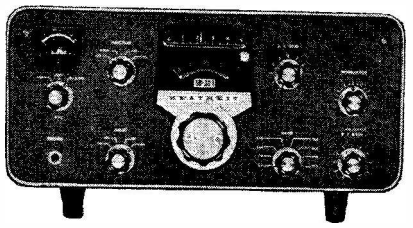
3/6

The SHORT WAVE Magazine

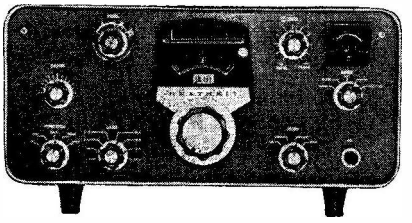
VOL. XXV JANUARY, 1968 NUMBER 11

Selection of Amateur Radio Equipment

THE ULTIMATE IN VALUE AND PERFORMANCE



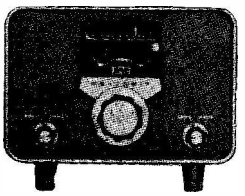
SB-301E Amateur Band Receiver . . . SSB, AM, CW and RTTY reception on 80 through 10 metres + 15 MHz WWV reception. Tunes 2 metres with SBA-300-4 plug-in converter.
Kit SB-301E, 23 lbs. (less speaker) **£140 . 12 . 0** Assembled **£170 . 12 . 0**



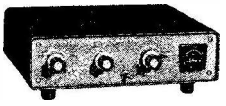
SB-401E Amateur Band SSB Transmitter . . . 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates "Transceive" with SB-301—requires SBA-401-1 crystal pack for independent operation.
Kit SB-401E, 34 lbs., **£157 . 10 . 0** Assembled **£192 . 10 . 0**
SBA-401-1 crystal pack, 1 lb., **£17 . 3 . 0**

HW-30 2 Meter Transceiver . . . For fixed, portable, or mobile. Ideal for local and RAEN purposes. Input 5 watt. CC. Tunable regenerative RX. Size 9¾"w. x 8"h. x 6" deep. (For 230v. operation if required).
Kit HW-30, 6½ lbs., **£26 . 8 . 0** Assembled **£36 . 8 . 0**
Kit GP-11 (Power supply 6 or 12v. D.C.) **£10 . 13** Assembled **£13 . 13**

New !

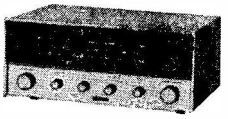


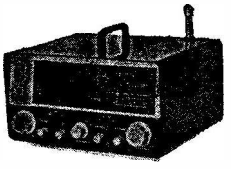
SB-640 External LMO for SB-101 . . . Provides Linear Master Oscillator frequency control or either of two crystal controlled frequencies for a total of five frequency control options. Power supplied from SB-101 Trans.
Kit SB-640, 9 lbs., **£51 . 6 . 0** Assembled **£56 . 6 . 0**



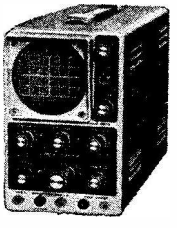
HA-14 The World's Smallest Kilowatt Linear . . . 80-10m. Only 3⅜ x 12⅜" x 10" deep.
Kit HA-14 £55 . 13 . 0
Assembled **£67 . 13 . 0**

HD-10 All Solid-State Electronic Keyer . . . 15 to 60 w.p.m. with 10 to 20 w.p.m. slow speed option.
Kit HD-10, 6 lbs., **£23 . 12 . 0** Assembled **£30 . 12 . 0**





GR-64E Short Wave Receiver . . . Covers 1 Mc to 30 Mc/s., plus 550 Kc/s. to 1620 Kc/s. AM band. Many special features for such a modest price. For 115, 230v. 50/60 c/s. A.C. mains operation.
Kit GR-64E £22 . 9 . 0 Assembled **£29 . 9 . 0**
GC-1U "Mohican" General Coverage Receiver . . . . 10 transistors, 5 diode circuit. Tunes 580-1550 Kc/s. and 1·69-30 Mc/s. in 5 bands. 6" x 4" speaker.
Kit GC-1U £37 . 17 . 6 Assembled **£45 . 17 . 6**



A complete line of Test Instruments for the Amateur Radio Station. The V-7A VVM and RF probe. The MM-1U Multimeter. The OS-2 Portable Oscilloscope and many more instruments are fully described in the latest Heathkit catalogue.

HEATHKIT

DAYSTROM LTD., Dept. SW-1, GLOUCESTER

☐ Enclosed is £..... post paid U.K.

☐ Please send model(s) .....

.....

☐ Please send FREE Heathkit Catalogue.

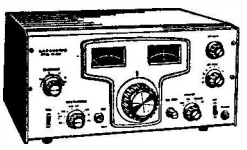
NAME .....

ADDRESS .....

.....

Prices and specifications subject to changes without notice.

***OR IN BIRMINGHAM* - 17 and 18 St. Martin's House, Bull Ring, Birmingham 5 Telephone: 021-643 4386**



SPECIAL OFFER!
LAFAYETTE HA-350
10-80 METRE
AMATEUR RECEIVER

- 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/s. Crystal Calibrator and Crystal BFO.
- "S" Meter-Calibrated in "S" Units 1·9 and to +40 dB.

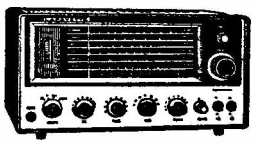
A limited quantity of these fabulous receivers are available which were made for 115 volt A.C. only. Offered Brand New and guaranteed at a much reduced price.

ONLY

£67.10.0

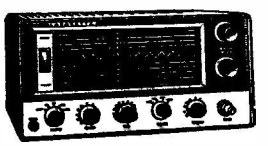
Suitable 115/230 volt transformer 24/-.

LAFAYETTE MODEL HA-500 SSB/AM/CW 80 THROUGH 6 METRE RECEIVER

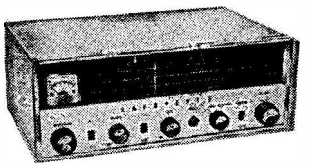


New outstanding Ham Bands only receiver covering the 80/40/20/15/10/6 metre bands. Incorporates 10 valves, product detector, two mechanical filters, S Meter, dual conversion on all bands, crystal calibrator, B.F.O. noise limiter, aerial trimmer, I.F.s. 2,608 Mc/s. and 455 Kc/s. Output 8 ohms and 500 ohms. Operating 220/240 volt A.C. Supplied brand new and guaranteed with handbook, **42 gns.** Carr. 10/-. 100 Kc/s. crystal, **35**/-.

NEW LAFAYETTE MODEL HA700 AM/CW/SSB AMATEUR COMMUNICATION RECEIVER



Eight valves, 5 bands incorporating 2 MECHANICAL FILTERS for exceptional selectivity and sensitivity. Frequency coverage on 5 bands 150-400 Kc/s., 550-1,600 Kc/s. 1·6-4·0 Mc/s. 4·8-14·5 Mc/s., 10·5-30 Mc/s. Circuit incorporates RF. stage, aerial trimmer, noise limiter, B.F.O. product detector, electrical bandspread, S meter, slide rule dial. Output for phones, low to 2KΩ or speaker 4 or 8 ohms. Operation 220/240 volt A.C. Size 7¾in. x 15in. x 10in. Supplied brand new and guaranteed with handbook, **36 gns.** Carr. 10/-. S.A.E. for leaflet.



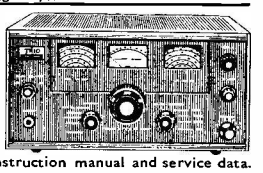
HAM-I. 4 BAND COMMUNICATION RECEIVER

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, **£17/17/-**, carr. 10/-.

TRIO JR-500SE AMATEUR RECEIVER

Covers all the amateur bands in 7 separate ranges between 3·5 and 29·7 Mc/s. 7 valves, 2 transistors and 5 diodes plus 8 crystals; output 8 and 500 ohm and 5000 ohm phone jack. Crystal controlled oscillator. . Variable BFO . VFO . AVC . ANL . S meter . SSB-CW . Stand-by switch . special double gear dial drive with direct reading down to 1 kHz . Remote control socket for connection to a transmitter. Audio output 1 watt. 115/250v. A.C. Mains. Superb modern styling. Size 7 x 13 x 10in. with instruction manual and service data, **£59.** Carriage 12/6.

TRIO 9R-59DE



Brief spec: 4 band receiver covering 550 Kc/s. to 30 Mc/s. continuous and electrical bandspread on 10, 15, 20, 40, and 80 metres. 8 valve plus 7 diode circuit. 4/8 ohm output and phone jack. SSB-CW . ANL . Variable BFO . S meter . Sep. bandspread dial . IF frequency 455 Kc/s. . audio output 1·5w. . Variable RF and AF gain controls 115/250v. A.C. Mains. Beautifully designed. Size: 7 x 15 x 10in. with instruction manual and service data. **£35.** Carriage 12/6.

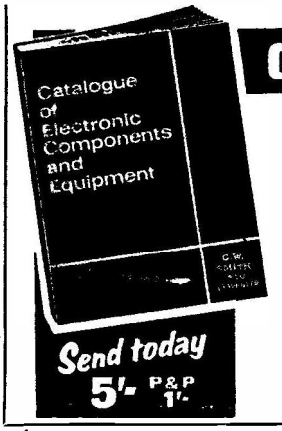
JOYSTICK AERIALS

Revolutionary variable frequency aerials with a variety of different matching units suitable for receiving or transmitting and covering medium and short waves.

STANDARD JOYSTICK, **£4/15/-**. DE LUXE JOYSTICK, **£5/19/6**

TUNING UNITS

Type 2A **£3/15/-** Type 3 **£2/15/-** Type 3A **£3/12/6** Type 4 **£4/4/-**
Type 4RF **£6/6/-** Type 4H **£3/10/6** Type 4H/RF **£6/6/-** Type 6RF **£3/19/6**

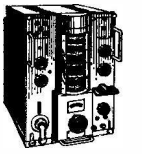


CATALOGUE

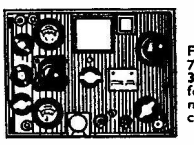
- ★ ELECTRONIC COMPONENTS
- ★ TEST EQUIPMENT
- ★ COMMUNICATION EQUIPMENT
- ★ HI-FI EQUIPMENT

We are proud to introduce our first comprehensive catalogue of Electronic Components and equipment. Over 150 pages, fully illustrated, listing thousands of items many at bargain prices. Free discount coupons with every catalogue. Everyone in electronics should have a copy, 5/-, P. & P. 1/-.

ADMIRALTY B.40 RECEIVERS



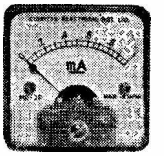
Just released by the Ministry. High quality 10 valve receiver manufactured by Murphy. Five bands 650 Kc/s.-30 Mc/s. 1/f. 500 Kc/s. Incorporates 2 R.F. and 3 I.F. stages, bandpass filter, noise limiter, crystal controlled B.F.O. calibrator, I.F. output, etc. Built-in speaker, output for phones. Operation 150/230 volt A.C. Size 19½in. x 13½in. x 16in. Weight 114 lbs. Offered in good working condition, **£22/10/-**, Carr. 30/-. With circuit diagrams. Also available B41 L.F. version of above. 15 Kc/s.-700 Kc/s., **£17/10/-**, Carr. 30/-.



COLLINS TCS TRANSMITTERS

Frequency range 1·5-12 Mc/s., in 3 bands. Employ 7 valves, 2 of 1625 PA, 1625 Buffer, 1625 Mod. 3 x 12 A6 Osc. R.T. or C.W. V.F.O. or provision for Xtals. Incorporate plate and aerial-current meters. Require ext. P.S.U. Offered in excellent condition, **£8/19/6**. Carr. 15/-.

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 21/32in. square fronts.

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

R.C.A. AR88 SPEAKERS

Eight-inch, 3 ohm speakers in metal case. Black crackle finish to match our 88 receivers. Brand new and boxed with leads, **59/6**. Carr. 7/6.

GRID DIP METERS

	£	s.	d.
KYORITSU. 360 Kc/s.-220 Mc/s. Mains operated	12	10	0
Lafayette Nuvistor 1·7-180 Mc/s. Mains operated	12	10	0
TE.15 Transistorised. 440 Kc/s.-270 Mc/s.	11	11	0

EX-AM CONTROL BOX with two Londex 7026 24v. D.C. Aerial Change-over Relsys. New, **39/6**. Carr. 5/-.

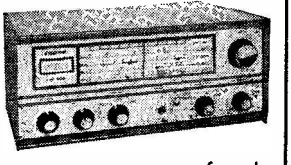
BUG KEYS	£3	19	6
ELECTRONIC KEYS	£16	10	0

ELECTRONIQUE COILPACKS

GC.166.	QP.166	£13	13 0
GC.166T.	HB.166T	£16	16 0

I.F. strips also in stock.

CODAR EQUIPMENT



		£	s.	d.
CR.70 Receiver	...	19	10	0
CR.45 Receiver	...	11	7	0
CR.45 Kit from	...	9	10	0
PR.30 Preselector	...	5	10	0
PR.30X (Built in P.S.U.)		7	4	0
RQ.10 Q Multiplier	...	6	15	0
RQ.10X (Built in P.S.U.)		8	8	0
CC.40 Control Unit	...	6	10	0
AT.5 Transmitter	...	16	10	0
T.28 Receiver	...	15	10	0
12/MS Mobile P.S.U.	...	11	5	0
12/RC Control Unit	...	2	7	6
AT5 Mains P.S.U.	...	8	0	0
Mini Clipper Kit	...	1	19	6

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

PART EXCHANGES WELCOME

INDEX TO ADVERTISERS

SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXV JANUARY, 1968 No. 291

CONTENTS

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

Advertising: **Maria Greenwood**

Published at 55 Victoria Street, London, S.W.1, on the last Friday of the month, dated the month following. *Telephone: ABBey 5341/2 (STD 01-222-5341)*

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.

The SHORT-WAVE Magazine

To All Our Readers, a Very Happy New Year, with Prosperity and Good Health in 1968

It is again the season for Sound Advice and Good Resolutions—and it hardly needs saying here that in our world of Amateur Radio much useful advice could be given and a long list of excellent resolutions could be catalogued.

It is widely held that nowadays radio amateurs use more commercial equipment than gear they design and build themselves. Certainly, whereas 30 years ago it was essential to home-construct much of one's apparatus, today there is no need to build anything at all—it can all be bought off the shelf, ready ta go on the air. There is nothing wrong with this; indeed in many ways it is a very good thing that such an approach to Amateur Radio is possible.

But as always, amateurs will remain individualists who pursue a great hobby as the spirit moves them—they are not really much concerned about what others may be doing, thinking or building.

So instead of offering advice for the New Year to those who may glance over this page, we would simply say that we wish all our readers, all over the world, the best of luck, happiness and good fortune for the coming year, and success in whatever direction their amateur activities may lead them.

Austin Forsyth, G6FO.

WORLD-WIDE COMMUNICATION

AN HF BAND TRANSVERTER

CIRCUIT DESIGN— AND A PRACTICAL EXAMPLE

B. A. WATLING (G3RNL)

Our well-known contributor now offers a solution to the familiar problem of working SSB on other bands when an existing Sideband transmitter or transceiver only gives restricted coverage. The principle of signal mixing at the proper frequencies to get SSB output on some different band or bands is well enough known—but there can be design difficulties if the amateur constructor is starting from scratch. All these are ironed out in the G3RNL HF-Band Transverter described and illustrated here.
—Editor.

STATIONS running commercial or even home-built rigs with only limited band coverage soon get to the stage of wondering how best to get going on the other bands. With improving conditions on the HF bands, 10-15 metres appear as a very attractive proposition. Several possibilities are considered. Either the purchase of an all-band rig, or constructing a small transmitter or transceiver for these two bands. The first alternative is a problem because of the cost, while the second alternative has most of the frustrations of building multi-band equipment. The answer then is to construct some form of converter. The existing rig can be plugged into this new unit which then converts the output signal into the required bands.

For owners of transceivers, a transverter is called for. This will not only mix the transmitter output to the other bands, but also act as a crystal controlled front-end converter on the receiver side. It was mainly for the owners of transceivers such as the NCX-3, HW-12 or M. & G. three-bander that the G3RNL transverter was devised. Even if separate transmitters and receivers are available, this same unit can still be utilised as a transverter. Alternatively, it can be run as a transmitter-converter only, by leaving out one of the five valves.

General Considerations

The transverter to be described was built specifically for use with the transceiver at G3LAT, which gives three bands—160, 80 and 20 metres. The other three bands, 10-15-40m., are provided by the transverter.

The size of the unit was designed to fit the available components, but with a little careful shopping round for certain items and lowering the PA valve through the chassis, the height could be reduced and made compatible in appearance with an existing transceiver. The PA valve in the transverter is the same as that in the transceiver, a 6146 in this case. This enabled the existing PSU, which had some capacity in hand, to be used. If the power supply is already running at or near its limit then, of course, a separate power supply for the transverter will have to be provided. The power requirements, using a 6146 in the PA, are: +750v. at 120 mA peak, +250v. at 40 mA, +210v. stabilised at 15mA, −100v. at 15 mA and 6·3v. AC at 3 amps.

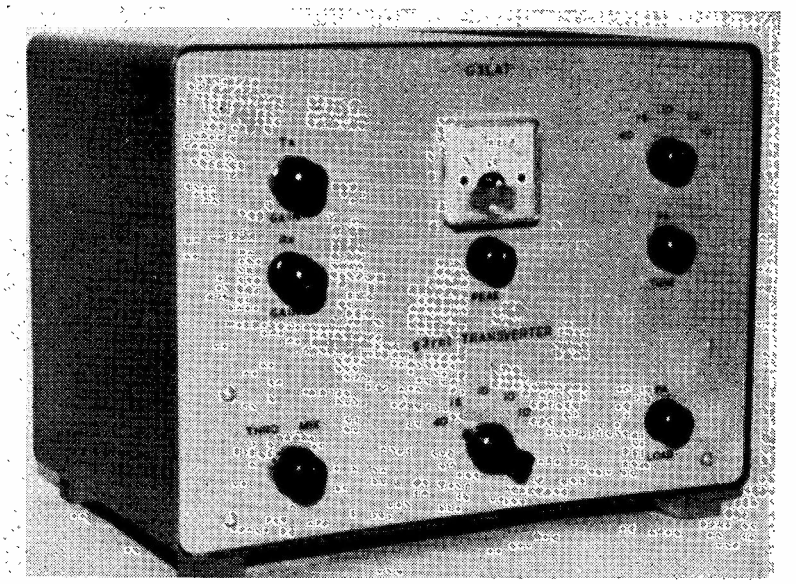
Circuit Plan

Fig. 1 is a block diagram of the transverter. V1, a 12AT7, operates as the conversion unit on the " transmit " side and is a simple balanced mixer. This is necessary in order to help suppress the straight feed-through of the 80m. signal or its harmonics, preventing these from reaching the aerial. Following the mixer is V2, a 6CH6 driver, which doubles as an RF amplifier on " receive." Gain control is effected on this stage for both transmit and receive. The relevant potentiometer is connected into the cathode circuit as part of the transmit/receive switching. The driver is followed by a Class-AB1 PA, a 6146 in the prototype. On the " receive " side the aerial is switched to the input of V2, which then functions as an RF amplifier. The output of V2 feeds V5, the receiver mixer. This form of mixer was chosen for its low-noise characteristics, as well as the good isolation it gives between the conversion oscillator input and the signal path. If the oscillator injection were to be to the cathode of this mixer, then a positive feedback loop would occur on " transmit."

Switching is also provided in the design so that the transverter can be left permanently connected to the transceiver. When switched to " Thro," the transceiver operates normally with the supplies to the relay, receiver mixer and conversion oscillator taken off. The PA is normally biased back anyway, leaving only the driver/RF amplifier conducting. An additional switch could be included in the PSU or on the transverter itself, to cut the heaters of the transverter for sustained non-use.

Circuit Details

The transmitter mixer, V1 of Fig. 2, is a simple balanced mixer that requires no adjustment. The incoming signal appears on the cathode of the first half of the triode and is coupled *via* C2 to the grid of the second triode. The two anodes are strapped together so that the components of the incoming 80-metre signal appearing at these anodes cancel (due to the fact that they are in phase opposition). The incoming signal is mixed with the output of the conversion oscillator (V4). This signal appears on the grid of the first triode of V1. The incoming 80m. drive must be of low level to prevent overloading of the mixer and is, therefore, coupled to the cathode of the mixer *via* C1, while R1 is selected to match the output impedance of the transceiver (50-ohm or 75-ohm). The drive requirement is only a matter of 2-3 watts maximum. Any more will drive the mixer towards cut-off and, therefore, reduce the output and would, of course, produce a very distorted output. If any difficulty is experienced in reducing the output of the transceiver to a suitably low level then C1 can be cut down to just a few pico-farads. This means, however, that the resistor R1 will need to have an increased power rating to soak up the unwanted output of the transceiver. In the prototype, however (using an M. & G. transceiver) the drive could be reduced to manageable proportions. If, on other types, it is found that the only way the drive can be reduced is by turning down the transmitted audio gain, then this will not be very satisfactory—because if only the audio is reduced



Front panel view of the completed Transverter, this model actually being built for G3LAT—see text.

the " suppressed " carrier stays at the same level; this means that the ratio of carrier to peak output will be such that the output from the transverter will be approaching AM! If there is no gain control in one of the RF stages of the transceiver the only answer is to use a small coupling capacitor for C1 so that the audio gain on the transceiver can be kept at a reasonable level.

The driver stage is conventional Class-A with the cathode switched on change-over to the relevant potentiometer. These provide " Transmit " and " Receive " gain facilities. The PA, in Class-AB1 has *pi*-tank output coupling and is neutralised by NC. In the prototype NC needed only to be a matter of a few pico-farads. It can be made up by two pieces of substantial insulated wire, about 2 inches long, twisted together. If this does not provide enough capacity for neutralising then the driver tuned circuit decoupling capacitor (C14) can be reduced to as little as 300 $\mu\mu$F.

Coil Points

In order to simplify the switching the anode coils of the transmitter mixer (V1) are arranged such that the 40-metre coil is in circuit all the time and the other coils are switched to be in parallel. This allows the aerial input to be permanently wired to the link on the 40-metre coil with no switching required.

In the prototype, switched coils were used as the conversion oscillator anode load. This was found most convenient due to the large frequency differences involved. If only 15 and 10 metres be required (as would be the case if used with an NCX-3) then only one coil would be needed as the anode load, with condensers switched across to change its resonant frequency. New wire-ended crystals were used in the prototype. However, surplus FT-243 crystal should prove satisfactory. For 40-metre operation a 3·3 mc fundamental crystal was used, while for 10-15 metres the second harmonic of a

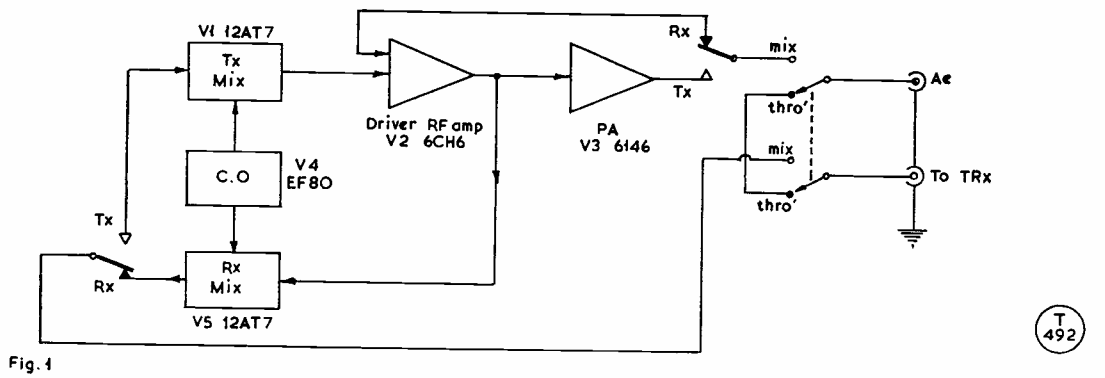
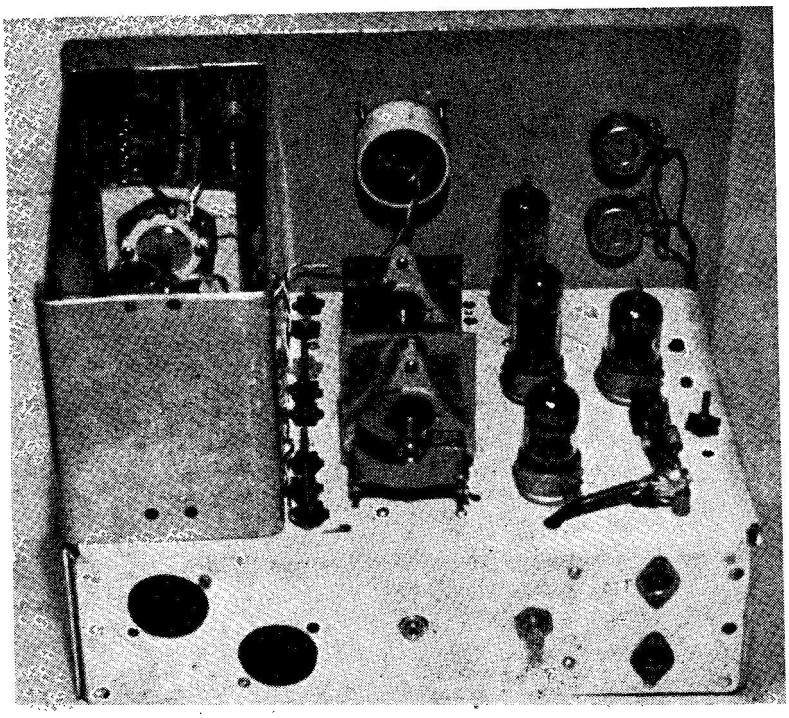


Fig. 1. Schematic diagram of the Transverter



Inside view of the top-chassis layout of the G3RNL Transverter.

12·5 mc crystal and the fourth harmonic of crystals around 8 mc respectively were selected.

Layout

Construction of the prototype was on a four-sided chassis measuring 10in. by 7in. by 3in. deep. The front panel is 10½in. by 7½in. Each stage in the prototype was screened, but this amount of screening probably was not necessary. The valve layout, as seen in the illustrations is, from the front panel, crystal oscillator V4, driver V2, transmitter mixer V1. To right of these is the receiver mixer V5 and to the left is the PA compartment including V3 and the *pi*-tank coil and PA tuning capacitor. The change-over relay is mounted under the chassis near the receiver mixer V5 and the Mix/Thro switch.

Operation

With the Mix/Thro switch set to " Mix," the " Peak " control should first be peaked up on a received signal. This will set it near enough for transmission. On " transmit " a small amount of carrier can be inserted to give a slight rise in cathode current above the no-signal level (25 mA). The peak control can now be set for maximum reading on the cathode current meter. With about 50 mA indicated, the PA tune should be adjusted for maximum output (or dip if the PA is neutralised correctly). The carrier can now be increased until the point is reached where further carrier does not increase the cathode current. The PA should then be loaded for a maximum cathode current of 135 mA. The tune-up procedure must be done fairly quickly to prevent

Table of Values

Fig. 2. Main Circuit, G3RNL Transverter

C1	= 50 μμF (*see text*)	R4	= 2,200 ohms
C2, C21	= ·001 μF	R6	= 1,500 ohms
C3, C7, C8, C11, C12, C14, C16, C17, C20, C22, C25, C27	= ·01 μF	R7	= 470 ohms
		R8	= 15,000 ohms
		R10, R12	= 47 ohms
		R11	= Meter shunt (to 150 mA f.s.d.)
		R14, R15	= 27,000 ohms
C4, C9, C26, C29	= 47 μμF	R16, R17	= 4,700 ohms
		R19	= 1,000 ohms
C5, C10	= 300 μμF	R21	= As for relay
		R22	= 10,000 ohms
C6, C13, C16, C23, C24	= 100 μμF	RV1, RV2, RV3	= 20,000-ohm pot.
C18	= ·001 μF, 4kV	RFC1, RFC2	= 2·5 mH RF choke
C19	= ·01 μF, 1kV	X1	= 3,300 kc
VC1	= 50 μμF, two-gang	X2	= 12,500 kc
VC2	= 365 μμF, wide-spaced	X3	= 8,000 kc
		X4	= 8,125 kc
VC3	= 365 μμF, two-gang	X5	= 8,250 kc
		V1, V5	= 12AT7
R1	= To match o/p, 50/75 ohms	V2	= 6CH6
		V3	= 6146
R2, R5, R19, R13, R18, R20	= 100,000 ohms	V4	= EF80
R3	= 100 ohms		

TABLE OF COIL DATA

L1, L4: Denco Range 4 " blue."

L2, L3, L5, L6, L10, L11, L12, L13: Denco Range 5 " blue."

L7: Six turns 20g. wound on R12.

L8: 21 turns 18g., one-inch diam., tapped at 5t. and 7t. from VC2 end.

L9, L14: Denco Range 3 " blue."

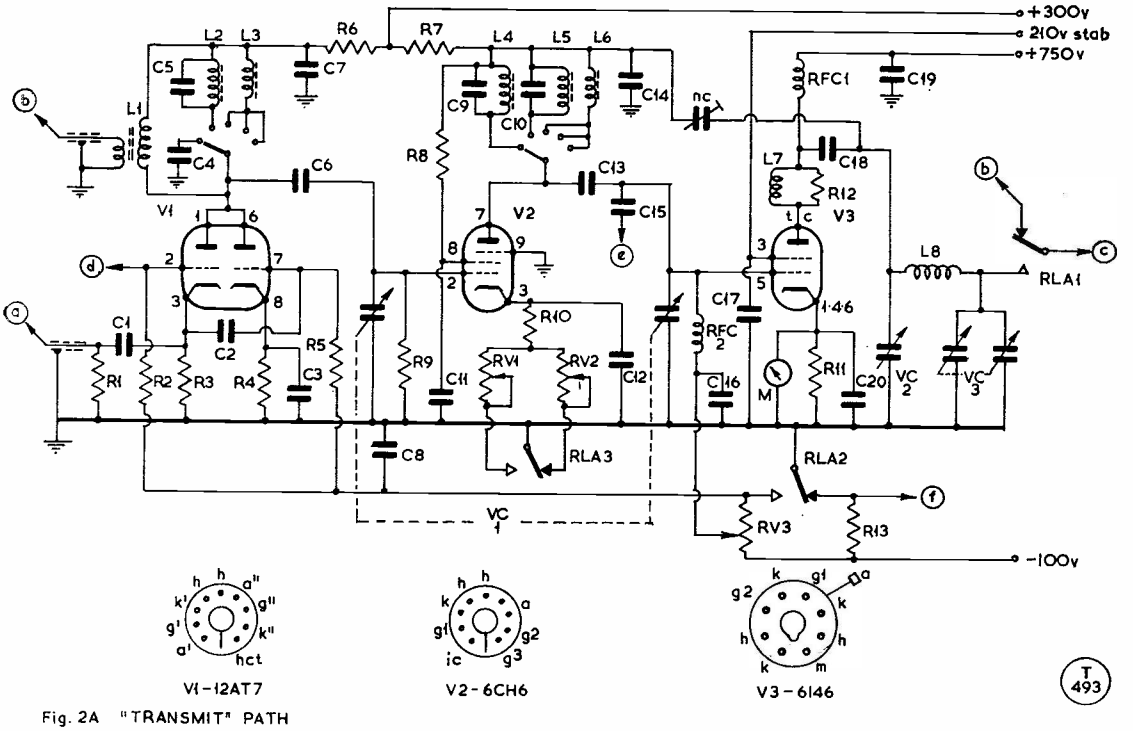


Fig. 2(A). "Transmit" path circuit diagram — and see below.

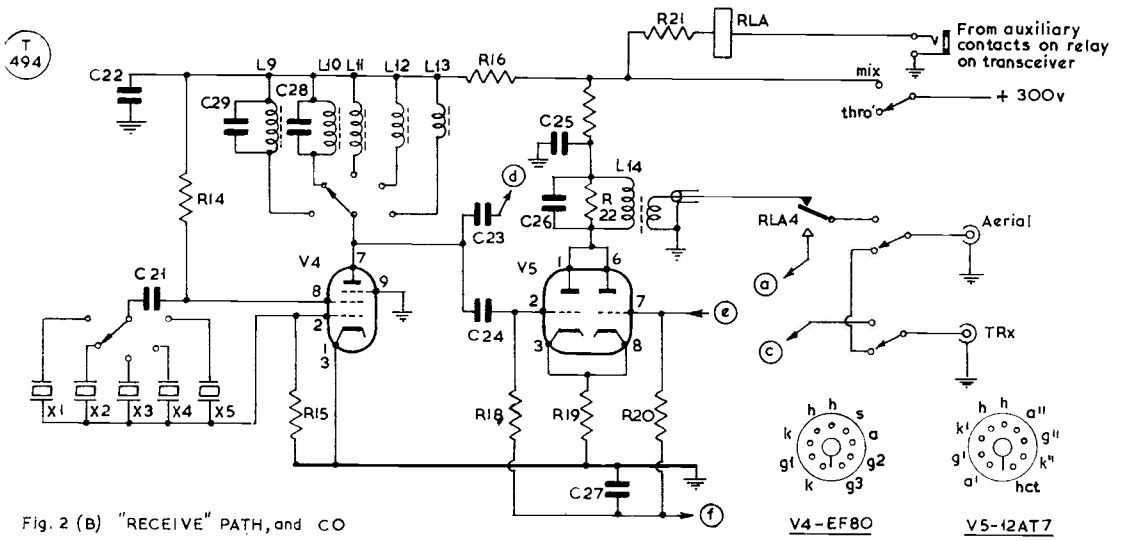


Fig. 2(B). The "receive" path and CO circuit for the G3RNL transverter. Points (a), (b), (c) etc. inter-connect with Fig. 2(A). Note that the unmarked resistor between C25 and R21 is R17.

exceeding the anode dissipation of the PA for too long. It is advised that full input only be used for about 2-3 *seconds* at a time. On voice modulation the cathode current should peak up to only *half* that indicated with full carrier.

Alternative Arrangements

In the case where a separate transmitter and receiver are used this same transverter can be employed. The 80-metre band on the receiver then becomes a tunable IF. No modifications are required to the unit for this form of operation. The aerial input to the transmitter, having its own aerial change-over facilities, should be connected to the input socket of the transverter. If only a transmitter-converter is required then V5 can be left out of the circuit altogether and the aerial change-over switching altered so that the aerial is switched to the transverter input socket on " receive."

If different bands are required, *e.g.* 20 metres, as may be the case if an HW-12 transceiver were used, then the conversion oscillator frequency must be 18 mc. This can be accommodated using a 9 mc crystal and doubling.

The conversion oscillator frequencies chosen for the transverter give full band coverage only if the original rig covers the full 500 kc of 3·5 mc to 4·0 mc. The dial readings relative to the 80-metre calibrations will then be as shown in Fig. 3.

Alignment

The following alignment procedure is intended as a guide to getting the transverter into a working state following its construction. The transceiver should first be set up on 80 metres and the PA tuned and loaded into a dummy load (or the aerial) before commencing the transverter alignment. The initial alignment can be done on any of the bands covered by the transverter and initially should have the PA anode and screen supplies disconnected. Ensure that the crystal oscillator (V4) is oscillating and then peak the anode load coils to resonate at the desired harmonic frequency. Resonate V1 and V2 and V5 (if used) anode loads on " receive " with the peak control set to mid position.

Adjust PA bias control for —50v. on the wiper with the equipment in the " transmit " position. Turn Tx gain fully up and insert carrier on the transceiver to a few watts driving the transverter. Monitor the output of the transverter and tune PA (with *no* HT on screen or anode) for maximum output. Adjust NC for minimum ensuring that PA is tuned for maximum output each time NC is adjusted. When complete connect PA supplies and equipment is ready to operate. Slight adjustment of the coils may be found necessary on transmit to ensure maximum drive.

Conclusions

One final thought on the subject of transverters is that the arrangement shown could be utilised to provide 160-metre operation, preferably mixing from 7 mc. This may be of interest to owners of transceivers covering 80 metres to 10 metres only. Conversion from 7 mc requires a conversion oscillator frequency of 5·2 mc. Another possibility is a transverter for 2-metre operation, mixing from either 20 metres or 10 metres. This would necessitate a slightly different arrangement than that used in the G3RNL HF band transverter, but it can be done. One does hear, on the air, several views on the dissipating or wasting of power into a dummy load when using a transverter. The author's view on this is that if it is necessary—as in the case of rigs with only an audio gain control—it can still be more convenient, and cheaper, than building a separate SSB rig for the required bands!

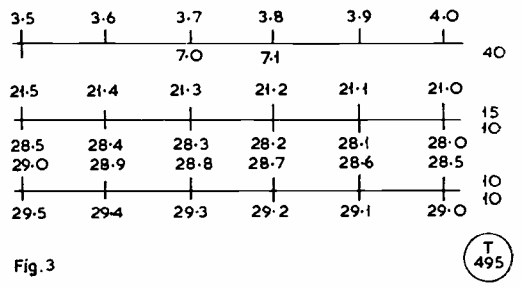


Fig. 3. The dial calibration to be expected when using the G3RNL transverter from 80 metres, and crystal frequencies specified.

COLOUR TV AT THE SCIENCE MUSEUM

If you want to see what Colour TV looks like—as received in a high signal-level area—go to the Radio Demonstration Room at the Science Museum, South Kensington, London, S.W.7, any week-day between 1030 and 1100 or 1400-1530, or on Saturdays 1030-1200 and 1400-1600, clock times. If the colour TV is not on, they give you high-quality VHF radio, or DX communication on the amateur bands over the Science Museum's own station signing GB2SM.

". . . Having a bit of trouble here with an intermittent — signal may have gone down . . ."

USEFUL DOUBLE-HT PSU CIRCUIT

GIVING TWO DC VOLTAGES FROM ONE TRANSFORMER

THERE is a sufficiency of cheap rectifier valves and multi-wound HT transformers still available to make the circuit shown here an attractive proposition for an HT/PSU giving two output voltages.

The arrangement shown in Fig. 1 is somewhat unusual in that one set of rectifier valves and one HT transformer are connected to provide two DC voltages, one of which is twice the value of the other.

It is evident that this circuit offers certain advantages over the conventional HT power pack arrangement, as regards both initial cost and component space required. The rectifiers are not equally loaded, but by using U19's this is no disadvantage, since the maximum rating for four U19's, in this type of circuit, is 500 mA at 4000v. DC.

Operation of the circuit is shown more clearly in Fig. 2. Two of the U19's and the components dotted in take no part in supplying the low voltage HT so that the arrangement resolves itself into a two-valve full-wave connection with the rectifiers inverted. The HV side utilises the four U19's but Ch. 2, Ch. 3, C5-C6 and C7-C8 (which are series connected condensers) take no part in the operation of supplying the high-voltage HT.

For C1, C2, C3 and C5-C6 with C7-C8, series-connected electrolytic condensers are recommended. With proper choice of values, the necessary working capacities are easily achieved. On the LV side, the input choke Ch. 2 must not be omitted.

Operating Notes

In a Sideband amplifier, for which this particular power pack was designed, a very large variation of anode current is called for as the drive (input) signal changes. The swing may be anything from 50 to 300 mA.

Since the internal impedance of the power unit produces some interaction between the 1000v. and 500v. supplies (in the circuit of Fig. 1) a sudden demand for maximum current would cause a reaction on the 500v. output if conventional condenser capacities were used for C1, C2, C3. The solution is to use three 450v. working 160 μF condensers in series, to give an effective 50-60 μF at 1350v. working. Resistors R1, R2, R3

Table of Values

Circuits of Fig. 1, Fig. 2 and Fig. 3

C1, C2, C3, C5, C6, C7, C8 = 160 μF, 450v. wkng. electrolytic
C4 = ·01 μF, 1,500v. wkng, paper
C9 = ·01 μF, rated for voltage used
C10, C11, C12 = Rate for circuit
R1, R2, R3, R4, R5, R6, R7 = 100,000 ohms, 1-watt
R8, R9 = 10,000 ohms, 1-watt

Note: Chokes Ch.1-Ch.6 can be 5-20 Hy swinging type, rated for maximum required current.

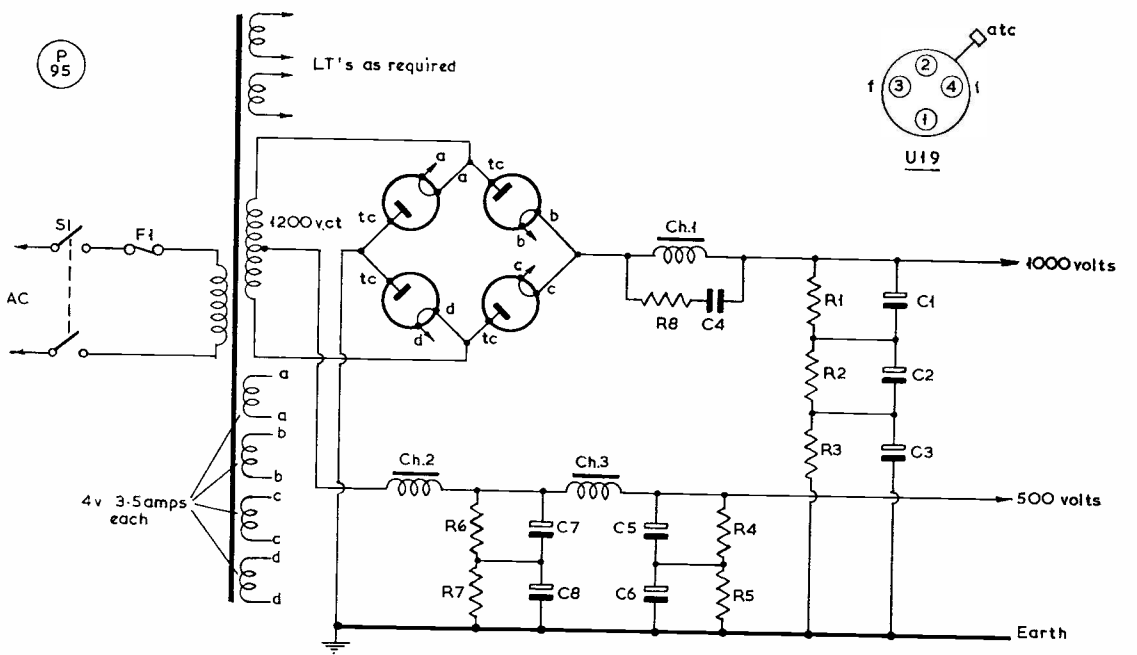


Fig. 1. HT supply circuit for two-voltage output.

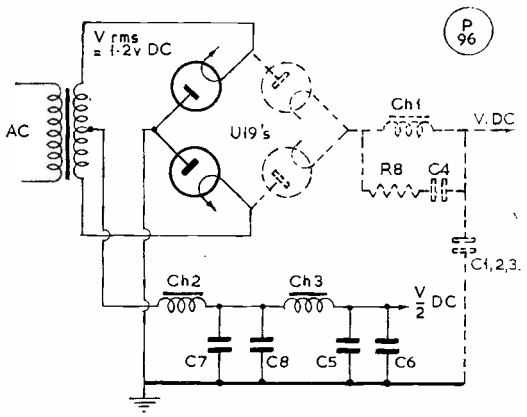


Fig. 2. Showing how the two circuits operate, as explained in the text.

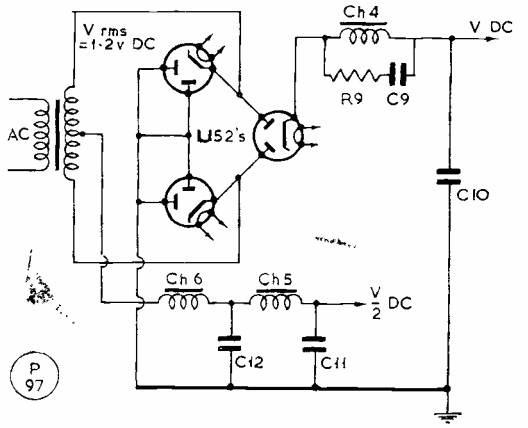


Fig. 3. Using three full-wave rectifiers to give two voltage outputs at different loadings.

across these condensers equalise the applied voltage. C5-C6 and C7-C8 are similar condensers.

Another circuit developed from the arrangement of Fig. 1 is shown in Fig. 3. In this, three bi-phase rectifiers are used. If the HV and LV DC outputs are similar, each valve is equally loaded. In this circuit, three U52's would provide 250 mA at the two voltages given by the single HT transformer, the rating of which must be equal to the total current load at the maximum required voltage.

GOING SIDEBAND ON VHF

HOW TO DO IT USING AN HF SSB RIG — CHOOSING THE CONVERSION FREQUENCY — ADAPTING EXISTING VHF EQUIPMENT — SUITABLE LINEAR AMPLIFIER FOR FINAL OUTPUT

T. P. DOUGLAS (G3BA)

Our contributor is already well enough known on VHF to make this an authoritative discussion on how to set about going SSB on the megacycle bands. What it comes to is that anyone already possessing an HF Sideband transmitter and equipment for VHF can marry them up to appear as a potent SSB signal on two metres. In explaining the basic theory—and the operating advantages of SSB on the VHF bands—he gives the necessary practical information for conversion to Sideband using the transverter technique.
—Editor.

A SCAN over the Amateur Bands from 160 to 10 metres shows quite clearly that for Phone operation SSB has now many more adherents than AM and it must be a foregone conclusion that this mode will eventually oust all AM whether we like it or not. The advantages of SSB are now too well known to require repeating here. The plain truth of the situation is that it is almost a necessity to work SSB in order to make Phone QSO's in sufficient numbers. It is also evident that most DX-peditions use SSB for much of their working, with CW only as a second best for the really weak and difficult stuff.

When we look at the VHF spectrum, however, almost the reverse situation prevails and over 90 per cent of Phone QSO's in this country are still conducted on AM. This mode, and NBFM, may be quite satisfactory on bands which are megacycles wide and where interference is relatively uncommon, but many a contact is never achieved due to the archaic operating methods which are still practiced on VHF generally. The technique of crystal-controlled fixed frequency operation and the inevitable " tuning the whole band for a call " is universally the method employed, though old timers will recall that on the lower frequencies this sort of thing went out way back in the thirties. It is quite amazing that VHF operators persist with these old methods and are apparently quite prepared to lose QSO's through the eternal searching over what amounts to some 200 channels on four metres, 660 channels on two metres and Heaven knows how many on 70 cm! However, quite a few VHF men have seen the light and are no longer prepared to put up with the methods of bygone days and who wish to conduct their contacts with the modes now usual on the HF bands and with the same facilities and methods of listening and calling as on, say, 80 or 20 metres. On the Continent the swing over to SSB on two metres is particularly marked, but in this country we are still dragging our feet and jogging along

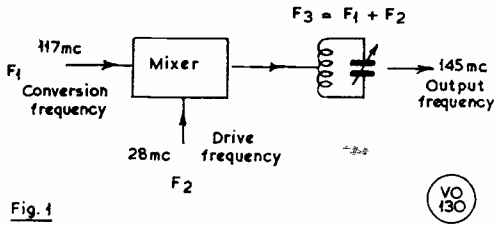


Fig. 1. Basic frequency converter for two metres.

with cries of " there is no activity " or " only some of these SSB types quacking away."

VHF at the best of times is an area of endeavour where a " piece of string " and a couple of watts never really bring in dozens of QSO's. Beam aerials and quite good equipment are required to beat poor signal-to-noise over the longer distances. How often have we had to struggle to identify some weak carrier with low mod. whereas had the station been using CW or SSB it would have been quite easy. The long-distance skeds operated on both 4m. and 2m. have shown the difference when using SSB compared with AM. Recent Continental openings have been a give-away for the SSB group over here as they only had to tune over a few channels at the most and immediate contacts were gained by net-frequency operation, Vox or p-t-t control, and all with much less QRM than had the stations been on AM. True, the AM people had their fun, but it was so much harder having to wait your turn whilst the DX started at one end of the band and worked its way up to your crystal frequency! What was really startling about the November opening, however, was the number of EU stations which were now using Sideband. The SSB channels were just full of stations, many of them G, but mostly DL's or PAØ's. Comments on the air afterwards were generally to the effect that " you SSB boys certainly had a ball " or " it was all right for you SSB chaps, we had to wait our turn." The old adage of " if you cannot beat them, join them " seems to fit here, and it was with this in mind that set out here are one or two practical ideas, to show that VHF SSB is really very easy—and in many cases can be achieved by just a simple modification to existing gear which is perhaps not being used to its fullest capabilities.

For the doubters or those who imagine that going on VHF SSB is a " difficult thing " and requires lots of wasted time spent on building equipment, let it be said that it is quite simple. Apart from the fact that there are one or two excellent Transverters on the market which will give instant results without pain or strain, this article is really aimed at the man who wants to do something on his own.

Transverter Principles

Most amateurs are aware of the fact that in a multi-band SSB transmitter the sideband is developed at a relatively low frequency and this is then mixed with some crystal controlled RF source to produce the band required. To extend this to VHF is, in essence, exactly the same. So we can see that a transverter is not some complicated thing, but just another mixer stage with a few variations.

If we take for example a frequency of 117 mc and mix it with 28 mc in a frequency converter, we can obtain 145 mc by just adding the two frequencies. (Fig. 1.) To be more specific, if the 28 mc is actually 28·41 mc and the drive is exactly 117 mc, we get 145·41 mc at the converter output. If the 28·41 mc is a USB signal then this will produce a small SSB drive, also on upper sideband, on 145·41 mc. Now, the internationally agreed Sideband frequency sector on two metres is centred on 145·41 mc—so that in principle getting on 2-metre SSB is fundamentally straightforward. Obviously, there is much more to it than just getting a 117 mc crystal and beating it up with some 28 mc SSB, but let's not get frustrated with complications, and see how we can expand on the principle. [over

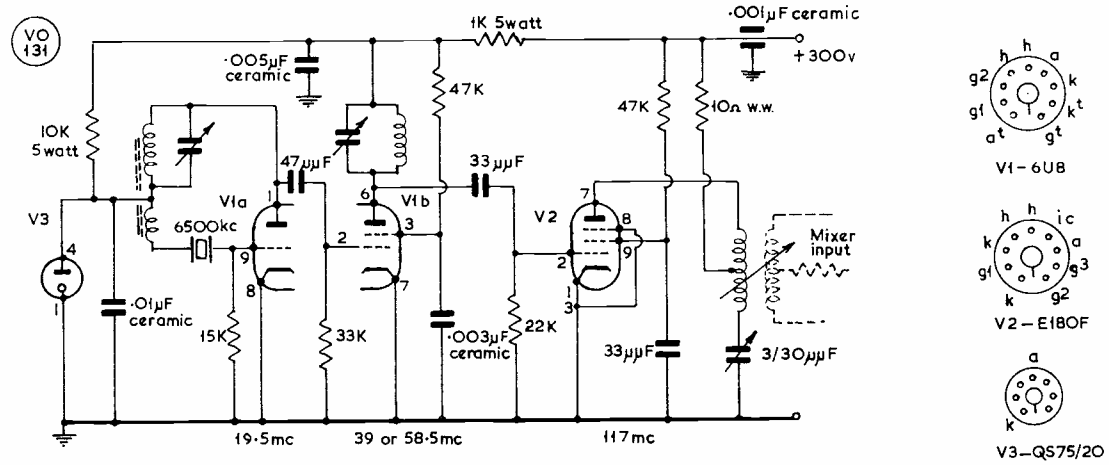


Fig. 2. Conversion frequency stages for 117 mc output. The tuned circuits are proportioned to resonate for channels as indicated.

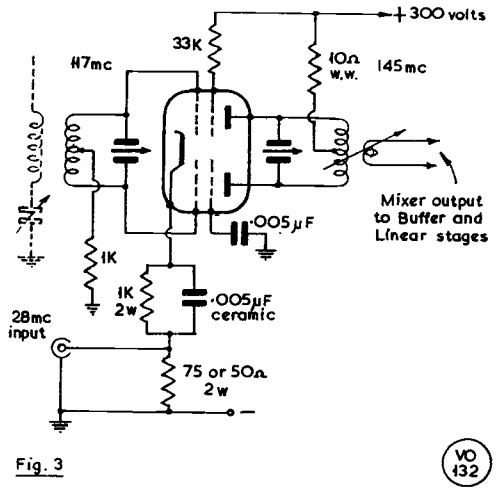


Fig. 3. A balanced mixer stage, the recommended arrangement.

Producing the Conversion Frequency

An actual crystal of 117 mc is not easy to obtain at present and in any case it is most unlikely that it would be capable of providing much power output with any real degree of stability. HC6/U crystals of 39 mc are available and these could be tripled to 117 mc, but this is not to be recommended as the HC6/U types, while being ideal in transistor circuits, abhor having a lot of power taken out of them or having their working state disturbed in any way by switching surges or the like. The FT-243 crystal of 6,500 kc operated in third overtone is hard to beat for ruggedness and will function very well indeed provided it is clean and undamaged. This then means that we have to generate 19·5 mc first of all and this can best be done in the triode section of a 6U8/ECF82—See Fig. 2. The pentode can then double the 19·5 mc to 39 mc or triple it to 58·5 mc; it is preferable to do the latter except possibly in Ch. 4 TV areas of very low field strength when the doubler would be advisable for obvious reasons. Next, to get the 117 mc out—this can probably best be achieved by using an E180F as a frequency doubler (or tripler) and there will be ample drive for what we want. Two valves total for the Conversion Frequency stage and that is all there is for this section. (Fig. 2, p.685.)

Type of Mixer

The mixer is perhaps the most important part of the whole transverter unit. A single-ended mixer could, of course, be used. However, it is very undesirable that this kind of circuit be adopted as, unless considerable filtering is embarked upon, the result will be full of spurious frequency responses. The Balanced Mixer is the arrangement to look at as this configuration can be used to reduce considerably one of the mixing frequencies. The problem is, which way round should we connect this mixer? Should we run the 28 mc in push-pull on the grids with the 117 mc in parallel, or *vice versa?* On the face of it, there might be a good case for the former layout because the 117 mc could be so well attenuated that it could not possibly appear at the mixer anode. True enough, but it is not very difficult to use selective circuits to do this if need be, so let us look a little closer at the mixer circuit before making the final decision. If we have the grids and anodes in push-pull, then any frequency presented to the grids at any reasonable power level will become multiplied in the anode and passed on to subsequent stages. With a comparatively low frequency, such as 28-30 mc, as the SSB source it is not difficult to see that the 5th harmonic of 28 mc is 140 mc and of 30 mc is 150 mc—so that whichever frequency we use as SSB drive will come out either in or near the band as a horrid-sounding spurious of enormous proportions! But if we do things the other way round then all of the output frequencies from the SSB exciter will be suppressed in the mixer and the aforementioned tuned circuits will take more than adequate care of the 117 mc component as it goes through the subsequent stages. So recapping again: The 117 mc is push-pull connected on the balanced mixer grids, the 28·41 mc SSB drive is applied to the grid (or cathode) in parallel and the sum product is taken from the anode in push-pull. (Fig. 3.)

After the Mixer

Having got our 2-metre SSB drive in the right sense, *i.e.*, USB, the power at this stage is not more than about a watt or two p.e.p. output, thus amplification is called for in the usual way to boost it up to whatever power is desired. It is good practice to follow a mixer with a buffer in Class-A and a suitable valve for this is the QQV03-10 which, incidentally, is the type recommended for use as the balanced mixer. The final output stage could well be a QQV06/40A or similar, and this will take a good 120 watts input to produce 70 watts p.e.p. output, RF.

The circuit diagrams herewith should be fairly self-explanatory and need not be gone over in detail. If we take a look at the block diagram Fig. 1 of what stages we have in the transverter and compare them with those in any low-power transmitter used with crystal control on either 2 or 4 metres, it will be seen that both are well-nigh identical in arrangement. What this really means is that if you already have a QRP transmitter available, here you have the transverter all made up and ready to go after only a few minutes' work with a soldering iron and some resistors and condensers! The reasoning is

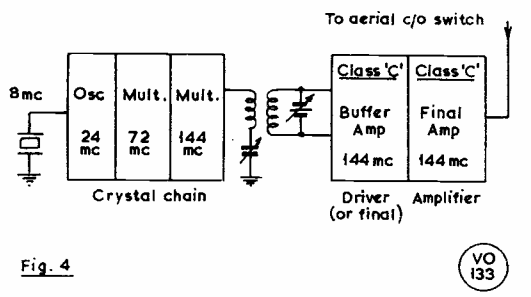


Fig. 4. Typical two-metre RF arrangement for a transmitter using crystal control.

thus: The usual VHF transmitter has a crystal oscillator/multiplier chain which is adequate to drive its power amplifier into enough grid current for Class-C operation. Compare it with the conversion frequency chain on the Transverter—surprise! It's the same (give or take small changes in circuit arrangement) so cunningly we throw away the 8 mc xtal for two metres and pop in the 6·5 mc FT-243 crystal already mentioned and tune it all up on 117 mc instead of 145 mc. This should be easy enough, as this frequency is lower than before, so circuits only need a bit more C to resonate.

Now look at the input of the QQV03-10 or 832 or what-have-you in your old first amplifier—yes, it's in push-pull too! It only needs to be peaked on 117 mc and we are nearly on the band! Where's the SSB fed in? Well, that is where the soldering iron comes in. You will most likely find that the cathode circuit of what was your buffer or PA was grounded to earth by a strap or wire. Unsolder this lead and pop in a bias resistor (1K, 2w.) with a ·005 μF by-pass capacitor across it and then connect the earthy ends of these two components down to ground *via* an *un*by-passed 50 to 70 ohm non-inductive resistor of 2w. rating. Put about one watt p.e.p. RF at 28·41 mc across this small resistor and you can take off about 2 watts or so p.e.p. from the anode on two metres. If you have a following amplifier stage this is sheer bliss, as all you have to do is to fix its potentials for Class-AB1 operation and you are ready to go on the air. If you have not got an RF amplifier, you will have to make one up to the circuit in the sketch for this stage. (Fig. 6, p.688.)

What has been said for two metres goes also for four metres. There is as yet no fixed SSB channel on the 70 mc band but most SSB adherents are on 70·35 mc or slightly lower. Crystal frequencies for the 4-metre band can be worked out, taking 14 mc from the SSB exciter.

Some operators will be asking whether 14 mc could be used likewise for the 2-metre rig. Though the answer is Yes, there is a warning to be heeded—take the two-metre SSB output from the mixer into a buffer first of all and then *via* a tuned circuit inductively coupled to the linear grids to give sufficient tuning selectivity to ensure that the 131 mc component is eliminated from the transmitter output. In fact, it is good practice to put this simple tuned filter circuit into *any* SSB rig, as it deals very effectively with out-of-band spurious radiations, without complication.

SSB Driving Requirements

It may have been noted that only one watt of SSB excitation is needed for the mixer circuit described. But most SSB exciters have power outputs of 50 or 100 watts RF peak and this has to be attenuated in some way. You could take off a low-power drive from an early stage of the HF transmitter, but this may be inconvenient. By far the easiest way is to feed the HF Sideband Tx into its dummy load and run it as it was designed to work in the first place. This ensures that the signal out to suppressed carrier ratio is correct and that all transmitter noise is in the right proportion to the SSB output. Attenuate the voltage developed across the load down to the 7 volts peak or so required by a simple series capacitor variable from 5-100 $\mu\mu$F connected

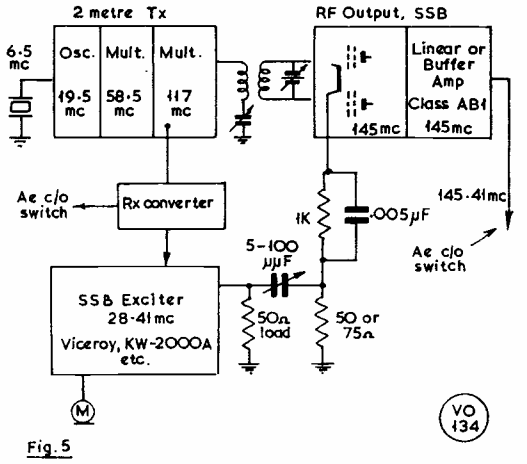


Fig. 5

Fig. 5. Transverter linear circuitry, for final SSB output on VHF. Auxiliary contacts on c/o switch or relay open the screen HT feed to mixer and following stages on "receive."

from the hot end of the load to the inner conductor of the coaxial cable which terminates on the 75- or 50-ohm unby-passed resistor in the mixer cathode.

Setting up the Mixer

It is necessary to set up the mixer in order to get it working cleanly and well within its capabilities. To do this we must measure the anode current of the mixer valve. If the crystal oscillator drive on 117 mc is cut and no SSB signal is being fed to the cathode, then the mixer valve will be running static. In this condition, with a 1K resistor in the cathode, the anode current with a 300v. supply rail will be about 15 mA or so. Switch on the 117 mc and drive the anode current up as high as it will go with all oscillator circuits and the mixer input tuned "on the nose." Now slack back the coupling from the last doubler to the mixer input until the anode current drops to about 30 mA. This is the right drive condition for the conversion frequency and no further adjustment is required. Put in SSB tone to drive the cathode with one-watt SSB RF when the anode current may rise ever so slightly. Reduce the 28 mc RF a little on the attenuator capacitor until only a 1 mA rise, at the most, is noticed in the mixer anode current. Do not exceed this setting from now on. Connecting the buffer (if any) and the linear, adjust for maximum drive all the way through. If the PA goes into grid current then reduce *the SSB drive* on the attenuator control only until it just tips grid current on voice peaks. Load up the PA for a shallow anode current dip for best linearity. The text books give all the appropriate information on how linear stages are adjusted—See 1967 *ARRL Handbook*, or *Single Sideband* (ARRL.)

Operating Conditions on VHF

To someone who has only operated on the HF bands the conditions which prevail on VHF may be a little bewildering. Those who find VHF operation the most rewarding will be operators who are situated well

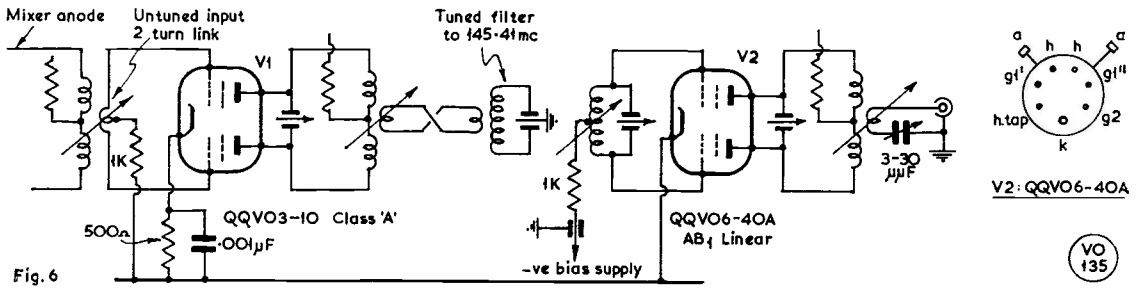


Fig. 6. Basic circuitry for typical buffer and linear amplifier stages, showing essential values.

a.s.l., with a clear unobstructed take-off in most directions towards the population densities from their location. Those who are screened into a valley, with high hills all round, will find it difficult to do well. For them, it is imperative that a properly mounted, rotatable, outside VHF beam system be erected, clear of other aerials and obstructions. It is best to go in for a thoroughly proved commercial aerial, designed for the band, and the best coaxial cable you can manage. The VHF population is much lower than on any HF band, so it is most unrewarding to come on, except by arrangement, outside the evening hours or at week ends. Of the total British VHF population, only a relative few have SSB gear and this is why we want more to come on to swell the ranks. The communications of the future will be *via* satellite of the synchronous type and it is certain that only SSB will be used for telephony work. Amateur satellites have been and are being sent into orbit and will use our VHF bands. The amateur with VHF/SSB equipment has this exciting new field before him. But in the meantime, on the everyday level VHF/SSB gives reliable communication over distances and from difficult locations where otherwise only CW could make the grade.

Every Monday from 2000z is Activity Evening on SSB, so the newcomer is advised to come on first during this period so that he can have the benefit of the help, which will be readily forthcoming, from the goodly number of stations on the air at this time. Remember it is only necessary to be able to call CQ over the 145·4 to 145·5 mc spectrum for SSB, as normally there will be no Sideband stations on any other channel. If four metres is the interest, then Monday evenings same time around 70·35 mc will be where to look for QSO's, although current activity is somewhat less on this band than on two metres.

Reception of SSB on VHF

Nothing has been mentioned so far about receiving SSB on VHF. Any normal 2-metre or 4-metre converter can obtain its crystal drive from a little RF taken off the transmitter converter frequency chain instead of from its local oscillator chain, and then the IF can be modified to 28 or 14 mc as required. Transceivers will use the receiver side for their " receive " input and it will then be just like working on any of the bands for which the set was originally designed.

For those who have no converter and do not wish to build one, *JXK Converters* offer a unit which will function with any normal transverter crystal drive, either for transceive or split-unit working.

When you get on VHF/SSB you will find the natives are really very friendly and all are keen to help any newcomer. Sideband communication is the future method for most VHF voice work and it behoves us as amateurs to be in the forefront of such progress and to demonstrate this by our operating skills and equipment.

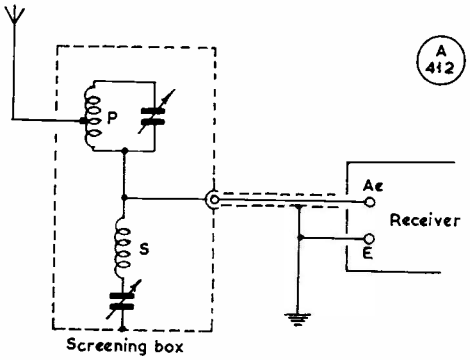
TO BE FAIR . . .

With reference to that picture of the Racal RA.1218 on p.617 of the December issue, we ought to make it clear that the sensitivity should have been given as " one *micro*volt for 15 dB S/N on CW/SSB "—and the stability as " 50 cycles over 8 hours." It was just that in the printing the symbol μ got misplaced.

"MOBILE FOR TOP BAND"

For his article in the December issue, G3SFV now informs us that in the legend for Fig. 2 (p.626), C1, C7 should have been shown as 220 $\mu\mu$F (C6 remains as ·001 μF), and the Denco coils are " blue, 3T," while in Fig. 3 terminal 8 the transformer T1 is left floating. The transistor IF strips mentioned are obtainable as advertised by A.J.H. Electronics (G8AQN), on p.591 of the November issue.

". . . Hope you can still follow—know I've got a mike somewhere . . ."



"THE BREAK-THROUGH PROBLEM"

Further to this article in the December issue of SHORT WAVE MAGAZINE, it is suggested by G5IC (Shrewsbury) that the circuit shown above would give an even better result as regards rejection of an unwanted break-through signal at the receiver IF. The aerial is tapped down the parallel tuned circuit P, and S is series tuned. By making sure that P and S are well screened (in an earthed box, as indicated), and keeping the coax lead short, it should be possible to deal with almost any interfering signal by adjustment of P, S and the Ae. tapping point, without affecting the general tuning of the receiver. What it comes to is that this is a useful and interesting experimental approach, which ought to give better results than that shown on p.641, December.

CHANGE-OVER SYSTEM FOR TWO TRANSMITTERS

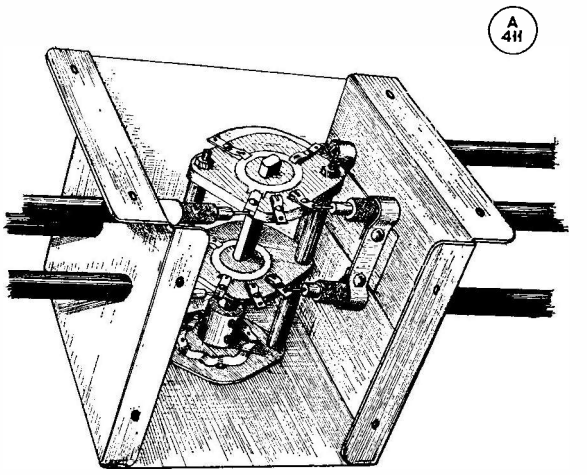
At right is an arrangement suggested by G3OHK (Seaton, Cumbs.) where more than one transmitter is in use but only one aerial. The switching works very well, two wafers being used, each a single-pole three-way, with the central connection left open. The switch assembly itself should be of good quality (preferably ceramic), especially if full-power Tx's are being used. The rod through the switch wafers is made of *Tufnol*, or some other hard insulating material, and is carefully filed with two flats to engage with the wafers. For a tidy job, the switch-box (which need not be screened) could have coax sockets mounted on it, for the various leads.

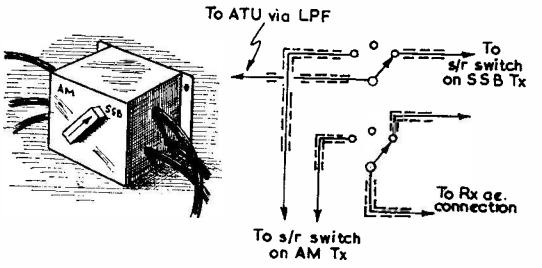
MAST FOR VHF PORTABLE

GI8AYZ (Ballymena, Co. Antrim) describes a mast he uses for his 70-cm. beam when out /P. Three 7ft. lengths of 2in. dia. aluminium tube (sold as rain-water piping) are joined by using 15in. sleeves made by slitting pieces of the same material length-wise, opening the sleeve out a little along the slit and making a force fit of the joint, which is then secured by tightening up with *Jubilee* clips (the sort of screw-up clips used for car water-hose connections, and many similar purposes, obtainable in various sizes at most repair garages). The butt of the mast fits over a ground-spike driven in close beside the car, with another support at the top of the door pillar, nylon guys being taken out from the second joint. The result is a cheap, light mast, easily and quickly erected, which knocks down to short sections convenient for transport. In GI8AYZ's case, the aerial for 70 cm. is a J-Beam "Parabeam," which goes up to 21ft. when operating portable with the mast described.

"VHF BANDS"

For those who have written about "VHF Bands"—and made kind enquiries about A.J.D.—we had hoped before now to have been able to make an announcement regarding the re-appearance of the feature. Though it has not yet been possible to finalise arrangements we expect to be able to resume the feature very shortly.





COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

JANUARY is traditionally the time for the making of Good Resolutions—and of breaking them as soon as possible! However this New Year pans out—and from this point in time it looks as though it will be one stage worse than 1940—there are quite a few things where the effect of a New Year resolution, carried out over the whole year, can improve our lot in the Amateur Radio context. Improvements in equipment performance; the installation of break-in facilities; a determined attempt to ensure that the outgoing signal is above reproach; adequate split-frequency facilities for those chasing DX with a transceiver—all these can be of great help. Above all, though, a change of heart on the operating side. Over the past year or so there has been an alarming slide in the standard of operating, and a lack of tolerance on the bands, which reflects itself in liddery and bad tempers, and even in downright contravention of the terms of the licence. As a tree is known by it's fruit, so also is an op. by his fist and his behaviour—and none of us *wants* to be branded as lids!

Top Band DX Tests

Spinning the dial rapidly away from the voice of discontent, and tuning the bands, the first port of call is Top Band. Here the boot is on the other foot—your poor old scribe hangs his head in shame—because he forgot to mention the important matter of the Trans-Atlantic Tests. The times, as ever, are 0500 to 0730 GMT, and the dates December 31, January 14, February 4 and 18; the " First-Timers " sessions are January 7, February 4, and March 3. The W/VE stations will call " CQ DX Test " during the first five minutes of the hour, and alternate five-minute periods after that, listening during the intervening periods. The " even " five-minute periods (when the W's are listening) the Europeans will be calling. This routine should be adhered to *at all times unless a QSO is actually in progress*, and reverted to when the contact is completed. As for frequencies, the East Coast W's will be in the 1800-1825 kc segment, and the Western ones 1975-2000 kc. VK5KO is understood to be coming on 1802 kc, Africans in the area from 1800 to 1830 kc, and everyone (note this) will be listening for the European stations between 1823 and 1830 kc. During the FT'ers sessions, it is particularly asked that those who have already " done the trick " will hold off and let the first-timers have a clear run, the only exception being the case where something rare and juicy which has not yet been booked in appears. In the latter case, the ploy is to get in, work him, and get off again with as little disruption of the first-timers' activities as may be.

The *CQ WW* Top Band Contest occurs over the weekend January 27/28, from 0001 Saturday to 1500 GMT on the Sunday—the extra three hours being to give the West Coast W's a chance. CW only is the rule, with no cross-mode or cross-band contacts allowed. Score 2 points for each station in one's own country, five points for QSO's with other countries, and 10 points for every W/VE/VO contact. A multiplier of one for every country (outside one's own) W state, or Canadian Province, is allowed, and the total score is the QSO points *times* the multiplier. The Contest exchange will be the usual RST plus serial number, starting at 001, and followed, for the W's, by their State or Province. Incidentally, Hawaii and Alaska will count as separate *countries;* and there are three Provinces prefixed VE1, and two signing VE8. Disqualification may be imposed for breaking the rules of the Contest, unsporting conduct, or taking credit for duplicate contacts in excess of 3 per cent. A whisper from a little bird says that there are going to be all sorts of interesting things going on—so get the logs off in good time. Mailing deadline is February 29, and they go to: CQ 160 Contest, 14 Vanderventer Avenue, Port Washington, L. I., N.Y., 11050, U.S.A.

From Cyprus, another letter from ZC4GM (R.A.F., Episkopi), who indicates that already the weather has done its worst to his aerial; however, at the time of writing, Gordon was moving into different quarters, and had hopes of the necessary copper wire to erect a 360-footer emerging from the bottom of his kit. Gordon has hard things to say about the EU QRM—haven't we all!—and their strange S9 babblings of " First QSO " and " QSL certain," while ZC4GM is working someone else. An operating point, that is rather against the usual run, is that owing to the malign intelligence of the local thundercrashes, even an S9 signal needs to repeat each of the essential parameters of the contact—RST, name, QTH, and so on, several times if the contact is to be R5. Gordon's own opinion is that at least *five* times is none too many. All the operational stations in ZC4 have extremely good receivers, but the constant static, regardless of the season, is the problem.

On now to G3BDQ (St. Leonards-on-Sea), who came on with his KW2000 and AR-8516L receiver between 2300 and midnight on the evening of November 25, staying on a frequency of 1820 kc, and worked OE5XXL, HB9NL, OF2KH, DL5YZ, EI9J, and ZC4RB—not bad for one hour of operation!

Another one to ring the bell quite hard on 160m. was G3VPS (Hailsham), who hooked 9H1AG on his second CQ with the Panda Cub which now decorates the shack, using a 175-foot end-fed wire hooked straight in to the Tx.

G3VMW writes to bring his table entry up to date, and mentions that he has been a participant in most of the Contests; Steve moves

up to 95 Counties/19 Countries, and worked a hatful of interesting stuff in the process, including VO1FB, ZC4RB, OF6UW, OE3PWW, HB9QA, HB9TT, HB9NL, OE5XXL, OF2KH, OE1KU, OE5KE, OE2JG, DJ6TR, DL1CF, DLØKF, DJ9IJ, DJ2TI, PAØPN, PAØGMU, EI9J, EI5AJ and of course many OK/OF stations.

Quite a long time since last we heard from G3UJS (Snettisham) who seems to be firing on all cylinders again after his back injury. Dave has put in a good deal of time elsewhere, but his main news is that he has a thousand cards to dispose of before he leaves U.K. for Australia; so anyone wanting one for Norfolk should work G3UJS if they have not already done so, and he will QSL 100 per cent by way of the bureau. The same applies to anyone who wants a card for a contact already made.

After a period of relative inactivity due to work pressures, G3SED is back on the band from Portsmouth. GW8CW was raised, but Mike understands that although many stations called him, Jan had considerable difficulty with the QRN, and just did not hear many of the callers. During the month of December, Mike prognosticates activity from 5Z4, VQ9 and EP2, and so will be about on the band, but in the New Year he intends to give the other allocations a whirl.

G3TNO (Horsham) used a home-built transmitter based on the 2DAF design, albeit with many modifications, and also a home-spun receiver to operate all bands from 160 to two metres. As far as the 1·8 mc activities are concerned, the aerial is the weak link, being a much-bent halfwave at a maximum height of 35 feet; it has produced OK, PA, DL, and ZB2BC whose card arrived *via* Bureau after Malcolm had mentally written him off as a pirate because the incoming signal was so strong.

Mike of G3VYF (N. London) bewails his "contact" with the supposed "VP8JD" which we discussed in this column last time; after replaying to himself the tape he made of the signal, G3VYF has to remark that it had all the right attributes of a DX signal, even if it was a phoney—but of course it may indeed have come from DX somewhere or other.

More news of piracy, this time from G2HKU, who remarks on a character heard at 339 working OE2JG, and giving callsign as ZL1AJU, name Brian, and QTH Auckland, on 1824 kc. This one has to be dud for various reasons—in the first place the North Island ZL's have 1875-2000 kc as their allocation, secondly the real owner of the call lives over 40 miles from Auckland—so be warned! Ted has been activating the Isle of Sheppey pretty hard to judge by his list of QSO's, out of which we must mention a rather comic one: Seems GI3NPP was hooked for Tyrone, but lost after exchanging reports; fifteen minutes later Ted was telling the sad story to GI3OQR, who came back with "Yes, Ron is my brother and sitting here with me—we share the same shack!"

The delights of the new transmitter have been somewhat curtailed for G3VWC (Bishops Stortford) partly through the need for revision and preparation for examinations, and partly because of time spent assisting with a local production of "Tom Jones"; three more counties were booked in, though, in G3NTI (Cheshire), G4LV for Northumberland and G3EKW, Notts.

Studies for A-level have also restricted things for GW3VPL (Porthcawl), who also mentions a rise of three counties; however, Steve has hopes that the pressure will be a little easier after Christmas and hence the score will rise.

A third one to suffer a lack of activity from the home station is G3WIT (Newport, I.o.W.) who spent more of his time contest-operating with the local group and also has a nice shiny new job on the go. He was at home for the recent 1·8 mc Contest, and heard lots of

Hector Cole, G3OHK, 25 Causeway Road, Seaton, Workington, Cumberland, runs a home-built SSB Tx (left), with a kit-constructed K.W. Victor (extreme right) and has a variety of auxiliary items, including gear for two metres. The HF-band aerial is a 135ft. wire. The receiver at centre is also a home-built job for all-band coverage.

the Northern stations on just before the " off "—alas, the most Northerly station worked was G3RPJ in Warwickshire.

ZB2AP came back to a CQ from G3TLX (Edgware), which must have shaken Ron to the core. However, he recovered from the shock enough to book in OF2KH, OK/OL's, DL/DJ's, and a PAØ.

Contact with 6W8CW was missed by G3UBW, who is now at Cambridge, although we gather that his operating is done from home when he is on vacation—and so a wrong date meant that he went home on the wrong weekend. Meantime, thoughts are being turned to the key to all DX success on Top Band, namely improvements to the earthing system.

Since last writing, G2DC (Ringwood) has been sniffing around Top Band as well as his more usual stamping-grounds higher in the spectrum. Jack is firmly convinced that most of the *élite* on the band must either live on the tops of mountains or have dud PA meters, judging by the way in which juicy bits of DX pop up, work these chaps, and then disappear. During the period under review, with a genuine 10 watts and no mountain in sight, G2DC traded reports with thirteen countries.

G3PQF (Farnborough) is another call not often heard among the Top Band lists, but Dave tuned up forty-metre vertical with another leading coil which made it resonate on the band, and proceeded to work GM3SVK, GI6TK, and DJ4SS for his first contact with the Continent on 160 metres—all this using SSB.

A new reporter is GI3WSS (Holywood, Co. Down) who had been a medium-wave BC/DX addict for years before deciding to join the technical class locally and ending up by passing the R.A.E. and getting on the air. Cyril started off on Top Band, and his second QSO was GM3SVK, which must have pleased him no end. Eight watts to a bent hundred-footer wound into the garden has so far secured contacts with 56 counties and 7 countries—of which only three are GI, and one of those not regularly operational on Top Band. What it boils down to is that just about every QSO that Cyril has is at DX.

Eighty Metres

Quite a crop of reports this time on the band; the first on the heap being that from G3VMW, who ran his standby rig at 60 watts to a 6146. This raised 5A1TP, 4X4CA, VE1ART on Prince Edward Island, W8GKX, K1LHK and an assortment of EU's.

The Royal Naval Amateur Radio Society wish it to be known that their code-practice runs, curtailed since 1965, are back in operation again; the first Tuesday in each month, and a start being made at 2000z on 3520 kc. Speeds will be 15, 20, 25, 30, and 35 w.p.m. and 100 per cent copy is required to qualify for one of the certificates they issue. Entries, with five three-penny stamps, should go to: QRQ Manager, RNARS, 27 Oxted Rise, Oadby, Leicestershire.

Talking about CW, G3TNO has an axe to grind. Malcolm is firmly of the opinion that *every* operator should be able to take the stuff down at 12's at least. The G3TNO aerial for 3·5 mc is the " 5RV " type which had to be wangled over the top of the house carefully to get the length in; it has paid off with W, VE, all the usual EU calls and some of the rarer varieties of U-derivation.

Conditions on the LF bands have shown an improvement in the last month, and have helped G3TLX to work all W call areas apart from the sixes and sevens, VE, VO, CT, I, EA, ZL's and PY's, UL7GW, UA9's assorted, 5A1TP, UD6DF and CX8CZ. Point taken!

G3PQF has been playing around with " one of the old faithfuls " in the G3KFE thing on aerials, and finds it gets the current node up in the air OK, but it is not as good as the loaded vertical—oh well! On the other hand, G2DC has been driving his existing skywire to no mean effect during the few hours he spent on 80 metres, the reward being 31 countries in six Zones.

Forty-Metre News

Still with G2DC, we find that Jack has been running a sked with VQ9JW, which had not, at the time of writing, succeeded, although the G2DC signals had been heard. Up to around midnight 40m. seemed pretty hopeless, but through the night, after the rude noises have retired, all continents were workable. The best of the crop were EA8BF, EP2BK, KZ5TW, PY5BLR, PY7VON, TA2BK, UF6QB, UI8AI, VK7SM, W6HJT, W6IBD and ZL4IE.

The band still has great potential in the view of G3UJS, who has allowed it to monopolise his time, although Dave does not say in detail exactly what he found; however, your scribe would agree

TOP BAND LADDER

(G3U-- and G3V-- stations only)

Starting date, January 1, 1966

Station	Counties	Countries
G3UTS	96	15
G3VMW	95	19
G3UBW	94	18
G3VGR	94	16
GM3UVL	93	13
G3VYF	83	17
G3VLT	80	16
GW3VPL	78	16
G3UXP	74	11
G3VMQ	73	15
G3UGF	71	11
G3VMK	70	11
G3UVT	68	12
GW3UUZ	66	15
G3VES	63	16
G3VOK	61	15
G3UJS	51	12
G3USE	51	12
G3VSL	51	9
G3VLX	50	8
G3VTY	49	9
G3UGK	43	13
G3UMK	39	7
G3UCS	36	?
G3VWC	34	7
G3VSI	19	4

that even during the evening period it is far from impossible to find a way through the crannies to the DX. On one evening the G3KFE receiver lighted upon a 4Z4 and a KP4, the former weakish but the latter a good signal, calling CQ—and little or no interest being shown in either of them.

G3TLX is the only other correspondent to make serious mention of 40 metres, and he winkled out all W call areas, VE's, VE5VD, VE7BQF, KL7PI, LX, TF5TP, KP4UW, 9H1's, UM8BA, UL7, UI8, CX3BH, VK's and ZL's, ZB2, ZD3G, FP8DJ, HK4EX, PY 'LU, 4S7FJ, YV5BPJ, TA2BK and OX3ZO. In the intervals he " cleaned up " on the other bands and built a Heathkit DX-40U transmitter!

Using the mast for the aerials at G3TNO, as he has only permission for one pole—so he has devised a rapid system whereby, when he wants to change bands, he changes aerials over in about ten minutes; also he uses the stick as a GP aerial, in addition to the dipole, with the aid of pre-tuned ATU's for each, which also makes for speed. The ground-plane has not been properly tried out over a period as yet, but so far every evening session when it has been used has yielded at least one U.S. contact. One of the droppable aerials, as has already been mentioned elsewhere, is a " 5RV," and Malcolm finds this inferior to the dipole, the latter yielding much better reports.

Station of G3GIQ, Henry Lewis, of 271 Popes Lane, Ealing, London, W.5, features a KW-2000A, with a Heathkit SB-200 linear amplifier and SB-610 'scope, as well as an AR88D as second receiver. Outside is a Mosley TA-33Jr. (traps of which are thought to have burnt out !) and though the main activity has therefore been confined to 10 metres, normally all HF/DX bands are worked, and Henry is also active on two metres. His first station description appeared in " Short Wave Magazine " eleven years ago (December '56)—but since then there have been many changes.

The HF Bands

For this time, with winter conditions well and truly upon us—and not just in the Amateur Radio context—it may be interesting to lump together the reports on the three HF bands and see how folk compare them.

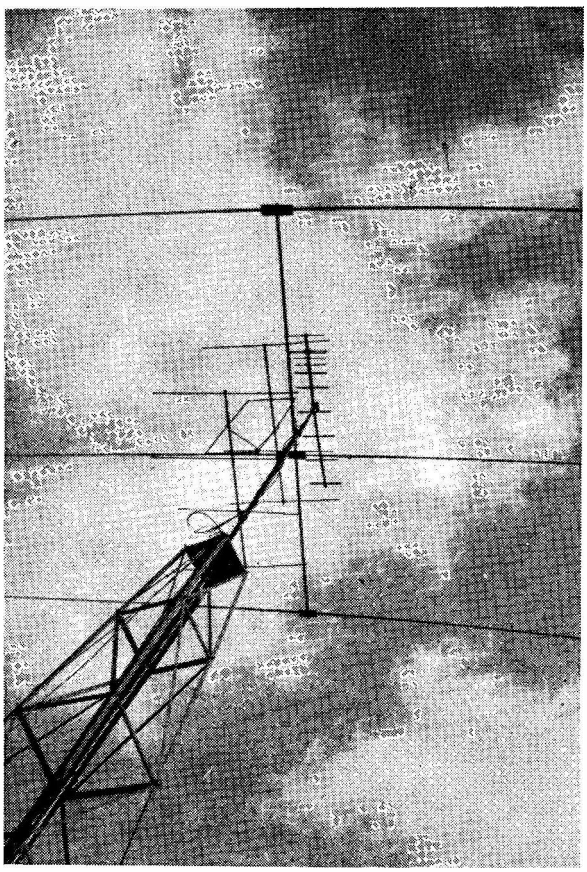
Taking the letter from G2DC first, Jack seems to have been fairly active on all three; in terms of countries and Zones, Twenty has yielded 52/19, Fifteen 40/17, and Ten 67/32. On Twenty, good all-round DX under the QRM and the intruders, with the morning period probably the best, with CE2DI, PJ3CC, VQ9JW, KZ5TW and TA1AV outstanding. The 21 mc band has been doing it's stuff from around 0700 until 2000, with annoying fluctuations in the MUF at about the latter time, causing a station to disappear, and then suddenly return at good strength. On both these bands the JA's have been numerous during the morning period, so that DX is buried under them, but at least, as Jack says, they are possessed of good clean signals and do not smear the whole band. Turning to Ten, G2DC found it opening as early as 0700 to the South, with the West coming in around 1100, so that by noon it is possible to work all continents. CE3ZK, CX8CZ, ET3FMA, HP1IE, HP1HXG, OA4PF, PJ3CC, PZ1AH, several VK6's, VK8UG, VQ9JW and ZD8J add up to a good month at the CW ends of the bands.

G8DI (Liverpool) details the nature of the QRM from which he suffers—School rebuilding, rehearsals for a nativity play, and carol concerts!—which resulted in only two contacts of note. VP8JD(S. Orkney) was followed by a QSL direct from G2RF, which enabled Bert to apply for a " squiggle " certificate which he has wanted to achieve for a long time; pity he was so excited your old scribe cannot decipher the squiggle! The other one, also found on 14 mc, was HZ1AB.

Apart from the Top Band activity discussed elsewhere, G3WIT preferred Ten and Fifteen, partly due to the loan to him of an AR88D. CW/SSB was used for a contact with VE3IT, who gave him 579 for his first VE on Ten, this one lasting for half-an-hour or more till the band started to fold up. Another one on Ten was LZ1CW, also for a new country, at 599 both ways. Fifteen also stumped up with a new country in the guise of EA7MG who came back to a CQ.

The Sphinx on the operating table and the sphinx behind the controls at G3VWC seem to be settling down happily together, and in the very limited time at their joint disposal another new one has been collected in the form of ZB2AP.

G2HKU worked only VK7RX and his regular sked with ZL2KP on Twenty SSB, but heard in addition KG6AAY, OA4UZ KC4USD, and WA6YMT/MM bound for



Paul Smith, recently licensed as G3WPB at 76 Southfield Road, Hinckley, Leicestershire, has a very fine composite aerial array. Operation is on all bands 10 to 160 metres, as well as on VHF, and the lower assembly seen here is a 3-ele Yagi for 15 metres.

Christchurch and then on to Mc-Murdo Sound, where he is to remain as KC4USG. CW on Twenty—listening only—gave F8TT/FC, VP8JG, XE1WS, FB8YY, PY7AHO, PY2DEH, YJ8BW (the latter being G3JWW, QSL *via* W4NJF). Turning to the CW end of 21 mc, Ted heard UJ8AH, UL7KAA, ET3FMA, PY7NJ, JA6ELV, JA2JGC and EA8FJ.

Part of a note from ZB2BG mentions the activities in Gibraltar at the time of writing; the R.A.F. boys are still at it, mainly on Fifteen and Twenty. ZB2W is in the throes of building a Tx for Twenty Phone only, with an SSB rig for the same band to follow; as he is located at the Europa lighthouse he gets out quite well. ZB2BG himself is nicely shielded by about 600 feet of Rock to the Eastwards and surrounded by high flats to boot, so that he can only expect his dipole on the roof to stump up in the Westward direction and has to take pot luck elsewhere. Also connected with Gib., although not there at the time of writing, G3RFH writes in to say that all the cards for his ZB2BA doings have now been sent. Ken has occupied the time during his two-year tour on his present ship by building a receiver, and a wobbulator with which to align it, so that now he is angling for a chance to get into one of the ship's receivers with the wobbulator "just for a practice!"

After a three month's trial of his new QTH in a stone cottage 300 years old, set in a valley with 500-foot hills all around, G5CP (Ashover) finds his signals are really getting out to some effect. A dual-band 10/15 metre Quad two-element beam and a doublet of 300-ohm ribbon have been put up, and so far VK/ZL, most W districts, KL and ZS have all been worked, together with UV3BC/MM in the Antarctic—Twenty CW—and DI2LE/MM on his forty-foot catamaran *World Cat* by the same method.

Snapshooting is the best description of the tactics of G3VDL (Chalfont St. Giles) during the last month, due to a shortage of time and heavy commitments. These short, snappy sessions resulted in QSO's—all on CW with 60 watts to dipoles—with YV, JA, TF2WKS, and KZ5TW on 14 mc. Then 21 mc yielded OY6FRA, VK, PJ3CC, 4L3A(?), IS1, 5Z4KX, ET3FMA, HZ1AB, 5R8BA and 9G1HM, while the ten-metre stints gave SVØWEE, KZ5GN, 4L3A, PJ3CC, ZS, 5R8BA, 9J2, 7Q7LZ, TJ1QQ and TA1AB. Since OY, PJ3, 5R8, and TJ1 were all new ones to give a lift to the score, it was quite effective shooting!

It seems quite strange to be compiling a column without the aid of a etter from GM3SVK, who by the time this is in print, will once more be just plain G3SVK—but our Far North still has a representative in the shape of GM3JDR (Golspie) who once again stuck to 14 and 21 mc, mainly the latter. Twenty CW accounted for PJ3CC, TY2KG, YV5BUA, 9H1AG and 9J2MX. On Fifteen, both CW and SSB were brought to bear, the former producing contacts with EA8, EL2D, ET3FMA, JAØAUF, KP4, PJ3CC, PY7ABY, TA's, TGØAA, TY2KG, assorted rarer U-varieties, VK/ZL, 4L3A, 5R8BA, 5H3KJ, 5V1KG and 6W8DW, while the talking-type stuff gave F9UC/FC, HP1AD, lots of JA's, MP4BBA, UA9KDL, UAØSK and ZC4AK. This, mark you in a month when the man complains that the band is closed for him by 1700! Whatever would he do if the band were open through

the 24 hours?

Enfield College of Technology have well and truly fired up G3VZN, and G3LAS, who is the chief driver, finds it all very exciting after those boring VHF bands where he has been holidaying these ten years past. However, the DX touch has not entirely deserted him, and on 14 mc HL9KR, KL7AHB, KR6CR, PZ1CE, TF2WKT, VE8ML and VE8RCS (both on Ellesmere Island) UAØNM, 3C1ASJ, together with hordes of VK's and ZL's, gave them a good start. On 21 mc, a gotaway was TJ1AR, but contacts were completed with CR4, DU1FH, KG6's, KV4, KZ5, VS6DO, VU2DKZ, YA1DAN, ZD7KH, 9G1FL, VK/ZL and all W call areas. As for 28 mc, the openings at times when G3VZN was on were mostly to Africa and U.S.A., so the log highlights the following: CE6EZ, CR6, EL8J, KV4, VE, VP2VM, XE's, ZD7DI, ZP5JB, 7Q7LZ, VK's, ZL's and all W call areas including K7ZFX/M in the streets of Phoenix, Arizona. An interesting contact was one with GB5QM/MM, the *Queen Mary*, the first indeed that has come to the notice of either this column or that of the SWL's, this occurring when she was west of Mexico.

Among the one-band merchants is G3SML (Earl Shilton) who spent his time on 21 mc. Roy mentions a round dozen VK/ZL contacts, plus KØILI/P/KG6, VU2DKZ, JA's by the canful, 5H3KJ and 9N1MM. Roy reckons that one of the most consistent signals is ZL2ANF, who he works regularly on a sked contact. As for the strongest signal, this prize goes to ZL2BE, who is probably firing at U.K. with one of his rhombics.

G3TLX with his DX-40U is now active on the HF bands. All W call areas, VE, YV, PY, LU, JA, and VK/ZL were worked on 14 mc, while a burst on 21 mc brought back CM1AR, and an assortment of W and VE signals, nothing being done as yet on Ten.

G3TNO has TVI severely on 14/21 mc, as he is in a Ch.1 super-fringe area, although by running QRP and paying extreme care to matching and feeder balancing it is possible to get on Twenty; as for Ten, Malcolm has had the idea of using a "ZL Special" firing at right-angles to the two-metre beam supported on the structure of the Skybeam. By making the ZL Special a bit "inverted-Vee-ish" it fits nicely across the ten-element VHF array.

Reporting the HF Bands

The Tabular Matter

This is the time of year when we make the changes to bring things up to date. Next month will be the first time out for G3V-- and G3W-- calls to go into competition, and for the G3U-- calls to drop out of this particular table. Thus this month is the last time for the Table to be shown in its present form. The other Top Band ladder will remain as at present, for the time being, anyway.

Turning to the HF Bands, the "New Cycle" Five-Bander will be replaced by a similar, but "All-time Post-War," one, the order of precedence being varied from month to month against a score on a specified band, or total countries worked. As far as the Zones Table is concerned, it is proposed to run a ladder showing total number of prefixes worked and number of Zones scored, starting from January 1, 1968, over all *six* HF bands. Just total up the prefixes for all bands—each one counting only once, of course (no matter how many bands it is worked on) and do the same with the Zones, so that your entry next month would just read, for instance, "G3ZZZ 100 prefixes, 10 Zones" and keep it topped up each month. This one will be of additional interest to the readers of the "SWL" feature in that they will be able to check the rate of working 'em against their rate of hearing, as shown in their own HPX Table.

Here and There

By way of G3SRZ, we are advised that the address for QSL cards for KG6FAE or WAØKKR/KG6 is either: CMR Box 53, APO San Francisco, California, 96334, U.S.A., *or* D. L. Haasager, RFD No. 3, Beresford, South Dakota, 57004, U.S.A.

G3PLQ/MM writes in to quote his new address, which will appear in due course in the "New QTH" column; here it is of interest to notice that G3PLQ/MM has now been allocated to John personally, rather than to the combination o John-plus-ship, which was the earlier procedure. This means that G3PLQ /MM does not have to go through the whole rigmarole each time he has a change of ship, providing the GPO inspector passes the station each time a change of ship occurs.

Still on the tack of addresses, but in a slightly different context, we hear from GI6TK that all claims for the W.A.G.I. award should be forwarded to Frank Robb, GI6TK, 125 Downshire Road, Holywood, Co. Down, Northern Ireland.

Reverting back to that preamble last month, when the question of shack heating was touched upon, G3VLX takes up the whole question on the argument that turning the heat off when the place is not in use lets the condensation bug loose in the place; but, although this is a fair comment, what your scribe was driving at when he mentioned G3JLA's method was merely the preservation of the gear itself. Deryck attacks things—probably better—by lining his shack with a layer, 1½ inches thick, of expanded polystyrene, insulating it to such a degree that a mere 100 watts left permanently on would be sufficient to keep the temperature as high as 50°F. It will be interesting indeed to see how the G3VLX plot, which should be working by the time this is in print, makes out.

G3MOJ, G8AFH, and G3VPS betook themselves to the Welsh Mountains for the *CQ WW* Contest (*Brrr!*), and had a whale of a time.

We understand from G3VPS that all three survived the weather, but on his return he was so cold that he forgot to tell us how they got on!

All being well, March 1968, should see G3RFH posted from his present ship, which at the moment is in a far sunnier clime than the U.K., and he hopes that his new location will not be too far from Sunny Somerset so that he will be able to fire up the Viceroy (and let the local TV owners know he is back!).

G3WET (Sutton Coldfield), the chap who, not so long ago, worked W2DRY, recently had successive QSO's with HBØLL and HV3SJ at 59's. The point of interest here is in the fact that these two prefixes muster a total of—we believe—four amateurs, and, more to the point possibly, they were worked, using the KW2000A, on a trap dipole just nine feet in the air. As a result, G3WET is now thinking of coiling up the 8KW aerial and burying it. However, in order to work the same sort of DX, it would seem likely he would have to go over to CW!

"... Tonight we are going to hear what conditions are like in VP8 ..."

The Late Mail

Thanks to the vagaries of the mail at this time of the year, generating a bonanza for the Christmas-card printers while slowing down everything else, several letters came in too late to be embodied in the text, and so we just mention them here.

A catastrophe in the power department resulted from G3UXP (Birmingham) trying to tune for maximum smoke—he got it! However, it is to be hoped that a repair can be effected to get Ron back on by the time this is printed.

The other late bird was GM3SVK (Unst), who wrote on December 4 with a long and most interesting final report from Shetland before packing up traps and returning to the South. Anyone still lacking a card for his Shetland QSO with Fred may write direct to G3SVK, 144 Chandos Road, London, E.15. He ended up with a score of 207 All-Time from Unst, and 201 in 1967, which indicates how much the interest in Amateur Radio helped in keeping him amused during his tour in Unst. As a final note GM3SVK would wish his thanks to be passed on to all the SWL's who sent him reports, to the stations he worked and made friends with, and particularly to GM3KLA, who not only spurred him on but also helped in keeping him on the air when the gales demolished his aerial farm.

Contests—Pro and Cons

In his letter this month, G3IDG (Basingstoke) points out that while Contests may be regarded by some as a nuisance there is no doubt that, given that one has a reasonable interest in the odd new country, one can find them more easily in the contests. Allan cites the *CQ WW* affair, in which he was on for only a short period, but came out with three new prefixes, a new country and two new stations towards the fourth sticker on his "Tops Century Certificate." On the other side of the coin, Allan is surprised at the number of stations on in contests who seem always to give reports of 599—is it true, or is it just easier to send 5NN? Skimming round the band during these battles it is very noticeable that it is usually the weaker brethren who go to the trouble of sending varied reports. Certain it is that the report of "four and one" mentioned in last month's piece is more credible than 59 from a DX station, even if it is perhaps going too far in the opposite direction!

Sign-Out

And there you have the story for this month. Before we give the deadline for next time, it is for your E.P.E. to thank all the many correspondents for their support in the past twelve months, and also specially to thank all those, too many to answer individually, who have sent their Christmas and New Year Greetings. Let us hope the New Year brings more fun, more DX, and, from us, all you wish yourselves in the Coming Year.

The deadline for the next issue is first post on **Monday, January 8,** addressed "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM. Till then, 73 es bcnu.

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

MORE ABOUT THE R.A.E.—TALK ON TECHNICALITIES — COMMENTS OF GENERAL INTEREST—DX ON THE TV CHANNELS—ON CONTESTS, SLP's AND THE HPX LADDER

By Justin Cooper

THOSE first paragraphs about the R.A.E. in the last "SWL" raised the odd comment in the mail this time; and in particular from *A. P. Ashton (Stowmarket)*. Writing a farewell letter, now that he has become G3XAP—what a wonderful way to start the New Year—Phil says that it has all been hard work. The reason for it being hard work is fairly obvious —to judge from his handwriting, Phil is, as our American friends would have it, no chicken—and he has had to do the lot, both R.A.E. and Morse, unaided, which has made the call all the more valued now he has got it. As he says, it is hardly an unfair requirement to be asked to prove one's interest by passing a stipulated test. In any case, the question of fairness hardly comes into it, as the rules and regulations are laid down and one has the choice of either obeying them or not getting a ticket.

The other side of the coin comes, by implication if not directly, from *W. L. Rees (Llandudno)*, who regards himself as a non-practical type, and, indeed has been struggling unsuccessfully with the recipe for the "Justin Cooper Five-Minute ATU" for some time now, just to prove the truth of his statement—fair enough, but that does not mean, as Bill believes, that he cannot pass the R.A.E. Far from it, as a glance inside the Development Lab. where your J.C. does his daily stint will show any time that there are many ideas that come to nought for each one that is good. Indeed, in the case of an SWL who has little or no connection with the practical side, it is mainly from one's failures that theory is wedded eventually to practice.

A certain licensed amateur of the writer's aquaintance who took up Amateur Radio in his late fifties had all his life been connected with the business of bricks and mortar; after passing the R.A.E. and Morse (at no small sacrifice of midnight oil) during the following year set to work to build his first Tx. Mark One was a birdsnest to end 'em all, but with help, it was persuaded to put out a decent signal—and then, *but not before*, George set-to and made Mark Two to the same circuit, which went almost at the first puff. Mark Three was a "Princess" which was duly modified in the course of time to the SSB version; and Mark Four was the linear to end all linears, which he designed himself and built from scratch with enough confidence to order the front panel cut and engraved to his requirements. Each one has provided more wisdom, and each one has proved the wisdom of his thinking out and understanding why things went wrong and what had to be done to put them right.

The New Year's resolution that ends the sermon is quite simple: Even if you don't think you have a chance, have a go—and if you fail first time, sit back and think a bit at each stage in the next course, to see where understanding was lost the previous time—it'll be twice as much fun when you *do* get on the air!

Technical Topics

Again a hark-back to the November "SWL" in which we discussed the use of an ordinary transformer with centre-tapped secondary, say 250-0-250 volts, in conjunction with a bridge rectifier to obtain 500 volts. *P. T. A. Watson (Horley)* points out that the fact of the peak voltage between either end of the winding and frame being able to rise as high as 706 volts (or twice the value when used normally) *may* mean that the transformer insulation, on a cheap-and-cheerful specimen, could give up even though from the VA point of view the thing is able to do the job. A fair comment, and one that was not emphasised enough last month. One can go further, and point out that the peak-inverse-voltage rating of the rectifier in this application is not unimportant; the figure of 1·57 times the DC volts quoted "in the book" does not make adequate allowance for variations of mains voltage at times, and the use of a pair in series in each leg of the bridge, each rated at 800 volts p.i.v. is far from pointless, to allow for the occasional surge. All this indicates that Peter is quite a knowledgeable type—and so he is, as he is putting off taking the R.A.E. until he has made his way through his IEE exams. When he has done so, he will be that rare bird in the Electronics industry—the chap who knows how to do it in practice and why it can't work in theory! Strange how these two attributes so rarely appear in the same individual, and how much it costs the industry each year—but that is another story on which we could expound for too long!

Arising from the recent activities with the value of the pound—cash, not weight—*G. T. Theasby (Keighley)* asks why so many amateurs buy a rig of American origin when there are perfectly good equipments of British origin on the market. This is a difficult one to answer, but probably stems from

two things: In the first place, it has to be realised that there is an enormous home market for American gear, and so there is a very wide choice; and it is fair to say that most tastes can be accommodated from the range of one maker or another. The second, and probably more important point, is that there is a large minority in this country who will fall down and worship anything American, with no regard whatever for its fitness for the task in hand. Some of the U.S. " precision instruments " which repose in the Test Gear racks of the industry are delightful creations to look upon, albeit the innards are enough to make a strong man weep. Most people spending the sort of money involved in setting up a decent station certainly look at the British gear first, and the majority probably do buy U.K. products—but for some the specifications do not quite suit their needs, and so, if they are to avoid value-reducing modifications, go to a foreign maker who can meet their special requirements most closely.

On a different tack, *T. Pinch (Plymouth)* with tongue in cheek one suspects, asks whether one should let the aerial stay down when the gales fell it, rather than freeze to re-erect it during the winter. One would feel the answer here is to do a few sums and make sure the thing goes up and *stays up* whatever the weather. Trevor should talk to some of the shark-fishing types—the line they use is ideal for keeping aerials erect. And, of course, there is always the thought that there is nothing pleasanter on a warm summer's day than to shin up the tower and make everything good, the while sampling some fresh air!

Problems, problems, laments *W. C. Torode (London, W.C.1)*, who has just moved (fifty yards) into a new flat. The old place was on the fourth floor of a five-storey block, but he is now in the ground-floor of another. As a result of this, plus the presence of an adjacent ten-storey monster, there seems to be a shortage of signals into the Torode receiver. Possibly the answer to this would lie in the provision of an aerial on the top of the block, connected through siutable matching equipment to a coaxial feeder running down to the ground floor. Such a system would probably collect a lot more signal and the mere fact of it being fed through the noisy area of the block—in the RF sense—would make a difference to the signal-to-noise ratio over the performance of even a good aerial at the lower level. Wally also comments on our preamble last time and wonders why the old Artificial Aerial licence was ever discontinued—why, indeed?

Here and There

R. G. Preston (Norwich) has managed to move into an indoor shack, which has no doubt added to his enthusiasm considerably, and in addition has just acquired a KW-77 receiver. For 21 mc, a " Swiss Quad " aerial is in the brewing stage, which should be quite useful in the way of finding further prefixes on the band.

Still about receivers, we notice that *H. Symonds (Altrincham)* is keeping to the same receiver, although, since he last wrote, it has been modified to give Top Band coverage. Hugh has also made a start at compiling a CW HPX list to augment the meagre Table—good for him!

Several people mention the OF prefixes, and their origin; *H. M. Graham (Harefield)* found some, and recognised the voice of OH5SM when the station was signing OF5SM—true enough, for these OF calls were allocated to all the Finnish stations during the period to December 6, Independence Day. An oddity heard on Eighty, was a thing signing MTD54/2 calling MTD54/1 late on the evening of November 26; nothing in the way of a reply was heard and there was no conversation. Obviously some sort of non-amateur transmission, but whether due to one of the folk with whom the band is shared, or a pirate trying to sound grown-up is not known.

Another query is the UV prefix in use in Russia, and apparently this one puzzled *M. G. Toms (Ilford)*; these are all-same UA calls, so that UV3ADX for instance, is one from Moscow. Mick is a little puzzled by the fact that his HPX entry at 394 appeared in print as 393—this was due to his logging of an " impossible " call from a not very

HPX LADDER

(Starting January 1, 1960)

Qualifying Score: 200

SWL	PREFIXES
PHONE ONLY	
P. Cayless (Exeter)	1003
S. Foster (Lincoln)	914
A. W. Nielsen (Glasgow)	868
D. Rollitt (Navenby)	850
W. Felton (Lincoln)	758
P. Milloy (Doncaster)	755
J. Singleton (Hull)	755
K. Southgate (Leigh-on-Sea)	741
C. Squires (Saltash)	727
R. G. Preston (Norwich)	667
T. Pinch (Plymouth)	627
J. Dutton (Ilkeston)	616
G. Bowden (Crawley)	610
S. Swain (Hayling Island)	603
J. Fitzgerald (Gt. Missenden)	599
P. Coull (New Romsey)	581
R. T. Jackson (Leigh-on-Sea)	578
W. Moncrieff (Hampton)	547
N. Henbrey (Northiam)	543
A. G. Scott (Liverpool)	528
A. P. Ashton (Stowmarket)	519
A. Hydes (Enfield)	515
E. Parker (Hove)	502
J. P. Scragg (Stockport)	489
W. L. Rees (Llandudno)	488
Mrs. M. Worbey (Dartford)	487
D. Sapsworth (East Ham)	480
A. P. Legg (Sutton)	474
G. Watson (Sheffield)	472
J. Tring (Sutton)	457
C. Claydon (Kinghorn)	453
B. Thomas (Castleford)	448
W. C. Torode (London W.C.1)	445
H. M. Graham (Harefield)	433
M. G. Toms (Ilford)	431
A. Niblock (Alsager)	430
M. A. Lount (Leicester)	427
R. Sexton (Gt. Missenden)	406
R. Allisett (Guernsey)	406
K. Plumridge (Eastleigh)	400
R. A. Gape (Leigh-on-Sea)	375
J. Edwards (London. S.E.20)	373
S. Cusworth (Wakefield)	367
D. Holbrook (I.o.W.)	352
A. Pyne (Budleigh Salterton)	349
D. Henry (N. Berwick)	346
D. L. Hill (Edinburgh)	344
D. Boniface (Ripon)	343
N. Flatman (Ipswich)	336
M. Broadway (Selby)	336
R. Glaister (Haywards Heath)	336
I. Cooper (Alnwick)	324
J. M. Dunnett (Singapore)	319
R. Hannis (Chester)	309
I. Poole (Leeds)	300
C. P. Davis (Leicester)	298
D. Henbrey (Northiam)	294
M. L. Jones (Leamington Spa)	293
K. Jeeves (Huddersfield)	291
I. Paterson (Carstairs)	285
H. H. Symonds (Manchester)	278
R. Geary (Leicester)	271
D. Richards (Welwyn Garden City)	271
M. Watson (Williton)	267
T. J. Bucknell (St. Albans)	263
S. M. Phillips (Dukinfield)	262
I. A. Lucking (Stanmore)	259
B. W. Lowe (Worsley)	245
J. Carter (Balham)	243
G. T. Theasby (Keighley)	242
C. J. Carrol (Sittingbourne)	239
J. A. Ennis (Saltash)	232
A. Long (Coventry)	225
H. N. Plumridge (Eastleigh)	225
L. Phillips (Inverness)	224
D. Stuart (Caistor)	220
P. Spindler (Ilford)	207
P. C. Swann (Glossop)	204
CW ONLY	
C. Claydon (Kinghorn)	492
A. F. Hunt (RAF Lossiemouth)	453
P. Cayless (Exeter)	425
J. M. Dunnett (Singapore)	424
C. Harrington (Maidenhead)	380

(NOTE: *Listings only include recent claims. Failure to report for two consecutive issues of " SWL " will entail removal from the Table. Next list, March issue, for which the deadline will be January 19.*)

Gordon Allis, of 117 Chessington Road, West Ewell, Surrey, is by calling a TV service engineer. He has been interested in Amateur Radio for the last three years, during which he has steadily built up a very nice Rx station. He now has an AR88D, a Geloso 209R and various home-built items. His antennae consist of a multi-band vertical dipole and a Quad. With a Countries score of 227 in 39 Zones confirmed, Gordon is now setting about getting his ticket.

unusual area—rather like logging a G9, in fact!

Since his last entry, *J. Edwards (Penge)* has managed to acquire an SX-24 receiver. This one was one of the line of communications receivers made by Hallicrafters in prewar years which culminated in the SX-28. The "X" in the model number indicated the presence of a crystal gate, Reader Edwards is also compiling a list for the CW table, which he hopes to enter next time out.

D. Sapsworth (East Ham) is quite elated at having found all forty Zones, the last one to be booked in being in the form of a VS6 in Hong Kong. This, and 24 other prefixes added to his total, mainly arose from the activity on 28 mc.

HPX is having to take a back seat at the QTH of *I. Cooper (Alnwick)* who is dividing his time between examination studies and R.A.E. with a little Morse thrown in.

GB5QM/MM has been somewhat elusive, to say the least; in fact at the time of writing no hard news of either hearings or contacts have come to hand, in spite of band openings in the desired directions. *D. Rollitt (Navenby)* has been trying hard in other directions, and the TA33 beam has helped in these also, the prefix total taking a large upward leap by 54 to 850.

First entry for the HPX table from *R. Geary (Leicester)* who uses a R.1475 receiver with sundry outboard bits, to a long-wire fed through a 19 Set variometer; however, he is handicapped by the presence nearby of a mains sub-station, which generates a fair amount of noise. SWL Geary queries the status of 4L7A, which was a special callsign from Russia; 4M5A (on for their contest from YV-land), and finally a "5K4RCA," which your conductor suspects to be a misreading of something else.

TV/DX News

On this front, we have a long letter from *F. Smales (Pontefract)* who while laid up has been putting some good work in on the test cards, particularly during that admirable opening over the middle of November. UHF was "forthcoming" on November 18, which started off with a *colour* test-card from Lille and for the next five hours several French and Dutch stations were solid copy. After going with Bruce Thomas to Ripon, where they met Denis Boniface, Frank came home and was able to resolve Tele-Luxembourg on 819 lines, always a difficult one due to QRM from the 625-line transmission from Markelo on the same E7 channel. Frank seems to be home-bound for quite a spell yet, and is planning to use the time to get his Bush TV receivers up to scratch, and also to modify one of them to give a complete 625 vision-*plus*-FM sound strip with tuners switched for all bands. Incidentally, on that evening of November 18, Frank logged signals from no less than nineteen different stations (other than the local channels) all but five being UHF outlets.

Bruce Thomas (Castleford), in addition to meeting Frank and Dennis, has been pushing away at the HPX, although at a slower rate than previously, due to the interfering influences of work and TV/DX; his total has gone up to sixteen countries seen on TV channels, and it is hoped to put it higher still when a new mast goes up *chez* Thomas in a few months' time.

A good reason for being off the air for anyone is being Hon. Sec. of a Club—this fate has befallen *J. A. Ennis (Saltash),* who is probably finding the seat hotter even that his worst fears. Your old scribe *knows*—he's had some!

Quite a long band report from *D. Henry (North*

Berwick) who has recently had the pleasure of obtaining a CR-70A receiver. This has been used to some effect on most of the bands; Eighty has produced W's in the morning and VS6 in the late evening, the latter being the cause of the first pile-up SWL Henry has heard on 80m. For the rest, Ten has been good during the daylight hours, the mornings particularly, with Fifteen in a similar state. Twenty, as is to be expected this time of year, has been pretty dead in the evening hours, except for the odd opening to PY and occasional ZS's, CR6 and so on.

An echo to that discussion about gear and the operators behind it comes from *M. Watson (Williton, Som.),* who recently had the use of a NCX-5 and TA33 beam on which to listen. In spite of what Malcolm describes as "this fantastic piece of equipment" he was bitterly disappointed at the poor total he was able to show. However, as he so rightly says, this proves the point that it is the operator that matters, and he himself has gained a lot of know-how in the process. As a side-issue, Malcolm has a few things to say about small—seventy-five milliwatt—transistor transmitters on Top Band, which he claims to have a range of a few yards. Seems only a few weeks ago that various people were reporting 589 signals from OL4AFI all over the U.K. when Jarda was running a similar power level on the same band—and it's not so many years since your aged J.C. had ears capable of making a one-watt WAC on Forty, admittedly as a result of more than a little burning of the candle at both ends *and* the middle!

John Dutton (Ilkeston) has been spending less time at the controls of his receiver due to the needs of his A-Level syllabus, although quite a few of the missing "uncommon EU" type of prefixes have been winkled out to swell the total.

A good way of gaining new prefixes, or countries for that matter, is to come on during the Contests. *E. Parker (Hove)* did just that, and by sitting through the entire 36 hours of the recent 21/28 mc event profited handsomely. Ernie took his part in the 7 mc shindig as well, and contrasts the behaviour of the U.S. amateurs in the 21/28 mc band queueing up to give the boys a point, while the G's on Forty were most reluctant to swap numbers, so that the going became very heavy, and things seemed virtually wrapped-up three or four hours before the end for lack of stations to work. This is one of the interesting things about the 40m. band, and it seems that those who are quite content to work the same round of EU stations stay on Forty and almost resent the presence of DX. A few evenings ago, J.C. tucked his beard inside his jacket, put on the cans, and listened round the band, about 2130z, and was amazed to find KG6 at 579 and a 559 signal from 4Z4 calling CQ and finding no takers—both as near in the clear as they could ever be on Forty, and certainly 100 per cent readable CW signals on his Eddystone 888. Eventually both got a contact, but nothing remotely like a string of them resulted.

The PCR-3 receiver used by H. N. Plumridge *(Bishopstoke)* has now been fitted with a BFO, and so can resolve SSB signals, although we gather it can only be done on 14 mc and then with difficulty. It rather sounds as though the BFO is not being set correctly, as stations below 10 mc use lower sideband and those above 10 mc—such as Twenty, for instance—use the *upper* sideband. K. Plumridge writes from the same address to say that he has added another thirty feet to the aerial and feels it is giving a slight improvement.

K. Jeeves (Huddersfield) had his finger crossed at the time he wrote his letter—uncomfortable?—as he was waiting the result of the December R.A.E. On the question of QSL returns, Keith says that he sends a good report, encloses an IRC, and covers it by a clearly-typed letter on headed notepaper—and has a return to date of around 75%.

Nice to hear again from *B. Macklin,* who is now in digs at *Farnborough,* and spending most of his spare time studying. The old CR-100 has been pensioned off and Barry has only his transistor set to play with—but an HA-500 is "in the pipeline" and will soon be set to useful work with the CW, which is now the only obstacle to a licence, R.A.E. having been passed last May.

Controversial?

From *D. Whitaker (Harrogate)* comes a plea that we should run a new HPX Table starting from January 1st, and also an SWL contest. Taking the first point, one feels this is somewhat unfair to the present leaders, who, if they took part in any such a ladder, would almost certainly go straight to the top again, but at a lower score. As for the second, while SWL contests are mildly popular, the logs are far from being self-checking—as the transmitting events are automatically, to a great degree, in that the contestants mainly work each other. Thus it means not only that an SWL contest needs quite a lot of organising, but also a fair number of invigilators on the band if any sort of fair check is to be made on logs sent in. No, the Set Listening Period is far more attractive—and we must see about another one!

Another graduate from the SWL ranks is *A. P. Legg (Sutton, Surrey),* who now has G8BCS, and operates the Club station G3UCL on occasions; we rather gather that progress is being made in the general direction of a G3-plus-3 call. Meanwhile, Anthony has a SR-600 on the HF bands and an Eddystone EC-10 for the lower ones, which have netted him an HPX total so far of 474.

Up 50 in the Table is *M. A. Lount (Leicester),* who, apart from having various troubles with the receiver, which were fairly easily cured, has been under the weather himself, and so has had to type rather than write his letter, and that with one hand—we can imagine the language!

In spite of pressure of work, *S. Foster (Lincoln)* found time for the odd hour or two on the bands, and as a result Stewart manages to rise a little further in the lists, with a new total of 914. *Stuart Swain (Hayling Island)* refers to the 5LA2 and 5LA8 prefixes, and points out that they were Liberian

Field Day stations—a fact that your scribe knew but completely failed to remember. *Mea culpa!*

Last time out the score in the Table was not up-to-date—but after all, if you don't send it in, we cannot claim any reliable results by telepathy! Seriously, though, the complaint of *A. Hydes (Enfield)* resulted from the non-enclosure of his list, as a glance at the file here showed! The majority of "misses" are, in fact, *because they miss the deadline*—but the Editor expects to have this piece ready for getting into the *Magazine* on time. What it all boils down to is that your J.C. has just one week, less postal delays each way, to write the script if we are to come out on time—and SHORT WAVE MAGAZINE is *never* late out of our hands. Getting back to Alan, he mentions that he has tacked a Codar PR-30X preselector on the front of his receiver, to the good of his score. However, it should always be borne in mind that the extra gain may result in increased cross-modulation, and so more care is needed in keeping the "front-end" gain as low as can be.

A 19 Set was recently acquired by *I. Poole (Leeds)* which came in handy when the rectifier in the converter went west—he was able to take the one out of the CR-45 and get back on the air by using the converter ahead of the 19 Set. Improvements have been made in the shack, and some early morning listening tried on Eighty, which yielded W's and ZL's at good strength.

Quite a large rise in the score is recorded by *J. P. Scragg (Stockport)*, who nevertheless failed to make his target of 500-up, because the receiver decided to go on the blink, at an inopportune moment. However, it is well said that it is better to travel hopefully than to arrive, and no doubt the next entry will turn the trick.

While cutting wood *J. Singleton (Hull)* managed to investigate the sharp part of the saw too closely; the piece has been stuck back on, and John hopes to see it again by the time this gets into print, although it may take longer before he has it as new! Very nasty. John has a few pertinent comments on the question of passing the R.A.E., and feels that a lot of the protestations are the result of an attempt to save face at the Club—or with one's self—rather than admit one was not adequately prepared! A good point, this.

Using an RA-1 built by father GC3WDX, *R. Allisett (Guernsey)* has been putting in about 24 hours listening each week; the combination of ability to listen to the HF bands with time spent has resulted in a thumping rise in Dick's score, from 226 to 406 in a couple of weeks.

A newcomer to this piece is *P. L. Spindler (Ilford)*, who is of but 13½ years and seems to have been severely bitten by this Amateur Radio business. Paul is able to put in a first entry in the Table, thanks to a spot of hard listening on the SR-150 to make the last few up. In addition, he is up to the point of 10 w.p.m. on CW, and pressing on to try to get over the hump.

Where have all the GM SWL's gone, wonders *D. Douglas (Dundee)*, who now has broken the "150 countries confirmed" barrier. David has a gripe about a number of amateur stations who receive cards direct, including IRC's or return postage, but neither stump up with the card nor even a reply stating it is not the policy to QSL (using the postage sent).

That comment by G3WUD about "not being an SWL any longer" was bound to make someone rise to the bait—and it is none other than Allan, G3IDG, who points out that the licensed type is *more* of an SWL *than* the SWL, in that most HPX hunters tend to identify the call and then pass on to pastures new, while the transmitting amateur in QSO has to get the whole contact from end to end. This being so, the licensed listener will always tend to be more careful in his scanning of the band, so as to sort out for himself the stations calling in whom he is interested — whether for DX value, quality of their fist, signal strength or whatever.

C. P. Davis (Leicester) has dabbled in the SWL hobby for years—he built his first 0-V-1 receiver way back in 1931—but has at last decided to get down to things a bit more seriously. Pete uses a R.1475 which he has realigned and generally done up. Although a crystal-controlled converter for 21/28 mc is completed it has not seen much use yet due to interest being concentrated on Twenty. A query heard on this band is "AC5DC," claiming to be in Zone 22; although there are a couple of AC5's in the call-book this one sounds to be rather Ungood—has anyone any news?

P. D. G. Milloy is now at University, and so finds his operating time rather short, though some good openings on Ten during the year have made it all worth while. Peter is involved with the *University of Manchester ARC* and forecasts a lot of activity from them in the way of DX-peditions.

Finally, to a couple of old-timers—old friend *A. W. Nielsen (Glasgow)* has been with "SWL" almost from the first and has been listening to the *CQ Contest* since 1959. A resumé of his loggings during this Contest over the years is most interesting, bringing out as it does the variation in the sunspot cycle and its effects on DX results. Another interesting point is that although A.W.N. does not listen much during the summer, since January 1st, 1967, he has logged 551 prefixes—which is the same total as he took thirty-three months to collect up to September of 1962. It just goes to show that it is experience that counts! *Charles Harrington (Maidenhead)* spent a lot of time on the same contest, and as a result goes up to 380 from the present QTH, all on a TV array as an aerial. To judge by his card, Charles has been at the SWL game since before the War, and is strictly a CW man, using an HQ-170A receiver.

Deadline

So there you have it. Remains only for your J.C. to wish you each and every one, what you hope for yourself in the coming Year, and to give you the deadline for the next "SWL." This is rather short—first post **January 19, 1968,** addressed to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM. Till then, 73 es DX.

An Eddystone Occasion

Presentation of EA-12 Receiver to Bruce Taylor, GM3NZI

IT will be remembered that early in the year—as announced in the April, 1967, issue of SHORT WAVE MAGAZINE—Eddystone Radio Limited offered an Open Essay Competition, under four subject headings to choice, for which the judges were to be Prof. R. Jennison, B.Sc., Ph.D., F.R.A.S., F.Inst.P.; T. P. Douglas, M.B.E. (G3BA); and H. A. Bartlett (G5QA). The point of particular interest here is that 20 years ago the then Roger Jennison, G2AJV, was himself the winner of the Eddystone Competition, his prize being an S.640—which, incidentally, he still possesses, and uses. He is now Director of the Electronics Laboratory, University of Kent, Canterbury, and accepted the firm's invitation to present this year's prize, an Eddystone EA-12, to the winner.

This turned out to be Bruce Taylor, GM3NZI, a 25-year old student at the University of Edinburgh. He chose as his essay subject a new approach to receiver design to meet the stringent requirements of international Amateur Radio as we know them today. He turned in a masterly treatise (later to be published in these pages) on the subject, his basic conception being a main chassis engineered to accept plug-in modules to meet a wide variety of amateur-band operating requirements—from HF to UHF, and in all modes—enabling the receiver always to be in step both with immediate needs and foreseeable development.

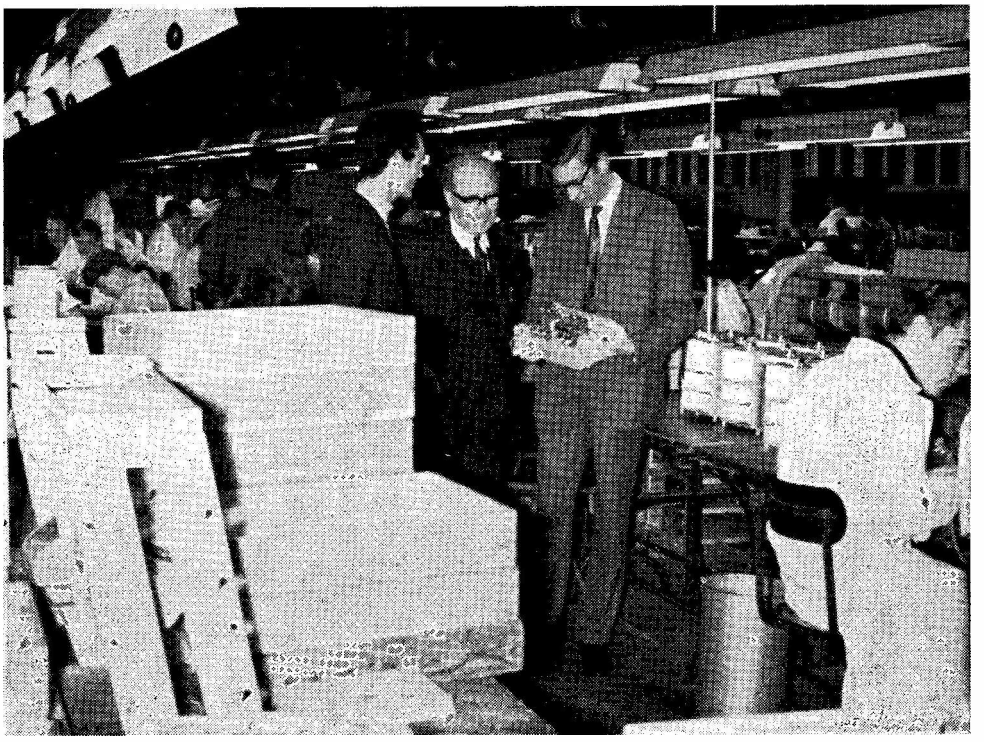
The judges agreed unanimously that of all the contributions received, this was the most useful and imaginative. Accordingly, at a very pleasant ceremony at the Hq. of Eddystone Radio Limited, on November 27 last, GM3NZI received his EA-12 (priced at £185 in the current Eddystone list) from Prof. Jennison. In addition to Eddystone senior staff, the judges and press representatives, one of those present was Austin Forsyth, O.B.E. (G6FO), Managing Editor of SHORT WAVE MAGAZINE, who had himself been one of the three competition judges when Roger Jennison was awarded the prize 20 years earlier.

In the course of the proceedings, Mr. W. Cooke, chief engineer, Eddystone Radio, discussed the EA-12—an amateur-band Rx of the highest grade—in detail, and also disclosed many of the technical features of the new Eddystone 990R solid-state VHF receiver.

Following the presentation and the hospitality of Eddystone Radio Limited—of which the managing director is Arthur Edwards, G6XJ, and himself a keen CW/DX operator—the party toured the Eddystone Radio works, to see the various production lines and manufacturing departments; the test and development rooms; and the drawing office.

From all of which not only can it be said that GM3NZI is the fortunate possessor of a very fine amateur-band Rx, but also that anyone who "buys Eddystone" invests in first-class equipment, backed by years of know-how (they started in the business about 1926), up-to-the-minute design and engineering, careful pre-sale test and efficient servicing. Had it been otherwise, Eddystone Radio Limited would not be where they are today, with up to 60 per cent of their output going for export.

The presentation, on November 27, of the EA-12 receiver to Bruce Taylor, GM3NZI (of Edinburgh University), winner of the Eddystone Essay Competition. On left, Prof. R. Jennison, with GM3NZI on the right. At centre is Arthur Edwards, G6XJ, managing director of Eddystone Radio, Ltd., and himself a confirmed CW/DX operator on the HF bands. In the foreground is the prize, an Eddystone EA-12 receiver, which is one of the more ideal types for amateur-band reception.



A general view inside the Birmingham works of Eddystone Radio Limited. Prof. Jennison is examining the chassis of one of the new Eddystone receivers, with Mr. Cooke, chief engineer of Eddystone Radio, on his immediate right. At left is GM3NZI, who was probably quite surprised to find out not only what is involved in the design, manufacture and pre-sale testing of his EA-12 (see story) but also that something like 60 per cent of Eddystone's receiver output—covering the whole range of specialised design for the marine, commercial communication, Service and amateur requirement—goes for export. The firm of Eddystone Radio, Ltd., has been in the short-wave receiver manufacturing business for the best part of 40 years.

"IT'S AN ILL WIND . . . "

To quote from a recent letter: "Whoever said it's an ill wind that blows nobody any good certainly knew what he was talking about. Having recently been laid up for four months, I was persuaded by amateur friends to learn Morse—which I did. I took and passed the Test a short time ago and am now the proud possessor of my callsign and can join the rest on the New QTH page." (*C. F. Withall, G3XBU, 8 Sumpter Pathway, Hoole, Chester.*)

"QUEEN MARY," W6PMO, LONG BEACH, CALIFORNIA

If you hear, or can work, W6PMO any time from now on, it will be the Long Beach Amateur Radio Club station aboard the ship we used to know as R.M.S. *Queen Mary*. In spite of all the ballyhoo, like many another great ship of bygone years, eventually she will rot at her moorings. Too big to keep clean and too expensive to maintain below the water-line, the mayor of Long Beach will come to wish that his municipality had never taken on the commitment. The awful thought is that ex-GB5QM/MM will be pointed out to sightseers as another of Britain's white elephants. Who wants a ship that can never again sail out under her own power.

USAFE/UK BID SALE, R.A.F. MOLESWORTH

With reference to the notes on p.569, November, and p.372, August, we are now informed by the U.S. authorities that the next bid sale for American surplus radio and electronic equipment has been fixed for Tuesday, January 16, at R.A.F. Molesworth, Huntingdon. The surplus being offered is valued at something like *three million dollars*, all subject to bid and covering a very wide range of radio-electronic apparatus. Apply for Sale Catalogue to: Sales Support Section, USAFE /UK Redistribution & Marketing Centre, R.A.F. Station, Molesworth, Huntingdon. (*Tel. Bythorn 371.*) And whatever you buy, make sure you get the handbook that should go with it.

THE OTHER MAN'S STATION G3WYS

SOME 18 months ago, members of the Silverthorn Radio Club found a 12-year old radio enthusiast awaiting their arrival on a meeting night. He was allowed to remain and, with some misgivings because of his age, was a little later admitted to full membership.

Philip Routledge (36 Oak Hill Close, Woodford Green, Essex) amply proved that the principle of "catching them young" paid dividends. Not without some opposition from the Local Authority, he was accepted into the forthcoming R.A.E. class, together with others under age, largely as an experiment. His instructor's faith was fully justified, and starting from the bottom rung of the ladder, he passed the Exam. first time. And before the R.A.E. results were out, he also took and passed the Morse Test and so had the frustrating wait until his 14th birthday.

As a concession, the Post Office allowed him his Amateur Radio certificate, thus enabling operation under supervision. At last *the* day arrived with the call G3WYS, *plus* a birthday card from the Post Office—a very nice touch!

Time spent in studying, and experience on the air, inevitably limited construction, and although a CR-100 was acquired, the transmitter was not ready. Philip's *début* on Top Band was therefore made with an A.T.5 loaned by a local amateur. His own transmitter is now well under way, and should be air-borne before long.

A refreshing feature of Philip's approach to Amateur Radio is his love of the key—all too often neglected nowadays—and 20-30 w.p.m. holds no terrors for him. The writer feels rather humble when he hears G3WYS paddling a bug with all the aplomb in the world! The station is housed in a garage, and although aerial size is limited by a small garden, a potent signal is put out.

In the photograph, the A.T.5 is shown on top of the CR-100. On the left there is a home-built HF rig, covering 10-80m., CW and 'Phone, running around 50 watts. On these bands the CR-100 and R.208, also on the bench, are linked for double conversion. Under the CR-100 can be seen the Top Band transmitter nearing completion. The associated modulator, on top of the HF-band rig, was built when Philip was 12, and worked first time when tested by a near-by amateur. The future of Amateur Radio is bright indeed when one so young makes such a promising start.

G2HR

THE TWENTY-SECOND MCC

The Magazine Top-Band Club Contest
November 11-12, 1967

WITH an actual entry of 94 logs—one more than last time—this year's MCC has demonstrated how resistant the average amateur is to change; in 1964 everyone said the new Rules were " impossible," but in 1967 only one Club even commented on them. Perhaps this was partly due to the extra effort expended this year, because of the rather poor band conditions on both sessions, which, of course, progressively increased its effects on the scoring, right down the Table.

Thus, we find the winner this year, **Burslem,** made 641 points, almost the lowest winning score since the present Rules came into force—so for them to raise their total of last year by nearly 100 points is a fine effort, on which they are to be congratulated. Runners-up **Moray Firth " A "** made 598 this year as against the 675 which took them to third place in 1966. Third slot this time goes to last year's winners, **Kirkcaldy,** who managed 530 points for 1967. At the other end of the Table, a similar trend is noticeable, the wooden spoon going to a score of 46, as against 98 in 1966.

What it all adds up to is just that the band was somewhat down as compared with last year, which is rather as one would have expected—but the 127 Clubs who played, and the non-Club stations who came on to give a point, still enjoyed themselves immensely.

It is, of course, much to be regretted that no less than 33 of the known participants failed to put in logs—some at least would have found themselves in a good position in the Final Table had they done so! But this particular phenomenon is with us every year.

MCC has always had a " training " aspect, in that many groups like the idea of using it as a means of teaching the newer members the tricks of contest working, while the experts either stand behind and criticise, or go away and demonstrate how they do things from another site. To this end, it behoves us to make sure that it is not only a pleasant entertainment but also a little more difficult than usual. And so we changed the coding system—which also made it easier to check the logs—and required the QTH of the Non-Club stations to be recorded. Seems this was a little difficult . . . G3BMY was noted as being at Craven, Craven Arms, Cradley, Chester and Crewe in various logs . . . Otley were sending, quite correctly, 0Ø1, but half the stations he worked were foxed by his code and only claimed one point for him! . . . No. 235 Squadron, ATC had 7Ø2 for a code, and *ninety per cent* of their contacts could not get it first time of trying—quite a lot required it *spelling out* to them!

Naturally, as a result of all this, most of the claimed scores have taken a beating in one direction or another, as the Table shows. Apart from one competitor near the top, everyone did their arithmetic in accordance with the rules, and the standard of presentation of some of them was a delight, although far fewer than usual were typed. One in particular (a first entry in this or any contest) by Hemel Hempstead, was a model of all it should be. There were, thank heaven, no really bad ones this year.

Gear Used

On the equipment side, the winners, *Burslem,* used a KW-2000 for transmitting, and a Drake R4A receiver, together with a half-wave dipole at 70ft. firing North/South and an end-fed half-wave at the same height covering East/West, used in conjunction with an ATU. The runner-up, *Moray Firth,* gave no details of their equipment, but the third-placed group, *Kirkcaldy,* used an Eddystone 750 and a Geloso/5763 PA into a dipole at 40ft.; their change-over system went on the blink for half-an-hour on the Saturday, which may have been enough to deny them second place. Among the rest, transceivers were prominent, along with a lot of home-brew rigs, Codar A.T.5's and a few Vespas and Cannonballs. Receiving was sometimes done on the transceivers, but quite a number of these were used in conjunction with other receivers; *Kings Norton* had a brace of Project 66 transceivers cross-coupled so that both were listening together, both were muted when transmitting, and either could be radiating. The Drake R4A already mentioned was only one of many types, from an old Hammarlund SP-200, through several varieties of HRO, AR88's, a Sommerkamp used in conjunction with a transverter, Heathkit RA-1's, BC-348, to a Racal RA-17—the latter with a Top Band preselector in front!

The invigilation of the whole affair is done each year by several experienced operators, each with blue pencil at the alert. This year there was, as always, the admirable

check log from SWL D. Law (Leicester) and also check logs from G3UKC, the University of Kent group in Canterbury, and G3REI (Reigate "A"), who were aware they had poor signal quality, particularly on the Sunday evening, and so sportingly closed down early.

By and large, the netting was pretty good this year, although there were one or two who seemed consistently to be listening on the "wrong side of the crystal." Usually, the trouble with Morse is in the receiving of it —but there was one station, fairly well up the list, who, to judge from his logging, *receives* far better than he sends—a couple of S-points of extra outgoing signal punch is no good for radiating "Martian Morse!" One or two others lost their grip on the paddle of the bug-key at times, with strange results in the logs. Calling was, at times of stress, a little overdone, as when two stations called CQ on top of each other for three minutes, and then proceeded to a QSO well larded with "BK" during which each gave t'other a 599 report.

Some Comments

"The multiplier greatly overestimates our difficulty of scoring (*no* quotes or locals and colleagues will lynch me!)" . . . "Hoping for some further addition to the traffic to be sent from one station to another—how about the frequency of this last contact together with the registration letters of his car?" (*Kings Norton*) . . . "The only side-effect was hearing CQ MCC at 30 w.p.m. during sleep on Sunday night" (*Wakefield*) . . . "Roll on next November" (*Manchester University*) . . . "CW operating procedure was shocking—many stations could not receive at 20 w.p.m., which one would think to be the minimum requirement for a contest" (*Nottingham*) . . . "And so—back to the drawing-board once more!" (*South Manchester*) . . . "Our first attempt at Top Band contests; aerial was a half-wave dipole at 200ft. which gave good results" (*University College of North Wales, Bangor*) . . . "Why, oh why, must some people not only key with their left foot, but also be proud of it?" (*Marconi Apprentices*) . . . "Thank you for organising a most enjoyable contest" (*Henley-in-Arden*) . . . "A1 signals with 6 kc bandwidths" (*Lowland Royal Signals*) . . . "Scoring rate drastically reduced this year by heavy QRN—from a local power station?—so we apologise to those we did not work" (*R.A.F. Sealand*) . . "One station caused serious blocking—either a wizard aerial or an 813" (*Southgate*) . . . "Site ten feet a.s.l., fifty yards from a creek, and surrounded on three sides by hills" (*Isle of Wight*). . . "The new ident. codes were very successful" (*Chester*) . . . "We like the code system" (*Mid-Herts*) . . . "Showers of dots without a home now and again—very FB! . . . Least said, soonest mended!" (*Ampfield*) . . . "We heard quite a few going at Mach 2!" (*Ballymena*) . . . "It would neither load, match, nor radiate" (*Maidenhead*) . . . "Only trouble was the ident. system!" (*South Birmingham*) . . . "Don't go much on scoring system" (*Grimsby*).

Technical Points

In previous years *Verulam* have used the same site, and the same aerial—this year they make no mention of their tradition of hauling the earth-plate out of the moat for the annual MCC burnishing—and they are a hundred points down. Just proves tradition is useful!

Chesham, for once, had no bothers with the gear, which was an all-band all-transistor job built by G3HBW, using *three* frequency synthesizers, and an overlay transistor in the PA; on the aerial side, they had a pair of half-wave inverted-Vees, with the centres held up to 110 feet, at right angles to one another. The point of interest here is that these antennae were fed in the balanced mode by using, on each aerial, a pair of cables with the sheath commoned, as a screened twin-balanced feeder, which *must* have done something for the noise-level.

Another G3HBW transceiver design was in use by the *Harrow* crowd; this one has a pair of BUY11 transistors in the PA and, apart from the usual facilities, had a bandwidth variable from 6 kc down to one cycle (!).

Making a first entry in MCC, the I.o.M. group signing GD3TNS worked themselves into 39th place. Here we see, on the key, GD3FXN (right) with GD3EGF, and standing (left) GD3HQR (who did that little cartoon on p.705), with GD3TNS. They ran a KW-2000, with a KW Ezee Match and an HA-350 Rx, the aerial being a half-wave.

The winners of the 22nd MCC, with their winning smiles—Burslem Amateur Radio Society, G3VNR, who sailed away from the GM's to bring First Place back into the Midlands—see graph p.712. On the key, G4QD with his son G3VNR logging. Left to right, standing, are G8IX, G3SAJ, G3COY, G3USF and SWL Wild (hon. secretary, Burslem A.R.S.). The gear they used was a KW-2000, a Drake R4A receiver and an electronic keyer, with choice of two good aerials—an east-west dipole and a 300ft. wire at an offset angle, both at a height of 70ft. Throughout the Contest, G3VNR was an outstanding signal and very well operated.

This, according to the Harrow operators, was the last word and their only other problem was cross-modulation. To cure this, someone thought of a 6 dB pad in the aerial feeder on " receive "—but then the receiver front end took off. They put in a cracking score. Incidentally, they got a T8 report or two on the Sunday, which puzzled them a bit, as locals said the note was quite OK and T9x.

This resurgence of home-brewing, in the sense that there were several other transceivers and receivers, as well as the usual run of transmitters is, of course, gratifying to the old-timer, but is nonetheless rather puzzling. One possible explanation could be that many operators are finding how useful real BK is from personal experience on a transceiver, and are then setting to work to make one without the shortcomings of some of the commercial devices.

Among the Non-Club stations, there were several who seem to have a connection running out over many years with MCC. G2YS, who appeared in one or two logs, is the only call to have been noted as winner of MCC from two different places—Coventry and Chester —while G3BMY took Stourbridge to the heights on several occasions—*see* graph. Two mobiles were worked by Clubs, one of whom was suspected of keying with his change-over switch! Other personal stations which appeared in various logs were G3TLX, GW3FSP (a winner in earlier years), GM3SVK, G3RSO, G3SWM, G6HD, OK2BJJ, PAØPN and G2MJ.

Time and Frequency

Dealing with last things first, quite a few of the entrants still had not adjusted the old alarm-clock (borrowed from Auntie) which we complained of last year. Nonetheless, between them, the invigilators made a note of most of the optimists, and points were docked if the QSO started after the closure—but we really will have to think up a stiffer penalty for the stations calling " CQ MCC " several minutes before and after time.

On a slightly different aspect of the *Time* question, one or two stations have called for a reduction in hours compensated for by a later start and a third session on

Sunday morning. This is a little difficult to comment on, but there seem to be two things to take into account: In the first one there is the undoubted fact that a Top Band contest on a Sunday morning would probably not be popular with the usual inhabitants of the band at that time—and they have a right to enjoy it without too many contests to ruffle things up. The second is that it would be very difficult to retain a balance which would give the GM's, for example, a sporting chance. The present sessions are chosen so that a Southern station can collect a hatful of contacts, while not giving the lads with the big multipliers too much scope for high scoring.

Another factor as regards timing of the sessions is that many Clubs who use their own Hq. station already have enough trouble in getting their premises opened for weekend use.

On the point of *Frequency*, all we or anyone else (who monitored the event) can say is that there was a lot of wasted space due to the main concentrations of activity being between about 1805 and 1865 kc. Instead of attempting to spread out, most operators simple piled in where the activity seemed highest, thereby merely increasing the congestion. A thoughtful few tried to attract activity up to 1900 kc. but found no takers. But here again, it is what happens every year, and why there are Club signals that are simply never heard in some parts of the country! Careful analysis of the logs reveals this as a fact.

Looking now at the *Operating*, to anyone monitoring some of it was pretty extraordinary—chaps put on bug keys that obviously were set too fast for them, producing a plethora of dots . . . the numeral " 3," occurring in practically every callsign, but so often sent as " SM " . . . the procedure signal BK frequently heard when it was clear the sending operator was not listening through . . . scrappy or indefinite signing-off or acknowledging . . . weakness in dealing with non-Club stations, either because the Club op. had not been briefed, or hadn't read the rules . . . a general tendency for over-fast sending . . . and, at some stations, the marked change in operating efficiency as a new hand took over the key (though this in itself is no bad thing, as it showed that somebody else was getting a turn).

However, in spite of these mild criticisms and strictures, the general standard of operating was pretty high, and from some stations outstandingly good, with clear, steady sending, correct procedure and quick, but not hurried or scrambled, clearing of QSO's. If the invigilators were pressed, they might mention G3VNR,

GM3FXM/A notched up 580 points to make third place for Kirkcaldy Radio Club in the 1967 MCC. Seated, left, GM3PFQ, with GM3FXM on the key. Standing, left to right, SWL's George, Donaldson and Givens, who backed up all through. Their Tx ran 10 watts to a 5763 PA, the receiver was an Eddystone S.750, and the aerial a half-wave.

TABLE I

Positions and Scores, Twenty-Second MCC

PLACE	CLUB	REGION	POINTS
1	Burslem (G3VNR)	M	641
2	Moray Firth " A " (GM3KHH)	GM	598
3	Kirkcaldy (GM3FXM/A)	GM	580
4	Newcastle University (G3OWM)	N	561
5	East Barnet (G3RPB)	S	557
6	Spen Valley (G3SVC)	N	552
7	Harrow (G3EFX)	S	524
8	Kings Norton (G3GVA)	M	523
9	Wakefield (G3VMW)	N	520
10	Leyland Hundred " A " (G3GGS)	N	504
11	Government Comms. (G3SSO)	S	500
12	Surrey (G3SRC)	S	485
13	Manchester University (G3VUM)	N	482
14	Nottingham (G3EKW)	M	470
15	Stourbridge (G6OI/A)	M	463
16	Albright & Wilson (G3OXD)	M	399
17	South Manchester (G3FVA/A)	N	395
18	Hereford (G3HVX/A)	M	387
19	Echelford " A " (G3UES)	S	386
20	Ealing (G3UUP)	S	384
21	University of N. Wales (GW3UCB)	GW	374
22	Marconi Apprentices (G3JTW)	S	373
23	Chesham (G3MDG/A)	S	372
	Painton (G3PHC)	M	372
25	Otley (G3MFJ/A)	N	357
26	Moray Firth " B " (GM3TKV)	GM	356
	Hemel Hempstead (G3WIH/A)	S	356
28	Guildford (G3TLM/A)	S	355
29	Verulam (G3VER)	S	351
30	South Bucks (G3KGV)	S	341
31	Crawley (G3WSC)	S	339
	Hillingdon (G3PWY)	S	339
33	Cardiff (GW3SQX)	GW	332
34	Henley-in-Arden (G3SIA)	M	319
35	Salop (G3SRT/A)	M	312
36	Crystal Palace (G3VCP)	S	305
37	Cray Valley (G3RCV)	S	304
38	Leyland Hundred " C " (G3JMZ)	N	295
39	Isle of Man (GD3TNS)	GI/GD	290
40	Lowland R. Sigs. (GM3TLR)	GM	286
41	Stevenage (G3SAD)	S	283
42	Midland (G3MAR)	M	281
43	Reigate " B " (G3OVL)	S	280
44	Bristol (G3TAD)	S	277
45	Salisbury (G3FKF)	S	273
46	R.A.F. Sealand (GW3ITZ)	GW	262
47	Wirral (G3NWR)	M	257
48	Loughton (G8AB)	S	246
49	Cheshunt (G3TZZ)	S	245
	Northern Heights (G2SU/A)	N	245
	Southgate (G3SFG/A)	S	245
52	Brunel University (G3UBR)	S	244
53	STC, Harlow (G3NIS)	S	241
54	Stroud (G3SDR)	S	240
	Acton, Brentford & Chiswick (G3IIU)	S	240
56	Crawley " B " (G3TNO)	S	234
57	Isle of Wight (G3SKY)	S	232
58	Silverthorn (G3SRA)	S	230
59	Nuneaton (G2HAO/A)	M	229
60	East Cheam (G3OJE)	S	227
61	Bury St. Edmunds (G3PHW)	M	226
62	Speedbird (G3NAF)	S	223
63	Southampton University (G3KMI)	S	222
64	Chester (G3GIZ/A)	M	217
65	235 Squadron ATC, Stoke (G3IGE/A)	M	213
66	Plessey (West Leigh) (G3WLE/A)	S	212
67	Mid-Herts (G3WGC)	S	204
	Southdown (G3WQK)	S	204
69	Clifton (G3GHN)	S	201
70	Leyland Hundred " B " (G3VAL)	N	195
	Chippenham (G3VRE)	S	195
72	Southampton Group (G3SOU)	S	194
73	South Shields (G3DDI)	N	192
74	Ampfield (G3JFY)	S	166
75	Ballymena (GI3FFF)	GI	161
76	Macclesfield (G3MKR)	M	160
77	Addiscombe " A " (G3UFY)	S	159
78	Echelford (G3SAZ)	S	157
79	Worthing (G3WOR)	S	156
80	Nailsworth (G3VVV)	S	150
81	Mid-Sussex (G3BZO)	S	129
82	Gosport (G3RQK)	S	129
83	Bishops Stortford (G3RGA)	S	125
84	Brighton Tech. College (G3TCB/A)	S	124
85	South Birmingham (G3OHM)	M	123
86	Sussex University (G3SJX/A)	S	108
87	Maidenhead (G3WKX/A)	S	102
88	Addiscombe " B " (G3VYI)	S	93
89	Bromsgrove (G3VGG)	M	85
90	Grimsby (G3VIP)	M	76
91	Mansfield (G3GQC)	M	74
92	Dover and Deal (G3UWQ)	S	66
93	Swindon (G3VBQ)	S	60
94	Haverfordwest (GW3KGD/A)	GW	46

G3SSO and G2HAO/A as among the best *operated* stations heard. And this is not to say that there were no others.

It should be remembered that, apart from trying to give Clubs an interesting competitive event, another objective of MCC is that it should be an exercise in CW-expertise—which does not just mean extra high-speed key manipulation.

Potted History

Many people imagine that MCC has been, in essentials, the same sort of event from time out of mind—this is just not so, and perhaps now would be a good time at which to put the record straight. A look at the graph, first, which shows how MCC has gone from strength to strength over the years—as, indeed, has Amateur Radio itself.

Back in 1946, the battle was spread over *nine days*, out of which one could take a maximum of twenty hours, to work all takers, and with a multiplier based on the number of call areas covered. G2YS (*Coventry*) made 209 contacts in the time with a multiplier of six. Actually the " possible " was nine—G, GC, GI, GM, GW, DL, LA, OK and OZ.

Year 1947 saw the number of hours upped to thirty, and this time G2JL, *West Cornwall*, replaced Coventry in the top spot, with 179 contacts and a multiplier of

One of the sides to field a second station for this year's MCC was the Echelford Amateur Radio Society (Zone South). The operating team consisted of (left to right), G3WVJ, SWL Adams, G3SAZ (foreground), G3WPK, G3UIJ and G3UNV (who took the picture). They knocked up 157 points for their 78th position in a field of 94 Club stations entering.

seven; " possible " this time was ten, with GD added to the list.

In GC, GI, GM and GW they seemed to have found the going a little tough, so for 1948, it was decided to make a QSO outside one's own Zone worth two points. For the GW stations this was just dandy, and GW3FFE (*Rhigos*) hit the jackpot, with seven prefixes, a victory repeated in 1949 with a multiplier of eight, while for 1950, he did the hat-trick with a multiplier of no less than eleven, these being G, GC, GD, GI, GM, GW, DL, EI, HA, OK and OZ—but it has to be said that even if the earlier rule of one point per QSO had been kept to, GW3FFE would have still been very near the top.

Clearly a change was due, and so 1951 saw the first real inter-Club affair. Nine days coverage still, Club contacts only, and each Club could be worked once each day. *Coventry* came first once again, this time signing G2LU.

A further change the following year saw eight periods from 1830 to 2230, and was spectacular in that G2YS, now representing *Chester*, and GW3EOP (*Neath*) dead-heated for first place. From 1953 to 1958 the rules were the same, but the operating period was progressively reduced, and times varied. Afternoons were taken in '53, and GW3EOP (*Neath and Port Talbot*) thrived on them, as they did again in 1954. Then 1430-1630 was replaced by 1500-1900, which enabled G3BFP, batting for *Surrey*, to break the GW stranglehold but not, be it noted, before the second hat-trick had been brought off, by GW3EOP over the years '52 to '54.

A further reduction, this time to twelve hours, by was of four sessions 1600-1900, and G3BMY put *Stourbridge* on top, as he also did the following year with an increased score. G3BMY nearly made another hat-trick in 1958 but just missed it by coming joint second with *Coventry* to the winners, *Crystal Palace*. The 1959 MCC featured later hours, 1700-2000, and the dropping of the exchange of QRA/QTH in favour of a scheme of Club identifying numbers, very similar to the one used this year, with which system *Stourbridge* again brought home the bacon with the help of G3BMY; under the same conditions he won yet again in 1960, this time very narrowly from *Aldershot*, who were also

TABLE II

Top Scorers in the Regions

	Southern	
1	East Barnet (G3RPB)	557
2	Harrow (G3EFX)	524
3	Govt. Communications (G3SSO)	500
	Northern	
1	Newcastle University (G3OWM)	561
2	Spen Valley (G3FVC)	552
3	Wakefield (G3VMW)	520
	Scotland	
1	Moray Firth " A " (GM3KHH)	598
2	Kirkcaldy (GM3FXM/A)	580
3	Moray Firth " B " (GM3TKV)	356
	Midland	
1	Burslem (G3VNR)	641
2	Kings Norton (G3GVA)	523
3	Nottingham (G3EKW)	470
	Wales	
1	University of N. Wales (GW3UCB)	374
2	Cardiff (G3SQX)	332
3	RAF Sealand (GW3ITZ)	262
	GI/GD	
1	Isle of Man (GD3TNS)	290
2	Ballymena (GI3FFF)	161

second the previous year, albeit by a much wider margin.

A new system, by which contacts were loaded by different points-value for each region, attracted a large entry—in fact a record up to then—and also a first Northern winner in *Hallamshire* (G3JHC). Talk there was of the absence of GI/GD stations of the previous years, and of allowing ten points per contact to the GM stations to give them a sporting chance! Indeed, in 1962, the GM stations *were* getting ten points per QSO—but apart from GM6RI, who was third, the order seems to have been determined solely by the number of Club QSO's made. Among the might-have-beens is the case of the Southern group who dismissed GM6RI as " not worth waiting for," as they thought he was " only a one-pointer "—but the 10 pts. would have brought him up a place and improved an already good position! Already, SWL D. Law had started his series of check-logs which have made him an institution in MCC, his first one appearing in 1961. *Gravesend* won this one.

As in 1962, the 1963 MCC was run off over one weekend, but with four hours instead of three in each of two sessions, GW3FSP winning on this occasion for *Port Talbot*. By this time the idea of MCC as a Contest wherein stations competed with one another on a regional basis, as well as for the absolute win, was well established. 1964 saw the first Contest under the present rules, using a two-letter code group instead of the earlier letter-plus-number system, and G3IGW took the plum, with *Oxford* (G3RBP) following *Halifax* into second place. Came 1965, and *Racal* (G3RAC) made a first stab at MCC—and won! They were followed home by *Maidstone* YMCA, with *Sheffield* " *B* " taking third place.

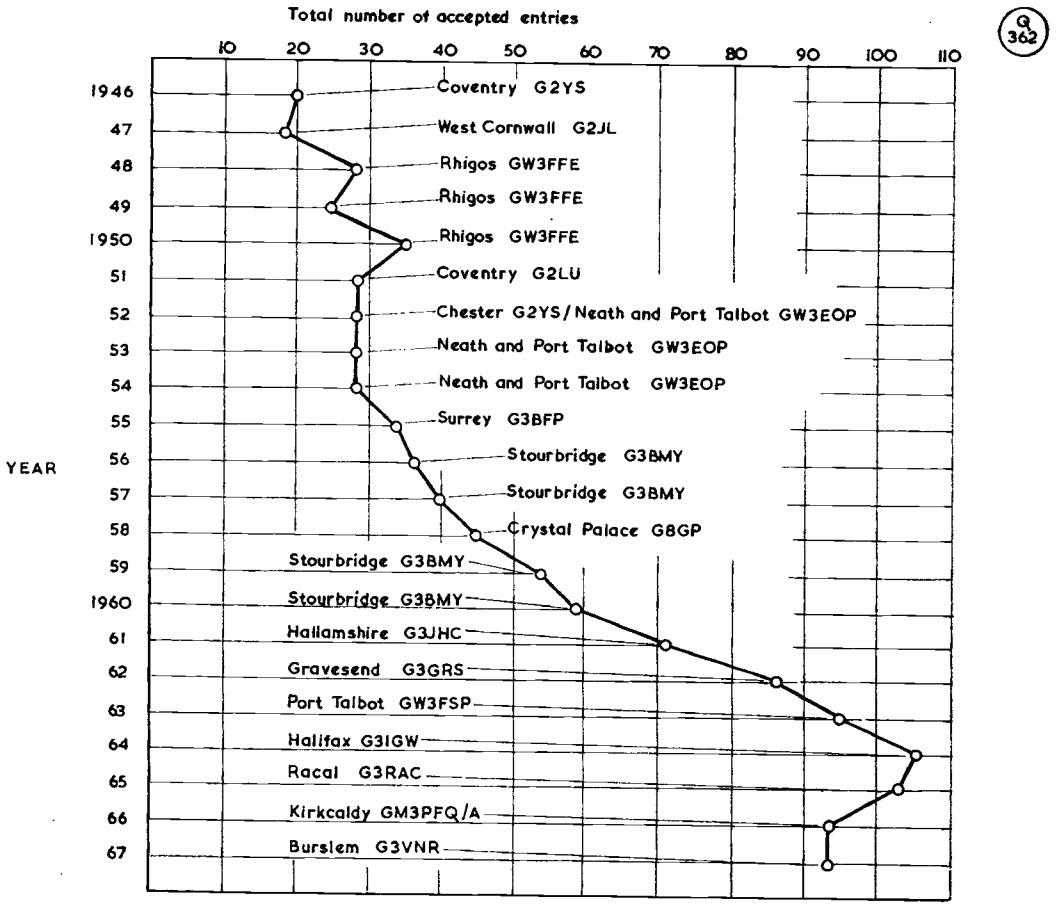
Just to show we really had a well-balanced formula at last, 1966 gave the first three as *Kirkcaldy*, *Newcastle University* and *Moray Firth*, in that order.

And so to this year, when no changes were made other than to revert back to a letter/number identification,

" MONTH WITH THE CLUBS "

With next month's issue, dated February and due out on January 26, the Club feature will revert to normal—for which reports should be with us by Friday, January 5, addressed: " Club Secretary," Short Wave Magazine, Buckingham.

This time, Verulam Amateur Radio Club, at 29th position, scored 351 points, their team being G3LXP (finger on paddle), SWL Fisher (logging), G2AIA checking the October issue of " Short Wave Magazine " to make sure they'd read the rules right, and SWL's Wells and Goldsmith. The gear consisted of a modified Sommerkamp Rx with an out-board Tx unit using the receiver VFO to give full transceive facilities, with BK, side-tone monitoring and low-current keying. To ensure accurate netting, a 7 mc " rubber crystal" circuit was used in the Tx mixer, this being combined with the 5 mc VFO to produce transverted output drive for the PA on Top Band.



Graph showing MCC development and progress since the inception of the Contest in 1946. Points of interest are discussed in the text.

albeit this time in a standard form which made the length of the group about the same for everyone; however, there is no doubt that the ball *did* run ill for the lads with the 7Ø2 code—it should have been printed as ZØ2!

Over the years, MCC has been notably a sporting Contest, and the fact that so many of the same calls that were prominent in yesteryear are still to be heard, one way or another, is a fine thing.

Changing tack a little, it is interesting to note how few "Works" groups enter. Really, this is not surprising, as there are few of us who are so dedicated as to want to play on the same premises where we work—but it is noticeable that, over the years, those who have found the enthusiasm have usually done well. One thinks of *Racal*, of *Plessey* (West Leigh) and, of course, of *Painton*, who this year put in an entry which took them to 23rd place with 372 points. The gear was the Club's KW-2000A, used in conjunction with SWR bridge and ATU to energise a half-wave end-fed aerial at 30 feet. The Painton operators were G3KAN, G3WJY, G3WJZ and G3RVM, all members of the firm.

Again, looking at the picture over a period of years, it seems to your scribe that there is a tendency for the groups operating in true Club fashion—that is, using the Club gear in their own premises—to score a little lower than those groups who put in a determined entry from the station of a member. But it doesn't seem to matter tuppence to the lads if there are snags, or whether the shack is warm or cold, so long as the Contest is played out—and that's how we on the *Magazine* like it, too!

So there you have it. One of the friendliest, and yet keenest, Contests on Top Band, and as much pleasure, we sincerely believe, to those who operate and log, as it is to us of SHORT WAVE MAGAZINE to lay it on, invigilate, assess the logs, and to read all the wise, witty —and otherwise!—comments.

Next month, it is back to normal for "The Month with The Clubs" and your reports, covering in particular forthcoming events, should be in to us by **first post January 5**, for inclusion in the February issue. Address them, as always, to "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM. Meanwhile, a Happy and Prosperous New Year to you all.

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.

EI7BS, P. J. McGorman, McCurtain Street, Clones, Co. Monaghan. (*Tel. Clones 97.*)

GM3RAO, P. S. Hayes, 3 Sydenham Road, Glasgow, W.2.

G3VRB, J. D. Nias, 49 St. Margarets Road, Bishopstoke, Eastleigh, Hants. S05 6DG. (*Tel. Eastleigh 3782.*)

G3WLT, D. Firth, 3 School Lane, Shaldon, Teignmouth, Devon.

G3WLW, R. Millar, 17 Brooklands, Bradley, Huddersfield, Yorkshire.

G3WPH, M. J. Chamberlain, 148 Calve Croft Road, Peel Hall, Manchester, 22. (*Tel. Mercury 2665.*)

G3WRA, S. Powell, 7 Commercial Road, Hereford. (*Tel. Hereford 3415.*)

G3WRD, R. J. Richardson, 32 Elliott Road, Chiswick, London, W.4.

G3WSJ, A. Evans, 1 Spital Lane, Cricklade, Swindon, Wilts. (*Tel. Cricklade 479.*)

G3WSZ, P. Gilson, 22 Carr Manor Place, Leeds, 17.

G3WTR, D. T. Wright, 8 Nolton Place, Edgware, Middlesex. (*Tel. 01-952 7342.*)

G3WWX, P. C. Swann (*ex-MD5PS*), 56 Church Street, Old Glossop, Derbyshire. (*Tel. Glossop 2650.*)

G3WXG, I. D. Habens, 367 Ditchling Road, Brighton 6, Sussex. (*Tel. Brighton 53150.*)

G3WXJ, G. Sanby, 25 Norton Park Drive, Norton, Sheffield. S8 8GP.

G3WYH, R. R. T. Hutton, 118 Ruskin Avenue, Sawley, Long Eaton, Notts. (*Tel. Long Eaton 4885.*)

G3WYY, J. R. Smith, Manor House Farm, Eccleston, Chorley, Lancs. (*Tel. Eccleston 373.*)

G3WZF, A. Butt, 15 Brownberrie Crescent, Horsforth, Leeds, Yorkshire.

G3WZI, K. A. Reeves, 15 Chadley Close, Solihull, Warks. (*Tel. SOLihull 0450.*)

G3WZJ, A. Dudley-Watt, 67 Glenhurst Avenue, Bexley, Kent. (*Tel. Crayford 22564.*)

G3WZM, G. A. Suckling, Station House, Railway Road, Downham Market, Norfolk.

G3WZP, G. A. Budden, 102 Frost Road, Kinson, Bournemouth, Hants.

G3WZS, H. Williams (*ex-9L1HW*), 4 Meadowbank Road, Fareham, Hants.

GM3WZU, J. Brown, 10 West Doura Avenue, Saltcoats, Ayrshire.

G3XAA, D. J. Howe, 7 Mayfair, Pedmore, Stourbridge, Worcs.

G3XAB, D. Whittaker, 6 Lynthorpe Road, Nelson, Lancs.

G3XAC, C. J. Whitehead, 68 Hollingreave Road, Burnley, Lancs.

G3XAD, A. Southwell, 12 Brockenhurst Street, Burnley, Lancs. (*Tel. Burnley 26037.*)

G3XAE, B. W. Hodkinson, 33 Brook Street, Macclesfield, Cheshire.

G3XAI, J. E. Temple, 4 Coquetdale Place, Bedlington, Northumberland.

G8BBG, S. Garrity, 11 Town Field Villas, Doncaster, Yorkshire.

G8BBP, K. F. Ballinger, 125 Astwood Road, Rainbow Hill, Worcester.

G8BBY, C. Hayward, Toll House Filling Station, Watling Street, Watford, Rugby, Warks. (*Tel. Long Buckby 200.*)

G8BCS, A. P. Legg, 12 Orchard Way, Sutton, Surrey.

GI8BDR, N. E. Evans, Killyberry, Castledawson, Co. Derry.

GM8BDX, A. J. Scott, Manderston Stables, Duns, Berwickshire.

G8BEA, R. I. Harcourt, 50 Pleydell Road, Swindon, Wilts.

G8BFJ, M. J. Brindle, 24 Mount Pleasant, Ruislip, Middlesex.

CHANGE OF ADDRESS

G2CIW, J. F. Moseley, 69 Brandwood Road, Kings Heath, Birmingham 14. (*Tel. HIGbury 1053.*)

G3BIK, E. Chicken, 21 Townsend Crescent, Kirkhill, Morpeth, Northumberland.

G3BNI, D. L. K. Coppendale, 27 Lismore Road, Homefarm, Highworth, Swindon, Wilts.

G3CCU, G. Phillips (*ex-GW3CCU*), c/o 7 Harbour Street, Broadstairs, Kent.

G3CIV, J. M. F. Sweet, 31 Gretdale Avenue, St. Annes, Lancs.

G3JMJ, D. E. Nunn, Fircroft, Station Road, Edenbridge, Kent. (*Tel. Edenbridge 3467.*)

G3LRS, Leicester Radio Society, Gilroes Cottage, Groby Road, Leicester. LE3 9QJ.

G3MFV, A. S. Frank, 8 Kennedy Avenue, Fixby, Huddersfield, Yorkshire. (*Tel. Huddersfield 23534.*)

GM3MHG, J. Enderby, 2 Muirhead Road, Troon, Ayrshire.

GW3NJW, C. Whelan, 24 Severn Road, Canton, Cardiff.

GW3PEX, L. France, 8 Conway Drive, Pant Farm Estate, Cwmbach, Aberdare, Glam.

G3PGX, D. G. Murgatroyd (*ex-9H1AI*), 14 Raleigh Road, Padstow, Cornwall.

G3SZC, I. G. West, 110 Wife of Bath Hill, Canterbury, Kent.

G3TRA, A. Wilkinson, 25 St. Helens Drive, Leicester. LE4 OGS.

G3TXH, B. G. Levett (*ex-VS9ABL*), 36 Lymescote Gardens, Sutton, Surrey.

GM3VVF, A. C. Ross, 42 Granton Place, Edinburgh 5.

G3VYE, J. Doswell, 42 Woodford Road, Poynton, Stockport, Cheshire.

G4AL, G. R. Cox, 98 Whatton Road, Kegworth, Derby.

G6KD, K. M. Dunsford, 51 Albany Road, St. Leonards-on-Sea, Sussex. (*Tel. Hastings 3690.*)

G6RJ, A. Robinson, Purdis Rise, Bucklesham Road, Ipswich, Suffolk. (*Tel. Ipswich 78748.*)

THREE-BAND AERIAL SYSTEM

FOR 40-20-10 METRES, WITH STUB MATCHING

WHERE only one transmitting aerial can be erected, the amateur with limited ground space at his disposal is faced with a problem in making this aerial operate efficiently on all bands. The problem is complicated if the line of the aerial cannot be orientated in a direction favourable to propagation along the general DX paths.

The aerial described here has proved to be very satisfactory for multi-band operation, and its performance on DX has been outstanding. Local conditions of terrain, height and obstructions play a big part in aerial performance, and it is not suggested that this one is necessarily the best for a particular situation. But whatever the conditions, it might be worth trying, as the construction is simple. The height is about 30ft. only. The mast end is on a halyard, so that the aerial can be raised and lowered easily.

Ability to bring the centre of the " flat-top " to within reach is an essential feature, as will be seen later.

Multi-Band Requirements

Use for Top Band dictates that the aerial be as long as possible, since the lengths of 50 to 100ft. generally feasible in most situations only represent a fraction of the wavelength, and anything less is not of much use except for local contacts. Much the same considerations apply to the 80-metre band. No appreciable control of directivity can be achieved on either of these bands, and the usual practice is employed of tying the feeder ends together at the transmitter end, and working the whole thing against ground. On 7 and 14 mc, however, dipole horizontal tops become practicable, and even the 66-ft. top requisite for a 7 mc dipole can be achieved at most locations.

Unless a dipole can be erected approximately N-to-S it is not the best form of aerial for the DX bands 14 to 28 mc. On the contrary, some form of long-wire aerial is desirable at these frequencies, in order to bring lobes to bear in the required directions.

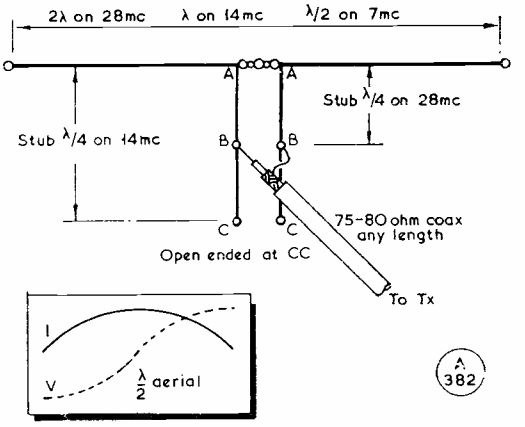
As the LF section of 7 mc is becoming useful again as a DX band, a dipole top cut for Forty will be worth having for general operation on it, irrespective of aerial direction.

Assuming, then, that a 66-ft. top is erected, its operation on 14 and 28 mc as a full-wave and two-full-wave aerial respectively will provide a more desirable lobe distribution, whilst operation on 1·7 and 3·5 mc with the feeders tied and operated against ground will give reasonable efficiency for local working.

The problem therefore resolves itself into one of feeding the aerial efficiently on the three HF bands.

Feeding and Matching

The use of tuned feeders has always been viewed with distaste because at HF it is difficult to avoid losses, and to maintain balance—particularly with end-fed aerials and aerial coupling coils and tuning condensers—becomes difficult for multi-band operation. Also, at full p.e.p. output the tendency to condenser flash-over is a nuisance, necessitating wide spacing and bulk in the ATU.



General layout and coupling system for the three-band aerial discussed in the text. It can also be used on the LF bands with "feeders tied". As explained in the article, the aerial must be erected in such a way that one end at least can be conveniently lowered.

Current feed, using a simple untuned link to the PA tank and a coaxial feeder, connecting into a current loop point on the aerial, is modern, simple and efficient.

Consideration of the application of this method to an all-band system led to the conclusion that a compromise was necessary, either in respect of efficiency or convenience. It was decided to maintain efficiency, and the sacrifice lies in the fact that in order to change the working band it is necessary to go outside and shift the position of the aerial end of the coax feeder.

Design of the Feeder

Above is shown a 66-ft. 7 mc dipole and the current distribution along its length. A current loop at the centre enables the feeder to be attached at that point, using low-impedance (75-ohm) coaxial cable.

The same top used on 14 or 28 mc has a current distribution such that the centre becomes a current node (voltage loop) and the low-impedance feeder cannot be attached at this point. If it is, the PA refuses to load up, because of the violent mis-match. Obviously the coax can be applied if the point of feed can be moved a quarter-wavelength (at the frequency to be used) away from the centre.

This can be accomplished by inserting a stub a quarter-wavelength long at the centre of the aerial, connecting the feeder to the other end. The effect is the same as adding another half wave into the aerial, except that since it is folded, the added portion will be non-radiating. However, two different stub-lengths are necessary for the 14 and 28 mc bands, the length of the former being approximately twice that for the latter. This led to trying out the idea shown in here, in which the open-ended stub is about a quarter-wavelength long on 14 mc and hangs vertically from the top portion.

For 7 mc operation the stub is not required, and the

coaxial feeder is attached at points AA.

For 28 mc the point of attachment is BB (quarter-wave at 28 mc below the centre) whilst for 14 mc the whole stub length is required and the feeder connects at CC.

The presence of the unused portion of the open stub at 7 and 28 mc has no effect on the functioning of the system. The stub comprises an open-wire twin-line of 16-gauge wire spaced to 3in.

The top or dipole section of the aerial was designed for 28,500 kc because it is best to cut the roof to the length necessary for the *highest* frequency band.

Since on 10 metres the top is two wavelengths long, the actual physical length is somewhat shorter than four times the length for a dipole at this frequency, owing to end effect.

The length may be calculated from the usual formula:

$$\text{L (ft.)} = \frac{492\,(N - 0{\cdot}05)}{\text{Freq. (mc)}}$$

Where N=the number of half-waves in the top (4 for 28 mc). The stub length is given by:

$$\text{L (ft.)} = \frac{234}{\text{Freq. (mc)}}$$

The stub length is actually made 17ft., so that on 14 mc the feeder taps on a few inches above the bottom end.

Adjustment and Operation

Begin with 28 mc. Attach the coax feed line to a point roughly half-way down the stub, inserting an RF ammeter in series with one side of the coax at this point.

The clips are now moved above and below this position about 2in. at a time until maximum current is indicated. At each setting the coupling of the PA tank circuit link is adjusted for constant power input to the PA. The stub wires are marked when the correct position of attachment is found. The same process is employed to determine the position for 14 mc with the feeder clipped on near the bottom.

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.

TRADE

QSL CARDS: Attractive two-colour designs, 25s. per 100. Send s.a.e. for samples.—G3OYI, 16 Banks, Honley, Huddersfield, Yorkshire.

HUNDRED-PAGE Illustrated Catalogue No. 17 of Government and Manufacturers' electronic and mechanical surplus, including a completely new section covering the latest semiconductors and miniature components, with a credit voucher worth 2s. 6d. Send for your copy now, price 3s. post free. The reading alone is worth the money!—Arthur Sallis (Radio Control), Ltd., 93 North Road, Brighton, Sussex.

QSL Cards and Log Books, GPO approved, cheapest and best. Prompt delivery.—Samples from Atkinson Bros., Printers, Looe, Cornwall.

QSL Cards: Two-colour, attractive design, variable features, from £3 3s. per 1,000 (inclusive). Send foolscap s.a.e. for samples.—ARA Press, 46 Moat Avenue, Green Lane, Coventry.

Introducing the new **G-Whip** fibreglass helical antenna for mobile or portable working. This aerial features compactness, a matching impedance of 50 ohms, shows an SWR of better than 1·5:1 and is rated to the full 400 watts p.e.p. limit. Send s.a.e. for further details.—**Roberts Radio Service, 82 Duke Street, Southport, Lancs. (Tel. 3990).**

WANTED Urgently: BC-221 and LM Series **Frequency Meters;** also BC-312, BC-342 and BC-348 **Receivers** TCS transmitters and receivers; all types of **Oscilloscopes** and **Test Gear.** Also RCA 8516L and Hammarlund SP-600 receivers. Write, call, or phone.—**Amateur Electronics, 518-520 Alum Rock Road, Alum Rock, Birmingham, 8.** (Tel. East 1497).

Valve Voltmeters, No.2, 70s. **Xtal Calibrator** No.7, 70s. **HRO PSU's,** 50s. **Capacity Bridges,** range 50 mmF to 50 mF, 80s. Lo-Band 25-watt **Rangers,** 85s. Wooden masts, 20ft., 1½in. diameter, 12s. 6d. Codar A.T.5 Tx and PSU, new, £23. A.T.5 Tx, new, £15. Coils, 30 and 50 turns 1⅜in. diam. on ceramic formers, 1s. each. Also meters, two-metre J-Beams and other items. Add postage.—**J. M. Fish, G4MH, 18 Town End, Golcar, Huddersfield** (52653), **Yorkshire. (Open Sundays).**

JOB OPPORTUNITY

Radio Mechanic Required, for maintenance of MF/VHF equipment and Electronic Apparatus at **Lighthouses** and on board **Light Vessels.** Age range 25-45 years, average salary £1,350 plus liberal subsistence allowances, with two weeks' paid holiday, sick pay, etc.—Applications to: **Workshops Superintendent, Trinity House Workshops, Orchard Place, Blackwall, London, E.14.** (Tel. EASt 5864/7).

READERS ADVERTISEMENTS

3d. per word, minimum 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.

SALE: Pye Ranger Type PTC-2002V, 12-volt input pos. or neg., complete and unmodified, with circuitry, hand microphone and crystals for 70·26 mc, price £10, plus carriage (Surrey area).—Box No. 4578, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Volumes "Short Wave Magazine" 1947-'56, 1958-'59 and 1962-'67, 15s. per volume, or near offer. Also RF units 24 and 26, at 7s. 6d. each. —Smith, 40 Harrow Road, Carshalton, Surrey. (Tel. 01-642 0207).

SMALL ADVERTISEMENTS, READERS—*continued*

SELLING: As new, KW-600 Linear Amplifier, at £90. SBE-34 Transceiver in mint condition, £145. AVO Minor Mk.IV, unused, £6.—Barry, 15 Fairlawn Court, London, W.4.

SALE: **One 70-centimetre tripler/PA,** complete with 2/C39A's, blower, etc., £10. One **23-centimetre tripler,** with 2C39, blower, etc., £8. **Also two-metre/four-metre receiver,** consisting two CC converters into Command Rx, tunable IF, switched bands, all on one chassis, price £10. All units ready to go. Take £25 for The Lot.—Russell, G8AWS, QTHR, or ring 051 ELL 2085, STD.

ENTHUSIAST Wanted to complete triple-conversion receiver project based on all-wave converter, R.1155 and BC-453. All the spade work has been done. Equipment complete plus full gen. and relevant magazine articles, asking £20 only.—Matthews, 31 Braemore Road, Hove, Sussex. (Tel. Brighton 730984).

SALE: Receivers BC-639A, coverage 100 to 156 mc, £12; R.1155 at £6. Also Marconi Type TF-428B/1 valve voltmeter, £8.—Bloom, 4 Langsett Avenue, Sheffield 6, Yorkshire.

WANTED: National HRO Senior receiver, with BS coil packs for amateur bands. PSU not essential. State price and condition. (Angus, Scotland). —Box No. 4579, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERS? Receivers AR88D and AR88LF, cleaned and with new valves, plus spares. Also Avoemeter Mk.VII and Nombrex Signal Generator. Best offers secure. — Clarke, Rosebank, Canon Pyon (374), Hereford.

WANTED: Several QQV02-6 valves at a reasonable price. Details, pse.—Grigg, G3PRX, 72 Elmstone Road, Rainham, Kent.

COMPLETE Mobile Station: Codar A.T.5 Tx, £12. T.28 Rx, £11. PSU, 12v., £8. R/C unit, 12v., 30s. Halson whip and coils for 80/160m., £8 10s. Xtal microphone, 30s. Speaker 2¾-in. by 8¼-in. Carriage extra, or complete rig £40, carriage paid.—Livermore, 15 Angel Hill, Bury St. Edmunds, Suffolk.

WANTED: By a novice-SWL, good amateur-band receiver, or any such Rx capable giving satisfactory SSB reception and any other interesting listening. Up to £75 available, but price must include delivery.—Coan, 140 Wroxham Road, Norwich, Norfolk.

WANTED: R.216 receiver with its PSU. Must be in perfect condition.—Davidson, 19 Cavendish Avenue, Finchley, London, N.3. (Tel. FINchley 4353).

BARGAINS For Quick Sale: Heathkit DX-100U Tx, £50. National NCX-3 with NCX-A PSU and suitable auto-transformer, £100. Star SR.550 receiver, amateur bands only, double-conversion with product detector for SSB, £45. All items in perfect condition and carriage paid.—Hargan, GI2DHB, 3 Epworth Street, Londonderry, Northern Ireland.

FOR SALE: K.W. Vanguard transmitter, covering 10 to 160 metres, 50 watts AM/CW, £40 or near offer? Home-built Rx to the G3RKK design, with Electroniques QPP-166 front end, two-converter, £25 or offer. Also Collins mechanical filter, 500 c/s 455 kc, offers?—Arscott, G3VSL, 5 Copsewood Road, Ashurst, Nr. Southampton, Hants.

SELLING: Latest model Swan 350 Transceiver with AC/PSU, both in as-new condition. Have made WAS/WAC with this rig using indoor dipoles! Price £190. Going VHF/UHF. (Lancs. area).—Box No. 4580, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: KW-2000A or Swan Transceiver.—Cafferty, 190 Victoria Avenue, Hull, Yorkshire.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: Lafayette HA-350 fitted 100 kc crystal calibrator, condition as new, £55. National HRO-5T, with nine coil-packs, condition as new and unmodified, £25. Codar PR-30X preselector, 65s. Joystick de luxe with Type 3 tuner, 70s.—Gillham, 260 Summerhouse Drive, Wilmington, Kent. (Tel. Swanley 3968).

SALE: Heathkit Mohican GC-1U receiver, in excellent condition and recently checked and aligned by Daystrom, Ltd., price £25.—Burke, 28 Gloucester Avenue, Hurstead, Rochdale, Lancs.

WANTED: Bandspread coil-packs for HRO-5T, covering 3·5 mc, 7 mc, 14 and 28 mc. Good price offered.—Oates, 3 Canadian Avenue, Hoole, Chester.

SALE: Converted Stratton (Eddystone Radio) transmitter, covering 20-40-80m. bands, running 90-200 watts, 813 PA, high-level modulated, VFO and with robust power supplies, any test, price £20. —Rayer, G3OGR, Reddings, Longden Heath, Upton-on-Severn, Worcs.

FOR SALE: Stablised power supply units; five-inch and 14-inch oscilloscope displays; UHF wobbulators; wideband 30 mc amplifiers; chassis and cabinets. Buyers to inspect and collect. No reasonable offer refused. — Wiltshire, G8AKA, 12 Leslie Road, Winton, Bournemouth, Hants.

EXCHANGE or Sell: Pye Base Station for 60-100 mc band; ideal for four metres, comprising Type PTC-330N Tx and PTC-3002N Rx, in modern blue cabinet, crystal-controlled with oven, 20 watts output, with manual, in excellent condition but requires new meter, price £20 complete plus 20s. post/packing; manual sent on 10s. deposit — or Exchange Phone Tx for 10-80m., home-built rig considered but must be TVI-proof. What Have You? All letters answered. — Lambert, No. 35 A.M.Q., R.A.F. West Raynham, Fakenham, Norfolk.

SALE: Hallicrafters HT-40 transmitter (circuit similar to DX-40), price £18 or near offer. Also new and unused KW low-pass filter for Ch.II, 75-ohm, 70s.—Brown, G3TLH, QTHR.

SALE: Eddystone EC-10, 12 months old, price £38. —Whitham, 25 Chatburn Park Drive, Clitheroe (2276), Lancs.

EXCHANGE or Sell: Eddystone S.640 Rx, modified and in excellent condition, with Candler Morse Course and practice buzzer, price £15—or Exchange for Model Railway, W.H.Y ?—Watson, Bartlow Road, Castle Camps, Cambridgeshire.

SELLING: Lafayette HE-30 receiver, £20. Also "Short Wave Magazine," years 1952-'64, from 15s. per volume.—Pilley, G3HLW, 27 Oxted Rise, Oadby, Leicester, LE2 5WG.

SALE: Collins TCS-12 receiver, in immaculate condition, with PSU, £8 10s. R.1475 Rx, with built in amplifier, £7 10s. Buyer pays carriage.—Smith, 50B Aldershot Road, Guildford, Surrey.

FOR SALE: For 70 mc band, Pye PTC-108D radio-telephone, £5 10s. Type RT34/APS-13 UHF Tx/Rx, 70s. All valved. Tuning Units TU5B, TU6B, TU7B, 50s. each. All carriage paid.—Austen, 1 Valebridge Road, Burgess Hill Sussex.

WANTED: For my R.1155, the IF transformers to suit, also any information about fitting a half-lattice filter, postage refunded. (London area). —Box No. 4581, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: Due Arrival Expensive Junior Op., my superbly-constructed 2DAF receiver, in a Philpotts cabinet, with new QCC xtals, Electroniques coils and transformers, complete except for its valves and not aligned, cost of parts over £100, snip for you at £45 (or a reasonable offer ?) Also Electroniques coils and IF transformers for the 2DAF Tx £10 or offer? All carriage paid.—Sykes, G3OYW, 1 Smallacombe Road, Bakers Hill, Tiverton (3466), Devon.

WANTED: A National NCX-5, Mk. II. (Midlands). Box No. 4584, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: Heater transformer for an 813. An Eddystone 2½-in. ceramic coil former. And a Mosley TA-32Jr. Beam assembly.—Bowen, G3GCO, 31 The Crescent, Donnington, Wellington, Shropshire.

SELLING: Frequency Meter BC-221T, with internal voltage stabiliser, PSU and spares, £30. Solartron Type SRS-152 stabilised PSU, output variable 0-500v. DC at 200 mA, 6·3v. AC, metered and with overload relays, brand new with manual (listed £100), bargain at £30. Marconi TF-1073 precision attenuator, coverage 1-250 mc, 75-ohm, with manual and leads, brand new in carton, £15. New spares for the AR88D: mains xformer, 85s.; full set IF's, 70s.; xtal 455 kc, 20s.; AR88LF o/p xformer, 35s. Xtal for BC-221, 50s. All items plus postage. Also the official manuals for CT.45, CT.218, Type 13A 'Scope and others, s.a.e. for list. (Lancs. area).—Box No. 4582, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

COULD you Let Me Have a copy of the October and November 1965 issues of "Short Wave Magazine"? Have for Sale an R.A.E. postal course (cost me £13), at bargain price £7. (South Wales).—Box No. 4585, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SWL's to Note! Monarch HM-1 receiver, with Codar PR-30 preselector, in excellent condition, £16. Also battery-operated MW/LW valve type portable Rx, at 30s. Cost includes carriage.—Skelcher, 52 Victoria Road, Wilton, Salisbury, Wilts.

ACCOMMODATION: In the Isle of Wight, bed-breakfast and evening meal, large TV lounge. Also a 4-berth caravan, with electricity and flush toilet.—Berden, G3RND, Bridgecourt Farmhouse, Godshill (606), Isle of Wight.

SALE: **Cossor Type 1035 Mk.1 double-beam Oscilloscope,** in very good condition and fully working, case resprayed like new, as offered elsewhere at £35, my price £21 only, and will haggle! A bargain for someone with more space. **Command Rx,** coverage 6·0-9·1 mc, free with 'scope, or going separately for 30s.—Street, G3TJA, 117 Parkway, London N.W.1. (Tel.: 01-387 2158).

WANTED: An R.216 receiver, with its matching PSU and instruction manual. All letters answered.—Box No. 4583, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: K.W. Viceroy Mk.IIIA SSB/CW transmitter, with extra filter, consistently reported as having exceptional speech quality, price £100. AR88D, up to full specification, £35. Special quality 2·7 kc Kokusai mechanical filter. 1·85 shape factor, new, at £10. Carriage extra.—Edson, G3NYQ, 24 Wrenbeck Avenue, Otley (3814), Yorkshire.

SALE: National HRO, with nine coil-packs, Type 234 PSU, and manual, in good condition, price £25 or offers? Also an unmodified SCR-522 Tx/Rx, in mint condition and unmodified, offers?—Romans, 50 Lamsdown Road, Gloucester.

SALE: R.206 Rx, with PSU and Adaptor, together covering 50 kc to 30 mc continuous tuning, also Minimitter converter, comprising together receiving station in excellent working order, no mods. and as good as 10 years ago, still a bargain at £30. — Whitehead, 91 Blackpool Road, Ansdell, Lytham, Lancs.

WANTED: By old-fashioned Old Timer, a CW-only Transceiver or combined transmitter/receiver, mains operated, for /A QTH. Must cover normal HF bands and have first-rate stability, with T9x QRI. AM or SSB of no interest whatever. Offers welcomed. (Birmingham area). — Box No. 4587, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: K.W. Viceroy CW/SSB Tx, 10-160m., in excellent condition and complete with LP filter, aerial relay, PSU's and manual, £75 or near offer?—Firth, G3MFJ, QTHR (Tel. Bradford 43953).

SMALL ADVERTISEMENTS, READERS—*continued*

WANTED: Valve-voltmeter (VTVM), also an amateur-band receiver; home-built with circuit details, or 2DAF-type would do. Full information and price, pse; could collect. (Staffs. area).—Box No. 4586, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE: Seven-valve Top Band Tx, VFO, pi-output, input xtal mic., PSU stabilised for VFO, metered for grid and cathode, with one meter on PSU; also receiver AR88D, in FB condition, with manual; also Xtal Calibrator, with PSU and manual, giving 10/100/1000 kc points; also SWR Bridge, with 0-500 micro-ammeter; also unmodified R.1132A receiver, with Type 3A PSU and meters; also Marconi UHF Wavemeter Type TF-643A, coverage 26 to 350 mc, complete with manual and charts. All this lot in EXCHANGE for SP-600JX or R.C.A. AR-85162 or Hammarlund HQ-170, or similar Rx in mint condition with manual, plus Avo Model 8 or 9, or good Valve Voltmeter. Disposing following valves, new and boxed: TZ40, 40s.; 807, 9s.; EBC35, 10s.; KT61, 9s.; EBC33, 6s.; 25SN7, 10s.; OS-108/10, 8s.; 6X4, 5s. 1d.; S6F17, 14s. 1d.; 6443, 14s. 1d.; 6067, 14s. 1d.; CV-4065, 15s. 1d.; F/6060, 5s. 1d.; 5899, 12s. 6d.; 3B22, 20s.; Z759, 23s. 1d.; 6ASW, 14s. 1d.; 6CL6, 8s. 1d.; 15B, 10s. 1d.; GL2D2, 19s. 1d.; OB2, 5s. 1d.; 6AU6B, 6s. 1d. Also, ex-equipment: G1/371K, 10s. 1d.; 6AM6, 2s. 6d.; 6064, 4s. 1d.; EF92, 2s. 1d.; 12AT7 2s. 1d.; 6021, 3s. 1d. Plus many others, pse enquire. Postage 6d. per valve.—Carey, 89 Pevensey Road, Bognor Regis, Sussex.

SELLING: Eddystone 940 receiver, in mint condition, with plinth speaker, £98. Light alloy rotatable 30 ft. aerial mast, with wall bracket, stay wires and p.t.f.e. bearings, £26. Shorrock Mk.V receiver, VHF/AM, aircraft band 110-144 mc, battery portable, as new, £18. Joystick de-luxe, with matching unit, £8. Buyers collect. — Ring Hunt, Walton-on-Thames 21842, after 7.30 p.m.

FOR SALE: R.C.A. AR88LF, cabinet resprayed metallic blue, RF alignment spot-on, price £21. Suitable transistorised Q-multiplier, 20s. Matching R.C.A. speaker unit, 25s. Buyer collects or pays half-carriage.—Jones, 14 Shakespeare Drive, Caldicot, Newport, Mon.

WANTED: An Eddystone bug key, in perfect condition; would consider Vibroplex, but no Japs. — Barnard, G3VSZ, Lulworth, Rushmoor Avenue, Hazlemere, High Wycombe, Bucks.

SALE: Hallicrafters HT-40 transmitter, in mint condition, with 250-110v. auto transformer, £25. —Nicholson, 6 Craigmount Place, Edinburgh, 12. (Tel. 031-334 5126).

SINGLE-Copy Orders for February issue (4s. post paid), due out on January 26, to reach us by Wednesday 24th—despatch Thursday 25th guaranteed. — Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: K.W. pi-tank, covering 10-160m., with tuning and loading condensers, plate choke and pair 6146's, 75s. the lot. Potted transformers: 504-0-504v. 240mA, plus heaters, 22s.; 6·3v. 2 amps (four times), 12s. 6d.; small plastic meters, under 2-in. square, 0-500 microamp. and 0-1 amp, 14s. each. Steel cabinet, grey hammer finish, with hinged lid, inside dimensions 15in. x 7½in. x 12in., price 25s. All carriage extra.—Edwards, G3KGN, 126 Danescroft Drive, Leigh-on-Sea, Essex.

REQUIRED: Complete 70-centimetre station; price and full details, pse.—Batten, 31A Whitton Road, Hounslow, Middlesex. (Phone 01-570 3154).

SWL, aged 20, intending to work his way round the world, seeks travelling companion, both paying own expenses. Genuine enquiries, pse.—Brown, 17 Stanley Street, Galashiels, Selkirkshire, Scotland.

SALE: Geloso converter, coverage 10 to 80m., complete with internal PSU and in good condition, price £12. — Woodhouse, G2AHY, Fellswood, The Avenue, Crowthorne, Berks.

SMALL ADVERTISEMENTS, READERS—*continued*

SALE: KW-77 receiver, having full pre-sale service by K.W. Electronics. Little used, as 2nd string to KW-2000A, in first-class condition electrically, mechanically and appearance-wise, price £70, no offers.—Sharpe, G3UXU, QTHR. (Hemel Hempstead 54413).

MUST sacrifice Hi-Fi Gear in EXCHANGE for proven all-band Tx. Offering immaculate Heathkit LW/MW/SW AM/FM tuner and 12-watt amplifier, with preamp/gram motor supplies, 3/15 ohm output. Slight cash adjustment as necessary. — Bates, G8BBJ, 88 Penhill Road, Lancing (3338), Sussex.

FOR SALE: Woden Transformers: 500-0-500v. 150 mA, 6·3v. 4A, 5v. 3A; 320-0-320v. 150 mA, 6·3v. 3A, 5v. 2A, ex-equipment, 30s.; modulation xformer, 75w., p/p 807's into 6,000 ohms RF, two off, 20s. each; driver xformers, 6J5-p/p grids, two at 10s. each. Partridge hi-fi 30w. Type WWOFB/O/1·7, 40s.; modulation xformer, 300w., 10,000-ohm push-pull into 6,000-ohm RF, 50s. Prefer buyers collect or carriage extra. Also available Instruction Manuals: SX-28, 11s.; AR88D, 16s.; AR60T/R/S, 11s.; ET-4336B, 6s.; ET-4332B, 11s. Limited quantities, post free.—Cook, G5XB, QTHR (Tel. Kidmore End 2195).

FOR SALE: R.C.A. AR88 communications receiver, plus 6-volt battery PSU M.18319A, with spares and instructions, price £25. Valve tester and data, £5. Transformer 500-0-500v., plus LT's. 40s. (Bucks.) —Box No. 4588, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Faulty receiver, such as CR-100, R.107, R.1155, or what-have-you, any condition acceptable, state price, collection arranged anywhere.—Briscoe, 335 Eton Road, Ilford, Essex. (Tel. 01-478 8141).

WANTED: Original handbook for the R.C.A. AR88LF receiver. — Moss, 18 Whalley Road, Wilpshire, Blackburn, Lancs.

SELLING: BC-221 in first-class condition, with professionally built-in stabilised PSU and charts, price £20. Battery-operated RQ.105s two-speed tape recorder, with all accessories, brand new, £15.— Simpson, 58 Dale Avenue, Hassocks (2394), Sussex.

WANTED: Manual for the Canadian Reception Set R.103, Mk.I, 30s. offered. Also manuals or instruction books on British, American and German Army, Navy and Air Force radio equipment.—Gee, 11 Whitehorse Lane, Stepney, London, E.1.

WANTED: Thermo-couple 0·5 amp meter, also 200 micro-amp moving coil meter.—Lewis, GW8BDV, 37 Edwin Road, St. Thomas, Exeter, Devon.

FOR SALE: General coverage receiver, NC-77X, 550 kc to 30 mc, price £12. Codar PR-30X preselector, 70s. Codar RQ-10, 60s. All in mint condition, buyers to collect.—Pepler, 26 Springfield, Bushey Heath, Herts.

WANTED: Several Pye High-Band Mobile Radiotelephones, suitable conversion to two metres, modified or not. Your price paid for units in good condition.—Phillips, 40 Castle Drive, Cimla, Neath (4998), Glam., South Wales.

FOR SALE: Transistor portable, VHF/MW/LW, 12in. bv 6in. by 3in., in black padded leather, £8. R.C.A. AR88 Rx, in excellent condition, will deliver to 50 miles, £37. Also two new 31 Set transceivers, with headsets, £6 each. WANTED: Modern wobbulator, valve voltmeter and signal generator covering 85 kc to 80 mc approximately; also a DC/PSU for the KW-2000A.—Lord, G3PHN, Newfield House, Moira, Burton-on-Trent, Staffs. (Tel. Swadlincote 7537).

COLLECTOR's Items! Eleven bound volumes "Wireless World," 1922-1929, in excellent condition. Will Exchange for Collins TCS equipment or W.H.Y?—Dotchin, G3WEP/VE3CXG, 34 Princes Street, Peterborough.

SMALL ADVERTISEMENTS, READERS—*continued*

EXCHANGE: Hallicrafters SX-101A receiver, 15-valve dual conversion, coverage 10 to 80m., selectable sidebands, with notch filter and xtal calibrator FOR an Eddystone 940 or Hammarlund SP-600.—Wolloff, 7 St. Mary's Avenue, Humberstone, Leicester.

WANTED: R.C.A. S-meter, in mint condition, for the AR88.—Hervey, 259 Lutterworth Road, Nuneaton, Warwickshire. (Tel. ONU2 4804).

SALE: K.W. Vanguard Tx and AR88D receiver, priced at £65 together, or £34 each. Can be seen and tried.—Hogan G3PUZ, 101 Radbourne Road, London, S.W.12. (Tel. 01-673 2061).

FOR SALE: Eddystone S.840A general coverage receiver, range 480 kc to 30 mc in four bands, with internal speaker, BFO and suitable for 110v. or 200-250v. AC/DC, recently realigned, electrical condition and appearance very good, price £25, with free delivery to 100 miles.—Smith, G3PZZ, 38 Leasway, Wickford (2791), Essex.

SELLING: R.C.A. AR88D, in good condition, with manual, speaker and headphones, price £27 10s. or near offer. Transport arranged in London area. —Claxton, 36 Priory Road, London, N.W.6. (Tel. GLAdstone 0209, day time).

SALE: Lafayette KT-340 (similar HE-30), twelve months old and in very good condition, price £17 or near offer?—Adkins, 72 Courtenay Avenue, Harrow Weald, Middlesex.

SELLING: Brand-new and unused Nombrex Signal Generators: Type AF-30 at £14 10s.; RF-31 at £9 10s. Also Avominor, £6, and an "Advance" valve millivoltmeter, range ·001 to 300v., 4·5 mc, in mint condition (list £49), price £20. (London area). —Box No. 4590, Short Wave Magazine, Ltd., 55 Victoria Stdeet, London, S.W.1.

WANTED: Sideband Equipment in immaculate condition, such as Collins, KW-2000A, Heathkit, Sommerkamp, or similar. Also beam rotator; CSE-2A10 160m. Tx, CSE-2AR Rx, or Top Band SSB Tx, such as Cannonball. Prices and full details, pse.—Baylis, Holt Farm, Fair Oak Road, Bishopstoke, Hants. (Tel. Fair Oak 470).

WANTED: R.216 receiver, price and details.—Vink, 7 Hayes Gardens, Hayes, Bromley, Kent. (Ring 01-462 2005, weekends or evenings; HOLborn 6989 working hours).

BARGAIN! T.W. Communicator two-metre transceiver, perfect, very little used, with J-Beam halo and 4-over-4 slot-fed. All as new. Having moved QTH, activity now low. Bargain all-in at £68. —Lewis, G2BTY, 10 Agar Meadows, Caron Downs, Nr. Truro, Cornwall. (Tel. Perranarworthal 198).

STILL Available, Heathkit SB-10U Sideband Adaptor, as advertised November. Must sell, reasonable offers around £25.—Hoban, G3EGC, 96 Ashworth Lane, Astley Bridge, Bolton (51502), Lancs.

OFFERING £25-£28 for a recent Eddystone EC-10 or EB-35 (FM) receiver. (Essex).—Box No. 4589, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Brand new unopened Trio 9R5-9DE, first reasonable offer? Also new de luxe Joystick, with 3A tuner, offers?—Parker, 43 Trafalgar Court, Tividale, Warley, Worcs.

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. *January, 1968.*