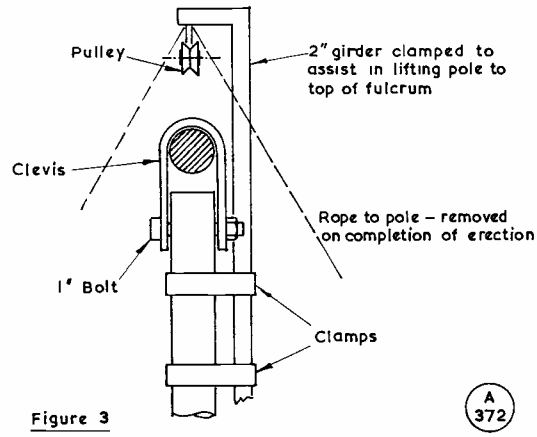


Figure 3

A 372

The 9L1HX Fold-over Mast.

4 inches, the outside diameter of the lower section of the pole—*see* Fig. 2. A half-inch thick steel flange was welded to the 4-inch section of the mast to act as a thrust bearing.

The section of outsize pipe that is welded to the clevis is bolted to the fulcrum before the fulcrum is raised. A section of 2-inch girder was clamped to the top of the fulcrum to assist raising the mast with the aid of a pulley (*see* Fig. 3).

A rope is tied to the bottom of the mast and through the pulley and, with some help, the lower end of the mast can be pushed through the outsize pipe at the top of the fulcrum and a bolt inserted in a hole in the mast to stop it slipping out.

The 3-inch section of mast is bolted to the bottom section. A spacer is required here to take up the difference in diameter of the outside of the 3-inch pipe and the inside of the 4-inch pipe. This can be made out of a section of the right thickness of $3\frac{1}{2}$-inch pipe, split down the side with a hacksaw and fitted over the bottom end of the 3-inch piece so that when it is inserted into the 4-inch section all the space between the poles is taken up. On no account should reducers, as normally used on water pipes, be tried. They are cast and have only about an inch of thread to take all the strain.

As the beam head to be put on was a Quad, of all metal construction, secured by scaffolding clamps,

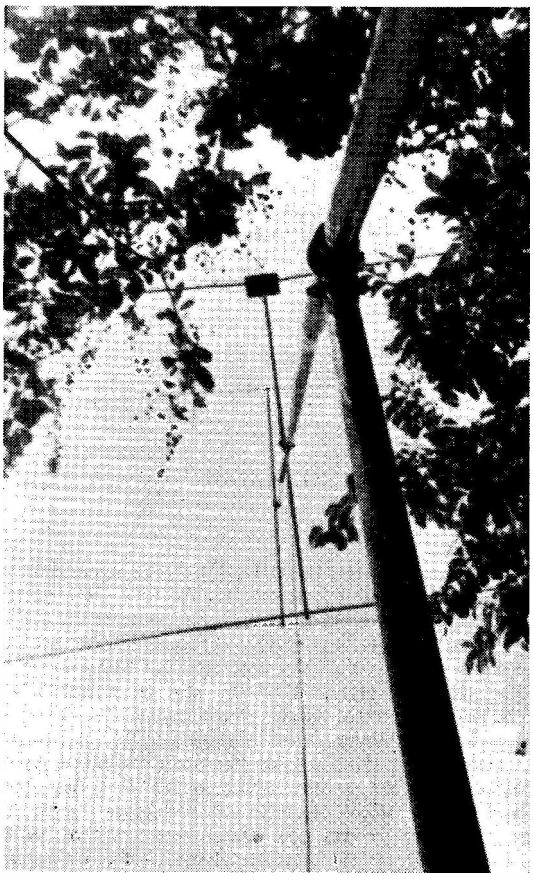
it was very convenient to make the last section of the mast out of scaffolding pole. The difference in pole diameters is rather large but two sections of angle iron rammed into the gap between the two sections of pole made a very good tight joint.

Hauling Up

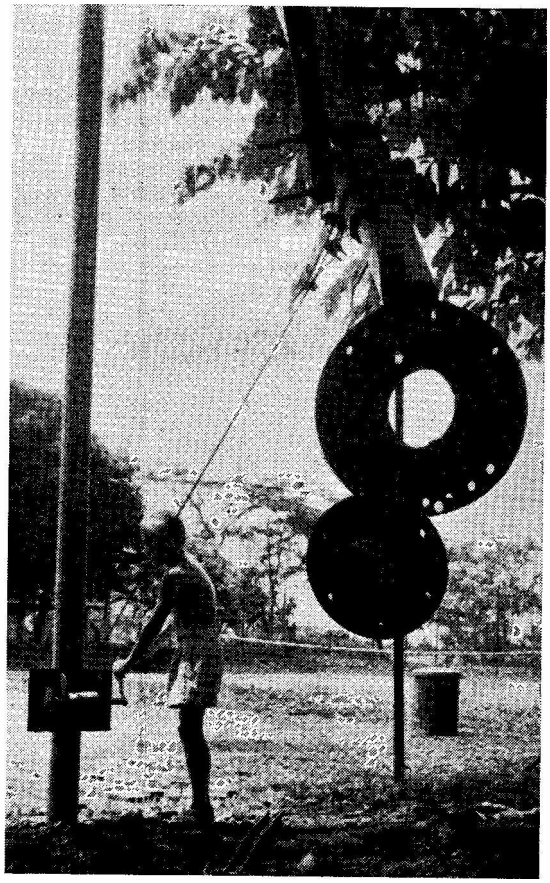
The steel cable from the pulley at the bottom of the pole is attached to the lower end of the mast and the pole is then pushed against the fulcrum so that the steel flange goes hard up against the outsize diameter pipe. Another bolt is then pushed through a hole in the pipe to stop the mast sliding out of the outsize pipe when the mast is raised or lowered. The mast should be raised and lowered to see if there are any snags.

Beam Details

The beam on the pole is an all-metal Quad that looks like two ten-metre beams stacked at half a wavelength (rather wide spaced). The tips of the elements of the two bays are joined together by 14g. copper wire, making full wavelength loops for 20 metres.



Looking up towards the fulcrum point, about which the clevis moves, as the mast comes up to the vertical. At this stage in the erection process the hauling up is quite easy, as the centre of gravity of the whole assembly is approaching the vertical.



The heavy pieces of iron are hung on temporarily to counterweight the mast, reducing the top-heavy weight to about 30-40 lbs.—making it possible for young 9L1HX (junior) to haul up Dad's 20-metre Quad on its 60-foot mast—see text.

The booms of the bays are connected to the scaffolding pole section of the mast. Initially the spacing between the bays was 18ft. 6in. but this had to be increased because the resonant frequency was too high. It would seem that the formula of "250 over frequency equalling length of one side in feet" does not apply with this configuration. The boom spacing on this Quad is now 20 feet and the resonant frequency is still a bit high. (Work had to stop with the onset of the rains, so the formula is still actually unknown.)

The aluminium elements on each bay are: Reflector, 19ft. 6in. and the driven element 18ft. only. If these lengths are increased they will also bring down the resonant frequency.

The Quad was wound up using the pulley, but with considerable difficulty. The weight of the beam was "amplified" by the long top section of mast above the pivot at the top of the fulcrum. In future

the writer would add counterweights every time some change was made in weight at the top of the pole. The pole is counter-weighted to give about 35 lbs. at the pulley. The mast and array have to be slightly top heavy so that some control can be obtained of the structure during raising and lowering.

This array has stood up to some bad storms that uprooted trees, and also survived a direct hit from lightning. When the rains let up different lengths of elements will be tried and other methods of matching —quite easy now that the beam can be raised and lowered in a few minutes.

As regards the depth of the mast in the concrete base, it would probably be a good idea to take it as deep as 7 feet if the soil is fairly light. The steel pole itself is very strong and although it sways a lot in gales it should stand winds up to 100 miles an hour—we hope !

Miscellany

COLUMN OF COMMENT ON THIS-AND-THAT

If Bell Telephone can fix Telstar while it's 3,500 miles out in space . . . how come the repairman always has to take my set to the shop ?

(Ex-G Radio Club "Bulletin")

— • • • —

Top Band Terminology :—

"I'm not sure whose turn it is" means *"I never listen when anyone else is transmitting."*

"I missed your last over due to local QRM" means *"I can't control these blasted kids."*

"QRX a minute" means *"If I don't take the wife's breakfast up she'll kill me."*

"Your first transmission was a bit distorted" means *"I didn't realise you were on SSB."*

"I never take notes" means *"You say the same old things every week."* *(Tamar Pegasus)*

— • • • —

Heard on Top Band—far too often—the complaint that SSB is "a nuisance in local nets." One would think the average Top Band net is equipped with receivers having no RF gain control.

— • • • —

In one of the local nets on Top Band, a /M station was having this trouble. One of the Technical Types in the net suggested a cure. "Stick your arm out of the window, Bill, and earth the whip with your hand to reduce the pick-up." Back came Bill on the next over and says the method works . . . Wonder where the accident finally occurred ?

— • • • —

Listening to the Phone signals on 80 metres makes one wonder whether the abolition of the probationary CW period was a good thing. Most of the horrible AM signals on the band seem to emanate from Phone-only stations with homebrew transmitters whose callsigns are of later origin. Or is the art of building *stable* un-neutralised PA stages dead ? Come to that, is it *possible* to build an 807 PA that does not need neutralising . . . there never has been one built yet in this station that didn't take off at first.

— • • • —

On Tuesday evenings at 1900 South African Summer Time, on a frequency around 3·6 mc, the Amateur Radio Research Group, a South African body, have a Technical Net. Questions are presented to the Net Master, who will call upon, in turn, members of the net, to answer and discuss the question. One cannot help wondering if this sort of thing is within the terms of the G licence, and if so, whether it would be the answer to the problem of getting an R.A.E. class going for people having no local Technical College offering the R.A.E.

— • • • —

Definition of frequency for a Top Band sked, overheard recently. "I'll meet you at eight o'clock tomorrow night just LF of the ninth Funny Noise counting from the two-meg end." Out of curiosity, a listening watch was kept, and sure enough both stations appeared at the appointed time dead on the same frequency.

— • • • —

Whilst on holiday recently, the writer came across a shop which sold fishing tackle. An item of interest to those amateurs whose aerials are supported from trees was a small lead sinker shaped like a bomb, having a strong wire loop cast into the "sharp end." When this was attached to the end of a length of 25lb. breaking-strain single strand nylon line bought from the same shop, it was found possible to throw the bomb far higher up the tree than the stone used previously. More to the point is the fact that the lower friction of the nylon line ensures that the bomb not only goes up but also comes down again under its own small weight, and the shape of the weight is such that it finds its way easily through the foliage on the way down. The line can be used to pull a stronger cord or halyard over, and then coiled up on its reel and put away with the bomb for the next time.

VHF BANDS

A. J. Devon

BECAUSE of some rearrangements in the shack of A.J.D., he has been somewhat disconnected from VHF goings on for the last month or so—but from the correspondence, it would seem that nothing very exciting started to happen until late in the period, around July 22-23, when EU's were coming into Southern England and the Midlands, including DJ/DL's and some Scandinavians. On the other hand, there have been periods when GDX has been quite good, and also EDX from the southern part of the country into France and to the south-west. As always, it is a matter of watching for the signs, one of the most useful of these being the weather charts shown on TV —look for the large anti-cyclones, and note in what direction they are predicted to move. Then there are all the other signs as well—the evening sky, cloud condition, the barometer, strength of the beacon signals, and of course the activity, meaning the sudden appearance of stations at DX, also testing conditions.

Some DX-Peditions

During August, the Islands of both Sark and Alderney are to be activated on VHF. Over August 14-27, GC3OUF will be on two metres, and GC3OHH on four metres, both from *Sark*, Frequencies are given as 144·16 mc and 70·41 mc, modes to be used being CW/AM/RTTY on both bands, with FSK and AFSK for the T/P operation—which could result in a few interesting "firsts." At any rate, the boys will deserve all the support they can get on the RTTY side—just think of the palaver involved in lugging all that machinery across and into a go-condition. The party will also include G3TEY and G3PLX, and the sole QTH for all skeds for this particular foray is: David Evans, G3OUF, 80 Argyle Road, Ealing, London, W.13. And he would like to hear as soon as possible, as time is now getting short.

From August 20 until September 5, a group signing GB2GC will be visiting *Alderney*, running all *four* VHF bands, 23 cm, to 4m., their frequencies being 70·35, 144·12, 432·15 and 1296·45 mc for the respective bands. Skeds will be welcomed for all bands, especially 23 and 70 cm., and those interested are asked to state frequency and preferred dates/times. Write: John Whittington, G3SHZ, 19 Dorset Road, Harrow, Middlesex. And, for those who may wish to know, the Islands score as separate counties, in the one "country" of GC.

Another interesting trip will be that to be taken by G3TWV/G3TWX through Holland and Belgium, signing PA9 and ON8 calls, running Withers equipment on two metres, with an 8-over-8, operating AM and CW; this will be during September 16-20.

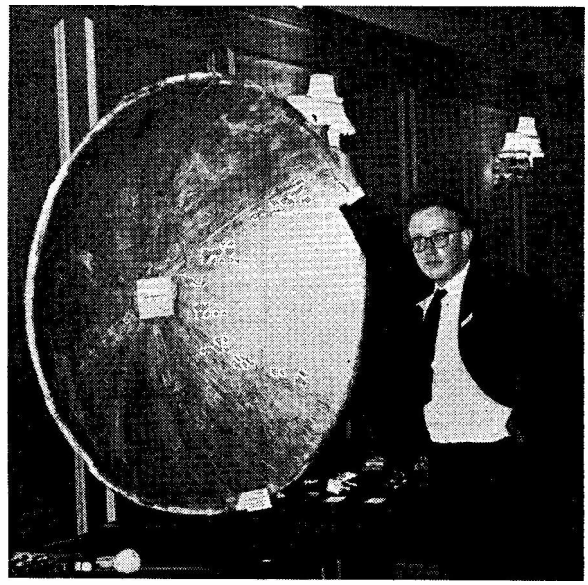
Incidentally, it might be mentioned here that we are always interested to have (for possible publication) notes and photographs covering DX-pedition experiences and results. Obviously, the GB2GC attempt on 23 cm. is an important undertaking from the experimental point of view, and any results will be well worth discussion here.

* * *

Talking of experimental work, the latest *Oscar* information, *via* G2AOX, is that the Melbourne University Radio Club are getting a vehicle, to be called *Australis I*, ready for launching (from California). It has already been successfully tested on balloon flights. Main features are: An HF beacon on 29·45 mc, sending VK five times every 70 secs.; a similar beacon on 144·05 mc; and various telemetry channels. In an attempt to control the well-known "tumbling effect" suffered by all small space vehicles (causing artificial fading) *Australis I* is to carry an experimental magnetic system to keep it in alignment with respect to the Earth's magnetic field. Like the *Oscar* shootings, the *Australis I* launch details will not be known until the U.S. Army authorities release the information.

Tabular Matter

Only the Two-Metre Annual is shown this time (it not having appeared for the last couple of



G3OAD, Dudley, Worcs., has contrived a 4ft. diameter dish aerial fabricated from fibre-glass and, presumably, covered with aluminium foil (details are not given). The important thing is the shape of the dish and the positioning of the feed point. We are informed that G3OAD can supply the details.

months). Claims for the year to the end of this month should be put in with reports for October, in which issue the final placings will appear. Of course, Annual Counties opens again immediately, starting from September 1, for which claims can be staked as soon as your first 14 counties have been worked. And this year, it is proposed also to run on the same lines, except that the starting figure will be 5 counties, an Annual for Seventy Centimetres.

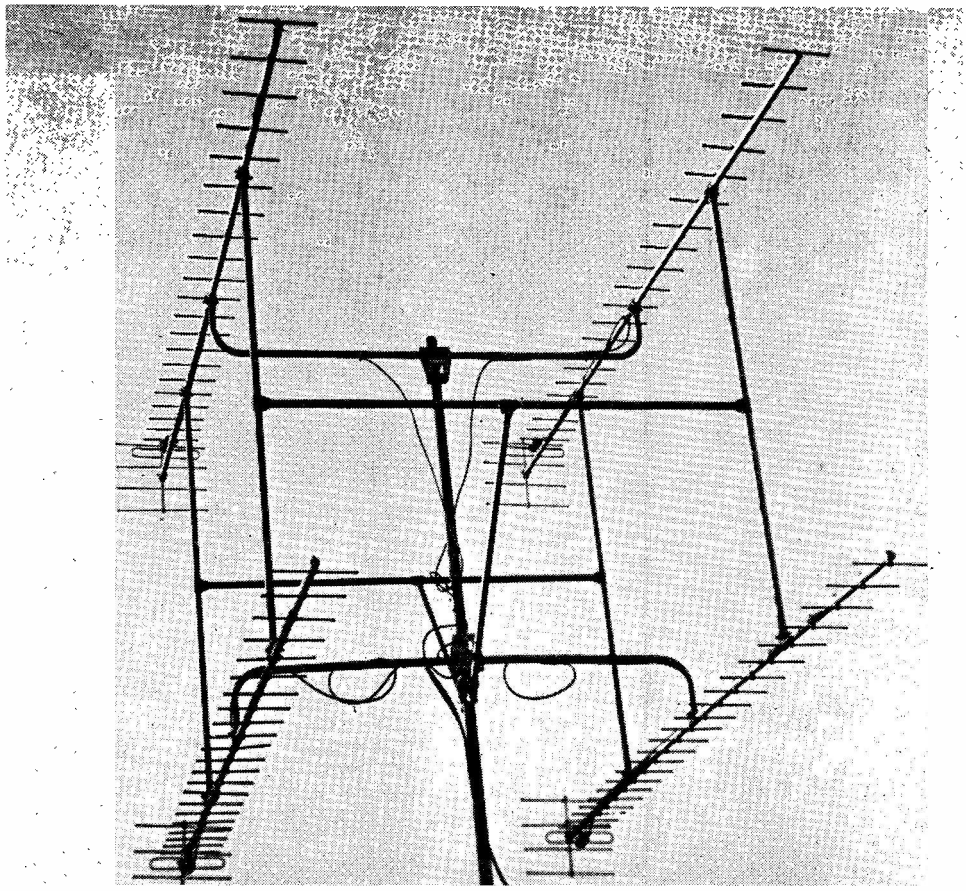
These two Annuals will be in addition to the Three-Band, which likewise closes at the end of this month, also opening again on September 1, general rules as before—but for this year we shall *not* have multipliers. This seemed a good idea at the time. In fact it has caused some unexpected confusions. We thought it was clear enough that the multipliers would only be effective for the period April 1 to May 31 inclusive—*see* p.157 May. It was also thought to be clear that the bonus so gained would be carried through to the end of the period. But the last appearance of the Three-Band Annual (for which your devoted A.J.D. did a number of complicated arithmetical calculations) raised some queries, the main one being: *"Well, how do we stand now?"* To which the answer is *"As shown on p.282, July."* So, for the October appearance of the Three-Band, just add whatever you have scored since and up to August 31, and that will determine final placings for the year now concluding.

For the coming year, then, that makes it the Three-Band, the Two-Metre and the 70 Centimetre as the Annual tables—to appear monthly—with the others, which are All-Time and cover 70 cm./2m./4m., being shown when space permits. We will try to get them in as often as possible, so keep up with the Two-Metre, Four-Metre and 70-Centimetre All-Time, and Countries Worked on Two Metres.

General Notes and News

The new Two-Metre Band Plan, discussed here last time (and look again at that Table on p.280, July, to make sure you are in the right slot) has been generally accepted as a sensible partitioning of the 144-146 mc area. Since the 70-centimetre band is substantially in third-harmonic relation, it is now proposed that 432·0-432·1 mc should be for CW only, with 433·41 mc as the SSB spot frequency. It has always been difficult to get the idea of zones established on the 70 cm. band—though, indeed, because the frequency-area is so much wider and beams a good deal sharper, defined geographical limits by frequency ought to be even more useful on 70 cm. than on two metres. As regards the immediate changes, what it comes to is that the frequency-area 432-434 mc is divided to the same limits, geographically and by actual width, as is the two-metre band, with the same counties in Zone 2, at

Though the Midlands VHF Convention, dated for May 14 last, was pre-publicised in these pages in our March-April issues, no subsequent report was ever received, and we are without any detailed information as to what happened, who was there, and how the thing went. (We were not even invited to contribute to the prize draw!) However, since then some photographs have come in "from independent sources," and this one shows Tom Douglas, G3BA, of Sutton Coldfield, who was in the chair, delivering his after-dinner address.



Guess what, and where? A 96-element J-Beam, energised at 432.6 mc, with full 360° rotation from the operating position, at a height of 1,000ft. a.s.l., with a clear take-off in all directions—that matter to EI2W, Sandyford, Co. Dublin. He is now putting out a very potent signal on the 70 cm. band, running 20 watts input, and is working G's even under what are euphemistically called "average conditions." Harry says he will always be glad to demonstrate what he describes as a very fine example of J-Beam engineering.

432·1-432·15 mc. From this, you can work out the rest of it for yourself, with the Table on p.280, July, as your guide.

* * *

An interesting EDX station now regularly on the air is ZB2VHF, from the top of the Rock at 1400ft. a.s.l., with a slot-fed 8/8, evenings Tuesday-Friday inclusive, 2000-23000z, on 144·091 mc, CW/AM. When things are quiet, they turn the beam north and put on an auto-keyer, calling "CQ de ZB2VHF," for 10-minute periods, then listening for 10 minutes. Skeds for this exercise would be welcomed by: J/T Osborne, ZB2AP/ZB2VHF, Devils Tower, R.A.F. North Front, Gibraltar. Stations worked since April this year include EA7FT, EA7HZ, CN8ED, four more CN8's, and CT1GZ at Castela Blanco. The ZB2VHF licence also covers 6m., 50-54 mc, and 4m., 70·0-70·6 mc, so there are possibilities on the latter band, too. As ZB2AP is available on 14·1 mc CW during 1800-1830z on the same Tuesday-Friday evenings, and ZB2 is a push-over from the U.K. on 20 metres, here is an obvious talking-channel for arranging skeds.

* * *

Looking at some of the reports, we are glad to see GW3CBY making steady progress. Swansea is a long way from the centres of VHF activity, and is heavily screened in northerly directions. Yet he is active on three VHF bands, and has recently worked G3MPS (Bridgwater) on 70 cm. G3TDL (Solihull) also enters claims for the Tables and though having started only a couple of months ago on two metres, has already raised 54 stations in 15 counties; his location near the centre of the land-mass of England will undoubtedly have helped him, but even at that it shows what can be done today on our most active VHF band.

On this theme, an interesting letter from G3FVC (Maidenhead) who came on two metres more because of the friendly persuasion of G3MEV than for any other

reason. Thinking that all he would have to listen to would be "sharsh" for long and lonely hours, he is astonished to find that he qualifies for the bottom rung of the Annual with 14 counties and no less than 102 different stations worked. He says: "My main reason for writing is to point this out to others who, like myself, may think two metres rather thin from the purely operating aspect. I work all the other bands, Top to Ten, and can say that it's well worth while, if only because it is so odd to have a contact without QRM and noises-off"! G3FVC remarks that his rig is of the simplest—

At the Midlands VHF Convention of May 14, held at Wolverhampton, the prize draw was managed by G3TEY (left), on the diddle-drum, and G3ENY. By one of those extraordinary coincidences, it was none other than G3ENY who drew the first ticket. (We gather that, on the forthcoming Alderney expedition, G3TEY is being given the teleprinter to carry.)

TWO METRES

COUNTIES WORKED SINCE SEPTEMBER 1, 1965

Starting Figure, 14

From Home QTH only

Worked	Station
62	G3EDD
52	G3DY (215), G3HRH, G3RST, G3TLB
45	G3UFA
43	G3FNM (136)
42	G3TQZ (140)
41	G3PTM (119)
40	G2AXI
39	G3FIJ
36	G3IOE
35	G3UFQ
33	G3BNL, G3KQF
31	G3AHB
30	G5UM
27	GW3PWH
26	G3JON (179)
22	GW3CBY (88)
19	G2CDX
18	G3THC
17	G3UTT
16	G3SLJ
15	G3TDL (54)
14	G3FVC (102)

This annual Counties Worked Table will close on August 31. The final Table for the year, made up from claims to that date, will appear in the October issue. The new Annual Table for 1966-'67 opens again immediately, w.e.f. September 1st, 1966, and will run till August 31, 1967. Operators new to the two-metre band are particularly invited to join Annual Counties.

a Tx running 10w. to a QQV03-10, into a 4-ele Yagi on brackets just outside the window (only 15ft. above ground), and the converter is a 6DS4 job into an HRO tuning 14-16 mc. Of course, having tasted blood, G3FVC is planning to make all this a bit better.

Having mentioned GW3CBY, long a follower of this piece, we should also mention that the next letter on the pile is from GW3PWH, also of Swansea; he is going very well on two bands, with 27C worked on two metres, also F3YY (Cherbourg) and EI2A (Co. Meath) for two more countries.

G3RST (Crowborough, Sussex) suggests that a list of all the EU beacons, with frequencies and transmission characteristic, would be helpful—agreed, and your A.J.D. is in process of compiling the necessary data. G3RST remarks, in support of his suggestion, that when the band was open to LA all that could be heard *was* the LA beacon. It would seem that at the time the LA's had nothing to hear from this country . . .

G3EDD (Cambridge), leader in the current tables, will be away in VK/ZL on firm's business by the time this appears. Brian keeps solidly at the other business of full activity on three VHF bands as time and opportunity offer, and is now one of our most prominent VHF operators. He was also one of those puzzled about scoring in the Three-Band Annual, and it is to be hoped that he will be launching out again in the Annuals for 1966-'67.

For many years now, G3FIJ (Colchester) has been a keen and active VHF operator. He runs the three bands 4m. to 70 cm., and consistently turns in healthy totals.

Most regrettably, this time we are unable to show the Four-Metre All-Time, for which G3OHH (Macclesfield), G3UYB (Bromley, Kent), G3UOR (Caterham, Sy.) and GW3PWH have reported.

And to Finish

Be careful over Bank Holiday weekend (August 26-30 this year); watch the met. charts; call CQ on CW if the band sounds dead; try two or three times again if you don't get a reply to your first call; and, to keep A.J.D. in your particular picture, write in again with all the gen. by **Monday, August 22,** addressed A. J. Devon, "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Always look left, and if Allah is with you, he will guide your footsteps. *73 de A.J.D.*

COMMUNICATION and DX NEWS

LISTENING casually around the bands, one is somewhat reminded of Lewis Carroll's " Hunting of the Snark."

" *They sought it with thimbles, they sought it with care;*
They pursued it with forks and hope;
They threatened its life with a railway-share;
They charmed it with smiles and soap."

It is one of the effects of Murphy's Law that whenever a transmitter is in no condition to go on the air, then the associated receiver will hear DX going begging. However, it is instructive to use such an opportunity really to listen to the pile-up on and around the frequency. If the DX is possessed of a *really* dirty note of the RST-252 variety, then one can sit back and be amazed at the 579x reports the pile-up gives the DX station, virtuously thinking what sort of a report would go out from " this station " were it possible to radiate. All this " smiles and soap " is not much help to a DX station far from a stockist of replacement components who is about to suffer an enforced QRT due to malfunction of his gear. If one leaves out of account the owners of commercial gear, it is fair comment that 99 per cent of the dirty notes on the air emanate from transmitters whose layout is all wrong technically; the same heap of bits put together correctly *could* radiate a T9 note. It is an odd thing about this that the Iron Curtain types who seem to own a lot of the 252 signals are granted licences by a system that ought to ensure that a transmitter with a dirty signal cannot exist. A lot of the trouble probably stems from the practice of monitoring the outgoing signal other than through the station receiver; a properly muted receiver picking up a mite of the radiated RF will give immediate warning of any deterioration in quality.

On the other hand it is amusing to hear the rabble seeking, pursuing, threatening, and charming the DX—all to no avail, and mostly when he is sending anyway, what time the smart operators are getting the contact with none of these tricks in evidence. With the modern trend towards split frequency working the smart boys must be able to listen on at least two frequencies at once, *i.e.*, the spot the DX is listening on, and also the spot he is radiating on, if they are to have a sporting chance —but your conductor is ready to take a small bet that most operators use one receiver only when actually on the chase. Perhaps, for the good of all, some of the old-timers would care, in their reports for next month, to expound on the ways and means as well as the results, for the benefit of the less-experienced who make up the vast majority of our readers. Your conductor would wish to make it clear that by " old-timers " he means those experienced in the hunt for DX, which implies nothing as to age.

Sea-Farer

Pride of place must go this month to G3PJY, who writes in to mention that he is going /MM during his annual spell of training with R.N.R., from Zones 14, 34, and 35, which leaves him scope for something interesting if the opportunity arises. The /MM part of the operation will involve mainly CW on Forty and Twenty, but, as Ray says, Phone will be possible but " to order " only. Operating times and so on will

FIVE-BAND DX TABLE

(New Cycle)

Starting date: January 1, 1966

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc
G3PQF	64	15	5	18	46	24
G3IGW	100	1	48	55	44	42
G3IAR	99	10	58	57	38	32
GM3SVK	103	3	92	24	37	4
GM3KLA	80	11	62	22	37	38
GM3RFR	94	7	51	62	36	6
G3LZQ	141	6	52	120	29	18
G3VDL	69	8	24	52	28	9
G3UML	169	55	69	145	26	29
G3VDW	74	12	35	51	24	9
9V1LP	35	14	22	24	21	21
GI3GTR	15	1	3	10	6	7
VP8HJ	67	3	8	65	5	1
G3UBI	49	2	10	26	5	25
G3UDR	76	5	20	46	2	18
G3NMH	187	48	93	177	—	—
G3RJB	44	—	—	36	—	22

Note: Placings for this month are based on " 7 mc " column.

depend to a great extent on the incidence of watchkeeping (and perhaps *mal-de-mer*), but a check on 7050 or 7064 kc around 2000z should show up some sort of indication of activity. Being with R.N.R. is one of the ways of getting the chance to go /MM, with a good crowd of chaps (G3PJY probably doesn't realise it but your scribe was in the same group of the same mob years ago when they had an Hq. near the top of Wheeler St....). And, of course, the sort of gear that is used nowadays is enough to make any amateur lick his chops in delight. A " constructional " type of amateur would find at the end of his training cruise that enough ideas have accumulated to keep him out of mischief for the rest of the year.

Still with the Services, this time in Singapore, we have a letter from Maurice, 9V1MK, which points out that he and 9V1ML are the operators of the Royal Signals (Singapore) Radio Club jaunt to Brunei, which if all has gone well, will be over by the time this is in your hands; however, this trip at least was to be devoted mainly to working the U.K. stations, unlike some of the others that have been heard on the bands recently. (Unfortunately, their news reached us too late for July issue.)

Welcome News

By way of a letter from 9G1ED we are pleased to be able to report that the ban on amateur operation in 9G1, mentioned on p.155 of the May SHORT WAVE MAGAZINE, has been lifted, with effect from July 8. Let us sincerely hope this is the last time such action occurs for a very long time indeed.

Award Note

We are told by the Newark group that they are now offering the " Robin Hood " award which does involve working outside the U.K., as well as the local lads; full details are available from the Hon. Sec. of the Newark Club, G3TWV (*QTHR*).

Around the Bands

For this month, we will take Top Band first. In the matter of the annual round-up of rare counties, quite a lot has been doing, although for much of the time the band has been even noisier than usual. Your conductor heard GM5PP/P out in Scotland from various rare counties, peaking S8 in the Home Counties in daylight on AM, from Selkirk, apparently ragchewing before the start of the serious business of the evening; however no contact resulted so this may have been one-way propagation. (And *see* p.357.)

Away up in the Shetlands, GM3SVK (Unst) has been quietly making preparations, and will be in full cry by the time we are in print. Fred says that at the time of his writing nothing much was doing, and cites PAØPN working 9H1AE, heard at his QTH, to prove it!

G3LWQ (Southport) sends in an RAIBC QSL-card with his county score, 98–98, which must have pleased Harold not a little. They must be made of stern stuff in Lancashire, because there is no other comment on the card, but it is a fair guess that Harold feels rather like the cat after she has stolen the cream—and so he should, too!

As for G3PPE (Wallasey), Mike has been finding no problem in knocking off the EU stations on the band, in spite of the seasonal static level. He puts in a claim for the Ladder, and says he has high hopes of adding to his totals by way of all the holiday-time activity.

From G2NJ, a very brief note and entry for the Table, from which it is obvious that the /P activities are already reaching a high level. G2NJ mentions GM3SAN/P, near Ullapool; GM5RI/P, Point of Stoer, Sutherland; and of course, GM5PP/P in various places.

G3UAN rang the bell to the tune of seven new counties during the month, four of which were /P stations, to push his total up to 72. G3UBW reports a QSO with GM3SVK, but what is even more interesting is his hearing W1BB and W2IU on the morning of July 10—great pity that a QSO did not result, although it seems likely that G3UBW was heard by W1BB. The W stations were around the S7 mark in Sevenoaks, and, thus encouraged, Stephen is proposing to keep watch each Sunday morning until the beginning of October. It will be interesting to hear the results of this exercise.

Those who regard Top Band as " out of court " owing to poor aerial facilities will be encouraged by the report from G2VV, who is the proud possessor of a 68 foot bent *indoor* wire, end fed, with which system he worked OK1AJY.

Up in Inverness, GM3IAA has erected his 570ft. VS1AA-type aerial, and reports on its effectiveness on all bands. In terms of 160 metres, it has so far yielded 589 from DJ8, and 599 plus from GW.

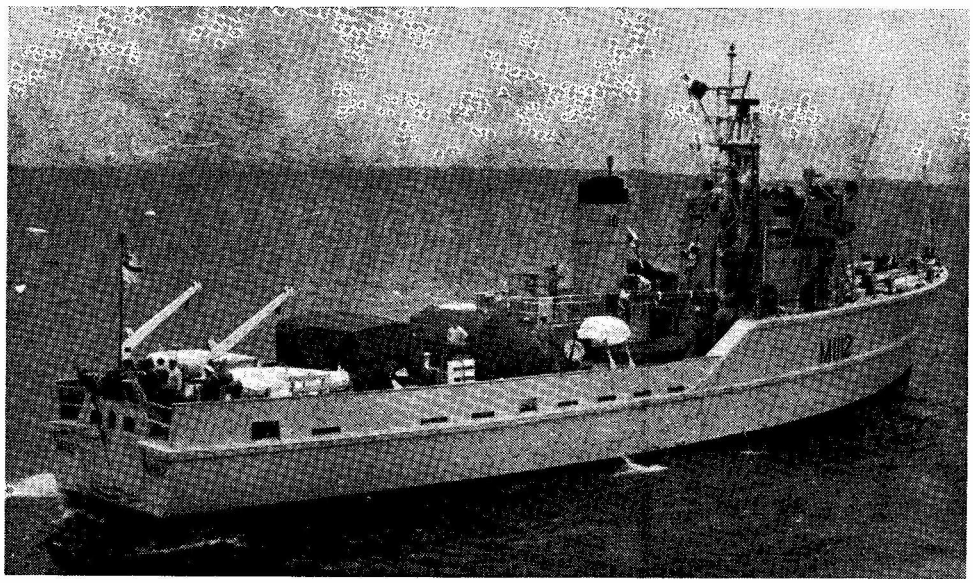
We hear that G3NMR/G3UML will be operating mobile from all sorts of places on the Continent over the period July 27—August 17; all bands will be used, but the item of especial interest as far as Top Band is concerned is that between August 2 and 10, they will, all being well, be putting the various OE prefixes " on the map," using both CW and SSB. Look out for them on or around 1830 kc, between 2100 and 2300. Let us only hope this does not provoke a Phone pile-up at the CW end of the band.

Eighty Metres

Hal, G3NMH, remarks that the Five-Band Tables do not place sufficient emphasis on Five-Band working. It is always a pleasure to satisfy a regular customer, and so easy. This month, the Five-Band Tables will be based on the score on Forty, and next month on Eighty, as regards placings, and in future we will endeavour to use each band in turn as the determining factor in placing, although retaining the " random " element from month to month.

It is not usual practice in this column to mention SWL reports which are really better discussed in the context of the " SWL " feature, but we have a letter to hand from SWL Knight (Aberdeen), from which we gather that over the period July 6–16, the SSB signals in the small hours of the morning were quite good to both North and South America. Your scribe is sure

Reporting the HF Bands



Another ship picture with an interesting Amateur Radio connotation—a coastal minesweeper of the Royal Navy, of the type in which R.N. Reserve personnel do their annual sea training. It is in a smart little ship like this that G3PJY/MM will be taking the air on the 7-14 mc bands, for a fortnight or so after August 12. He will be using CW mainly, 2000z onwards, and expects to be " somewhere in Zones 14, 34 and 35 "—the lucky chap! He gets paid for it, too, the fortunate fellow!

SWL Knight will not mind if we transfer the rest of his letter to the " SWL " feature, for which column he has various points of interest to discuss.

Forty Metres

This band has been its usual self; a band you either love or heartily detest. One of its main charms is that it is the " easiest " band from the point of view of TVI on which to work outside Europe. G3PQF mentions that SSB on 40m. is profitable, and cites 9Q5CZ and 7Q7AL to support his contention. Your conductor is more fond of CW on this band and has heard various mildly interesting signals, albeit always at least three layers down under the EU-stuff.

G3LZQ put on his " other hat " as GB3DCL, along with G3LIQ, G3JXE, and G3PJR, using a Swan transceiver and groundplane, and their united efforts produced UF6, UJ8, UA9, UAØ, and UL7's on the key, plus CN8 and PY on SSB.

GM3SVK offers PY7, SV1YY, TF5TP, CM2QN, among others, and remarks that the band is open most nights if one is only prepared to listen carefully through the holes in the wall of QRM—and, of course, as the night goes on the short skip weakens and by early daylight excellent DX is workable.

The HF Bands

As usual, these have carried by far the majority of the traffic, with an increasing amount being siphoned off Twenty on to the other two bands.

Looking first at the Ten-metre clip, G3IDG mentions 33 countries heard during the month, mostly on the North-South path, or short-skip, all on CW. One of the most interesting was G3SJ/CT3, who apparently has been on Madeira for a couple of years but has only just succeeded in getting a licence; when the ticket landed, it authorised 500 watts but gave no callsign, so presumably a CT3 call will be forthcoming in due course. Among the best of the other prefixes heard were PY, ZC4, ZD7, 7X2AH, and 9Q5LJ.

G3PQF (Farnborough) has been enjoying the delights of the band so thoroughly that he forgets to tell us what he has found! However, doubtless we shall hear it all next time round.

Up in Hull, G3LZQ is still having work QRM; however, against that we are now getting up-to-date on his letters. Last month we quoted his letter sent in for the previous month; this time there are two letters in the clip to bring us right at last! The 10m. takings for June were mainly by way of the short-skip stuff, with 4U1ITU as about the best of the bunch, and nothing at all in the June offering. Carrying on further north, there is a report from GM3SVK, again of short-skip and some DX on the North-South line, South America and Africa being heard. On most days the GB2SM signal is audible on 28·2 mc.

The letter from G3NMH is one of the monthly mainstays, always full of interesting snippets, but on this band, all he says is " very disappointing " followed by OHØNF, MP4TBO, FH8CD, all on SSB, plus CR6GJ on AM. Your Scribe would raise no objection whatever to having that quartet in *his* log, OM.

G3NOF (Yeovil) has taken the beam down for overhaul, but nevertheless is able to report a 10-metre opening in the direction of South America on the afternoon of June 13, to give QSO's with PY's and also 5Z5, KZ5, and KP4. On

the following day, it opened very suddenly to North America for an hour from 2250, in which time G3NOF had S9 SSB contacts with various W1's and W2's. It begins to seem as though the sunspots are getting down to work at last!

G3VDL only makes mention of one contact on 10 metres, with ZD7IP, on CW; likewise G3NWT (Derby) who raised one W on the band, but could hear G3NOF at the same time working strings of them, as related earlier.

One supposes that the bulk of the DX traffic is carried on 14 mc, whatever the state of the sunspots, if only from the consistency of the band over the years. Even in a flat period, on any given day one has at least a sporting chance of finding *something* to work, even though it never rises to the heights of Ten at a sunspot peak, when " the world on a piece of wet string " is almost true. Hal, G3NMH, has a long list of interesting things, like FO8AG, FY7YJ, LA1EE/P (Bear Island), M1B, ZD8TV, FB8WW, and hosts of others.

GM3SVK worked TA2BK, JA, and a collection of the rarer parts of the Russias, on a very inefficient antenna system, but is now working on something a little more potent; the results will be offered next month. Be careful with predictions like that, Fred—the last time your conductor threatened the band with a new aerial, it took him a month to find the fault in the rig which prevented him loading it up properly!

GM3JDR (Golspie) offers, with no comment, a nice list, including ET3RN, ZD7RH, FP8CS, LA1EE/P, loads of JA calls, KR6's, and other pieces too numerous to mention, all on the key.

G3LZQ reports a couple of all-time new ones for him on 20m. were PJ2MI and 9N1BG, both on Sideband; CM1AR on the key, TG9AD, XP1AA, TI8LM, LA2JK (Jan Mayen) all on SSB, were some of the other catches of the month on this band, for G3LZQ.

G3VDW (Coalville) received his ticket on April 2, but has already worked 74 countries, 51 of them on Twenty, using 150 watts to 136ft. of wire, end-fed, and receiving on an AR88LF, which is pretty fair going, to put it mildly. An interesting one found by G2VV on this band was OX3LP/OZN who is ex-OZ4LP, OZN being the sound radio station at Prince Christian.

Over at G3VDL, the pump-handle has been running hot again, and as a result such items as FP8CK, HK3BAE, HZ1GI, KV4CI, MP4MAW, YN1CJD, and 9Q5LJ grace the log for the last month.

A nice long chatty letter from G3NWT, who mentions XE3CM, various VK's, VP1, VP2, and the sad affair of the LU who thought G3NWT was in the Shetlands and stood by 20 minutes waiting to work him, with HR1KS (Tegucigalpa) to round it off.

Fifteen Metres

At this stage in the sunspot cycle, 21 mc is a band that fascinates by its very waywardness, sometimes thick with signals, and a few hours later broody, introspective, and above all, silent. For example, on July 4, ZD8J, busily working the W's and taking no notice of anyone outside the U.S., what time the band was giving to Africa and the Far East most of the day; later on, in the evening, South Americans falling over themselves to be worked. But on the following day . . . *Nix*, all day.

GM3JDR seems to have pretty well cleaned the band of DX, both CW and Sideband, if his list is anything to go by. Taking the CW log first: FG7XT, TF2WJS, a couple of nice symmetrical call-signs in IR1REE and ID1IDA, CR6, CR7, OD5, SU, EA8, HK5, 5Z4, TL8SW, and shoals of others. Who says there is not a lot of CW on this band? As for the SSB list, we have CR6's, FP8CY, MP4BEU, YV5CFA and 9Q5's by the load, also a marathon callsign in the form of W6SZU/MM/ZD8.

G3LZQ's two letters both say the same thing " only W6 and W7, around midnight, on CW." A more hopeful tone is noticeable in the letters from GM3SVK, who first of all makes the point that he thinks the ZP5LS mentioned last month as a query by your scribe was almost certainly OK, as he had a string of contacts in the same general area around the same time, with similar reports. The list for this month on Fifteen must be as long as your arm, Fred, because the sample you offer is longer than any of the other letters! In the first line are such things as 9Q5, 9V1, 9J2, 9J7AA/P, 9H1, VU's, then come CR6, CR7, EL2Y, VP and VR's and just about the lot besides.

G3NMH has a short list for 15 metres: 9M2OV, MP4TBO, FH8CD, FB8WW, all on SSB.

G2VV has a list of impressive dimensions for this band, the more so when one considers the " best bent wire " used as an aerial; the pick of the crop includes W6's, DX by any standards, CR6's, ZD8, ZP5, LU, 9Q5, and all the usual stuff such as the other W call areas.

G3NOF only made a few contacts on 21 mc, owing to the beam overhaul, but still managed to get ZS1JA, and 5Z4AA on to the hook, both being worked on SSB.

On now to G3VDL, who has EL2Y, TL8SW, WA8SVU/VP9 to show for his labours, all on CW.

GM3IAA writes of a dogfight on Fifteen that has its comic aspects, with 5H3JJ, acting the part of the " bone," being called by at least two stations, who should have known better, as HS2JJ! It must be difficult if one cannot add up to five, with all these awkward numbers of dots and dashes . . . albeit your scribe must honestly admit that while he *can* count up to ten at a push, he is still far from being a good CW operator.

A final snippet that may be of interest is that 9Q5LJ, who is active on Fifteen, asks for his QSL's to go *via* ON8RA, *QTHR*.

Here and There

The letter last month from G3IDG on the subject of " Boris, Vlad, and Ivan " touched off an answering chord from ZB2AG. Frank remarks with some truth that the tractor spares in a Farm Co-op in UL7-land are unlikely to include suitable parts to get the Tx back on the air again. On the other hand, OM, that situation may not hold for much longer, as there are remote controlled tractors about, and they could be in production in a few years—useful on a DX-pedition if the prime mover were also to serve as the junk box.

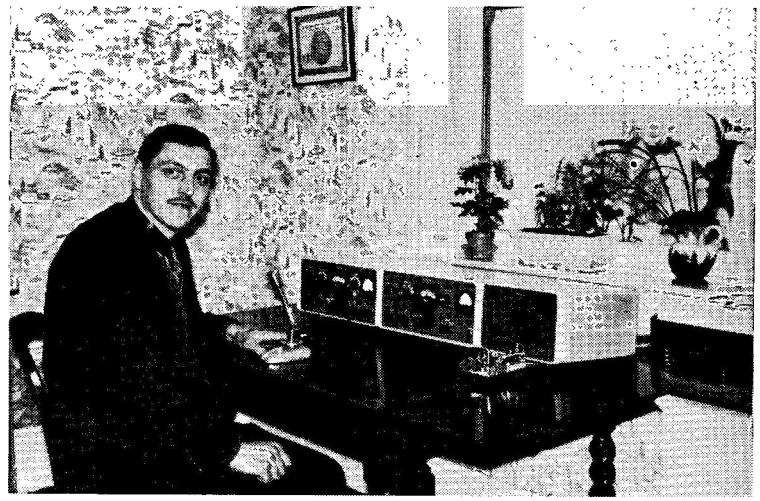
On the same theme, G3NWT supports the proposition that we are being hard on the " B, V, and I " characters. He points out, in their defence, that they are among the best in the matter of QSL cards, (which is dead true) and adding that if it were necessary for the practice of Amateur Radio to QSO in

Russian, he hates to think how basic the contacts would become.

On a different tack, ZB2AG explains the activities of the SSB gang on the Rock. It seems that from their home stations, it is impossible to get out to East or South-East. They therefore mount the occasional DX-pedition to RAF, North Front, about 50 yards from the Spanish border, from whence they get out in the awkward directions satisfactorily.

G3IDG refers to DXCC history this month; it was announced in *QST*, September 1937, with a first listing in November of that year, four W's and G6WY, now VE3BWY. At the end of '40, when DXCC was put in cold store, there were 122 calls in the list, including 16 U.K. stations. After the War it started all over again, and the first post-war DXCC in this country went to G6ZO.

Friends of Martin, OY7ML will be sorry to hear that he is forced to sell his gear, to pay for specialist treatment to his son David, who had an accident to his eye involving a toy pistol; let us hope all goes well and that OY7ML will soon be back on the bands.



When J. E. French, now of 53 Reddal Hill Road, Old Hill, Staffs., was serving in the Royal Signals, he got caught up in Amateur Radio and, on leaving the Corps in 1952, he promptly became G3LGL. After a 3½-year spell on 40m., he turned to working DX on 15 metres, gaining his DXCC. The present rig consists of the Collins S-line, to which the matching Collins 30L-1 linear is to be added in due course. Activity now is mainly DX on 20 metres, for which the aerial is a ground-plane.

G3PQF wants an article on " Ten-metre aerials guaranteed not to upset the neighbours." Your scribe went past the G3PQF mansion a couple of weeks ago and didn't notice a thing, so he must have touchy neighbours. All we can suggest, OM, is an invisible aerial of 36g. wire, using bits of the inner insulation of coax as the insulators. These are for all practical purposes invisible, and seem to be quite remarkably long-lived considering how thin the wire is.

The postscript to G3LZQ's letter is aimed at G3JUX—G3LZQ has had as many QSO's in five months as in the preceding seven years, adding " Anything in SSB? "

FIVE-BAND DX TABLE

(All Time)

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc
G2DC	329	170	291	317	170	112
G3IGW	195	123	133	157	119	74
GI3IVJ	325	181	263	319	103	83
G3KMQ	237	10	99	212	101	55
G8DI	162	67	100	141	74	43
GM3KLA	96	11	62	29	73	40
G3PQF	97	21	25	46	69	46
G3LZQ	202	58	122	170	57	29
G3UML	220	59	107	205	50	33
G3RJB	121	11	26	113	50	22
G3UBI	103	10	26	113	50	22
GM3RFR	133	11	69	108	49	15
G3NOF	288	132	194	272	34	39
G3IDG	104	61	73	54	27	18
VP8HJ	178	8	57	174	26	11
G3UDR	152	29	76	122	4	38

Note: Placings this month are based on " 7 mc " column.

Prefixes

ID1IDA is the callsign of a station operated from an off-shore oil-terminal of SAROM refinery, Ravenna, in connection with a Ravenna field day, June 24-27.

IR1REE was on from the Electronics Exhibition in Rome, and the QSL address for this one is

understood to be P.O. Box 361, Rome.

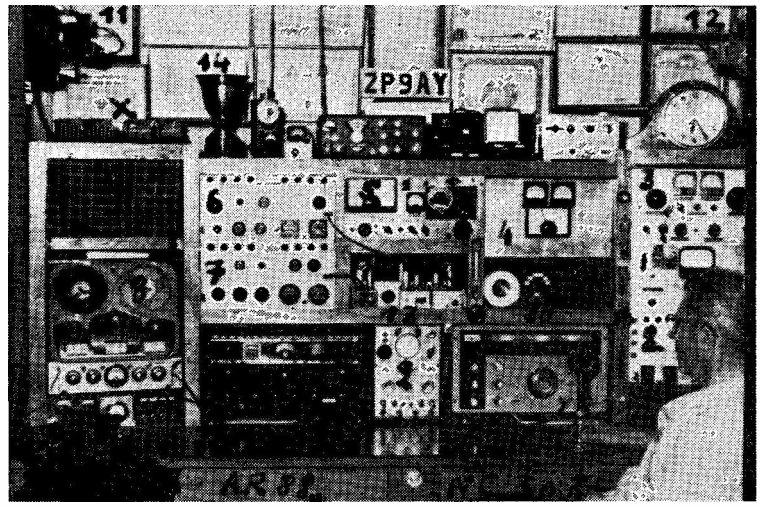
DX-Peditions

For ten or twelve days, starting on either July 20 or 30, a station will be operating on Pantelleria Island, which figured so much in the news bulletins of Hitler's War; we gather the prefix will be IP1, callsigns could be IP1AA and IP1JT, but we have no idea at the time of writing of any likely frequencies.

It is believed that the Rockall exercise has been postponed owing to lack of transport, so we may have to wait a little while for that new GR prefix to appear on the bands. On the other hand Alderney will be around on all bands between August 20 and September 2, the calls being GC3POI/P and GC3SHZ/P.

The assault on the Emerald Isle by G3UGF and G3UBI mentioned last month appears to have developed parasitic oscillation—we have had *three* letters announcing changes of plan, and the last one seems to imply that the EI call is not so likely to be used, as they have applied for GB2NI to be allocated and propose using this call to put some of the rarer parts of Northern Ireland on the record; if there are a lot of takers then time will be made for this by cutting out the EI part of the exercise.

During August 5–14, G3NRU will be holidaying in the Outer Hebrides, mainly near Stornoway (Lewis), and Scarastavore (Harris), with /M operation up the West Coast route and M6 on the first and last day of the trip, operation being on Top Band and Eighty.



The callsign ZP9AY (Roberto Godefroid, Col. Cap Miranda, Itapua, Paraguay) is often mentioned in the 160m. DX news. Among other things, he made the ZP/W "First" for Top Band, with W1BB/1 at the other end.

Chester and District ARS are now repossessed of their old call G3GIZ after a long break. It is proposed to use it sometime in September in one of the rarest Scottish counties on Top Band and VHF. Enquiries about this one should be addressed to G3TZO (*QTHR*).

For prefix-hunters, PA9 and ON8 calls are being activated by G3TWV and G3TWX during their holidays between September 16 and 20, all bands 160 to 2 metres, mainly mobile operation—but not Top Band in Belgium.

In conclusion, may your conductor take valuable space to say a sincere "thank you" to all who have written in with words of encouragement, and friendly letters; already he feels as if he had known some of you for years.

So, to the sign-off, and the deadline for next month, which is **August 15,** with everything addressed "Communication and DX News," SHORT WAVE MAGAZINE, BUCKINGHAM, England. Take care of yourselves, and good hunting. *E.P.E.*

"ADVENTURE OPPORTUNITY"

In this month's small advertising on p.374 there are two insertions to stir the blood of any keen young licensed amateur who can measure up to the requirements. And the pay and conditions are pretty good, too, even if the job is an arduous one—after all, it means that after two years' service, with all found, you come home on paid leave to find about £2,000 in the bank. Not bad, by any standard, as well as being a wonderful experience!

CORRESPONDENCE NOTE

While again reminding readers that the sole address for all Editorial correspondence is: SHORT WAVE MAGAZINE, BUCKINGHAM, England, we would also ask them (*a*) Always to sign their call (if they have one), after their name, and (*b*) To print name, full address and callsign clearly and unambiguously. Every week, we see some shocking examples of illegible hand-writing, which wastes a lot of time. In one recent instance, the address was so badly written that the only thing to do was to cut it off the letter and stick it on the return envelope (leaving the Post Office to carry the can)—sure enough, back came the letter in a few days as "undeliverable." No doubt the reader concerned wonders why he doesn't get answers to his letters.

RESCUE BY HELICOPTER

In reporting the loss of the pleasure launch *Prince of Wales* near Barmouth on July 22, with heavy casualties, the press accounts mentioned the rescues by an R.A.F. helicopter, one of its crew being named as Master-Signaller Eric Briggs. He is, in fact, GW3IJU, well known under various calls from Service locations overseas, recently posted to R.A.F. Valley, Anglesey.

RTTY Topics

TRANSMISSION AND RECEPTION OF TELEPRINTER SIGNALS—FOR THE NEWCOMER —SUPPLY CIRCUIT FOR THE DL6EQ TERMINAL UNIT

W. M. BRENNAN (G3CQE)

This feature deals with radio teleprinter operation, results and techniques on the amateur bands. It appears in alternate months.—Editor.

SUMMER brings a period of relative inactivity as far as serious RTTY operation is concerned and there is little news this month. The newspapers call this the "Silly Season"! Since these columns cater mainly for the hardened RTTY'er during the rest of the year, the writer would like to direct the majority of this offering to the newcomer to RTTY and indeed to those who may be reading this out of idle curiosity and not because of any particular interest in RTTY.

The basic question asked by the non-RTTY amateur is "What is a T/P signal"? followed quickly by "How is it transmitted and received"? The answers to these questions could, if dealt with fully, take up a full volume. However, a brief outline is all that is required in order to appreciate the transmission system that enables an amateur in this country to type out a message on a teleprinter in Australia.

RTTY In a Nutshell

These days, almost everyone at all technically minded knows what a teleprinter is and what it does. We see them often enough on TV—usually printing out the football scores as they come in over the press wires. These machines were originally intended for operation over land lines and the simplest system consists of a DC land line connection between two machines. The actual signal output from the T/P sending mechanism is a series of DC pulses and by arrangement these may be a positive pulse for the "mark" signal with negative for "space" or *vice versa*. Alternatively, the pulses may be positive for "mark" and zero voltage for "space," or again *vice versa*.

Fig. 1 shows a complete T/P signal using positive mark and negative space. The upper train of pulses shown are those which denote the letter "Y" and the lower denotes the letter "R" in the T/P code. Every T/P signal commences with a "start pulse" and ends with a "stop pulse." These are synchronising signals which, as their name implies, start and stop the T/P receiving mechanism. The actual intelligence is conveyed by the five code elements which are various combinations of "mark" and "space" for the different letters. The operator is not concerned with the actual code, he merely selects the required letter on the keyboard and the machine automatically produces the correct signal for it. Although the code elements are various combinations of mark and space, it should be noted that the "start" pulse is always a space signal and the stop pulse is always a mark. The complete signal then consists of a 20-millisecond start pulse followed by five 20 mS code elements and finally a 30 mS stop pulse. The longer stop pulse enables a machine which is running slightly slow to remain in synchronism. The total transmission time for one letter is 150 mS and this means that a *maximum* transmission speed of 66·66 words per minute is obtainable at this pulse rate. Other speeds are used, but in amateur practice the only alternative is the 60 wpm rate employed by most U.S. equipment and adopted by almost every station on the DX bands. With that we may leave the subject of T/P speeds and the complications involved.

Transmission

The output signal from a teleprinter, then, is a series of pulses and the problem in RTTY is to con-

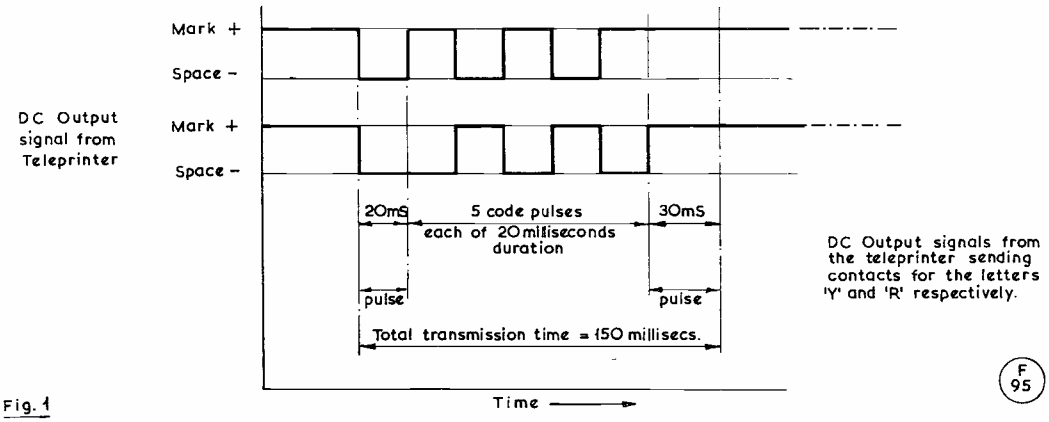
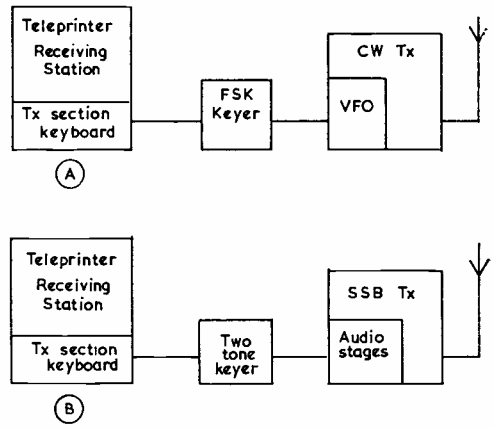


Fig. 1

vert these DC pulses into a radio transmission at the transmitting station, whilst at the receiving end they must be re-converted into DC signals suitable for operating the T/P receiving mechanism. There are several transmission systems that can be used for this purpose but amateurs are at present concerned with just two. The main system in use is FSK (Frequency Shift Keying); the other is AFSK (Audio Frequency Shift Keying), used only on the VHF bands and is even there being superseded by FSK which gives better results with weak signals. Thus we can look a little more closely at FSK as a means of transmitting T/P signals on all bands.

Freq. Shift Keying means that a mark signal is denoted by a signal transmitted on one frequency and the space signal is indicated by a *shift* in the transmitted frequency. The mark and space signals are of course never transmitted at the same time instant and so the FSK signal appears to be two transmissions with a slight frequency displacement—one transmission disappears as the other comes up. The total frequency displacement between the two signals is called the "shift" and amateurs mainly use an 850-cycle shift, with 170 c/s rapidly becoming popular. On all bands the convention is that on FSK the *higher* freq. signal is the "mark," and the lower, the "space." The mark signal is continuously transmitted when the T/P is at rest, *i.e.*, it is the signal that will be received when the T/P operator has paused in his sending.

Thus, in order to adapt the normal amateur Tx to be capable of transmitting FSK we need some gear which will accept the DC T/P signals and cause the Tx to respond to them by producing a controlled change in its output frequency in sympathy with the keying. Fig. 2A shows a block schematic of such a system applied to a CW/AM transmitter. A simple way to achieve a freq. shift of the Tx in response to signals from the T/P would be to employ a relay in series with the T/P sending contacts and to connect a small capacitor across the VFO tuning *via* the contacts of the relay. Thus, when the T/P energised the relay coil the capacitor would be shunted across the VFO tuning, resulting in a shift in frequency LF at the Tx. This is however rather cumbersome (and has a lot of snags!) and a much better way of achieving the same thing is shown in Fig. 3A. Here a diode is used to switch the condenser in and out. The diode is forward-biased from the VFO stabilised HT supply *via* R1 and potentiometer P1. This virtually puts the small variable capacitor in parallel with the VFO tank circuit. The T/P keyboard contacts are connected in such a manner that when the T/P is sending a "mark" signal the forward bias on the diode is removed, thus placing the whole of the backward resistance of the diode in series with the capacitor and removing the circuit through it to earth. The amount by which the diode is opened on "space" may be adjusted to some extent by P1. This gives some degree of control of the effective capacity of the diode/condenser combination and thus gives a fine frequency shift adjustment. This particular circuit has some failings, however. When the diode is



Schematic of RTTY FSK Transmitting set-ups (F 93)
Fig. 2

"shut off" with zero voltage applied across it, the smallest voltage will tend to open it; such voltages can be introduced by stray hum and RF pickup with the result that the transmitted signal may exhibit a rough FM note. Moreover, there is a certain amount of RF across the diode from the VFO tank circuit anyway and the diode may clip it.

A much better performance is obtained by using the circuit shown at Fig. 3B and for very little more complication. The difference here is merely that a reverse bias is applied to the diode at all times. The forward bias is increased so that when applied it overcomes the reverse bias as well as controlling the diode switching action. When the forward bias is removed the reverse bias shuts off the diode with several volts to spare. Again the potentiometer P1 acts as a fine shift adjustment. The RF chokes and capacitors C2, C3 form a keying filter circuit which reduces the clicks caused by the rapid transition from "mark" to "space" produced by the signal pulses. The RF chokes also of course isolate the RF circuits from the DC circuits. C4 is a DC blocking component and as this is in series with C1 and the diode it is in the VFO tuning and should therefore be of good quality. In fact, all the components to the right of the RFC's are part of the VFO tuning and should be mounted as near as possible to the VFO if not inside it. The rest may be mounted at anywhere convenient inside the transmitter. The diode must be of a type that has a very high backward resistance and of course must have a suitable p.i.v. rating. There are dozens of suitable types now on the market. Finally, a fact often overlooked by newcomers to RTTY is that the connecting leads between the key and Tx must be screened in order to prevent pickup—the fact soon becomes obvious!

Sideband transmitters present a special case when it comes to producing FSK from them. Of course the VFO in this type of Tx can be modified in just the same way as the AM Tx just described. Many

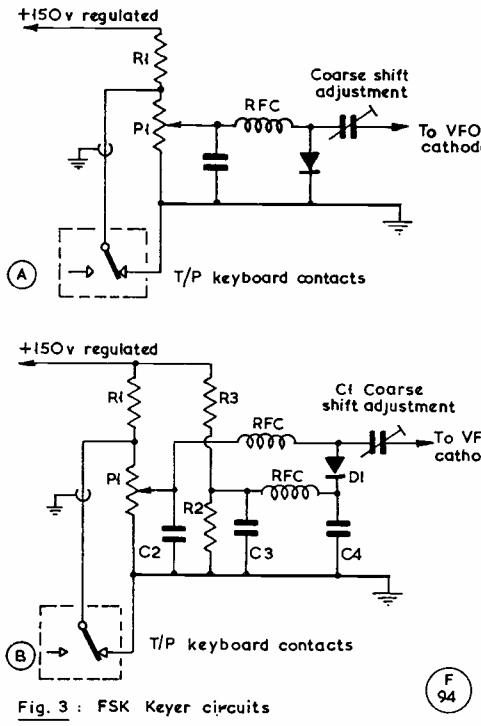


Fig. 3 : FSK Keyer circuits

Fig. 3. For this circuit values can be: C1, 3-30 $\mu\mu$F; C2, C3, C4, .005 μF; R1, 47K; R2, 10K, R3, 100K; and potentiometer P1, 25K. The RF choke is 2.5 mH. For D1, see text.

amateurs favour doing just this. However there is an alternative and Fig. 2B shows a schematic of this. A single AF tone fed to the AF stages of a SSB transmitter will produce an RF carrier at the Tx output. If this tone is shifted 850 c/s in frequency the RF output from the VFO, with the advantage that no internal modification to the Tx is necessary since this two-tone type of keyer may be fed in at the microphone input. The oscillator can be of the AF tuned circuit variety with additional capacity switched in by a diode, as used in the VFO keying circuit. Another method is to use two separate oscillators running continuously, their outputs being electronically switched by the T/P signal.

The two tones used must of course be 850 c/s apart and both must be chosen to be well within the AF/IF passband of the transmitter.

Receiving Side

On the 20m. band the RTTY signal would be as shown in Fig. 4 with the mark signal on 14,100 kc and the space some 850 c/s LF. At the receiving end the FSK signal must now be converted back to the DC pulses required to operate the teleprinter receiving mechanism. The station receiver is of course one of the major items here. It should possess good stability and preferably have an overall bandwidth that will just accommodate the FSK spectrum. For FSK, the required bandwidth is about 1·2 kc. This is due to the fact that the T/P signal waveform approximates to a series of square waves and in order to reproduce a reasonable approximation to a square wave the third and fifth harmonics of the keying frequency must also be passed through the receiver. The maximum keying frequency is 25 c/s and this occurs when a 20 mS mark signal is followed by the 20 mS space signal and *vice versa*. At such times, there will be essential signal information at 125 and 75 c/s either side of the mark and space frequencies. In order to pick up the HF sidebands of the "mark" signal and the LF sidebands of the "space" the minimum bandwidth is therefore 1·1 kc. Adding the odd 100 c/s for tuning errors we get a minimum bandwidth of 1·2 kc. For a 170 c/s shift the bandwidth needed is only 500 c/s!

The real business of FSK demodulation is carried out by some form of frequency to amplitude converter. Such a device is the well known FM Discriminator. FSK may be looked upon and treated as a simple form of FM, one in which the transmission has a constant deviation of ± 425 c/s either side of a centre frequency. In the case of FSK, however, the centre frequency is never transmitted, since when the T/P is resting the "mark" signal is always transmit-

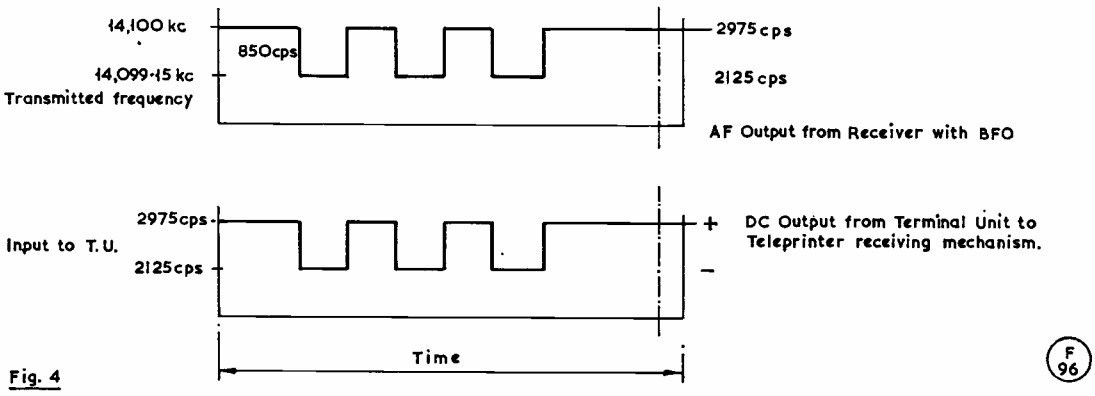
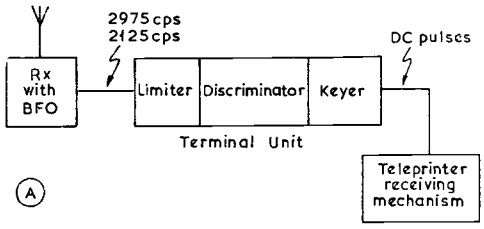
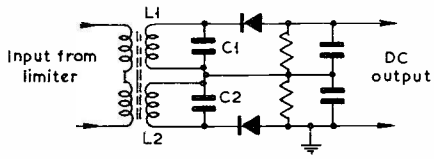
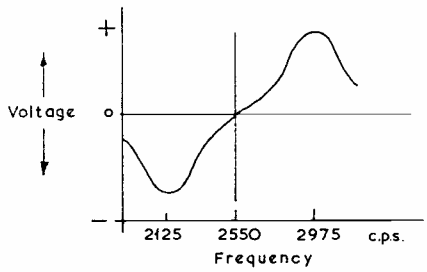


Fig. 4





B Typical two tuned circuit discriminator



C Output voltage / Frequ. characteristics of Discriminator

Fig. 5

F 97

ted and this corresponds to a carrier shift of +425 c/s.

The standard BC/FM receiver usually carries out the freq. to amplitude conversion in a discriminator at 10·7 mc. In RTTY, however, the conversion is usually either at some normal communication receiver IF of 455 kc or at audio freqs. The AF type of converter is by far the most popular with amateurs. Fig. 5A shows a block diagram of a typical set up. In this system the receiver BFO plays an important part. To receive RTTY the receiver is tuned midway between the incoming mark and space signals and the BFO adjusted to produce an AF beat note of 2975 c/s from the mark signal and 2125 c/s from the space. Most RTTY receiving stations have some form of tuning indicator to enable the operator to find this tuning point quickly. The two tones produced are fed from the Rx AF output stage into the RTTY freq. to amplitude converter. This is usually termed the RTTY Converter or "Terminal Unit" in amateur circles. Almost all Terminal Units (T.U.'s) in which the FSK signal is treated as FM have an amplitude limiting stage preceding the discriminator. This limiter removes any amplitude modulation of the FM signal caused by interference and also maintains the level of the signal to some extent during fading.

Fig. 5B shows a typical "Two Tuned Circuit" type of AF discriminator commonly used in RTTY. The AF output from the limiter stages is coupled to the two tuned circuits L1, C1 and L2, C2. These circuits are tuned to 2125 and 2975 c/s respectively. The DC output from the two diode detector loads is the algebraic sum of the individual diode outputs. At the centre frequency of the discriminator (2550 c/s) the output from the diodes is equal and opposite giving zero DC out. As the frequency is shifted nearer to the resonant point of one or other of the two tuned circuits the output from the associated diode will exceed that from the other. The whole produces a voltage/frequency characteristic, as shown in Fig. 5C. Here it is worth noting that unlike standard discriminator practice, the tuned circuits are actually tuned to the highest and lowest freq. expected at maximum deviation and not higher and lower than the maximum *expected* frequency. In RTTY, the signals are always transmitted at maximum deviation and so the linearity of the discriminator at other deviations is of little concern. The "flat topping" of the response curves at the maximum deviation points actually produces a circuit which is reasonably tolerant of slightly inaccurate shifts.

From Fig. 5C it can be seen that alternating inputs of 2125 and 2975 c/s will produce alternating positive and negative DC outputs. The DC outputs from the discriminator stage is usually then passed to a DC amplifier after residual AF components have been filtered out. The DC amplifier stage can then drive a polarised relay which in turn is used to key a DC supply which is connected to the T/P receiving mechanism. Alternatively, the DC amplifier may drive an electronic keyer which likewise keys the T/P mechanism direct.

This, then, is one method by which the RTTY signal is converted into DC signals for the T/P. A second one which is rapidly becoming popular handles the two tones from the receiver as independent and separate channels. Each channel is amplified and detected separately before finally being combined in a stage which "decides" whether the incoming signal is "mark" or "space" and keys the T/P accordingly. This type of T.U. has several advantages over the "FM" type, particularly when selective fading is present on the signal path.

* * *

The foregoing is of course only an outline of RTTY FSK technique. There are many variations and equally as many refinements which are calculated to improve the performance of the basic system or to reduce the demands made upon the operator. These are well beyond the scope of a single article. Sufficient to say that if you have read and understood this far you will have some idea of what RTTY is all about.

Bias and Keyer HT Supply For The DL6EQ T.U.

The power supplies required for this T.U. are 250v. HT 6·3 v. AC with a separate 100v. HT and 300v. bias supply for the keyer valves. The first two voltages are easily come by but the last two may present some problems. G3LZN overcame these in a neat way and as promised in the last "RTTY Topics" the circuit is shown here (Fig. 6). An existing power pack provided the 250v. HT and 6·3v. AC and there was an extra 6·3v. AC winding available. This was used to feed the 6·3 winding of a *Radiospares* miniature mains transformer as a primary, leaving the normal 230v. primary free to be used as a *secondary* in addition to the given 120-0-125v. section. The circuit is self-evident. Many thanks to G3LZN for his tip.

Time now to put in the CW ident., enjoy the holidays and see you in October—month of the W.W.S.S.! *73 de G3CQE.*

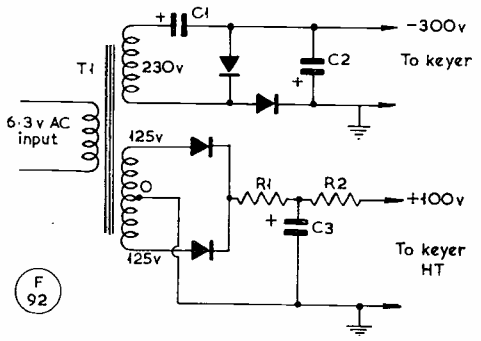


Fig. 6. Bias and keyer supply for the DL6EU T.U., as devised by G3LZN. C1, C2, C3, are 16 μF, 450v.; R1, 200 ohms, 10w.; R2, 1500 ohms, 10w.; all diodes BY-100 type; and T1 is the "Radiospares" miniature mains transformer, with 125-0-125v. and 6.3v. windings.

SOME CORRECTION NOTES

We are asked to make it clear that, in the *Partridge* "Mobile Joystick" advertisement on p.197 of the June issue, the phrase at the end of the first paragraph should read "*has been* tested for safety and rigidity . . . ," and not as printed.

With reference to the item "Ideal for Portable or Mobile," p.229 June, the G.P.O. point out that if transmitting while under way, the usual /M licence conditions would apply—in other words, if installing equipment for amateur-band operation in a Broads cruiser, it would be necessary to take out a mobile licence if operation while actually cruising is contemplated; the callsign would then be suffixed /M, but *not* /MM !

In the article by G3HRH in the July issue, there is a slight error in the circuit diagram on p.269, affecting the connections of R18 and the zener diode : The change is to connect D1, the zener diode, between the other end of R18 and chassis, and not as shown. The configuration then is −7·5v. to R18, other side R18 to D1 and through C17, other end D1 to chassis.

EXHIBITION DATES AND ARRANGEMENTS

The first International TV and Radio Show will take place at Earl's Court, London, during August 22-26. This show is different in that it will be trade-only, with no BBC/ITV clanjander or public celebrity-gawping, and so is strictly for business. Another difference is that the products of the radio manufacturing industries of about ten foreign countries will be on view, including the highly-competitive Japanese range under their Sony and National brand names. Hong-Kong will also be represented by equipment made to order for U.K. firms. The coverage of the Exhibition is "radios, radiograms, record players, tape recorders, audio apparatus, television and allied products," and the whole effort—organised by Industrial & Trade Fairs, Ltd., with the support of the Radio & Television Retailers' Association—will be backed by extensive advertising at home and abroad.

* * *

We are asked to notice the fact that the Northern Radio Societies Association will be holding their second annual convention and exhibition over September 3-4, in the Lancaster Exhibition Hall. The official opening is at 2.0 p.m. on Saturday 3rd, and various events have been arranged, as well as lectures, a trade exhibition and a dinner to bring the convention to a close (details : F. Barlow, 2 Lingdale Avenue, Cheadle Hume, Cheshire). Talk-in stations using callsign GB2BVC will be available on 2m., 4m. and 160m. For further information and trade stand arrangements, write : I. D. MacArthur, G3NUQ, 55 Langdale Road, Bramhall, Cheshire.

* * *

Then, for the four days Wednesday, October 26 to Saturday, 29, the annual International Radio Communications Exhibition (the Amateur Radio show) will be on at the Seymour Hall, Marble Arch, London, W.1—in other words, at the same place and the same sort of time as last year. And, as last year, we shall be at the same Stand, No. 19. We are now the only full stand-space-buying organisation left that has supported this Exhibition since its beginnings; many firms have come and gone, and some exhibitors have been there as *persona grata* (or for a peppercorn rent)—but we have always been in strictly on a business footing. And as regards the Amateur Radio exhibition looked at from its immediate post-war beginnings, there is no other firm that can say the same. (Not that it matters a great deal—it's just an interesting fact.)

DISCUSSING SINGLE SIDEBAND

FULL POWER LINEAR AMPLIFIERS — CIRCUITRY AND NOTES — THE MULTI-PARALLEL CONFIGURATION — SINGLE-VALVE HIGH POWER STAGES

Part VIII

B. A. WATLING (G3RNL)

There are no maths. in this discussion—it just suggests how you can choose a Linear for full power operation. It is evident that valves like the 813—once described many years ago as "capable of giving 400 watts RF output with just a little drive blown on to its grid"—or even several 807's in parallel, still have a large part to play in radiating a potent Sideband signal. Linears of this type are also wonderful RF amplifiers for serious CW operation.—Editor.

THERE are many circuits for high-power linear amplifiers, designed to follow an exciter giving about 50 to 100 watts output. Quite a few amateurs have experimented with these and the results and designs of some will be discussed here.

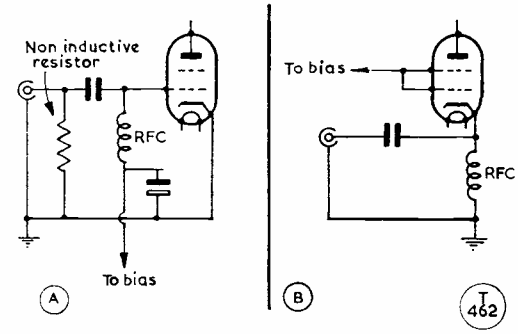


Fig. 1. At (A) is shown a conventional grid-driven linear amplifier (passive grid). Sketch (B) shows a normal cathode-driven (grounded grid) linear.

Re-capping a little, there are two configurations possible: A grid-driven amplifier generally used in Class AB_1 or Class AB_2, and there are cathode driven (grounded grid) amplifiers normally employed in Class-B. Fig. 1 shows the basic arrangement for these two configurations when used to follow an exciter. Observe that the grid driven amplifier is shown as a "passive grid," a resistor replacing a tuned circuit with a link input, which can be used if the drive available is lower than that needed to produce the required voltage swing on the grid of the linear amplifier valve.

The linear amplifiers about to be described one

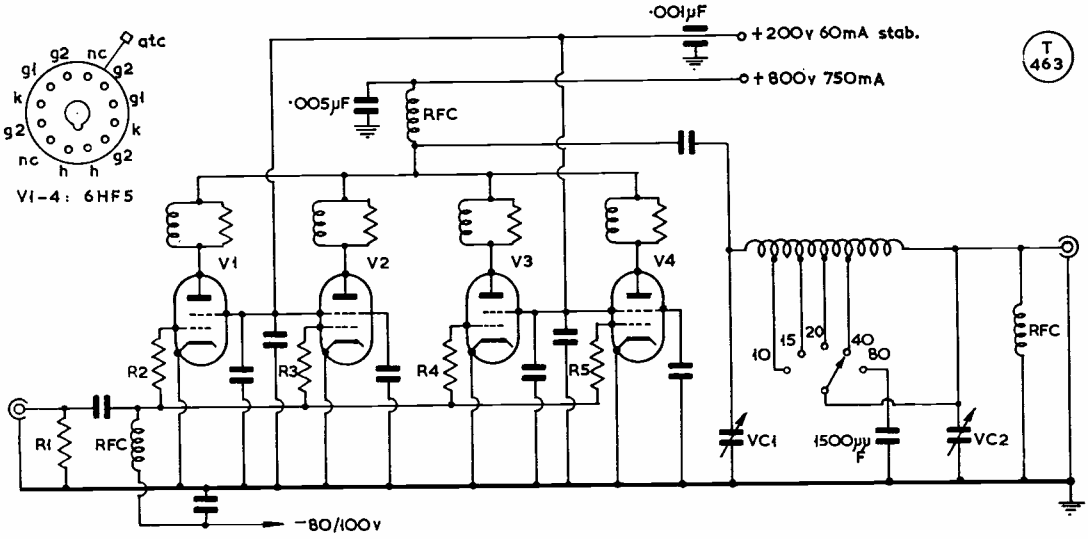


FIG. 2

Fig. 2. The G3NSN Linear RF amplifier, using four 6HF5's, the 6HF5 being a robust R.C.A. duodecar type designed for colour TV receivers. It is on a 12-pin base, has maximum ratings of 900v. plate HT with a dissipation of 28 watts, and runs rather hot, up to 225°C. In this circuit, R1 is 133 ohms; R2, R3, R4, R5, are each 10 ohms; VC1, 2/500 μμF; and VC2, 3-gang 500 μμF Rx type. All pins on the valve base connected to G2 are decoupled; all cathode pins are earthed; all leads carrying supplies are fed in on feed-through condensers; all heaters are decoupled. This degree of decoupling, necessary because the stage is not neutralised, is not shown here for the sake of clarity.

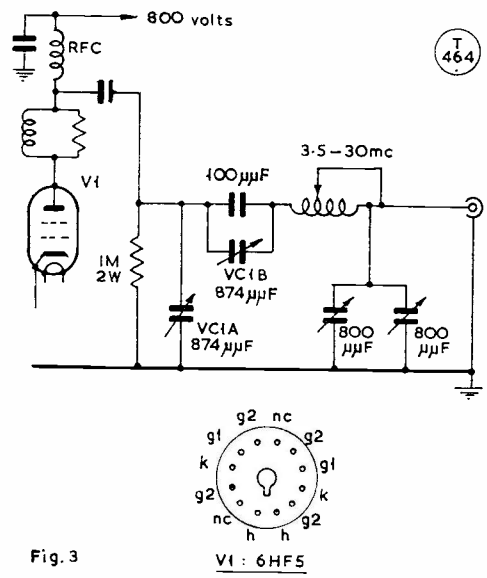


Fig. 3

Fig. 3. The method used by Galaxy Electronics (U.S.A.) to overcome the problems associated with a low anode load resistance, RL. This linear amplifier uses no less than ten 6HF5's in parallel, and is rated at two kilowatts p.e.p.

can split into three groups. Group 1, Conventional grid-driven linears; Group 2, Normal cathode-driven linears; Group 3, Amplifiers with screen voltage derived from or controlled by the drive.

GROUP 1 — Conventional grid driven linears

The G3NSN Linear: (First described *RSGB Bulletin*, July 1965). This is an interesting design in that it uses four 6HF5's in passive grid (*see* Fig. 2). With the grid resistor shown about 20 watts input would be required to drive the linear to its maximum. With only 800 volts on the anodes the output will easily reach the maximum in this country (400 watts p.e.p.). You will observe that the *pi*-tank capacitor values are unusually high. This is due to the fact that the RL of a 6HF5 is only 2000 ohms giving a total RL of but 500 ohms with four in parallel. A parallel push-pull arrangement could be used with these valves bringing the values to a more reasonable figure, but bandswitching becomes cumbersome. Table on p.356 gives performance details of this amplifier.

An interesting point came to light in *QST* for January 1966, where a 2 kW p.e.p. linear, made by Galaxy Electronics in the States, used ten (!) 6HF5's in parallel. The low RL (200 ohms) and large output capacity problems are overcome, as shown in Fig. 3, by introducing a series variable capacitor in the horizontal leg of the *pi*-tank circuit. The value of the coil therefore becomes more manageable.

GROUP 2 — Conventional cathode-driven linears

Grounded grid linears are inherently stable amplifiers, because the input is effectively screened from the output by the grid(s) which is (are) earthed. No neutralising is required. Certain valves, the 807 being the most common, can be operated with zero bias. A design, which cannot be improved on for simplicity, is shown in Fig. 4. Four 807's—or 1625's (with 12v. heaters) or 6L6's could be used—provide about 150 watts p.e.p. output. HT voltages up to 1000 volts can be used.

For those who may have 813's around a design for one is shown in Fig. 5. With 2500 volts on the anode about 350 watts p.e.p. output will be available for about 500 watts p.e.p. input. Zero-signal anode current could be as low as 15 mA.

The signal input is fed to the filament *via* a ·01 μF capacitor which must be a ceramic type. The filament transformer is isolated from RF by means of bifilar wound RF chokes. At maximum output

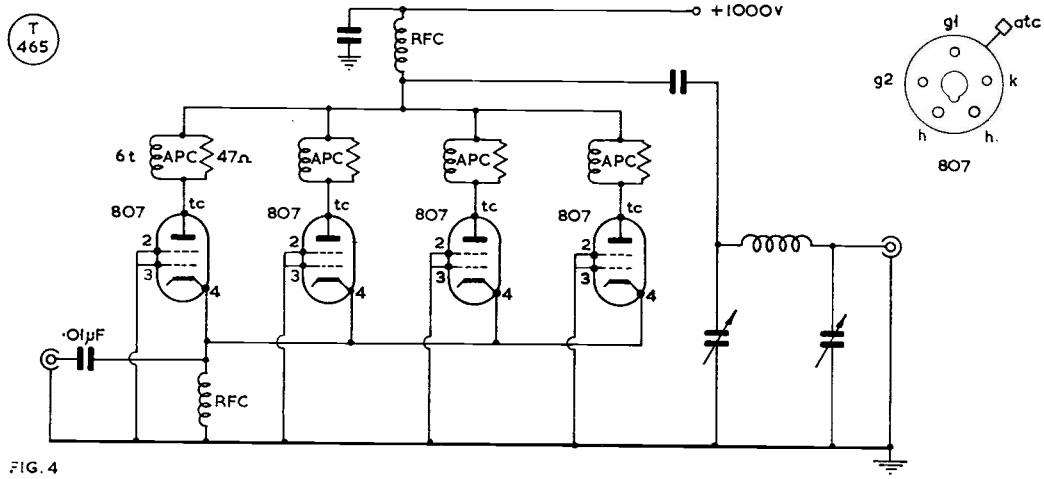


FIG. 4

Fig. 4. Simple type of grounded-grid linear amplifier using four 807's in zero bias, capable of giving nearly 150 watts p.e.p. output. Note that the valve heaters should be fed via bifilar-wound RF chokes.

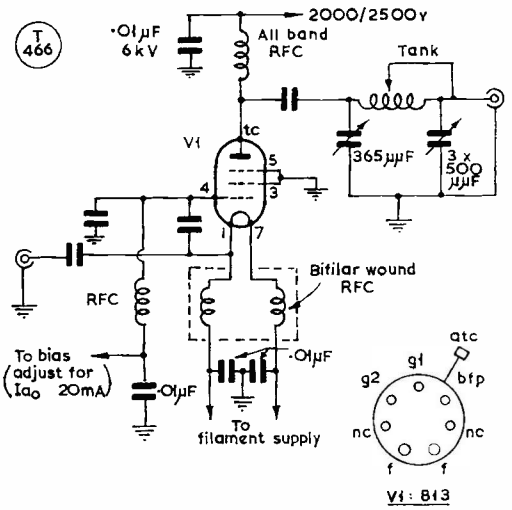


Fig. 5. An 813 as a grounded-grid linear amplifier, useful working figures being Ia max., about 200 mA, and Ig1 max., 50 mA. The filament input condenser should be about ·01 μF, and a good ceramic type.

grid current will be approximately 50 mA.

GROUP 3 — **Linear amplifiers with drive-controlled screen voltage**

G3MHQ "RF Ultra Linear" (Described in *RSGB Bulletin,* January 1963). This is an unusual and interesting design (Fig. 6) in that a conventional Class-B 813 linear is modified to incorporate screen-grid voltage variations to follow the anode voltage. As G3MHQ in his article states, if and when the anode voltage falls below the screen voltage then distortion will occur. The RF transformer comprising L3 and L4 effect a form of negative feedback. Assume that the anode voltage is falling then the voltage induced into L3 opposes the screen bias voltage, hence reducing the screen potential to maintain linearity. G3MHQ states that approximately 200-250 watts p.e.p. output can be obtained with only 1200 volts on the anode.

G2MA Linear (First described SHORT WAVE MAGAZINE, February 1959). Fig. 7 is the circuit of the now famous G2MA Linear, designed nearly eight years ago. Screen grid voltage is derived from a potential divider network comprising RV and V3. With no drive applied V3 has no grid bias and therefore conducts heavily drawing its current through RV. Virtually all of the supply appears across RV therefore the screen grid of the 813 is near zero, almost cutting off the valve. When drive is applied part of it is tapped off

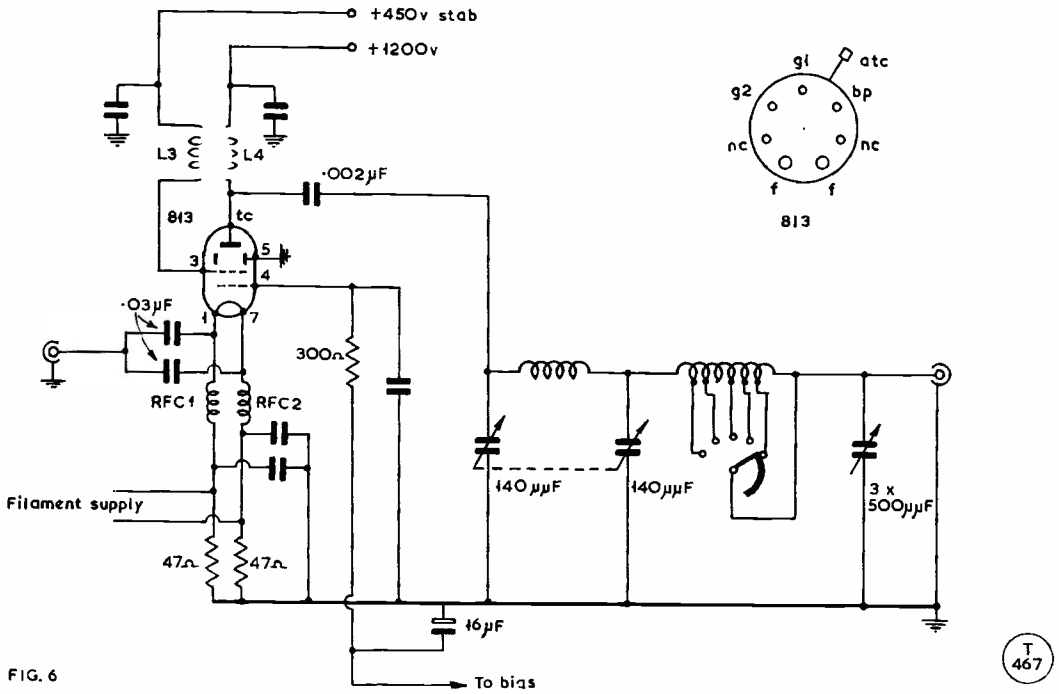


FIG. 6

Fig. 6. The G3MHQ "ultra linear amplifier" using an 813, which for years has been available for all manner of high-power RF applications; a single 813, correctly loaded and driven, will give up to 400 watts RF output, over the amateur HF range. Looking at the circuit here, L3 and L4 form an RF transformer, wound on 1in. diameter polythene tube 4in. long. L4 is close-wound with 28g. over 3in.; L3 is ditto over 1in.; insulation between L3 and L4 must be good. The RF chokes are 30 turns of 16g. on a 1in. diameter former, remembering that the filament current of an 813 is 5 amps.

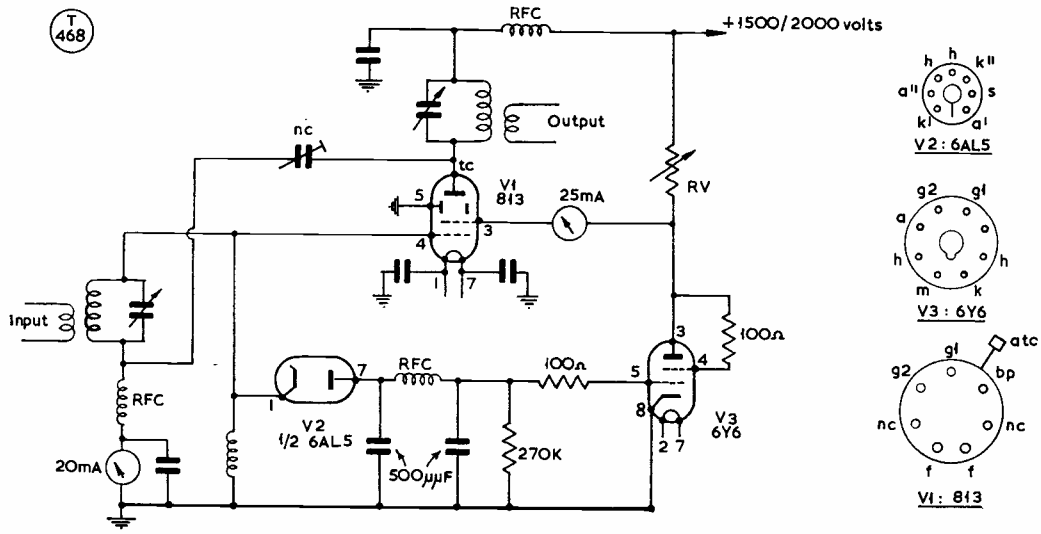


Fig. 7. The G2MA Linear Amplifier, first described in the February 1959 issue of "Short Wave Magazine," uses an 813, and the functioning of the circuit is discussed in the text. The variable resistor RV should be adjusted so that the current drawn by the 6Y6 is just less than the plate mA at which maximum anode dissipation would occur. All RFC's shown in the circuit can be 2.5 mH.

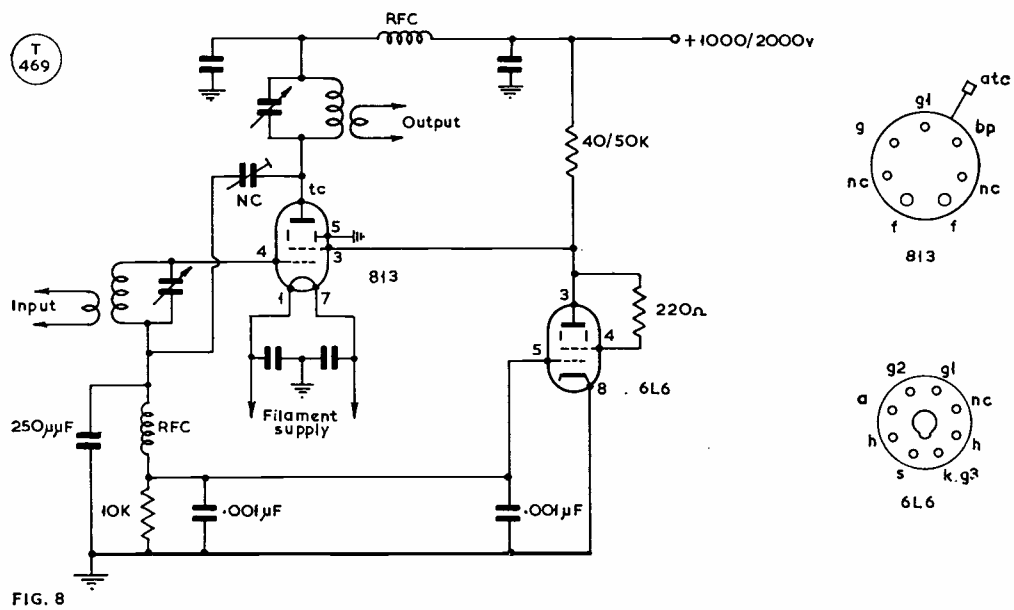


FIG. 8

Fig. 8. Circuit diagram of the ZL1AAX Linear—also described in detail in the February 1959 issue of the Magazine—is similar to the G2MA design except that rectification of the grid driving current is used to give the controlling DC voltage for the 6L6.

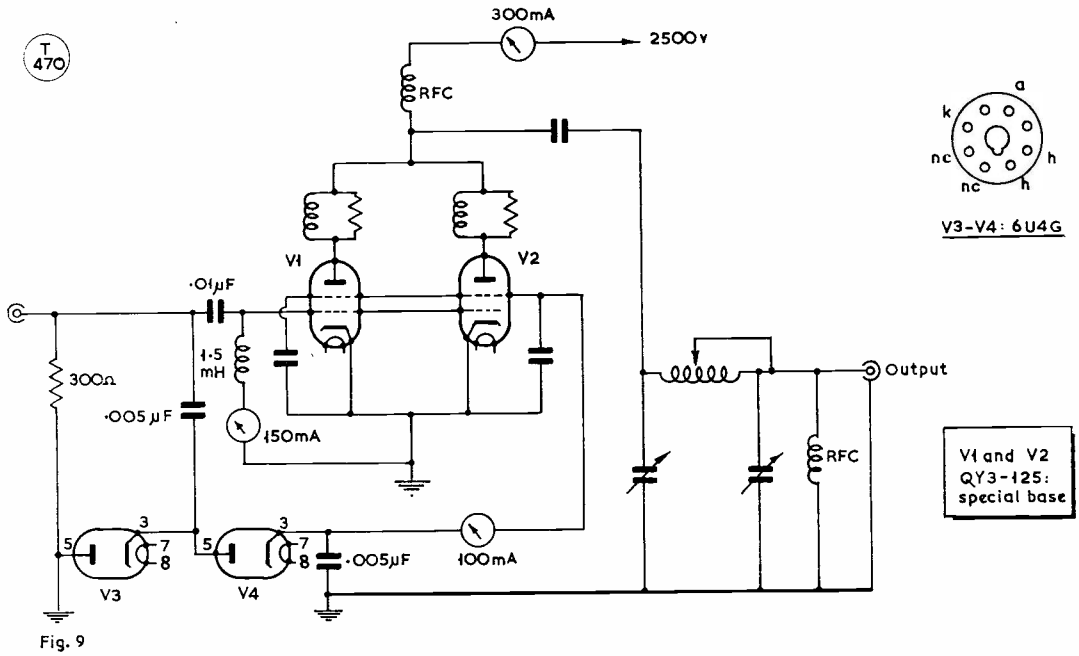


Fig. 9

Fig. 9. The more modern G2DAF linear amplifier, using a pair of Mullard QY3-125's. The screen voltage for these is derived from the drive using a conventional voltage-doubler circuit taking a pair of 6U4GT's. An 813 as the PA could also be used in this sort of circuit, as explained in the text. The tank details are omitted for clarity.

via diode V2, which rectifies this to produce a negative voltage proportional to the input. This negative voltage is applied to the grid of V3 causing it to conduct less. The voltage drop across RV therefore decreases raising the screen voltage. The only adjustments required to set up this amplifier is the neutralising (adjust as described in Part VII of this series) and RV. The value of RV should be such that with no drive the DC input to V3 is just below the rated maximum anode dissipation.

ZL1AAX Linear. (First described in SHORT WAVE MAGAZINE, February 1959). Fig. 8 is the circuit of the ZL1AAX Linear. This is one step further in simplification than the G2MA linear in that the rectifying of the drive to provide bias for the clamp valve is effected by the diode formed by the grid and cathode of the 813. Apart from this the action of the circuit is exactly similar. As regards efficiency and linearity there is apparently nothing to choose between this and the G2MA linear, both having slightly greater efficiency than a Class-B zero-bias linear, and both exhibiting linearity almost as good as Class-AB_1 linear.

G2DAF Linear. (First described in *RSGB Bulletin*, April 1963). If we assume that the G2MA is the start of the family of screen grid control linears then ZL1AAX took a step in one direction by removing the rectifying diode from the circuit and using the 813 itself as the diode, while G2DAF has taken a step in the opposite direction. Fig. 9 is the original circuit using two Mullard QY3-125 valves. The article also discusses the circuit differences when using two 4X150A's and in a later article (*RSGB Bulletin*, May 1963) he describes how an 813 will perform (400 watts p.e.p. output with only the one valve).

In this circuit the whole of the screen grid voltage is derived from the drive. A standard voltage doubler circuit using two 6U4's (or EY81's) provide the necessary voltage. A single 6146 linear will just about drive the G2DAF to maximum. A linear comprising two 6146's is however advisable—as mentioned previously it's better to have some in hand than barely enough.

A final word on the subject of linear amplifiers for the moment—and no excuse is made for repetition—*do not* try to "talk up" the anode current meter on peaks to more than half the maximum signal

TABLE I

Amateur Band Operating Conditions
(400 watts p.e.p.) Four 6HF5's in Parallel.

Va = 800 volts	Single-Tone	Two-Tone
Anode current (zero sig.)	120 mA	120 mA
Anode current (maximum sig.)	750 mA	475 mA
Power Input (DC)	600 watts	380 watts
P.E.P. Input	600 watts	600 watts
Ig_2	40 mA	24 mA
Ig_1	0 mA	0 mA
Vg_2	200 volts	200 volts
Vg_1 (peak drive)	92 volts	92 volts
Anode Dissipation	200 watts	180 watts
P.E.P. Output	400 watts	400 watts
Power Output (mean)	400 watts	200 watts
Anode Efficiency	66 per cent	52 per cent

current unless you've checked for flattening on a 'scope to find the correct level. Apologies to the SSB operator (not heard by the writer), who, on 80 metres, was putting out a foul signal—dogs barking, birds twittering and the clock some feet away from him sounding like a sledge hammer. The station he was working thought " he sounds loud " (!) and asked the offending station what power he was running. The reply was a deafening whistle into the microphone followed by " Well, it reads 200 mA on the anode current when I whistle, but it's the devil of a job to keep it up there while I'm talking." ! ! Sorry, whoever you may be, to use this statement as an example, but it does illustrate the point forcefully. A lot of people new on SSB have the same problems. The whole point is that the anode current meter has not got a fast enough response to follow voice peaks so don't try to lift it too high—only about half (not more) of the maximum. Prove this yourself with a bug key (whatever that may be for). With key constantly down (or to the side, or whatever) the anode current will register, say, 100 mA. If you now send a string of dots then the anode current will only register the average level. The faster the dots the higher the anode current. Now look at your speech waveform on a 'scope and imagine what the meter will try to do. It can't, though—it's not fast enough.

Editorial Note: The February 1959 *Short Wave Magazine* referred to here was in fact a vintage issue as regards Linear Amplifiers for Sideband. It discussed in some detail designs now seen to have been years before their time. This issue of the *Magazine* is now, regrettably, right out of print with us, but there must be tens of 1000's of copies in the hands of readers. If you are interested and have not been a regular reader long enough to possess a copy, or cannot borrow one locally, you would almost certainly be able to get Feb. '59 by looking for it in our Readers' Small Advertisement section, through which many such items change hands.—*Editor.*

TOP BAND GDX NOTE

GM5PP/P ROUND THE SCOTTISH COUNTIES

G5PP, Bob Palmer, of Coventry, now has the distinction of having operated on Top Band from every Scottish county, and in so doing has covered 15,000 miles in that country.

He made his eleventh annual trip during June 25-July 8 and once again put out a remarkably consistent signal, being worked on all 13 nights from the writer's QTH at Peterborough, Northants.

Aerials varied from 300 to 600 feet in length, 26 gauge cotton covered wire (with no insulators) being used, at a height of 45ft.

For the first four nights, GM5PP operated from the Ettrick Valley in Selkirk. Then followed Comrie in mid Perth; Argarton, near Arrochar, Argyll; Loch Ochiltree, Wigtown; and Glen Trool, Kirkcudbright; the tour concluded with one night at Troutbeck, Nr. Keswick, Cumberland.

GM5PP's absence from the band on the night of July 3 was due to his battery becoming " flattened " through daylight working with GM's. Outstanding contacts were those with G3IUD/P, who was at The Lizard, Cornwall; G3SIG, Cheshire, when signals were S8 each way, which for a noon contact from a valley in the mountains in Selkirk, was extremely good; and GM3TMK, Ross, this also being in daylight with both signals S9; GM5PP was operating from Argyll during this latter QSO with the Grampians on the path.

Expressing himself quite pleased with the trip, GM5PP regretted some lack of co-operation on the part of some stations who persisted in working on the same channel when they must have known that activity was on from a rare county. The writer feels that this view will be shared by many operators who were anxious to work GM5PP/P. It is to be hoped that Bob will continue the good work next year.

G2NJ.

During his Top Band expedition to Scotland, Bob Palmer, GM5PP/P (right) was visited by GM3TDS, when the 5PP camp was in Glen Trool, Kirkcudbright. As many old 160m. hands will know, G5PP (Coventry) has for several years made a speciality of going on a /P holiday trip to Scotland. He has now worked round the U.K. on Top Band from all Scottish counties, and has also logged about 15,000 miles in the process.

• • • The Mobile Scene • • •

As this is being written, the weather has turned distinctly inclement for the time of year—and the further outlook is unpromising. However, enthusiasm for /M activity and Rally planning continues unabated, and there is still a very full programme to be worked through till the end of the Rally season.

We would be glad to have reports—*see* this space, last time—on events already held, together with pictures. A selection of photographs taken at recent Rallies appears herwith, and the captions tell most of the story.

The Mobile Calendar now reads as follows:

August 14: Derby & District Amateur Radio Society ninth annual Mobile Rally, Rykneld Schools, Derby, with a large programme of events, starting at 2.30 p.m., including an exhibition of amateur equipment, *Karati* demonstration, field events and competitions, grand prize draw, junk sale, etc., etc. Talk-in will be by G3ERD/A on 160m., and by G2DJ/A on 2m. and 4m. Admission and parking are free, with ample parking space and indoor accommodation if wet. Refreshments available on site. Hon. Organiser: T. Darn, G3FGY, Sandham Lodge, 1 Sandham Lane, Ripley *(2972)*, Derbyshire.

August 14: Plymouth Radio Club Mobile Picnic, at the Scenic Car Park, Yelverton, on the A.396, 13m. north of Plymouth, with talk-in by G3PRC on 80/160m., and G3LMG on two metres. This event is by way of being an informal meeting of the several South Devon Clubs, and anyone else interested is invited to join the party, which starts at 12 noon. Information from: E. Fallon, G3SGV, 8 Queens Road, Plymouth, Devon.

August 28: Bromsgrove & District Amateur Radio Club Mobile Picnic on Doderhill Common, four miles south of Bromsgrove on the B.4090, with talk-in by G2CLN on Top Band.

August 29: *(Bank Holiday)*. Peterborough Mobile Rally, by the swimming-pool on the riverside, with plenty of free parking and picnic space; no entrance fee. Talk-in stations will be G3DQW on 1980 kc, G3RED on 70 mc, and G3EEL on two metres. Further information from: D. Byrne,

General view of the main car park at the Northern Amateur Radio Mobile Society's annual Rally at Harewood Park, near Leeds, on June 19, for which they had a day of brilliant sunshine, with an attendance in the region of 2,000. Three talk-in stations were in operation—on 2m., 4m. and 160m.—the weight of traffic being with G3OGV on Top Band. Special QSL cards were available on the spot for contacts made by mobiles with the Rally stations. In addition to the usual raffle and prize draw, there was a competition for /M's, won by G3UXO. The prize for the longest-distance traveller went to GM3RNI.

Photographed together at the Northern Mobile Rally, left to right: SWL Danby, G3VFH, G3UBN and G3UMH. It was a fine and sunny day for the event.

On May 22 last, an informal mobile rally was held at Lincoln, for local /M's from Newark, Scunthorpe and Brigg. Among those present were, left to right: G3AWK (shoulder to camera), G3HRP, G3MWZ (who provided /P talk-in on 1980 kc), G2HCO and G3HLR.

Members of the St. Helens Electronics Society formed a party, signing G3RTK/P, to visit the Trentham Gardens Rally.

G3KPO, Jersey House, Eye, Peterborough, Northants.

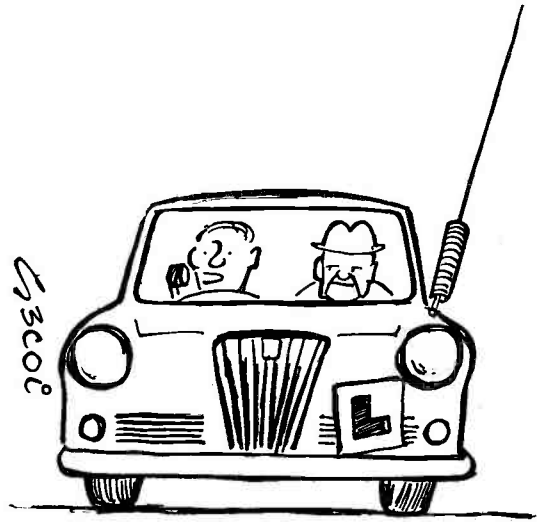
September 4: Swindon & District Amateur Radio Club Mobile Picnic at Lydiard Park, about two miles west of Swindon, just off the A.420 to Chippenham, map reference 157/100842, and sign-posted. Lydiard House, ancestral home of the Bolingbroke family, is a show place and will be open. Talk-in by G3LLZ/P on 1920 kc, and by G3JOT/P on 70·2 mc, both on the air from 12 noon. Events will include a raffle and a bring-and-buy sale. A picnic meal should be brought if required, though light refreshments will be available on site. An advance notification of attendance would be appreciated, to: I. S. Partridge, G3PRR, 104 Grange Drive, Stratton St. Margaret, Swindon, Wilts.

September 11: RSGB Mobile Rally, at Woburn Abbey, near Luton, Beds., the well-known show place, grounds and zoo park maintained by the Duke of Bedford—where you can roam over 3,000 acres inhabited by 2,000 animals, and see the state apartments of the Abbey. The Rally will be in a reserved area, with talk-in by stations GB2VHF and GB3RS on the following channels: 1940 kc, 3750 kc (SSB), 70·26 mc and 144·86 mc. There are restaurants and snack bars in the grounds, and events for Rally visitors will include a pedestrian D/F hunt (that's

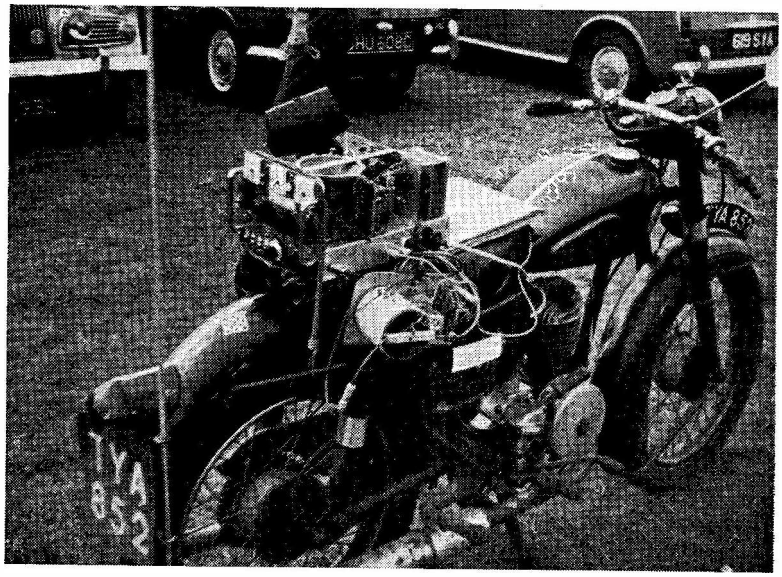
[*cont'd p.361*

A very keen member of the Bristol A.R.C. is SWL J. Hooper, who turned up at the Longleat Mobile Rally, complete with his /P Rx, having cycled all the way. The gear, which is not actually used mobile for obvious reasons, is entirely home-constructed and enables Jeremy to go out portable-listening on 160 metres. The enthusiasm of our SWL's is surpassed only by their ingenuity.

Group seen at the Northern Mobile Rally on June 19, gathered at the 4-metre talk-in station.



". . . Pse QRX — examiner says noise is distracting him . . ."



In addition to the Marquis of Bath's lions, this equipage attracted a good deal of attention at the Longleat Mobile Rally on June 26—the outfit on his motor-cycle, all home built by G3UPV/M, Warminster. The rig is a 160-metre transceiver, with an 11-transistor Rx and a 6-valve Tx, running 10 watts to an 807 PA, series-gate modulated. Well, it's one way of getting about mobile!

You can guess that this is another Jack Hum, G5UM (car 73 JH) offering! He and his XYL noticed it while motoring through Ayrshire. The place is no more than a hamlet—pity that the A.A.'s "Box 88" has to be at Caxton Gibbet in Cambridgeshire.

what it says !), a junk sale, a trade exhibition, and a grand raffle. This is always one of the big Rally events of the year and, given a sunny afternoon, it should be as well supported as ever. There is an admission charge to the Park, which can come to quite a lot for a carful.

September 16-18: Second International Amateur Convention and Mobile Rally at Knocke-le-Zoute, near Ostend, Belgium, to be attended by radio amateurs and (X)YL's from several countries. A three-day, Friday-Sunday, programme has been arranged, at an inclusive charge of £10 a head, covering meals and accommodation and including the special convention lunch on Saturday, 17th. Bookings should be completed before August 31. Temporary mobile permits are being issued by the Belgian authorities. For details, forms, brochures, etc., apply: Mons. L. Vervarcke, ON4LV, 284 Lippenslaan, Knocke-Zoute, Belgium. U.K. bookings can also be made through: J. C. Foster, G2JF, Wye College, Ashford, Kent. Air fare from Lydd, Kent, or Southend, to Ostend (12 miles from Knocke) costs £8 17s. return, with 10 per cent reduction for parties of 15 or more.

September 25: Harlow Mobile Rally *(details later).*

WHY NO CORRESPONDENCE COLUMN—THEY ASK

The fact that we practically never publish readers' letters as received has for long been what might be called a non-feature of SHORT WAVE MAGAZINE. There are several (what we think are) good reasons for this. The first and most important is that we run in the MAGAZINE no less than four regular features that are entirely built up from readers' letters; these cover a wide range of subjects and, within reasonable limits, all views are projected and everyone can have his say. The second reason is that a properly developing correspondence column can be extremely demanding of space—and with us, space is always short. Thirdly, it must be admitted that we do not often see a letter that could not be adequately dealt with through one of the features. On the other hand, this does not mean that we are not interested in having letters from readers on some new or important subject about which they feel particularly hot. What we are *not* interested in is starting silly controversies, like "Phone *v.* CW," or "Should Amateurs Roll Their Own," or "Why Do We Need a Morse Test."

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for September Issue: August 12)

(Please address all reports for this feature to "Club Secretary," **Editorial Dept., SHORT WAVE MAGAZINE, Buckingham.)**

ONE of the most interesting facets of Club life, as revealed by the letters from groups all over the country, is the attitude to the important matter of where, and how ofen, to hold meetings. The venue seems to vary, from "a place of their own," through school classrooms and church halls, using a member's home, or even to meeting in a different member's QTH each time on a rota basis. As to the frequency, it again varies, from two or more meetings each week, to once a month. If one equates success in the Club context with numbers attending the meetings regularly, then some odd results appear from a study of the overall picture. Allowing that there is roughly one amateur per 5000 head of the population, together with, shall we say, a similar number of SWL's, then a study of the population figures for the towns in which there are reporting Clubs is interesting. Judging by the figures quoted for attendance, some Clubs seem to rope in a far higher proportion of the possible local lads than others. In almost every case where a Club seems to be outstandingly successful, one finds the programme to be something along the lines of a monthly, or at most fortnightly, meeting, usually in a hired room, with a talk or filmshow or what-have-you laid on, frequently of a fairly high standard. While they may, and often do, hold a Club callsign, there is little evidence of the presence of a Club station as such. The odd thing about all this is that these Clubs are often not in areas where lecturers could be expected to be abundant.

It seems possible that the reason for this could be at home. Most of the married men are, by nature, home-birds, and while they are glad to attend a monthly meeting with a lecture or some such, they just do not feel that a twice-weekly trip to the Club for a ragchew is worth it, particularly if things are made uncomfortable by QRM from a station operator who insists on having the receiver run up so high as to drown conversation anywhere in the room. It would be interesting to hear comments from the various reporting Clubs, and try to collate these to see of your scribe is talking through his hat.

Just for a change the reports have been divided up into regional groups this time, and we commence with the *London and Home Counties* offerings.

Verulam ARS have changed the venue of their meetings to the Cavalier Hall, Watford Road, St. Albans; the one on August 17 will have a lecture by G3NOH of the BBC on TV outside broadcasts, while the September affair, on the 21st, will be addressed by G6CJ, giving his famous "Aerials" lecture. **Crawley,** on the other hand, have for their August date the Annual Junk Sale, with G3FRV trying to sell *nearly* everything. As for September, the VHF Field Day and the commencement of the efforts of G3PHG with his R.A.E. classes again, are the highlights.

North Kent RS have gatherings slated for the 11th and 25th August, at 7.30 p.m. No details are given in the notes we have, but those who attend will enjoy themselves for certain. Home on to the Congregational Church Hall, Bexleyheath.

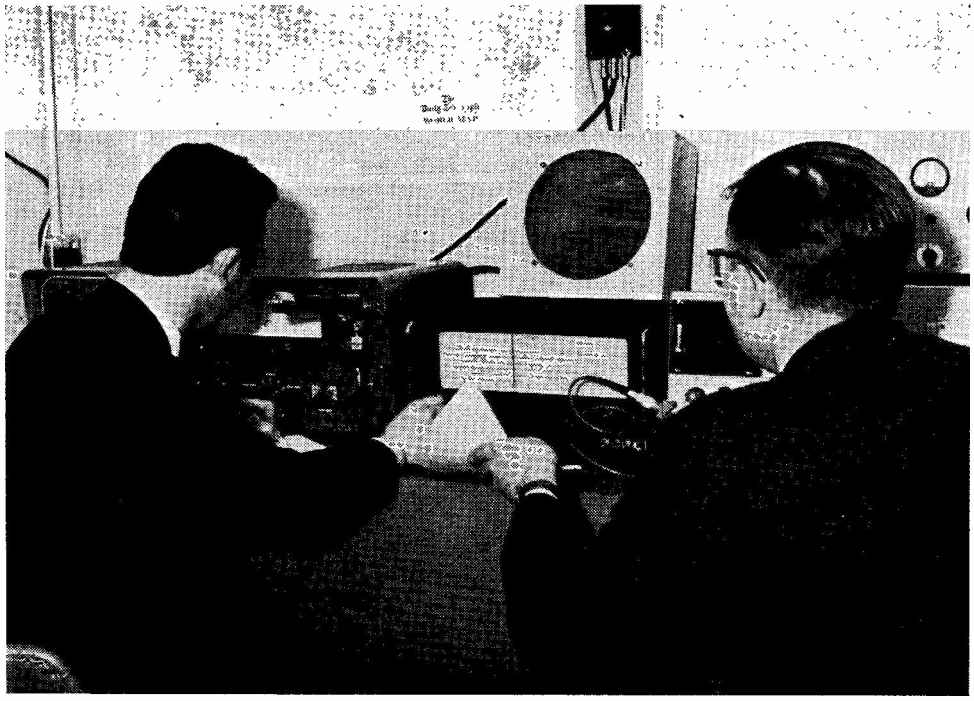
Echelford ARS similarly give no information as to their activities for August, but anyone in the Ashford, Middx., area can doubtless get all the gen. from the hon. sec. for the price of a phone call or a postcard; they have a most interesting *Newsletter*, the June issue of which carried a list of zones, with comments on the difficulty or otherwise of each one. This now adorns your conductor's wall.

Over to **Cray Valley,** who are so excited about their first signing-up of a YL member, Miss G. Butcher, that they *also* forgot to give their programme for August; however, they do mention the Annual Dinner and Dance, at the Bulls Head, Chislehurst, on September 17.

At **Purley,** they have a Natter Nite on August 5, and on the 19th G3FTQ will be showing slides taken on Ibiza. The Purley club newsletter, *Splatter*, also gives details of the **South London Mobile Club,** who are in the swim at Clapham Manor Baths on August 13 for a Film Show by G3DPW. The other member of SARA, Wimbledon and District, must have gone to ground, as no reference to the August programme appears in any of the SARA publications, apart from a reference to a meeting "on the 30th" to hear G6CL, at the St. John Ambulance Brigade QTH, which we think is more likely to mean July than August. (Sorry chaps, you have beaten us here!)

At the A.E.U. Club, 66 High Road, Chiswick, London, W.4, on August 16 at 7.30, **Acton, Brentford & Chiswick RC** will be having an Open Discussion Night to which visitors and prospective members are specially welcomed. **Surrey RCC** will be going on safari again, conducted by G2YL (who gives a very interesting talk) at the Blacksmiths Arms on August 9. It is pointed out that the Club are proposing to make a start with the evening at 8 p.m. *sharp*, so that there will be enough time for a good old ragchew after the formal meeting is over.

Southgate traditionally hold no session in August,



One of the social activities enjoyed by the Painton Group of Companies, of Northampton —of which G4TZ is principal, and G5BG and G8LT joint managing directors—is a club organisation. After a somewhat inactive period, the Painton Radio Club has now got going again, with its own permanent amateur-band station, signing G3PHC. Ample accommodation is available, and that includes acreage for an aerial farm ; the equipment assembly is a K.W. Viceroy, a Vanguard, an Eddystone 888 and sundry items of test and measuring gear. In addition, an EMI TV camera and monitor are shortly to be used for A/TV transmissions. At the moment, no less than 14 members of the Club are preparing for the December RAE, and for them instruction has been arranged locally. Our photograph, taken on the occasion of the firm's recent open day, shows G3PPP (left) and G2AXO operating G3PHC. Club night is Wednesday, at the Painton Social Club Building, Studland Road, Kingsthorpe, Northampton. Visitors are welcome, but should contact the Club hon. secretary (R. Green, Painton's) or G2AXO, in the first instance.

and so it is this year. September is given over to a Junk Sale, on the 8th, whole on October 13, the G6QM Trophy (a constructional contest) holds sway. Incidentally, who was it who entered an 0·1 μF capacitor on flying leads as a " Universal Test Set " in this contest some years ago ? ! The Southgate Club foregather at Parkwood Girls' School, Wood Green, London, N.22, the time of the kick-off being 7.30 p.m.

Crystal Palace & DARC *Newsletter* is a thoughtful piece of work by the hon. sec., Geoff Stone, G3FZL ; but we feel he is being defeatist when he says the group have " next to no chance of winning a field day event if they are to enjoy it." The logic of this seems a bit twisted to the writer, who has always enjoyed it more when he has been with the group that are " having a go " . . . even though he has never been promoted above the rank of teaboy, third-class. G3FZL talks on aerials at the next get-together, on Saturday, August 20.

Chesham & District welcome new members to their meetings, which take place each Friday, 8.0 p.m. at Hq, rear of 5 Bois Moor Road, Chesham, Bucks. If anyone can give a lecture on " 70 cms and above " he will be more than welcome at Chesham ; if necessary out-of-pocket expenses would be defrayed by the Club. Any volunteers ?

Edgware & District RS is one of the Clubs to go into suspension, as it were, during August, but unlike most of the others, Edgware keep things alive by means of a weekly Club net on 1875 kc, Wednesdays at 2100 hrs.

NORTHERN DISTRICTS

Turning now to the clip from Scotland and the North, we hear from **Lothians** that they held their AGM on June 23, although they have not indicated their meeting-place. A humorous note from Stockport indicates that the **Ashton-under-Lyne & DARS** has re-activated the earlier Ashton Club's call, G3BND, and is operational on 160, 80 and Two metres. They say " new members are very welcome. We need the money ! " On the other hand we gather they intend to organise a full programme for this winter, so we look forward to being able to discuss their future efforts. From over at **St. Helens Electronics Society,** we are glad to be able to report that the station planned for operation at Pilkington's Gala Day, on August 6, is now definitely " on," all operators being

welcome ; they start the new season at I.V.S. Centre, 55 College Street, St. Helens, at 7.30 on Tuesday, September 6. This Club, as its name implies, is one that caters for a rather wider range than is usual, including such things at A/TV and Model Control, all of which must widen the outlook of the members.

Derby & District ARS have a fully paid-up membership of 150, with no less than 533 on the nominal roll. They have *six* sessions laid on for the month of August, each with a definite end in view, ending up the month with a lecture on " Wine-Making, by the Members," who are invited to bring along samples, at the Club Hq., Room No. 4, 119 Green Lane, Derby, on August 31. The rest of the month of August for Derby may be summed up as follows : 3rd, Surplus Sale at Hq.; 10th, Preparing for the Mobile Rally at Rykneld School ; on the 14th the big Derby Mobile Rally itself, also at Rykneld School ; on the 17th a D/F Night, with the alternative of a lecture in the Club room for the non-D/F types ; August 24, a " limited-number " visit to Derbyshire Royal Infirmary—and, of course, the wine-making session aforementioned on the last day of the month.

From Derby to **Northern Heights,** who also have a full programme of events laid out. On August 13, they have a demonstration station at Halifax Agricultural Show, with a visit to Whitby on the following day. On the 17th Alan Bates is to talk about Transistor Design Procedures in Audio Circuits, while on the 31st they have the pea-and-pie supper mentioned in this column last month, at which they are hosts to Manchester & DARC.

Fylingdales (Early Warning Station) send a first letter, from which we hear that there is a problem in finding the Hq. at St. John's House, which is back of St. Hilda's Terrace, Whitby, the actual location being in the basement, every Tuesday evening at 7.30. The main project in hand at the present is the preparation of their effort in connection with the Whitby Regatta, on August 13-15, when the callsign GB3FRC will be in use. Again, this is a Club which makes special mention in its letters of the welcome extended to new members.

Ainsdale write in to say they are enjoying a visit from their wandering boy, VO1FB ; Joe has brought a tape-recording of some of his G contacts on Top Band over with him, and we gather it is causing some mirth locally. (Those 10-watt key clicks !)

From **Lichfield ARS** we learn of yet another Club

Names and Addresses of Club Secretaries reporting in this issue :

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
AERE (HARWELL): V. J. Galpin, Building 347.3, AERE, Harwell, Didcot, Berks.
AINSDALE: N. Horrocks, G2CUZ, 34 Sandbrook Road, Ainsdale, Southport (*77604*).
ARMS: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10. (*LEYtonstone 6700.*)
ASHTON-UNDER-LYNE: R. Higginbotham, G3VDS, 1 Bankfield Cottages, Woodlands Drive, Woodley, Stockport, Cheshire.
BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
BROMSGROVE: J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.
CARDIFF (Radio Contest): N. Graham, GW3OAY, 23 The Rise, Llanishen, Cardiff.
CHESHAM: D. Kind, 19 Hollybush Road, Chesham, Bucks.
CHESTER: P. J. Holland, G3TZO, Field House, 19 Kingsley Road, Great Boughton, Chester.
CORNISH: M. J. Harvey, Oak Farm, Carnon Downs, Truro, Cornwall.
COVENTRY: W. F. M. Hahn, G3UOL, 11 St. Patrick's Road, Coventry.
CRAWLEY: R. G. B. Vaughan, G3FRV, 5 Filbert Crescent, Gossops Green, Crawley (*23359*).
CRAY VALLEY: C. W. A. Davis, 6 Braemar Gardens, Sidcup (*FOOtscray 5077*), Kent.
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23. (*FORest Hill 6940.*)
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (*21931*).
DURHAM: D. H. Plumridge, G3KMG, 34 West Drive, Lanchester, Durham.
EAST LANCS.: J. Simpson, 1 Marsh Terrace, Darwen, Lancs.
EAST WORCS: J. Bazley, G3HCT, Brooklands, Ullenhall, Solihull, Warwickshire.
ECHELFORD: A. G. Wheeler, G3RHF, 88 Village Way, Ashford, Middx. (*Ashford 55265.*)
EDGWARE: G. S. Fitton, G3RAA, 18 Beverley Drive, Edgware, Middx.
EX-G RADIO CLUB: F. W. Fletcher, G2FUX, 53 St. Ives Park, Ringwood, Hants.
FYLINGDALES (Early Warning Stn.): W. Burton, G8ANQ, 14 Westbourne Road, Castle Park, Whitby (*935*), Yorks.
HULL: *Secretary's name and address wanted.*
LICHFIELD: S. W. Williams, G3VIQ, 65 Wallfield Road, Alrewas, Nr. Burton-on-Trent, Staff. (*Alrewas 491.*)
LOTHIANS: A. J. Masson, GM3PSP, 20 Merchiston Park, Edinburgh, 10.
MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead, Berks.
MAIDSTONE: C. Robertson, G3ERY, 17 Northumberland Road, Maidstone, Kent.
NEWARK: G. Francis, G3TWV, 93 Balderton Court, Newark, Notts.
NORFOLK: A. Marcantonio, G3TLC, 10 Hellesdon Mill Lane, Norwich, Norfolk. NOR.21L. (*45244.*)
NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (*64329*).
NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath (*8655*), Kent.
PAINTON (Northampton): R. Green, Painton Social Club, Studland Road, Kingsthorpe, Northampton (*34251*).
PLYMOUTH: B. J. Curnow, G3UKI, 113 Mountgould Road, Lipson, Plymouth.
PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey.
RADIO CLUB OF SCOTLAND: A. Barnes, GM3LTB, 7 South Park Terrace, Glasgow.
RAIBC: Mrs. Frances Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
REIGATE: D. Thom, G3NKS, 12 Willow Road, Redhill (*45033*), Surrey.
SALTASH: D. Bowers, 95 Grenfell Avenue, Saltash, Cornwall.
ST. HELENS: B. Hardy, 198 Knowsley Road, St. Helen's, Lancs.
SHEFFORD: D. A. Pike, 32 Lawrence Avenue, Letchworth, Herts.
SOUTHAMPTON: *Secretary's name and address wanted.*
SOUTH BIRMINGHAM: A Bishop, 40 Cecil Road, Birmingham, 29.
SOUTHGATE: R. Wilkinson, G3TXA, 23 Ashridge Gardens, Palmers Green, London, N.13. (*PALmers Green 4592.*)
SOUTH MANCHESTER: M. Barnsley, G3HZM, Greenways, 11 Cemetery Road, Denton, Manchester.
SOUTH LONDON MOBILE: B. Negri, G3LXN, 17 Voltaire Road, Clapham, London, S.W.4.
SURREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon, Surrey. (*ADDiscombe 5982.*)
SWINDON: D. Goacher, G3LLZ, 51 Norman Road, Gorse Hill, Swindon (*21740*).
TORBAY: B. E. Symons, G3LKJ, 52 Reddenhill Road, Babbacombe, Torquay, Devon.
VERULAM: G. Slaughter, G3PAO, 6 Leggats Wood Avenue, Watford, Herts.
WAMRAC: Rev. A. W. Shepherd, G3NGF, 1 North Street, Crewe (*2558*), Cheshire.
WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.

Some of the licensed members of the East Lancs Amateur Radio Club, now rapidly coming to the fore in that part of the world. Back row, left to right: G3SXC, G4CJ, G3SSD, G3PUO, G3OTA. Middle row, left to right: G3NCZ, G3UUA, G3GZE, G3JZO, G3VGB, G2HFP. Front row, left to right: G8JA, G2FMU, G3XK, G3OGU, G3EKP, G3VDO and G2BNF. This is not all the transmitting membership of the Club, now in the 80's and including a large body of enthusiastic SWL's.

callsign, in this case G3VKP, which they propose to use with vigour on field days and similar events.

Durham City ARS slant alternate meetings towards the beginner and SWL, even to the extent of making the place "dry" to allow the youngsters to join in. It is hoped the old hands will participate actively in this part of the programme. This seems a very good idea, and one wonders whether an exchange of views between the Durham and Harlow people (and possibly others) who are active in this sort of way could not lead to mutual benefit, or even to an article in the *Magazine*, to point out to other Clubs the pitfalls to avoid? On August 25, the Durham evening is "normal," the earlier meeting this month, *i.e.*, 11th, being "Accent on Beginners." QTH, The Bay Horse, Gilesgate, at 8 p.m.

The Railway Institute, Anlaby Road, Hull, on August 12, is the place to be to see the latest Pye commercial equipment demonstrated to **Hull & District ARS** by G3AGX, whilst on the 26th interest will centre around a Transistorised Dip Oscillator. The Club station is installed at the Distillers Company, Saltend, Hull.

The **Radio Club of Scotland** meet at 336 North Woodside Road, Glasgow, every Friday at 7.30 p.m., no details being to hand at the moment of writing; on October 2, RCS hold their 1966 convention, tickets for which are 25s., the venue being the Grand Hotel, Charing Cross, Glasgow, from 3 p.m. till 10 p.m., and the price, we gather, includes dinner. From the programme we note events aimed at the distaff side during the afternoon.

The **East Lancs. ARC** has not yet celebrated its first birthday, but already it seems to be part of the local Amateur Radio scenery. On August 4, they get together at the YMCA, Limbrick, Blackburn, at 7.30 p.m. to hear and ask questions of a GPO representative. On the 8th, the Club station opens for business on a twice-weekly basis, with a roster of operators to do the work. On the 7th the exercise is a D/F competition with no "fiddles," insofar as the rules specify the use of public transport or shanks pony; they propose to hold a bus-ticket inspection after the event. It occurs to your conductor that they must have a secret collector in their midst!

Round now to **Newark,** who have been discussing the value of various periodicals in a manner described as "fiery" and enjoyed it so much they propose to have another session shortly—no wonder your scribe has been suffering a burning sensation in the ears of late. Mondays and Thursdays at 7.30 at the Mall, in Guildhall Street, and a welcome to visitors, including other Clubs.

At **South Manchester** they do not report very often for the simple reason that they have so many activities that there just is not time. The main activity in August is on the 12th, when G3SVW will lecture the assembled multitude on "The Construction and Use of Q-Multipliers." Other activities include the Northern Convention, over September 3-4, in which they are involved, a Field Day, and a National D/F Final to be organised, this latter on September 18. Hq. is the Rackhouse Community Association, Rackhouse, Daine Avenue, Northenden, Manchester.

Wirral ARS have a Sale of Surplus Items slated for August 3, and on the 17th there will be an Evening D/F contest. The Club Hq. is at Harding House, Park Road West, Birkenhead, and if the

Newsletter is any criterion, new members should soon feel " at home " with this group.

MIDLANDS AND EAST

A most interesting publication, run by the **Norfolk ARC,** and titled *Challenge,* tells us that the Club meets each week at the Hq. at Old Lakenham Hall, Mansfield Lane, Norwich, every Monday at 7.30. The programme for the month of August is as follows: on the 1st a Brains Trust; an informal session on the 8th; Lucky Dip on the 15th; Business on 22nd, and on the 29th, No Meeting.

Shefford & District have an Open Evening to start the new session on August 18, at the Church Hall, Shefford, at 8 p.m., but early arrivals will find that from 7.45 the sound of the oscillator giving out Morse practice is the prevailing note. A warm welcome is extended to visitors and new members; this is not just a recruiting slogan, it's true—as your conductor knows from his own experience some years ago, when he attended a talk on Police Radio in Shefford's old QTH.

Coventry ARS appear to be in the wars; we gather that a bomb was thought to be under their Hq. and the place was closed. To be " bombed out " 21 years after the War is bad enough but the cream of the joke is that " Hq." to them is the Civil Defence Hq. building! Until the scare is over they get together each Friday at the Grapes Hotel, Radford Road, at 8 o'clock.

South Birmingham occupy the Scouts' Hut, Pershore Road, Selly Park, Birmingham, 29, on Wednesday, August 17, to hear a lecture; the subject is not confirmed at the time of compiling this piece.

Bromsgrove & DARC entertained several neighbouring Clubs last month with a most interesting lecture and demonstration of Heathkit Sideband gear, by G3HXN. As for the August " do " on the 12th, they will be at the Bromsgrove Co-op Hall watching a film show.

The **East Worcestershire RS** gather at the Old People's Home, Park Road, Redditch, on August 11, for a session on the Club constructional projects. The time given is 7.30 for 8 p.m. As for the September affair, a lecture by Daystrom Ltd. is slated. Here again is a Club which makes a point in their letter of the welcome offered to visitors.

SOUTH AND SOUTH-EAST

Round now to the South and South-East corner of England, and the first stop must be the Club with the free offer (or so it says in the advert in *QUA*). The free offer comprises chinwags, gossip, free tea and a transmitter for both Top Band and two metres. This free offer may be investigated on Wednesdays and Fridays at the Club Hq., 20 Carlton Road, **Southampton,** starting at 7.30 p.m. Further comment from your scribe is unnecessary!

Maidenhead take us to task for misquoting the address of the hon. secretary last month. It is believed some mail may have gone astray due to this, so if anyone is owed a letter, please blame your conductor and write again, to the correct address given in the panel this time. As to their meetings, there is one on August 6, when a visit to USAF, High Wycombe, occurs. Anyone wishing to go on this is asked to inform the hon. sec. (*quickly,* please) with name and address, as the Station authorities require the information. There will also be a few Natter Nights at local hostelries before the new session starts on September 20 at East Berks College, for details of which, again, refer to the hon. sec.

Maidstone YMCA ARS have a very full programme laid on; August 3, a talk about the R.A.E., by G3ORP; August 10, G3ERY on Radio Mathematics; 17th, " Class-C RF Amplifiers," explained by G3LXO. Transistor VFO's is the subject offered by G3UEW on August 24, and finally, on the 31st, a session on Centimetric Wavelengths under G3LQV. In each case the lecture will be preceded by a half-hour session of Morse practice, until 8 p.m. For the time being, meetings are being held at the Cheshire Home, Mote House, Mote Park, Maidstone.

Over now to **Reigate,** where we learn that the Club foregathers on August 25, at the George and Dragon, Cromwell Road, Redhill, at 7.30 p.m., when the main item will be to make arrangements for the VHF Field Day.

On July 2, the Maidenhead & District A.R.C. were able to visit the G.P.O. long-distance receiving station at Bearley, near Stratford-on-Avon. The group photographed against some of the rhombic arrays, giving 360° coverage.

When the Scunthorpe Amateur Radio Society ran an exhibition station signing GB3LST, part of their display included a stand of apparatus ranging from a valve made before Kaiser's War to the latest printed-circuit amplifier. That horn speaker will raise some nostalgic memories among those who can remember "wireless" in the 1920's.

WALES AND WEST

Under this heading, the pile could start with the **Chester & DARS** letter, from which we are glad to note that the group have re-activated the Club call, G3GIZ, after a lapse of almost ten years, the reason being the number of members now interested in the idea of contest and /P operation. On August 2 the Chester net meet; on the 9th, a visit to Moel-y-Parc ITV Tx is on the line; the 16th is a Natter Nite; G3FNV shows a film of NFD on the 23rd; and on the 30th, the evening is G3DRB's. All sessions start at 8.0 p.m., at Chester YMCA. From **Torbay ARS** comes a letter giving details of their June and July get-togethers—but no details on the forthcoming events or address of their secretary ! All we can say is that on the basis of the programme for the last couple of months, a visit to the Club Hq., Bath Lane (Rear 94, Belgrave Road), Torquay, could be worthwhile.

Cornish ARC have their fine *Cornish Link* printed in three colours, from which we are able to glean details of an interesting talk on "Fault Finding" by G3XC, on August 4 ; there is a VHF group, within the Club, and in addition there is thought about forming an SSB section, as well as a group centred on St. Eval, all part of the Cornish service.

Nearer home, we join **A.E.R.E. (Harwell)** by way of *QAV*, who make no mention whatever of meetings, but much mention of their recent activities out-of-doors ; reading between the lines we gather that VHF NFD is on the programme. Judging by the results shown in *QAV*, these chaps have the contest racket about taped, so September 3-4 should be interesting.

On to **Saltash,** who report that they have a Mobile evening-out on August 12, when they will be going "Fox-hunting"—one only hopes Those People will not throw pepper at them to spoil the scent ! On the 26th, the exercise is a Mobileers Mystery Evening. Both events start at the Club Hq., 7.15 pip-emma, and on the dot, please.

Still in the West Country, a Club who call themselves "Wiltshire Hams," in fact the **Swindon & DARC,** who meet on August 10 and 24, at Rodbourne Cheney Old Scout Hall, behind St. Andrew's Methodist Church, Moreden Road, Swindon. For September 4, a Mobile Picnic is on the card, for which G3PRR will welcome offers of help.

Yeovil meet on Wednesday evenings at 7.30, at the Youth Centre, Park Lodge, The Park, Yeovil. The Club station will be at work at the Yeovil Youth Centre Michaelmas Fair on October 1, and, of course, taking part in the VHF Field Day, but no details are given of run-of-the-mill activities.

The main activity at **Plymouth Radio Club** for August is the Annual Club Picnic, and plans are being formulated in the way of activities for September, including a lecture at the Plymouth Central Public Library on "Amateur Radio as a Hobby" with slides, and a weekend visit to Drake's Island in Plymouth Sound with the idea of a spot of /P operation.

From the **Cardiff Radio Contest Club** a report that they are now in "the quiet summer period,"

IMPORTANT NOTICE

Club secretaries and others concerned are reminded that the address for this feature is: Editorial Department, Short Wave Magazine, Buckingham, England, with the letter marked "Club Secretary." Reports must reach us by the date given at the head of the article each month, and must also include the QTH of the hon. secretary for the address panel. Some reports are still being sent to our London office, causing delay, and others do not give an address for the hon. secretary.

with plans being made for trying new sites using portable gear. The objects of the Club being what they are, and implied by the title, recruiting is slow, because the first requirement of a prospective member is " unlimited enthusiasm and dedication, with ability or at least a desire to learn." However, progress is being made, to the extent that consideration is being given to the idea of training up keen SWL's to be contest operators.

NO GEOGRAPHICAL BOUNDARIES

Some of the Clubs reporting have no geographical boundaries we can conveniently drop them into. One such is **RAIBC,** the Bedfast Club, who meet through the medium of an 80-metre net on Tuesdays at 10 a.m. and Wednesdays at 2 p.m., around 3·7 mc, and of course through their *Radial* each month. One item not mentioned in the issue at hand is that SWL Boydell, having passed the R.A.E., has now, we believe, passed the Morse Test as well. To ensure that such happy events continue to occur at regular intervals is the aim of RAIBC, and they can *always* use some help. Incidentally, the current issue of *Radial* has a full list of Cheshire Homes, taken from the " Cheshire Smile."

The **Ex-G Radio Club** is another that lives by its nets and its *Bulletin,* which is full of news and views from ex-G types all over the world, interspersed with letters and jokes. A thoroughly interesting effort indeed.

From *Mobile News,* the organ of **ARMS,** we find the editors pointing out that they are printing almost all that comes in, so the publication is just what the members make it! ARMS, of course, do not formally hold many meetings other than the essential AGM, but cater pretty thoroughly for the needs of the /M types; members are to be found at most of the Mobile Rallies.

British Rail ARS send in a long letter which we would have liked to quote in full; it gives details of the International Amateur Radio Railway organisation, and its next congress, " FIRAC-66," at Gavle, Sweden, during August 27-30. It is surprising to learn that a society such as this, with member-groups in the railway organisations of no less than 12 countries, is not considered worth a publicity note in their own *Rail News.* From the call book for FIRAC, we get it that more than 60 G's are members—including some quite distinguished callsigns — supported by more than a dozen SWL's, all connected with British Rail in some capacity—interesting!

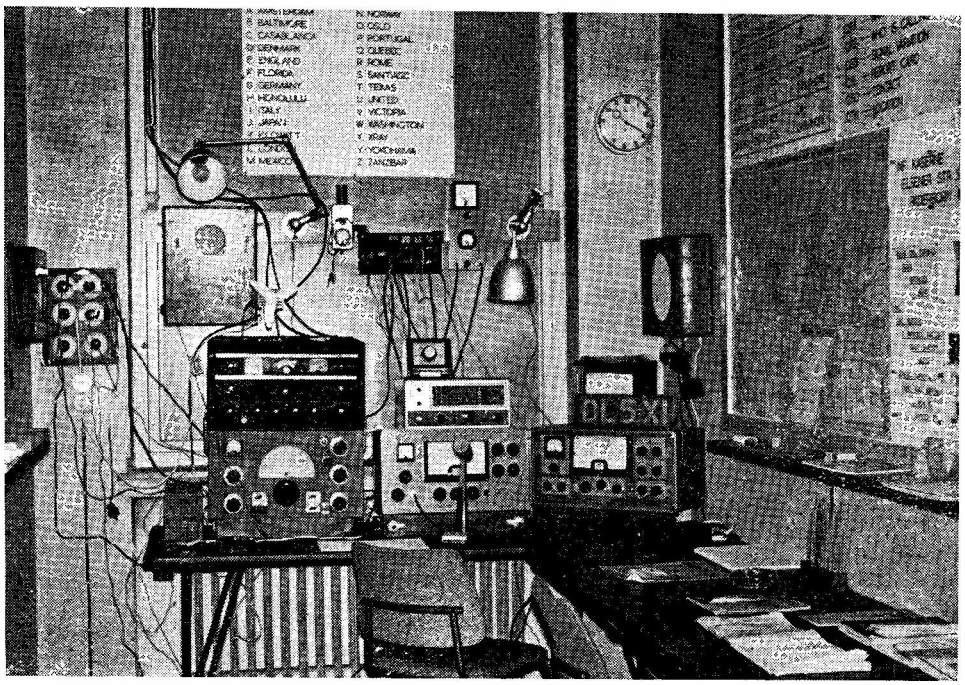
Your conductor was grieved to hear from the **WAMRAC** *Circular Letter* No. 58 that they are no longer backed officially by the World Methodist Council; the grounds given in the Council's resolution seem to imply that the authorities are using Clause 16.3 of our licence to suggest that WAMRAC can serve no useful purpose. WAMRAC will continue to exist and deserve support as much as, if not more than, before and we trust that official Methodist Council backing will soon be restored. After all, any amateur who breaks the terms of his licence deserves all he gets, but there is no need to break the licence terms in order to make friends with others of a like mind—which is, after all, the main object of membership of any Club.

And that about wraps things up for this month. Let us have all your news, comments, programmes for the future, and anything you think will be of interest, by **August 12** for the September issue, and **September 16** for October. Meanwhile, don't forget the address, " Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, and do look after yourselves.

PHOTOGRAPHING AMATEUR EQUIPMENT

While we often get quite adequate photographs with articles offered for publication, too often an otherwise useful article is spoilt by totally unusable pictures. This is nearly always because the subject has been badly posed or inadequately lighted. In fact, it is quite easy to take acceptable photographs with an ordinary camera, provided the light is strong enough (sunlight, outside the front door) and some trouble is taken with preparation. This amounts to providing a smooth contrasting background—and there is nothing simpler than taking a low table, arranging a sheet or tablecloth to cover the table and held up at the back, and sitting the equipment on that. The picture should be sighted so that it just about fills the view-finder (at the correct focus distance for the camera) and one or two shots taken with different poses. The other way to get good photographs of your gear is to take it to the local studio photographer, who of course has all the right equipment to do a professional job, tell him exactly what you want to see, and let him get on with it. The point here is that if the picture is to illustrate an article, and if the article is acceptable for publication, we are prepared to pay at a reasonable rate for photographs taken professionally.

". . . Lig here English copy one in Magazine . . ."



THE OTHER MAN'S STATION DL5XI

SPENDING all his Army career to date (14 years) in radio communication, Guy Yearsley was ZC4GY and 5B4GY before becoming DL5XI, with the station shown here.

But it was not until 1961, in Cyprus, that he became interested in what we know as Amateur Radio, and then it was because of the enthusiasm of a friend. He started with a station consisting largely of obsolescent Army pieces with which, nevertheless, all HF bands were worked and the seeds of serious interest were sown. A period of intense activity resulted in the formation of an R.E. Unit radio amateur club, with nine members, all Army operators, and all the world being worked. Soon, the QSL's started flowing in—including a card from one of the Saudi princes, who was an active amateur and had been worked from 5B4GY; his card arrived just a fortnight after he had been assassinated in the Saudi revolt.

The station of DL5XI—W.O.II G. Yearsley, B.E.M., R.E., 4 Divn. Engineers, B.F.P.O. 16—is now established at Paderborn, West Germany. The equipment includes a K.W. Vanguard, an AR88 and a B.39, as well as various items of Heathkit gear. A KW-2000A is also being installed, for Sideband operation. A 40-foot mast carries a Mosley rotary trap dipole for all-HF-band working.

Bands mainly used are 15 and 20 metres, with an occasional sortie on 40 metres, where the locals can be worked. And by the time this appears, yet another R.E. Unit club will probably have been formed. Already, there is a German radio amateur club at Paderborn, of which DL5XI is a member, and he remarks how pleasant and helpful the DJ/DL boys are to their British colleagues.

NEW QTH's

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

EI5BG, F. W. Fletcher, Carragoona, Bray Road, Fox Rock, Dublin. *(QSL via G2FUX.)*

G3GIZ, Chester and District Radio Society, c/o Y.M.C.A., Old Palace, Chester. *(QSL via G3TZO.)*

G3UFK, M. P. Taylor, 48 Garfield Road, Enfield, Middlesex.

G3UNA, D. J. Cutter, 124 Briercliffe, Scarborough, Yorkshire.

G3UTB, J. Vissenga, 53 Robin Hood Road, Brentwood, Essex.

G3UUQ, A. S. Clelland, 397 London Road, Cheam, Surrey. *(Tel. Ewell 5896.)*

G3UVA, D. E. Knowles, 92 Dicksons Drive, Chester, Cheshire.

G3UZN, M. Rathbone, Blankney House, Winterton, Scunthorpe, Lincs. *(Tel. Winterton 416.)*

G3UZU, A. Upton, 28 Woodville Road, Birkenhead, Cheshire.

G3VAN, J. Cutter, 124 Briercliffe, Scarborough, Yorkshire.

G3VCE, F. C. Ellery, 47 Newmorton Road, Moordown, Bournemouth, Hants.

G3VCN, P. A. Kalas, 21 Garfield Terrace, Collingwood Road, Stoke, Plymouth, Devon.

G3VDC, V. C. Cheesman, South Lodge, Bolney, Haywards Heath, Sussex.

G3VDE, R. Sellers, Mill Road, Eastrington, Goole, Yorkshire.

GM3VDE/A, R. Sellers, 20 Royal Terrace, Edinburgh, 7.

G3VEU, P. W. Dew, 16 Old Millmeads, Horsham, Susex.

GM3VEY, F. Baxter, 22 Leggart Avenue, Aberdeen. *(Tel. Aberdeen 22852.)*

G3VEZ, A. S. N. Blake, 159 Southcote Road, Bournemouth, Hants.

G3VFI, J. A. Rampton, 23 Oxford Close, Fareham, Hants.

G3VFS, J. M. Cooper, 18 The Dingle, West Green, Crawley, Sussex.

GW3VGA, W. A. Metcalfe, Thorndale, Water Street, Caerwys, Mold, Flintshire.

G3VGB, R. Taylor, 46 Willows Lane, Accrington, Lancs.

G3VHX, D. G. Muller, 183 Meadowcroft, Aylesbury, Bucks.

GI3VIH, E. McCourt, 7 Ashburn Avenue, Woodburn Park, Londonderry.

G3VIQ, S. W. Williams, 65 Wellfield Road, Alrewas, Burton-on-Trent, Staffs.

G3VJO, P. G. Hildebrand, 70 Harpenden Lane, Redbourn, Herts.

G3VJR, J. B. Longstaff, 70 Clayfield View, Mexborough, Yorkshire.

G3VJU, The Electrics' Society, c/o Students Union, The Royal College of Advanced Technology, Salford, 5, Lancs.

G3VJY, J. L. Evans, 3 Birkrigg Crescent, Ulverston, Lancs.

G3VKA, A. Carr *(ex-MP4BFL / VS9AAD)*, 26 Cavendish Road, Felixstowe, Suffolk.

G3VKC, E. Haycock, *(ex-G8ALP)*, Two Four, The Comyns, Bushey Heath, Herts. *(Tel. BUShey 3387.)*

G3VKF, K. Kelly, 6 Cranford Avenue, Macclesfield, Cheshire.

G3VKO, L. Emmett, Box Tree Cottage, Whiteleaf, Princes Risborough, Aylesbury, Bucks. *(Tel. Princes Risborough 1009.)*

G6ABU/T, F. W. Evans, 21 Oaklea Avenue, Chelmsford, Essex.

G6ABW/T, D. W. Parsons, 21 Oaklea Avenue, Chelmsford, Essex.

G8APV, C. R. Jenner, 27 Buchan Road, Nunhead, London, S.E.15

G8APZ, S. R. Lucas, 64 Beresford Gardens, Hounslow, Middlesex.

G8AQI, I. J. Joyce, 47 Glebe Gardens, New Malden, Surrey. *(Tel. COO 4258.)*

CHANGE OF ADDRESS

EI9AF, N. Miller, *QSL via G3MVV.*

G2CAT, W. C. Alcock, Lower Encombe, Corfe Castle, Wareham, Dorset. *(Tel. Corfe Castle 556.)*

G3BDQ, J. D. Heys, 418 The Ridge, St. Leonards-on-Sea, Sussex.

G3LDG, B. E. Gee, Magnolia House, Ravensden, Bedford.

GM3LWS, E. H. Ross *(G3LWS / ZC4FB / ZC4CZ / VP8CZ /5B4CZ)*, 24 Ettrick Way, Glenrothes, Fife.

G3MVV, N. Miller, Avon, Gardiners Lane, Crays Hill, Billericay, Essex.

G3MXO, D. V. Walters, Greenacres, Little Liverpool, Coton-in-the-Elms, Burton-on-Trent, Staffs.

G3NDK, R. K. Webb, 24 Birch Avenue, Finningley, Doncaster, Yorkshire.

G3NMJ, G. C. C. Knapp, 14 All Saints Lane, Bexhill-on-Sea, Sussex.

G3NVJ, G. W. Hubber, 12 Antron Park, Mabe, Penryn, Cornwall.

G3OIX, B. E. Dean, Starbeck Swimming Baths, Spa Lane, Starbeck, Harrogate, Yorkshire. *(Tel. Harrogate 83155.)*

G3PYN, J. A. Birley, No. 2 Quarter, West Tofts, Mundford, Thetford, Norfolk.

G3RHB, J. E. Wright *(ex-ZB2AG)*, c/o Oakcroft, 190 Exeter Road, Exmouth, Devon.

G3SI, E. L. Wright, Hanchetts, Weaverhead Lane, Thaxted, Essex. *(Tel. Thaxted 229.)*

G3SLJ, D. W. Parsons, 21 Oaklea Avenue, Chelmsford, Essex.

G3SLP, L. Peace, 15 Woodway, Outwood Lane, Horsforth, Leeds, Yorkshire.

G3UJA, B. A. McClory, 115 Knutsford Road, Wilmslow, Cheshire.

G3USF, Prof. M. Harrison, Dept. of Political Institutions, University of Keele, Keele, Staffs.

G4JA, A. D. Stenning, Powis Cottage, Ruyton - XI - Towns, Shrewsbury, Salop.

SPECIALLY ON THE AIR

Referring to the note on p.301 of the July issue of SHORT WAVE MAGAZINE—about the local-QRM difficulty often encountered in setting up a demonstration station—one Club had the experience of finding themselves placed alongside the stand of a local dealer demonstrating hand power-tools for the do-it-yourself types! When they explained the difficulties and asked for a rearrangement, their new neighbours turned out to be a firm proposing to show how arc-welding is done . . . ! These are typical of the hazards at many a local exhibition, county show or arts and crafts festival. In fact, it is doubtful if it is possible to run a radio station for any such occasion without the certainty of having to contend with a very high local noise level. It is of little use "moving the radio station right away," as then nobody comes to visit it. The only practicable solution is, of course, a live-and-let-live arrangement by which all noise sources are shut down for specified short periods to give the radio group a clear run.

We trust that none of the Clubs listed here will have to tackle the suppression of arc-welders or electric drills.

GB3WIJ, till August 7: Operated by the Salisbury & District Short Wave Club for the Wiltshire International Jamboree at Ogbourne St. George, with about 2,000 Scouts from several countries in camp. For sked contacts and QSL's, the QTH is: D. Hobbs, 5 Norfolk Road, Salisbury, Wilts.

GB3SFS, August 5-7: For the South Shields annual flower show, Bents Park, running AM on 20/80m., with some activity on 160m., two metres and possibly 15m. This is a regular commitment for The South Shields & District Amateur Radio Club, of which the hon. secretary is: D. Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham, who says that visitors to the Club stand will be very welcome.

GB3SES, August 6: Arranged for the Pilkington Gala Day by the St. Helens (Lancs.) Electronics Society, with operation on all bands 10-160m., from noon till 7.0 p.m. Visitors welcome and QSL address: B. Hardy, 198 Knowsley Road, St. Helens, Lancs.

GB2TS, August 13: At Tollerton Horticultural Society's Show and Sports Day, operating on all open bands 10-160m. from 2.0 p.m., and organised by local amateurs and SWL's, with four operators. Details from: Dr. T. M. Newland, G3TMN, The Meads, Tollerton, York.

G3VGG, August 13: For the local Flower Show and Fête, and arranged by the Bromsgrove & District Amateur Radio Club at the Barnsley Hall, where all visitors will be welcomed. Hon. secretary: J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.

GB3FRC, August 13-15: Organised by the Fylingdales Radio Club in connection with the Amateur Radio exhibition at Spa Gates, Whitby, Yorkshire N.R., running commercial gear on all bands 15-80m. All contacts will be QSL'd with special care and visitors will be made very welcome. Details from: W. Burton, hon. secretary, Fylingdales R.C., 14 Westbourne Road, Castle Park, Whitby, Yorkshire.

GB3LEY, August 18-21: Organised by the Leyland-Hundred Amateur Radio Group, in connection with Leyland Motors 70th anniversary celebrations. Two transmitters will take care of all bands 15-160m., CW/AM/SSB, and skeds and contacts will be particularly welcomed with amateurs having connections with the motor industry. A special QSL card is being produced for the occasion. The factory open day is August 20, entrance by ticket only. For QSL's, skeds and tickets apply: F. Whalley, Press Office, Leyland Motors, Ltd., Leyland, Lancs.

GB3RED, August 29 *(Bank Holiday):* Station to be established for the Redbourn Annual Fair, running two channels, Top Band and 10-80m., AM/SSB, in action all day till 6.0 p.m., for which skeds will be welcome. Fair will be sign-posted, with easy access off M1 and A5. All contacts will be QSL'd by special card. Information and details: L. S. Duffy, G3TXP, 60 Snatchup, Redbourn, St. Albans, Herts.

GB3ALT, September 7: At the Altrincham Show, put on by the South Manchester Radio Club, to operate all bands 10-160m., AM/SSB. Details from: W. M. Furness, G3SMM, 171 Woodhouse Lane East, Timperley, Altrincham, Cheshire.

And, by the way, we would be interested to have brief reports from Club secretaries and hon. organisers as to how their event went, what sort of impact it made on the public, and notes covering on-the-air results.

SINGLE-COPY ORDERS

Those readers unable to obtain a copy reliably through a local newsagent and not wishing to pay the full year's advance subscription for delivery by post are reminded that they can get a copy of any issue right on time by sending us a postal order for 4s. "for next month." That is to say, if you want the September *Magazine* on the day of publication, (Friday, September 2) send a P.O. for four shillings to us on Tuesday, August 30, asking for the September issue. A copy will be posted, flat in an envelope, to reach you by Friday, September 2.

COURSES FOR THE R.A.E.

As in previous years, we now start listing those centres at which instruction is offered for the Radio Amateur's Examination, Subject No. 55 in the City & Guilds of London Institute examination syllabus—the first step to getting a U.K. amateur transmitting licence, irrespective of grade or the type of licence wanted.

These courses are held at local evening institutes, technical colleges and adult education centres up and down the country provided a sufficient number of

candidates come forward for enrolment. Instruction is normally for an hour or two, once or twice a week during evenings, and since all City & Guilds subjects come under the general scheme of further education, fees are nominal. Courses are taken by qualified instructors, who are usually themselves licensed amateurs, and so they are in a position to give a great deal of valuable help and guidance. Some of the courses we list have been running for years, and have an impressive record of successes. Most are due to start about mid-September, for the winter session, the next R.A.E. being in May, 1967—with possibly a subsidiary London-only sitting in December next.

Even if your locality is not mentioned in the list here, or that to appear next month (for which we expect details later), it is quite possible that there is a course available in your district, or within reach. To find out, ask at the local office of your education authority, quoting "Subject No. 55, Radio Amateur's Examination, City & Guilds of London Institute." Even if they haven't the information immediately to hand, they can find out and let you know. Please *do not* write to us asking for Course details or centres; we print all the information we have, as given here. The proper source for information is the local Education Authority.

Barry, Glam: At the College of Further Education, Colcot Road, on Tuesdays (Theory) and Thursdays (Morse and Practical Work) 7.30-9.30 p.m. In addition, a Radio Construction Course for Amateurs will be offered on Friday evenings. The lecturer in charge is D. H. Adams, GW3VBP, and enquiries should be directed to the Principal, at the College, quoting Ref. 22. Enrolment evenings September 7-8.

Basildon, Essex: At the Basildon Evening Institute, Pattiswicke Square, organised by the Basildon & District Amateur Radio Society in conjunction with the local Education Committee. Instruction for the G.P.O. Morse Test will also be given. Enquiries to the Institute or to: C. Roberson, G8AAO, Milestone Cottage, London Road, Wickford *(2462)*, Essex.

Birkenhead: At the Technical College, Borough Road, under G3EGX as instructor, with Morse teaching tapes also available. Apply at the College for information and details.

Birmingham: At the Lea Mason Evening Institute, enrolment week commencing September 5, for course starting week following. Subject to sufficient candidates being interested, a Morse Class and Basic Radio Course will also be arranged. Full details from: M. A. Brett, G3HBE, 55 Chestnut Drive, Erdington *(3026)*, Birmingham, 24.

Bristol: At the Technical College, Ashley Down, on Monday evenings, 6.45-9.15 p.m., commencing September 12. Course includes R.A.E. Theory and Morse instruction. Fees, 50s., or 20s. for juniors. Registration at the College, September 8, 9, 12, during 2.30-4.30 p.m. and 6-8.30 p.m. Lecturer in charge, R. E. Griffin, G5UH, who has been running this course very successfully for years.

Coventry: At the Technical College, Butts, on Wednesday evenings, 7-9 p.m., fee 36s., inclusive of Morse tuition. The College now has its own station G3UVW, which will be on 160m. Enrolment for the course, September 7-8, evenings. Lecturer, D. Dumbleton, G3HCM.

Crawley, Sussex: At the Sarah Robinson Evening Institute, Ifield. Full details from A. J. Gibbs, G3PHG, 6 Dairyfields, Gossops Green, Crawley, Sussex.

Harlow, Essex: At the College of Further Education, Harlow, with E. P. Essery, A.M.I.E.E., G3KFE, as instructor. Further information from: G. O'Donald, G3TLJ, Great East, Harlow Road, Roydon, Harlow, Essex.

Lichfield, Staffs: At the Lichfield Evening Institute and School of Art, with enrolment towards the end of September. Apply for details: J. Beamand, G3DZT, 101 Valley Lane, Wissage, Lichfield.

London (Beckenham): At the Evening Education Centre 28 Beckenham Road, on Thursdays, 7-9 p.m., starting Sep. 29. Fees are graded according to age up to a maximum of 40s. Morse tuition will be available on Monday evenings. All details from: M. D. Bass, B.Sc. G3OJE, 42 Clevedon Road, Beckenham, London, S.E.20.

London (Poplar): At Hay Currie School, Technical Block, Byron Street, E.14, on Thursday evenings, enrolment September 19-23, course fee 25s., term commencing September 26. Apply for brochure with full details to: The Principal, Bow and Poplar Institute, Marner School, Devas Street, London, E.3.

London (East Ham): At the Technical College, High Street South, starting September 19 with Morse and Practical; September 21, R.A.E. theory. Enrolment, at the College, September 12-14, evenings 7-9 p.m. Information from: H. E. Reeve, G3JXZ, 284A Barking Road, East Ham, E.6.

London (Holloway): At Montem School, Hornsey Road, N.7, commencing Monday, September 26. 7-10 p.m., R.A.E. theory; Wednesday, 28th 7.30-9.30 p.m. for Morse. This has been one of the most successful Courses in the London area, with hundreds of passes registered over the years. Full details from: A. W. H. Wennell, G2CJN, Grafton Radio Society, 145 Uxendon Hill, Wembley Park, Middlesex.

London (Hounslow): At the Brentford Centre for Adult Education, Clifden Road, on Monday evenings, 7-9 p.m., commencing September 26. Course fee, three terms, leading up to practical work, 30s. Apply for enrolment details to: Organiser for Adult Education, Education Offices, 88 Lampton Road, Hounslow, Middlesex.

London (Ilford): At the Ilford Literary Institute, Cranbrook Road, starting on September 21, with enrolment September 5-8, 7-8.30 p.m. This course

has been running continuously since 1948, with one of the best success records in the country. Course fee, R.A.E. only, 40s.; Morse tuition, 27s.; or the two together at 50s. inclusive. Apply: W. G. Hall, G8JM, 48 Hawkdene, North Chingford, London, E.4.

Halifax: At the Percival Whitley College of Further Education, commencing in September. Apply to the Principal, at the College, for details, or to A. Robinson, G3MDW, hon. Secretary, Northern Heights Amateur Radio Society, Candy Cabin, Upper Brockholes, Ogden, Halifax.

Manchester: At the Openshaw Technical College for Further Education, Whitworth Street; enrolment from September 19, and all that week. Full details from: M. Barnsley, G3HZM, 11 Cemetery Road, Denton, Manchester.

Sheffield: At the Western Road Evening School, Sheffield 10, on Wednesday evenings, commencing September 21 at 7 p.m. For further information: J. Bell, G3JON, 25 Edale Road, Sheffield 11 *(61281)*.

Stoke-on-Trent: At the Longton Annexe, Northern College of Further Education, Trentham Road, Longton, on Monday evenings, 6.30-8.30 p.m., enrolment September 5-9 inclusive at the New College, Moorland Road, Burslem. Course is to be organised by K. H. Parkes, G3EHM, 41 Golborn Avenue, Meir Heath, Stoke-on-Trent, who can supply all details.

Further information, set out in the form shown here, for publication in the September issue of SHORT WAVE MAGAZINE should reach us by August 13 *latest*, addressed: Editorial Dept., Short Wave Magazine, Buckingham.

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, London, S.W.1.

ADVENTURE OPPORTUNITY

BRITISH ANTARCTIC SURVEY has vacancies for Wireless Operator Mechanics to serve in the Antarctic. Candidates must be able to transmit and receive at 20 wpm, and be capable of elementary maintenance of transmitting and receiving equipment. Salary in the scale £864 to £1083 per annum, with all found; salary entry point in accordance with qualifications. Applications to:—Personnel Officer, British Antarctic Survey, 30 Gillingham Street, London, S.W.1.

BRITISH ANTARCTIC SURVEY requires a Wireless Operator for service in Port Stanley, Falkland Islands, on a three-year contract in the first instance. Commencing salary is £710, x £30 to £860 per annum. Leave on full pay with free passages. Candidates, who must be single and aged 21-35 years, are required to be able to do at least 20's, sending and receiving, and a PMG certificate is essential.—Applications to: Personnel Officer, British Antarctic Survey, 30 Gillingham Street, London, S.W.1.

SITUATIONS VACANT

YOUNG and Enthusiastic Trouble Shooters wanted immediately by EAGLE. Good prospects. Write or phone—Rex Toby, G2CDN, 32A Coptic Street, London, W.C.1. (MUSeum 9606.)

TRADE

AVAILABLE: A G.E.C. BRT-400, at £65. Green LA-600 Linear Amplifier, 11 months old, £55. A. G. & D. 2M1000, brough up to scratch, £65. Professionally rebuilt HRO's, 38 gns. Write for details.—Green E.C.E., Ltd., 79-91 Braemar Road, London, N.15. (Tel. STAmford Hill 1287.)

URGENTLY Required: Communications Receivers of all sorts. For SALE: AR88D, with S-meter, £35. Codar PR-30X Preselector, £6. NCX/D PSU, unused, £45. Non-shrink nylon cord, suitable for guys and halyards, 4s. a hank. Write or call:—G3MOE, 11 Westbury Road, Cheltenham (24217), Glos.

READERS' ADVERTISEMENTS

3d. per word, min. charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). 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, London, S.W.1.

OFFERING: K.W. Viceroy Mk. IV, with solid-state PSU and extra half-lattice filter, unused, never unpacked, £140 or near offer? Marconi Valve Voltmeter TF-428B1, as new, with spare valves, £10. BC-454 series receivers, 1·5 to 3·0 mc (heaters converted with output transformer), 200 kc to 550 kc and 3·0 to 6·0 mc unconverted, all as new, offers? New transmitting valves, not ex-equipment, two 813, four 4-65A, two 4-125A, offers? Philpotts cabinet, Geloso 4102 VFO and major parts for 150w. AM Tx, including Johnson pi-tank coil and counterdial, meters, etc., needs completion, £15 or offer?—Box No. 4338, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: In mint condition, R.A.E. Postal Course, £4.—Reid, 12 The Heath, Lower Boston Road, London, W.7.

SALE: Codar Preselector PR-30X, 18 months old, £4 10s. Buyer collects.—44 West Park Grove, Roundhay, Leeds, 8, Yorkshire. (Ring Leeds 664362.)

SALE or EXCHANGE: R.C.A. AR88 receiver, completely realigned and serviced (see article October-November, "Short Wave Magazine"), with hand-calibrated S-meter, price £35 or EXCHANGE for Rx, Tx or W.H.Y.? Working or not.—G3LLL, QTHR, Blackburn 58594; callers evenings, not Sundays.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: Crystal Filter, 9 mc, with matching carrier crystals. Price and details.—Saunders, G3OEW, St. Briavels, Sutton Poyntz, Weymouth, Dorset.

FOR SALE; Command receiver, coverage 520 to 1500 kc, brand new, £7 10s. RF Units, in good condition, 30s. each.—Jones, 23 Whitehall Road, Evington, Leicester.

WANTED: A Joystick antenna. SALE: Marconi 52 Set ATU, 30s. Withers two-metre converter, £5. VHF Sig. Gen. Wavemeter, in oak cabinet, £3. RF-27 Unit modified for two metres, £2. New 45 mc IF strip, 12s. 6d.—Thompson, 1 Church Road, East Molesey, Surrey. (Ring MOLesey 4503 after 7.0 p.m.)

SALE: Heathkit Mohican receiver, factory aligned and in excellent condition, buyer collects for £26, or near offer? Joystick de luxe antenna and tuner, £3. Multimeter, 2000 o.p.v., £2. (South London.).—Box No. 4339, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Heathkit RSW-1 transistor Rx, transistor RF amplifiers 10 to 160m., AF output 200 milliwatt, 9v. battery. Offers?—Kermode, 7 Saltburn Place, Bradford 9, Yorkshire.

SELLING: Bush FM radio, less valves, 70s. WANTED: CR-70A and recent British transistor radio.—Box No. 4340, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: SSB Rig, 150w. Tx, Rx and matching PSU, S-Line style, working 20/80m., only additional xtals required for all bands, Price £45.—Brown, 84 Bonner Road, London, E.3. (After 7.0 p.m. or weekends; ADVance 2896.)

OFFERING: R.C.A. AR88D, Eddystone EC-10 with mains PSU, new Joystick with ATU, new 6/6 two-metre J-Beam, RSGB "Amateur Radio Handbook" and "Radio Data Reference Book," price £70 the lot.—Cropper, 72 Church Street, Middleton, Manchester.

FOR SALE: Home-built 10w. Tx for 160m., with modulator and PSU, £7. R.220 Rx or converter, IF 4·86 mc, 50s. Converter, 10/15m., IF 10·16 mc, needs alignment, 20s. All offers considered.—Butler, 67 South Barcombe Road, Liverpool, 16.

SELLING: Hallicrafters SX-28 receiver, coverage 550 kc to 41 mc, some mods. to front end, condition reasonable, price £20, buyer inspects. — Tomalin, Chapel Street, Barford, Norwich, Norfolk.

SALE: Hy-Gain TH4 Beam, £20. BC-221M, £16. Green & Davis 500-watt Linear Amp., £55.—Willmott, G3LBG, 59 Green Lane, Eastwood, Leigh-on-Sea, Essex.

FOR SALE: National HRO receiver, complete with 8 coils and PSU, £28 or near offer?—Baulch, 30 Lias Road, Street, Somerset.

SELLING: Heathkit RA-1, unused and factory aligned, £30. CR-103 receiver, coverage 1·0 to 16 mc, complete £5. TA-12B transmitter, £5. Also all components for 750v. PSU and 70w. modulator, with new UM2 mod. xformer, 40s. New Joystick, Joymatch 3 and signal strength meter, £4. Also Dansette record player, 40s. Valves, rotary transformers, microphones, etc. Delivery in London area.—Heygate, 902 Nell Gwynne House, Sloane Avenue, London, S.W.3.

VALVES: Ex-Rental Sets, 25s. per 100, post/packing 4s.; per 1000, £8 10s., carriage free. Also tested and guaranteed valve lots. such as EF91, 15s. doz.; EF80, 10s. 6d. doz.; ECC82, 26s. doz., 6L6G, 6s. each; 6L6M, 6s. each; 6SN7, 2s. 3d. each. Dozens of other types, send for list.—G3NJQ, 140 Oak Street, Norwich, Norfolk.

MANUALS at 20s.: CR-100, CR-300, BC-312, S.36, R.107, R.206, ARI-5083, R.1294. Variables for Z-match, 25s.—Brown, 5 Farrant House, Winstanley Road, London, S.W.11.

GOING Cheap: National HRO receiver, table model, with four coils, needs realignment and PSU, £7 10s. Raymart absorption wavemeter, 10 to 80m., 15s. Parmeko 10 Hy 300 mA choke, 20s. Murphy oil-filled xformer, 375-0-375v. 250 mA, 565-0-565v. 400 mA, 50s.—Cotter, 4 Radstone Court, Hillview Road, Woking (62277), Surrey.

FOR SALE: KW-2000 and AC/PSU, original model in immaculate condition, faultless performance, going for best cash offer; delivered to 100 miles.—Ayscough, 59 Malvern Road, Swindon, Wilts.

REWARD £10 if in the last four months you have bought the right second-hand T.W. Twomobile. It's modified with an additional insulated black coax socket in rear panel. It couples coax into the tunable IF of the Rx. It could be stolen property, so contact Ealing W.5 police station, or local police.—Craven, 202C Uxbridge Road, Hanwell, London, W.7.

WANTED: An HF Command Rx. SELLING: Complete AM/CW station, consisting of CR-100 Rx, LG.300 Tx, ex-W.D. PSU and 100% modulator, £50 or nearest offer for lot; carriage free GI only.—Semple, GI3OYG, 1 Shandon Park, Ballymoney, Co. Antrim, Northern Ireland.

FOR SALE: Hallicrafters S.36A and Panadaptor to match, £60. Jensen Trio Rx, includes two-metre band, £45. Codar Preselector PR-30X, £4 10s. Philips Trans-World transistor radio, list £105, unused, at £85. All manuals included and exchanges considered. Sutcliffe, 103 City Road, Bradford (24144), Yorkshire.

OFFERING: Panoramic Adaptor, IF input 450-475 kc. Creed Type 3X teleprinter, plus one for spares, and PSU. Transformers: 2300-0-2300v. 500 mA; heater xformer for pair 813's, 10v. 10 amp. CT; another heater xformer, total 10·5 amp. at 6·3v. Chokes: 10 Hy 250 mA; 5 Hy 500 mA. Electrolytic condensers, six, 300 mF, 500v. wkng. Offers?—Rodgers, G3SRZ, 7 Broadlands Avenue, Hockley, Essex.

SALE: Birdcage Aerial, to 4ZU design, built as W6SAI specification, spider construction with fibreglass poles, coverage 10 to 40m., dB gain, demonstration arranged, buyer collects, £20 or near offer.—Barrett, G3STL, 145 Benfleet Road, Hadleigh, Essex. (Tel. Southend-on-Sea 559246.)

EXCHANGE: (1) RTTY Teleprinter T.U. by Western Electric; AN/FGC-1 Rolls Royce unit in 100 per cent condition, 850 c/s shift. AFC, etc., 230v. AC, with handbook. (2) RTTY terminal unit built to commercial details, toroidal filters (not IF type) 100/1000 c/s shift, 'scope tuning, electronic relay, PSU's, etc., as table-top unit in Imhof-style cabinet, needs aligning, with handbook and all details. Wanted in EXCHANGE: Amateur band Tx; UHF Rx, coverage 150 to 200 mc, AM/FM; Multi-channel model control Tx/Rx. May be able to arrange delivery/collection depending on district.—Scott. 27 Waverley Avenue, Whitley Bay (27141), Northumberland.

WANTED: Marine radio-telephone. For SALE: A large mains power unit, suitable TCS transmitter and receiver, giving HT and LT, £10. Brand-new late type Q5'er, £5. BC-433 receiver, £10. Transceiver for 40-80-160m., £7 10s.—Mogford. 27 Ynysmaerdy Road, Briton-Ferry, Glam., South Wales.

WANTED: Urgently, not to say Desperately, one or more Electroniques 100 kc (or 85 kc) IF transformers with centre-tapped windings. Top price will be paid.—Bibby, 149a Middleton Hall Road, Kings Norton, Birmingham, 30.

SMALL ADVERTISEMENTS, READERS—*continued*

URGENTLY Needed for my Aerial Farm, a TA-33Jr beam; can you help, please? Also wanted, a vibrator transformer ex-B.44.—Dunn, G3SCD, The Poplars, Scamblesby, Louth, Lincs.

SELLING: Marconi CR-300 receiver, coverage 15 kc to 25 mc, with internal PSU and speaker, in new cabinet, very good condition both mechanically and electrically, price £13. An R.109A Rx, 1·8 to 12 mc, excellent condition, £3. AVO-7 Testmeter, in good condition, with new leads and batteries, in leather case, £10. Carriage extra all items. WANTED: Knob for ART-13 VFO; also Command Receivers (especially the BC-453).—Judkins, G3OMJ, 20 Highbury Crescent, Bessacarr, Doncaster, Yorkshire.

WANTED: Lafayette pre-amp. and converter, with handbook; faulty no object. State condition and price.—Berden, G3RND, 20 Mill Hill Avenue, Pontefract, Yorkshire.

FOR SALE: Labgear 50-watt transmitter, coverage 10 to 80m., AM/CW. A complete table-top Tx for £25, carriage extra.—Box No. 4332, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: An R.C.A. AR88 in first-class electrical and mechanical condition, delivery 50 miles, price £32. An SSB exciter, not in de luxe condition, without cabinet, and chassis definitely holey, but worked FB on 20m. and 80m. until LF filter and carrier oscillator xtals removed, with grid and plate meters for pair 807's in PA, and PSU giving 700v.-300v.-6·3v., price £12. Also All-Wave Signal Generator, for mains input, coverage 100 kc to 60 mc, complete with output meter, price £3 10s. And a Heathkit RA-1, the amateur-bands only receiver, only two months old, and in perfect condition, asking £29.—Lord, G3PHN, Newfield House, Moira, Burton-on-Trent, Staffs. (Tel. Swadlincote 7537.)

FOR SALE: An R.C.A. AR88D, purchased new recently at £85. Best cash-and-carry offer, or would EXCHANGE for mint Eddystone 888A (Luton, Beds., district).—Box No. 4333, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Urgently, an airflow base for a 4X150A. State price and condition.—Crane, G3ABH, 26 Highfield Road, Corfe Mullen, Dorset. (Ring Broadstone 2452.)

SALE: Heathkit DX-40U with self-contained Globe VFO, genuine T9 note and good modulation on all bands; also a new 813 with base and R.C.A. potted heater transformer. The lot for £25, or near offer.—Fish, G3RHJ, 12 Acton Lane, Sudbury, Suffolk.

SELLING: A G3HTA-type amateur band communications receiver (see "Short Wave Magazine," Dec. '64), aligned but not calibrated and without xtal; with Eddystone dial, silicon-diode rectifier and high-tolerance components, including S-meter, price £25. —Box No. 4334, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED Woden UM1 modulation xformer; state price and condition. Also handbook or manual for Collins TCS-5 receiver.—Shaw, 27 Southover, Bromley, Kent.

SALE: An Eddystone 940 in grey, with plinth speaker, price £90 or near offer? Must sell a lot of other gear, cheap.—Lack, 46 Christleton Avenue, Crewe, Cheshire.

OFFERING: A number of Magazines, including 168 copies "Wireless World," 1951 to 1964; 43 copies "Practical Wireless"; 47 of "Practical Television." Every copy in perfect condition. Price £7 The Lot, carriage paid.—Box No. 4335, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: Collins mechanical filter Type F.250A-67, centre frequency 250 kc, bandwidth 6·7 kc at 6 dB, price £8. Lustraphone dynamic microphone LFV/59 (low impedance), £6. PSU Type 9, 12v. vibratory, giving 250v. at 100 mA, 20s.—Johnson, The Laurels, High Street, Collingham, Notts.

WANTED: To Buy, Hire or on Loan, the handbook for the Hallicrafters Super-Skyrider Receiver.—Miles, GW3IMQ, 76 Vicarage Road, Morriston, Swansea, Glam., South Wales.

SALE: Eddystone 960 receiver, transistorised and general coverage over 500 kc to 30 mc, with crystal filter, and as new, cost £135, accepting £75, no offers. But would accept in Part EXCHANGE an Eddystone EC-10 in mint condition.—Box No. 4336, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

PROPERTY of Late SWL George Marsden: Eddystone 940 Rx, 18 months old, with K.W. amateur-band converter, Brown's headphones, etc. Offers?—Mrs. Marsden, 150 Middleton Park Road, Leeds, 10, Yorkshire, or G3PTN, QTHR. (Ring Leeds 72800.)

FOR SALE: Type R.206 receiver, in excellent condition, 11-valve superhet, coverage 550 kc to 30 mc, good on SSB, with mains PSU, £22 or near offer? Buyer to collect, or carriage extra.—Leadbetter, 388 Hurcott Road, Kidderminster, Worcs.

SELLING: A K.W. Viceroy, Mk. II, separate PSU. Looks and operates as when new. PA and rectifier valves renewed, with seven unused spare valves and new Geloso microphone. First reasonable offer secures. Buyer to collect (Surrey).—Box No. 4337, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MOBILE Equipment: Elmac AF-67 Tx and PMR-7 Rx, 10 to 160m. AM, with 6/12v. power supplies, manuals, etc., in original and unmodified condition, owned by me since new, price £75.—Soans, G2HJV, 39 Northumberland Road, Leamington Spa, Worcs.

GIVE Away Bargains! One Lafayette KT-320 communications receiver, slight fault but otherwise perfect, £25. One Heathkit GC-1U receiver, slight fault but otherwise perfect, £35. (Both these Rx's factory-built). One No. 19 Set Tx/Rx unit only, cased and working, 30s. Regret callers only please. Monday to Friday after 5.0 p.m., any time weekends. —Letch, 175 Whitmore Way, Basildon, Essex.

FOR SALE: Mosley TA-33Jr. beam array, price £14. Preferably buyer collects.—Winnard, G3SPE, Mount Severn, First Raleigh, Bideford (3717), North Devon.

BREAKING: Station, less receiver, Rack Transmitter Type 47, comprising Modulator PSU Type 387; Power Amplifier PSU; Modulator unit Type 1 with provision for audio oscillator operation; Driver unit Type 1; RF amplifier, 813, Type PE-12; R.C.A. master oscillator (crystal multiplier), Type MI-19467 and MI-19468; TU6B unit; Wavemeter Type W.66, coverage 3·5 to 15 mc; also sundry valves, transformers (mains and modulation), condensers, microphones, chokes, small PSU's, etc. Offers?—Card, Lewis Jones Hall, Univ. College of Swansea, Singleton Park, Swansea, Glam., South Wales.

SALE or EXCHANGE: A G2DAF-type Rx, immaculate, with commercial filter crystals, in "S-Line" cabinet, price £35, no offers, or would consider good AR88D in exchange. Also available a BC-348 at £7 and a Minimitter mobile Tx at £10, or Exchanges? WANTED: A 4-65A Valve.—GW3KYT, QTHR.

YOURS for £40, an Eddystone 840C in mint condition. Also an Eddystone Speed Key, 40s.; and a 160m. VFO/PA CW Tx, no PSU, £4.—Witt, 5A Fairview Parade, Mawney Road, Romford, Essex.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: Dow-Key relay, and an HRO-5 in new condition, can be less coils ; also K.W. low-pass filter and Digital Clock. SELLING: Valves, 54GY, 6s.; new and boxed KT88's, 15s.; TT21, 21s. AR88 Cabinet. Transformer for 2/813's, 10v. at 10 amps. —Stead, 2 Cliff Road Gardens, Leeds, 6, Yorkshire.

SALE: Pye Ranger, self-contained with 12v. vibrator PSU, p-t-t microphone, in perfect working order, 50s.; another, with 24v. transistor PSU, 45s.; both easily converted for 4-metre band. Hohner "Apache" guitar, as new, with two PSU's and soft case, £13. Also left as offered July issue p.317, turret coil pack, rotary transformer and 12in. speaker. Will deliver heavy stuff to 30 miles. —Cowdery, G3UKB, 275 Church Road, Hayes, Middlesex. (Ring NUF 9369.)

FOR SALE: Eddystone 888A Rx, £65. KW-160 Top Band AM/CW Tx, £17. Geloso 212 Tx, virtually a Vanguard, £38. All items in spotless condition. Prefer buyers inspect and collect.—Clingan, G3TNI, 12A Marlbrook Lane, Bromsgrove, Worcs. (Tel. Hillside 2922.)

MORSE Keys Wanted by Collector—either old, new, antique, civilian, Service or ex-Govt., in rough, fair or good condition, whole or in parts. Details and price, or post unwanted items for offer.—Carter, G8AAG, 14 Falmouth Road, Whitley Wood, Reading (883611), Berks.

WANTED: An Eddystone S.750 general-coverage Receiver, and a recent domestic FM receiver.—Box No. 4341, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: An Eddystone S-meter, Cat. No. 669.—Page, Church Cottage, Tutshill, near Chepstow, Mon., South Wales.

SALE: Collins TCS-12 Tx for 40-80-160m., in FB condition with PSU in matching cabinet, asking £12 or near offer.—Wheeler, G3RTW, 22 Brickhouse Lane, Stoke Prior, Bromsgrove (3313), Worcs.

WANTED: A G2DAF-type Sideband transmitter, complete or otherwise. Please state price and details.—Box No. 4342, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: A Mosley V-4-6 Vertical Aerial System, also a K.W. SWR Indicator looking into 52 ohms.—Price, G3RLF, 8 Newland Road, Droitwich, Worcs.

TO SELL: One new and boxed SR-550 amateur-band Rx, at £50 (£11 below list) ; Transistor tape recorder TP-703, new and boxed, at £13 (list £20). REQUIRED Urgently: Marine radio-telephone set, in any condition, also crystals for marine frequencies 2182, 2381. 2527 and 2009 kc.—Box No. 4343, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

GOING Sideband: A Heathkit DX-100U at £50 ; Eddystone 680X receiver, £55. Both in FB condition ; offers considered.—Sutton, 3 Wynford Avenue, Leeds, 16, Yorkshire.

WANTED: Manual, circuitry or alignment details for BC-348R. Will buy or pay postage for loan, as necessary.—Sheppard, 43 Southway, Lewes, Sussex.

WANTED: Heathkit DX-40U, in FB condition ; also an HRO-5T with no mods.; PSU and coils not required.—G8IB, QTHR.

SALE or EXCHANGE: A Nombrex Signal Generator, for £8 or Photographic/Radio equipment. 1964 issue "World Radio & TV Handbook," 10s.—Garth, Stagbury Avenue, Chipstead, Surrey. (Tel. DOWnland 54130.)

SMALL ADVERTISEMENTS, READERS—*continued*

SALE or EXCHANGE: Lafayette HA-230 (not kit version), a general coverage short wave Rx with amateur bandspread, £23 10s. Also an HA-55 aircraft receiver, £13 10s. Both these receivers in absolutely mint condition. WANTED: An Eddystone general-coverage receiver in perfect condition.—Rogers, 18 Maxwell Drive, Hazlemere, High Wycombe, Bucks.

NOT AN Advertisement: Only a reminder that you can get a copy of the September issue on the day of publication (in the U.K.) by sending us a postal order for 4s. on Tuesday, August 30, with your QTH clearly written and a note saying "send Sept. issue, pse."—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Eddystone 770R Rx, £65. New QQV06-40A's at 30s.; 5B254M's, 15s.; 5763's, 7s. 6d. Send s.a.e. for list receiver valves and 28 mc xtals.—Brealy, G3TSE, 85 Station Road, Keyham, Plymouth, Devon.

SALE: Heathkit Mohican Rx, late model GC-1U, in excellent condition, with mains PSU, built-in 100 kc xtal calibrator and relay muting system, otherwise unmodified, price £30. Brand-new latest model 3FIF mobile whip coil for Top Band, complete with base but less fibre-glass whip top.—Actng. Surgn. Lieut. A. J. N. Eardley, R.N., Medical Mess, Royal Naval Hospital, Plymouth, Devon.

FOR SALE: R.209 Rx in new condition, £12 10s. Brand new 19 Set RF amplifiers, £6 10s. each. Complete Tx 53 VFO units, 807 driver, giving sufficient output drive for 2/813's, coverage 1·2 to 17·5 mc, with circuit diagram, less valves, £3 each. 19 Set variometers, 10s. each. Wavemeter, 20 to 100 mc, £4. Boonton Radio (U.S.) FM/AM signal generators, 1 to 10 mc and 30 to 40 mc, less PSU, £5. Buyers collect. Also various pieces UHF equipment.—Sharratt, 12 Pebblemoor, Edlesborough, Dunstable, Beds. (Tel. Eaton Bray 297.)

WANTED: National NC-303 receiver; up to £125 given for mint specimen; collect 100 miles. Also clean BC-348 or BC-342 with minimum modifications; price according to condition, or EXCHANGE for Aveley 120w. transistor DC/DC converter, giving 12v./300v./600v., in mint condition.—G3HRH, QTHR (or ring Welwyn 4769).

SALE: Codar CR-70A general coverage receiver, in mint condition, with circuit, £14 10s. or near offer.—Ring Aston Clinton 600, near Aylesbury, Bucks.

LUCKY Buyer inspects and collects a KW-77 triple conversion Rx; first offer of £65 secures.—Heys, G3BDQ, 418 The Ridge, St. Leonards-on-Sea, Sussex.

FOR SALE: Geloso 4/102 VFO unit, not mint, but perfect working order, complete with dial, £4. Truvox Mk. III tape-deck, unused and absolutely as new, with handbook; cost £21, offers nearest £10.—G3OEI, QTHR.

OFFERING: Home-built 160m. Tx, in first-class condition, at £10. Class-D Wavemeter, £4. Crystal calibrator with 10 kc multi-vibrator, 50s. Panda low-pass filter, 40s. Radiocraft Preselector, £4. Or the Lot for £20.—North, G8IO, 69 Redditch Road, Stoke Heath, Bromsgrove (2151), Worcs.

GOING SSB: Selling Heathkit DX-100U, speech clipper unit; HRO-MX with BS Coils for 15-20-40-80m., plus several GC coils, and PSU. All in good condition. Best offer around £75 secures, carriage paid.—136 AMQ, R.A.F. Station, St. Eval, Cornwall.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: Heathkit **HO-10E Monitor'Scope,** as new, £28. **Prop-pitch Motor,** bought as new and unused, with indicator; best offer secures.—G3NMH, ring Wootton Bassett 792.

WANTED: Receiver such as Eddystone 680X or 940, or possibly G.E.C. BRT-400; must be in new and unmodified condition, with manual. Please quote details and price delivered Manchester. SELLING: A superb AR88D, in original carton, with tools, headphones, spare set of valves and manual; cost £70 in June '64, and since purchased an Ernest Turner calibrated S-meter and matching AR88 speaker added; also a valuable collection of genuine AR88D spares, boxed and unused, including mains xformer, condenser filter pack, gear train assembly, frequency and vernier dials, output xformer, xtal unit, switch-gear, extra valves, etc.; accept £58 for everything; no offers and not split up; buyer to collect Manchester.—Ring MOSside 2763, or write Box No. 4344, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Codar PR-30 Preselector, £3. Geloso 4/102 VFO, coverage 10 to 80 metres, drives pair 807 or 6146, £4. Vertical Aerial Kit Mk. I, 42ft., with nylon guys, £4. All carriage paid.—Box No. 4345, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERED By G3LHA: Windsor Signal Generator 66A, £12. New Valves: 6146, 27s. 6d.; PC88, 5s.; QQV06-40, 30s.; s.a.e. valve list. Woden items: UM3, 50s.; DT1, 15s. AR88 knobs and vernier dial, 10s. TU9B, 12s. 6d. G2DD 70 cm Converter, 30s. Converter for 23 cm, IF at 28 mc, £7. Microamp meters, 3-inch, 8s. 6d. TV Service sheets. s.a.e. for requirements. Magazines: "QST," 1940-'57; "Short Wave Magazine," 1947-'58, at 18s. per dozen. Postage extra on heavy items; please write after August 10.—Bastin, G3LHA, 112 Attoxhall Road, Coventry, Warks.

WANTED: An R.A.E. Correspondence Course, in good condition.—Blakeley, Manana, Burn Hall Crescent, Burn, Nr. Selby, Yorkshire.

WANTED: G2DAF-type Rx, incomplete or part-built considered. OFFERS for a K.W. Vanguard, early model; Heathkit FM Tuner; and a Class-D Wavemeter, less xtal.—Grant, Cairnfield Lodge, Buckie, Banffshire, Scotland.

FOR SALE: G.E.C. BRT-402E, as new, £45.—Box No. 4346, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Heathkit Mohican, £20. PCR-3, with PSU, £7. BC-221, £10. All these items in very good condition. TE-22 AF generator, new, £5. Codar Q-multiplier, new, £3. Valves: QV06-40, TT15, E180F, and many more, with components, list s.a.e.; must sell.—Senior, 26 Park Road, Barnet (4218), Herts.

SELLING: Geloso 209 Rx for AM/CW/SSB, and Geloso 212-TR AM/CW transmitter, both in good condition, price for the two, £75, or near offer.—Edwards, 71 Deakin Road, Erdington, Birmingham, 24.

WANTED: An R.1132A receiver, modified or unmodified.—Box No. 4347, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: The IF and output stages (1600 kc, 85 kc) with 6 valves, from an Eddystone 750, price £4. 100 kc xtal on octal base, 12s. 6d. Pair TZ-40's, 12s. 6d. Isolation xformer, 750-watt, 17s. 6d. Car antenna, 40-inch, with enclosed coax balun, 35s.—Line, G2ASL, 7 Dunmore Avenue, Northfield, Birmingham, 31.

TWO Cabinet Speakers, one 65w. auto xformer, Hallicrafters SR-150 handbook, Browns-F headphones, 60s. the lot. Buver collects (Grays, Essex).—Box No. 4348, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

FOR SALE: KW-2000, with 12v. PSU and Shure microphone, rig three months old only, asking £170 for buyer to collect.—Squires, GW3IYI, 53 Penllwyngwyn Road, Bryn, Llangennech, Carmarthenshire, West Wales.

SELLING: Two-metre T.W. "Communicator" in mint condition, with AC/PSU, £65. Eddystone S.750 Rx, with S-meter, completely overhauled and realigned by makers, £45. WANTED: An HW-32 Transceiver. Replies after August 18.—Box No. 4351, Shore Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Pye Ranger, high-band FM model, Type PTC FM-8007.—Joslin, G3NPY, 13 Talbot Road, Skegness (1185), Lincs.

FOR SALE: Mosley TA-33Jr., only nine months' use, in excellent condition, £20. Also parts to make 10-80m. Linear PA: 2/813, transformers, rectifiers, coils, meters, case, etc., £5.—G3POZ, QTHR.

SELLING: New 813 and base, £2. RF-24 Unit, 20-30 mc, valved, £1; RF-25, 40-50 mc, valved, £1. UM2 modulation transformer, 50s. Labgear 10-80m. link output assembly, 10s. Rotary generator, 12v. input, 275v. 100 mA output, suppressed, 20s. Mains PSU, 300v. 100 mA, 300v. 40 mA stabilised, 6·3v. 2A, 20s. All these items carriage extra. Following prefer inspect-and-collect: Hallicrafters SX-28A receiver, 550 kc to 43 mc, new mains transformer, silicon rectifiers, in good working order, with manual, £23. Complete SCR-522 (VHF) equipment, 30s. Mains PSU's: 600v. 100 mA, 400v., neg. bias, 6·3v., 12·6v. LT's, metered, 40s.; 500v. 150 mA, 450v. 200 mA, 6·3v. 6A, £3. Auto-transformer, 230v. input, 115v. 150w. output, 40s.—Orchard, G3TTC, 25 Kenmore Drive, Yeovil, Somerset.

FOR SALE: KW-77 receiver and speaker, 12 months' old, little used, spotless and perfect, £85. Also Eddystone S.750 Rx, very good condition, £35. Prefer buyers inspect and collect.—R. J. Newey, G8AJI, 23 Lea-House Road, Oldbury, near Birmingham.

SALE: Marconi Valve Voltmeter, TF-481B/1, £7. Hallicrafters S-38E receiver, £9 10s.—Box No. 4349, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Eddystone S.750 double superhet, S-meter, in good condition, price £39 or near offer; carriage extra.—Kellow, St. Dominic, Callington, Cornwall.

SALE: Wavemeter W.1191, with AC/PSU, 50s. Command receivers, usual mods., 3·0 to 6·0 mc, £3 10s.; 6·0 to 9·0 mc, appearance rough, 30s. Ferranti C-core transformer, 700-0-700v. 500 mA, ideal doubler for linear, 35s. K.W. low-pass filter, 72-ohm, £3. All collect or carriage extra.—Edwards, G3KGN, 126 Danescroft Drive, Leigh-on-Sea, Essex.

FOR SALE: Hammarlund Super-Pro receiver, 1·3 to 49 mc, as new and in original condition, complete with PSU and manual, price £40. Pye Ranger, high-band model, excellent condition, ideal to modify for two metres, £13. Both items plus carriage.—Box No. 4350, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: HRO coil packs for 900 to 2000 kc band, and 1·7 to 4 mc.—Barker, 171 Birchover Way, Allestree, Derbyshire.

CLEARANCE SALE: Marconi Signal Generator No. 13, 20 to 80 mc in two ranges, mint condition, £20. TF-144G, 85 kc to 25 mc, needs slight attention, £10. R.1392 receiver, xtal controlled 100-146 mc, £3. Type 1392 PSU, 15s. VHF Oscillator, with chart 12 to 115 centimetres. Pye PTC-262 VHF Tx/Rx base station, in 125 mc range. G.P.O. type dial telephones, 12s. 6d. Two Marconi Video Oscillators, require attention, make one good one, pair £25. R.1132A Rx, less PSU, £5. R.1294, also less PSU, £5. OFFERS for the following: Signal Generators TS-13, 3 cms.; TS-14, 10 cms.; Boonton Video Generator, 50 cycles to 5 mc, complete with manual; APR-4 Rx, complete with TN-16 tuning unit, 38 to 95 mc; Marconi UHF Wavemeter, TF-643A; two General Electric (U.S.) Hi-Fi FM xtal transmitters, 260 to 350 mc, easily modified for two metres, lumpy but good! P.58 Rx, 280-680 mc, less PSU. Xtal oven, 9 x 6 x 5 in., for 230v. AC. Hi-Volt set, 50 kVA, DC. EMI Tape Recorder BTR-1, console 4ft. x 3ft. x 2½ft., needs attention. Two-path transistorised gyro pre-amp., Royston. Cossor 'scope Type 1035, working. Miniature 'scope CT-52, in travelling case, mint condition. Creed 7B Teleprinter spares: motors, typeheads, etc., but regret no keyboard or carriages.—Diggle, G3LSD. Netherton Cottage, The Elms, Stoke Damerel, Plymouth, Devon.

WANTED: AUY-10, and 300-0-300v. 300 mA transformer. SELLING: Seventeen "QST's," 22 "Bulletins," 38 "Short Wave Magazines," all recent issues, offers? Also ARRL "Mobile Manual," 12s. 6d.; "Technical Topics," 5s. Brand-new Geloso pi-network coil, for single 6146, 20s. Well-built "Natterbox," £6 10s.—Whelan, EI6AU, 44 Synge Street, South Circular Road, Dublin, 8, Eire.

WANTED: Unmodified amateur-band receiver, 10 to 160m. coverage, such as Hallicrafters, Geloso or KW-77; full details, please. SALE: Eddystone 840C receiver, new December 1965, £50 or near offer.—Rogers, 205 Brownshill Green Road, Coventry, Warks. (Tel. Keresley 2952.)

SALE: R.1155 Rx rebuilt with miniature valves, S-meter, PSU, etc., £10. PCR-2 with spare valves, S-meter and PSU, price £10. VCR-517C long-persistence CR tube, 20s. Converter for 4 metres, 30s. Buyer collects or pays carriage.—Smith, 76 Southfield Road, Hinckley, Leicestershire.

FOR SALE: Hammarlund 18-valve Communications Receiver, outside appearance rough, but recently overhauled and realigned, price £30, or near offer. Genuine HRO manual. 20s. Taylor Signal Generator, £5.—Ring BLUebell 9882, evenings after 7.30 p.m.

SMALL ADVERTISEMENTS, READERS—*continued*

BEGINNER requires reliable Transmitter and Receiver, also aerial tuning unit, absorption wavemeter, and heterodyne frequency meter.—Pryse, 36 Hart Road, Byfleet, Weybridge, Surrey.

SALE: Collins TCS-12 Rx, with PSU and speaker, £10. Labgear 160m. converter, £4 5s. Both these items in mint condition. Also 160m. Tx with two PSU's, £7. Codar CR-66 Rx, £15. Codar PR-30 preselector, £4 5s., in good condition. All items in perfect working order. Will deliver 30 miles, otherwise buyer collects (Staffs.).—Box No. 4352, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

GOING ABROAD: Eddystone 840C receiver, with Codar PR-30 preselector; Joystick aerial plus ATU; in immaculate condition. Must sell. £39.—Brown, 99 Paxford Road, North Wembley, Middlesex. (Ring DRUmmond 0200.)

FOR SALE: Labgear Cubical Quad Array, brand new, with prop-pitch motor and direction indicator, £22 the lot.—Dutfield, Overton Grange, Ludlow (2810), Shropshire.

SALE: Electroniques coil pack type QP-166, unused, and 85 kc IFT's. Also HRO coils, mains transformers, Morse course and record, Eddystone 898 dial, etc.—Harbour, 22 Priory Road, Hampstead, London, N.W.6.

FOR SALE: BC-342 receiver, with matching speaker and PSU, plus RF-24 Unit, price £12, buyer collects.—Howell, 14 Snowdon Road, Cannock, Staffs.

SALE: Heathkit RA-1 receiver, in absolutely mint condition and little used, £34 or offer. Also CL-1 calibrator, £3. Only selling because I've fallen for an SB-300.—Ross, Earlswood, Ercall Lane, Wellington, Shropshire.

SELLING: Pye PTC-313 150-watt mod., two TZ-40's; and PTC-314 PSU, two U19's, in rough Dexion rack. Offers?—Smith, 2 Saffron Close, Littleport, Cambs.

WANTED: BC-455 output transformer, Princess transmitter components, large cabinet, for 19in. x 7in. panel.—While, 157 Lazy Hill, Kings Norton, Birmingham.

SALE: Vertical Aerials Mk. I, 32ft. plus whip end, £3 3s., or new at £5, carriage paid. Rejector Units Mk.I, for ATU's, etc., price 20s. each, 5s. post. Japanese testmeter, 30,000 o.p.v., as new, £5 10s. Super transmitting coax cable, 75-ohm, price £5 per 100 yards.—Tonks, G3JFL, 11 St. Edwards Road, Bournbrook, Birmingham, 29.

EXCHANGE: Cine Projector, Bolex M8 with case, as new, FOR K.W. Vanguard 10 to 160m. in good condition.—Jones, G5ZT, 3 Bircham View, Eggbuckland, Plymouth (71552), Devon.

SALE: KW-77 with speaker, £85. Cossor Type 1035 double-beam Oscilloscope, £25 or near offer. Marconi 600v. 500 mA PSU, weighs 60lb., £5. EXCHANGE a Heathkit RA-1 for the RG-1.—G3TCG, QTHR.

FOR SALE: AM/CW transmitter, 150-watt, with 813 PA, TVI proof, price £25. Also general-coverage transistor receiver, genuine Mohican front end, £12.—G3OTD, QTHR (or ring Skegness 766).

Printed by The Courier Printing Co. Ltd., Tunbridge Wells for the Proprietors and Publishers, The Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. The *Short Wave Magazine* is obtainable abroad through the following: Continental Publishers & Distributors, Ltd., William Dawson & Son, Ltd.; AUSTRALIA AND NEW ZEALAND — Gordon & Gotch, Ltd.; AMERICA—International News Company, 131 Varick Street, NEW YORK. Registered for transmission to Canada by Magazine Post. *August 1966.*