

# The SHORT WAVE Magazine

VOL. XXII

NOVEMBER, 1964

NUMBER 9

## K. W. ELECTRONICS for all your Amateur Radio Requirements

Consult us at K.W. for all your equipment—we may have it in stock

**NEW!** CDR Rotor and Control Unit TR11A £13. Also in stock models AR22, TR44 and "HAM-M."

### WE STOCK:

**KEYS**—Vibroplex Semi-automatic and G.P.O. type. HK1B keyer.

**VFO'S**—Geloso, Miniphase.

**TOWERS**—G3BX1 and S.V.S.

**PHASE-SHIFT NETWORKS**—B and W.

**ROTATORS**—CDR, TR11A, AR22, "HAM-M," & TR44.

**BEAMS**—Mosley, Hy-Gain. 11HC 2 metre curtain.

**AERIALS**—K.W. & Mosley, G3FIF & Webster Band-spinner (mobile).

**MIC'S**—Geloso, Shure, Acos.

**FILTERS** SSB—McCoy Crystal and Kokusai Mechanical.

**FILTERS**—High Pass and Low Pass.

**"WALKIE-TALKIE"**—Tokai Transceiver on 28.5 mc/s. New 200 mW. model.

**AIRDUX COILS**. Complete range ½" to 2" dia.

**RELAYS**—Dow Key Co-axial type.

**SIG. GENERATOR**—Nombrex Transistorized.

**CABLE**—Co-ax 75 and 52 ohm, 15 s.w.g. enamelled copper.

**POLYTHENE CORD**—280 lb. and 350 lb. strain.

**SWR INDICATOR**—KW Match 75 or 52 ohm.

**CONVERTER**—Front-end KW. Geloso.

**PLUGS, SOCKETS, PI COILS, R.F. CHOKES**, etc.

COLLINS 'S' LINE 3253 & 7553



The KW77 Receiver

### K.W. TRANSMITTERS

**KW "Viceroy"** S.S.B. Transmitter MK. IV with built-in Power Supply £156

(Additional ½ lattice filter, £9 extra)

**KW500 Linear Amp.** 500 watts p.e.p., £78 10s.

**KW "Vanguard"** A.M. and C.W. 10-80m. £69.6.0 10-160m. £73.10.0 Kits also available.

**KW160.** Top band transmitter with a punch, £30.10.0

Send for details.

Carriage extra

Awarded Silver Plaque, Radio Communications Exhibition, Seymour Hall, London, 1963



**KW2000 SSB TRANSCEIVER AND A.C. POWER SUPPLY**  
10-160 metres. Mobile and Fixed Station

Easy Terms Available

**NEW!** 50/- each  
6146B tubes 2/6 postage & packing

Importers of U.S.A. Equipment

### KW MODELS FOR 1965

**KW 2000.** SSB Transceiver

**KW 600.** Linear Amp.

**KW 2000A.** SSB Transceiver (180 watts)

**KW 2000C.** Commercial 4-chan. Tcvt.

**KW 77.** Receiver—Trip. Conversion

**KW 707.** Receiver—Mech. Filter

**KW "Vespa."** SSB Transmitter

**KW "Viceroy."** SSB Transmitter

**KW 200.** Transverter, 2 metres

**KW "Vanguard."** AM/CW Tx

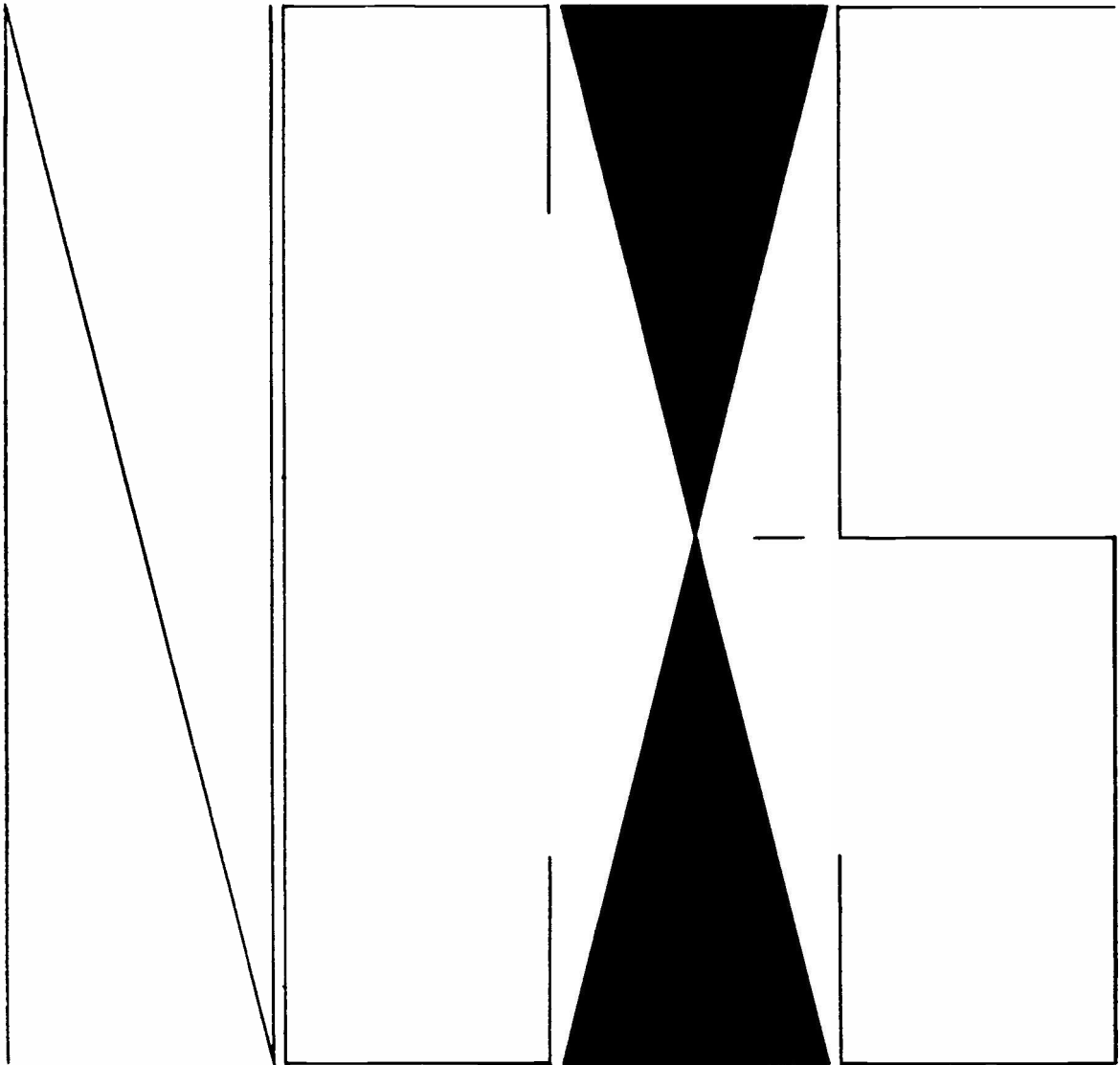
... and more to come ...

# KW

## ELECTRONICS LTD Vanguard Works

1 HEATH STREET, DARTFORD, KENT

Cables: KAYDOUBLEW, Dartford Phone: DARTFORD 25574

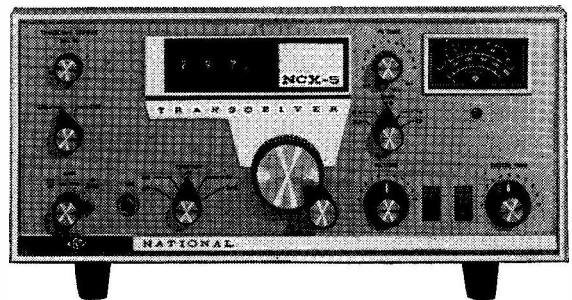


## NEW NATIONAL NCX-5 All Band TRANSCEIVER

The NCX-5 is far superior in features and performance than any of the finest equipment previously available. Designed as a total amateur station for the 80-10 metre bands, without compromise for either mobile or fixed station operation. For use with the NCX-3 power supply.

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Regret no C.O.D. orders accepted

**VALVES FOR RADIO, T.V. AND AUDIO APPLICATIONS**

OA2 ... 6/16AT6 ... 4/10D1 ... 7/35Z4G ... 4/EBF83 ... 7/16EL81 ... 8/6PCC85 ... 7/TP25 ... 5/	OB2 ... 6/16AU6 ... 6/10F1 ... 14/35Z5GT ... 6/EBF89 ... 6/19EL84 ... 5/PCC88 ... 10/TP2620 ... 7/6	OB3 ... 6/16AV6 ... 6/10F3 ... 8/50B5 ... 7/EC80 ... 8/EL85 ... 8/PCC89 ... 10/TT21 ... 32/	OC3 ... 6/16BE6 ... 5/10F9 ... 10/50C5 ... 6/EC88 ... 12/EL86 ... 7/6PCC189 ... 10/U25 ... 11/	OD3 ... 5/16BH6 ... 7/10F18 ... 9/50CD6G ... 25/EC90 ... 2/EL82 ... 6/PCF80 ... 6/U26 ... 11/	IA5GT ... 5/16BJ6 ... 8/10L1 ... 7/650L6GT ... 6/6ECC91 ... 5/EM31 ... 5/PCF82 ... 7/U191 ... 11/	IA7GT ... 8/16BK4 ... 20/10LD11 ... 10/757 ... 16/ECC84 ... 6/EM34 ... 9/PCF84 ... 8/U251 ... 12/6	IB3GT ... 7/16BK7A ... 8/10P13 ... 12/6805 ... 30/ECC85 ... 6/EM80 ... 6/PCF86 ... 8/U281 ... 13/	IH5GT ... 7/16BN6 ... 7/10P14 ... 12/6807 ... 9/EC88 ... 10/EM81 ... 7/6PCF80 ... 10/U282 ... 14/	IL6 ... 17/16BQ7A ... 8/12AH7GT ... 5/829B ... 60/ECF80 ... 7/6EM84 ... 8/PCF802 ... 10/U301 ... 12/	IN5GT ... 8/16BR7 ... 11/612AH8 ... 11/832 ... 20/ECF82 ... 7/6EM85 ... 9/PCF806 ... 13/U403 ... 7/	IQ5GT ... 8/16BR8 ... 5/12AQ5 ... 7/954 ... 5/ECF86 ... 11/EM87 ... 9/PCL81 ... 9/U801 ... 18/	IR4 ... 6/16BS7 ... 16/12AT6 ... 5/955 ... 3/ECM21 ... 10/EN31 ... 10/PCL82 ... 6/UA020 ... 7/6	IR5 ... 5/16BW6 ... 9/12AT7 ... 4/956 ... 2/ECM32 ... 12/EN32 ... 10/PCL83 ... 8/3UAB80 ... 5/6	IS4 ... 5/16BW7 ... 9/12AU6 ... 6/957 ... 5/ECM42 ... 8/EY1 ... 7/PCL84 ... 7/UAF42 ... 8/	IS5 ... 4/16CC21 ... 12/12AU7 ... 5/958 ... 4/ECM81 ... 6/EY81 ... 8/PCCL85 ... 9/UBC41 ... 6/6	IT4 ... 3/16CB6 ... 5/12AX7 ... 6/959A ... 8/ECM83 ... 7/6EY81 ... 8/PCCL86 ... 9/UBC81 ... 7/	IT5GT ... 6/16CD6G ... 17/12BA6 ... 6/2050 ... 12/6ECL80 ... 6/6EY86 ... 6/PEN45 ... 6/6UBF80 ... 6/6	IU4 ... 5/16CH6 ... 6/12BE6 ... 5/5654 ... 8/ECM82 ... 7/6EZ80 ... 5/6PEN45DD ... 7/	IU5 ... 6/16CL6 ... 9/12BH7 ... 8/5763 ... 10/ECL83 ... 9/EZ81 ... 4/6	IX2A ... 7/16CW4 ... 12/12Q7GT ... 5/6080 ... 25/6ECL86 ... 9/GZ32 ... 10/PEN46 ... 6/UCC84 ... 9/	IX2B ... 7/16DS4 ... 15/19AQ5 ... 5/6146 ... 27/6EF36 ... 4/6GZ34 ... 10/PEN220A ... 7/UCC85 ... 6/6	2C51 ... 2/16F8G ... 5/20F2 ... 15/AZ1 ... 9/EF37A ... 8/GZ37 ... 9/PEN348 ... 12/UCC80 ... 9/6	2CW4 ... 12/16F11 ... 6/20L1 ... 14/AZ31 ... 8/EF39 ... 5/HL2 ... 3/PEN453DD ... 10/UCH21 ... 8/6	2D21 ... 6/16F13 ... 6/620P1 ... 14/AZ41 ... 6/6EF40 ... 9/HLK ... 3/	3A4 ... 4/16F17 ... 6/20P3 ... 12/CL33 ... 9/EF41 ... 7/6HL23 ... 6/PL36 ... 8/6UCH81 ... 7/	3A5 ... 7/16F23 ... 9/620P4 ... 14/CY31 ... 6/6EF42 ... 6/HL23DD ... 6/PL38 ... 16/UCL82 ... 6/	3D6 ... 4/16F24 ... 11/20P5 ... 12/DAF91 ... 4/6EF54 ... 6/HR2 ... 15/PL81 ... 7/UCL83 ... 10/	3Q4 ... 6/16F28 ... 10/25A6G ... 5/DAF92 ... 6/EF55 ... 8/HR7 ... 15/PL82 ... 5/6UF42 ... 7/6	3Q5GT ... 6/16F33 ... 6/25L6GT ... 8/DAF96 ... 6/EF80 ... 5/KT8C ... 20/PL83 ... 3/6UF42 ... 7/6	3S4 ... 5/16K8GT ... 8/25Z4G ... 7/DP96 ... 6/EF83 ... 10/KT41 ... 7/6PL84 ... 6/6UF80 ... 6/6	3V4 ... 5/16L1 ... 8/25Z5 ... 7/6DK96 ... 7/6EF85 ... 6/6KT44 ... 5/PL500 ... 15/UF85 ... 7/	5R4GY ... 9/16L18 ... 8/25Z6GT ... 8/6DL96 ... 6/6EF86 ... 6/6KT61 ... 12/6PX25 ... 10/UF86 ... 6/	5U4GB ... 6/16N7 ... 8/28D7 ... 7/DM70 ... 5/EF94 ... 6/6KT63 ... 7/6PY31 ... 7/UF89 ... 6/	5V4G ... 8/16U4GT ... 10/630C15 ... 10/DY80 ... 7/EF95 ... 5/6KT66 ... 15/6PY33 ... 9/UL41 ... 7/6	5Y3GT ... 5/16U8 ... 7/630C17 ... 12/DY86 ... 8/EF98 ... 10/6KT88 ... 20/6PY81 ... 5/6UL84 ... 6/	5Z4GT ... 8/16V6 ... 9/30F5 ... 9/EBBC8 ... 14/EF183 ... 8/N78 ... 15/6PY82 ... 5/UM4 ... 10/	6/30L2 ... 10/16X4 ... 4/30FL1 ... 11/EI80F ... 15/EF184 ... 8/NR88 ... 12/6PY83 ... 6/UM80 ... 7/	6AB4 ... 6/66X5GT ... 5/630L17 ... 13/EAB8C80 ... 7/EF60 ... 10/OCPT1 ... 2/6PY88 ... 8/6UY21 ... 8/	6AF4 ... 11/16Y6G ... 6/30P12 ... 10/EA442 ... 8/6EL33 ... 12/6ORP12 ... 12/6PY80 ... 8/6UY41 ... 5/6	6AG7 ... 6/16Y8 ... 7/30P19 ... 14/EB41 ... 5/EL34 ... 10/6ORP60 ... 10/6QV03-10 ... 10/UY85 ... 5/	6AH6 ... 10/16Y8V6 ... 7/30PL1 ... 11/6EBC33 ... 7/EL37 ... 17/6PC86 ... 10/6QV03-10 ... 10/W81M ... 6/	6AK5 ... 5/16YD7 ... 7/35A5 ... 11/6EBC41 ... 7/EL38 ... 17/6PC88 ... 12/TH41 ... 10/X65 ... 5/	6AM6 ... 4/10C1 ... 10/35L6GT ... 7/EB80 ... 6/6EL41 ... 7/PC97 ... 9/TH233 ... 6/X66 ... 8/	6AQ5 ... 6/10C2 ... 12/35W4 ... 5/EBF80 ... 6/6EL42 ... 8/6PCC84 ... 5/6TH2321 ... 7/X79 ... 18/
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**TRANSISTORS**

OC25 ... 8/16OC45 ... 6/OC77 ... 8/	OC28 ... 17/6OC70 ... 6/OC139 ... 12/	OC35 ... 15/OC71 ... 5/OC170 ... 8/	OC42 ... 8/OC72 ... 8/OC171 ... 9/	OC44 ... 6/OC76 ... 6/OC204 ... 10/6
Matched pair of OC81 with one OC81D ... 12/6				
R.C.A. 2N410 (OC45) ; 2N412 (OC44) ... each ... 3/6				
R.C.A. set of two 2N412 and one 2N410 ... 8/				
G.E.T.115 ... 7/ G.E.T.573 ... 20/				
Matched pair of G.E.T.573 ... 35/				
Micro-Alloy :				
MAT101 ... 8/6 MAT121 ... 8/6				
Philco T1166 ... 6/				

**SEMI-CONDUCTOR POWER RECTIFIERS**

Silicon :	
BY100, 700 p.i.v., 450 mA ...	7/
DD58, 800 p.i.v., 800 mA ...	12/6
OA211, 800 p.i.v., 400 mA ...	7/6
BYZ10, 800 p.i.v., 5 amps ...	7/6
Germanium :	
GJ3M, 200 p.i.v., 400/800 mA ...	3/6
GJ5M, 300 p.i.v., 400/800 mA ...	3/6
GJ7M, 80 p.i.v., 500/1,000 mA ...	3/6

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Self-contained portable wavemeter, crystal controlled, covering a range of 1900 to 8000 kc/s. for heterodyning, with an accuracy of ± 2 kc/s. The instrument will also provide crystal check points from an internal 100 kc/s. crystal up to 25 mc/s. at 1 mc/s. intervals. Power supplies required 6v. accumulator. Price, perfect condition and guaranteed ... £3/10/- P.P. 15/-

**GERMANIUM DIODES**

CG10E ... 1/6	OA81 ... 2/
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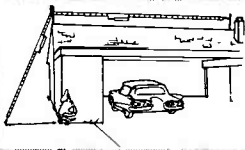
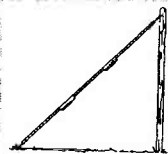
**NATIONAL NC77X £28.14.1, NC121 £53.6.11, NC190X £89.18.2, NCX3 £148.8.4, NCX5 £235.0.0, LAFAYETTE HA63 £27.10.0, HE30 £35.0.0, HE-40 £19.19.0, SECOND-HAND 640, 740, 750, 840A, 680, 888A, EC10, G209, KW Viceroy, KW160, Minimitter Top 2-7, Drake 2B, Redifon R50M, AR88, CR100, SX28, HRO, RG-1, BC221, LM14, RA-1B, etc., etc. JOYSTICK antenna and ATU, and many more items too numerous to list.**

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# BRIAN J. AYRES & CO.

# the EL TORO AERIAL

by MOSLEY



### ▶THREE MODELS

Mosley El Toro aerials are available in three models, TW-3X, NS-3 and TW-3X Jr., designed to give outstanding performance.

### ▶THREE BAND OPERATION

Mosley TW-3X and TW-3X Jr. aerials operate on 20, 40 and 75/80 meters. Mosley NS-3 (Novice Special) operates on 15, 40 and 80 meters. All Mosley aerials feature pretuned, compact design and excellent broad band characteristics.

### ▶TWO POWER RATINGS

Mosley TW-3X has an AM rating of 1000 watts input to the final amplifier and a CW/SSB rating of 2000 watts P.E.P. Mosley TW-3X Jr. and NS-3 (Novice Special) have ratings of 300 watts on AM and 500 watts CW or 1000 watts P.E.P. on SSB.

Mosley El Toro aerials are trap type grounded quarter wave aerials using a unique method of tuning and a single 52 ohm coax line. Aerial is 58 ft. long and can be mounted to fit most any location. No radials are needed when mounted at ground level. Aerials come pretuned, in kit form and can be easily adjusted to resonate at any portion of the rated bands.



## Model V-4-6

SWR with response exceptionally flat across full width of each band. Weather-proof traps are of Hi-Q design wound on grooved polystyrene forms. Will maintain resonant points under wide variations of temperature and humidity. Rated to 1 KW. Rugged, lightweight aluminum tubing telescopes to height of 20'. Pre-drilled and color coded for fast, easy assembly. Supplied with heavy duty base mount that is made of molded "Cycloc" and incorporates a coax fitting and ground strap. Polyethylene guy rope, hardware and detailed instructions are also furnished. Normal ground installations required 4 radials, 33' each; Shipping weight, 12 pounds.

## Model D4-BC-A

Beautifully constructed base loading coil permits operation of V-4-6 Vertical Aerial on 75 and 80 meter bands. Rated to handle a full kilowatt (AM), coil is space wound. Mounts quickly and easily on base section of vertical. With silver plated coax connector. Shipping weight, 3 pounds.

## Commando

### II



Commando II incorporates many features which make it the Outstanding Transmitter. Buy Today! Only reliable "air-tested" circuitry is used. Power Supply is the latest, cool-running Silicon Rectifier, fuse protected and conservatively rated. Power Amplifier employs two 6J46 Tetrodes operating at 750 Volts Glass AB1 Linear Amplifier Service to give Maximum I.C.A.S. rating at 180 watts P.E.P. The Pi Tank circuit band-switching 80 thru 10 Meters gives efficient loading into low impedance coaxial lines. Sideband generation at 435 kcs. with half-lattice crystal filter for 45 db. sideband/carrier rejection. Sideband switch in "normal" position is correct for band-in-use, but, an "inversion" switch gives choice of alternate sideband.



**Mosley Electronics Ltd.**

48, Valley Road, New Cotessey,  
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Nov. 1964

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Advanced design and craftsmanship plus an unequalled reputation proved by the many hundreds of testimonials received from CODAR users is your guarantee of complete satisfaction. Only the best is good enough for CODAR—Mullard, Brimar, Jackson, Denco, Electroniques, Thorn, A.E.I. are just some of the famous names built into CODAR equipment. Illustrated leaflets available on request.

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CODAR CR66  
Communication  
RECEIVER**

The finest superhet kit ever offered.  
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Carr. 7/6 on all models  
(H.P. Terms available)

**CODAR R.F. PRESELECTOR**  
Will considerably improve the performance of any superhet receiver. "Results are amazing." "Well worth the money."

**Model P.R.30.** Uses EF183 Frame Grid tuned R.F. Amplifier and provides up to 20 dB gain plus substantial image rejection, improved signal/noise ratio and selectivity. Selector switch for either dipole or single wire antenna. Power requirements 180-250 volts 12 M/a H.T., 6.3 volts .3 amp. L.T. Size: 8½" x 5" x 4". Ready built, complete with cables, plugs and instructions, £4. 17. 6, carr. 3/-.

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**CODAR "Q" MULTIPLIER**

**Model R.Q.10.** For use with any superhet receiver with an I.F. between 450 and 470 kc/s. Provides considerable increase in selectivity for either peaking or rejecting a signal on AM, CW or SSB. Both PEAK and NULL functions tunable over receiver I.F. passband. B.F.O. facility included. Size: 8½" x 5" x 4". Power requirements 180-250v. H.T. at 5 M/a. 6.3v. .3 amp. L.T. Ready built, complete with cables, plugs and instructions, £6. 15. 0, carr. 3/-.

**Model R.Q.10X.** Self-powered version for 200-250v. A.C. and also provides 25 M/a. at 200v. H.T. and 6.3v. 1 amp. L.T. for other accessories, £8. 8. 0, carr. 3/-.

**CODAR A.T.5, 12 WATT  
2 BAND TRANSMITTER.**

The newest, most compact transmitter for fixed or mobile use on 160/80 metres. "The tiny TX with the BIG voice." Size only 8½" x 5" x 4" (Base area is less than 2/3rds of this page). High stability new type calibrated V.F.O. 1.8-2.0 mc/s. and 3.5-3.8 mc/s. (up to 4 mc/s. export). Air-spaced CODAR-QOIL Pi-net output. P.A. Plate current meter, plus neon indicator. Plate/screen modulator. AM/CW switch and Panel key jack Plug changeover for 6 or 12 volt heater supply, £16. 10. 0, carr. 4/-.

**A.T.5. POWER  
SUPPLY  
UNITS.**

Type 250/S. For 200/250v. A.C. with Standby/Net/Transmit and aerial changeover switching, stabilised V.F.O. supply, neon standby/transmit indicator, £8.0.0, carr. 5/-.

Type 12/MS 12v. Transistor power supply unit available shortly.

**CODAR-QOILS AIR-SPACED INDUCTORS.**

A complete range of low loss air-spaced inductors developed by CODAR and suitable for all types of circuit application. Over 40 different sizes from ¾" to 3" diameter suitable for all types of circuit application including V.F.O. P.A. Tank, Pi-network, A.T.U., aerial loading, etc. Full data and prices on request.

**Codar-Qoil**  
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Penfold Road, Felixstowe, Suffolk.

**CODAR RADIO COMPANY**

**BANK HOUSE, SOUTHWICK SQUARE,  
Southwick, Sussex. Tel. 3149**

Canada: Codar Radio of Canada, Tweed, Ontario.

# NEW from Labgear

## THE ONE SIXTY SERIES

### FOR MOBILE AND FIXED INSTALLATIONS



#### The One Sixty Topband Mobile/Fixed Transmitter

- Full 10 watts 1.8–2.0 Mc/s.
- High level modulation for punch.
- Build-in aerial c/o relay.
- Netting — c.w. — Remote switching facilities.

Price £15.15.0

#### Mobile Power Supply Unit

- 12v. D.C. input.
- 300v. 150 mA D.C. output.

Price £8.0.0

#### Fixed Station Power Supply Unit

- 200–250v. 50 c/s. A.C. input.
- 6.3 or 12.6v. A.C. output.
- 300v. 150 mA D.C. input.

Price £7.7.0

#### The One Sixty Topband Mobile Converter

- Connects to any car radio.
- Covers 1.8–2.0 Mc/s.
- I.F. output in MW band.
- Crystal controlled.

Price to be announced

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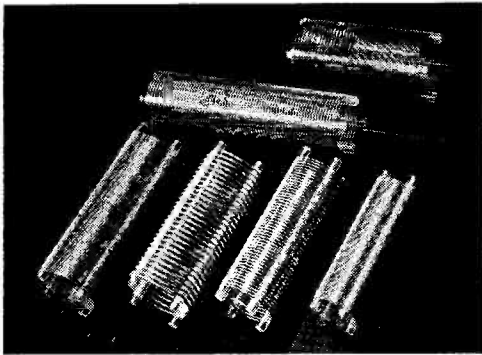
# ELECTRONIQUES

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'QOILPAX'  
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## HIGHLIGHTS of the 1964 I.R.C. EXHIBITION

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#### THE PERFECT COILS FOR ANY TX DESIGN

A complete range of over 40 different sizes from 3/8" D. to 3" D. Beautifully engineered. High 'Q' and low losses. Ideal for Pi Tank Circuits, Aerial Tuning Units, Loading Coils, etc.

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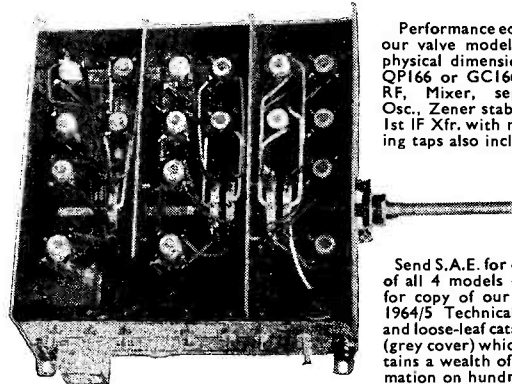
**PATHFINDER WORKS, PENFOLD ROAD, FELIXSTOWE, SUFFOLK.**

### "QOILPAX"

Our famous "QOILPAX" now **FULLY TRANSISTORISED!**

MODEL HB166/T 6 BANDSPREAD HAM BANDS

MODEL GC166/T 6 GENERAL COVERAGE BANDS



Performance equal to our valve models. All physical dimensions as QP166 or GC166. RF, Mixer, separate Osc., Zener stabilised. 1st IF Xfr. with matching taps also included.

Send S.A.E. for details of all 4 models or 2/6 for copy of our latest 1964/5 Technical Data and loose-leaf catalogue (grey cover) which contains a wealth of information on hundreds of our components and

complete data on our special kits for such famous designs as the G2DAF Mk. II RX and SSB TX, the G3BDQ RX and SSB TX, the G3RKK prize winning RX and 50 watt AM/CW TX, the G3KVG RX, etc., etc.

**Phone: 4500**

## SIDEBAND ENGINEERS TRANSISTORISED SSB GEAR

135 watts. P.E.P.  
Built-in Power Supply and Loudspeaker.  
18 Transistors, 18 diodes and 1 zener diode.

Low current drain.  
Collins mechanical filter.  
The only tubes used are two, rugged PL-500.

Bandswitch and tuning capacitor are interlocked by Geneva movement making it impossible to tune to a spurious frequency.  
Size: (Overall) 5 1/2" H., 12" W., 10" D.  
Weight: 15 lbs.

# NEW

**THERE'S A 1 KW SBE LINEAR TOO!**

# GREEN & DAVIS

HORNSEY ROAD, LONDON, N.7.

Tel.: NORth 6871

#### S.B.E.

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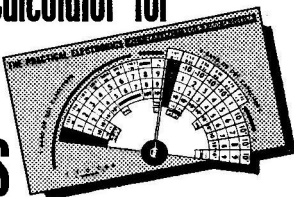
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# The SHORT-WAVE Magazine

## EDITORIAL

### **Miniaturisation**

*This is one of those words which, even if it is ugly and un-English, is very expressive and does not require to be explained to any radio man. Except perhaps in one particular sense.*

*For it does not only mean equipment designs made physically small simply by bunching everything together, to a greater degree than has been accepted practice in the past. It means making full and proper use of modern parts, and especially transistors, so that much less space is taken up without troubles such as interaction and over-heating. In the field of miniaturisation, we are well served for most components—not only an excellent range of valves, but also condensers, resistors, coil packs and mountings and fittings such as jacks, knobs, dials and switches. The only exception seems to be power supply components; it is still necessary to provide a good deal of space for even a modest HT unit if it is to be kept within its ratings.*

*However, in spite of the potentialities of miniaturisation, in Amateur Radio circles full advantage has not yet been taken of all the possibilities. One still sees a great deal of home-constructed equipment, larger and heavier by far than it need be, which could have been scaled down to something much neater, lighter and more compact with no loss of efficiency.*

*Some of the latest commercial designs, on the other hand, are excellent in these respects, and show what can be done by the proper use of modern components and constructional techniques.*

*While among radio amateurs there are some superb craftsmen, capable of turning out hand-built work up to the highest standards of electrical and mechanical design, the majority of us have not yet really got down to this business of miniaturisation in the way it should be tackled for our particular requirements.*

*Here, indeed, is food for thought and an interesting field for constructional activity during the months of semi-darkness now before us.*

*Austin Foxgk,  
G6FO.*

---

## RECEIVER PRE-SELECTOR UNIT

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—INTERESTING  
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TUNER

M. A. SANDYS (G3BGJ)

THE simple double superhet described by the writer in the March, 1964, SHORT WAVE MAGAZINE was unusual in that it utilised the transmitter *pi*-network as the first RF tuned circuit. This fed, via a cathode follower, the grounded-grid RF stage of the receiver. The arrangement worked admirably but suffered from some minor shortcomings which were attributed mainly to a lack of front-end selectivity. The circuit, therefore, was modified to include an extra signal tuned circuit. In its new form, as a pre-selector which is an integral part of the transmitter, it may appeal to the home constructor as a simpler method of improving the front of his receiver than building a separate unit.

### The Pre-selector

Fig. 1 shows the circuit of the pre-selector and the relevant portions of the transmitter and receiver.

One half of an ECF82 acts as a pentode RF amplifier and the other half as a cathode follower to feed into the receiver. A neutralised triode or grounded grid stage was originally considered for V1A but ease of modification dictated the choice of the noisier pentode. Its use does not appear to have impaired the performance of the receiver on the higher frequencies. The extra gain, however, caused some cross-modulation effects to appear. To reduce these the original 100  $\mu\text{F}$  coupling capacitor from the *pi* circuit was replaced by a 30  $\mu\text{F}$  Philips trimmer (C1) and the capacity reduced until interference of this type was indiscernible. A beneficial side effect of this was to cure an annoying defect of the original circuit, namely that on the higher frequencies the tuning of the *pi* circuit for transmission did not quite correspond to the setting for optimum reception. The *pi* circuit is coupled to the pentode grid by relay contact A1, this contact earthing the grid when transmitting. The relay coil is in the anode circuit of the driver and operates when the Tx HT is switched. The complete circuit of the transmitter itself was described

### Table of Values

Fig. 1. Circuit of the Pre-selector by G3BGJ

C1 = 30 $\mu\text{F}$ Philips trimmer	R5 = 15,000 ohms
C2, C3 = .01 $\mu\text{F}$	R6 = 100,000 ohms
C4 = 300 $\mu\text{F}$ two-gang (see text)	L1 = Osmor QO4
C5 = 16 $\mu\text{F}$ , 350v. elect.	L2 = Osmor QO2 (link removed)
C6, C7 = 1 megohm	MR1 = 250v. 50 mA rectifier
R1 = 1 megohm	T1 = 6.3v. 1.5A heater transformer
R2 = 47,000 ohms	V1 = ECF82
R3 = 270 ohms	
R4 = 47 ohms	

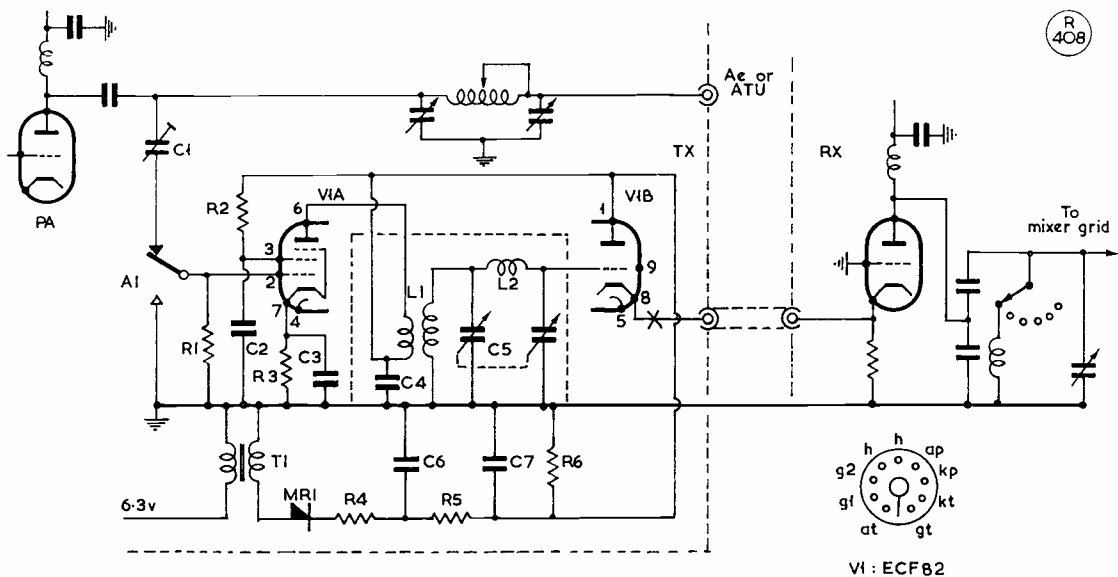


Fig. 1. The pre-selector designed by G3BGJ to work between the transmitter tank circuit and the receiver which, in his case, has a grounded-grid RF stage. The circuit could, however, be used with any receiver having a low-impedance input. The circuit elements L1, L2, C5 constitute an all-band tuner (see text) covering from 3.5 to 28 mc without any coil change being involved. The sketch at Fig. 2 shows how the bands appear on the tuning dial. This circuit configuration is used in commercial practice to obtain all-band coverage.

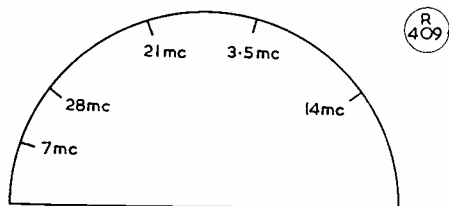


Fig. 2. This sketch shows the sequence in which the amateur bands come up on the all-band tuner L1, L2, C5 shown in Fig. 1. The only precaution to be observed when setting up the tuner is to ensure that no two bands can appear at the same setting.

in the October, 1962, SHORT WAVE MAGAZINE.

**All-Band Tuned Circuit**

The pentode anode is coupled to an all-band tuned circuit *via* the link on the low-frequency coil L1. For those unacquainted with this double-coil arrangement (now much used in commercial gear), the coil L2 constitutes a short circuit at low frequencies and L1 is tuned by the two sections of the ganged condenser in parallel. On the high frequencies L1 may be regarded as an RF choke and L2 is tuned by the two sections in series. By suitably choosing L1 and L2 all amateur bands from 3.5 mc to 28 mc can be covered by one sweep of the tuning capacitor. The cores of L1 and L2 were adjusted to tune the amateur bands in the sequence shown in Fig. 2. The procedure is to set C5 to near minimum, peak L1 for maximum signal on 7 mc, then rotate C5 through about 20 degrees and peak L2 for maximum on 28

mc, repeating these operations several times. The other bands may then be tuned in to ensure that no two appear at the same setting. A two-gang condenser of 300  $\mu\mu\text{F}$  per section was available at the time of building and was used for C5, but one of 200  $\mu\mu\text{F}$  per section should suffice. A slow-motion drive is desirable for ease of tuning. The all-band tuned circuit is connected to the grid of the triode section, the cathode of which feeds directly to the grounded-grid stage of the receiver.

**Power Unit**

The original power supply, a half-wave rectifier fed from a heater transformer placed back to front, was found to be adequate providing about 90v. for the valve anodes. For receivers with little front-end gain higher voltages could be used on the anode and screen of the pentode. Replacing R5 by a smoothing choke would increase the HT to about 250v. An RF gain control might then be beneficial.

This pre-selector, whilst being a decided improvement on the original circuit, could be used to even greater advantage with some of the older receivers. When connected to the writer's R.1155 it transformed an almost dead 14 mc band into one full of readable signals. If used to feed the aerial link coupling of a conventional receiver, a small resistor and RF by-pass condenser in parallel should be inserted at point X. In some receivers, such as the R.1155, the aerial link may not go direct to chassis; an alternative in this case is to connect a 300-ohm resistor between V1B cathode and earth, the output being taken from the cathode *via* a .001  $\mu\text{F}$  capacitor.

**SCREENING THE TV RECEIVER**

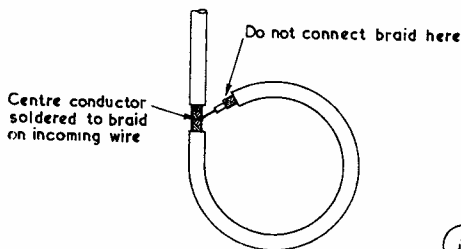
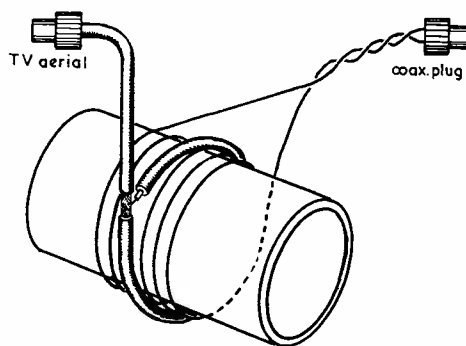
**AGAINST TRANSMITTER INTERFERENCE — USING THE FARADAY LINK**

**E. CARR (G3SDE)**

UPON acquiring a compact self-contained transmitter of a popular commercial make, the writer found himself bedevilled by TVI. This just would not respond to the usual treatment of low-pass, high-pass and mains filters, and became a problem for much discussion and head scratching.

The TV interference manifested itself in the form of break-through on Sound, and line breaking with patterning on the local ITV Ch. 10 whenever the

This sketch illustrates the discussion by G3SDE, showing how a Faraday screen can be applied to the input of a TV receiver to minimise, if not eliminate, TVI. As this circuit is so easy to put together, it is worth trying, though the coil value may call for a little experiment, and a good deal depends on the level of signal at the TV aerial.



Tx was radiating on any of the three amateur bands 160, 80 and 40 metres.

The ITA station is only 15 miles away from the writer's QTH and the signal is exceptionally strong. Indeed, it was found that a short piece of wire plugged into the TV receiver gave very good results on Ch. 10 during QSO's but replacing the correct aerial and coax lead reintroduced the interference pattern. At this point it should be mentioned that BBC/TV on Ch. 2 did not appear to suffer. Consultations with the manufacturers of the TV and the transmitter did not give any clue to the cause of the bother.

Considerable investigations were carried out into the possibilities of how 10 watts on 1.9 mc could possibly give harmonics or other responses on the 199 mc band (Ch. 10) and attempts to overcome the difficulty included moving the TV aerial around, also the Tx aerial. Many different types of aerial couplers were tried without any improvement.

#### Solution

It was eventually discovered that by disconnecting the braid of the TV aerial the interference pattern was cleared—but of course the TV picture had a "ringing" effect, *i.e.* black outlines following white, and *vice versa*. This suggested that some better means of coupling into the TV Rx should be sought.

The coil unit shown here was found very effective in coupling the aerial to the TV set while isolating the Tx interference from the braiding. Although an old TV receiver is in use, the cure has been found effective and details are passed forward for the benefit of anyone who may have tried all the usual filter systems without success.

Naturally, it is not guaranteed to cure every case,

and of course the usual procedures should be adopted in tracing TVI—but it is offered as another weapon in the amateur's armoury for TVI difficulties.

The device consists of 5 turns of 22g. copper wire, polythene insulated, wound on a 2in. o.d. former and spaced about  $\frac{1}{4}$ in. between turns; the ends are twisted together to form a "flex" and are terminated in a coax plug, one lead to the centre and the other to the shell, and taken to the TV/Rx input—see p.525.

Around the centre of this winding and over it is made one Faraday Link turn; this consists of a length of TV coax cable with the centre conductor soldered to the outer braiding of the incoming line at the point where the link completes one turn—see sketch. The loose end is fitted with a coax termination in the usual way to take the TV aerial.

It may be necessary to reverse the connections to the 5-turn winding and even to fit the Faraday Link in the opposite direction to that originally on the coil. Some experimentation with turns direction and coupling may be required to arrive at the condition which gives a clear picture. Incorrect phasing of the coil assembly results in the TV picture showing the "ringing effect" and the negative images which are characteristic of mismatch and standing waves on the aerial feed line.

The unit should be mounted in an insulating box—a metal container is *not* recommended as the metal work tends to permit the interfering signal to by-pass the isolator. Orientate the RF coil to avoid pick-up from the scan coils around the tube base, or the TV screen may exhibit a vertical white line along the left-hand side. Keep the twisted leads from the coil as short as practicable and mount the assembly as close as you can to the aerial socket on the Rx.

## REALITIES OF BEAM AERIAL GAIN

WITH PARTICULAR REFERENCE  
TO THE E-M-E PATH

B. SYKES (G2HCG)  
(*J-Beam Aerials, Ltd.*)

**T**HE advent of Moonbounce is a reality for the amateur rather than a dream has only been brought about by recent improvements in the performance of equipment. The Moonbounce path is completely unforgiving in terms of performance—unlike the early amateur short-wave experiments when the results exceeded the apparent realms of possibility. The earth-moon-earth path is nearly half a million miles, and the attenuation over this distance is a constant, and is accurately known. The reflection co-efficient of the moon is also

accurately known, and there are thus no short cuts to the performance required. Transmitter power is limited by regulations, and is accurately known. Adequate receiver performance is relatively easy to obtain and the limitation here is cosmic noise rather than performance capability. The remaining requirement is adequate aerial gain, and this inevitably works out to a figure in excess of 20 dB over a half-wave dipole. The gain of an aerial is very often an unknown quantity taken on trust! Anyone who has studied aerial theory is able to form his own conclusions as to the possible gain of a given aerial, but many people have to rely upon published information with no means of checking the figure claimed.

There is one basic rule with aerial gain figures, namely that to double the gain of an aerial, *i.e.* to add 3 dB, it is necessary to double the size of the aerial. This basic rule applies in almost every case. For instance, stacking two identical aerials increases the gain by 3 dB, or doubling the length of a Yagi increases its gain by 3 dB, while adding reflectors to a stack of dipoles also increases the gain by 3 dB. This provides a very simple rule—



of-thumb method of checking up on published gain figures.

### Some Facts

Commonest of beam aerials is the Yagi and the gain of a Yagi is governed by its *physical length*, rather than by the number of elements used. This is a most important point to remember. A typical example is the use of the long-Yagi technique, with directors spaced at  $4\lambda$ . Using this technique 13 dB of gain over a half-wave dipole can be obtained from ten elements on a boom length of some two wavelengths. An aerial using 20 elements could be manufactured on this same boom length of two wavelengths, but its performance would not exceed the 13 dB obtainable from 10 wide-spaced elements. Bandwidth would perhaps be made greater with the additional number of elements, but overall gain is basically limited by the length of boom.

Basic fact is, therefore, that every additional 3 dB of gain means doubling the size of an antenna. This very rapidly results in the "law of diminishing returns" when beam design is considered for an earth-moon-earth project for a gain in excess of 20 dB. That 20 dB may well necessitate a system measuring 12ft. x 12ft. x 12ft.; increasing the number of elements in this 12ft. cube will not increase the gain, and there is no way around the fact that to get 23 dB will mean an aerial measuring 24ft. x 12ft. x 12ft.

Finally to measure the gain of a large E-M-E aerial array is very difficult indeed. It will normally be made up of a large number of units, and if the gain of each of these units is accurately known, the gain of the whole array can be calculated. A useful basic aerial for a 2-metre moonbounce array is the 10-element Long Yagi, having a gain of 13 dB over a half-wave dipole. Utilising the fact that each 3 dB of additional gain means doubling the size, two 10-elements will give 16 dB, four will give 19 dB, and eight will give 22 dB—which is about the minimum to ensure results on the earth-moon-earth path.

### Stacking and Aperture

The next basic fact that has to be swallowed is that there is a *minimum stacking distance* between two aerials, and this may perhaps be understood

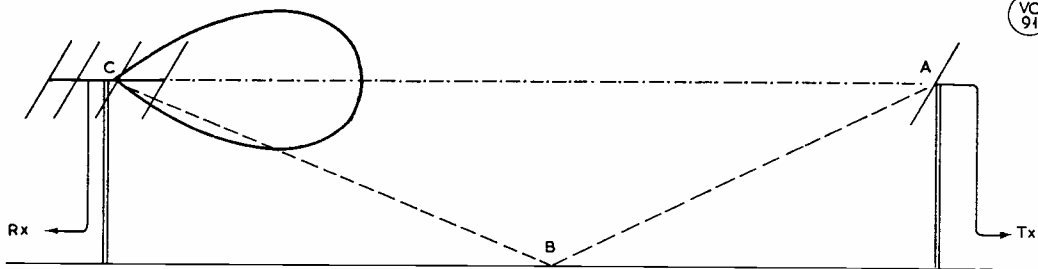
*Our contributor is, of course, a recognised authority on VHF beam design in the professional context, with the knowledge, experience and resources to carry his ideas through to practical effect. Recently, some most improbable (not to say improper) claims have been made in the literature on the subject of beam gain. This article discusses the basic facts from which there can be no escape, and also explains the practical difficulties involved in measuring the gain of full-sized systems.*  
—Editor.

when the aperture of an aerial is considered. Aperture is directly proportional to gain, meaning the greater the gain the larger the aperture. This can be quite literally represented by imagining an infinite sheet of metal between transmitter and receiver with the gain of an aerial represented by a hole in the sheet. The greater the gain the larger will be the hole, and obviously if it is required to increase the gain by the use of two holes then it would not pay to allow them to overlap—thus, the optimum distance is that which just allows the apertures to touch, and in the case of the 13 dB 10-element Yagi this is 11ft. The E-M-E array, made up for convenience as nine Yagis in three rows of three, will therefore be 22ft. square to the centre of each cross boom—quite an erection!

Returning to the basic aerial for a moonbounce array it is of vital importance that the efficiency of this unit be high in terms of the ratio of gain to amount of material used. Any inefficiencies here will be multiplied by the number of aerials used, resulting in a larger array than is really necessary—and as we have seen even a fully efficient E-M-E array is quite a mighty pigeon perch.

### Gain Factor

The gain of an aerial is normally expressed in dB over a half-wave dipole. The very term dB is an expression of ratio, and any figures published without this qualification of *gain over a half-wave dipole* should be treated with extreme suspicion since the figure is thereby meaningless. The figure of gain over a half-wave dipole is obtained simply by substituting for the aerial under test a half-wave dipole and noting the difference in gain. This sounds very simple, but when a number of tests are under-



Sketch to show the confusion that can arise, due to multi-path interference (ABC), when attempting to evaluate the gain of a VHF beam system. In fact, there are considerable practical difficulties in setting up a VHF testing range—see text for discussion.

taken on the same aerial in different locations results are found to differ wildly.

There are many sources of inaccuracy in aerial gain measurement, probably the greatest being the difference in propagation characteristics of the aerial under test, and the dipole which is to be substituted for it. The dipole may be receiving not only the direct signal but also a reflected signal from the ground which could be out of phase, causing cancellation and an apparent reduction in dipole performance. On p.527 is illustrated a typical test set up with the shape of the radiation pattern of the test aerial superimposed. It will be seen that in addition to the direct signal path between the two aeriels AC there is a reflected signal path ABC. The phase relationship of these signals will be a function of path length or frequency and the reflected signal may augment or diminish the signal received. In this case, however, the sharpness of the radiation pattern of the aerial under test will result in a considerable reduction in intensity of the reflected signal, which will thus have little effect. When, however, in an attempt to measure gain a dipole is substituted for the test aerial, there will be little or no attenuation of the reflected signal, and an entirely misleading reading of the dipole will be obtained.

#### Test Problems

Hence, the problem is not so much that of measuring the performance of the test aerial, but of measuring the performance of the dipole with which to provide comparison.

The amount of space required for an accurate testing range is quite large and measurements made using normal dipole substitution methods on inadequate ranges only result in misleading results. The main requirement is that there should be no reflections or if reflections do occur the path length shall be similar to that of the direct path. Similar path lengths can only be achieved by spacing the aeriels quite a large distance apart, and keeping them reasonably low down. A simple formula for this spacing is:  $R=4D^2/W$ , where R is the spacing and D is the largest physical dimension of one aerial and W is the wavelength in use.

Pursuing the fact that the most difficult part of the measurement is that of the dipole itself it is very advantageous to use an aerial of known gain for substitution instead of the dipole. Considerable effort can be expended on measuring the gain of this known aerial, which typically could be a 6-element Yagi with a gain of 9 dB over a half-wave dipole; 9 dB is approaching the theoretical maximum for six elements, and any test results or published gain figures in excess of this should be ignored.

There are of course other methods of measuring gain which minimise the problems mentioned here. A very well-known one is the measurement of *beam width* from which gain can be calculated. This should, however, be treated with a considerable amount of reserve, since no allowance is made

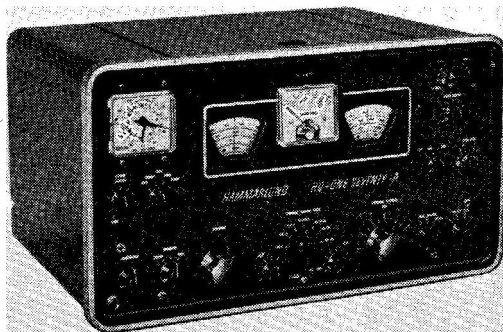
for losses in the aerial itself and these can be quite considerable at VHF and UHF. As a matter of interest, and bearing on this problem, a method employing two identical test aeriels has been developed by the writer's Company, and enables the actual substituted dipole performance to be computed, thus providing an accurate source of comparison. This method is beyond the scope of this article, which is intended to bring out the problems involved and to explain the facts.

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#### THE AMATEUR LICENCE FIGURES

We are informed by the Post Office that by September 30, there were 10,899 amateur "A" licences in issue in the U.K.—these are the full all-band radiating permits that most of us hold. In addition there were 114 "B" licences, which are in the G8AAA sequence and for UHF phone only (obtainable by R.A.E. without benefit of Morse test), making a nett total of 11,013 U.K. amateurs licensed to be on the air. Included in this figure are the 1,721 amateurs who hold "A" permits to work mobile—surely a most remarkable increase in the /M interest. There are also 168 licences out for ATV (likewise UHF only), for which callsigns are (or will be) in the G6AAA/T sequence. Looking at the basic figure of 10,899 "A" licences, the nett increase in the four months since May 31 is only 216. *Where* do all these chaps who pass the R.A.E. go? Is Subject No. 55 simply an educational stepping-stone or an intellectual objective? In point of fact, the answer is of no consequence—because obviously so many individuals must be taking, and passing, the exam. for the simple reason that they have a practical interest in radio communication. Which is a good thing for its own sake.

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The Hammarlund HQ170A-VHF is a new general-coverage receiver which takes in all amateur bands from two metres to 160m., including the 6m. band. The VHF ranges are covered on separate nuvistor front-ends, designed to ensure sharp front-end sensitivity, the figures for 2m. and 6m. being 0.3  $\mu$ V for a 10 dB signal-noise ratio, with an IF rejection at 145 mc of better than 70 dB. The dial arrangement gives expanded vernier tuning on VHF and the Rx will take AM, CW or SSB signals.

## LATCHING RELAY CHANGE-OVER SYSTEM

INTERESTING CIRCUIT USING  
NORMAL RELAYS

R. A. BUTTERWORTH (G8BI)  
S/Ldr., R.A.F. (retd.)

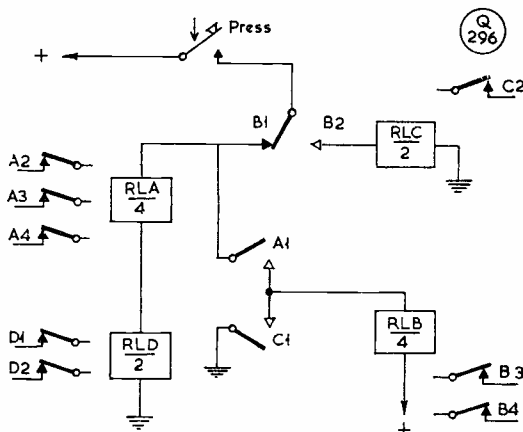
HERE is a circuit which could possibly be of interest and use to many readers, for a variety of purposes. The writer came across it when a requirement arose for a quick change-over from "Main T/R" to "Std./By." There are Latching Relays available, but there were two snags—price and insufficient contacts on one relay. At least eight were needed at G8BI.

The basic circuit is shown in the diagram. This was hooked up using two 12v. relays, RLA and RLB, having 4 + 4 c/o, and one 12v. 2 + 2 c/o RLC, with one pressel switch Sw1. It never failed to operate and all who saw it were fascinated and would have played with it for hours!

Operation is as follows: When Sw1 is pressed RLA operates, RLA-1 closes; RLB cannot function at this moment since positive voltage is applied to it. Immediately Sw1 is released, however, it does go over and changes RLB-1 over to bring into circuit RLC—but not into operation since no volts are applied.

At the next pressing of the switch, RLC is energized, closing RLC-1 to earth and bringing the whole circuit back to normal.

Eight circuit change-overs were wanted, and two,



Relays RLA-RLD all 2500Ω.

The relay layout devised by G8BI and explained in his article. Operation of the pressel switch is all that is required for change-over. Each of the relays is of 2500 ohms DC resistance.

RLA-1 and RLB-1 having been used, another relay RLD was put in series with RLA and the voltage increased a bit. Thus was obtained change-over of two microphone lines, two audio lines, three operational lines and one lamp indicator, to show which equipment was in use.

No doubt those who work with relays will recognise the circuit as a *counting* relay system, as used in landline circuits. To the best of the writer's knowledge it is not well known to amateurs, so is offered in the hope that it may be of use to those with a complicated change-over problem. Anyway, it is worth spending a few minutes hooking it up and trying to make it mis-fire!

### Do You Know That—

— Small brass paper fasteners pushed through the holes in peg-board (or ordinary hardboard), with the prongs opened out, make very good tag-panels, or mountings for transistor equipment. For better insulation where required use Paxolin strip with holes drilled. (G3K1A).

— Beams and outdoor aerial assemblies generally can be protected against the weather by giving them liberal treatment with rubberised car under-coating. This is flexible to a certain extent and can be peeled off when necessary. (G3KPO).

— The brass valence rail as sold by Woolworth's at about 1s. 2d. a foot is well suited to making handles for equipment. The edges are ready rounded, and it is strong enough for most applications. Bends should be formed round dowelling of suitable diameter, and the brass then painted over with a clear plastic varnish. Valence rail of this type is also ideal for making small aerials, such as a halo for two metres. (G3TFR).

— When winding coils that are required to be specially rigid (such as for VFO's) it is a good idea to put the former in the refrigerator and the wire in the oven before making the coil. As the materials attain normal room temperature, the windings tighten, producing a "stay-put" job where it is most wanted. (GM3BN).

— The improved absorption wavemeter indicator (M. H. Judd, p.472, October) can be made even more sensitive by connecting a DC supply in series with the miniature neon. If this is set at just less than the striking voltage, only a little RF is needed to produce a glow, with a further improvement in sensitivity. (G4LU).

— Aluminium tubing of 17g. is a sliding fit in the 1/8 in. sizes—for instance 3/8 in. diameter tubing will be a sliding fit into 1/2 in. tube, and all 1/8 in. differences can be used similarly. This is very useful for beam aerial adjustment and the construction of telescopic masts. (G3JEQ).

A small reward of 10s. 6d. is paid for any item we can print under the D-Y-K-T heading.—Editor.

# LF-BAND PHONE TRANSMITTER

PRACTICAL DESIGN FOR  
/A, /M OPERATION

W. STEPHEN (GM3IVZ)

**A**FTER acquiring a BC-454 Receiver (3.5-6 mc) and completing the necessary modifications to get it operational, the writer decided to construct a transmitter of similar dimensions to operate /A.

A look through the junk box produced an RF-24 case and a chassis and front panel were fabricated to suit this case. The SHORT WAVE MAGAZINES accumulated over the years were scrutinised and the circuit by F. G. Rayer, G3OGR, in the October 1963 issue was selected.

The alternatives mentioned in his article were adopted, viz. an RF choke in the anode of the buffer when operating on Top Band; an EF91 used as the buffer-doubler; the variable resistance in the screen supply to the buffer-doubler was omitted. For metering the PA current, a 100 mA meter is plugged into the cathode.

It was planned, and has been so wired, that an OA2 regulator valve would be used for stabilization of the oscillator HT, but this has so far not been found necessary.

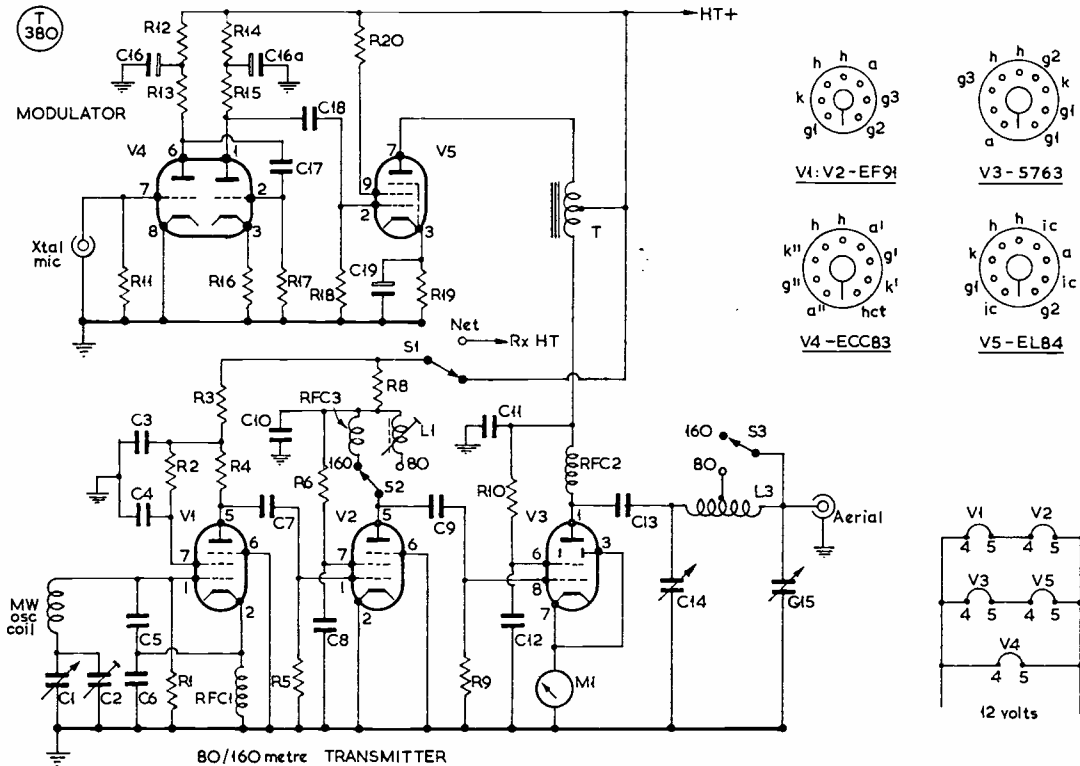
A centre-tapped speaker transformer is used as a choke in the modulator and the valves are ECC83 for speech amplifier, and EL84 for modulator. The

### Table of Values

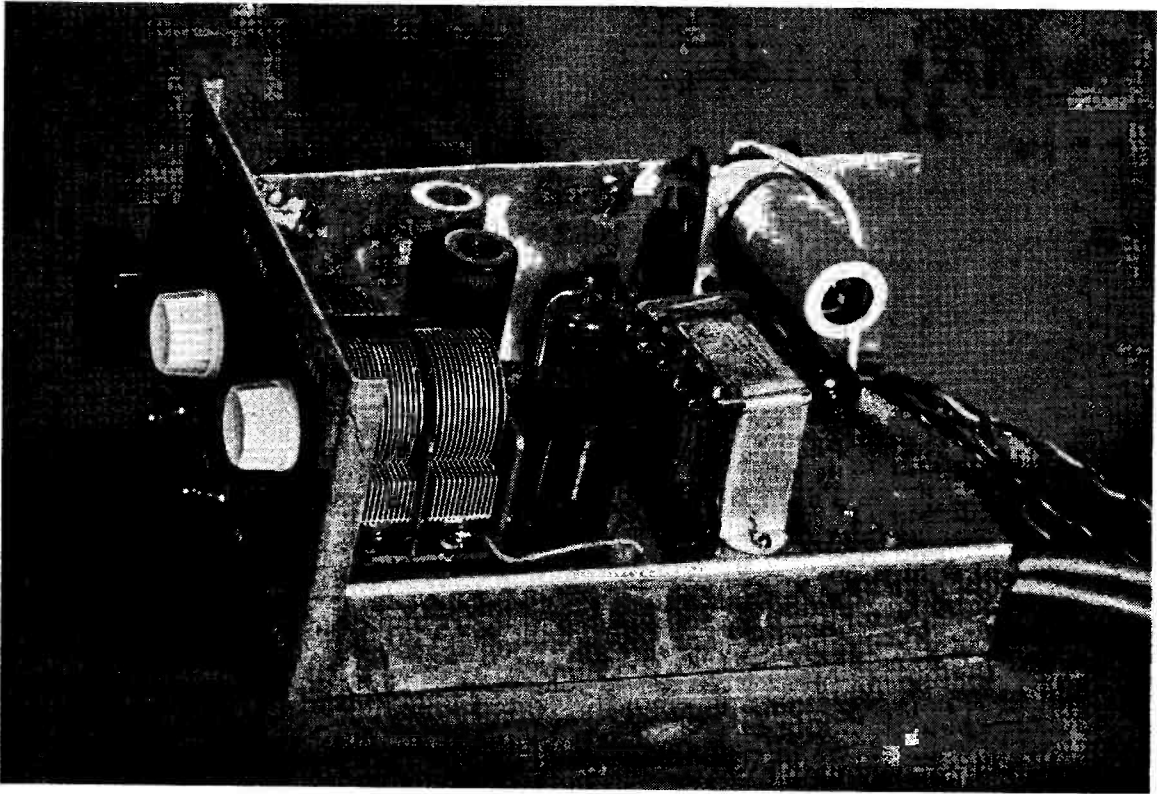
Circuit of the Choke-Control Phone Tx

C1 = 25 $\mu$ F, VFO tune	R4 = 27,000 ohms
C2 = 75 $\mu$ F, VFO set	R5 = 100,000 ohms
C3, C4, C8, C10 = .01 $\mu$ F	R9 = 22,000 ohms
C5, C6, C13 = .001 $\mu$ F	R10 = 5,600 ohms, 2w.
C7, C9 = 100 $\mu$ F	R11 = 2.2 megohm
C11, C12 = .002 $\mu$ F	R12, R14 = 47,000 ohms
C14 = 250 $\mu$ F	R13, R15 = 100,000 ohms
C15 = 500 + 500 $\mu$ F, BC gang type	R16 = 1,500 ohms
C16, C16A = 16 $\mu$ F, 450v.	R17 = 1 megohm
C17, C18 = .005 $\mu$ F	R18 = 220,000 ohms
C19 = 50 $\mu$ F, 12v.	R19 = 1,200 ohms
R1 = 68,000 ohms	R20 = 10,000 ohms
R2, R6 = 33,000 ohms	RFC = 2.5 mH RF choke (see text)
R3, R8 = 2,200 ohms	V1, V2 = EF91
	V3 = 5763
	V4 = ECC83
	V5 = EL84

NOTES: The modulating choke is a centre-tapped speaker transformer primary, such as the Radiospares EL84 output type. Metering is in PA cathode, with a test point in the EL84 mod. cathode, using an 0-100 mA meter. The RF choke could be substituted by a tuned circuit if drive is insufficient.



Circuit complete of the 80/160m. transmitter discussed by GM3IVZ, and based on the original design by G3OGR in the October 1963 issue of "Short Wave Magazine." It can be built up in a very compact form and, as shown here, is giving very good results on both LF bands. The photograph suggests some constructional details.



The LF-band transmitter described in the article by GM3IVZ. This view is on the PA side of the chassis, showing the tank coil, output loading condenser, and the modulating choke (actually the primary of a speaker transformer), with the 5763 PA valve and buffer-doubler stage V2 alongside. The modulator is on the sub-chassis and the VFO behind the screen.

valve heaters are wired in series-parallel to work with a 12-volt supply, thus: two EF91's in series, EL84 and 5763 in series, and the ECC83 takes 12 volts.

When operating from AC mains, a silicon rectifier is wired into the power lead to the *ex-19* Set relay with a 100  $\mu$ F 25-volt working capacitor to chassis. The 12 volts for the heaters is obtained by using 6.3 volt and 5 volt in series, which gives it near enough.

For /A or /M operation, a coil former for a centre-loaded whip was made from a 3in. o.d. plastic bottle with a 1in. dia. perspex rod through the neck and out *via* a hole in the base, and then held in position with *Evo-Stick*. The ends of the 1in. dia. rod were drilled and reamed to take the ends of the whip sections.

Coils used in the transmitter were a medium-wave type oscillator coil for the VFO, and for L1, a  $\frac{3}{4}$ in. dia. cored Aladdin former filled complete length with 30g. enamelled wire. The PA coil L2 was 70 turns of 26g. enamelled on a 1 $\frac{1}{4}$ in. dia. former, tapped about the centre for 80 metres.

This transmitter has worked very well for the writer on 80 metres from fixed and portable sites, running 12 watts input with 1 $\frac{1}{2}$  mA of grid drive. Reports have given good quality with plenty of modulation. No traces of frequency modulation

have been reported. Operation on Top Band has proved equally successful, using a transistor converter for 160m. reception. The general set-up is shown in the photograph above.

#### DECEMBER R.A.E. SITTING

At certain centres, a sitting for the Radio Amateur's Examination—Subject No. 55 in the City & Guilds of London Examination syllabus—is being held on December 10. Those taking it should by now have their applications in. We wish them luck and hope to see many more new call signs come through as a result. The main examination will be in May next year, for which a large number of candidates are preparing.

#### SOLD BEFORE HE SAW HIS COPY!

A reader with a Small Advertisement in the September issue of SHORT WAVE MAGAZINE—Flt./Lt. Pain, whose adv. was on p.445 of that issue—writes to say that he disposed of the gear before he had even seen his advertisement in print! We do not suggest that this is what always happens, but it does show that if you have something worth offering at a reasonable price, you are pretty sure of disposing of it quickly and easily through our Readers' Small Advertisement section.

## AMPLIFIER-CLIPPER-FILTER FOR BETTER MODULATION

TRANSISTORISED UNIT FOR  
GOOD AM PHONE

C. E. DEAMER (G3NDC)

It is well known that the only useful power radiated by a transmitter is that contained in the sidebands, and that the sideband power is determined by the modulation percentage. Also it is generally recognised that a 100-watt transmitter modulated 100 per cent is equal, in communication effectiveness, to a 400-watt transmitter modulated 50 per cent and causes less heterodyne interference. In these days of crowded amateur bands these facts are of considerable importance and have led to a great increase in the use of single sideband, with the improvement it offers in communication efficiency.

There are, however, still a large number of amateurs who prefer AM for 'Phone working and for this reason numerous articles have appeared dealing with circuit techniques for increasing mean modulation percentage. These invariably describe systems which, if employed with an existing transmitter, reduce the overall modulator gain and since in the writer's case there was very little gain in hand it became apparent that any system employed must introduce no less and should preferably increase the available overall gain.

The transmitter at present in use at G3NDC is a K.W. Valiant which has given very good service for a number of years. It was felt that, rather than modify its existing circuitry, a general-purpose unit should be developed which could be connected externally, between microphone and modulator, with this and any other transmitter. This required that the unit should be small, so attention was turned to the possibility of employing transistor circuitry.

The amplifier-clipper-filter described here was produced for use with a crystal microphone and in addition to increasing mean modulation percentage gives an overall gain which is variable and, of course, dependent on input level since the clipping circuit limits the output to approximately 300 mV maximum.

### Description of Circuit

The circuit diagram Fig. 1 shows the unit as now in use at G3NDC and although it is not essential that the same type of transistors be used, some care should be taken when selecting that to be employed in the first stage TR1 (OC201) since it is of primary importance that this stage should introduce as little noise as possible. The input impedance of a common-emitter amplifier stage is normally too low to be used with a crystal microphone but by the use of negative feedback the input impedance of the first stage has been raised to a suitable level. In this first stage the OC201 ensures a low noise factor.

Two stages of amplification TR2, TR3, follow and the gain of the first is made variable by feedback control on the OC44. It was found necessary to

### Table of Values

Fig. 1. Circuit of the Transistorised Amplifier-Clipper-Filter

C1 = 0.1 $\mu$ F	R11 = 820 ohms
C2 = 2 $\mu$ F	R12 = 56,000 ohms
C3, C9 = 50 $\mu$ F, 6v.	R13, R15 = 10,000 ohms
C4, C6 = 1 $\mu$ F, 50v.	R16, R20 = 3,300 ohms
C5, C10 = 10 $\mu$ F, 15v.	R17 = 500-ohm, var.
C7 = 100 $\mu$ F, 25v.	R18 = 270 ohms, $\frac{1}{2}$ -w.
C8 = 0.25 $\mu$ F, 15v.	R19 = 8,200 ohms
C11, C14 = .02 $\mu$ F	L1 = 950 mH, Mullard core
C12 = .005 $\mu$ F	L2 = 167 mH, Mullard core
C13 = .04 $\mu$ F	L3 = 63 mH, Mullard core
R1 = 100,000 ohms	Tr1 = OC201, Mullard
R2 = 220,000 ohms	Tr2 = OC44, Mullard
R3 = 33,000 ohms	Tr3 = GET-103, G.E.C.
R4 = 68,000 ohms	Tr4 = OC77, Mullard
R5 = 4,700 ohms	D1, D2, D3 = OA6, Mullard
R6, R21 = 2,200 ohms	
R7 = 1,000-ohm, var.	
R9, R14 = 1,000 ohms	
R8 = 22,000 ohms	
R10 = 15,000 ohms	

NOTES: Resistors can be rated quarter-watt, except as stated. Inductors L1, L2, L3 are wound on Vinkors LA-2303 cores. Any equivalent transistors may be used for Tr1-Tr4 and for diodes D1-D3, but the Mullard OC201 is recommended for Tr1.

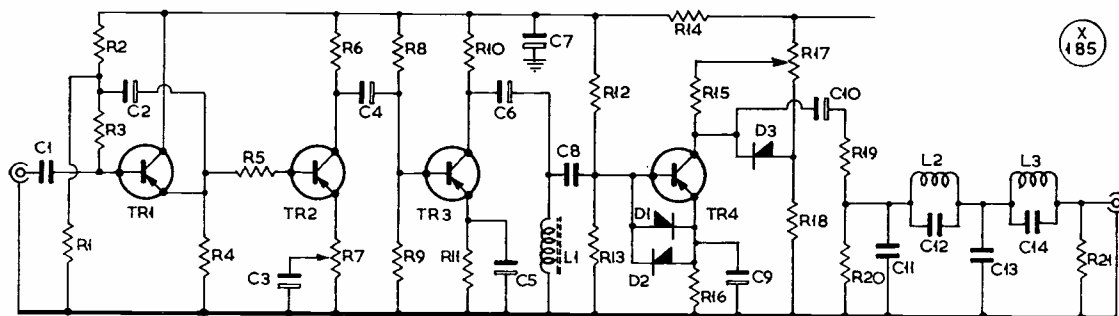


Fig. 1. Circuit of the unit described by G3NDC, performance curves of which are shown in Fig. 2. It can be made quite small (see photograph) and is intended to insert between the microphone and the first stage of any existing speech amplifier. An essential requirement is that the unit should be sufficiently well boxed in to prevent any RF pick-up from the transmitter with which it is being used.

employ two stages in order to get the signal level high enough to obtain satisfactory clipping.

The amplified signal is then clipped by the following stage TR4 which can be adjusted to give symmetrical clipping by means of the balance potentiometer R17, Fig. 1.

The filter C11, L2/C12, C13, L3/C14 which follows the clipper removes unwanted harmonics and also limits the overall response to that shown. It will be seen from Fig. 2 that the low-frequency response of the filter does not fall off very rapidly but that of the complete unit overall does. This is brought about by the supplementary effect of the low values used for C4 and C6, together with L1 and C8.

The unit was constructed on a piece of *Veroboard* and housed in an aluminium box 4in. x 5in. x 1½in.

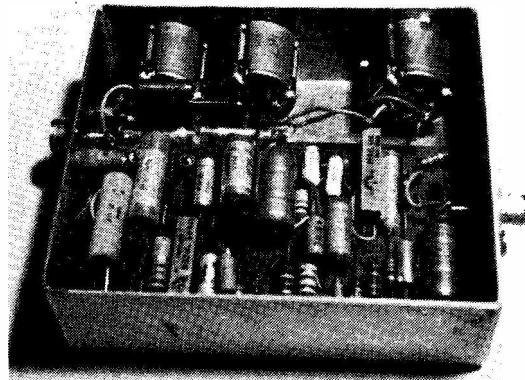
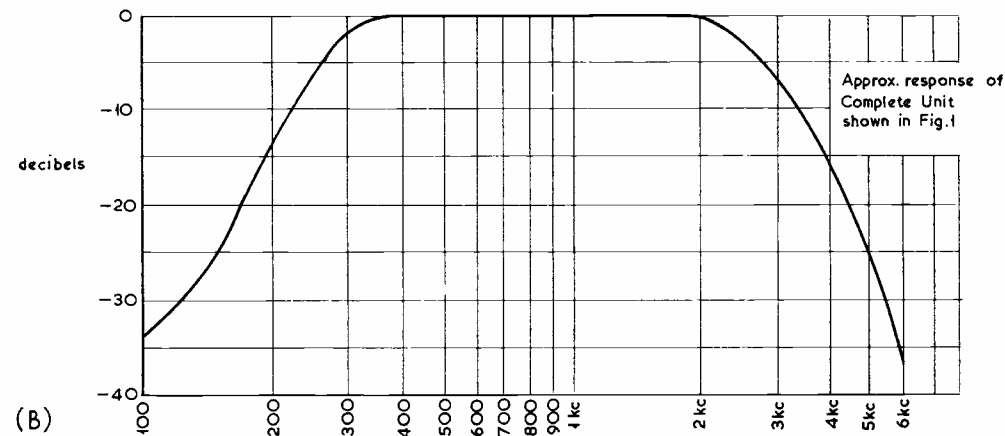
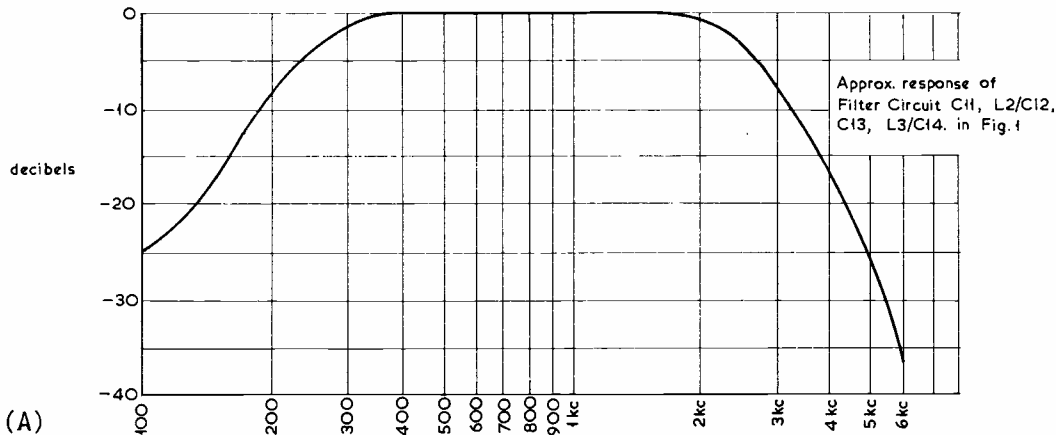


Fig. 2. Curves derived from the circuit of Fig. 1. At (A) is the response of the filter section alone (see text), while (B) represents the response overall. These curves are in good agreement, and the unit covers an adequate audio pass-band for speech—see text.

The amplifier-clipper-filter unit as described and constructed by G3NDC. The circuit is shown in Fig. 1, and measured performance curves in Fig. 2.



and the general layout is as shown in the photograph.

The filter inductances L1, L2, L3 were wound on Mullard Vinkors type LA-2303 to reduce the size and to allow them to fit in the available space.

Any form of construction may be used and the layout presents no real problems since the overall gain is quite small. Care should be taken, however, to ensure that RF cannot get into the box as this will cause feedback, positive variety.

#### Setting Up

When completed and connected to any existing AM transmitter it will be found necessary to reduce the gain of the modulator from that normally employed. A signal should be applied to the input of the unit at approximately 1000 cycles—either by using an audio frequency oscillator or by whistling into the microphone—and the gain control R7 adjusted until the modulation does not exceed 100 per cent regardless of the level of the input signal.

Symmetrical clipping is most easily set up by using an oscilloscope, but a fair approximation can

be reached by monitoring the radiated signal—preferably at a distance and with the help of a co-operative local amateur—and adjusting the balance control R17 for best quality, in conjunction with the gain of the modulator itself. The setting is quite easily found and will not normally require readjustment even with a change of microphone, although in this case it may be necessary to re-set the unit gain control, R7.

#### Power Supply

The power supply need only provide 15 mA at 12 volts, or any other conveniently available voltage up to a maximum of 20 volts although some adjustment of R18 may be necessary to obtain symmetrical clipping. The power supply at present in use at G3NDC is a battery which is connected only during "transmit" periods. If the unit were built into a transmitter a power supply would probably be more conveniently derived from a rectifier fed from a low-voltage transformer winding, provided the output was well smoothed, using 500  $\mu$ F condensers.



The Green & Davis 70CM100 is a tripler-amplifier for the 430 mc band, rated at up to 90w. input, depending upon what PA valve is fitted (to customer requirement). Both tripler and amplifier stages are blown, and all 70-cm. circuits are formed by parallel lines, screened for better efficiency and minimal radiation. Both stages are metered, a heavy-duty coax relay is fitted for aerial change-over, and all metal-work relevant to the output frequency is heavily silver-plated. Construction is on a copper chassis. The 70CM100 is intended to be driven from any suitable two-metre transmitter.



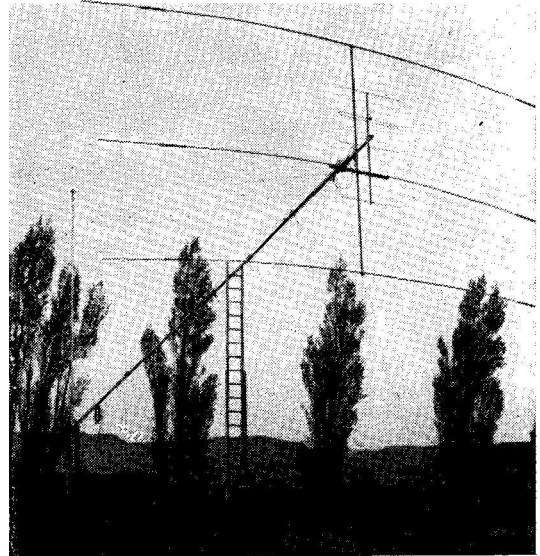
## HEAVY MAST ERECTION

### USING A LEVER-BOOM FOR A 55-FOOT STICK

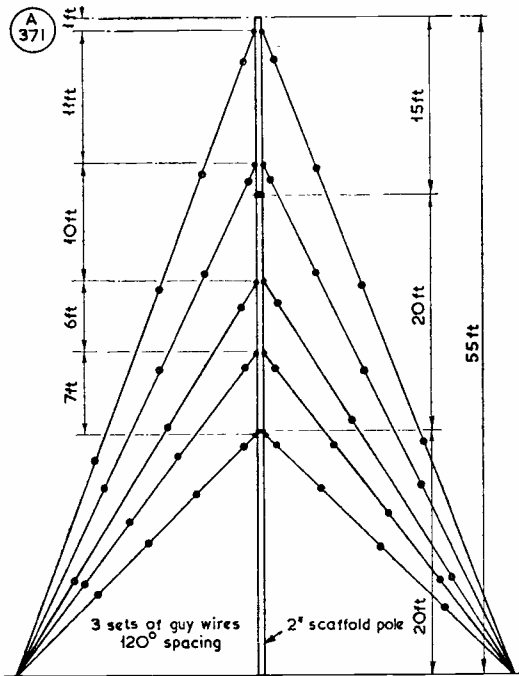
C. R. PLANT, A.M.Inst.E., Assoc.I.E.E.  
(G5CP)

IT is a fallacy to assume that an aerial mast some fifty feet in length, complete with a three element tri-band beam and a five element 144 mc Yagi and associated drive mechanism, can be easily built and as easily erected. However, with careful planning and preparation, the assistance of local club members and a great deal of hard work, it can be done. Such a mast was recently installed at G3ZY, near Chesterfield, Derbyshire.

Two pieces of wood 12ft. 6in. x 7in. x 2in. were fastened together, spaced at 6in. by 2in. diameter tube, using  $\frac{3}{4}$ in. galvanised bolts 1ft. long. This tabernacle was buried 5ft. in the ground to form a rigid base; the heavy clay obviated the necessity for concrete filling. The lowest section of the mast is made of 2in. diameter mild-steel tube and the remainder is in similar section standard aluminium scaffold pole; all the fittings for joining the lengths together and securing the mast in the



Hangin'g between earth and heaven—the G3ZY beam assembly on its 55-foot mast, just before hoisting. This was done by using the lever-boom technique, hauled on by block-and-tackle for the heavy work.



Mast dimensions and guying system in the G3ZY layout, as described in his article by G5CP—and see photographs.

final position are standard scaffold erecting items. The sketch shows a general layout of the mast and the points of connection for the guy wires; these are all  $\frac{3}{4}$ in. diameter semi-stiff galvanised wire, similar to that used by local Electricity Authorities for small-pole tensioning. All the guy wires were cut to length, insulated and fixed to the mast prior to the aerials being fitted.

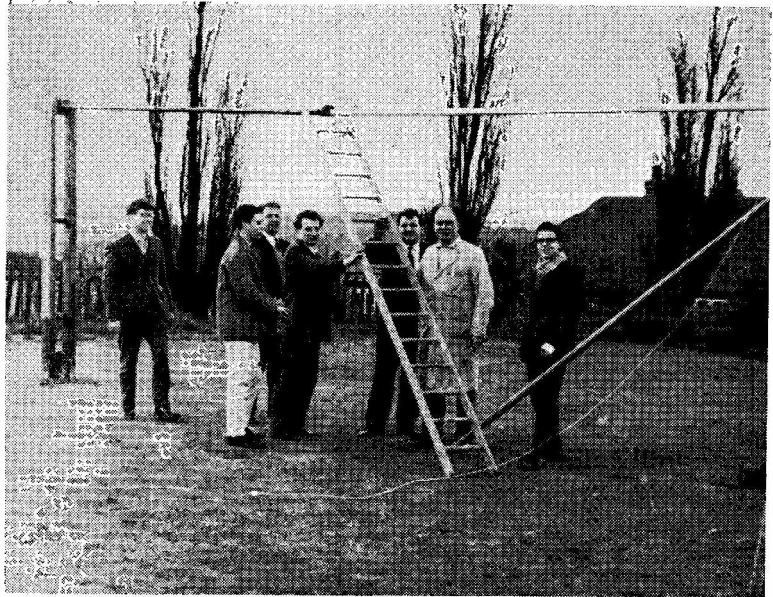
The mast hinge is simple and effective—a 5in. length of 1in. steel tube is slipped over the top  $\frac{3}{4}$ in. bolt of the base structure and over this a similar length of 2in. tube. The latter is clamped solidly with the vertical tube which forms the mast in the same fitting, thus allowing the whole to hinge freely on the inner tube and bolt.

#### Raising

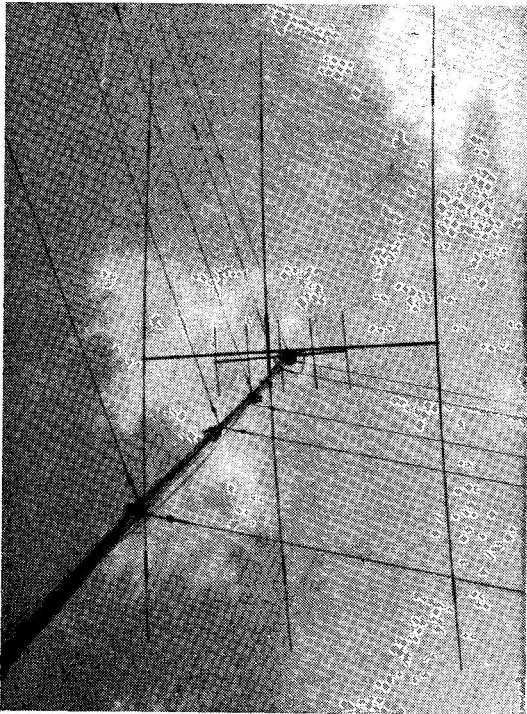
A boom 20ft. long, of 2in. scaffold pole, was next mounted at right angles to the mast 8ft. from the base using a standard scaffold fitting and to the remote end a complete set of guy wires was tensioned—a temporary guy was also taken from this point to the base of the mast (this being removed after the mast had been raised into position). A flexible steel rope was also taken to the end of the boom and firmly fixed and then passed through a block and tackle, the latter being secured to a convenient tree located immediately behind the mast position 5ft. above ground level. With the remaining guy wires loosely fastened to their respective anchorages and with a man positioned at each point, the mast was raised to a height of 8ft. and rested on a tripod

support. The aerials and ancillary equipment were then fitted and all was ready for the big lift! An extendable ladder was pushed under the mast and with some effort the remote end was raised to a height of 15ft.—at this point four men commenced pulling the cable attached to the block and tackle, thus taking the strain, allowing the ladder to be extended and the lift increased. After several lifts and repositioning of the ladder, the boom haulage was able to take full control and the mast was pulled into a vertical position where it was secured.

During the whole of the lifting process the guy wires at 60° and 300° were manually tensioned, progressively, to keep the mast straight; the importance of this cannot be over-emphasised. At the first attempt one of the top guy wires slipped and the mast came down to the ground—fortunately the boom tension controlled the fall and little damage resulted and (after the fright) a second attempt was



The ground-crew standing by to start the erection of the G3ZY mast—see article. The lever-boom method, with block and tackle, was used for hoisting. This is very effective and perfectly safe provided that all materials are strong enough for the job, the hoisting guys are correctly measured off—and all concerned know exactly what they have to do.



The G3ZY system in the vertical, and before final adjustments had been made to the guy-wire turnbuckles. The diagram shows the guy-wire layout—more than adequate for the job.

completely successful.

Results obtained by G3ZY on 14 and 21 mc fully justify the work put into this project—and it has also been used as a vertical radiator on Top Band, tuned by a variometer at the base, with outstanding success. The Chesterfield Amateur Radio Society provided the necessary man-power for the raising operation and the total cost to G3ZY, excluding aerials, was £34.

### GET THE QTH RIGHT

Most every day in every month we tussle with addresses that can only be read by guess and signatures that are totally illegible. In this office, hours are wasted checking through gazetteers to establish whether your name could be Bossock in Chagford or Bostock in Chalfont. And if in the end we get it wrong, it is entirely your own fault! So, when writing in to *SHORT WAVE MAGAZINE*, about anything at all, please scribe your name and address clearly—and if you have a callsign, put it in plain capital letters (so that, if necessary, we can check in the *Call Book*). And speaking for the Post Office, the correct address for all amateur licence matters is: Radio Services Dept., Radio Branch, Amateur Licensing Section, G.P.O. Headquarters Building, St. Martin's-le-Grand, London, E.C.1.

# SWL • • • • •

## "ESCALATION"—NEWCOMERS—JOYS OF CW — HOW THEY STARTED — THE COMING SEASON—HPX LADDER MOVEMENTS

ONE of the factors that makes such a feature as this rather difficult to compile is the constant "escalation" of its readers. (That rather horrid word is the only one to describe the situation briefly.) They join us at the bottom of the stairs, so to speak, and gradually improve their own standing until they reach the roof and leave us, cheerfully waving a QSL card with their newly-acquired callsign as they depart.

Those who are keen on the competitive side of things also join us at the bottom of the "HPX Ladder" and are usually a goodly way up by the time they leave it. Some—bless them!—don't leave at all, but become dyed-in-the-wool listeners with no intention of going for a transmitting licence.

The point is this—how does the compiler of a feature like "SWL" cope with the technical side of things? A couple of years back we dealt pretty exhaustively with many of the things an SWL wants to know: Aerials, tuning units, receiver front-ends, converters, the conception of a modern receiver, Q-Multipliers, How to QSL and all that. And now we have a bunch of new readers who need the same all over again; and at the same time we have the old hands who know the basic stuff inside out and want something more advanced. This, of course, they can get from other articles in the MAGAZINE.

Fortunately there are many who are quite content to see "SWL" as a bi-monthly summary of what goes on, and what the SWL's are doing. One, this month, is kind enough to write "I am pleased to see that 'SWL' improves in content and interest with every issue" (and thank you kindly, *John Fitzgerald of Great Missenden!*) And certainly the volume of mail is such that there is no difficulty in filling the allotted space by merely using the more useful comments from readers' letters . . . which, it appears, is what the majority like to see, anyway.

So we will continue doing just that, leavening it where possible with technical gen., and referring back to some of the earlier numbers for details. (New readers can obtain several of the back numbers still.)

### Newcomers

This month sees more new faces, so to speak, than ever before, and a lot of unfamiliar names appear at the lower end of the HPX Ladder (and even some a good way up).

*R. de Buis (Felixstowe)* joins the CW Ladder, and reports that he mastered CW by the very

method we recommended—"switch on that receiver and listen to everything." He now finds that he can read callsigns at 35-40 w.p.m., although his full copying speed is much lower. Pet aversions—those signals from Eastern Europe that sound like something from a bird sanctuary, and those who call very long CQ's and get blotted out when they come to the more important part — their own callsign. (SWL de Buis queries the TJ8 prefix, but it is quite in order—Republic of Cameroon).

*Chris Freeman (Nuthall)* has been held up by GCE QRM, but is now out to get the prefixes, and joins at the bottom of the ladder. He uses an 870A and an R.107, with a Joystick and ATU, also an outside wire for the LF bands. He asks if /P and 5M stations count for HPX—they don't!

Another "joiner" is *W. J. Angerson (Leeds)*, 14-year-old owner of a home-brew TRF four-valver; he can copy SSB on it by using regeneration, after a little practice . . . and it must be tricky, too. He asks if "YA6ZA" is genuine, but we don't think so—was it YU?

*Victor Rix (Swindon)* writes in for the first time, although he has been with us since Vol. 1 No. 1 (in 1938). He regrets the old days of the 'thirties, when quite primitive gear would bring in the VK's . . . whereas now, with all the advanced technique, better components and all, we find ourselves listening to a load of QRM . . . for which one can only blame "progress" and the increase in population. And he believes in improving the signal where it matters most—so he uses a good aerial.

*David Griffiths (Ilford)* joins with an HPX figure of 155, all on an ordinary 7-transistor radio using an untuned long wire; quite a bit of DX in his list, too.

*N. Roberts (Cambridge)* says he has been listening hard for seven months, "punctuated, though not interrupted, by A-level Exams." He has a 52 Set and copes with both phone and CW, but hopes for something more selective and going higher than 15 mc in due course. R.A.E. coming up in December!

*Iain Mackay (Dingwall)* shifted his interest from philately to listening to commercial stations on an old pre-war BC set. Duly infected, he bought an HE-30 and set about things in earnest, now covering six amateur bands. He queries the HPX rules for stations like VE1AJR/SU . . . and that is simply an SU; /MM's count separately, provided that their prefixes are all different; and OHØ is not only a different prefix, but a different country—Aland Is.

*David Richmond (Alloway)* comes in with a score of 239, collected on six bands AM and SSB with a Hallicrafters S.38, a 132-ft. wire with ATU, and a ground-plane using the ex-Government kit, as described in the June, 1964, SHORT WAVE MAGAZINE. He is 15½, and started eighteen months ago with an old BC receiver.

*D. H. Foster (Rainham)* is 13 years old and runs an R.107, with a 132-ft. wire for the LF bands and a ground-plane for Twenty. He is keen on CW, because he finds that exotic prefixes can be winkled

out when the Phone portion of the band is virtually dead—and that's a pretty good reason.

*Christopher Pedder (Preston)* has an unmodified R.1155L, connected to a 14-mc dipole with coax. He was justifiably surprised, therefore, when he casually tuned Eighty one evening and logged W1 and W2 (W1FRR was 5-and-7). SWL Pedder became interested about eighteen months ago, and three weeks after becoming thus infected, he put his name down for the R.A.E. (on the last day!). Yes—he passed. He now queries a “doubtful” FK8BC, speaking French on Twenty SSB, 0800; we should say this one was genuine . . . why not?

*D. W. Chappell (Axminster)* sends in a list, but it proves to be of *callsigns*, not prefixes! (Imagine 119 prefixes on One-Sixty—gave us quite a start!) Prefixes, Don, are the bits that go before the call-sign—the letters and figures. Thus all G3's count the same; but G4's are different, and so are GM3's or GC3's, and so on . . . we hope you have got it now.

*Douglas Watts (Staines)*, listening on a 4-valve portable covering Medium and Long, hears stations on both Top Band and Eighty if he puts a biggish aerial on the thing. “Images,” of course, and, we presume, from pretty strong and quite local stations. But when it comes to identifying two “tone” signals on the 10-metre band, we give up . . . there seem to be masses of them if the band is open.

All the foregoing correspondence came from readers who wrote in for the first time, many of them quite new to these columns. We like to see it.

### The Regulars

*J. E. Hart (Leeds)* asks two queries, both of which have been answered in foregoing replies . . . and he adds that he is now awaiting a CR-100 and a Codar preselector.

*John P. Fitzgerald (Great Missenden)* fills a long letter with many points. One of them is that the lack of sunspots is barely noticeable—a little selective and intelligent listening brings in all sorts of DX. One of the happy hunting-grounds is the section around 14100-14120 kc, where, almost any night around 2230, you will find some quite rare prefixes (he also heard PJ3, HC1, HP1 and T15, higher up the band, all in a few minutes). As soon as Ten opens up, SWL Fitzgerald proposes to buy, or build, some new gear; at present he can only copy AM, and if one thing is pretty certain it is going to be that Ten will be the happiest hunting-ground of them all for SSB.

*Terry Popham (Exeter)* added 46 prefixes recently, despite a stay in OE-land on holiday. He comments on the excellent openings for SSB on Fifteen—especially to the Caribbean and Central American area.

### More Points about CW

This hoary old CW-versus-Phone argument (it has been rumbling round for the last 40 years) usually ends up in a slanging-match, but it is

interesting to see new points of view. An unusual one comes from *R. Hunter (Kenton)*, who says “CW does have the disadvantage of not indicating a person's nationality by his accent, as on Phone. For example, an early-morning watery note *could* be an out-of-skip G or West European station, or it might come from Hawaii.”

*Pete Cayless (Exeter)* cracks back at those who have insisted that CW will get through when other modes fail, by saying that it is therefore less of an achievement to log DX stations on CW . . . one can find them in profusion when the identification of a weak AM phone is quite difficult.

Yet again, there are those who look on this extra ease of logging DX (or, later on, of working it) as a just reward for their perseverance in mastering the Code in the first place. And it is a remarkable fact that nearly all those who dislike, or decry, CW are those who can't read it and don't look as if they particularly want to try.

### Briefs

“Many days the 20-metre CW band is jammed by all the USSR ‘WSEM’ boys furiously swapping numbers at 35 w.p.m. Maybe they enjoy sending numbers, but from a listening point of view . . .” (*R. Hunter, Kenton*). “Just because you have passed an exam. and can bash out 12 w.p.m., it doesn't necessarily mean that you have the ability, experience and sense to track down an elusive one. A few years with receiver-only can't hurt anybody, and I'm quite sure that any licensed amateur who has been an SWL for some length of time will agree that the experience and knowledge is useful” (*Pete Cayless, Exeter*).

“My CW prefixes are steadily mounting up, but I am *not* trying to notch up the 150 in as little time as possible; instead, I try to copy as much of the QSO as I can—this makes for better practice and speed” (*Phil Holliday, Nottingham*). “At the time of writing, the 80-metre band on SSB is beginning to look interesting. W1's were audible here at 0001 GMT during August, and VE1WI was also coming in . . . 5 & 7, or even 8. The Central New England Net is held on 3842 kc at either 1800 or 0930 GMT every day.” (*Derek Rogers, Wrexham*).

“I think I owe my high score (600) to my good QTH here—I am situated at the top of a high hill, and even though I have a poor aerial, I hear a lot of DX. (Also, it is a great help having the gear at the bedside—you can listen at very odd hours!)” (*Ray Williams, Birmingham*).

“I get most of the more exotic DX stations when I listen to the G's calling them—sometimes they come back” (*R. S. Finley, Kenton*). “Anyone with no outdoor space should not hesitate to erect an indoor aerial. I have found mine really no handicap as an all-band aerial, provided that there is correct matching to the receiver. On this 100-ft. long wire, ZL's are being heard on 80-metre SSB during the early morning sessions; but most of my time is spent on Forty, and just about all the stuff

worked by the U.K. group has been heard." (J. R. Daws, Leeds).

Interesting note from one of our most experienced SWL's: Roy Patrick (Derby) reports the appearance of JPIAH and JPIKAE, both active on 14 mc CW from Mongolia, their QSL address being Box 60039, Ulan Bator. This is in the difficult Zone 23 area, and will be of great interest to many DX operators and listeners.

Barry Curnow (Plymouth) says "I was overjoyed to see that I had at last fulfilled a lifelong ambition in reaching the top of the HPX Ladder on CW." And he is now in the double-DXCC category, having passed the 200-countries confirmed mark. During the summer, Barry and two SWL friends did a 2,000-mile tour through the Lake District and GM, meeting scores of amateurs who had been heard on CW and phone; a most successful trip, by all accounts. And he adds, modestly, "Even my O-Level results turned out very well, so with major exams, over for a couple of years, and more time for DX, I certainly have nothing to complain about just now"! And he's still at the top of that CW listing.

A. Pardoe (Stourbridge) has started at London University, so will not be able to do any more

# SWL ● ● ● ● ● ●

continued

serious listening till the Christmas vacation comes round. But he hopes to "keep in touch with the bands" in the meantime.

### Potted Histories

Most SWL's seem to start up in the same way. Here's a very new one, still only 14, who says his first efforts were on local stations with the BC receiver; then an H.A.C. One-valver; then a two-valve mains set; and now a CR-100 . . . and after this, what? (This is C. Dillon, Bath).

And then comes Lawrence Carter (Spalding), first triggered off by his friend Ian Buffham (who has now left us to try his luck on the bands with his own call). The start was a crystal set "which looked hideous and relied for insulation on Elastoplast" but which brought in Radio Moscow, Sofia and others on a moderate aerial. Then to a Philips domestic receiver, covering 13-50 metres, and then a new front-end to bring in 80 and 160 metres. And, more recently, an R.107 which, with a 70-ft. wire produces reasonable DX. (Still more recently, the R.A.E. passed, and the Morse Test awaited . . . a complete and typical "pilgrim's progress" !)

Mike English (Yeovil) used to be on the Ladder a long time back; he dropped out because of QRM from finals, but has now come back on again, with a better QTH and more room for aeriols . . . but they will be used for other purposes, no doubt, as he passed the R.A.E. in May.

Laurie Margolis (Ilford) — one of the fortunate ones with an active amateur for a father — has set next May as his target, and hopes to get a ticket before his 15th birthday. He says that Fifteen is wide open to Central America, W4 and the like at 2230; the rig is now a Heathkit SB-300, with a Quad at 44ft. G3NMR intends to add the SB-400 (the matching Tx) to complete the station, but he has just acquired a Creed 7B page-printer, so RTTY is about to invade the household . . . It's all go and progress!

### QRM Troubles

R. S. Finley (Kenton) has to pipe down during peak TV hours, since the oscillator of his Rx produces a harmonic that causes TVI. (He doesn't tell us what the receiver is, but some old HRO's used to be notorious for this.) Now he's at work with an acceptor circuit and a low-pass filter and says "anyone would think it was a Tx, not an Rx!"

In reverse, don't some TV sets radiate? We know of several cases in which interference from the harmonic of the line timebase generator produces patches of QRM every 10 kc, especially

## HPX LADDER

(Starting January 1, 1960)

Qualifying Score—150

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
A. W. Nielson (Glasgow)	657	B. J. Turner (Westcliff)	255
R. J. C. Coats (Cowie)	637	J. P. Fitzgerald	
R. Hunter (Kenton)	609	(Great Missenden)	254
R. Williams (Birmingham)	600	G. S. Bunting (Birmingham)	251
L. Margolis (Ilford)	579	I. A. Mackay (Dingwall)	240
T. R. Popham (Exeter)	547	D. L. Richmond (Alloway)	239
S. Foster (Lincoln)	536	G. Christie (Gainsborough)	239
B. Curnow (Plymouth)	511	M. A. Stephens (Hove)	233
P. Etheridge (Hull)	470	C. G. Ivermee (Reading)	220
D. A. Whitaker (Clitheroe)	467	J. E. Hart (Leeds)	212
A. H. Pardoe (Stourbridge)	467	R. S. Finley (Harrow)	208
D. A. Pickup (Preston)	456	H. Wolton-Carr	
C. N. Rafarel (Poole)	448	(Cambridge)	204
K. C. Staddon (Stroud)	447	D. Poulter (Morden)	196
P. A. Cayless (Exeter)	447	A. Parker (Chesham)	190
M. Vincent (Cheltenham)	441	D. Dewar (Morden)	188
P. Baxter (Winchester)	428	P. A. Holliday (Nottingham)	185
M. Healey (Horsham)	391	L. J. Carter (Spalding)	171
M. Woollin (Leeds)	381	D. Rogers (Wrexham)	170
C. Crisp (Maidstone)	355	C. Dillon (Bath)	164
M. English (Yeovil)	348	D. Griffiths (Ilford)	155
M. J. Summers		N. Robson (Corbridge)	154
(Market Harborough)	335	W. J. Angerson (Leeds)	154
C. Pedder (Preston)	326	C. Freeman (Nuthall)	150
A. Stone (Kidderminster)	325		
J. R. Daws (Leeds)	298	CW ONLY	
C. Whaley (Cambridge)	292	B. Curnow (Plymouth)	547
A. F. Roberts		R. Hunter (Kenton)	538
(Kidderminster)	285	J. D. Williams (Winchester)	378
D. C. Parker (Redditch)	285	V. Lindgren (Hull)	356
J. L. Pearce (Basingstoke)	279	M. Vincent (Cheltenham)	339
B. G. Hamilton (Belfast)	276	M. Healey (Horsham)	286
M. Shaw (Bromley)	271	R. de Buis (Felixstowe)	195
R. Turlington (Braunstone)	257	P. Etheridge (Hull)	188
D. H. Foster (Rainham)	255	M. Woollin (Leeds)	150

(NOTE: Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the table. Next list, January, 1965 issue—deadline, NOVEMBER 27.)

Give your overseas contact a gift-subscription to "Short Wave Magazine"

*Next appearance of this feature—January 1965. All correspondence and photographs (of SWL stations and equipment) by November 27, addressed "SWL," c/o The Editor, Short Wave Magazine, 55 Victoria Street, London, S.W.1.*

on Top Band. In crowded areas this has become quite a problem, and, of course, a re-diffusion system doesn't help—if anything it makes it worse, because the noise can be re-radiated by the distribution cables.

#### Miscellaneous

SWL's who really want to make the best of their hobby are reminded that this is yet another winter for peak DX on the LF bands. One-Sixty, in particular, should be about as good as it has ever been—but the DX won't be of much interest to the "Phone-Only" men. CW from exotic parts may well be heard, even in the evenings . . . and the W's and VE's will be there most mornings between 0500 and 0800. Many SWL's will agree that there is a particular thrill about logging

American stations on this band. It's a challenge, anyway.

The DX season for *Eighty* is also upon us — and the "magic spot" is around 3800 kc, which is the boundary between the two worlds, so to speak. The W's are not allowed to use phone below 3800 kc, and we are not allowed to use *anything* above it! So most QSO's between the U.S.A. and Europe take place "across the wall"; the VE's are not so handicapped, and can work in our part of the band.

*Contests* — Top-Banders should look at the Club Notes for the gen. on MCC, which takes place on November 14-15. This is a case where SWL's can really be of help by putting in check logs (but, again, it's a CW event). And the CW half of the *CQ* Worldwide DX Contest will be on over the weekend of November 28-29 (the Phone half was in October).

The next instalment of "SWL" will appear in the January, 1965, issue, and the deadline for letters will be first post on *Friday, November 27*, addressed "SWL," c/o The Editor, SHORT WAVE MAGAZINE, 55 Victoria Street, London, S.W.1. Make a note of it, don't miss it—and we hope you all have many interesting happenings to report by then. Good Listening!

## CALIBRATING THE GRID DIP OSCILLATOR

BY EXTRAPOLATION METHODS

G. P. ANDERSON, A.M.I.E.E. (G2QY)

MUCH has been written on that useful piece of equipment, the Grid Dip Oscillator, and the calibration is usually dismissed with some such phrase as "by comparison with a suitable receiver." But supposing no suitable receiver is available? For instance, a GDO may have been built as a means of adjusting 70 or 144 mc receiving equipment, and one is faced with the difficulty of "finding the band"; there are a few markers in these regions to use as guides.

The method to be described makes use of a general-coverage short-wave receiver, such as is to be found in the average amateur station, accurately calibrated over at least one of the ranges to be covered by the GDO. The only other equipment, apart from the oscillator itself and its coils—which must have overlapping ranges, a usual feature—is a separate tuned circuit, which may consist simply of a variable capacitor and a coil or coils; as will be seen later this is to be used as a reference during the calibration process, and need not be elaborate. As a guide, the coil for each range will be approximately the same size as the corresponding one in the GDO and hence one coil may be used, and the turns

reduced as calibration reaches higher frequencies; this will become clearer as the description proceeds.

For convenience, the frequencies to be referred to as examples will be those applying to the particular model used to prove the method, and they will not of course apply to any other unit.

First, it is necessary accurately to calibrate one of the lower frequency ranges of the GDO—for example, 8·8-15·3 mc. It is very convenient if this can be marked on the oscillator dial, but if it has only a 0-100 or 0-180 division scale it may be necessary to note the scale reading corresponding to say, every 100 kc step, and to draw a calibration graph. If possible calibrate the next range in a similar way. Again using the prototype as the example, this covers 14·2-24·7 mc; this step is not essential but serves as a useful check on the method. In fact calibration of one range only is required.

The next range commences at 22·7 mc, and its higher frequency limit will be in the same ratio to this as are the maximum and minimum frequencies of the other ranges; thus if  $x$  represents the highest frequency covered by the coil, and referring to

$$\text{the accurately calibrated range, then } \frac{15\cdot3}{8\cdot8} = \frac{x}{22\cdot7}$$

(and incidentally =  $\frac{24\cdot7}{14\cdot2}$ ) from which by simple arithmetic:

$$x = \frac{15\cdot3 \times 22\cdot7}{8\cdot8} = 39\cdot5 \text{ mc}$$

This coil therefore tunes from 22.7 to 39.5 mc, and calibration of intermediate points on the scale can be carried out by a similar calculation of proportions. For instance, to mark the 25 mc point we have to find the corresponding frequency on the 8.8-15.3 mc range; let this be represented by  $y$ , then

$$\frac{25}{22.7} = \frac{y}{8.8} \text{ or } y = \frac{8.8 \times 25}{22.7} = 9.67$$

Therefore, if we set the GDO dial to the 9.67 mc mark, we can draw a line on the appropriate scale to indicate 25 mc, or alternatively note the dial reading corresponding to this frequency. Similar calculations may be carried out for other frequencies to complete the calibration of the range.

### Reference Circuit

Assuming that it is not possible to continue the calibration by comparison with a receiver, the next problem is to find the lower limit of the next coil, and it is here that we bring the separate coil-condenser circuit into use. With the next higher frequency coil inserted in the GDO, and its condenser all-in, *i.e.* set to the lowest frequency, adjust the separate circuit to resonance, observing the usual precautions exercised with Grid Dip Oscillators, namely to use only sufficient coupling between the circuits to obtain a dip indication on the meter. Replace the coil in the GDO by the next lower frequency—in our case 22.7 to 39.5 mc—and use the GDO to find the resonant frequency of the reference tuned circuit. It is obviously essential that the adjustment of the latter must not be disturbed during this operation, but again the degree of coupling should be only just enough to give a meter indication. In the prototype this frequency proved to be 36.4 mc, and applying the ratio calculation as before this gives a range of 36.4-63.5 mc for this coil. Calibration of other points in this range are carried out as described above, after which the lower frequency limit of the next coil may be ascertained by bringing the reference circuit into play again.

The Grid Dip Oscillator is inherently a rather approximate method of frequency measurement—in fact it is really more correct to refer to it as a means of frequency indication. But within these limitations, the method of calibration described does enable one to obtain at least a rough idea of frequencies in ranges otherwise not perhaps readily available by other means.

### Use of Slide Rule

The calculations can be made easier if a slide rule is available, and a brief note is appended for the benefit of those not familiar with its use.

The simplest form of slide rule has four scales, two on the body of the rule and a corresponding pair on the slider; for convenience, these are usually referred to as the A, B, C and D scales, A and B being the upper pair and C and D on the lower half of the rule. There may be several other scales as well, but for our purpose we can ignore all but the C

and D ranges. The slide rule will also have a transparent cursor with a fine line drawn across it, and this is useful in setting up and reading off some of the figures.

In order to simplify the explanation of the procedure it is proposed to use the calibration of the 14.2 to 24.7 mc range in order to mark out the 22.7 mc "plus" coil. First set the cursor so that its hair line is on top of the 22.7 mark on the D-scale—that on the upper edge of the lower half of the slide rule—then move the slide so that 14.2 on the C-scale lies under the line on the cursor; that is, we now have 14.2 on the C-scale opposite 22.7 on the D. Examination of the D-scale opposite 24.7 on the C will show that the corresponding frequency, the highest frequency of this range, will be 39.5. Thus we see that while the C-scale represents the 14.2 to 24.7 mc range, frequencies on the coil range 22.7 to 39.5 mc lie in the D-scale, and the corresponding ones may be read off from it.

A slight complication occurs if we use the range 8.8 to 15.3 mc as the standard, owing to the C-D scales only encompassing one decade, *i.e.* 1-10. Having set the cursor to D 8.8, set C 22.7 beneath the line as before; the frequency corresponding to 25 mc may now be read off (9.67), but above about 25.8 we run off the D-scale. It is therefore necessary to transfer to the other end of the D-scale, by setting the cursor opposite 1 on the C-scale, and moving the slider so that C 10 falls under the cursor line, when the other points may be obtained; it will be seen that D 15.3 is opposite C 39.5. An alternative way is to use the A and B scales, which are marked as 1-100 with 10 at mid-point (or occasionally, especially on smaller rules, as two similar decades).



The PACO G.32 Sweep Generator is an FM Sig. Gen. with a basic frequency range of 3-213 mc in 5 bands overlapped, and the sweep width is adjustable over 0-30 mc at the VHF end. The application of the instrument (which is available in kit form) is in the alignment of wide-band amplifiers, and a marker-adder facility is provided to avoid misleading results.

## SMALL-CURRENT MEASUREMENTS

### ALLOWING FOR METER RESISTANCE — METHOD FOR AC READINGS

G. A. W. PARTRIDGE

VOLTAGE testing on most radio apparatus is usually quite simple. It is just a question of connecting a suitable voltmeter across the circuit and reading off the result. Current measurement has the disadvantage of having to break the circuit in order to insert a milliammeter. However, such work is carried out from time to time, especially in valve and transistor testing. Some of these currents are very small and therefore require far more sensitive equipment than the usual ammeter.

Fortunately in most radio work it is only small DC currents that need to be determined. Milliammeters and microammeters are moving coil instruments which are admirable for the purpose. Their scales are easy to read and for such sensitivity the prices are reasonable. Milliammeters cost about 27s. 6d. while the far more sensitive microammeters are approximately £2. Of course, these prices vary, especially on the surplus and second-hand markets, but this is a rough indication.

Multimeters are constructed around milli- or microammeter movements, so they can be used successfully for testing small currents.

Here again, there is a wide variety on the market. It is advisable to purchase the more expensive meters (not less than 5,000 ohms per volt DC) which have reliable milli- and microampere scales. The cost of such instruments could be from about £5 to £24.

Fig. 1 illustrates how a current meter is connected to a circuit. The internal resistance is very low so no appreciable loading of the circuit takes place under most circumstances. The following gives the approximate internal resistances of some current meters.

0-100 microamperes	about	1110 ohms
0-500	"	190 "
0-1 milliampere	"	60 "
0-10	"	4 "

If, however, it is desired to know what difference the internal resistance makes to a circuit the procedure illustrated in Fig. 2 can be applied. The current meter is connected into the circuit in the usual way and the voltage  $E$  measured at the point indicated with a high resistance voltmeter. Now the total resistance, that is the resistance of the load and the internal resistance of the meter, is found from:

$$R_t = \frac{E}{I} \text{ where } R_t = \text{Total resistance};$$

$E$  = Voltage, and  $I$  = Current in *Amps.*

We now subtract the meter internal resistance and find the actual current that would flow in the circuit *without* the meter from:—

$$I = \frac{E}{R_1} \text{, where } R_1 = \text{Load resistance.}$$

Here is an example:

The current taken by a particular circuit was found to be 5 mA when 12 volts was applied to it. The resistance of the milliammeter used was 4 ohms. The total resistance

$$R_t = \frac{E}{I} = \frac{12}{5/1000} = 2400 \text{ ohms.}$$

The resistance of the circuit without the milliammeter is  $2400 - 4 = 2396$  ohms.

The current that would flow when the milliammeter is out of circuit will be:

$$I = \frac{E}{R_1} = \frac{12}{2396} = .00501 \text{ Amp.} = 5.101 \text{ mA.}$$

It will now be seen that the internal resistance of the milliammeter has very little effect upon the circuit. In fact it is small enough to be ignored. Therefore the reading on the milli- or microammeter can be taken as correct.

### AC Current Measurement

The measurement of small AC currents does not often occur but there is the possibility that a small AC heater current may need to be checked or the

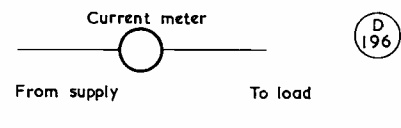


Fig. 1. A simple current test

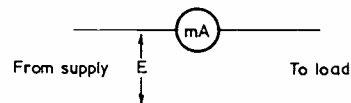


Fig. 2. Testing for  $R_m$  effect

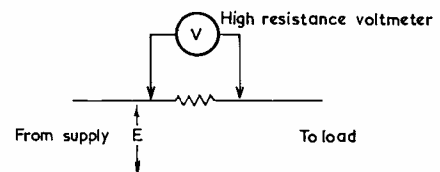


Fig. 3. Testing AC currents

Circuits to explain the points made in the text in connection with the measurement of very small currents.



current flow through an inductance or capacitance determined under AC working conditions. There are very few AC milliammeters available and most multi-meters have no AC milliamp. scale. However, the problem can be overcome by inserting a non-inductive resistance into the circuit and measuring the voltage across it (Fig. 3). A low-reading high-resistance voltmeter (not less than 1000 ohms per volt AC) must be used. The resistance value should be high enough to give a clear reading on the voltmeter. The current is calculated from:

$$I = \frac{E}{R} \text{ where } I = \text{Current in Amps.}; E =$$

Voltage across resistor; and R = Value of resistor.

An example: A voltmeter indicates 1.2 volts AC across a 30-ohm resistor. What is the current?

$$I = \frac{E}{R} = \frac{1.2}{30} = .04 \text{ Amp., or } 40 \text{ mA.}$$

In order to find the current that would flow *without* the 30-ohm resistor R, first measure the voltage across the load at the point shown in Fig. 3. Suppose this reading to be 12.

Then the total resistance will be:

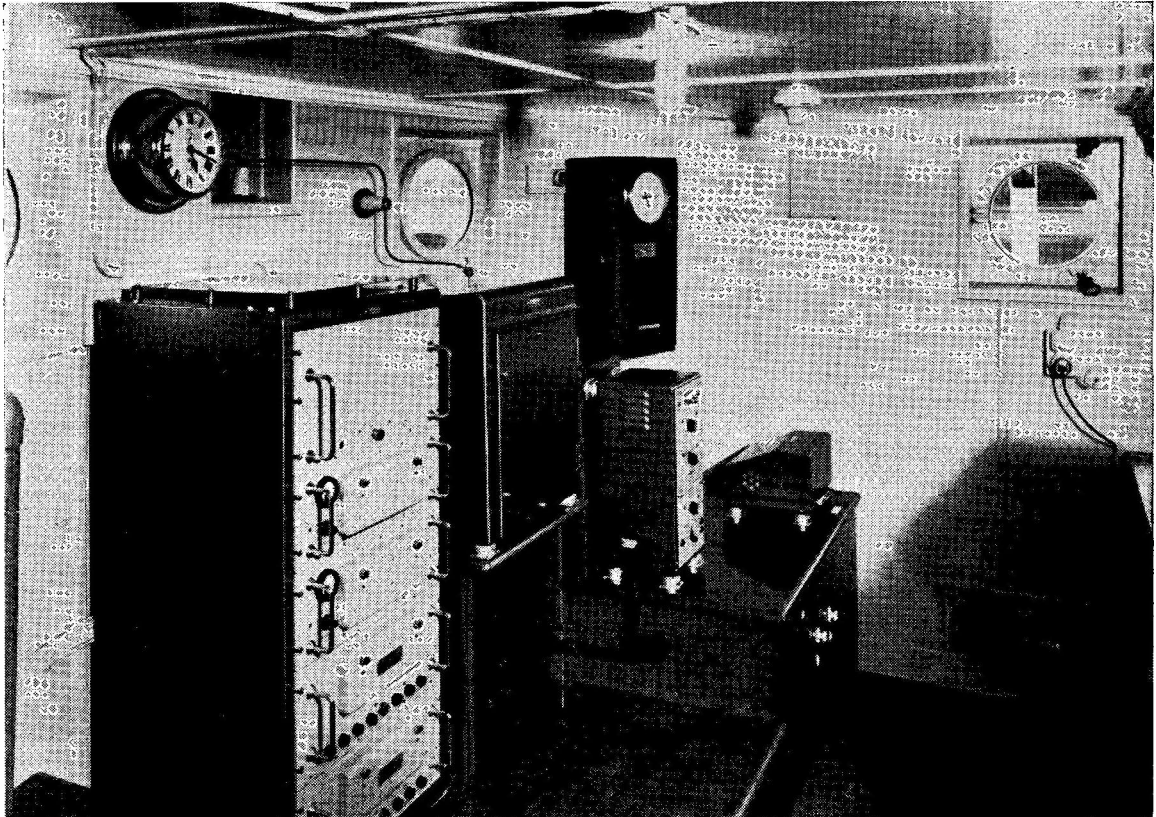
$$R_t = \frac{E}{I} = \frac{12}{40/1000} = 300 \text{ ohms.}$$

The load resistance  $R_1$  will be  $R_t - R$ , which is  $300 - 30 = 270$  ohms.

The actual current that will flow *without* R will then be:

$$I = \frac{E}{R_1} = \frac{12}{270} = .044 \text{ Amp.} = 44 \text{ mA.}$$

These simple measurements will cover most current tests. A good valve voltmeter will enable small AF currents to be determined quite accurately in the same way.



In addition to their normal function of marking shoal water and dangerous channels by lights and sound signals, the lightships of Trinity House will in future also put out a radio beacon signal in the MF band, as a navigational aid. This is a typical installation, manufactured and installed by Redifon, Ltd. The transmitters are their Type G.142, giving 80w. output, designed for automatic unattended operation, controlled by a call sign sender and chronometer, and incorporating an immediate-alarm system in the case of failure of any of the units. The installation shown here will be in the ship on the East Goodwins, a notorious hazard on what is probably the most congested shipping lane in the world.

# COMMUNICATION and DX NEWS

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

AT the time of writing, Twenty is full of W6's, all S9 or more; W7's, VE7's and some W0's are equally strong, and there is no European QRM whatever. Just a few Europeans are coming in, but weak and watery, and, for once, they all seem to have quite good notes. No lids, no chirpers or creepers.

Up in the phone band, too, there are only a few Europeans. Some of them, on SSB, are nice signals and easy to copy—but all the outstanding signals seem to be from W6 and 7. What has happened to the band? Have we reached the happy day at last, when the DX rolls in and the local QRM has vanished? Unfortunately, no . . . only one thing has changed. Your conductor happens to be writing this in Los Angeles.

To be precise, in W6EBG's "front yard," with a 3-el. beam 50 feet above his head and a blue swimming-pool alongside; and with 6,000 amateurs in the same city, within a radius of some thirty miles. Many of them are capable of punching holes in all that European QRM that we know and love so well (?), and a short drive around the hilly region to the North of the city reveals a few dozen beams, some of them real monsters.

Many of the local TV receiving aerials are just about as big as the average amateur beam in the U.K.—imagine clusters of TV aerials on top of a 60-foot steel lattice tower! But there they are, and a few of them must be 100 feet up, if the owners happen to be in a low-lying spot. The *real* amateur beams seem to grow everywhere, even in the centre of the city, and few small towns were passed through on our various trips without seeing some pretty ambitious ones.

Internal QRM in California? Well, worse than anything we have to suffer in Europe, but such

nice quality! No T6's, no bad chirps or clicks (unless a real local comes up, and then the whole band seems to tilt over, although very often the station being worked can still be copied).

If all our Eastern European friends were to be dumped in, say, W9 or W0 land instead of the stations who cause the present QRM, our W6 friends would probably not appreciate the change.

The sheer *number* of amateurs on the West Coast is incredible to the visitor from afar: About 6,000 in Los Angeles, and probably almost the same number in the San Francisco area; 3,000 or thereabouts in San Diego; nearly 1,000 estimated by W6AM to be in Long Beach (which is a smallish place, by Californian standards).

Although the really red-hot DX men constitute only about 1 per cent of the total (as they seem to do the whole world over), that gives quite enough tremendous signals to fit into one pile-up . . . and they do *not* use 150 watts (except in the exciter units)!

Among the top scorers the height race and the element-race is continuous. Beams seem to go up from 50 feet to 80, from 80 to 100, possibly having an extra element or two added in the process. Competition is of an intense nature that the average G simply wouldn't understand; even owners of 50ft. beams and full kilowatts look on themselves as small fry compared with the boys who put in those really fantastic signals when a "new one" is around . . . and anyone with an average G outfit—150 watts and a dipole or "piece of wire" would never even be heard when the pack is in full cry.

The DX Clubs (the writer had the pleasure of attending the meetings of three of them) include among their members many of the top DX'ers in the world. Any hint

of a DX-pedition or a new one and the whole place hums like a dynamo. VHF links come into operation, handlines buzz, tips are passed around—and at the meeting after all this activity, everyone reports on his luck. (And most of them, of course, worked the quarry before he escaped.) The sheer enthusiasm for DX for its own sake is terrific, and the results justify it. We came away with the impression that California is one vast DX-hunting machine of a most efficient type, and that the only fly in the ointment is that these types have mostly worked everything that's going, and require another DX-pedition every so often to bring them to the boil again.

Regarding our own signals . . . having listened to Europe on many consecutive days from W6-land, it can most definitely be said that it takes a really exceptional station ever to put in a signal there which compares in any degree with the W6's coming in the reverse direction. On the whole, the G's are rare; just a handful of them seem to come up with a good signal now and then, but mostly they are just plain *weak*, compared with DL's, OK's, OE's, UB5's and others. A question frequently met with is "Why don't we hear you guys?"

On some days it only takes a moment to decide that conditions to Europe are hopeless; on others a weak DL or two will alert an operator who, if he stays around, may work quite a few European countries before the band folds. (Most of these remarks apply to 1500 GMT or thereabouts—the morning session at 8 a.m., clock time, in Los Angeles, when the vast majority of W6's will have gone to work.)

Other quick impressions—the pleasure of seeing a familiar W6 call on the number-plate of a car in front of you; the amazement at

seeing W6AM's world-famous Rhombic Farm, bigger in actuality than one could imagine; W6YY's remote-controlled station on Mount Wilson, only reached after a 19-mile drive, naturally uphill all the way . . . and then a 6-element Telrex beam on a big, big pole at the top of the mountain; and, of course, the overwhelming kindness and hospitality with which a visitor is treated.

More of this later, we hope—there is much more to say about life in W6-land. But there is so much correspondence in hand for this month that we must come back to earth and deal with it. Meanwhile, just a heartfelt vote of thanks to the W6 gang, and especially to Gene, W6EBG, for the most enjoyable (and strenuous) holiday of a lifetime. Your conductor will never be quite the same again!

**Top Band Topics**

Time Marches On! Once more, a clarion call from W1BB on behalf of the traditional Trans-Atlantic Tests on One-Sixty. These have now expanded into World-Wide Tests, but to many they are still the original Trans-Atlantics, started in 1932 and continuing without a break except for the war years.

**Dates:** December 6 and 20; January 3 and 17; February 7 and 21. Set your clocks accurately, so that W/VE stations can call on the hour and every ten minutes thereafter, with the DX responding at 5, 15, 25 and so on past the hour.

The North American stations will use 1800-1825 kc (East Coast), 1975-2000 kc (West Coast). Europeans 1825 kc upwards, ZL 1875-1900 kc, VK 1800-1860 kc, and stray DX will crop up, as always, anywhere from 1800 kc.

Remember that these are *Tests*, not contests, and send your reports either to G6QB or to W1BB (preferably the former for all U.K. stations). Also be alert for unusual DX openings almost anywhere, as long as most of the path is in darkness.

Apart from such organised tests as these, there will be lots of DX forays to and from various places; but we have a feeling that the

amount of DX worked will vary in direct proportion to the amount of sleep lost.

G3RFS (East Barnet) says he has been completely off the bands for some time, but now has a new Top Band aerial—a quarter-wave with a 60ft. vertical section, four quarter-wave radials and three shorter ones. He already has skeds lined up with ZS1, ZL, W6 and JA . . . last season he worked 32 W/VE stations, 22 countries and had SWL reports from EP, 5N2, VS1 and VS6, all on an aerial rather inferior to the new one.

G3SVW (Manchester) already has 10 countries to his credit, including W1BB, who was worked on September 6 (with a 132ft. wire only 25ft. high).

G3PAI (Ongar), who operated from Sark during the CQ 160-metre Contest this year, tells us that he intends to repeat the trip for the 1965 event.

GM3KLA (Haroldswick) — the “farthest North station in the U.K.”—joins the select band at the top of the WABC Ladder with 98/98. He is the third GM to do so (GM3OM and GM3COV were the previous ones) and he points out that no GI, GW, GC or GD has

ever made it. It's interesting, too, to note that his WABC (60 counties) was achieved during his first year on the air, with a battery-powered rig—before the mains reached the island! Finally, 54 out of the 98 contacts were over distances of more than 500 miles . . . and Bill wants to thank all the stations, including many /P types, who made his final score possible.

G3PLQ (Salisbury) is probably off on his West Africa run again by now. During his leave he worked VE2UQ (September 13) and was delighted to have personal visits from G3GRL, 3PPU, 8AX, 3TSJ and 3JWH. He reports that ZB2AE will soon be active; that 9L1HX is already on, and that 9G1DV should be there by January. (The “OZ's” and “LA's” worked by G3PLQ and others were phoneyes, and now it seems that G3PU landed a YU—almost certainly of the same ilk.)

A later letter from G3PLQ tells us that he is now aboard m.s. *Kumba* and bound for Takoradi and Lagos. Listening for G's at 2100-0001 GMT Mondays to Fridays, 2100 Saturdays and 0400-2100 Sundays. [over

ZONE-BAND TABLE

Station	Zones Worked						Total Zones
	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc	
G2DC	40	40	40	36	25	5	186
W6AM	36	39	40	37	23	9	184
G6QB	38	40	40	34	20	7	179
G3DO	39	40	40	28	24	2	173
G3IGW	36	38	38	32	18	11	173
G3HZL	27	39	39	28	14	2	149
OH3NY	32	30	40	25	10	7	144
G3NOF	34	38	39	10	8	1	130
G3PEK	2	21	35	30	17	4	109
G3RDC	3	14	38	11	3	1	71
G3IDG	20	23	17	3	2	2	67
G3OLN	2	7	11	16	3	4	42
G3PLQ	1	8	7	3	3	5	29

(Entries for this new table are invited; scores are post-war, i.e. starting from any time back to January 1946.)

### Super-Pirate!

6Y5XG (formerly 6YAXG) had a couple of months in England and is now back in Jamaica, looking forward to a first-class season on Top Band. He was amazed when a pile of OK listeners' cards for 6YAXG turned up; at first very pleased, but when he found that none of them checked, very annoyed! As Peter says: "Someone actually had the audacity to use my call on *Top Band*—should not be so touchy if he had kept it to the HF bands, but this is a bit much." He will be spending more time on 7 and 3.5 mc than on the HF bands, from now on. Look for him after 2300 GMT, around 3520-3525, and 7010 kc (and on Top Band, 1800-1820). QRN has been high up to now, but the local thunderstorms should end in a few weeks.

### The Cyprus Affair

Most DX-chasers will know by now that the old ZC4 prefix has reappeared. Apparently all the 5B4's outside the Sovereign Base Areas on Cyprus were closed down and had their gear confiscated (as reported last month), but from September 18 those within the S.B.A.'s reverted to their old ZC4 prefixes and kept the flag flying.

Unfortunately many people think they are pirates, and realise their mistake only when they hear others. ZC4GT says he understands that ZC4 now counts as a separate country, but we have no confirmation. G3HAL (Winslow) writes to say that he worked G3HHT using a ZC4 call, and he told him precisely the same. And G3NWT (Stapleford) says he heard SV5GB who, he thinks, must have been 5B4GB "on the threshold of an enforced QRT." He remarks on it as possibly "the world's first example of a reversion from a shocking numeral prefix to a sane and old-fashioned one." These ZC4's—who are, of course, all British Service personnel—have now clinched the deal—good luck to them.

### Note from VS6

Rather strangely, our next letter is from VS6FO, who used to be a ZC4, but has never been a 5B4.

He is G3ICH, *ex*-DL2SU and ZC4PN, and now finds himself with "the poorest location on the island" for working the U.K. Being surrounded by hills up to 1,800 feet high, Pete has no great hopes for his DX-40, crystal frequencies and AR88, but he intends to try, starting with a dipole and progressing as circumstances dictate. We hope to hear and work him soon.

VU2GW, currently very active on Twenty CW, writes with a few queries and tells us that he uses a Geloso VFO driving a pair of 807's with 100 watts input. He finds conditions rather poor and not helped by lots of the old DC fans, which his neighbours continue to use with metal rectifiers! Twenty is open to Europe almost daily, 1330-1600 GMT, and when the Quad, which is "taking shape" is finally in action, Ranga expects even more luck with the G's.

5Z4JD, Awards Manager for the Radio Society of East Africa, writes to say that the independence of Northern Rhodesia (Zambia) has been marked by a temporary increase in points value. From October 24 until December 12 (Zambia's Independence Day and Kenya's Republic Day respectively), cards from Kenya will count for two points, Zambia for eight.

Since Zambia is the sixth "ex-VQ" area to change prefix during recent years, a new award will be produced to replace the "Worked All VQ Areas" certificate; details will be issued as soon as it is finalised, but applications for the "WAVQ" will still be processed for some time.

### Odd Notes

Interesting technique, reported by G3SVW:—"One of those long-drawn-out CQ calls the other day from a G3T -. And he ended it with 'VA dit—dit.' No reply!" Perhaps he simply didn't want one?

G3IDG under fire from

G3SEN:—"I am always interested in the comments of G3IDG, but surely some are a little unnecessary? Is ours a hobby in which we please ourselves how we operate (up to a point), what mode we use, what band, and so on, or not? We are not in some sort of Secret Service in which all transmissions *must* be cut to the bare essentials, and 'the,' 'RST,' 'ur' considered irrelevant."

As for recent strictures on "BK," SWL Steve Gall (Old Coulsdon) surely has the last word. He sends a newspaper cutting with the headline "Break-In Method Kept Secret," which goes on to say that prosecuting counsel admitted "Even the police had never heard of it, but a carpenter would find it very simple." Actually the perpetrator was a carpenter, and he was put on probation for three years for "five break-in offences." Just watch it, some of you breakers . . .

G3OHX (Ashford, Middx) sends the following, with the permission of the amateur who made the comment: "Just come back from two glorious weeks in Devon and Cornwall with the YL, and it's nice to get back to the rig." G3OHX says this sentiment surely represents the ultimate in loyalty to Amateur Radio, but adds "The poor chap must be mad."

And G3JDK sends a story from behind the Iron Curtain (one of those "whispered-from-person-to-person" affairs): A Russian peasant, working in a forest, found a wire strung between two trees, and on the strength of his discovery he claimed the invention of the telegraph. About the same time, a peasant in Red China was planting rice and did not find any wires, so the Red China government claimed the invention of wireless. Oh, well . . . !

### Around the Bands

And so to some DX! G2DC thinks the conditions are holding up remarkably well, and finds no

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## Reporting the HF Bands

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difficulty in raising good DX at reasonable hours on at least three bands—7, 14 and 21 mc. The Far East has been really good on 14 mc during the afternoons, with 21 mc wide open to those parts in the mornings (0800-1000), for Africa and North America in the afternoons, and for South America in the evenings. Oceania has been bagged on 7 mc as early as 1730 and also from 0700-0830.

Jack has been overhauling transmitter and aerial for Top Band, too, and has been listening in order to get the swim of things on One-Sixty. (How nice if a few others would do this, too, instead of barging in without knowing what really ticks!) He was distressed to hear of a G using a pair of 813's in his PA for this band, which presages some acid comments flying around—not to mention some QRM.

G3HZL (Isleworth), who was QRT until last August, now has up a 33ft. vertical and uses it on all bands—to the tune of 55 countries in 22 Zones in five weeks. He says it is exceptionally good on Top Band, with eight countries and a 579 from OHØ. On the strength of this, he joins the Zone-Band Table, in what he calls his "usual middling position"!

GM3JDR (Golspie) has moved to 21 mc for most of his operations, and finds Africa most consistent but very hard to get, as they seem to have a permanent pipeline to the U.S.A. On SSB he raised a pile of ZS's, 7Q7, 9Q5, 9G1, 5H3, 5Z4 and the like, as well as quite a longish list on CW. On 14 mc CW he collected the Cambodia DX-pedition, W9WNV/XU, but never managed to hear him on SSB.

G3NOF (Yeovil) reports several openings to Africa on Ten, but says it's often necessary to listen for long hours to catch one of them. Fifteen, though, has been opening to the U.S.A. many afternoons around 1500, and on October 18 from 1200-1800. Things are definitely looking up! Twenty has been good for all areas, and Don quotes a few "specimen OSO's" with HS11, DU1AP, W9WNV/XU, YA1AN, 4W1F, ZL1ABZ and such, as a



Now of 34 Birch Avenue, Romley, Cheshire, G4HU was first licensed pre-war under the AA call 2DDM. After a varied experience, on the air and off it, he is now settled on 14 mc for CW and 3.5 mc for phone, operating after midnight because the local TV receiver time-base radiation blots out his Rx—TVI in reverse. In fact! The Tx is a PR-120V and the receiver an Eddystone 840C with a Codar PR-30X preselector and a Q-multiplier. For the HF bands the aerial is Mosley trapped dipole, with "a bit of wire" for 80m. G4HU's other hobby is fencing and, taking part in tournaments about the country, he travels /M.

measure of the conditions (all SSB, as ever). His most consistent signal has been VS9MG. And on Forty the VK's have been heard around 2000 most evenings, and VS9MG was also worked there.

Some more brief reports on Ten Metres: G3IDG heard VQ2DT, ZS6ADY and 5A3TL (all AM and round about 1700); G3OAD (Dudley) lost his 3-ele. rotary in a recent gale, but before that had worked CX's, LU's, PY's as well as hearing 9G1, 6W8, South Americans and several Europeans; and SWL W. H. Gundill (Dewsbury) heard VQ2DT, LU4DM and CX1AAM.

A suggestion has been put up that, in order to promote more activity on Ten, interested operators should call CQ on the hour, 1600-2200 GMT, in the 28600-28650 kc region. (The same might go for the CW types, say 28000-28050 kc.) Excellent idea—please adopt it.

### Contests and Suchlike

Coming events: **November 28-29, CQ Worldwide DX (CW Half)**. Rules as usual, but remember that it now starts and ends at midnight, not 0200.

**January 30-31: CQ Worldwide 160-metre Contest**. As before, but fuller details will be given in the next two issues.

Results of the CQ (1964) SSB Contest will appear in full in our December issue, but a preliminary flash gives DL3LL as the outright winner in the All-Band category, with G4CP also in the Top Ten—the only G and the only other European to make it.

The 1965 French Contest, celebrating the 40th anniversary of the R.E.F., will be held on January 30-31, 1400-2100 GMT (CW half) and February 27-28, 1400-2100 GMT (Phone half). Three points per QSO with French and French-Colonial stations; multiplier the sum of French Departments and

DUF countries for each band. All stations sending in a log for a score of over 1,000 points will receive a special certificate for this Anniversary event.

Top scorers in the 1964 French Contest (all with over 20,000 points) were DJ5BV, UB5FG, YO4WU and YU1BCD. Top-scoring G (out of only three entries) was G3EYN with 13,851. Longest entry lists came from UA, UB, OH, OK, SM and DL.

For the IOTA (Islands On the Air) Award, the following continental committee members have been appointed: Europe G3AWZ; Asia 4X4DK; Africa 5Z4ERR; North America W2BXA and

VE3CFG; South America CX2CO. (About as hot a "WAC" of DX'ers as you will ever find grouped under one heading!) The preparation of the Directory of Islands is now in progress, and the whole scheme will open on January 1.

It is some time since we mentioned the "Top People" in the DXCC Listings in *QST*; so it is nice to be able to record that G4CP and G3AAM are both in the very top bracket, with 311 current credits, and 335 including the "deleted" countries. Other G's very near the top are G2PL with 309/332, and G3FKM with 309/326. FB!

VK9BW (14275 kc SSB), VK9CJ and 9MM (7 mc CW) and VK9NT (14105 kc SSB).

**Easter Island (CEØ)**: Activation promised by W4QVJ and W6UF, around December 1; CW at LF end of 80, 40, 20 and 15, SSB in various places on 40, 20 and 15. Film and tape recordings will be made, also a TV film.

For the WPX-chasers, some unusual ones: DU5DM, a Field Day station; YA3TNC, YS1HUKE (the year's most improbable call-sign), and, of course, the first operation from Zambia (ex-Northern Rhodesia) for which the new prefix is not known at the time of writing.

### TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NJ	98	98
G3GGS	98	98
G3NPB	98	98
G3REA	98	98
G5JM	98	98
G6VC	98	98
GM3KLA	98	98
G3LWQ	96	96
G3PLQ	92	95
GM3IKD	86	90
G3RHM	73	78
G3NOW	72	81
G3NLR	67	67
G3PPE	60	72
G3OJE	55	56
G3IDG	51	56
G3SWH	38	58
G3SNU	37	59
G3SJJ	36	71
GW3ITZ	35	61
G3SXW	23	45
G3SVW	19	59
<i>Phone only</i>		
G3NPB	88	88
G5JM	72	74
G3RHM	69	70
G3PLQ	55	58
G2NJ	54	54
G3REA	53	66

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

### DX News from Everywhere

W9WNV/XU, during his brief stay in Cambodia, made 7,100 QSO's. His QSL's will count for DXCC, and of course the big thing (for the W's) about this DX-pedition was that the FCC legalised contacts with Cambodia, since the operator was a W with full permission to carry out the whole project. Don then proceeded to Vietnam (3W8) on the same basis, and fired up on October 20 with good signals into Europe at 1330.

Other imminent DX-peditions include one by G3NIR, who will be on from VR2, VR5, YJ1 and FK8. This was due to start on October 28, but should still be on by the time you read this.

K2HWL will be in Tahiti for some days when he goes there at the end of October . . . callsign FO8JL. VU2NR begins his trip to the Andaman Is., whence he will sign VU2NRA, around November 18. He will take his home-brew gear, and use a 3-ele. beam on a 100-ft. mast which is already in position on the island.

5H3KC, on 14 mc SSB, is DL9HF, who will be on as DL9HF/ZE in November. Thereafter he is liable to show up from at least a dozen African countries, possibly including Rio de Oro and Ifni, operating a transceiver on 14 SSB.

**Norfolk Island**: VK3TL will be signing VK9TL from this spot during January . . . Lots of activity from New Guinea, especially from VK9GC (14 mc CW). Also

### Aerial Gen.

Each month we receive quite a good selection of letters saying that the writers approve of the new format of this feature. Mostly they say that the news about what people are using, or doing, or just *thinking*, is more interesting to them than lists of Calls Worked, which tell one so little in these times.

So—it is felt that the time has come for a little research into aerial systems. How do the various types match up with the results that their owners are getting? What are the latest brainwaves being thought out, tried out—even thrown out? Did that freak thing that old G3--- mentioned six months ago ever work? Why has the Top Band signal from so-and-so suddenly increased by about 20 dB? Has he gone mad and installed a pair of 813's, or has he really found an aerial that does things for him?

Please let us know about all this, even if you are merely using a home-made Quad which only stays up there if the wind is less than five knots. This is one thing about which everyone talks, on the air, and it might well be extended into these columns.

As an example we have a "Late Flash" letter from G3NPB (Hexham) telling us that he, too, now claims the top score of 98/98 on the WABC Ladder—and we should like to know what kind of a wire he did it on . . . and the next letter is from G3PPE (Wallasey), who says that he and G3TKN

are experimenting with loaded "L" aerials for Top Band, with the object of obtaining both long-wire and whip characteristics from the one wire so as to work locals, GDX and "real DX" with equal efficiency.

Reverting for a moment to W6-land . . . the word seems to be getting around in the States that nothing is so good for DX as a Quad. After all, many of these "QRP" G's who beat the big DX'ers at their own game are using them. But—we didn't see a single Quad in California; just Yagi's, bigger, better and higher.

Yet a recent analysis of the DX-Kings' antennae, in one of the American publications, established that the Quad was without doubt the top scorer overall. What would results of a similar survey in the U.K. reveal? We would hazard a guess that there may possibly be more Quads than Yagis over here. (Meanwhile we find on returning that our own "piece of wire" is at zero-height at the far end, owing to the ravages of a gale which struck a week or so back . . . but it seems to work just as well in this position. But the *look* of the thing is so bad that the missing halyard must be replaced as soon as possible, just to soothe the nerves.)

### More DX Shorts

Recent gleanings on *Top Band*: K4KYV, VE3AGX, W1BB, W2EQS, W2IU, W2KQT, K2GAL . . . all logged around 0430-0500. Known to be QRX—VK5KO, 1832 kc, 2000; VQ2W, every Monday, 2030-2115.

And on *Eighty*: CW—VK5NO (2000), VQ2DT (2000), ZL1AXB, 2AUA and 3OX (0615). SSB—Evenings, OX3WX, OY7ML, VP9BN, 5Z4AA, PJ2ME, VO, VE and W1. Early mornings, ZL2BCG, 3BG, 4LM, YV5ANS and 5BPJ, W5, W9 and W0.

*Forty*: Evenings, MP4TBJ, VE1AJR/SU, VP2SC, VP8HU, 5Z4IV, 9Q5AB, BY1PK, OR4VN. Mornings, KC4USK, VK9RB, ZL4IF, W6's, VK3ZR, 6W8AJ. SSB: Evenings, JA2BTV, MP4BBW, VK's, 5Z4AA, 9M4LX, EP3HS. ZS1XX. Mornings, VK, ZL, TI2SS.

All the above have been either



In August issue we showed a picture of G3PLO in his sea-going capacity. Here he is in his own station at 32 Campbell Road, Salisbury. A very keen Top Band man, he worked a good deal of GDX on 160m, while home on leave during September. By the time this appears, he will be away at sea once more—and will be listening at DX for G's on Top Band. The Tx shown here is K.W.-160 (middle left), and the Rx an HRO Senior with bandspread, using a Codar PR-30X preselector.

heard or worked from the U.K. during the three weeks or so before writing.

Gus Browning should really be on his way to AC3/5 by now, probably having passed through London *en route* . . . Trinidad Is. (PY0) operation is hinted at for the first week in November by PY2PE/0 . . . YA1A, YA4A and DJ4EK/YA are all reported active, mostly 21 mc . . . Hammarlund are working on an operator to go to Heard Island (VK0), late October or early November . . . HZ2AMS is back in Saudi Arabia and further DX-peditions to the Neutral Zones are expected soon.

### The Tables

Note the new look of that Top Band Counties Ladder, with *seven* callsigns sharing the Top Spot of 98/98. Others have made it in the past, of course, and have "retired," but never before have there been more than three or four displayed in the top bracket. Where do they go from there?

A few recruits to the Zone-Band Table seem to appear every month; we hope this one will become more popular as DX conditions on all bands show an upward tendency.

And now—at last—for the new table: **Ten-Metre Counties and**

**Countries Worked.** We should like to start this one next month, with just the three columns: (a) Callsign; (b) U.K. Counties Worked; (c) Countries Worked, commencing date October 1, 1964. This will give some encouragement towards ground-wave and tropospheric working, we hope, rather than making it exclusively a DX list. If anyone ever achieves 98 British Counties on Ten, we shall be very surprised indeed! So send in your entries by next month's deadline.

### Sign-Off

So much, then, for a pretty interesting month, despite a lowish level of conditions on the HF bands. Things will liven up from now onwards, especially on Top Band and Eighty; let us hear of all your activities by **first post on November 16**. Without long lists of Calls Worked, we should like to hear briefly of your doings and chief successes on each band; something about the Quads, Yagis and bits of wire responsible for them; and any general chat you may have. Address everything, by that deadline, to "Communication and DX News," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1. The more the merrier; and, until then, Good Hunting, 73 and—BCNU.

## NOTES ON MOBILE AERIALS

### FOR TOP BAND—CONSTRUCTION, FITTING AND TUNING

W. FARRAR, B.Sc. (G3ESP/M)

IT has been said often enough that a transmitting station is only as good as its aerial, and this certainly applies to mobile operation. The whip used for the popular 160-metre band suffers especially due to its shortness compared to a normal quarter-wave wire, so to get other than mediocre results it is essential to get its efficiency as high as possible. There is a distinct lack of published information on the subject, and what has been published (mainly in the U.S.A.) seems to be based more on theoretical than practical considerations. (The outstanding exception is the well-known article "Resonant-Whip for Mobile Working on Top Band," in the June 1956 issue of SHORT WAVE MAGAZINE, this being still the standard reference on practical design and construction.—*Editor*.) The following notes are offered as a result of a few years of trial and error.

What is an essential requirement of any radiating system? Obviously, it must resonate at the frequency fed into it, and here many a mobile aerial falls short. There are those who get two or three whip sections, stick a coil in series and hook it to the transmitter, and are delighted to get an R4-S5 report from ten miles away. Others may buy a commercial model with similar results. But, to get only that report from that distance is by no means good, assuming that the car is not hemmed in by buildings. It is easy enough to build a suitable compact mobile transmitter (such as the Minitopper, described in SHORT WAVE MAGAZINE for August 1962)—but the most difficult part of a Top Band mobile installation is the making of an aerial which is truly resonant.

#### Whip Design

What is a loaded whip? It is effectively a tuned circuit, which should resonate at the operating frequency. The loading coil provides the inductance, and the rod above the coil the capacity to ground. Because a base-loaded aerial has a longer top section than a centre-loaded system of the same overall length, the capacity is greater, and so the coil can be smaller. Whether one uses base or centre loading is a matter of choice. It is generally conceded that a centre-loaded system is better than a base-loaded one, though some people get excellent results with the latter. It depends a lot on how it is mounted and fed. G3ESP/M uses an approximately centre-loaded whip, and a brief description of this follows, along with points of design which could apply to any other mobile aerial.

The mobile handbooks stress the absolute necessity of having a large diameter air-spaced loading coil. The difference between this inconvenient and

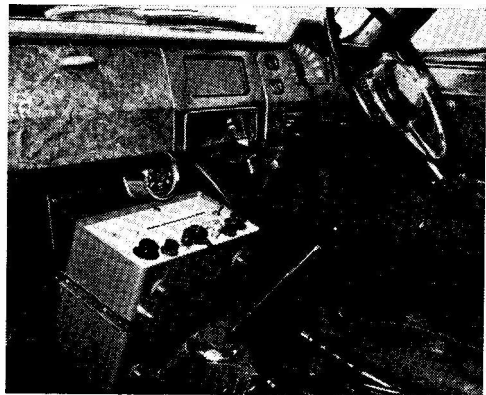
bulky device, and a smaller, neater and probably stronger coil is not noticeable in practice. Thus one can use very satisfactorily a good quality coil former and a close-spaced winding. It can be long and narrow, and therefore less obtrusive than a large diameter type.

The writer's aerial consists of a bottom section of solid dural (ex-TV aerial) about 3ft. 6in. long, and a top section of about 4ft. 6in., being the upper and part of the middle section of a British tank aerial. The coil is wound on a hollow perspex former 7in. long by 1½in. in diameter, with perspex end plugs. The winding consists of 236 turns of 23g. enamelled copper wire, close wound, the winding length being 6¼in. The top section is permanently fixed into the end of the former, and one end of the coil soldered to it. The other end of the coil is soldered to a ⅜-in. diameter threaded plug, which screws into a corresponding threaded socket fixed on top of the bottom whip section, making good electrical and mechanical connection. Thus most of the aerial can be removed (essential for garaging!) and carried in the car.

One should not now go away and make a Chinese copy to these measurements, because most likely it would not resonate at the required frequency. A noticeable change in resonant frequency can occur if the top section is changed slightly in length, or replaced by a rod of different diameter, or if the coil is altered in any way. The frequency is dependent also on the design of the car body and the mounting position, as well as proximity to buildings, trees, lamp posts, etc. Obviously no cut-and-dried formula can be used. Instead, it must be a case of cut-and-try.

#### Mounting Methods

Before dealing with the job of trimming the aerial, the mounting of it must be considered, as the final tuning *must* be done with the aerial on the car in the permanent operation position. The G3ESP/M aerial is mounted where car receiving aerials used to be—just in front of the windscreen, on one side. It goes through a hole in the bodywork,



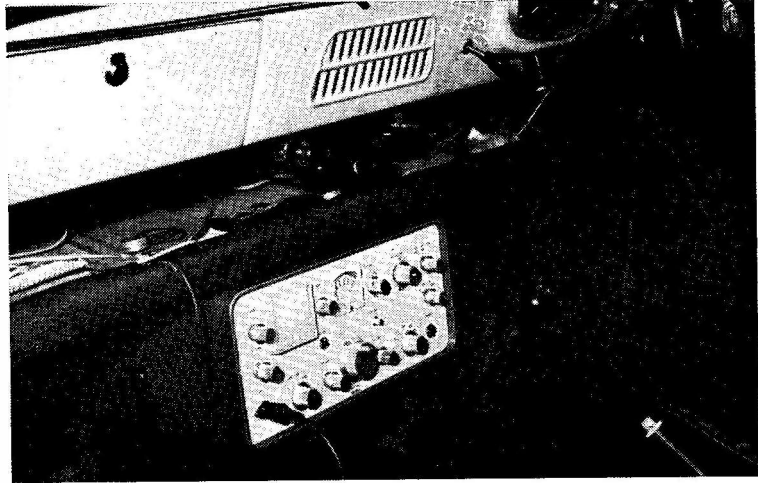
G3HXN/M (Glos.) runs an MG fitted with 160m. gear, for which the Rx, PSU and modulator are all-transistor. The Tx (VFO, BA, PA) is valved, with a 5B/254M in the output stage — at Woburn on September 13.

A G3GMN print



suitably insulated, and down a few inches behind the dashboard. To ensure that it goes where it should, it is advisable to drill a small pilot hole from *inside* the car, and complete the job from outside (you can't replace the hole if you put it in the wrong place). For years this insulation consisted of a synthetic rubber grommet. Now it consists of a rubber grommet with a polythene sleeve around the rod where it goes through. The bottom of the rod is fixed to a bracket, insulated from it, of course. The small Ford cars from 1953 to 1959, and the "Popular" from 1959, have a parcels tray; this makes an excellent insulated anchor for the bottom of the rod. Super insulation is not required, as the RF voltages at the bottom of the whip are low (and anyway the power limit is ten watts). With an overall length of about 8ft. 9in., the top of the whip is less than 12 feet from the ground, which clears all normal obstructions like bridges and trees. Even in difficult territory, the springy top section just bends out of the way. The coil is well above the car roof level, and it works remarkably well. A bumper-mounted whip could be longer, of course, but might tend to sway, unless stayed in some way.

Front fitting has much to recommend it. The feed impedance of such an aerial is very low, and normal coaxial cable will not match this. Therefore a minimum length of such cable is desirable. Further, some form of tuner is required, so that the aerial can be resonated at various frequencies over the band. One commercial model uses a capacity hat in the form of a small springy cross, which can be slid up the top section to alter its capacity to ground. The disadvantage here is that it could perhaps be dragged off if the aerial fouled a tree. Also, it seems that a ladder might be needed for extreme adjustment. A telescopic top section is another solution. The disadvantage of such external tuning systems is that the operator has to get out of the car to adjust them. An internal adjuster, conveniently to hand, is much better. With an aerial mounted at the front, as described, this is a simple matter. In the writer's case, a coil of some 20  $\mu$ H is put in series with the aerial, inside the car. The coil has tapping points every few turns over most of the length, and every turn for the last ten turns. These tappings are connected to rotary switches, giving coarse and fine adjustment. This extra base loading enables the aerial to be resonated anywhere in the 160-metre band. The free end of the coil is connected by a short



The KW-2000 Transceiver owned by G3FZW/M is fitted in his Austin A.40, the aerial system used being the Webster Band Spanner, which is an all-band design for mobile.  
A G3GMN print

length of coax to the change-over relay, which in turn is connected to link windings on the transmitter and receiver.

#### Making The Whip

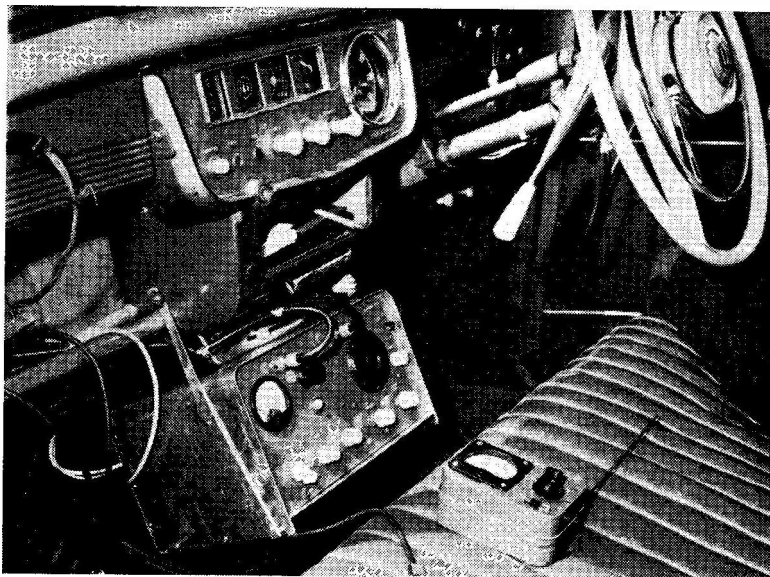
Let us now consider how to make a whip successfully. Having got a suitable former and rods, wind the coil *bigger* than necessary. Then assemble the rods and coil in the operating position, and connect up to the transmitter. The resonant frequency will be lower than desired. An approximate idea of the frequency of the aerial can be determined before connection to the transmitter, by putting a two-turn coil between the bottom of the aerial and the car frame, and linking this to a grid dip meter. On tuning this, it will show a dip at the resonant frequency. This will at least show that the aerial is at a lower frequency than required. If not, add more wire. Next, set the transmitter to the lowest operating frequency, and take wire off the loading coil two or three turns at a time, until it is resonating in the band. Then proceed *very carefully* pruning the coil, finally removing one turn at a time, until the aerial is resonant just below 2000 kc. Before reaching this stage, it could be that there is an inch or two of former to spare, where wire has been removed. This can be cut down before finally pruning the coil.

Having got the aerial resonant at the highest usable frequency, it can then be tuned to lower frequencies by the aerial tuning coil already described. Even if one is a single-crystal operator, the aerial still needs some tuning device, as nearby buildings and trees can throw it off resonance when working from a static location.

Now for a few final hints, to ensure a satisfactory

job. In joining tank aerial sections, one should not rely merely on the push fit. These tubes are of steel and, though copper-plated, can rust in time. Clean down to the steel on either side of the joint, wind thin wire over the joint, then flood the lot with solder (a large hot iron is useful here). When everything is connected up, the sections can be given a beautifying and protective coat of aluminium paint.

It must be emphasised again that precise tuning of the aerial is essential for maximum efficiency. In the writer's station, a change of one turn on the internal aerial tuning unit can cause a change of about 2 mA in the PA anode current, which runs about 30 mA normally. This is a change of about 6 per cent, or a change in input power of about half a watt. Why waste this? Every little helps.



A Hillman Minx fitted mobile for Top Band. The installation is home-constructed and is operated by G3PPP/M, of Northampton. *A G3GMN print*

### *First Impressions of The Show*

At the moment of writing, the Exhibition at Seymour Hall is in full swing. So far, attendances have been good, and record totals all round are expected by the time the Show closes.

The opening, by Mr. E. D. Whitehead, lately Director of Electrical Inspection, Ministry of Aviation—in the presence of a much larger crowd than usual—was attended by a distinguished gathering from the world of Electronics and Communication—and Amateur Radio.

It was then announced that the annual Manufacturer's Prize had been awarded to the firm of T. Withers (Electronics) of which the principal is Tom Withers, G3HGE, the equipment selected being his new range of TW Communicators. These are single-band transceivers for two metres, four metres and Top Band, their main features being: Small size, internal aerial change-over; push-to-talk, and the CW facility; an all-transistor Rx in each case; a 15-watt transmitter complete with modulator; a transistorised PSU; and full metering.

The size and general design of these units make them very suitable for portable or mobile use, or for QRP operation in a fixed station. Finish and workmanship are, of course, up to the usual high standards expected from this stable.

It is not the intention, nor is there the space, here to discuss all that there was to say and do at this year's Exhibition—suffice it to say that the general impression, as gathered from visitors round the stands, was that it was the best Show yet, in terms of new equipment to be seen and people to meet. The whole atmosphere of Seymour Hall as this is being written is one of buoyancy and enthusiasm.

A fuller report, with more detailed information about new products, will appear in the next issue.

# VHF BANDS

A. J. DEVON

CONDITIONS, like the weather, slumped during the middle part of October. Having been good up to about the 5th, there was then an abrupt fall-off until the 18th—during which quite a lot of GD<sub>X</sub> was noted—and again a slump till towards the end of the period, when things started to pick up again.

GB3LER (Shetland beacon, and your A.J.D. apologises for having put him on the wrong frequency last time; it should, of course, be 145.995 mc, nominal) was again being heard in Southern England on October 3/4, exciting because one would expect shoals of GM's to be there under such conditions. But the fact is that many reports say that this is just what does *not* happen—GB3LER may be coming through quite well with not a GM signal to be found on the band.

Since we all know that the GM's are as alert for openings as anyone else, this rather unexpected phenomenon suggests that there may be a pronounced ducting effect over the route, carrying the beacon signal right over GM and Northern England

—which may sound improbable, but it does tie in with those occasions (very few, it must be admitted) when GM's inaudible in England have been working F's and PA's.

Whatever the explanation, the fact remains that the presence of the GB3LER signal in the London area does not necessarily mean that there are GM's about, and workable. What we would now like to know is when, and how, the Glasgow and Edinburgh boys find GB3LER? Is he a consistent signal, does he tie up with GD<sub>X</sub> conditions, or what?

G3EDD (Cambridge) is one of those who have noticed the peculiar timing sequence on GB3LER—he says “they must have a little man winding the handle” and that it is necessary to sit on the frequency for not less than nine minutes before deciding whether or not it is audible. He also mentions the paucity of GM's when the beacon signal is there—though GM3HLH was worked on October 3 and G13GXP on October 4, with nothing much else on the band in the way of GD<sub>X</sub>.

## Sideband and Channel

On quite another topic: Now comes up the matter of the SSB band. Inspired (and your A.J.D. thinks that is probably the correct term) by G3BA (Sutton Coldfield), about twenty or so Sideband types have settled in the frequency-area  $\pm 25$  kc of 145 mc. Being VFO-controlled, they are able to clear the CC boys, and can enjoy the pleasures of single-channel working under Vox conditions, with the minimum of searching and calling CQ. As all this is obviously *contra* the Zone Plan, it is not popular in all quarters, and the question now is: What should be done? So far as we are concerned, the answer is nothing until the matter has been more fully discussed, and all the implications examined. As G3BA points out, with the coming of transverters, commercial and otherwise, there will be a lot more people in a position to operate VFO-wise on two metres (even if they are not using SSB),

and Tom's idea is that the 145 mc region is the right band area for this because (a) It is mid-band and easily remembered; (b) For most people the desirable ED<sub>X</sub>/GD<sub>X</sub> is at the LF or HF ends; and (c) The readily available crystals can be for translation from either 14 or 28 mc. He also says that the 145 mc channel is in the largest zone, and that 95 per cent of VHF operators look for DX in other parts of the two-metre band. These ideas may not find favour with everybody, but at least it can be said that “something is being done”—and that it is now for protagonists of opposite view to have their say.

## New Record Notes

G5ZT (Plymouth) has worked GC2FZC (Guernsey) on 430 mc

## TWO METRES

COUNTIES WORKED SINCE  
SEPTEMBER 1, 1964

Starting Figure, 14

From Home QTH only

Worked	Station
50	G3EDD
46	G3SAR
42	G3HRH
38	G3CO
34	G3FNM, G3GWL
32	G3AHB
29	G2CDX
27	G3PSL
25	G3KWH
23	G2BJY, G3LAS
19	G3FUJ
18	G3PTM
17	G2AXI
16	G8VN
14	G3KQF

*This annual Counties Worked Table will run till August 31, 1965. All two-metre operators who work 14 or more Counties on the band are eligible for entry. QSL cards or other proofs are not required. After the first 14 worked, simply claim from time to time with counties as they accrue, giving call sign and date for the county worked. To keep the Table up-to-date, claims should be made at frequent intervals. Operators new to VHF are particularly invited to join Annual Counties.*

for a "first"—this was on September 23, with good signals both ways. GC2FZC has a QV03-20A as a tripler final, into a 6/6 slot-fed, and a transistorised converter with an HRO; the gear at G5ZT consists of a 4CX250A in a coax line as PA, with a pair of 8/8 slots in stack, and his Rx is an A.2521 pre-amp. into a CC converter, the main Rx being a BC-454.

Harry, EI2W, is also knocking up more "firsts." On September 27 he made it with GD3FOC/M

on 4 metres, this giving him all G call areas on 70 mc, and 48C. on that band. Also noteworthy is Harry's two-metre QSO with GI3KYP/P on October 10—he says he has been waiting for 15 years to work Fermanagh, this putting him up to 96C. in the All-Time.

### Two-Metre Talk

After an interval of five years, G5MA from Gt. Bookham has been out portable again, using the old 10w. rig with a pair of 6C4's in the PA. From the site on the South Downs, near Storrington, a 214-mile QSO was obtained with FIFK (the F1's are the French VHF phone-only boys) and G3IOE was worked at 290 miles. This was on October 3; on the 4th Bob was at home listening to GB3LER and wondering why the GM's were not coming through.

G3CO (Hartley, Kent) missed G3IOE during the October 3 session but was compensated by a contact with GM3HLH. Another nice QSO for him was with G3BDS/P for Hereford.

From Sale, Ches., G3FNM makes a first claim for the Annual, remarking that he has now been on two metres for 12 months, with a 40w. PA and a slot-fed 5/5 at 30ft. He is glad to notice an increase in CW operation and (like others) suggests that it would be very helpful if people would give their locations when calling CQ — yes, agreed, and it is a procedure that we have consistently advocated. G3FNM was also hearing GM3HLH on October 4.

G8VN (Leicester) has got up to 16C in the Annual on his indoor beam, and mentions a number of new stations worked on two metres in the Midlands district.

G3AHB (Slough) found nice conditions on October 20 for GDY across to the south-west, and had a very good first-time contact with G3XC for Cornwall. G3FIJ (Colchester) reports again, for the current tables, after a long absence, and G3SAR (Sevenoaks), who was there for some of the DX openings, reports an

extraordinary occurrence: GI3SLI calling GW2HIY to tell the latter that G3SAR wanted him. DX the hard way, one might say!

G3PQR (Thorpe, Essex) writes in with a first report and says he's having a "whale of a time" after a few weeks on the band; with QRP and small beam he has worked 55S in three countries—but he is disappointed with his QSL return. Very few cards have

### FOUR METRES

#### ALL-TIME COUNTIES WORKED LIST

Starting Figure, 8

From Home QTH Only

Worked	Station
49	G3IUD
48	EI2W, G3OHH (187)
43	G3EHY
37	G3PJK
34	G3JHM/A
33	G2OI, G5JU
32	G3NUE, G5FK
31	G3OWA (195)
30	GM3EGW
28	G3PMJ
26	G3LQR
25	G2BJY, G3AYT
24	G3LZN
23	G3BOC
21	GI3HXV
20	G2AXI
19	G3BNL
16	G3BJR, G3FDW, G3HWR
14	G3OKJ
12	G5CP, G5DS
11	G3LHA, G3OJE, G3SNA, G5UM
10	G2BDX, G3ICO
9	G3EKP, GC3OBM
8	G3NNO, G3PRQ

This Table records Counties Worked on Four Metres, on an all-time basis. Claims can be made as for the other Tables, e.g. a list of counties with the stations worked for them, added to from time to time as more counties accrue. QSL cards or other confirmations are not required. Totals in excess of 100 different stations worked can be claimed and will be shown in brackets after the call.

### TWO METRES

#### COUNTRIES WORKED

Starting Figure, 8

- 26 ON4FG (DL, EA, EI, F, G, GC, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UP, UR, YU)
- 24 G3LTF (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, LZ, OE, OH, OK, ON, OZ, PA, SM, SP, UA, UR)
- 22 G5YV (DL, EI, F, G, GC, GD, GI, GM, GW, HB, HG, LA, LX, OE, OH, OK, ON, OZ, PA, SM, SP, YU)
- 21 G3HBW
- 19 G3CCCH
- 18 G2JF, G6NB, ON4BZ, OK2WCG
- 16 G3BA, G3BLP, G3CO, G3GHO, G3KEQ, G5MA, G6RH, G6XM, PA0FB
- 15 G2CIW, G2XV, G3AYC, G3DKF, G3EDD, G3FZL, G3HRH, G3RMB, G4MW, GM3EGW
- 14 G2FJR, G2HDZ, G3AOX, G3FAN, G3HAZ, G3IOO, G3JWO, G3KPT, G3LAS, G3NUE, G3PBV, G3SAR, G3WS, G4LU, G5BD, G5DS, G6LI, G8OU
- 13 G2HIF, G2HOP, G3AOS, G3DMU, G3DVK, G3EHY, G3GPT, G3GWL, G3IIT, G3LHA, G3NNG, G3OHD, G6XX, G8VZ
- 12 EI2A, EI2W, F8MX, G2BJY, G2CDX, G3BNC, G3GFD, G3GHI, G3JAM, G3JLA, G3JXN, G3OBD, G3PSL, G3WW, G5CP, G5JU, G5ML, G8DR, GW2HIY
- 11 G2AJ, G2AXI, G2CZS, G3ABA, G3BDQ, G3BOC, G3GSO, G3IUD, G3JHM/A, G3JYP, G3JZN, G3KUH, G3PTM, G4RO, G4SA, G5UD, G6XA, GC2FZC, OK1VR, PA0VDZ
- 10 G2AHP, G2FQP, G3BK, G3DLU, G3FIJ, G3GSE, G3KQF, G3LAR, G3LRP, G3LTN, G3MED, G3OSA, G3OXD/A, G5MR, G5TN, G5UM, G8IC, GW3ATM, GW3MFY, GW5MQ
- 9 G2BHN, G2DHV, G2DVD, G2FCL, G3BOC, G3BY, G3FUR, G3OJY, G4LX, G8GP, GC3EBK, GI3ONF, GM3DIO, GM3LDU
- 8 G2BDX, G2DGD, G2XC, G3AEP, G3AGS, G3AHB, G3CCA, G3EKK, G3GB, G3HCU, G3HWJ, G3KHA, G3PKT, G3MPS, G3VM, G5BM, G5BY, G8SB, GM3JFG

come back for all those sent direct.

Also reporting with claims are G3PSL, G3KWH, G2CDX and G2DHV.

### Alfred Gay, G6NF

We were very sorry to hear of the recent death of Alfred Gay, who as G6NF was a keen and consistent VHF man, with a particular interest in the 430 mc band. An old timer, and of the old school, he would have been well known to many who will see these lines.

### Some Four-Metre Items

G3OHH (Macclesfield) has now worked no less than 187 stations on 4 metres, and the all-time for this band shows some striking movements. G3RDC (Hastings) writes to say that he has got going on 70.2 mc, with 13w. AM phone and 17w. CW, and would like to find others to work during the evenings—he has a neighbour in G3RZC (Bexhill), who is running a B.44 with a 4-ele beam.

An interesting 4-metre claim from Fraser, GM3EGW (Dunfermline) who has accounted for 30 counties in five countries — which, from where he is, represents pretty good going. He has always been a well-known VHF operator, and has good totals on two metres and 70 cm. as well.

G13HXV (Belfast) gained another one from the Co. Fermagh boys and says that 4m. continues to hold the interest of the GI's—helped in no little way by the appearance of GD3FOC /M (who made it a very good mobile expedition for himself).

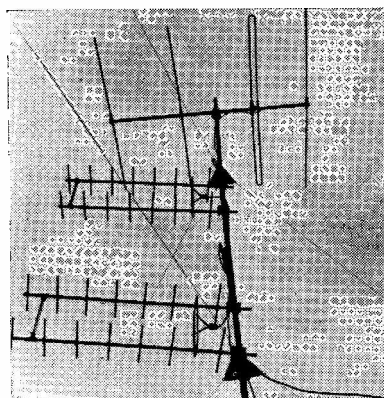
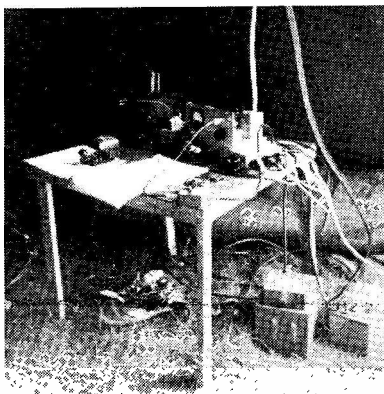
Other 4m. correspondents this time are G3LZN (Rowington, Warks.), G3OJE (London, S.E.20) and G3OWA (Old Coulsdon, Sy.), with claims. We were also glad to see a movement from GC3OBM (Guernsey), now at 10C in the table by reason of a QSO with G3ICO for Somerset. For those remote from the centres of activity, it is hard going on a band like 4 metres — however, with GC3ROP on Sark, GC3OBM can claim the GC/GC "first."

G3JHM/A, who has a "favourable location" near Worthing, is an active three-band man, and he has worked a lot of GDX on 4 metres recently—his best heard was G3FDW/P in Cumberland. In the Sussex-Surrey area there is a great deal—and "great deal" is the term—of mobile operation on four metres; indeed, G3JHM lists more than 20 stations who use 70.26 mc (as distinct from the Guildford chaps, who are netted on 70.65 mc) and on his regular Portsmouth - Worthing journey each night, he can get two or three mobile QSO's. An interesting fact is that G3PUR of Worthing has now worked 100 stations under strictly /M conditions. And for those who would like to know more about all this, there is a get-together arranged for November 23 by the Worthing group—see p.560 this issue for all the details.

### And to Conclude—

By the time you see this, the Exhibition will be over, and there will have been much discussion about this-and-that connected with VHF. This is, of course, being written under what might be called extreme Exhibition-pressure, and your A.J.D. can only say that he hopes no important point has been missed. For the next offering, it is hoped and intended to get the Two-Metre All-Time out again, also if possible to show one or two other Tables we are not able to include very often.

Please let us have all your VHF gen. for the December issue by **Friday, November 20**, addressed: A. J. Devon, "VHF Bands," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1 —with you again on December 4 (all being well, and Allah being with us). *73 de A.J.D.*



Some pictures taken by G3OUF on the GB2GC expedition to Alderney, G.I., during September 3-7. Top, the two-metre station, looking N-E; the blockhouse is a relic of the German war-time occupation. Next down is the gear used on 4 metres. Below is the 4m./70 cm. aerial array. The two-metre beam was a separate installation, and 61S were worked off it. The contest produced 24S raised on 4 metres. But 70-cm. results were disappointing—this, the boys admit, was largely due to certain inadequacies in the 430 mc gear. But they did try, and had very difficult conditions to contend with, as regards both the Wx and radio-wise. For the trip, every single thing needed had to be taken over—food, tents, camp-beds, the lot. One of the most teasing practical problems was getting 3/12v. accs. across in strict accordance with the air safety regulations. The team consisted of G3OUF, G3PSH, G3RRU and G3SHK—and they reckon they were taking more risks for VHF than any other team in the DX-pedition business!

# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for December Issue: November 13)

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

IF the number of additional requests for Club identification letters is anything to go by, it looks like being the hottest MCC yet. Several Clubs are putting in two stations, and a few are even contemplating a third—which is, of course, all to the good, since our annual Top Band Club Contest has for long been recognised as first-class training for potential contest operators of all ages. It is of no consequence if a particular Club fails to gain a high place due to the inexperience of its operators, so long as the ops. themselves learn something by taking part in the Contest.

Certainly, for any Club to win MCC nowadays—or even to get a high place in the event—means that it must be very well tee'd up, with first-rate gear and an effective aerial, an operating team well trained in the technique of fast CW working, with a good supporting group of log-keepers, monitor-receiver operators, and tea-makers! There are not many Clubs in a position to meet all these *desiderata*—and some even leave it to a couple of their ace-operators to handle the whole project. More than a few dummy-runs will be staged between now and November 14 to make sure that all is in order. And on the day there will be some local-Derbys, too!

But those who do not aspire to striking sparks and hope simply for a creditable place in the Table of Results—or at least to see an improvement on their last year's performance—gain just as much enjoyment from "MCC," and of course it is their participation that helps to make it all worth while.

The final list, arranged alphabetically for convenience in checking off, appears on p.561 and was complete at the time of going to press. Read the footnotes, and delegate somebody to prepare the fair log we hope to have from you before November 27. Good luck to all who are having a go, and we look forward to an interesting and successful event.

## CLUB REPORTS

With a stand-in "Club Secretary" in charge and a larger-than-usual compilation this time—only to be expected, as we are now well into the busiest time of the year in the Amateur Radio context—we look first at proposed new club formations.

At **Bedford**, accommodation has been secured, a first meeting has been held, and it is hoped that all licensed amateurs and SWL's in the district will give their support to G3OWQ, who is acting hon.

secretary—which means that he is doing a lot of hard work to get things going.

The British Aircraft Corporation Amateur Radio Club has already been formed, at **Hurn**, where they have excellent facilities for radio construction and operation—and a very nice QSL card, featuring the BAC-One Eleven, is available for members. The idea is to get in any licensed member of the Vickers-Armstrong group of companies, with a view to forming a register and arranging skeds. G2DBF is handling matters (QTH as panel, p.558).

G3NXP writes that a club is proposed for the **Aldridge, Brownhills and Walsall** district, and anyone interested (AT op. or SWL) should get in touch with him, at 32 Mob Lane, High Heath, Pelsall, Nr. Walsall.

One of the most active Clubs in East Anglia is **Peterborough**, where they have an energetic secretary in G3KPO; he reports that their AGM is to be held on November 6, at the Technical College; that club-nights are each Friday; and that their new Hq. is in Old Mill (back of the Peacock Inn), in London Road.

An interesting note from **Ipswich** remarks "we decided not to recess this summer and were rewarded with practically normal attendances"—good! Their meeting place is the Civic College, last Wednesday in the month, and they have a programme to suit all members, "DC to UHF," as the report puts it.

## Midlands and North

One of the oldest Amateur Radio clubs in the country (if not in the world) is **Barnsley**, with fortnightly meetings, at the King George, Peel Street, and a varied programme—such as their traditional Pie Supper, held a fortnight ago. Next meetings are on November 6 and 20, and G4JJ is the new hon. secretary.

An established society with a new name is **Loughborough**, now known as the Loughborough Amateur Radio Club. They also have new premises,

## "MCC" — NOVEMBER 14/15

Rules and scoring, pp.498-499, October. Final Club Identification List, p.561 this issue. Take an accurate GMT time check before 1700 on Saturday 14th. Make sure your log-keepers have read Rule 7, p.498, October. Logs with us by Friday 27th latest, or earlier if possible.

at Beach Yard, Wards End, L'boro', where they get together every Friday at 8 p.m.—except when they are off on a trip somewhere, as on November 29, when they visit Rugby Radio, GBR, the famous GPO station capable of world-wide coverage (When, and if, we ever had the time, a lot of interesting research could be done on the subjects of famous GPO stations and amateur clubs with a long history—such as Loughborough and Barnsley.)

**Blackpool and Fylde** will have a home-built CC converter demonstrated to them by G6DN on November 9; on the 16th, the lecture is on Elements of Radio Valve Theory and Manufacture. G8JU will talk on Aeronautical Electronics (what the Americans now call "Avionics") on the 23rd; and the 30th is booked for a junk sale (and come prepared to tidy up afterwards!) The **Liverpool** programme also includes a junk sale, on November 10, and on the 17th the talk will be by G3GST.

The group known as **Northern Heights** is very active in the Halifax district. Having arranged an R.A.E. course at the Percival Whitley College, they laid on a demonstration station during the enrolment week. Next event is a visit to the Mullard Film Show at Kings Hall, Bradford, on November 10, and on the 11th there will be a most important occasion—three of their youngest SWL's will Lecture on Listening, one of the speakers being recently-licensed G3TQA, who, though only 14½, has had much experience of SWL'ing. On November 25, they will get back to such matters as Transmitter Alignment, by (we suspect) a professional. And this is the sort of thing that makes the pattern of Amateur Radio.

An interesting visit is scheduled for **Spenn Valley** on November 12 — they go to the Home Office Wireless Dept., QTH The Common, Kippax (that's what it says!). In fact, authorities such as the Ambulance Service, the Fire Brigade, the Police, and the Post Office are only too glad to show off their stations and communication systems to intelligent visitors if the right approach is made to the proper authority—and we would say that there are few Clubs, anywhere in the country, not within reach of some such official radio station well worth a visit.

Going much further north, to Edinburgh, a report from the **Lothians** Radio Society says that they have started the winter session, the big event to come being the Hobbies Exhibition arranged by Edinburgh Rotary Club during November 7-14, in the Waverley Market, when the Club will be represented. Next meeting will be on November 26, their visitors' night, when members of any neighbouring GM Club will be most welcome.

It may be remembered that in the September issue of *SHORT WAVE MAGAZINE* we mentioned one Sid Warren, a protégé of **South Birmingham** Radio Society, who was being helped through considerable difficulties to obtain his licence. He is now G3TPC, on the air in his own right, and doing well, thanks to the local lads. Their next meetings are on November 19 and December 17, 7.30 p.m., at Friends Institute, Moseley Road, Birmingham.

At **Coventry** they have a new hon. secretary,

G3TKO, and next on the clip is a report from **Mid-Warwickshire**, where membership continues to grow, with meetings on alternate Mondays at 7.30 p.m. in the C.D. Training School, Harrington House, Newbold Terrace, Leamington Spa. The local College of Further Education is now an R.A.E. centre, and five members are expected to take the next examination.

The **Chester** group have meetings fixed for November 17 and 24, 8 p.m. at the Y.M.C.A., and at **Dudley**—a club from which we do not often hear—they have had their third AGM, at which the officials elected were G2DTQ, G3PWJ (hon. secretary), G3OSP and G3SIO, with two SWL's as committee members; meetings are normally in the Art Gallery, Dudley, but on November 7 they "go outside" for the annual dinner.

Next get-together for **Melton Mowbray** will be on November 26, 7.30 p.m., at the St. John Ambulance Hall, Asfordby Hill, when the time will be devoted to construction; here, members can keep in touch either by joining in on or listening to a twice-weekly Top Band net. The **Leicester** Radio Society has got through its AGM; meetings take place on Sunday mornings and Monday evenings, and participation in various competitive events is planned. **Derby** send in a programme taking them through to August of next year! In the meantime, they meet weekly on Wednesdays, 7.30 p.m., in Room 4, 119 Green Lane, the next on November 11 being devoted to a Demonstration of Communications Receivers—could be very interesting.

From the October issue of their *Newsletter*, we get it that for **Midland** the big days are November 17, when they have a demonstration of the Eddystone EA-12, and December 15, which will be the occasion of their annual Christmas party. Included with this issue of the *Newsletter* is the financial statement, which shows M.A.R.S. to be in its usual good position. Though there was again a loss on the annual dinner, the Trentham Rally showed them a profit of £43, and there was an excess of income over expenditure for the year. Their realisable cash assets now stand at over £400.

The neighbouring **Sutton Coldfield** Club hold their AGM on November 18 when, no doubt, finance will be up for discussion.

#### West and South-West

At their recent (and first) AGM **Bristol** were given a very good report; of the 42 members present, 18 held full licences, no less than ten of these having been gained in the year. New premises have been made available to them at the Bristol University Settlement, 43 Ducie Road, Barton Hill, and a strong body of officials includes five callsigns.

For **Torbay**, the next meeting will be on November 7, at the Hq. in Bath Lane, Torquay. **Plymouth** continue very active, with gatherings each Tuesday, 7.30 p.m., at Virginia House, Bretonside. Their new station G3PRC was officially opened by Mrs. Western, G3NQD, of the Torbay A.R.S., on October 13, which was also the occasion of the return quiz-contest between the two Clubs—handsomely won this time

by the home team. The evening was a great success (and not only for this reason!) as they had a capacity attendance, including members of the Kingsbridge group.

Many of the Clubs reporting this time mention their intended participation in MCC—but only **Yeovil** have already booked a date, November 18, for their *post mortem* on it! We can only hope that the findings will satisfy the coroner! Another activity during the month will be the re-building of the Club's 160m. Tx (the two themes seem to be connected, somehow!) for operation from their Hq. at Park Lodge, The Park, where they meet every Wednesday at 7.30 p.m. **Cornish** report that at every meeting, held on the first Thursday of each month at the S.W.E.B. Recreation Room, Pool, Camborne, "we find new faces appearing and becoming members." On October 8, no less than 32 members were present—which is pretty good for a district rather underpopulated in the amateur sense.

The next **Southampton** group meeting will be on November 14, when a visiting American officer will talk on—Espionage! The Group takes in the Wessex A.R.C. and the R.N.A.R.S. and they issue a joint

newsletter, called *QUA*, each month, covering the activities of all.

In Somerset, the **Burnham-on-Sea** Club get together on the second Tuesday of each month at The Hall, Berrow Road, the premises also being open on Sunday mornings and "at other times when needed." On November 10 G3NUK will give Part II of his talk on Fifty Years of Fun with Morse, and it is said that those who heard Part I will not want to miss this. Another speaker scheduled for a future occasion is Ken Randall, G3RFH/VP8HF, on his wanderings in the Antarctic.

Also from Somerset, the R.A.F. Amateur Radio Society, **Locking** reports, but rather a dolorous state of affairs. Though the financial statement shows an excess of income over expenditure, and a good liquid asset position, this has only been achieved by cutting down drastically on *QRV*, the Society's periodical (which still makes a loss). And the absence of RAF-ARS from the recent Exhibition, for the first time in years, was due to the unfortunate fact that Ministry financial support has been withdrawn. (That magnificent stand we used to see every year was provided by the Service public relations department,

#### Names and Addresses of Club Secretaries reporting in this issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.  
 A.E.R.E. (HARWELL): C. Sharpe, G2HIF, Building 347.3, A.E.R.E., Harwell, Berks. (*Abingdon 1220, Ex. 3026*).  
 A.R.M.S.: N.A.S. Fitch, G3FPK, 79 Murchison Road, London, E.10 (*LEYtonstone 6700*).  
 BARNSELY: J. A. Ward, G4JJ, 44 Northgate, Barnsley, Yorks.  
 BASILDON: C. Roberson, Milestone Cottage, London Road, Wickford (2462), Essex.  
 BEDFORD: J. R. Clarke, G3OWQ, 12 Robin Hill, Brickhill, Bedford.  
 BLACKPOOL & FYLDE: J. Boulter, G3OCX, 175 West Drive, Cleveleys.  
 BRISTOL: E. Davis, G3SXY, 72 Northview, Westbury Park, Bristol, 6.  
 BRITISH A/C Corp., HURN: J. F. Squires, M.B.E., G2DBF, 18 Wakefield Avenue, Northbourne, Bournemouth, Hants.  
 BURNHAM: D. W. Birt, G3GIW, 99 Stoddens Road, Burnham-on-Sea, Somerset.  
 CEYLON: D. S. Ratnadurai, 4S7SR, 17 Jayakunta Lane, Kiriulla Road, Timbirigasayaya, Ceylon.  
 CHESTER: P. J. Holland, 19 Kingsley Road, Gt. Boughton, Chester.  
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.  
 COVENTRY: E. E. Snow, G3TKO, 11 Lupton Avenue, Styvechale, Coventry.  
 CRAWLEY: R. G. B. Vaughan, G3FRV, 9 Hawkins Road, Tilgate, Crawley (23359), Sussex.  
 CRAY VALLEY: S. W. H. Harrison, G3KYV, 30 Plaistow Grove, Bromley, Kent.  
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 10 Liphook Crescent, London, S.E.23 (*FOR 6940*).  
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.  
 DORKING: R. Catles, 4 Dawnay Road, Great Bookham (3291), Leatherhead, Surrey.  
 DUDLEY: R. Fisher, 63 Swan Crescent, Langley, Oldbury, Birmingham.  
 GUILDFORD: D. H. Mead, G3OXI, 41 Egley Road, Woking, Surrey.  
 HARLOW: G. O'Donald, G3TLJ, Great East, Roydon Road, Roydon, Harlow, Essex.  
 HOUNSLOW: D. F. J. Walmsley, G3HZL, 153 Worple Road, Isleworth, Middlesex (*POP 3239*).  
 IPSWICH: R. J. Wells, 43 Clench Road, Holbrook, Ipswich.  
 LEICESTER: J. R. Dowson, 384 Hinckley Road, Leicester.  
 LIVERPOOL: H. James, G3MCN, 448 East Prescott Road, Liverpool, 14.  
 LOTHIAN (Edinburgh): T. Spears, GM3OWI, 24 Priestfield Road, Edinburgh, 9.  
 LOUGHBOROUGH: G. P. Bateman, G3LCG, 24 Farndale Drive, Loughborough, Leices.  
 LOUGHTON: A. W. Sheppard, 11 Barfields, Loughton (*LOU 4296*), Essex.  
 MELTON MOWBRAY: D. W. Lilley, G3FDF, 23 Melton Road, Asfordby Hill, Melton Mowbray, Leics. (*Asfordby 373*).  
 MIDLAND: C. J. Haycock, G3JDJ, 29A Wellington Road, Handsworth, Birmingham, 20.  
 MID-WARWICKSHIRE: H. C. Loxley, 51 Guy Street, Warwick.  
 NEWBURY: R. A. Fuller, 6 Pleasant Hill, Tadley, Basingstoke, Hants.  
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.  
 NORTH KENT: B. Dawson, G3RMI, 16 Derwent Close, Dartford, Kent.  
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough, Northants.  
 PLYMOUTH: R. Hooper, 2 Chestnut Road, Peverill, Plymouth.  
 R.A.F.A.R.S.: Hon. Secretary, R.A.F. Amateur Radio Society, R.A.F. Station, Locking, Somerset.  
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 10 Sturton Road, Saxilby, Lincoln.  
 READING: R. G. Nash, G3EJA, 9 Holybrook Road, Reading.  
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill, Surrey.  
 SCOTLAND (Radio Club of): A. Barnes, GM3LTB, 7 Southpark Terrace, Glasgow, W.2 (*WESTERN 4080*).  
 SOUTH BIRMINGHAM: A. E. Bishop, Jr., 40 Cecil Road, Birmingham, 29.  
 SOUTHAMPTON: G. J. Meikle, G3NIM, 34 Victoria Road, Netley Abbey, Hants.  
 SOUTHGATE: R. Wilkinson, 33 Amberley Road, Palmers Green, London, N.13.  
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.  
 STEVENAGE: G. R. Henderson, G3RTJ, 76 Austen Paths, Stevenage, Herts.  
 SURREY (Croydon): S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, South Croydon.  
 SUTTON & CHEAM: F. J. Harris, G3BOF, 143 Collingwood Road, Sutton, Surrey.  
 SUTTON COLDFIELD: K. H. Varney, G3DMV, 149 Whitehouse Common Road, Sutton Coldfield, Warks.  
 TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.  
 UXBRIDGE: F. J. P. Offord, 43 Greys Road, R.A.F. Uxbridge, Middlesex.  
 WEST KENT: H. F. Richards, 17 Reynolds Lane, Tunbridge Wells.  
 WIMBLEDON: E. N. Hurlie, G3RZN, 156 Monkleigh Road, Morden, Surrey.  
 WORTHING: R. J. Tarr, G3PUR, 245 South Farm Road, Worthing, Sussex.  
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Som.



not by the Society.) It seems that unless a recruiting return is forthcoming, the Ministry will not put up the cash. And the authorities must now be scratching their heads a bit about the enormous cost of providing tied lines for the RAF-ARS stand at the Earls Court Radio Show — whoever thought of *this!*

### London & Home Counties

The majority of Clubs are, of course, in this part of the country, and we have a corresponding number of reports. **Uxbridge** fill their three November meetings with a series of talks on SSB, by G3NDU, who gives Parts II and III on November 16 and 30. On December 7 they have a jollification, their bangers-and-mash supper.

**Cray Valley**, covering the Eltham, Sidcup and Orpington districts, have been hearing about the good old days (and they were good, for radio amateurs) from G2MI; the current issue of their newsletter *QUA* has a screed from G2HP about the Goyder Lock method of CO-PA drive—which worked well if you could get it to work. Indeed, this issue of *QUA* has a number of interesting items. **West Kent** also produce a neatly printed single-sheet newsletter, called *QLF*, listing their fortnightly meetings at Culverden House, Culverden Park Road, Tunbridge Wells, next being on November 13 (Talk on Components) and November 27 (Dual Standard TV Circuitry); their Christmas Party is slated for December 18.

**Dorking** took part in three contests this year, "with average success," the report says. Their chairman, G3LHC, as a member of a recent overseas trade delegation, was able to show the September meeting some interesting colour slides of China and Japan. On November 10 the gathering will be at the Wheatsheaf, and on November 24 at the Star & Garter—visitors always welcome.

The **Southgate, Finchley & District** group will be at Atlasta Lodge, Tottenham Road, Palmers Green, N.13, on November 12 for the G6QM trophy competition, and on November 26 for talks with and for SWL's.

For **Guildford**, the November 13 meeting will be devoted to a discussion on the Racal RA-17 receiver, by G3NR, and on the 27th they have a talk on the Decca Navigator. The big night is December 11, when their president will discuss The Operation of Practical Equipment, 1900-1922; this lecture is being specially recorded, and should be of considerable interest. (Note 1900-1922!)

**Reigate** decided that, for this year's VHF field day, they would "get well away from the London QRM" — so they went down to a site near East-



For the Harlow & District Radio Society's Rally on September 27 last, the talk-in station on Top Band was G3PRN—and here it is being operated by Robert Frost, G3SZF, who is Harlow's youngest member; he is just bobbing on the ripe age of 15 years.

bourne, and 17 members were in camp, under canvas; in spite of the weather, they were not deterred, and similar forays are planned for the future. On November 21, at the George and Dragon, Redhill, G8RW will be talking on UHF. The latest call in the Reigate group is G3TQY.

A talk started by G3MFB on Radar Techniques, for **Wimbledon**, proved so interesting that time overran, and the second part is to be given on November 13. Their AGM is fixed for December 11. **Acton, Brentford and Chiswick** will be meeting on November 10 to hear G3IGM on Radio Test Gear, 7.30 p.m., at Club Hq., 66 High Road, Chiswick.

**Harlow** report a very successful Mobile Rally on September 27, with 180 cars in the park, of which 60 were fitted /M; some had come over 100 miles to be at Magdalen Laver for the event. More than 50 donated prizes were handed out by Harlow's president, G6UT, and from the Rally proceeds it was possible to make a substantial donation to the very-deserving R.A.I.B.C. The Club has arranged R.A.E. and Morse classes locally, under G3GRQ and G3KFG, about which information can be obtained from the hon. secretary.

Also reporting a very good Rally are **Reading**, one of their visitors being an SWL from Coventry — on a scooter! On November 28, the evening at Palmer Hall, West Street, will be devoted to the Conversion and Use of Government Surplus, a pretty broad subject of perennial interest; the December meeting will be on the 19th, same QTH. **Sutton and Cheam** get together monthly at the Harrow, High Street, Cheam, and November 18 will be the occasion for a Junk Sale. **North Kent** run a lively *Newsletter*, though the latest issue to reach us gives no forward information about November meetings — but the sequence

looks like fortnightly Thursdays (12th and 26th) at the Congregational Church Hall, Clock Tower, Bexleyheath.

**Worthing** have an interesting event scheduled for November 23 — a 4-metre gathering, to be held at the Royal Oak, Hooksway, 6 miles from Chichester, just off the B.2141. (The hostelry itself is described as old, isolated, interesting and without mains!). G3PUR on 70.26 mc will be well sited for talking-in 4-metre mobiles, the time is from 8 p.m., and all interested would be very welcome. The Worthing club itself now has over 30 members, meetings are held monthly on the second Monday at the Adult Education Centre, Worthing, and visitors are always expected. On November 9 the discussion will be on the Use and Construction of Simple Test Equipment.

During November 14-21, **Loughton** will be co-operating in a large-scale experimental closed circuit TV presentation on behalf of the Television Viewers' Council, to be put on at Loughton Hall; local-interest programmes representing the activities of cultural groups in the district are to be professionally produced and viewed by judging panels, to decide whether such a service would be of community interest. Much of the gear is being supplied by the British Amateur Television Club, under G3MJZ/T, this group having had much experience of practical closed-circuit TV work. Loughton's regular meetings are on alternate Fridays, 7.30 p.m., at Loughton Hall, Rectory Lane, and on November 6 they will be hearing, from a BBC speaker, about the Corporation's broadcasting techniques on short-wave.

**Basildon** will entertain Peter Blair, G3LTF, for his lecture on VHF/UHF, at the Bullseye, Southernhay, Town Centre, Basildon, on December 9 at 8 p.m. As this talk will be of special interest, many visitors are expected, and they are informed that admittance is free, with ample car parking.

The October issue of *QAV*, for **Harwell** (A.E.R.E.) is again a good one, with much meaty practical gen. about Club activities. Their meetings are held on the third Tuesday of each month, at the Social Club, A.E.R.E., at 7.30, and visitors are always welcome. The talk on October 20 was by G3CBU on Noise Measurement, with special reference to parametric amplifiers at 144 mc.

**Crawley** maintain a high level of activity, and have decided to "celebrate another successful year" by a dinner — on March 19, 1965! The next meeting here is on November 25, with a welcome for everybody. The *SRCC Monthly News*, from Surrey, gives November 10 for the next meeting — at the Blacksmiths Arms, South End, Croydon — when G5DJ will talk about Cables.

The *Stevenage Beam* is a well-presented newsletter, for the **Stevenage** and District A.R.C., and reports some very useful lectures at recent meetings; another event during the month was a visit to the Sheffield A.R.C., in their new Hq., which proved to be a very enjoyable evening. The Stevenage AGM is on November 19 when, as usual, all members are asked to make a special effort to be present, and on time!

Next date for **Newbury** is November 27, when the Rev. Paul Sollom, G3BGL, will give a talk entitled *A Little Flutter* on VHF — as he is good at VHF, this should be interesting. The QTH is, as usual, Elliott's Canteen, West Street, at 7 p.m. Visitors are invited, and a p.c. to the hon. secretary will bring any information required.

**Hounslow** have got the Club station G3TDD going on two metres, attendances are improving, and a successful season is anticipated. November 16 is marked as "special meeting," and the 23rd as "Transmitting night on 144 mc — G3TDD on the air." On November 30 Audio Techniques will be considered.

One of the stronger Clubs in the London area is **Crystal Palace**, of which Geoff. Stone, G3FZL, has been hon. secretary for many years. He produces a regular one-sheet newsletter which shows that a variety of interests are covered — including hi-fi, D/F, stereo, RTTY, VHF and the ordinary business of working DX on the HF bands — what more could you want!

#### Special-Activity Clubs

Under this heading come the organisations which, by their nature, have a specialist appeal outside and beyond any particular district or area. Such as the **R.A.I.B.C.** ("Radio Amateur Invalid & Bedfast Club") devoted to the needs and interests of those who, by reason of disablement or infirmity, cannot get about; their only contact with the outside world can be over the air. The members of R.A.I.B.C. are kept together by their monthly compilation *Radial*, which in turn is kept going by the devoted and painstaking work of Mrs. Frances Woolley, G3LWY, who regularly turns out a well-written, newsy and nicely produced 8-page bulletin, full of *personalia*. We make no apology for suggesting that anyone with charitable instincts in the Amateur Radio context might consider getting in touch with G3LWY—but, remember, she is a busy housewife, with domestic responsibilities of her own. So keep it short, enclose an s.a.e., and make it clear whether you would like to help with gear (in working order), radio periodicals—or cash. (And while writing this, it occurs to your stand-in "Club Secretary" that there might well be scope for local visiting of bedfast types, taking out for drives, and so on. But only G3LWY is competent to advise.)

Now we come to the **Amateur Radio Mobile Society**, also a specialist organisation, but in *quite* a different context. They, too, produce a monthly journal, likewise well-written and nicely duplicated, and involving a great deal of production effort, all in an honorary capacity. After nearly six years of hard trying, they can show about £260 of nett assets disposable among fewer than 400 members — yet there are at this moment more than 1,700 amateurs licensed mobile in the U.K. alone (the appeal of A.R.M.S. is claimed to be "world-wide"). Well might they ask, in their September issue, "Where Do We Go From Here?"—though, to be fair, this is out of context, because the quote is taken from the September leader comment about their

## IDENTIFICATION LETTERS FOR CLUBS IN "MCC"

## Full Alphabetical List

<i>AB</i> Aberdeen	<i>CT*</i> Crawley, Sussex, No. 3	<i>LP</i> 42nd Sig. Regt. Liverpool	<i>RP</i> R. Sigs. A.R.S., Catterick
<i>AC</i> Acton, Brentford & Chiswick	<i>CU*</i> 65th Sig. Regt. (Scot.)	<i>LS</i> Leeds Univ.	<i>RR</i> R.A.F.-A.R.S., Locking
<i>AG</i> Ash Green (Surrey)	<i>CV</i> Coventry	<i>LV</i> Liverpool	<i>RS</i> Radio Club of Scotland
<i>AI</i> Ainsdale (Lancs.)	<i>CW</i> Cotswold RCC	<i>LY</i> Leeswood	<i>RV</i> Ravensbourne (London)
<i>AL</i> Aldershot	<i>CX</i> Crawley, Sussex, No. 2	<i>MA</i> Macclesfield	<i>RY</i> Rugby
<i>AQ</i> Aquila (Kent)	<i>CY</i> Chorley and Leyland, Lancs.	<i>MD</i> Medway	<i>RZ</i> R.A.F., Sealand
<i>AR</i> Aborfield (Berks.)	<i>CZ</i> Clifton (London), No. 2	<i>MF*</i> Moray Firth	<i>SA</i> Salisbury
<i>AT</i> A.T.C. Sqdn. (Staffs.)		<i>MG*</i> Magnus G.S. (Newark)	<i>SB</i> St. Benedict's, London
<i>AW</i> Albright & Wilson (Birmingham)		<i>MH</i> Mitcham	<i>SC</i> Scunthorpe
		<i>MO</i> Morecambe	<i>SD</i> Sheffield, No. 1
<i>BA</i> Barnet	<i>DA</i> Dalriada (Scot.)	<i>MP*</i> Marconi Apprentices, Chelmsford	<i>SF*</i> Sunderland Tech. Coll.
<i>BB</i> BBC, Lime Grove	<i>DB</i> Danbury, Essex	<i>MR</i> Midland RCC	<i>SG</i> Stroud
<i>BC</i> Buchan (Fife)	<i>DH</i> Dollis Hill, GPO	<i>MS</i> Midland ARS	<i>SH</i> Sheffield
<i>BD</i> BBC, Evesham	<i>DL</i> Deal	<i>MY</i> Maidstone YMCA	<i>SJ</i> Sheffield, No. 2
<i>BG</i> Bradford G.S.	<i>DR</i> Derby	<i>MZ</i> Manchester	<i>SK</i> Sole Bay
<i>BH</i> BBC, Bush House	<i>DS</i> Dursley		<i>SL</i> South London Mobile
<i>BI</i> Bristol		<i>NK</i> Newark	<i>SM</i> South Manchester
<i>BJ</i> Bath	<i>EC</i> Eccles, Lancs.	<i>NL*</i> Northampton College, London	<i>SO</i> South Birmingham
<i>BL</i> BBC, Langham Place	<i>ED</i> Edgware	<i>NN</i> North Notts	<i>SP</i> Stockport
<i>BM</i> Blackwood, Mon.	<i>EK</i> East Kent	<i>NO</i> North Kent	<i>SQ*</i> Silverthorn, London
<i>BN</i> Blackburn	<i>EL*</i> East Worcs.	<i>NP*</i> Northern Poly- technic, London	<i>SR</i> Scarborough
<i>BO</i> Bagshot	<i>EW</i> East Cheam	<i>NR</i> Norfolk	<i>SS</i> South Shields
<i>BP</i> Blackpool	<i>EX</i> Exeter	<i>NT</i> Nottingham	<i>ST</i> S.T.C., Harlow
<i>BQ*</i> Burnham Beeches, Bucks.		<i>NU</i> Newcastle Univ.	<i>SU</i> Stourbridge
<i>BR</i> Barnsley	<i>GD</i> Guildford	<i>NW</i> Norwich	<i>SV</i> Stevenage
<i>BS</i> Burnham-on-Sea, Som. No. 1	<i>GE</i> G.E.C. Research	<i>NY</i> Newbury	<i>SW*</i> South-West Essex Tech. Coll.
<i>BT</i> British Timken, Coventry	<i>GF</i> Greenford	<i>OV</i> Overstone (Northants.)	<i>SX</i> Stoke-on-Trent
<i>BU</i> Bangor Univ.	<i>GN</i> Grafton	<i>OX</i> Oxford	<i>SY</i> Surrey (Croydon)
<i>BV*</i> Burnham-on-Sea, Som. No. 2	<i>GR</i> Gravesend	<i>PD</i> Paddington	<i>SZ</i> Sutton and Cheam
<i>BW</i> Brentwood, Middx.	<i>GS*</i> G.E.C. Apprentices, Coventry	<i>PL</i> Plymouth	
<i>BX</i> Burslem, Staffs.	<i>GY</i> Grimsby	<i>PN</i> Painton (Northants.)	<i>TH</i> Thanet
<i>BY</i> Bury	<i>HA</i> Halifax	<i>PO</i> Port Talbot, South Wales	<i>TY</i> Torbay
<i>BZ</i> Basingstoke	<i>HL</i> Hallamshire (Yorks.)	<i>PR</i> Preston	<i>UK</i> Univ. of Keele
	<i>HR</i> Harlow	<i>PT</i> Petersfield	<i>UX*</i> Uxbridge
<i>CA</i> Cheltenham	<i>HS*</i> Hounslow	<i>PY</i> Purley	<i>VR</i> Verulam (St. Albans)
<i>CB</i> City of Belfast	<i>HT</i> Hartlepoons	<i>RA</i> Reigate, No. 1	<i>VS</i> Vickers, Hurn
<i>CC*</i> Cannock Chase	<i>HW</i> Harrow	<i>RB</i> Reigate, No. 2	
<i>CD*</i> Cambridge	<i>HX</i> Harwell (A.E.R.E.) No. 1	<i>RC</i> Reigate, No. 3	<i>WD</i> Wanstead and Woodford
<i>CE</i> Chester	<i>HY*</i> Harwell (A.E.R.E.) No. 2	<i>RD</i> Reading	<i>WK</i> Wakefield
<i>CF</i> Cray Valley		<i>RF</i> 92nd Sig. Regt., Forfar	<i>WL</i> Wellingborough
<i>CG</i> City & Guilds, London	<i>IL*</i> Isle of Man	<i>RG*</i> No. 1 MHU A.R.C., Middlesex	<i>WO</i> Wolverhampton
<i>CH</i> Chiltern, Bucks.	<i>KN</i> Kingston	<i>RH</i> Rhondda Valley	<i>WR</i> Wirral
<i>CL</i> Clifton (London), No. 1	<i>KW</i> K.W. Radio Club	<i>RL</i> R.A.F. Little Rissington	<i>WS</i> Wimbledon
<i>CN*</i> Conway Valley		<i>RN</i> Royal Naval A.R.S.	<i>WT</i> Worcester
<i>CO</i> Cornish	<i>LC</i> Leicester	<i>RO</i> Rotherham	<i>WV</i> Wolverton, Bucks.
<i>CR</i> Crawley, Sussex, No. 1	<i>LD</i> Loughton (Essex)		<i>YV</i> Yeovil
<i>CS</i> Civil Service, London	<i>LF</i> Leven (Fife)		
	<i>LH</i> Loughborough		
	<i>LM</i> Lymington		
	<i>LO</i> Lossiemouth		

NOTES: (1) Clubs marked\* are those who have applied for identification letters since the October issue appeared.

(2) It does not necessarily follow that every Club named here will enter the Contest.

(3) The listing is complete at time of going to press. Later applicants will be allotted identification letters but cannot now be listed.

(4) Rules, with scoring and operating examples, appeared on pp.498-499 of the October issue.

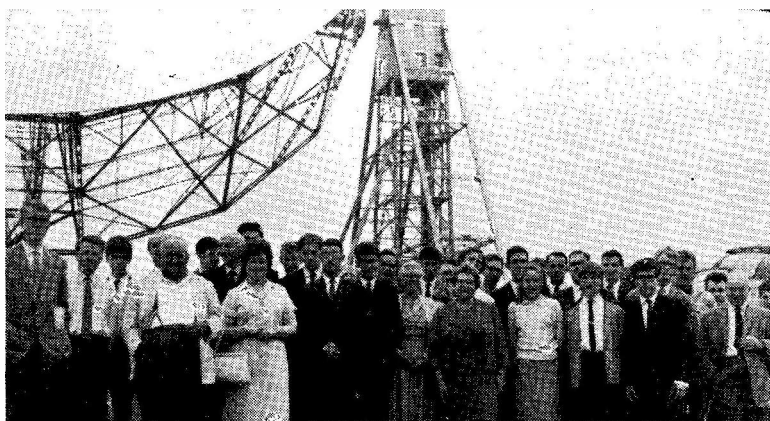
(5) It is essential to have all logs in by the due date, November 27, made out as laid down in Rule 7, p.498, October.

(6) The judges reserve the right to refuse adjudication of logs not conforming to the rules.

alleged success in wiping everyone else's eye in the matter of Reciprocal Licensing. This is one of those concepts which is of far less importance than it is made out to be, and it is much to be regretted that exaggerated language has always to be used "for and on behalf of" a small organisation which—as the figures show—has only a limited appeal. However, this is not to say that the **Amateur Radio Mobile Society** has not done—and has the potential for doing—a good and useful job. It is just that the language should be moderated a bit and some attention paid to increasing membership among U.K. mobiles—and the fact is that even if A.R.M.S. succeeded in *doubling* its U.K./M membership, it would still have only a bare half of the G's licensed mobile! The hon. editress of *Mobile News* does an excellent job journalistically—she has a most engaging style.

In another category again is the *4S7 Bulletin* of the **Radio Society of Ceylon**. Also a duplicated effort, it is produced by Ian Wollen, 4S7IW, who talks entirely in the Amateur Radio context. Though his *Bulletin* represents one of the smaller Commonwealth societies, with quite a small membership (less than 100 members), it has nevertheless achieved the distinction of IARU recognition. The aim is to publish six times a year, giving a journal of about 20 pages a time—no mean effort, and 4S7IW draws attention to the difficulties of any honorary editor in getting suitable material from a small group of members.

And one could say that the *GM Magazine*, the monthly offering for the **Radio Club of Scotland**, produced by GM3AXX with the assistance of GM3OLG, is in yet another category. The September issue runs to 45 duplicated pages of which seven are devoted to tape recording interests and 15 pages to summarised information on M-O valve types. This leaves about 23 pages for the coverage of Amateur Radio activity in Scotland—and here again, the hon. editor has to issue an urgent appeal for more support in the way of technical articles, lecture



Group photograph taken on the occasion of the Northern Heights Amateur Radio Society's visit to the Radio Astronomy Laboratory at Jodrell Bank, Cheshire. The party consisted of over 40 members and friends, and heard a lecture by Sir Bernard Lovell, the director of the Laboratory. They were much impressed by what they saw and heard.

#### NOTE FOR SECRETARIES

These pages are available for reports from any Club caring to make use of the space. It is essential that we have reports by the due date, given each month at the head of article, with the Club hon. secretary's name, c/s (if any) and full address for inclusion in the Secretaries' QTH Panel. Reports received late cannot be written in. Address all items for this feature to: "Club Secretary," *Short Wave Magazine*, 55 Victoria Street, London, S.W.1.

material and assistance from members for Club projects generally.

#### For Consideration

Truth of the matter is that for any worth-while periodical to survive with the support of fewer than about 500 members, paying quite a high subscription (not less than 15s.), means that there must be a great deal of sustained and selfless honorary effort. This is always forthcoming—for a time. But sooner or later, the crunch must come and it is then that serious difficulties arise—as we have already seen in the case of the R.A.F. Amateur Radio Society, which can claim a membership in this bracket and at one time enjoyed considerable backing, official and unofficial, to say nothing of trade support.

For next "Month With The Clubs," your stand-in Club Secretary (who always follows this feature with the closest interest) will be handing back to our regular contributor—so don't blame *him* for any errors, omissions, expressions of opinion, misunderstandings or failures to comprehend in this month's offering! He will want to hear from all honorary secretaries in good time for the December issue—so note the date at the top of p.556. And remember that MCC logs, strictly in accordance with Rule 7, p.498 October *SHORT WAVE MAGAZINE*, must be in on time—Friday, November 27.

#### LOOK AT THE BOOK LIST

Here and there in this issue are the list of books available through our Publications Department, which aims to give a by-return service, because everything we advertise is from stock. The titles shown on p.567 are all new ones, carefully selected from the wide range of new books coming on to the Amateur Radio market from Britain and the U.S.A. And with Christmas coming, what better present could there be for a radio amateur than a book on some aspect of the subject in which he is particularly interested—such as Sideband, VHF, RTTY, Mobile or even DX.

# THE OTHER MAN'S STATION

## G3JDK

**H.** N. Kirk, of 54 Allendale Road, Rotherham, Yorkshire, was licensed as G3JDK in 1953, and the picture here represents the third of his amateur-band installations since that date. And with the exception of the Hallcrafters SX-110 and the HT40K transmitter, the whole of the rest of the gear, including the console, is home-built—and not, G3JDK adds, from kits!

From left to right, we see the first main unit, a CW/Phone transmitter for Top Band (832 PA, 10w. input), incorporating a small CRT for modulation monitoring. This Tx has made WABC and has also given many EDX contacts, using a 134ft. wire and the Z-match unit standing above it. Next on the bench line come a modified Heathkit VFO, re-housed in a G3JDK cabinet above which stands the electronic keyer for CW operation. Across the corner comes the HF-band Tx, running 120w. to a TT21, which is self-contained for power, and is plate-and-screen modulated by a pair of 5B254M's giving 45 watts of audio, with a separate, external 600v./200 mA PSU. These items are contained in the narrow-panel units standing on the Tx.

To the right is the station main Rx, the SX-110, with an HF-band Z-match unit above it. Further to the right, behind the microphone, is a 75-watt stand-by Tx for emergency use.

At lower left, below desk level, is the station control panel, for selecting units and bringing on their power supplies; the main switch on this panel is an automatic circuit-breaker, which "fails safe" if any mains circuit fault develops. This panel also incorporates a mag-slip driven direction indicator for the 15m. rotary beam. Radiation on all other bands



is off the 134ft. aerial, through the Z-match unit—which, says G3JDK, is "worth its weight in gold."

Beside the control panel are cupboards for storage of tools and spares. The operating console may be of some interest because, basically, it is of standard metallised material, with die-cast corner fittings and edging, as obtainable from the local D-I-Y supplier. Cost for main members is in the region of 1s. 6d. per foot run. A sliding writing-top, seen under the right-hand desk level, accommodates the *Call Book*, the station log and note pads.

It will be observed that this is a very neat installation in the sense of layout. That is only partly because it is in the G3JDK dining-room and so must have the critical acceptance of the XYL! The other reason is that G3JDK has a particular flair for doing his own cabinet work, which is why all these units look "together" and so professionally finished—readers may remember an article by him in the September 1963 issue of *SHORT WAVE MAGAZINE*, from which the style can be recognised.

G3JDK operates on all bands from 160m. to 10m., CW and phone, DX or local as opportunity offers, and divides his AT activity between building and operating in the ratio 60:40. This means that much equipment is always on the drawing board (including a new SSB Tx) or is in hand for a written-up description in the *Magazine*.

# NEW QTH's

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

- G2FUX/A**, F. W. Fletcher, 53 St. Ives Park, Ringwood, Hants.
- G3BYX**, D. Dowson, 23 Langley Road, Newton Aycliffe, Darlington, Co. Durham. (Tel. *Newton Aycliffe 356.*) (Re-issue.)
- G3SKO**, P. M. Wingfield, Rothelstone House, Bell Street, Swanage, Dorset.
- G13SLI**, 1938291 SAC Osborne, Hut 6, Site 4, R.A.F. Bishopscourt, Downpatrick, Co. Down.
- G3SXZ**, W. D. Sargent, 17 Truro Road, Gravesend, Kent.
- G3TGQ**, P. Taylor, 72 The Course, Eltham, London, S.E.9.
- G3THW**, P. J. Walters, 112 Windsor Avenue, Penn, Wolverhampton, Staffs.
- G3TIP**, F. H. Gibbons, 11 Gold Street, Barnsley, Yorkshire.
- G3TIS**, J. A. Clarke, 40 Morland Avenue, Dartford, Kent.
- G3TJB**, D. J. Norman, 98 Hamilton Road, Feltham, Middlesex.
- G3TJG**, H. E. Plant, 171 High Street, Chasetown, Walsall, Staffs.
- G3TJK**, R. Everitt, Ferndale, Colchester Road, Ardleigh, Colchester, Essex.
- G3TJN**, R. W. Pattullo, Hill Cottage, Kirk Merrington, Spennymoor, Co. Durham. (Tel. *Spennymoor 2207.*)
- G3TJO**, E. Box, 15 Blankney Crescent, Lincoln. (Tel. *Lincoln 25685.*)
- G3TJY**, D. R. H. Jolly, D.S.C., 30 York Road, Broadstone, Dorset.
- G3TKB**, J. B. Foster, 21 Leechmere Road, Grangetown, Sunderland. Co. Durham. (Tel. *Sunderland 71529.*)
- G3TKI**, D. Bradshaw, The Bungalow, Moorgate, Chorley Old Road, Horwich, Bolton, Lancs. (Tel. *Horwich 938.*)
- G3TKO**, E. E. Snow (ex-9G1DS/ZD1S), 11 Lupton Avenue, Styvechale, Coventry, Warks.
- G3TKQ**, G. T. Barrell, Floral Dene, Park Lane, Langham, Colchester, Essex.
- GW3TKZ**, W. J. Palmer, 42 Bloomfield Road, Blackwood, Mon.
- G3TLC**, A. Marcantonio, 24 St. Laurence Avenue, Brundall, Norwich, Norfolk. NOR.86.Z. (Tel. *Brundall 2118.*)
- G3TLH**, I. D. Brown, 10 Langdale Drive, Flanshaw Estate, Wakefield, Yorkshire.
- G3TLS**, B. C. Little, 28 Fitzgerald Road, St. John's Lane, Bristol, 3.
- G13TLT**, H. Irvine, Fernrock, Ballyree, Bangor, Co. Down.
- G3TLU**, J. H. Serlin, 25 Parkside Drive, Edgware, Middlesex. (Tel. *Stonegrove 7405.*)
- G3TLV**, G. C. Wynes, 14 Brook Road, East Twerton, Bath, Somerset.
- GW3TLW**, T. G. Davies, The Malt House, Llantrisant, Pontyclun, Glam.
- G3TMA**, I. Buffham, 99 Pennygate, Spalding, Lincs.
- G3TMI**, E. Wood, 18 Dover Street, Canterbury, Kent.
- GW3TMJ**, A. Taylor, 24 Emroch Street, Goytre, Port Talbot, Glam.
- GM3TMK**, I. M. Ross, 11 St. Duthus Street, Tain, Ross and Cromarty. (Tel. *Tain 174.*)
- GW3TMP**, J. H. Jones, 3 Bryn Clyd, Leeswood, Mold, Flintshire.
- G3TMO**, R. J. Harrison, 28 Carmalt Gardens, Putney, London, S.W.15. (Tel. *PUTney 9107.*)
- G3TMX**, Mrs. Sheila Bennett, 73 Guildhall Street, Bury St. Edmunds, Suffolk.
- G3TMY**, T. C. Bennett, 73 Guildhall Street, Bury St. Edmunds, Suffolk.
- G3TMZ**, D. Greaves, 46 Grosvenor Drive, Walkden, Manchester.
- G3TNI**, J. F. Clingan, 12A Marlbrook Lane, Bromsgrove, Worcs. (Tel. *Hillside 2922.*)
- G13TNK**, S. Dornan, 67 Earlswood Road, Belfast, 4.
- G3TNL**, P. W. Tynan, 111 Cheam Common Road, Worcester Park, Surrey.
- G3TNZ**, K. Drummond, Midholme, Barmoor Lane, Ryton, Co. Durham.
- G8ACK**, M. Sugit, 5 Worsley Road, Hampstead, London, N.W.3.
- G8ACZ**, P. J. Cox, 51 Bicester Road, Richmond, Surrey.
- G8ADD**, B. A. Carter, 57 Gravelly Hill, Erdington, Birmingham, 23.
- G8ADU**, G. P. Shirville, Tansor Court, Tansor, Oundle, Northants. (Tel. *Cotterstock 224.*)
- G8ADU/A**, G. P. Shirville, No. 2 The College, Malvern, Worcs.
- G8KI**, P. C. Mortimore, O.B.E., Pinelands, Beechwood Avenue, Weybridge, Surrey. (Tel. *Weybridge 46140.*) (Re-issue.)

## CHANGE OF ADDRESS

- G2IP**, C. W. Andrews, M.C., Tobermory, Grove Road, Beacon Hill, Hindhead, Surrey.
- G3ANW**, C. Paxton, 116 Preston Lane, Tadworth, Surrey.
- G3DQW**, Peterborough and District Amateur Radio Society, c/o D. Byrne, Jersey House, Eye, Peterborough, Northants. (Tel. *Eye 351.*)
- G3EHM**, K. H. Parkes, 41 Golborn Avenue, Meir Heath, Stoke-on-Trent, Staffs.
- G3FCB**, E. D. Melville, R.E.M.E. Inspectorate, B.F.P.O. 34, B.A.O.R.
- GW3GWX**, L. P. Jones, Noddfa, Vicarage Road, Llandudno, Caerns.
- G3HDQ**, W. Baker, 148 Redditch Road, Alvechurch, Birmingham.
- G3HGD**, V. S. Best, 2 Eden Avenue, Dewsbury Road, Wakefield, Yorkshire. (Tel. *Wakefield 6429.*)
- G3HGJ**, D. M. Foster, 31 Glamis Crescent, Rowlands Gill, Co. Durham.
- G3IEX**, D. J. Roper (ex-G13IEX), c/o 78 Bush Road, Cuxton, Rochester, Kent.
- G3IGL**, C. J. Lovelock, 29 Pendell Avenue, Harlington, Hayes, Middlesex.
- G3III**, G. P. Lovelock, 6 Compton Bassett, Calne, Wilts. (Tel. *Calne 2298.*)

- G3JFC**, B. M. Stone (*ex-VSIGN* /VS4BD / VS5BS / VR3L /ZC5GN/5A2CW), 18 Glenluce Road, Blackheath, London, S.E.3.
- G3JMH**, V. Callaghan, 18 Dean Close, High Wycombe, Bucks.
- G3JQL**, J. S. Haggart (*ex-GM3JQL*), 22 Alnwick Road, Framwellgate Moor, Durham City.
- G3JRJ**, F. Buckley, 18 Sherwood Court, Harrowby Street, London, W.1.
- G3JUC**, R. G. Timms, 14 Woodlands Road, Neston, Wirral, Cheshire.
- G3KCB**, B. N. Green, 44 Mansfield Road, Flixton, Manchester.
- G3KTZ**, C. Lindsay (*ex-GM3KTZ*), 43 Witherington Road, Holloway, London, N.5.
- GW3KUA**, J. Rae (*ex-G3KUA* /GM3KUA), 64 Coryton Rise, Whitchurch, Cardiff, Glam.
- G3MKV**, C. Curtis, 8 Compton Bassett, Calne, Wilts. (Tel. Calne 3010.)
- G3MPN**, D. E. Johnson, 3 Folly Gardens, Folly Road, Wymondham, Norfolk. (Tel. Wymondham 3382.)
- GW3MXC**, Rev. D. J. Whelan, 27 Elizabeth Avenue, Colcot, Barry, Glam.
- G3NEA**, L. J. Saunders, 5 Henleaze Terrace, Westbury-on-Trym, Bristol.
- G3OCM**, D. A. Hills, South Holt, Danbury, Chelmsford, Essex.
- G3OGZ**, M. S. Beer, Braizedale Close, Larchfield, Leadhall Lane, Harrogate, Yorkshire.
- GM3ORX**, A. G. Rumbold (*ex-G3ORX*), Valhalla, Tullichewan Road, Balloch, Dunbartonshire.
- G3OZS**, D. J. Marrage, South Holt, Danbury, Chelmsford, Essex.
- G3PDM**, P. G. Martin, 2 Dence Park, Herne Bay, Kent. (Tel. Herne Bay 391.)
- G3PFL**, W. J. Perkins, Shepherds Hey, Browns End Road, Broxted, Dunmow, Essex.
- GW3PMR**, A. H. Jubbs (*ex-G3PMR*), 1 Friars Terrace, Bangor, Caerns.
- G3PMY**, M. J. Harwood, 93 Pine Hill, Epsom, Surrey.
- G3PQE**, J. Thorn, 6 Plumtree Close, Sandford Road, Winscombe, Somerset.
- G3PRP**, R. G. Poole, 50 Peterfield Road, Whitwick, Coalville, Leics.
- G3PTC**, Peterborough Technical College, c/o D. Byrne, Jersey House, Eye, Peterborough, Northants. (Tel. Eye 351.)
- G3RBG**, A. L. Gray, 6 Hillingdon Road, Whitefield, Manchester, Lancs.
- G3RBR**, F. B. S. Rogerson, 14 Vicarage Road, Winslow, Bucks.
- G3RFH**, K. J. Randall (*ex-VP8HF*), 5 Blakes Crescent, Worston Lane, Highbridge, Somerset.
- G3RKL**, A. J. T. Whitaker, 7 Sea View Park, Whitburn, Sunderland, Co. Durham. (Tel. Whitburn 2174.)
- G3RLK**, J. H. Longhorn, A.M.I.E.E., 9 Foxlands Avenue, Wolverhampton, Staffs. (Tel. Wolverhampton 35289.)
- G3RUZ**, D. H. Martin, 2 Dence Park, Herne Bay, Kent.
- G3SJC**, G. J. Perry (*ex-VP2SZ*), 171 London Road, Horndean, Hants.
- G3SXX**, B. J. Doel, South Holt, Danbury, Chelmsford, Essex.
- G4DK**, W. H. Morehouse, Flat 6, Damery Court, Fir Road, Bramhall, Cheshire. (Tel. Hillbrook 425.)
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### SMALL ADVERTISEMENTS, TRADE—continued

**MARCONI** Transmitter Power Meter, £5; No. 10 Crystal Calibrators, 37s. 6d.; 40w. power meters, £2 10s.; s.a.e. list.—Worthing Radio, 245 South Farm Road, Worthing.

### READERS' ADVERTISEMENTS

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**FOR SALE:** HRO Senior, completely modernised throughout, 6BA6's etc., panel RF trimmer control, noise limiter, crystal marker fitted; with PSU, complete range of nine general coverage coils, 50 kc-30 mc, £20 o.n.o.? Bandsread coils, including 21 mc, £2 each; manual, 10s. Carriage extra (Midlands).—Box No. 4002, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** R.206, first-class condition, 55 kc-30 mc, front end 50-600 kc, power unit, S-meter. Deliver 30 miles; manual, bargain, £15.—R. Smith, 50 Calfridus Way, Bracknell, Berks.

**URGENTLY REQUIRED:** Mains transformer for Cossor Oscilloscope type 339A.—Walters, G3THW, 112 Windsor Avenue, Penn, Wolverhampton, Staffs.

**2-METRE T.W. T.R. converter,** £5 10s. Bargain. Heathkit Rx RG-1, almost new, factory built, £32.—Worthington, 43 Mount Road, Penn, Wolverhampton.

**EXCHANGE:** Compact 8 zoom Projector, new; Volks Ciné 8 zoom Movie Camera, F2.8 Zeika lens, pistol grip, case, both perfect, value approximately £65, FOR best Hammarlund or similar Receiver offered.—Kavanagh, 27 Sandringham Road, Swindon, Wilts. (Tel. 6885, evenings.)

**FOR SALE:** Eddystone 640, good condition, unmodified, complete with 3in. external S-meter, £20 o.n.o.? AVO Valve Tester, £3. Small Oscilloscope, £3 10s. Buyer collects.—G3OSK, 77 Southampton Road, Cosham, Portsmouth.

**SALE:** Eddystone 840C, £46 o.n.o.? VFO controlled CW Tx, 10-metre 10w. C/W int. PSU, £8.—Marriott, 100 The Crescent, Andover, Hants.

**WANTED:** Marconi No. 52 Receiver (mains and 12v. operation) must be electrically 100%; cannot collect but will pay £1 of carriage.—Details to Wilkinson, Craig-y-Don, Conway Road, Penmaenmawr, North Wales.

**SALE:** Receiver HRO5T, complete with nine coils, matching speaker, power unit and handbook, VGC, £15; Transmitter DX-40U, VFO type VF-1U and 20-metre Quad Antenna, £28; GDO, £4; G.E.C. 36-range Multimeter, £6; BC-221, £12. Prefer buyers collect from Bucks, otherwise carriage extra. **WANTED:** Electronic Keyer.—Box No. 4003, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** Codar PR.33 in fair condition; also Eddystone S.640 manual/data.—Condition and price to S. Richards, Bancroft's School, Woodford, Essex.

**WANTED:** All knobs for CR-100 Rx; also crystals of 9,000, 11,500, 11,750, 12,000 kc.—G3SIX, Hart, 42 Gravel Hill, Addington, Croydon, Surrey.

SMALL ADVERTISEMENTS, READERS—continued

NEW and slightly used 4X150A valves, holders, chimneys, what offers? 144 mc Transceiver, mobile, over 700 stations worked on this compact rig, £20; AC power unit for shack use, £4; 70 mc Transceiver, mobile, first-class performance, £20; 70 mc QRO PA unit for QOV06-40A, £10; 70 cm Converter, 6AM4's, £9; 144 mc Nuvistor Converter, 12-volt, £8; 144 mc Nuvistor Pre-Amp, with power unit, £3; Command Rx 3-6 mc, all mods., FB, £5. Load of VHF/UHF equipment available.—State requirements to Box No. 4004, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

DXCC'er has above average S.640 (one owner) for sale, £24. WANTED: 888A.—Box No. 4005, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: KW-2000 with DC power supply, August 1964 model, £180.—J. H. Winnard, Mount Severn, First Raleigh, Bideford, N. Devon.

WANTED: G8KW Multiband dipole with 97ft. coax. State price.—G3NAK, 145 Huddersfield Road, Meltham, Huddersfield.

FOR SALE: TCS Rx with PSU and LS, £11 10s.; Joystick aerial, 35s.; Practical Wireless, April 1957 to March 1963, offers? "Natterbox" components (Short Wave Magazine, June 1961), crystals, transformers, etc., 45s., all post extra.—L. Arnold, 24 Albert Road, Stechford, Birmingham, 33.

SALE: Test Card C Monoscope tube; Videcon; Power units 400v. 200 mA, metered; 50-250v. variable output; 250v. stabilised; all with heavy-duty heaters, all items £2 each.—G6AAL/T, 127 Horton Road, Datchet, Bucks.

R.A.F. Halton Apprentices seek 10-80 metre gear for Club station, offers?—G3TFG-ZB1FG, R.A.F. Halton, Aylesbury, Bucks. (Wendover 2242, Ex. 227.)

SALE: Hartley 13A double-beam Oscilloscope complete with leads, manual and graticule, £25 o.n.o.? Heathkit V7A-U.K. Valve Voltmeter with HF probe, £9. Both very good condition. WANTED: Prop Pitch Motor, Hy-Gain 7 mc or 7/14 mc beam HT-18.—G3FPQ, Markham Oak, Bucks Horn Oak, Farnham, Surrey.

FOR SALE: BC-342 Rx, 1.5-18 mc, £7 10s.; Advance Sig. Generator 100 kc-60 mc, £10; 100 yards high grade twin coax cable, £2 10s.—Crossan, 9 Palace Street, London, S.W.1 (VIC 0252/SPR 6645.)

WANTED: HF-Band Radiogoniometer, ex-D/F apparatus (Adcock station, etc.), with data. Good price paid for instrument in clean condition and working order. Can collect.—Reuly Box No. 4010, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CALLERS ONLY: Valves, Z-Match condensers, Command Rx's, Mains and LP filters, vibrator 12v. etc. Evenings. Lots of junk.—Smith, 54 Freshfield Road, Formby, Lincs.

WANTED: Outer main tuning knob for R.107, also antenna terminals: set less above, £9.—Cree, 20 Longwood Lane, Amersham, Bucks.

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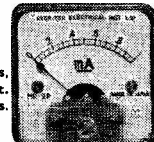
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200µA	27/6	2mA	22/6	300mA	22/6	20v	DC 22/6	15v	AC 22/6
500µA	25/-	5mA	22/6	500mA	22/6	50v	DC 22/6	50v	AC 22/6
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### SMALL ADVERTISEMENTS, READERS—continued

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**T**RANSISTOR Bargains: OC16, 10s.; OC22, 12s. 6d.; OC23, 15s.; OC24, 15s.; OC36, 12s. 6d.; OC71, 3s.; OC77, 4s. 6d.; GET573, 10s.; GJ5 diode 300v. p.i.v., 1 Amp., 2s. 6d.; p. & p. extra, s.a.e. list, numerous other types. Orders over £2 post free.—Tynan, 29 Elm Walk, Stevenage, Herts.

**840A**, working order, £18; buyer collects, Essex. Hallicrafters SR-150 handbook, 15s.—Box No. 4006, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**R**TTY TELEPRINTER SCOOP: 43 Type 7B page printers for sale. Also two wavemeter/signal generators 140-255 mc, xtal check, with instruction manual and mains PSU, £2 10s. TF517 Signal Generator 10-300 mc, £3 10s. 25w. CW transmitter, Geloso VFO, mains PSU, £10. Carriage extra; s.a.e. details and price of T/P's.—G3LMR, 112 Groby Road, Glenfield, Leicester.

**F**OR SALE: AR88D, excellent condition, £40—or HRO with bandsread coils, covering 80m., 40m., and 10m., and general coverage, haggle around £25.—F. Nurse, 31 Woodfield Avenue, Colindale, London, N.W.9 (COL 4791).

**C**R-100 Receiver. Loan or purchase of the manual for this receiver required by B. Gordon, 72 Coldshott, Holland, Oxted, Surrey.

**W**ANTED: Mod. xformer UM-1 or similar, also Eddystone 898 dial.—Maxwell, 367 Gower Road, Killay, Swansea (Tel. 22909.)

**H**RO coils 3.5-7.3 mc, 50-100 kc, 10s. each, post 2s. 6d. each. New valves: ECF80, ECH81, EF80, EF85, EF89, EBF89, EABG80, EBC81, EL84, EZ80, EZ81, ECC81, ECC82, ECC85, EM80, EM81, EM84, 4s. each; p. & p.—J. Cooper, Churchfield Road, Outwell, Wisbech, Cambs.

**A**R88LF, S-Meter, £30; Mullard Bridge, £3; Cossor A Pattern Generator Type 1320, £7, all with manuals. TBS, Tx and Rx, 60-80 mc, £2 10s. each. Buyer must collect.—G3RZD/T, 9 Park Lane, Southwick, Sussex.

**R.107**, good condition, £10 o.n.o.? Buyer inspects, but will deliver London area. M/c Milliameters, 2in. flush round, 0-50, 0-100, 0-200, 7s. 6d. plus 2s. Two 813's with bases, £1 each plus 2s. Maintenance manual for Creed 7B T/P, 4 µF 1.500v. capacitors, 3s. plus 2s. New Muirhead S/M drives with vernier blocks, etc., 10s. plus 2s.—Box No. 4007, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**BC-221**, complete, £15. Panda Cub and manual, £35. HRO modified with B7G valves and product detector; five bandsread coils, 80, 40, 20, 15, 10, PSU, manual, £25.—G3HDA, 98a Lea Green Lane, Wvthall nr. Birmingham (Wythall 3338.)

**W**ANTED: Viceroy Mk. IV. SALE: Olympic 250w. loaded Z-Match; HRO coils 10-15-80m. BS with one 80m. GC; MC-70 studio crystal mike. Offers?—Box No. 4009, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**W**ANTED: BC-453.—Fabricant, 5 Benscliffe Drive, Loughborough, Leics. (5118 after six.)

SMALL ADVERTISEMENTS, READERS—*continued*

**EDDYSTONE S.640**, in very good condition, complete with matching loudspeaker and manual, £19; **AIR Inverter**, input 110v. DC, output 110v. AC, 60 c/s, 350w. continuous, almost as new, £22 o.n.o.? **Eico 720 90w. CW Tx**, 115v. AC input, electrically OK, although exterior marked, £22. All above buyer please collect. Joystick, new, 35s.; Type 5 Joymatch, 10s.; **HRD bandspread coils 80, 40, 15 metres**, very good condition, 50s. each. (Oxford).—Box No. 4008, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**FOR SALE** owing to bereavement: Viceroy Transmitter Mk. III with filter; AR88 Receiver (rewired), other items. Send for list.—Aram, 23 Elms-hurst Gardens, Tonbridge, Kent (Tel. Tonbridge 2969.)

**SALE**: Type 3 Teleprinter with spares and power pack, £15; 35 reels paper tape, 35s. Marconi T.F. 428A Valve Voltmeter, £4. Post Office rack with swing doors, £5. No. 9 Rx with power pack, £5. Terminal unit C.F.S. ZA-39384, £5. Tape perforator, £2. ATU for 52 Set, 15s. Collins ATU, new, £1. *De luxe* Joystick with all-copper RF elements, £3 5s. Acos mic. 39, £1. Angle-iron rack, £1. Minimitter converter, Amateur and Commercial, £15, as new.—B. Davies, 16 Mulkern Road, Holloway, London, N.19.

**FOR SALE**: Eddystone S.640 with Eddystone Speaker and S-meter, £20.—G3KTL, 30 Sudbury Drive, Cheadle, Cheshire.

**AUTO TRANSMITTER 6S5**, AC mains, hammer-grey finish, £50; no offers, worth £80.—Box No. 4011, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED**: Miniature Tx/Rx type RT-159B/URC-4; also 30s. offered for manual for the above. Will pay good price for all types of manuals, handbooks, etc. relating to suitcase-sets, used by Resistance Forces.—Gee, 11 Whitehorse Lane, Stepney, E.1.

**SALE**: Minimitter mobile whip Antenna, 160-metre, mounted on one section of Skirack for attachment to roof of car; together with 80-metre coil and top section, £7 10s.—G3RDC, QTHR, Speedwell 8831.

**AR88D**, as new, manual and tools, £50. TA-33 Sr. traps etc., £10. Sterns Mullard 5/10 Amplifier, £9. Two-valve pre-amp/equaliser for above, £5. Pair QY3/125's with bases, £4. 2C39A, £3. FM tuner, £5. New bug-key, £3. Crystal calibrator, £1. FT241 crystals for G2DAF Rx filter, £2. **WANTED**: BC-348 Rx in good condition.—Ring G3LAS, Berkhamsted 1186 (QTHR).

**TIGER TR.60B** in excellent condition, with Tiger Z-Match and Minimitter LPF, £55 o.n.o.? Carriage paid. Minimitter Top 2-7, 24w. excellent, £21 (10s. carriage). HR0-MX, 9 coils and power supply, £21 (£1 carriage); Jackson C.804 capacitors 15 and 30  $\mu$ F, brand new, suitable tuning B.44, 3s. 6d. each, post 6d.; A.M. Morse keys, 12s. 6d., (2s. 6d. postage), few only. Meters, components, many new items; s.a.e. for enquiries.—G3MOE, Westbury Road, Cheltenham. Glos. (24217.)

**WANTED**: Junk AR88D at junk price for spares; also VTVM and 'scope for fair price.—G3AAJ, QTHR.

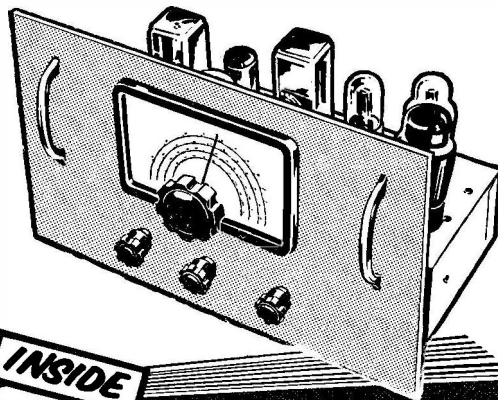
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MOSLEY MODEL SWL-7 Dipole Kit. For 11-49 metres.	<b>£7. 0. 0</b> P. & P. 1/6

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SMALL ADVERTISEMENTS, READERS—continued

**SALE:** Two Parmeko 'C'-core potted transformers, rated 500-0-500v. at 250 mA and four separate LT windings, £2 each; also five 8 µF at 1,000v. DC paper capacitors, 7s. each. All plus postage.—G3SWH, 66 Pettigrove Road, Kingswood, Bristol.

**CR-100** with S-meter, manual, £17; **CR-300** with manual, £14; **Scott Marine Rx**, 1-9-22 mc with manual, £8; **Marconi Oceanspan Tx** with manual, £5; **Marconi Auto-Alarm** with manual, £3. Also other gear.—G3IGG, 26 Hooton Way, Hooton, Wirral, Cheshire (*Hooton 2009*.)

**SSB Transmitter** etc. required for The Norfolk Amateur Radio Club Station. Will collect 100 miles.—Secretary, 140 Oak Street, Norwich.

**FOR SALE:** Canadian No. 52 Set with all parts, £16; 62 Set, £4 10s.; **Creed 3x Printer and PSU**, £6; **TV**, £2; 10-line exchange, 30s.; 19 Set **PSU**, £1; **B2 Rx**, 10s. More oddments. Buyer collects.—Taylor, 21 Hollydene, Beckenham Lane, Bromley, Kent (*RAV 8776*.)

**SALE:** Collins TCS Tx Modulator preamp. on crystal platform, otherwise unmodified, £9. Collins TCS Rx, noise-limiter model, 3-ohm output transformer, otherwise unmodified, £9; **Heathkit 465 kc Q-Multiplier**, assembled and as new, £7 10s.; 1/813, £1 10s.—G3PTD, 185 Bispham Road, Blackpool.

**LIST** of Tape Library addresses free, 2½d. stamp appreciated.—D. French, 136 Tollington Park, Stroud Green, London, N.4.

**SALE:** Complete SSB station: **KW-77**, K.W. Viceroy Mk. III, mike, **RME DB-23** preselector, **Dow Key Ant.** relay, two years old, cost over £300, mint; no serious offer refused.—G3FWB, Hunt, 10 Weston Way, Weston Favell, Northampton (*Tel. 36258 day, 35876 evening*.)

**TOP BAND CW transmitter**, VFO control, £5; **Radiocraft Type 46 transmitter**, crystal control, phone/CW, 80/10 metres, £5.—Roth, 4 Camden Road, Somerton, Somerset.

**FOR SALE:** **DX-100U**, perfect, with manual, £50 f.o.n.o.?—G3OMY, 191 Dudley Road, Springfield, Dudley, Worcs.

**FOR SALE:** K.W. converter, 10-80m., brand new condition, £15.—GW3TMP, 3 Bryn Clyd, Leeswood, Mold, Flintshire.

**DISABLED SWL** has for sale **Transistor Signal Generator**, 150 kc to 300 mc, new, cost £9 10s., sell £6 10s. or **EXCHANGE S.38 Receiver** or any receiver. Crystals 100 kc, 500 kc, 7s. 6d. each.—Box No. 4012, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**MARCONI CR-100**, 6SG7, RF's, S-meter, hand-book, good condition, £17.—GW3PPQ, 25 Fouracres, Llantwit Major, Glamorgan.

**FOR SALE:** **AR88D**, new condensers and aligned, £22. Buyer arranges collection.—Peers, 3 Monks Brook Close, Eastleigh, Hants.

**FOR SALE:** **CT.84** miniature 'scope, instructions, circuit, leads, case, transformer, £14. **Nombrex Sig. Generator**, new, £6 10s. 38 Set complete, £1. Transformers, valves, etc., £1, or **EXCHANGE** lot for good general receiver. No dealers (London).—Box No. 4013, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**EDDYSTONE S.640** fitted **RF EF85**, **ECH81** and crystal calibrator, mint condition, £21. Reslo ribbon mic., type R.V., £3 5s.—Box No. 4015, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—continued

**SALE:** Modified Redifon RTTY T/U ZA39384, S 465 or 735 kc input, built-in mains PSU, £10 o.n.o.? Carriage extra.—G3NPF, 130 Ashington Road, Rochford, Essex.

**SPACE REQUIRED:** Hammarlund SP600/JX6, cabinet table model, new and almost mint condition, complete with full U.S.A. technical maintenance manual, £165 o.n.o.? Tiger TR2M 2-metre Tx, 75w. 'phone, brand new (list £85), £55. Tiger 2-metre Cascode Nuvistor converter, IF 28-30 mc, new, £8 10s. K.W.-160 Mk. II, brand new, £20. Marconi UHF Sig. Generator TF.762/A, 400-600 mc, brand new, complete with manual, £15. TF.912 Tx output meter, 0-25w., £6 10s. BTH UHF Wavemeter, 250-850 mc, uses 4in. 50  $\mu$ A meter, £5 10s. Mobile 2-metre Tx complete (PTC-115) QQV03-20 PA, excellent condition, with manual, £8. Command Rx 28-41 mc, £3; 1.5-3 mc model, new in carton, £9. BC-453, same condition, £7 10s. Browns Type "F" phones, new, 25s. Special quality U.S. Air Force, 21s. RF-26B, brand new, 25s. All plus carriage costs. **WANTED:** R.216, preferably complete with PSU, also first-class Oscilloscope, single or D-Beam, Cossor, Solartron, Heathkit, etc.; also GD-1U. Any of these requirements accepted in PART EXCHANGE for the above equipment; cash adjustment either way.—Box No. 4014, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**CR-100/8**, brand new with manual, £29 or exchange for best 35mm. magazine loaded slide projector with screen.—Arends, 18 Granada Road, Denton, Lancs. (DEN. 4937.)

**WANTED:** Valiant Tx 10-160 metres, will pay up to £40 for late good clean model and collect up to 50 miles.—G3GQ, phone Hatfield Woodhouse 230.

**MK. I** 32ft. Vertical Aerials (see June Short Wave Magazine), £3. K.W. all-band dipole (new), £4 2s. Tx cabinet 19in. x 12in. x 18in., grey, £2 15s. Call—11 St. Edwards Road, Birmingham, 29.

**FOR SALE:** BC-221 Frequency Meter with internal mains power pack (stabilised), £15.—Good, Rose Cottage, Steeple Morden, nr. Royston, Herts.

**FOR SALE:** 40w. 6-band Mobile Station comprising K.W. Valiant Tx, K.W.76 double conversion Rx and Aveley 425v. Transistor PSU, £65. Will not separate. Withers 2-metre transistor converter, IF 4-6 mc, £6 10s.—G3KNB (QTHR.)

**FOR SALE:** CR-100/8 mod., with Codar PR30X, splendid performance, £16.—Phone TOT 6632, 189 The Avenue, Tottenham, London, N.17.

**TWO APG5 12 cm. Transmitter/Receivers**, £6 each. Pye Television Monitor, as new, £12. Vitavox B.50 mobile hand mic., unused, 35s. (cost £6). Many Valves, Crystals and components very cheap, e.g. 6J5G, 1s.; U18, 2s.; s.a.e. list. Post extra.—Liv 8489, after 7.30 p.m. V. Cedar, 2A Convent Hill, London, S.E.19.

**WANTED:** HRO-5T in mint condition, with bandspeed coils.—Fletcher, 43 Park Lane, Whitefield, Manchester (Tel. WHI 5165.)

**WANTED:** A Novice Band in the British Isles.—C. Forrister, 368 Rush Green Road, Romford, Essex.

**WANTED:** SSB Tx and Rx, such as Hallicrafters, Collins or similar, also Vanguard. Cash.—Box No. 3073, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**FOR SALE:** DX-100U, in good condition, £40. Delivery free 30 miles.—Wickham, 56 Kings Road, Walton-on-Thames, Surrey.

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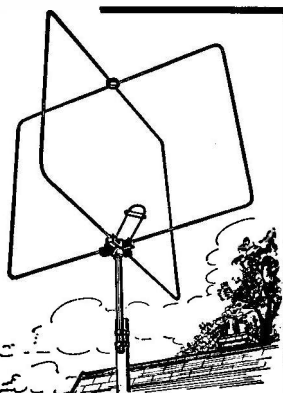
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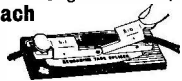
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### SMALL ADVERTISEMENTS, READERS—continued

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**MINIMITIER Top 2-7,** excellent condition, £20.—G. Kelley, 9 Cornwall Drive, York.

**EXCHANGE:** 500 Bun pennies, 150 H and KN pennies, plus mint 10 x 50 binoculars with case, plus cash, for best Radio Receiver offered. Also WANTED: outside aerial for general coverage Receiver.—Coldwell, 154 Bradway Road, Sheffield.

**750v. or 850v. 250 mA power supplies; also give 6·3v. 7A. 300v. 100 mA, Bias 200v. with two FW4/500, 5Z4 small size, 90s.; buyers collect. Transformers, Admiralty rated, from above, £3, including post. Marconi Sig. Generator TF-390G, 16-250 mc, as new, £10, crated, including charts, spares. WANTED: Eddystone S-meier.—B. L. Cedar, 2a Convent Hill, London, S.E.19. (Tel. Livingstone 8489, evenings.)**

**HRO,** six coils with HRO PSU and preselector £20-15-10m., £10. Buyer collects. WANTED: Eddystone 640.—GW3LSB, Holcombe, Vicarage Avenue, Llandudno, Caerns.

**ZC-1 Mk. II,** 160 and 80 metres, pi-output, mains powered, but complete with vibrator unit removed from Set, £8. Buyer collects or carriage extra.—G3OZA, 9 Erneston View, Corsham, Wilts.

**FOR SALE: K.W.-77,** £70. London area.—Box No. 4016, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**R. 107,** excellent condition, £10; Mohican, £14, or R. PART EXCHANGE general coverage Receiver, AR88, etc.—Westwood, 114 Pettits Lane, Romford. (Romford 47577.)

**QRT SALE: DX-40U, VF-1U,** Olympic loaded QZ-match, LP filter, co-ax relay, £30; Eddystone S.640, Codar preselector, £25; Top Band CW/phone TX, £10.—Box No. 4017, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**62 Short Wave Magazines,** 1957-1963, mint condition, indexes, 25s. Buyer collects.—Bennett, 130 Avenue Road, Acton, London, W.3.

**MINIMITTER MR-44/II Receiver,** new condition, £35, or EXCHANGE Eddystone S.750 or similar general coverage receiver. Two Command Receivers less valves, 30s., unmodified. Berks.—Box No. 4018, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE: SX-101A Receiver,** ideal SSB, immaculate condition, £95; or EXCHANGE for Eddystone 770R or similar VHF Receiver.—King, G3ACB, OTHR or Sanders'ead 3943 after 7 p.m.

**PANDA PR-120V, 5-band 150w. Tx,** £45. Excellent condition. Buyer to inspect and collect, please.—G3NLY, 20 Bridge Cross Road, Chase Terrace, Walsall, Staffs.

**FOR SALE: DX-40 with VFO,** £25. Wavemeter F.W.1191 with amateur band charts, £8 o.n.o.?—Sgt. Akehurst, Royal Signals Camp, Newton Abbot, Devon.

**KW-77 Receiver with matching speaker, manual,** also Hy-Gain 14 AVS vertical antenna with LC.80 loading coil, very little used. £85 complete.—

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**SALE: Short Wave Magazines,** August 1956 to February 1964, £5: R.S.G.B. Bulletins, November 1957 to December 1963, £4: 1958 ARRL Handbook, 12s. 6d.; Antenna Book, 7s. 6d.; Multimeter, £1; TCS loading coil, 10s.; ¼in. coax, etc. for callers.—118 College Hill Road, Harrow Weald, Middx.



SMALL ADVERTISEMENTS, READERS—continued

**WANTED** : ZC-1 RX/Tx for 160-80 metres. All letters answered.—Box No. 4019, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED** : Crystal Calibrator Mk.10 or similar. State full details including range, condition, price.—1 Homestead Avenue, Leicester.

**FOR SALE** : BC-453, £5 10s.; RF.26B, 35s.; R.216 Power Unit, £12 10s.; AVO All-wave Signal Generator, £10. All new, unused. Marconi TF-340 output meter, £10. SX-28A Mains Transformer, £3; CR-100 Manual, 35s.—A. J. Reynolds, 139 Waller Road, New Cross, London, S.E.14. (Tel. New Cross 1443 after 7.30 p.m.)

**G73** Wavemeter with xtal calibrator, good condition, £10 o.n.o.?—Barr, 21 Whitecross Road, Lydney, Glos.

**K.W.** Valiant, as new, K.W. built, 10-16m., little used, going SSB. £30.—G3GCO, 31 The Crescent, Donnington, Wellington, Shrops.

**R.107** Handbook, S-meter, coax, input, spare valves, vibrator, rebuilt, professionally realigned, FB condition, £12.—Macdonald, Gracie Hall, Wake Green Road, Birmingham. 13.

**WANTED** : Transformers (1) Ex-SCR.522 mod. or DT-1; (2) Woden UM-2; (3) Parmeko type G20, 550, 375v. outputs.—Harkess, GM3THI, 8 Ailsa Street, Prestwick, Ayrshire.

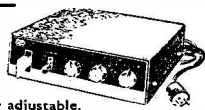
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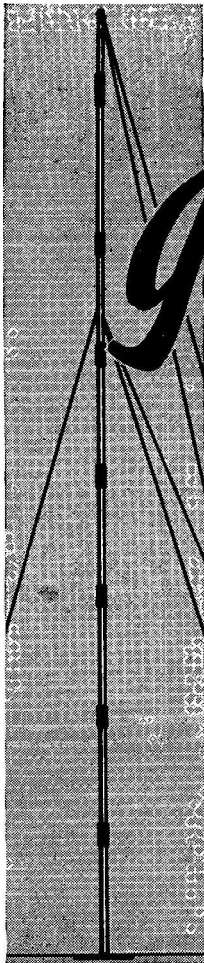
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- \* GREEN & DAVIS CONVERTERS
- \* KW EQUIPMENT
- \* MOSLEY AERIALS
- \* WITHERS

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**TWIN FEEDER.** 300 ohm twin ribbon feeder similar K25 6d. per yard. K35B Telecon (round) 1/6 per yard. 75 ohm twin feeder 6d. per yard. Post on above feeders and cable, 1/6 any length.

**COPPER WIRE,** 14G, H/D, 140 ft., 22/6; 70 ft., 11/6, post and packing 2/6. Other lengths pro rata.

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**CERAMIC CENTRE PIECE** for dipoles, Type AT, 1/6 each. P. & P. 1/-.

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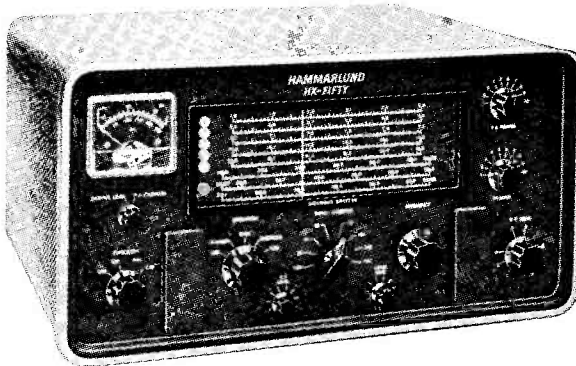
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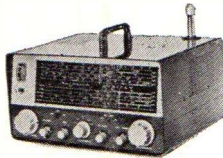
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RG-1



GC-1U



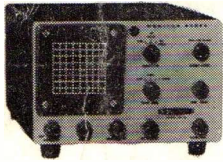
RA-1



DX-100U

### AMERICAN HEATHKIT SINGLE SIDE BAND EQUIPMENT

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HO-10E



HW-12



SB-400E



SB-300E

**3" MONITOR 'SCOPE, Model HO-10E.** A must for the SSB station. Gives at-a-glance, visual indication of your transmitted signal and the incoming signal, displaying envelope patterns. Built-in two-tone generator ensures a clean output signal. Power Req.: 115/230v. A.C. 50/60 c/s. £34.10.0 Kit

**FILTER-TYPE SSB TRANSCEIVER, Models.** For the 80, 40, or 20 metre bands. 200 W. P.E.P. input TX. 1  $\mu$ V sensitivity RX. Employs easy-to-build printed board techniques, with pre-aligned circuits. Power Req.: 800v. D.C. at 250 mA., 250v. D.C. at 100 mA., 125v. D.C. at 5 mA., 12v. A.C. or D.C. at 3.75A.

Model HW-12. 80m. } £60.1.0 each. Kit  
HW-22. 40m. }  
HW-32. 20m. }  
GH-12. Push-Talk Microphone £3.13.0 Assembled

**SB-300E AMATEUR 80-10m. BANDS RECEIVER.** This de-luxe receiver offers unsurpassed value to the Radio Amateur. Of advanced concept, employing up-to-date design and construction techniques its ultimate specification ensures unparalleled performance. Full specification and details on request. Weight 22lb. Power Req.: 115/230v. A.C. 50-60 c/s. 50 watt. Size: 14 $\frac{1}{2}$ " x 6 $\frac{1}{2}$ " x 13 $\frac{1}{2}$ ". £133.14.0 Kit (Less speaker)

**A fitting companion for this receiver is the SB-400E Transmitter** which is designed for "lock-in" facility with the SB-300E. A self-powered filter type Tx covering the "Amateur" bands, 80 to 10m. with a P.E.P. of 180 watts. Weight 33lb. Power Req.: 115/230v. A.C. 50-60 c/s. Size: 14 $\frac{1}{2}$ " x 6 $\frac{1}{2}$ " x 13 $\frac{1}{2}$ ". £165.4.0 Kit  
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**"CANTENNA" TRANSMITTER DUMMY LOAD, Model HN-31.** Simplifies servicing and testing. £5.4.0

**REFLECTED POWER METER, Model HM-11.** Indicates Antenna/Transmitter match. £8.8.0 Kit

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