



RSGB

JULY, 1962

VOL. 38, No. 1

BULLETIN

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

DALE *ELECTRONICS*

Your complete buying guarantee for

AMERICAN EQUIPMENT

COMPONENTS · TRANSMITTERS · RECEIVERS · TEST GEAR

ALWAYS IN STOCK

DRAKE 2B

HALLICRAFTERS HT32B & 37

CDR ROTATORS

LINEARS HT41 & COURIER

JOHNSON INVADER

HAMMARLUND HQ170

All equipment carriage paid and supplied for use on
200/240 volts at no extra cost

There is no question of not being completely satisfied when you purchase from Dale, if you are not satisfied with anything you buy from us, just return it within 7 days and we will refund your money . . . it's as simple as that!

Why buy elsewhere?

DALE *ELECTRONICS*

109 JERMYN STREET · LONDON · SW1
WHITEHALL 4856

K. W. ELECTRONICS

... DX working is so much easier on SSB with a 'Viceroy'!

- ★ Complete SSB TRANSMITTER with Power Supply using SILICON RECTIFIERS
- ★ Highest standard Reliability, Stability, Carrier Suppression, Sideband Suppression
- ★ Outstanding audio "punch" due to A.L.C.
- ★ Requires no test-gear for setting up



The K.W. 'Viceroy' (Mark III) Price £142
(Extra ½ lattice filter £8)

- ★ BK keying
- ★ Suitable A.M.
- ★ Already in Service, Quick delivery
- ★ Employs Crystal filter—Extra ½ lattice filter an optional fitting, gives nearly 60db sideband suppression
- ★ Rugged Construction
- ★ 180 watts P.E.P.
- ★ Full TVI proofing

K.W. QUALITY EQUIPMENT★

KW equipment usually available from stock:—

- ★ KW VANGUARD. 50 watt Transmitter. A.M. and C.W.
 - ★ KW VALIANT. Mobile and fixed station. Tx.
 - ★ KW 160. "Topband" Tx. High level mod and BK C.W. (Series II available).
 - ★ "KW Match" SWR Meter. Low and high Pass Filters. Microphones. Dow-Key Relays, etc.
- Again Available:—
- ★ The famous KW-GELOSO CONVERTER. Remarkable Bandspeed and Stability. Self-contained Power Supply. 4-6 Mc/s output. The "Rolls-Royce" of converters. Price £23 plus 10/- carriage.

Main Distributors for

HAMMARLUND



HQ170

HQ170. Triple Conversion, selectable sidebands, full bandspeed 6, 10, 15, 20, 40, 80 and 160 m. 17 tubes 100 kc crystal calibrator. Excellent performance. £184

(Other models in stock including the latest HQ 100A, HQ 110, HQ 145X & HQ 180)

EASY TERMS AVAILABLE

IMPORTERS OF U.S.A. EQUIPMENT

TRADE IN YOUR RECEIVER FOR A NEW ONE!

K. W. ELECTRONICS LTD., VANGUARD WORKS

1 HEATH STREET, DARTFORD, KENT. Cables: KAYDUBLEW-Dartford. Tel. Dartford 25574

★ THE KW "VICEROY" SSB EXCITER

Very SUITABLE FOR DRIVING THE P.A. of your A.M. transmitter. It is not difficult to change your Class "C" stage to a linear. Similar in appearance to the KW "Viceroy." Self contained power supply. 8 watts input sufficient to drive Linear 6L46's, 6L21's, 4/125A, etc. Low impedance output. Full VOX control and anti-trip.
£90.0.0 plus carriage

★ THE KW500 LINEAR AMPLIFIER

500 watt P.E.P. input, grounded grid P.A. Suitable for being by the KW "Viceroy" or similar transmitter. Including 1750 volt H.T. supply.
£87.10.0 plus carriage

your NEW Communications Receiver

• hallicrafters •

DRAKE • GELOSO • MOSLEY

(Model 2B)

(G209-R)

(CM-1)

Make sure you buy a new Receiver that is "peaked to perfection." Our engineers take a pride in adjusting all imported Receivers to meet manufacturers specification.

We know we have the largest turnover of imported Amateur receivers in the U.K. Our stocks are always changing, therefore, you can be assured that you get the latest Production model.

We stock:—

CDR BEAM ROTATORS AND INDICATORS, 220/240 volts

£18.19.0.

MOSLEY Beams and Verticals.

K.W. TRAP DIPOLES.

B & W PHASE-SHIFT NETWORKS, £2.15.0.

McCOY 9 Mc/s S.S.B. FILTERS, £16.10.0.

FERRITE BEADS for the 5 Band Aerial, 50 for 19/-, 100 for 38/-.

Most available on easy terms.

CRYSTALS & COMPONENTS LTD

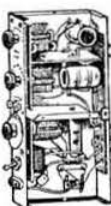


TEL: TEM.1189 2.4. EARLHAM STREET W.C.2.

Near Cambridge Circus, a few minutes walk from Leicester Square or Tottenham Court Road Underground Stations

BC610 TUNING UNITS

These compact units (size 9 x 4 x 2 in.) were used as plug-in tuning boxes with the BC610 TX. They contain miniature variable condensers of 140 pf and 100 pf, a standard size 50 pf ditto. A 1 1/2 in. dia. 0-100 graduated knob/dial, a D.P.D.T. toggle switch and several other components. Coverage is 5.6-35 or 6.35-8 Mc/s. Price 6/6 each. P.P. 3/-.



The well known BC 221 FREQUENCY METERS

Every one tested.
In perfect working order.

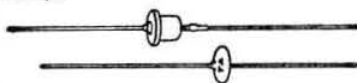
From £10/10/- (externally soiled) to £16 (in new condition).

CABLES

80 ohm twin feeder 6d. yard.
80 ohm Co-ax 6d. yard.

SILICON RECTIFIERS

Miniature silicon power diodes at new prices. Made by one of England's greatest manufacturers. Type (1) 400 P.I.V. 250 mA. d.c. output. Price 3/6. Type (4) 1,000 P.I.V. 0.45 amp. Price 8/6.



RELAYS

U.S.A. P.O. type Relays. Type A.P.H.C. 6,500 ohms, 12V. 2 Ma. S.P.C.O. 2/6. Type A.P.L.C. 3,500 ohms, 6 Ma. S.P.C.O. 2/6. G.E.C. Sealed, 1 pole changeover 24V. 5/-.

CRYSTALS

IT IS VIRTUALLY IMPOSSIBLE TO ADVERTISE OUR COMPLETE RANGE OF CRYSTALS. WE HAVE NOW COMPILED A NEW LIST OF CURRENT STOCKS. PLEASE SEND S.A.E. FOR LISTS BY RETURN POST.

MODULATOR UNITS

Type (1) Ex the 1985/1986 Aircraft T/X. 7 watts class B output. Crystal or low impedance input. Output matches TT 15. Complete with valves. 10/-, p.p. 3/-.

I.F. AMPLIFIER STRIPS

Three-stage I.F. amplifier strips ex the TR 1985/1986 series transmitters. Frequency 9-72 Mc/s. Widely used as an F.M.I.F. amplifier, etc. Price complete with valves. 10/- each, p.p. 3/3.

FIELD STRENGTH METERS

100-150 Mc/s

Contains 0-1 M/A Meter, 155 Valve Extendible Chrome Aerial, etc. in as new condition, requires only 1.5V and 90V. Housed in Black Crackle Case size 7" x 7" x 7".

Price 45/- plus 2/9 P. & P.
LIMITED SUPPLIES

DISC CERAMICS

Available in .001, .002, .005 and .01 mfd, 500 V.W. 4/- per doz., your selection, P. & P. 6d.

CERAMIC SWITCHES

1 P 11 W 2 bank 7/6
2 P 6 W 4 bank 8/6

MINIATURE POTS

Short spindle 1K, 10K, 50K, 100K, 1 Meg. any 3 for 4/6.

WIRELESS SET No. 19

TRANS/REC. Covers 2-8 Mc/s, uses a 6 valve superhet Receiver, I.F. being 465 kc/s and a 6 valve transmitter designed for voice and c.w. operation, incorporates a meter (500µA) for tuning voltages, aerial loading, etc. Panel controls frequency tuning, P.A. Tuning, Gain Control, MCW, CW, R/T switch, Het-tone netting off/on, quench, aerial-AVC-HT-LT-Drive Test. Complete with valves 55/-.

Carriage 10/-
Limited Supplies

SPECIAL OFFER

CHARGER TRANSFORMERS

Prim. 240 V. Sec. 17V. 1A., 8/6. P. & P. 1/9.

CRYSTAL FREQUENCY STANDARDS

10X type, 2" fitting
500 Kc/s 7/6 1 Mc/s 15/-
2 Mc/s 7/6 5 Mc/s 5/-
Bases 9d. each.

FLUORESCENT TUBE KIT

Contains choke, starter, holder and condenser 17/6

TERMS OF BUSINESS

CASH WITH ORDER. Handling charge of 1/6 on all orders under 20/-, where P. & P. is not otherwise stated.

MAINS TRANSFORMER BARGAINS

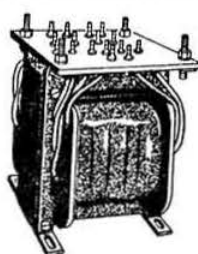
Type (EHT 1). Input 0-210-230-250v. 50 C.P.S. Output 2kV. 10 mA 4v. 1a. 0-2-4v. 1-5a. 22/6. P.P. 5/-.
Type (EHT 2). Input 10-0-200-220-240v. 50 C.P.S. Output 2-5kV. 10 mA 6-3v. 3a. 2v. 1-5a. 3-5kV. D.C. working. 22/6. P.P. 5/-.
Type (HT 1). Input 10-0-200-220-240v. 50 C.P.S. Output 350-350 100 mA 0-4-6-3v. 5a. 0-4-5v. 2-5a. 29/6. P.P. 5/-.
Type (HT 3). Input 10-0-200-220-240v. 50 C.P.S. Output 350-300-0-300-350 50 mA. 0-4-5v. 3a. 0-4-5-6-3v. 4a. 0-4-6-3v. 3a. 1kV. wkg. 25/- + P.P. 5/-.
Type (HT 2). Input 10-0-200-220-240v. 50 C.P.S. Output 350-0-350 120 mA. 0-3-8-12-18v. 5a. 39/6 + P.P. 5/-.
Type (HT 4). Input 10-0-200-220-240v. 50 C.P.S. Output 500-0-500 135 mA. 0-4-5v. 3a. 0-4-5-6-3v. 3a. 0-4-6-3v. 4a. 0-4-6-3v. 3a. 42/6 + P.P. 5/-.
Type (HT 5). Input 10-5-0-110-200-220-240v. 50 C.P.S. Output 450-400-400-450v. 180 mA. 5v. 3a. 0-4-6-3v. 3a. 0-6-3v. 3a. with Electro-Static Screen, 39/6 + P.P. 5/-.
Type (HT 6). Input 10-0-200-220-240v. 50 C.P.S. Output 500-0-500 95 mA. 0-4-5v. 3a. 0-4-5-6-3v. 3a. 0-4-6-3v. 3a. 0-4-6-3v. 2a. 32/6 + P.P. 5/-.
Type (HT 7). Input 10-0-200-220-240v. 50 C.P.S. Output 500-0-500v. 200 mA. 0-4-5v. 3a. 0-4-5-6-3v. 3a. 0-4-6-3v. 4a. 49/6 + P.P. 5/-.
Type (HT 8). Input 10-0-200-220-240v. 50 C.P.S. Output 450-0-450 120 mA. 5v. 3a. 6-3 5a. 6-3 1-5a. 4v. 1-5a. 35/- + P.P. 5/-.
Type (HT 9). Input 10-0-110-200-220-240v. 50 C.P.S. Output 480-0-480v. 90 mA. 44-0-44v. 300 mA. 6-3v. 2-5a. 6-3v. 1a. 5v. 2a. 47/6 + P.P. 5/-.
Type (HT 13). Input 0-205-225-245v. 50 C.P.S. Output 0-300v. 37-5 mA. 0-300v. 37-5 mA. 0-4v. 1a. 4kV. wkg. 0-4v. 0-3a. 17/6. P.P. 5/-.
Type (26). Input 230v. Output 250v. 60mA. (H.W.) and 80v. at 0-1a. 5/- P.P. 2/-.
Type (350/120). 350-0-350v. 120mA. 6-3v. 3a. 5v. at 2a. 16/6. P.P. 3/6.
Type (SK). 350-0-350v. 350mA. 5v. 3a. tapped at 4v. 2v. 2a. 10kV. ins. 20v. 1a. 7-5v. 1a. 5kV. 5mA. Price 25/- P.P. 6/-.
Type 6V 4A. 6-3v. 4a. Price 8/- P.P. 2/-.
Type (250/60). 250-0-250 60mA. 6-3v. 4a. Price 9/6. P.P. 2/-.

CHOKES

Type (CH 1). 5-H. 100 mA. 145 ohms. 5/6 + P.P. 2/- Type (CH 2). 4-H. 300 mA. 50 ohms. 12/6 + P.P. 3/6. Type (CH 3). 20-H. 40 mA. 640 ohms. 6/- + P.P. 2/6. Type (CH 4). 20-H. 80 mA. 440 ohms. 6/6 + P.P. 2/6. Type (CH 6). 2-5 H. 250 mA. 7/6 + P.P. 3/6. Type (CH 8). 20-H. 100 mA. 185 ohms. 7/- + P.P. 2/6. Type (CH 9). 5-H. 250 mA. 100 ohms. 12/6 + P.P. 3/6. Type (CH 10). 17-H. 140 mA. 300 ohms. 8/6 + P.P. 3/6.

I.F. TRANSFORMERS

Good quality iron-cored 465 Kc/s. Type (1) size 1 1/2 in. x 1 in. x 2 1/2 in. Type (2) 1 in. x 1 in. x 2 1/2 in. Price 2/6.
Half or fully potted 465 Kc/s size 1 1/2 in. x 1 in. x 1 1/2 in. 3/6 each, 6/6 pair.



Highest quality kit-sets



at lowest possible cost

Radio · Amateur Gear · Test Instruments · Educational · Hi-Fi Equipment



DX-40U

AMATEUR TRANSMITTER. Model DX-40U. Compact and self-contained. From 80-10m. Power input 75w. C.W., 50w. peak, C.C. phone. Output 40w. to aerial. Provision for V.F.O. £32 10 0

AMATEUR TRANSMITTER. Model DX-100U. Covers all amateur bands from 160-10 metres. Self-contained including power supply, modulator and V.F.O. 150w. D.C. input ... £71 10 0



DX-100U

'MOHICAN' GENERAL COVERAGE RECEIVER. Model GC-1U. Fully transistorised, in the forefront of design with 4 piezo-electric transistors, printed circuit board, telescopic whip antenna, tuning meter and slide rule dial of about 70". Covers 600 kc/s-30 Mc/s in 5 bands. Ideal for amateur and short wave listeners. Bands spread tuning B.F.O. 10 transistors. ... £38 15 0

GRID DIP METER, Model GD-1U. Continuous coverage from 1-8 to 250 Mc/s. Self-contained, with mains power supply. Box of 5 plug-in coils supplied. Will measure resonant frequency, inductance, capacitance and Q factor and locate source of parasitic oscillation, etc. ... £10 9 6

TRANSISTORISED VERSION, Model XGD-1. Range 1-8 to 45 Mc/s ... £10 8 6

VALVE VOLTMETER. Model V-7A. Measures volts to 1,500 (D.C. and RMS) and 4,000 pk. to pk. Res. 0.1 Ω to 1,000 M Ω . D.C. input imp. 11 M Ω . Complete with test prods, leads and standardizing battery £13 0 0

RES-CAP. BRIDGE. Model C-3U. Measures capacity 10 pF to 1,000 μ F., resistance 100 Ω to 5 M Ω and power factor. 5-450 v. test voltages. With safety switch ... £8 6 6

TAPE RECORDING/PLAYBACK AMPLIFIER. Thermometer type recording indicators, press-button speed compensation and input selection. Printed Circuit Board. Mono. Model TA-1M ... £18 2 6
Stereo Model TA-1S ... £23 6 0



TA-1S



S-33



AG-9U

6-W STEREO AMPLIFIER. Model S-33. 3w. per channel. Inputs for Radio (or Tape) and Gram., Stereo or Mono, ganged controls. Sensitivity 200 mV. ... £12 8 6

HI-FI AUDIO AMPLIFIER/MODULATOR. Model MA-12. 10-12w. output. Frequency 20 c/s to 30 kc/s \pm 1dB. Output impedance 3 and 15 Ω £10 19 6

AUDIO SIGNAL GENERATOR. Model AG-9U. 10 c/s to 100 kc/s, switch selected. Distortion less than 0.1%. 10 v. sine wave output metered in volts and dB's ... £19 19 6

R.F. SIGNAL GENERATOR. Model RF-1U. Provides an accurate source of R.F. up to 100 Mc/s on fundamentals and 200 Mc/s on harmonics. Up to 100 mV output on all bands ... £11 18 0

Money Saving PACKAGED DEALS of Complete Stereo Equipment from £44 9 0.



SB-10U



GC-1U



O-12U

SINGLE SIDEBAND ADAPTER. Model SB-10U. May be used with most A.M. transmitters. Less than 3w. R.F. input power required for 10w. output. Operation on 80, 40, 20, 15 and 10m. bands on U.S.B., L.S.B. or D.S.B. ... £37 6 0

VAR. FREQ. OSCILLATOR VF-1U. Calibrated 160-10m. Fund. 160 and 40m. Ideal for our DX-40U and similar transmitters ... £11 2 0

5 in. OSCILLOSCOPE. Model O-12U. Has wide-band amplifiers, essential for TV servicing. F.M. alignment, etc. Vertical freq. response 3 c/s to over 5 Mc/s without extra switching. T/B covers 10 c/s to 500 kc/s in 5 ranges ... £36 10 0

'COTSWOLD' HI-FI SPEAKER SYSTEM. Acoustically designed enclosure "in the white" 26" x 23" x 15", housing a 12" bass speaker with 2" speech coil, elliptical middle speaker and pressure unit to cover the full frequency range of 30-20,000 c/s. Complete with speakers, cross-over unit, level control, etc. ... £21 19 0

HI-FI SPEAKER SYSTEM. Model SSU-1. Ducted-port bass reflex cabinet "in the white." Twin speakers. Pedestal Model ... £11 15 0
Bookcase Model ... £10 14 0

HI-FI EQUIPMENT CABINETS. Range available to meet different needs. Details on request. From £11 12 6 to £18 10 0

HI-FI 18W. STEREO AMPLIFIER. Model S-99. Ganged controls. Stereo/Mono gram., radio and tape recorder inputs. Push-button selection. Printed circuit construction ... £26 19 0

HI-FI AM/FM TUNER. Model AFM-1. FM: 88-108 Mc/s; AM: 15-50, 200-550, 900-2,000m. Tuning heart (£5 5 incl. P.T.), and I.F. amplifier (£19 8 0), complete with cabinet and valves; self-powered. Total ... £24 13 6

HI-FI FM TUNER. Model FM-4U. 88-108 Mc/s. Tuning unit (£3 2 0 incl. P.T.), with 10-7 Mc/s I.F. output and I.F. amplifier (£11 11 0), complete with cabinet and valves; self-powered. Total ... £14 13 0

6-TRANSISTOR PORTABLE. Model UXR-1. Pre-aligned I.F. transformers, printed circuit, 7 x 4 in. high-flux speaker. Real hide case ... £14 3 0

SHORTWAVE TRANSISTOR PORTABLE. Model RSW-1. (Four band—two Short, Trawler and Medium) ... £21 6 0



S-99



AFM-1



UXR-1

Deferred terms available over £10

All prices include free delivery U.K.

Assembled model also available

Please send me FREE CATALOGUE (Yes/No)

Full details of model(s).....

.....Deferred Payments (Yes/No).....

NAME (BLOCK CAPITALS)

ADDRESS

..... R.B.7

DAYSTROM LTD.

DEPT. RB7, GLOUCESTER, ENGLAND.

A member of the Daystrom Group,
manufacturers of the
WORLD'S LARGEST-SELLING ELECTRONIC
KITS

Volume 38 No. 1

July 1962

3/- Monthly

R.S.G.B. BULLETIN

CONTENTS

EDITOR:

John Clarricoats, O.B.E., G6CL

DEPUTY EDITOR:

John A. Rouse, G2AHL

EDITORIAL OFFICE:

*R.S.G.B. Headquarters, New Ruskin
House, Little Russell Street, London,
W.C.1.*

Telephone: HOLborn 7373

ADVERTISEMENT MANAGERS:

*Sawell & Sons Ltd.,
4 Ludgate Circus, London, E.C.4
Telephone: FLEet Street 4353*

- 9 Current Comment
- 10 A Case for the Radio Amateur Emergency Network
- 10 Special Events Stations
- 11 The G8PO "Guy Wire" Array. By J. E. Ironmonger, O.B.E. (G8PO)
- 16 Book Review
- 17 Third Method Single Sideband—Part 1. By G. F. Gearing (G3JJG)
- 20 A Stabilized Power Supply for the BC221 Frequency Meter. By Michael J. Humphries (G3LRQ)
- 21 Mobile Column. By C. R. Plant (G5CP)
- 23 The Rig goes Round. By L. Labutin (UA3CR)
- 24 Coventry Cathedral Festival Station
- 25 The Month on the Air. By R. F. Stevens (G2BVN)
- 29 4U1ITU. By Janet Milne
- 30 Single Sideband. By G. R. B. Thornley (G2DAF)
- 31 RTTY. By Arthur C. Gee (G2UK)
- 32 Project Oscar. By W. H. Allen, M.B.E. (G2UJ)
- 33 Four Metres and Down. By F. G. Lambeth (G2AIW)
- 37 Society News
- 38 Council Proceedings
- 39 Silent Keys
- 40 Contest News
- 41 Letters to the Editor
- 44 Forthcoming Events
- 45 Regional and Club News

THIS MONTH'S BARGAINS

AERIAL EQUIPMENT

TWIN FEEDER: 300 ohm twin ribbon feeder, similar K25, 6d. per yard. K35B Telcon (round), 1/6 per yard. Postage 1/6 per length. 75 ohm Twin Feeder, 6d. per yard.

COPPER WIRE: 14G H/D 140 ft., 17/-; 70 ft., 8/6. Post and packing 2/-. Other lengths pro rata.

RIBBED GLASS, 3" aerial insulators, 1/9 each. P. & P. 1/6 up to 12.

CERAMIC FEEDER SPREADERS, 6" type F.S., 10d. each. P. & P. 2/- up to 12.

CERAMIC "T" PIECES, type A.T. for centre of dipoles, 1/6 each. P. & P. 1/-.

2 METRE BEAM 5 ELEMENT W.S. YAGI. Complete in box with 1" to 2 1/2" mast head bracket. PRICE 49/-. P. & P. 3/6.

SUPER AERIAL CABLE. 75 ohm, 300 watts, very low loss, 1/8 per yard. P. & P. 2/-. 50 ohm, 300 watt coax, very low loss, 1/9 yd., P. & P. 2/-.

TOUGH POLYTHENE LINE, type MLI (100 lbs.), 2d. per yd. or 12/6 per 100 yds. Type ML2 (220 lbs.), 4d. per yd. or 25/- per 100 yds., post free. Ideal for Guys, L.W. Supports, Hal-yards, etc.

NEW MOSLEY POWER BEAMS
Write for details.

BAND CHECKER MONITOR



This new, sensitive, absorption wavemeter is fitted with a 0-500 microammeter and is also a most useful phone monitor. Covers 3.5 - 35 Mc/s. in 3 switched bands. A "MUST" AT ONLY 3 Gns.

SCREENED MICROPHONE CABLE, 1st grade, 9d. yard. Plus postage.

12 CORE SCREENED CABLE 2/- yard.

10 CORE (5 PAIRS) SCREENED CABLE 1/8 yard. All plus 1/6 P. and P.

GELOSO V.F.O. UNITS Type 4/102 with new dial and escutcheon. Output on 80, 40, 20, 15 and 10 metres. For 2-807 or 6146 tubes. Only £8.5.0. Set of valves 24/- post free.

ABSORPTION WAVEMETERS: 3-30 to 35-00 Mc/s in 3 Switched Bands, 3.5, 7, 14, 21 and 28 Mc/s Ham Bands, marked on scale. Complete with indicator bulb. A MUST for any Ham shack. Only 22/6, POST FREE.

ROTARY TRANSFORMERS, 12v Input, 490 v, 65 mA, Out. 17/6 each. P. & P. 3/-.

AMERICAN 807 VALVES. Ex W.D. 7/6 each or 4 for 25/- P. & P. 2/-.

SHADED POLE MOTORS, 230 v or 110 v operation, ideal for fans, blowers or models. Single Unit 12/6 plus 2/- P. & P. or Pair £1 plus 2/6 P. & P.

RACK MOUNTING PANELS: 19" x 5 1/2" 7", 8 1/2", or 10 1/2", black crackle finish 5/9, 6/6, 7/6, 9/- respectively, postage and packing 2/-.

VARIABLE CONDENSERS. All brass with Ceramic end Plates and Ball Race Bearings, 50 pf, 5/9; 100-6/6; 160 -7/6; 240-8/6; and 300 pf, 9/6. Extension for ganging. P. & P. 1/-.

★ PLEASE PRINT YOUR NAME AND ADDRESS

CHAS. H. YOUNG LTD.

DEPT. 'B', 110 DALE END, BIRMINGHAM 4
Telephone (all depts.): Central 1635

Z & I AERO SERVICES LTD.

Retail Branch (callers): 85 TOTTENHAM COURT ROAD, LONDON, W.1.

Tel.: LANGHAM 8403

Please send all mail orders and correspondence to our Head Office at: 14 SOUTH WHARF ROAD, PADDINGTON, LONDON, W.2. Tel.: AMBassador 0151/2

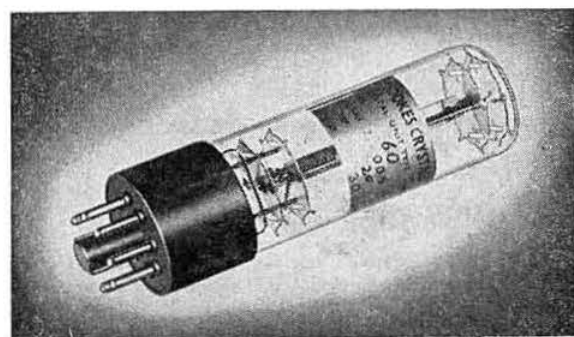
TESTED AND GUARANTEED VALVES										EAT6 .. 7/6 EACB80 .. 8/- EAC91 .. 4/- EAF42 .. 10/- EB21 .. 7/6 EB37A .. 7/- EB41 .. 7/6 EB48 .. 9/- EBF80 .. 9/6 EBF83 .. 12/- EBF89 .. 8/- EBI21 .. 12/6 EC91 .. 3/- EC92 .. 4/- EC94 .. 9/- EC96 .. 7/6 EC97 .. 6/- EC98 .. 8/- EC99 .. 10/- ECH81 .. 7/6 ECL80 .. 7/6 ECL82 .. 8/6 ECL86 .. 11/- EF22 .. 7/6 EF37A .. 7/6 EP29 .. 4/- EPB81 .. 7/6 EPF40 .. 10/- EPF48 .. 9/6 EPF83 .. 12/- EPF89 .. 8/- EPI21 .. 12/6 EP51 .. 3/- EP55 .. 6/- EP80 .. 6/- EP85 .. 6/6 EP86 .. 7/- EP89 .. 7/- EP92 .. 3/6 EP98 .. 10/- EP183 .. 10/- EP184 .. 10/- EL32 .. 4/- EL33 .. 16/- EL34 .. 12/- EL38 .. 15/- EL41 .. 8/- EL42 .. 8/- EL83 .. 7/6 EL84 .. 7/6 EM84 .. 9/6 EN31 .. 10/- EN32 .. 10/- EV51 .. 8/- EY80 .. 9/- EY86 .. 10/- EY91 .. 3/- EZ80 .. 6/- EZ81 .. 7/- GR18 .. 15/- GT10 .. 10/- HL2K .. 3/- HL23DD .. 7/- KT30C .. 10/- KT35 .. 10/- KT41 .. 12/6 KT61 .. 7/- KT62 .. 8/6 KT66 .. 15/- KT67 .. 7/- KT71 .. 10/- KT72 .. 12/6 KT81 .. 12/6 KT86 .. 10/- KT91 .. 10/- KT94 .. 10/- KT97 .. 10/- KT98 .. 10/- KT99 ..									
------------------------------	--	--	--	--	--	--	--	--	--	---	--	--	--	--	--	--	--	--	--

URGENTLY WANTED VALVES TT12 30/- EACH PAID

Postage and Packing 2/6 in £, subject to a minimum of 1/6.

URGENTLY WANTED VALVES TT12 30/- EACH PAID

BROOKES *Crystals*



mean **DEPENDABLE** frequency control

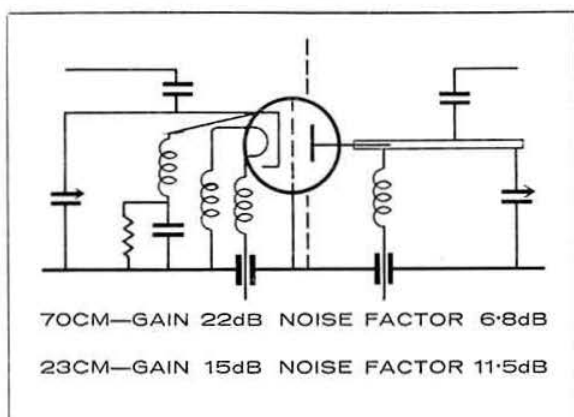
● Illustrated above is a Type O B Crystal unit with a frequency range of 50-110 kc/s. Frequency Tolerance $\pm .005\%$ of nominal at 20° C.

ALL Brook's Crystals are made to exacting standards and close tolerances. They are available with a variety of bases and in a wide range of frequencies. There is a Brook's Crystal to suit your purpose—let us have your enquiry now.



BROOKES CRYSTALS (1961) LTD.
Suppliers to Ministry of Supply, Home Office, B.B.C., etc.
CORNHILL FACTORY, ILMINSTER, SOMERSET
Telephone: Iminster 2402

A2521 **LOW NOISE** 70 and 23CM RF AMPLIFIER



Full details are available on request



The M-O Valve Co Ltd
Brook Green, London W6
Telephone: RIVerside 3431

NEW **TIGER TRANSMITTERS** *

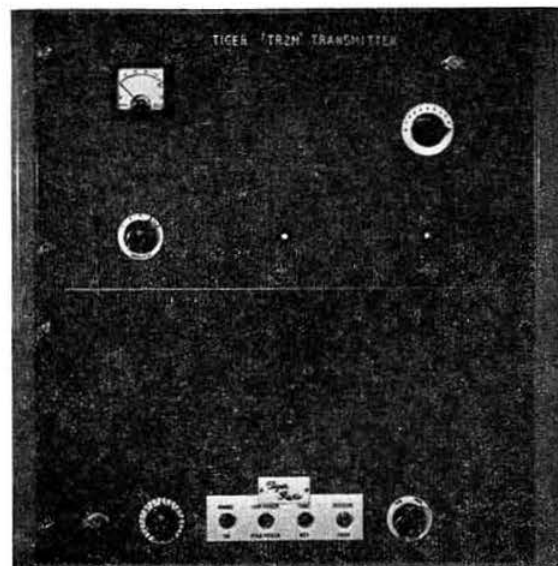


THE TIGRESS 10-80 Metres 6146 PA, KT 77 modulators, compact and simple to operate. 57 Guineas.

NEW RANGE OF ANTENNA COUPLERS 10-80 Metres, 8" x 6½" x 3½". 75 AC—52-80 ohms unbalanced. 300 AC—52-300 ohms balanced. 600 AC—300-1000 ohms balanced. Any type £6 19s. 6d. plus 5/- postage.

WOLFENDALE & HOBDEN trading as
TIGER RADIO LTD., 36A KIMBERLEY ROAD
SOUTHBORNE, BOURNEMOUTH, HANTS.

Telephone: Bournemouth 48792

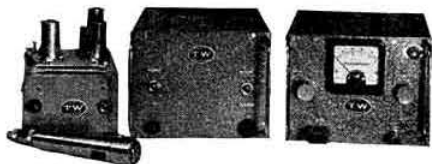


TR 2M—QRO 2 Metre Transmitter QQVO6/40 PA, KT 88 modulators, crystal control. 100 watts input on 5 spot frequencies. 80 Guineas.

RF Section only, in cabinet. 35 Guineas.

TW MEANS V.H.F.

MANUFACTURERS OF V.H.F. EQUIPMENT FOR THE RADIO AMATEUR AND INDUSTRY



This neat Table-Top 2m Station consists of:
THE NUUVISTOR CONVERTER, TW-2 AND P.S.U.

- TW-2 10W TX complete with Mod. 23 gns.
- TW Nuuvistor Converter (You choose I.F.) 11 gns.
- With built-in P.S.U. £15
- TW Mains Supply/Control Unit (All supplies necessary for TW-2 and Converter) 13 gns.
- TW Halo Aerial (Easily mounted) £17.6

- ★ **ALL TRANSISTOR MOBILE RECEIVER**
- "TOP MOBILE" Bandspread 1.8-2.0 mc.
- "TWO MOBILE" Tunable I.F. 4-6 mc. Measures 2 1/2" high, 6" wide, and 6" deep. Available shortly.

BOB LEE | **ORBIS OY** | **STUDIO IV**
U.S.A. | **FINLAND** | **S. RHODESIA**

For full details write to:

T. WITHERS (Electronics)

15b GILBERT STREET, ENFIELD, MIDD.
G3HGE Tel. Waltham Cross 26638 G3HGE

BRITISH NATIONAL RADIO SCHOOL

PRINCIPAL:

Mr. J. SYKES, M.I.E.E., M.Brit.I.R.E.

Britain's only Privately Owned and Conducted
Radio Correspondence School
(Est. 1940)

RADIO AMATEURS' EXAMINATION

There is no time to lose if we are to prepare you for success in the C. & G. examination next October.

Present Fee for the above course **£7-0-0**
but an increase is long overdue, and as from
1st August, the fee will be **£10-0-0**

R.A.E. fully worked exam papers
20/- per set of 8 (post paid)
or 35/- by airmail

Also Morse Code Record 12" L.P. reduced to 30/- or
45/- by airmail. Transistor audio oscillator 35/- or
42/6 by airmail. Morse Keys 10/6 (post paid U.K.).

B.N.R.S.

RED LION COURT, STALBRIDGE, DORSET

Tel.: Stalbridge 498

(formerly 20 years at Croydon)

Brand new, individually
checked and guaranteed

VALVES

AL60 .. 6/-	EBC90 .. 5/-	EZ40 .. 7/-	PV32 .. 12/-	Y66 .. 8/-	604 .. 2/6	7H7 .. 7/3	S2 .. 8/-	8013A .. 25/-
AR8 .. 5/-	EC52 .. 8/-	EZ41 .. 6/9	PV80 .. 7/-	Z51 .. 6/-	605GT .. 6/-	7C6 .. 7/3	83V .. 8/-	8020 .. 10/-
ARD55 .. 2/-	EC70 .. 19/-	EZ80 .. 6/-	PV81 .. 7/-	Z51 .. 6/-	606 .. 3/-	7C7 .. 6/6	84 .. 8/-	9001 .. 3/-
AR2 .. 3/-	EC90 .. 20/-	EZ81 .. 6/9	PV82 .. 8/-	1A5GT .. 5/-	608G .. 5/-	7G7 .. 7/-	85A1 .. 9/-	9002 .. 5/6
AR4 .. 3/6	EC91 .. 3/-	FW4500 .. 6/6	PV83 .. 7/3	1C5GT .. 7/6	6D6 .. 4/-	7V7 .. 5/-	85A3 .. 15/-	9003 .. 6/-
AR12 .. 3/-	EC981 .. 5/6	GI201/B .. 9/-	PZ1-35 .. 9/-	1D8GT .. 6/-	6F5 .. 5/-	7Y4 .. 6/-	89 .. 6/-	9004 .. 2/6
AR121 .. 5/6	EC982 .. 6/6	GL450 .. 10/-	Q21 .. 6/-	1E7G .. 7/6	6F6GT .. 5/8	7Z4 .. 4/6	210VPT .. 6/-	9005 .. 2/6
AR124 .. 3/6	EC983 .. 7/-	GL464A .. 10/-	Q22 .. 5/3	1G6GT .. 6/-	6F7G .. 4/-	8D2 .. 2/6	220TH .. 8/6	Cathode Ray
AR134 .. 4/-	EC984 .. 7/-	GU20/21 .. 40/-	Q25 .. 6/9	114 .. 3/6	6F7 .. 5/-	9D2 .. 3/-	350B .. 8/-	Tubes:
ATP4 .. 2/9	EC985 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F8G .. 5/-	12A6 .. 2/6	393A .. 15/-	ACR1 .. 15/-
ATP7 .. 5/6	EC986 .. 4/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F9 .. 5/-	12A7 .. 2/6	705A .. 15/-	ACR11 .. 15/-
AU1 .. 5/-	EC987 .. 8/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F10 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
AU4 .. 5/-	EC988 .. 7/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F11 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
AW3 .. 4/-	EC989 .. 7/9	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F12 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
AZ31 .. 5/-	EC990 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F13 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
844A .. 5/6	EC991 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F14 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
BT45 .. 15/-	EC992 .. 7/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F15 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
BT-B .. 20/-	EC993 .. 3/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F16 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
BT83 .. 22/6	EC994 .. 4/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F17 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
CV54 .. 3/-	EC995 .. 2/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F18 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
CV264 .. 20/-	EC996 .. 3/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F19 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
CY31 .. 7/6	EC997 .. 5/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F20 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
D41 .. 3/6	EC998 .. 4/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F21 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
D77 .. 4/3	EC999 .. 6/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F22 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DA30 .. 12/6	EC1000 .. 5/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F23 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DA70 .. 35/-	EC1001 .. 6/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F24 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DAF91 .. 8/-	EC1002 .. 7/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F25 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DAF96 .. 7/6	EC1003 .. 7/9	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F26 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DD41 .. 4/-	EC1004 .. 3/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F27 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DD79 .. 15/-	EC1005 .. 3/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F28 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DDT19 .. 3/6	EC1006 .. 5/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F29 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DDT20 .. 2/-	EC1007 .. 3/9	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F30 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DF30 .. 4/-	EC1008 .. 3/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F31 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DF72 .. 7/6	EC1009 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F32 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DF91 .. 4/-	EC1010 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F33 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DF96 .. 7/6	EC1011 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F34 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DK96 .. 7/3	EC1012 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F35 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DL92 .. 6/-	EC1013 .. 4/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F36 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DL96 .. 6/-	EC1014 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F37 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
DL96 .. 8/-	EC1015 .. 9/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F38 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
EA50 .. 1/6	EC1016 .. 15/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F39 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
EAB80 .. 7/3	EC1017 .. 7/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F40 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
EAC91 .. 6/-	EC1018 .. 6/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F41 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
EAC91W .. 7/6	EC1019 .. 6/6	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F42 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
ER34 .. 3/6	EC1020 .. 6/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F43 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
ER91 .. 3/9	EC1021 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F44 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
EBC33 .. 7/-	EC1022 .. 8/-	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F45 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-
EBC41 .. 7/9	EC1023 .. 3/8	HL23DD .. 8/-	Q875/20 .. 6/9	11D5 .. 5/-	6F46 .. 5/-	12A7T .. 5/6	715B .. 60/-	CV855 .. 15/-

MANY OTHERS IN STOCK include Cathode Ray Tubes and Special Valves

U.K. orders below 10/- P. & P. 1/-; over 10/- 2/6; even less, & P. free. C.O.D. 2/6 extra. Overseas Postage extra at cost

P. C. RADIO LTD.
170 GOLDHAWK ROAD, W.12
SHEPHERDS Bush 4946

Radio Society of Great Britain

(Incorporated 1926)

PATRON

H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH, K.G.

COUNCIL 1962

President

E. G. INGRAM, GM6IZ

Immediate Past President

Major-General E. S. COLE, C.B., C.B.E., G2EC

Executive Vice-President and Honorary Treasurer

N. CAWS, F.C.A., G3BVG

Ordinary Elected Members

C. H. L. EDWARDS, A.M.I.E.E., A.M.Brit.I.R.E., G8TL R. C. HILLS, B.Sc.(Eng.), A.M.Brit.I.R.E., G3HRH A. O. MILNE, G2MI
L. E. NEWNHAM, B.Sc., G6NZ R. F. STEVENS, G2BVN G. M. C. STONE, A.M.I.E.E., A.M.Brit.I.R.E., G3FZL
J. W. SWINNERTON, T.D., B.Sc.(Econ.)(Hons.), A.I.L., G2YS

Zonal Representatives

H. A. BARTLETT, G5QA

F. K. PARKER, G3FUR
A. C. WILLIAMS, GW5VX

A. D. PATTERSON, G13KYP
E. W. YEOMANSON, G3IIR

P. H. WADE, G2BPI

General Secretary and Editor

JOHN CLARRICOATS, O.B.E., G6CL

Deputy Editor

JOHN A. ROUSE, G2AHL

Assistant Secretary

MAY GADSDEN

REGIONAL REPRESENTATIVES

Region 1.—North Western. B. O'Brien (G2AMV), 1 Waterpark Road, Prenton, Birkenhead, Cheshire.

Region 2.—North Eastern. J. R. Petty (G4JW), 580 Redmires Road, Sheffield 10, Yorkshire.

Region 3.—West Midlands. W. A. Higgins (G8GF), Kingsley Road, Kingswinford, nr. Brierley Hill, Staffs.

Region 4.—East Midland. E. C. Ward (G2CVV), 5 Uplands Avenue, Littleover, Derby.

Region 5.—Eastern. S. J. Granfield (G5BQ), St Luke's, 47 Warren Road, Cambridge.

Region 6.—South Central. L. W. Lewis (G8ML), 34 Cleavelands Avenue, Cheltenham, Gloucestershire.

Region 7.—London. P. A. Thorogood (G4KD), 35 Gibbs Green, Edgware, Middlesex.

Region 8.—South Eastern. Norman D. Mattock (G2DFG), 70 Bouverie Road West, Folkestone, Kent.

Region 9.—South Western. R. E. Griffin (GSUH), 13 Alexandra Road, Uplands, Bristol 3.

Region 10.—South Wales. C. H. Parsons (GW8NP), 90 Maesycoed Road, Heath, Cardiff, Glam.

Region 11.—North Wales. Robert Jones (GW3JI), Beirut, Albert Drive, Deganwy, Caernarvonshire.

Region 12.—East Scotland. A. G. Anderson (GM3BCL), "Helford," Piffodells, Aberdeen.

Region 13.—South-East Scotland. G. P. Millar (GM3UM), 8 Plewlands Gardens, Edinburgh 10.

Region 14.—West Scotland. D. W. R. Macadie (GM6MD), 154 Kingsacre Road, Glasgow, S.4.

Region 15.—Northern Ireland. J. William Douglas (GI3IWD), 54 Kingsway Park, Cherryvalley, Belfast.

Region 16.—East Anglia. P. J. Naish (G3EIX), 6 Mildmays, Danbury, Chelmsford, Essex.

Region 17.—Southern. M. P. Nicholson (G2MN), 80 South Leigh Road, Warblington, Havant, Hants.

The annual subscription rates to the R.S.G.B. are as follows: Corporate Members, Home and Overseas—35/- (\$5 U.S. or Canadian). Associate Members under 21 years of age—15/-. Application forms may be obtained from Headquarters on request.

SEE and HEAR



the
imaginatively
designed

MOSLEY CM-1 receiver

- First low priced receiver with double conversion and crystal controlled first oscillator.
- First receiver with 5 dual-purpose valves of one type and 4 semi-conductor diodes which perform all functions usually requiring 12 or more valve sections.
- First low priced receiver with selectivity, sensitivity and stability that equals receivers selling for UPWARDS OF £50 MORE.

FEATURES and PERFORMANCE:

Diode detector for a.m. and product detector for s.s.b. and c.w.

Calibration every 5 kc. WWV reception at 15 Mc.

Sensitivity: 2.5 kc. at -6 db. Automatic noise limiter.

Selectivity: $\frac{1}{2}$ microvolt for 10 db. signal-to-noise ratio on ten metres.

Stability: Less than 500 cycles drift after one-minute warm-up.

Less than 200 cycles change for 10% line voltage change.

Image and i.f. rejection: 35 db. minimum.

Power consumption: 33 watts. (230 volts a.c., 50 to 60 c.p.s.)

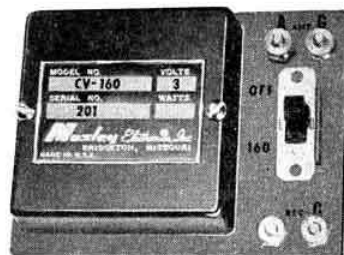
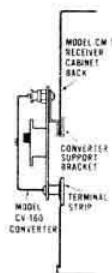
Rear chassis accessory facilities: Transmitter relay terminals, accessory power socket, external speaker/VOX terminals.

Write for complete descriptive brochure and the name of the dealer handling the CM-1 in your area.

Net Price £86. (All crystals included).



15 Reepham Rd., Norwich, Norfolk



New! MOSLEY 160 METRE CONVERTER Model CV-160

Converts the 160 metre band, 1750-2000 kc. for reception on most 80 metre band receivers. Transistorized, crystal controlled, printed circuit and self powered.

Designed to attach directly to rear of the Mosley CM-1 and adaptable to most other receivers.

Net Price £7. 10. 0.

"Worlds Leading Manufacturer
of Amateur Radio Aerials"

Current Comment

discusses topics of the day



Society Publications

IT seems a very far cry to the time when the Society's one and only publication was the T. & R. BULLETIN. In the 37 years that have elapsed since J. A. J. Cooper, Gerald Marcuse and Bevan Swift launched the first 12 page issue Amateur Radio has made tremendous progress.

Initially the BULLETIN was the official publication of the old T. & R. Section and its title page carried the words "Devoted to the interests of the Transmitting Amateur." Following fusion in 1926 between the T. & R. Section and the main body of the Society, the BULLETIN gradually assumed a wider outlook but it has always remained true to the aims of those who founded it, namely to meet the demand for up-to-date information and to provide a medium for the expression of opinion.

The beginning of a new volume—as is the case with this issue—affords an opportunity to take stock briefly of what has been achieved in past years and look a little into the future.

During the first 14 years of its existence—from July 1925 to September 1939—the BULLETIN reflected faithfully each new development as it took place. The introduction of the crystal-gate, highly selective, superheterodyne communications receiver, the use of the quartz crystal as a means of achieving stable frequency control, improvements in the technique of measuring frequency and the coming of the fixed, and later the rotary, beam aerial were but a few of the outstanding developments that were reported upon in early issues of the BULLETIN.

In those days too, there was in existence within the Society that most virile of all sections—Contact Bureau—which, led by such eminent amateurs as T. Palmer Allen (G16YW) and H. J. Powditch (G5VL) helped materially to raise the technical status of the Society to a very high level. In later years, H. Cecil Page (G6PA), J. C. Elmer (G2GD) and A. M. Houston Fergus (G2ZC) undertook the leadership of Contact Bureau and its successor, the Research and Experimental Sections. The work reported upon by members of Contact Bureau and of the Research and Experimental Sections covered a wide range of subjects, of which the contributions made by Denis Heighman (G6DH) were outstanding. It was he who postulated propagation theories which aroused the attention of such eminent men of science as Professor (now Sir) Edward Appleton. In the field of 28 Mc/s DX communication, the pioneer work done by J. W. Mathews (G6LL), F. Rodman (G2FN) and Nell Corry (G2YL), to mention only three names, aroused world-wide interest.

Throughout this period the BULLETIN published a great many descriptions of home constructed equipment, much of which would hold its own even today, albeit the modern amateur station is generally more compact and more "commercial" in appearance.

Pre-war issues of the Society's journal were notable for their size. Volume 14 (July 1938 to June 1939), for example, ran to 768 pages—an average of 64 pages per issue, compared with the 616 pages that went to make up the volume just completed.

District Notes and News, the publication of which aroused the ire of some members who thought the space should be used for more constructional articles, nevertheless provide us today with much valuable historical information about what was going on at the time.

It is not generally known, even now, that when the war started in September 1939 one of the first tasks undertaken by the depleted Headquarters staff was to provide the powers-that-be with names of members who had, during the preceding few years, experimented with 5m equipment. The knowledge acquired from the BULLETIN by such members—who were amateurs in the full sense of the word—stood the country in good stead.

Each succeeding pre-war volume of the BULLETIN told the story of Convention, of the B.E.R.U. Contest, of the Loyal Relay to the Society's then Patron, H.R.H. The Prince of Wales (now the Duke of Windsor), of National Field Day and a host of other events as they came into being. They make interesting reading today, as do accounts of the establishment of the Empire Link Station network, of the Royal Naval Wireless Auxiliary Reserve and of the Royal Air Force Civilian Wireless Reserve, all of which were highlights in the history of the Society.

In pre-war years the Society, with its limited resources, had to tread warily in the publishing field, in fact, looking back now it is difficult to believe that the Society's present very flourishing technical publications business began in 1929 with a four page leaflet which described the Aims and Objects of the Society. This led, in 1930, to the publication of the first edition of *What is Amateur Radio*—a 24 page pocket-size booklet. Two further editions followed in 1931 and 1932 and then, in 1933, came the Society's first real experiment in technical publishing—*A Guide to Amateur Radio* appeared. For five years in succession a new edition made its debut on the Society's stand at Radiolympia. The first edition ran to 48 pages, the second to 76 pages, the third to 96 pages, the fourth to 128 pages and finally the fifth—in 1937—to 164 pages—and all for sixpence! Is it to be wondered at that more than 9,500 copies of that famous edition with its "blueprint" cover were sold on the

Society's stand in 10 days and that a total of 12,000 copies went within a month of publication?

The success of *The Guide* led to the decision to publish an *Amateur Radio Handbook* the first edition of which, running to 5,000 copies and 300 pages, appeared in December 1938. It sold for half a crown! A second printing of 3,000 copies was delivered to R.S.G.B. Headquarters in Victoria Street on the Saturday before war was declared! It is history now that those 3,000 copies were sold in no time at all and that before the type of the revised Second Edition was broken up after the 12th printing had appeared in February 1946 no less than another 181,500 copies had been sold at 3s. 6d. a copy, to say nothing of five printings, totalling 115,000 copies, of a 164 page *Handbook Supplement* which appeared between March 1942 and May 1946. The fact that the Society today possesses assets worth £15,000 is due almost entirely to the outstanding success of the war time edition of the *Handbook* and its companion *Supplement*.

Since the war the publications side of the Society's work has developed by leaps and bounds. First to arrive were the pocket booklets—covering such subjects as *Microwave Technique*, *Valve Technique*, *V.H.F. Technique* and *Receivers*—which were intended to fill the gap until a new edition of the *Handbook* could be produced. Then came the *R.S.G.B. Amateur Radio Call Book* (ten editions of which have now appeared) followed by four new editions of *A Guide to Amateur Radio*, *The Morse Code for Radio Amateurs* and *The*

Radio Amateurs' Examination Manual came later and both were produced for the benefit of those who aspire to obtain a transmitting licence.

An entirely new venture—*Radio Data Reference Book*—is now in course of preparation but this and all other publications must surely take second place to the third edition of the *Handbook* which made its bow last November. Unfortunately the good old days when the Society could offer a 320 page *Handbook* for a few shillings have gone (doubtless for good) but it is gratifying to know that nearly 10,000 copies of the new *Handbook* have already been sold. This month, as an experiment, the Society is sending to every secondary school in the United Kingdom an appraisal of the *Handbook* and an invitation to the Science Master at each school to requisition a copy for his library.

During the course of this new volume the size of the *BULLETIN* will be increased from the present 48 pages to 64 pages. To provide material for these larger issues more and more members must be prepared to offer contributions. As recorded earlier it was commonplace before the war to publish 64 pages each month. It would indeed be unfortunate if today with a membership approaching 12,000 the Society should find itself short of technical material. As an inducement, the amount of the copyright fee paid to contributors will now be from £2 2s. 0d. to £5 5s. 0d. per 1,000 words at the discretion of the Editor, with the highest rate being paid for first class technical articles.

J. C.

A Case for the Radio Amateur Emergency Network

A VIEW quite widely held is that whilst something may be said for the Radio Amateur Emergency Network in areas such as the East Coast of England where severe flooding has occurred in the past, there is little need for it elsewhere. Such an opinion is rather immature. There are areas in this country where, although natural disasters are considered unlikely, such things as aeroplane crashes, train smashes, explosions, etc., have happened with numerous casualties and loss of life. When something of this kind occurs very heavy demands are made upon the available channels of communication. Telephonic communication may be impossible due to the absence of landlines. These may not exist at or near the scene of the disaster or they may have been destroyed as a result of it.

In these circumstances the sole means of communication may be by a radio network set up by the police. Even if normal landline communication is available the police network will be established and both this and the landline(s) will be hard-pressed to handle the traffic between the scene and ambulance depots and hospitals.

Police forces have efficient radio systems including large numbers of "mobiles" but messages must of necessity be passed through their "Information Rooms," generally via a central repeater station. Experience shows that police radio traffic during a major incident rises to an extremely high level embracing not only priority messages to ambulance and hospital services but also enquiries from anxious relatives to say nothing of the press and radio.

To cater for the rare occasion of a catastrophe by enlarging the existing system sufficiently to handle it would be quite uneconomical but R.A.E.N. can provide an additional channel if consideration of the conditions in any particular

area points to the need for it. Several police forces have in fact already welcomed the formation of R.A.E.N. groups for the specific purpose of co-operating with them during an emergency. In some instances facilities have been provided for establishing a station at Police Headquarters and exercises with police participation are held from time to time. Amateur mobile stations are of particular value in such areas as they can be stationed at the scene of the disaster and at various hospitals as the authorities may request.

By joining one of these groups or by helping to form one where there is need amateurs can indulge their hobby and at the same time give a useful service to the community. Such groups must be efficient and reliable, carrying out serious exercises with police participation from time to time. It is a service well worth doing.

C. M. D.

Special Events Stations

LIVERPOOL and District Amateur Radio Society will be operating GB2LS 24 hours a day on July 19, 20 and 21 at the annual Liverpool Show. Activity will be on all bands from 10-160 metres, using c.w. and a.m. Liverpool Corporation has donated special QSL cards which will be used to confirm all contacts. QSL cards for GB2LS should be sent via the R.S.G.B. QSL Bureau or to H. James (G3MCN), 448 East Prescott Road, Knotty Ash, Liverpool 14.

GB2CHS will be in operation on 10-160m on c.w., a.m. and single sideband at the Castle Bromwich Horticultural Show on July 31 and August 1. The operators will be G2AGK, G2FLY and G3PBQ.

GB3KEC will be active from July 28 to August 9 in connection with a course entitled "Introducing Electronics" for science teachers at the Kent Education Committee's Folkestone Summer School. The instructors will be G3FCT and G3LCK.

The G8PO "Guy Wire" Array

An Experimental Multi-band Aerial System, including a High Gain Fixed Reversible Quad for 14 Mc/s

BY COMMANDER J. E. IRONMONGER, O.B.E., R.N. (G8PO)*

OVER the past year the writer has been experimenting with various forms of aeriels mainly in an effort to find an arrangement which would:

- (a) Give considerable gain on 14 Mc/s, with a unidirectional pattern, capable of reversal.
- (b) Allow experimental operation on all bands from 3.5 to 28 Mc/s.
- (c) Fit into the average suburban garden.
- (d) Be acceptable to neighbours.
- (e) Be capable of withstanding severe gales.

Items (d) and (e) above were found to be the most difficult: to disguise a beam such that it is acceptable to ones neighbours is tricky! To make it stand up to the s.w. gales on the South Coast is also a considerable feat. As can be seen from Fig. 1, the "Guy Wire" array was found to be the answer at G8PO.

General Description

The aerial arrangement detailed in Fig. 1 shows the fixed reversible three element quad for 14 Mc/s. Also shown are the methods of providing experimental operation on the 3.5, 7, 14, 21, and 28 Mc/s bands, using the metal mast and parasitic elements. In practice, the quad would appear to have a gain of 7db or more and a front-to-back ratio better than 30db. It may be of interest that the use of "diamonds" as opposed to squares does not appear materially to degrade the performance. The beam width is found to be quite considerable; fixed in a north-east and south-west direction adequate low angle coverage has been achieved from VP8 around to W4 in one direction, and from KR6 to VS9 in the other.

The centre height of the arrangement depicted is approximately 28 ft. above ground and results are considered satisfactory for this relatively low level. Many hundreds of VK/ZL phone contacts have been made over both routes and the ratio of replies to DX calls made is about 80 per cent, indicating a relatively outstanding signal in the path of the beam.

To allow ease of reversal of the beam, three elements are used plus "remote" tuning stubs on the parasites. Such an arrangement may appear over complicated, but in practice has proved to be superior to any other fixed reversible version which the writer can devise. It is considered that the main advantages of a three element quad over a two element type are:

- (a) The lower angle of radiation when erected at the same height.
- (b) The higher front-to-back and front-to-side ratios.

Experimental operation on the bands 3.5 to 28 Mc/s is achieved as described later. Whilst results are in no way outstanding on these bands, it is considered that a compromise facility is better than none at all and, therefore, where space is restricted, use should be made of the mass of wire forming the quad to allow experimental radiation on frequencies other than 14 Mc/s. Even though numerous feed lines are used to achieve this, such an arrangement

is considered to be justified in the interest of a compact, single mast, back garden type array.

Operational Data

The 14 Mc/s Three Element Quad

The centre "diamond" of the array is fed with 52 ohm coaxial cable via a "gamma" match and no difficulty has been experienced in obtaining a very low s.w.r. Fortunately, this method of feed also takes care of the unbalanced to balanced connections. The spacing between the diamonds is shown as 9 ft. but this is not critical and could be reduced to, say, 6½ ft. without too adversely affecting forward gain.

The "remote" stubs are attached to the bottom corners of the parasitic diamonds as shown. They perform four useful functions:

- (a) Resonate the elements *in position*.
- (b) Allow low-loss reversal of the system at ground level.
- (c) Provide a means of using the 14 Mc/s parasitic element as radiators on other bands.
- (d) Tether the bottom corners of the diamonds to the ground and allow correct adjustment of shape and spacing of the array.

It will be appreciated that the electrical state that exists at the bottom corners of the parasitic elements will be repeated at the remote half wave points along the open wire lines. Thus stub adjustments can be made around these positions, with ease, at ground level. The reflector state will be achieved with a "short" approximately 3 ft. longer than the half wave point, whilst the director condition will be found about 3 ft. shorter than the half wave point. The latter condition is most advantageous compared to using the normal *open* director stub close up to the element; moving a "short" is much easier than snipping small lengths off a line.

The remote stubs are made in miniature fashion from bare wire and small terminal blocks or spacers, resulting in a line separation of about 1 in. They are 38 ft. long and arranged as shown in Fig. 1. The half wave repetition points along the open wire lines are clearly marked for reference. Large metal terminals are used to bridge the lines as these ensure a very satisfactory short circuit, while being easily adjustable.

To reverse the beam, the short circuits on the remote stubs are interchanged. To overcome the need for two shorting-bar changes, both reflector shorts can be left permanently in position, only the director short requiring to be moved to the line and element which it is desired to tune as a director. This is possible because the short circuit nearest to the parasitic element becomes the active one—i.e. the "reflector" short on the director stub is rendered inoperative.

Change of directivity at G8PO is achieved by physically moving over the director short from one remote stub to the other. Control from the shack via relays can, however, be easily arranged. Closing both director shorts will make the array bidirectional, with some loss of gain and a higher s.w.r. The keen experimenter could possibly devise a means of making the shorts adjustable over, say, 18 in. of stub with a

* 15 Monks Way, Hill Head, Hants.

number of relays—or even a form of motor driven short. VK3WC has achieved such an arrangement on a conventional three element quad by using servo operated capacitors across the parasitic stubs.

The question of weather affecting the tuning properties of the remote stubs will no doubt be of interest to readers. In practice, a slight detuning does take place when the array is wet but reduction in forward gain is found to be negligible; front-to-back changes can easily be corrected by resetting the short circuits should this be considered worth while. Snow and ice on the remote stubs has not been experienced but would obviously produce some detuning of the array.

"Side Fire" Verticals for 14 Mc/s

To obtain coverage off the sides of the quad, use can be made of the parasitic elements and their remote stubs, together with the metal mast, to form three three-quarter wave verticals as detailed in Fig. 1. It will be seen that connections can be made to the parasitic element remote stubs (after the reflector shorts) without in any way detuning the 14 Mc/s quad. The remote stubs are connected end to end with an additional 33 ft. of conductor, the centre of which is connected to a convenient point on the metal mast and at that point fed via a "gamma" match and coaxial line. In spite of the strange configuration at ground level, results indicate that the system tends to operate as three close spaced verticals. The low level horizontal portions appear to contribute little to the pattern, merely "inefficiently"

connecting the gamma match to the base of the "verticals" and the mast.

Whilst little or no gain can be claimed for such an arrangement, the fact that it allows all-round coverage with a fixed quad is considered very worth while. In the writer's case ZS, VQ4, VE7 and KH6 contacts could not be made with the quad; by using the "verticals" QSO's became possible. Checks against other stations using verticals indicate this compromise "side fire" system to be equal to a ground plane in most directions; however, the horizontal pattern is somewhat "oval" with maximum radiation off the sides of the quad and this is of course an advantage when used in conjunction with the 14 Mc/s quad.

Verticals for 3.5 and 7 Mc/s

The main mast and yard-arm are of metal construction and well bonded to ensure electrical continuity. Thus, by standing the base on some form of insulator (e.g. Bakelite or asbestos), the mast can be fed against ground with 52 ohm coax and used as a vertical radiator. The height of the mast is 44 ft. and this, plus the top loading of the yard-arm and quad, gives approximately quarter wave resonance and a good match on 3.5 Mc/s.

As mentioned earlier, for "side fire" use on 14 Mc/s the ends of the quad remote stubs are paralleled with the metal mast and there gamma fed. Whilst this does not appear to effect operation on 3.5 Mc/s, fortunately it does allow operation on 7 Mc/s, due to the additional wire looking like

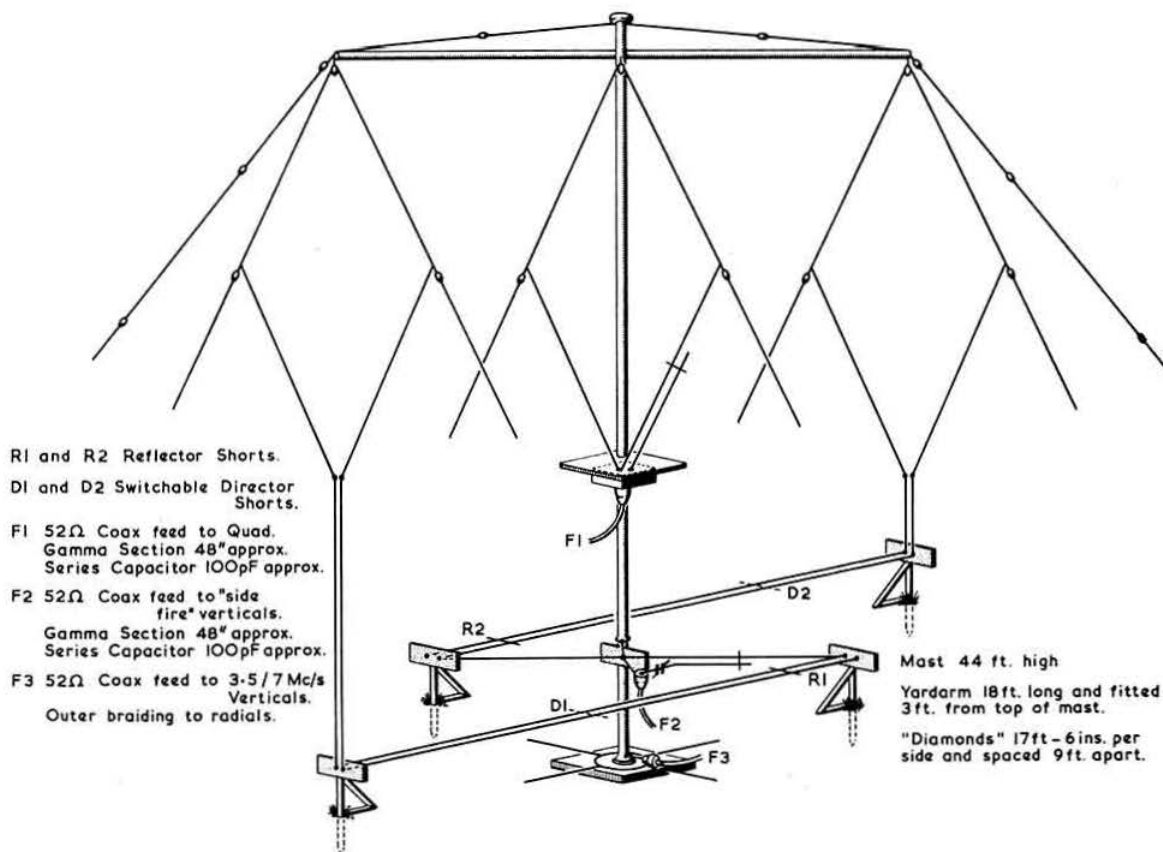


Fig. 1. The "Guy Wire" array.

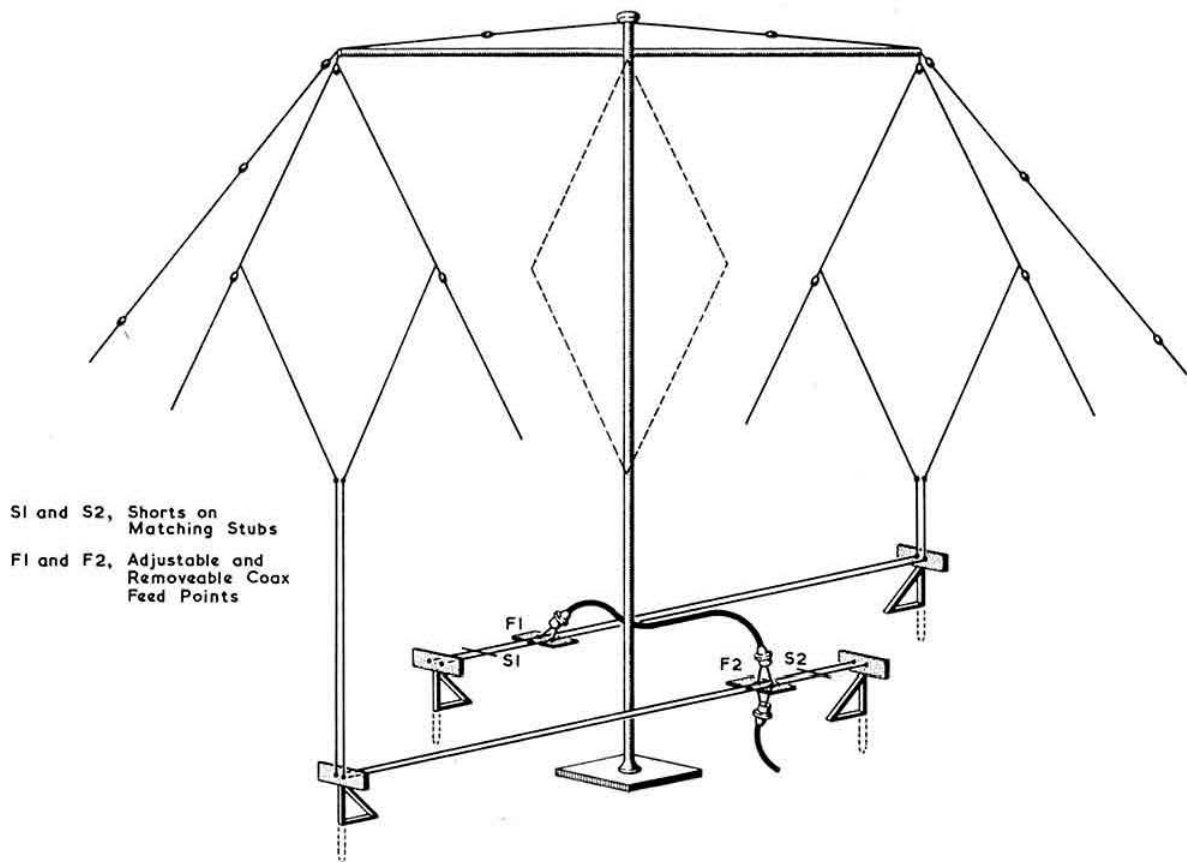


Fig. 2. Multi-band general purpose feed arrangements.

two parallel three-quarter wave elements at this frequency. It has not been found necessary in practice to disconnect the 14 Mc/s "side fire" feeder when operating on 3.5/7 Mc/s or vice-versa. Thus dual operation is available on 3.5 and 7 Mc/s via the base feed. Agreed, such an arrangement is basically a mass of paralleled wires, however, the majority of it is vertical and results prove it to be a satisfactory low angle radiator. On both 3.5 and 7 Mc/s many QSO's on c.w. and s.s.b. have been made with VK, ZL and W. Results for inter-G working, however, proved unsatisfactory and other forms of high angle radiator are recommended for shorter distances—means of achieving this are considered later. Operation on 1.8 Mc/s has not been tried but may prove practical, particularly with a base loading coil.

Parasitic Elements as Multi-band General Purpose Radiators

It will be appreciated, that if the driven element of the 14 Mc/s quad is neglected and the short circuits removed from the remote stubs, considerable use can then be made of the parasitic elements as effective radiators on other bands. Fig. 2 indicates the feed arrangements that allow this to be achieved.

Operation on 7 Mc/s

The main requirement on 7 Mc/s (in view of a low angle radiator being readily available in the form of the main mast) is for an efficient high angle radiator. Fortunately, the parasitic elements are half wave loops at this frequency and

as detailed in the *A.R.R.L. Antenna Book*, give maximum radiation from a point opposite to where they are fed—thus high angle radiation results. Radiation does of course take place at angles other than the extreme vertical and good general coverage can be obtained—however, the vertical radiator will be found superior for DX.

To allow the required voltage feed to the half wave loops, shorts are fitted about 38 ft. from the elements on the remote stubs; this automatically produces two quarter wave matching sections to which can easily be connected a low impedance feeder. As detailed in Fig. 2, a 52 ohm coaxial line is connected approximately 5 ft. up from the short on one-quarter wave section and the feedline then extended by a half wave of coaxial to a similar point on the other matching section.

"In Phase" connections between the matching sections give the best results for inter-G working, i.e. with a half wave of coaxial (44 ft.) as the phasing section, one pair of connections requires to be transposed. It was hoped that out-of-phase connections would give results similar to a W8JK beam, but unfortunately two "out of phase" half wave loops do not appear to respond as well as two horizontal dipoles similarly spaced. Nevertheless readers may like to experiment with different phasings between the half wave loops. The spacing detailed is about one-eighth wave on 7 Mc/s, and fed out-of-phase with the interconnecting line reduced to one-eighth wave, a switchable unidirectional pattern may be achievable. Allowance for the presence of the 14 Mc/s driven element must of course be made and this

may be one of the reasons why only the in-phase connection gave satisfactory results when tried at G8PO.

Operation on 14 Mc/s

The 7 Mc/s arrangement just described can, without further adjustment, be used as a well-matched bi-directional low angle system on 14 Mc/s. This results from the fact that (a) the parasitic elements become full wave loops on 14 Mc/s and require current feeding, (b) the remote stubs become half wave and give the desired feed without change of low impedance feeder tapping points or short positions. The vertical angle of radiation from a full wave loop is maximum at 90° to that from a half wave loop, so that low angle radiation results on 14 Mc/s as opposed to high on 7 Mc/s.

The same section of interconnecting line between the stubs is still used and becomes full wave at this frequency. The in-phase connections for 7 Mc/s (via transposition) are not changed and become out-of-phase on 14 Mc/s—this appears to give the best results. Reports and checks against the three element quad indicate that this driven wide spaced arrangement has considerable gain. The lack of front-to-back ratio is of course a great disadvantage on reception and the three element quad is much preferred. However, readers will readily appreciate the possibilities of developing a multi-band aerial system around a "two element driven quad" and proposals are detailed later. As outlined for the 7 Mc/s system, various phasings between the loops are worthy of trial, particularly if the system is developed around two elements only.

Operation on 21 Mc/s

Once again, without change of matching arrangements, the parasitic elements can be used on this band. This is possible because (a) the elements are $1\frac{1}{2}$ wave and require voltage feed, (b) the stubs are three-quarter wave and produce voltage at the points of connection to the radiators. The interconnecting or phasing line becomes $1\frac{1}{2}$ waves long, resulting in "in-phase" feed if no change is made from the 7 Mc/s and 14 Mc/s settings. This phasing appears to give the best general results and efforts to produce a switchable unidirectional pattern have been unsuccessful—the third element perhaps once again upsets things, plus too wide a spacing and $1\frac{1}{2}$ wave elements. Nevertheless, the system is an efficient, well-matched radiator on 21 Mc/s and equal if not superior to a dipole.

Operation on 28 Mc/s

Tests on 28 Mc/s indicate that the same matching arrangements are acceptable, the s.w.r. being of a low order. Due to prevailing conditions few contacts have been made; however, indications are that the system will prove effective. Ideally, of course, the top corners should be open circuited and the bottom corners voltage fed, otherwise the half wave elements of the array are incorrectly phased to give a high gain directive pattern. In the interest of simplicity, and to retain a multi-band facility, the writer recommends the same feed arrangements for 28 Mc/s as on the other bands.

General

To utilize the parasites as multi-band radiators it is of course essential

to remove all the 14 Mc/s short circuits from the remote stubs and re-position them as detailed for 7 Mc/s. This may appear a tedious process, but due to being carried out at ground level, normally takes less than 2 minutes, even in the rain. So many additional experimental facilities are provided by these shorting bar changes, that the writer considers them more than worth while.

From the foregoing, it will be appreciated that when rigged as a multi-band system, the three element 14 Mc/s quad, 14 Mc/s "side fire" and 3.5/7 Mc/s verticals are rendered inoperative, repositioning of the 14 Mc/s shorts and detachment of the coaxial feeders from the remote stubs being necessary to return to the basic guy wire array. By using different configurations of remote stubs or relays, readers may be able to devise some form of quick change-over method, should this be desired.

It will be seen that "bazookas" or unbalance to balance connections have been omitted in all the above arrangements; no detrimental effects are, however, apparent. The incorporation of such devices would of course prohibit the multi-band facilities and is therefore not recommended.

Hints on Construction

At G8PO the array stands on a plot 70 ft. by 80 ft.; the following points on construction indicate how this has been achieved and may be of general interest to would-be users.

(i) If three ground tethering points are not available either side of the yard-arm, bamboo or dowel type spreaders can be used as shown in Fig. 3. The centre diamond's guys should be very strong and permanently secured to ground. The spreader or "equilateral triangle" guys should be separately fastened to the same ground points. The spreader guys do not require to be as strong as the centre diamond guys and plastic clothes line has been found most satisfactory—a break in these guys will not let the mast fall, just the parasitic elements of the quad.

(ii) The main guys, fore and aft on the yard-arm, should be broken every 6 ft. with insulators.

(iii) The 14 Mc/s diamonds can be permanently attached to the yard-arm via insulators and made part of the main

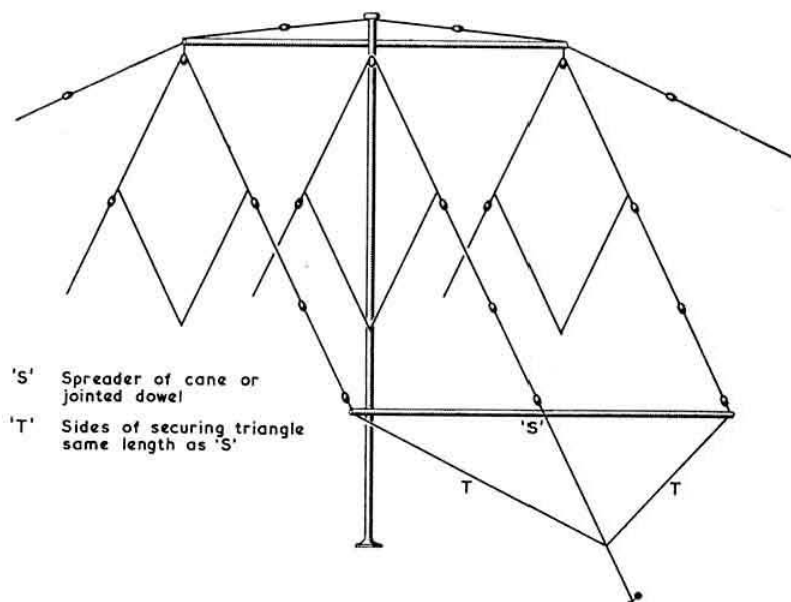


Fig. 3. Method of securing guys when only one ground position is available for each side.

guying system as in (i). Alternatively they can be hauled into position by halyards. The latter method necessitates two extra permanent guys at the mast head.

(iv) To facilitate gamma matching of the 14 Mc/s quad (and to secure the bottom corner of the centre diamond) an insulated "shelf" should be fitted to the mast as shown in Fig. 1. Two terminals, separated to retain the gamma section spacing, are fitted to the shelf and a weatherproofed gamma series capacitor fitted to the underside, with provision for connection of a coaxial feeder.

(v) $7 \times .029$ V.I.R. cabling has been used successfully for the elements. The remote stubs are best made of bare wire, as this allows simple adjustment of the short circuits for optimum front-to-back and forward gain settings. The horizontal portions of the remote stubs should be held above ground, say 1 ft., by a form of insulated support as shown in Fig. 1.

(vi) The main mast and yard-arm can with advantage be constructed from standard 2 in. diameter dural scaffold pole. Normally supplied in 22 ft. lengths, fittings are readily available to interconnect the sections in the required configuration.

Tuning the Array

The writer has found the following procedure to be satisfactory for tuning the 14 Mc/s quad and the general purpose, multi-band radiators.

14 Mc/s Quad

(a) With a ladder alongside the main mast, set the gamma short circuit approximately 50 in. up from the feed point and the 150 pF series capacitor at half mesh.

(b) At ground level attach both reflector shorts about 36 ft. along their respective remote stubs.

(c) Attach one director short approximately 29 ft. along the remote stub connected to the element which is to be the director.

(d) With an s.w.r. indicator in circuit, adjust the gamma short circuit and capacitor for minimum s.w.r.

(e) Arrange a remote loudspeaker from the receiver such that signals in the 14.1 to 14.2 Mc/s range can be clearly heard at the remote stub shorting points. Adjust the *operative* reflector short for minimum signal off the back, on a received station, by sliding the short along the remote stub. The position will be critical to 3 in. approximately and very definite. The front-to-back ratio should be high (with stations off the back) even on high angle signals; if this is not the case, look for snags—e.g. remote stubs twisted and shorting, very high s.w.r. on feed line, etc.

(f) Adjust the director short circuit for maximum gain on received signals in the forward direction. Setting will only be critical to about 12 in., but quite definite. (Adjustments detailed in (e) and (f) can, out of interest, be made in reverse by the VK6GU method, i.e. adjust director short circuit for maximum back-to-front ratio and the reflector for maximum forward gain. In fact, as the short circuits are so accessible, experiments with various combinations are very worth while.)

(g) The above adjustments will no doubt have varied the s.w.r. and further corrections on the gamma match may prove necessary.

(h) To check reversal of the beam, move the director short to the opposite remote stub and tune up as at (e) and (f) on received signals from the opposite direction. (It is essential to do the tuning on signals in line with the array, short skip type being quite satisfactory; e.g. at G8PO with the beam switchable N.E. and S.W. adjustments for maximum front-to-back ratio when looking S.W., are made on OH, LA, UA, OZ etc. for forward gain on CT2, PY, YV, etc. Looking N.E. the reverse applies.)

(i) With 17 ft. 6 in. sides the writer finds the three element quad to be quite broad in frequency response. Once the gamma match is set for minimum s.w.r. say around 14,200 kc/s, it will remain at an acceptable level from end to end of the band. Front-to-back ratio and forward gain can of course be quickly corrected for any major frequency change. An adjustment of about 18 in. in reflector and director short circuit settings appears necessary when changing from

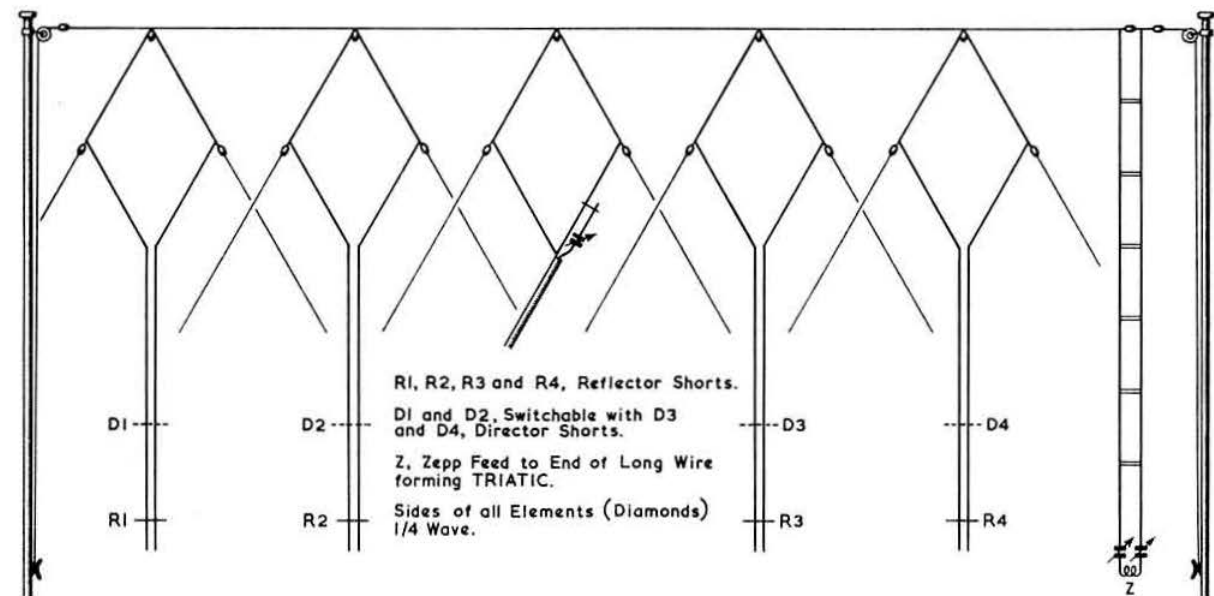


Fig. 4. Multi-element triatic quad.

14,100 kc/s to 14,300 kc/s, the higher frequency requiring the reduced lengths.

3.5/7 Mc/s Vertical Radiators

As the vertical mast is fed directly against ground with 52 ohm coaxial cable, no adjustment can be made. However, with the height of mast and yard-arm given, plus the additional wire to the parasitic elements (all fed via 88 ft. of coaxial), an acceptable s.w.r. is achieved.

Multi-band General Purpose Radiators

Firstly, remove all the 14 Mc/s shorting bars from the remote stubs. Refit a shorting bar at the end of each stub, i.e. about 38 ft. from the parasitic elements. Connect a coaxial feeder 5 ft. up from the short circuit on one stub and parallel across to a similar point on the other stub, transposing the connections if a half wave of coax is used. To allow simple connections of the feeders, coaxial sockets can be fitted to the stubs on movable terminal blocks; this gives ease of adjustment for matching and permits rapid disconnection. Adjust the system for lowest s.w.r. at 7 Mc/s by moving the coaxial feeder tapping points and positions of the shorting bars as necessary. The positions given are approximately correct and no difficulty should be experienced in quickly achieving a low s.w.r. Checks at 14, 21 and 28 Mc/s should also be made and a compromise setting for all bands found. The writer has been amazed at the good match attainable on all bands with a minimum of adjustment although the fact that the feeder is a multiple of half waves long (88 ft.) may have helped.

Suggested Experiments and Other Arrangements

The following are other arrangements for guy wire quads and arrays that the writer has tried or recommends:

(i) A five or seven element quad, using a triatic between two masts, instead of a yard-arm is a most attractive arrangement in that the support rope or triatic could easily be raised or lowered to facilitate erection and adjustment. The gain achieved by using two reflectors and two directors, as compared to the ideal of one reflector and three directors, is not known. However, unless a symmetrical arrangement about a centre driven element is used, a simple system of reversal is not easily achieved. For high gain in one direction, the beam could be made non-reversible, e.g. reflector, driven element and many directors; perhaps the whole could hang from an all-band, end-fed long wire, as shown in Fig. 4. Use of the parasitic elements as verticals with various spacings could also be tried.

(ii) A taller mast and longer yard-arm to accommodate 7/14 Mc/s version; this would necessitate relays or stubs to open and close the top corners, together with provision for either voltage or current feed; possible use also on 28 Mc/s.

(iii) A two band version 14/21 Mc/s, using the G4ZU method of coil and stub loading, plus dual gamma match and variable remote stubs.

(iv) A field day guy wire quad constructed in kit form for quick erection.

(v) Erect a 14 Mc/s quad at a great height, say 100 ft. on a triatic, with $1\frac{1}{2}$ wave remote stubs. This would be relatively simple compared to a Yagi or normal quad at such a height, because only guy wires are involved.

(vi) A two element reversible guy wire quad, driven element fed via a gamma match with a parasitic element tuned at ground level either as a director or reflector. Low impedance detachable connections on remote stubs would allow the parasitic element to be used as (a) a high angle radiator on 7 Mc/s, (b) $1\frac{1}{2}$ wave loop on 21 Mc/s and (c) a two wavelength loop on 28 Mc/s. Alternatively, both elements could be tuned via remote stubs and the low impedance feeder attached as described earlier, together with a switchable phase shift section paralleling the two remote stubs.

(vii) Where space is not available to erect a half wave dipole for short distance working on 3.5 Mc/s, use can possibly be made of a full-wave "garden fence square", gamma fed on the shack side. A back garden 70 ft. \times 70 ft. is ideal but not essential. Such an aerial, spaced say 5 ft. above ground should give high angle radiation, from the theory that a full wave, vertically positioned square, gives relatively low angle. This system has not yet been tried but looks interesting.

General Conclusions

Whilst the guy wire array described has obviously many shortcomings compared to a fully rotatable three band three element beam for purely DX chasing, it is felt that the following advantages should not be overlooked by the aerial experimenter:

(a) The parasitic elements are tuned at ground level where various combinations of stub settings can easily be tried and their effect immediately monitored on a remote loudspeaker.

(b) Adjustable feed facilities to the normally "untouchable" parasitic elements are automatically available and this opens up a host of experimental possibilities.

Acknowledgement

The writer would like to acknowledge assistance from many operators on many bands and in particular from Cmdr. A. J. R. Pegler, R.N. (G3ENI) and Mr. L. A. Moxon, B.Sc. (G6XN).

Book Review

THE RADIO AMATEUR'S HANDBOOK (Thirty-ninth Edition —1962) by the Headquarters Staff of the A.R.R.L. 640 pages, $6\frac{1}{2} \times 9\frac{1}{2}$, fully illustrated and with many tables and diagrams. Price 38s. 6d. postage paid, from R.S.G.B. Publications, 28 Little Russell Street, London, W.C.1.

The 1962 edition of this well established Handbook has been set in a completely new type face and the pages have been restyled. A non-gloss paper has been used to reduce glare and improve readability; the former aim has been fully achieved, and the claim that the photographs and drawings are particularly sharp and clear as a result, is indeed justified. It is, however, noticeable that the paper is less opaque, and one is often more than a little aware of coming events, and even past interests, casting their shadows unpleasantly.

There is a Mark II version of the "Simple X Super" receiver, and a new crystal-controlled converter for 20, 15, and 10 metres. The latter looks particularly attractive and will commend itself to amateurs who have not become catalogue-minded about receivers, for whatever reason.

The "All-band Inexpensive 40-Watt Transmitter" has been replaced by "An Inexpensive 75 watt Five-band Transmitter" using crystal-control, plug-in coils, and a 1625 p.a.; it looks to be a good honest job with considerable care taken in the matter of TVI. A two-band v.f.o. with differential keyer, giving 30-50 volts drive on 3.5 or 7 Mc/s, is a newly designed replacement for the old single-band job.

There is a new design for a high frequency crystal-filter side-band exciter using a 9 Mc/s filter and delivering 50 watts p.e.p. on 3.5, 7 and 14 Mc/s.

The crystal-controlled converters for 50, 144 and 220 Mc/s are now designed around the small "Nuvistor" triode for low noise. A new crystal-controlled converter for 432 Mc/s uses two grounded-grid r.f. stages and a grounded-grid mixer.

These are only a few of the many changes which have been made for the 1962 edition. All the customary data, background fundamentals, and practical information are there as fully as ever.

A steady increase in the treatment of semiconductor devices, plus details of applications, must result in increasing attention being paid to the fundamentals of all kinds of transistors, rectifiers and voltage reference diodes, in future editions. The present issue is yet another which fully maintains the high standards of its predecessors.

T. P. A.

Third Method Single Sideband

PART 1—Introduction

By G. F. GEARING (G3JJG) *

SINGLE sideband has achieved prominence in amateur circles only in the last ten years or so, but many people are still doubtful of the claims made for its supremacy as a means of speech communication. When it is realized that an A3 (i.e. double sideband full carrier) transmitter wastes the largest portion of its output producing signal components which carry no useful information then one begins to appreciate why an s.s.b. rig is superior.

Of course, this modern idea is really quite old, having been used in the 1920s by the G.P.O. However it was not until the advent of the crystal filter and the high Q cascaded tuned circuits of the LC filter that single sideband (partially or fully suppressed carrier) became popular in the field of amateur communications.

The stage has now been reached where very high standards of unwanted sideband suppression are required. Many service or commercial communications networks operate i.s.b. (independent sideband) with separate voice frequency communication channels on upper and lower sidebands. Obviously, with poor sideband suppression, one channel would interfere with the other. For i.s.b., a pilot carrier (26db down on peak signal level) is used for automatic frequency control systems. Amateur requirements with respect to drift are far less stringent and the carrier can be fully suppressed.

S.S.B. Standards

Standards generally acceptable are for the unwanted sideband to be at least -45db and the carrier also -45db. The figure for sideband suppression is at the output of the generator and will be degraded by spurious signals due to the heterodyning stages and the final amplifier. For these reasons, all stages in the signal path must be operated under linear conditions and no frequency multiplying stages used. Theoretically, if the input voltage (signal) to a linear amplifier is doubled then the output should increase by a factor of 2, the output spectrum containing only the original signal and no others. In practice, the final amplifier is never perfectly linear and distortion products result.

If two signals of equal amplitude are applied to the input of the amplifier, they will be amplified and also distorted due to the non-linearity. The stage will thus act as a high-level mixer producing spurious signals, known as intermodulation products, some of which will fall in the unwanted sideband. The level of intermodulation products at the output is the yardstick by which a single sideband transmitter may be judged.

An amplifier biased to be in class AB or B is less efficient than a similar stage in class C. However the difference of less than 2db is far outweighed by the system power gain of single sideband suppressed carrier over A3. The actual figure quoted varies but may be taken as 9db system gain using a receiver capable of sideband reception with minimum bandwidth.[†]

This advantage, along with others, is gained at the price of increased complexity at both ends of the contact. It is possible to avoid duplication by using the s.s.b. generator in reverse as the demodulator when receiving. In fact, the s.s.b.

concept lends itself particularly well to the design of transceivers.

S.S.B. Generators

Most published designs of s.s.b. generators use the filter system, either crystal or LC filters, or the phasing technique. In the former, a double sideband signal is produced, the carrier being attenuated by using a balanced modulator and the unwanted sideband is suppressed by the filter action.

Filters using only L and C components are confined to frequencies below 100 kc/s, thus necessitating at least two and probably three stages of frequency translation to reach the final operating frequency. Above 100 kc/s, quartz crystals in either half or full lattice configurations are used, with up to five crystals for satisfactory sideband suppression. Unless the constructor purchases brand-new crystals, he is forced to etch surplus crystals to the required frequencies. This takes patience and skill with the added difficulty of accurate measurement of the point of series resonance.

Designs featuring high frequency (9 Mc/s) crystal filters eliminate one stage of frequency translation but to etch the crystals and then to measure accurately their series resonance practically calls for the use of a frequency counter.

The alternative is the phasing system in which an audio signal is produced and passed through phase-shift networks, two signals exactly 90 degrees out of phase and equal in amplitude resulting. These are fed to two balanced modulators, the switching voltages consisting of two r.f. signals, equal in frequency but 90 degrees out of phase.

The outputs of the two balanced modulators are combined, the wanted sideband component in each chain being in phase with each other and so being passed onward and the unwanted sideband components, being 180 degrees out of phase, are cancelled out.

The greatest difficulty with this system is the audio phase-shift network, the two outputs of which must be exactly 90 degrees apart over the audio range of 300 c/s to 3000 c/s and the stringent requirements for amplitude balance throughout the generator.

Properly adjusted and maintained it is capable of producing a very pleasing single sideband signal with about 40db suppression of the unwanted sideband and carrier. It has the advantage that it may be generated at, say, 9 Mc/s, as easily as at 450 kc/s.

Both of these systems will act in reverse as the receiving demodulator. If sideband switching is required, the phasing method requires that the phase-shifted audio inputs to the modulators be reversed. The filter method requires entirely separate filters for each sideband or that the heterodyning oscillator be shifted the requisite amount.

The Third Method

Another method, known as the Third Method, was designed and patented in America by D. K. Weaver. It was published in the *Proc.I.R.E.*, December 1956 [1], to be followed in September 1957 by an article in *QST* [2].

Early in 1958, a commercial firm marketed a s.s.b. radio-telephone using this so-called third method. This was the Redifon GR400 which uses transistorized circuitry for sideband generation and demodulation and features good performance and reliability with low initial cost.

An excellent article by J. F. H. Aspinwall in the January

* 21 Rastell Avenue, London, S.W.2

† See Chapter 10, *The Amateur Radio Handbook*, Third Edition.

1959 *Wireless World* [3] explained the advantages of the system and gave a mathematical analysis. For the average amateur, however, it contained insufficient information to construct such a unit.

In this and subsequent articles, the advantages and disadvantages will be discussed, the operation explained and full circuit details given to construct a basic "third method" exciter. It is a hybrid design, where possible incorporating the desirable features of the two systems previously outlined. Four phase-shift networks are used, but they have to deal only with signals constant in frequency and amplitude. Consequently each network is very simple, consisting of one resistor and one capacitor. Close tolerance components are not required, only one or two resistors being made variable.

Two low pass filters are used with a roll-off in response at about 1450 c/s, being at least 50db down at 1800 c/s with respect to the level at 650 c/s. (This does not infer the transmission of a restricted audio bandwidth.) As the filter action takes place at audio frequencies, the tolerances are wide. With an audio tone input at 300 c/s, the percentage differential between the wanted signal and the unwanted at the filter is nearly 50 per cent. For a crystal filter at 500 kc/s the difference is only 0.12 per cent. Surprisingly, it is at the high end of the audio range that the percentages differ the least. For the "third method," it is still nearly 50 per cent and for the crystal filter it is now 1.2 per cent. A "third method" exciter is capable of at least 45db suppression of the unwanted sideband at any modulating frequency in the range 300 c/s to 3000 c/s. Furthermore, it is not dependent on any variable controls and will not be degraded by ageing of components.

Carrier suppression is achieved at a.f. in two ring modulators using crystal diodes and drift in the balance is negligible. About 20db suppression is gained in the modulators and a further 30db or more due to the action of the filters.

The frequency of the carrier oscillator is 1650 c/s, which is the mid-frequency of the audio range. After the two filters, there are two single sideband suppressed signals in the range 1350-0-1350 c/s corresponding to the original 300-3000 c/s. The two signals, differing in phase by 90 degrees, are fed to two balanced modulators which are switched by two r.f. signals having 90 degree phase difference. These may be of any fixed frequency up to 2 Mc/s. It is, however, convenient to use 460 kc/s to facilitate the use of the generator as the receiving demodulator. Sideband switching requires a second crystal 3.3 kc/s above or below the first crystal. For instance, for a nominal carrier frequency of 460 kc/s, the crystals are 458.35 kc/s (lower sideband) and 461.65 kc/s (upper sideband).

As the majority of the circuitry is at a.f., the layout is not critical and no interstage screening is required although care must be taken with regard to heat dissipation. All the modulators use crystal diodes which will change resistance with variation in temperature. Air must be allowed to circulate freely, with cool air drawn in through the underside of the cabinet, passing the heated air out through louvers in the top of the cabinet.

The complete exciter, with direct sideband switching and delivering 500 mV r.m.s. at 460 kc/s uses four 12AT7's and one 6AK5, two crystals and 12 diodes. The measured performance shows that the suppression of unwanted sideband and carrier is better than 50db, spurious distortion products in the wanted sideband better than -26db (5 per cent) and

Comparison of S.S.B. Generation Systems

System		Advantages	Disadvantages
Filter Systems	LC Filter	> 50db sideband suppression available. Possible to attain nearly perfect selectivity curves. Used professionally.	Not practical above 100 kc/s. Multi-section filters used requiring large number of inductors. Physically large.
	Crystal Filters	50db suppression of sideband and carrier available with five crystals. Surplus crystals available at low cost though may need etching. Sideband suppression not dependent on adjustment. Carrier re-insertion simple.	Necessary to etch surplus crystals to required frequency. Difficult to measure accurately above. Bandwidth restricted, giving slightly "tinny" quality. Difficult to switch sidebands. Not suitable for use above 500 kc/s unless new crystals are purchased.
Phasing Technique		May be generated at 450 kc/s, 9 Mc/s or any other frequency with ease. Sideband switching requires only that two wires be reversed. Good communications quality. Use as receiver demodulator satisfactory 42db maximum sideband suppression.	Audio phase-shift network critical. Sideband suppression dependent on adjustment, degraded by small error in phase and amplitude balance. Necessary to tailor frequency response of a.f. amplifier. Carrier suppression dependent on balanced modulator. Not augmented by filter action. Layout fairly critical.
Third Method		Majority of circuitry is at a.f. Layout not critical —no screening required. Sideband and carrier suppression > 50db. Carrier balance at a.f. No close tolerance components required. No tailoring of a.f. response necessary. Lends itself readily to sideband switching and use as receiver demodulator. Filters fairly easy to construct. Good communications quality. Possible to align with phones and receiver.	If final balanced modulators drift, signal 1.65 kc/s from f_{nom} is transmitted. Necessary to have efficient cooling to avoid drift of balanced modulators. Carrier re-insertion for A1 and A3 not as simple as filter system.

the third order intermodulation products better than -40db. The overall frequency response at the p.a. grid with respect to the level at 1000 c/s is -1.5db at 300 c/s and 3000 c/s, -22.5db at 3300 c/s falling sharply thereafter. The theoretical response at 3.3 kc/s, i.e. >50db, is only realized if the 1650 c/s oscillator is a pure sine wave.

It will be seen that really good communication quality is produced. Circuit details will be given for transmission on 80 metres only. For multiband operation the reader is referred to the excellent articles by G. R. B. Thornley (G2DAF).*

Transmissions compatible with A3 stations are made by re-inserting the 1650 c/s signal after the filters. The signal has a full amplitude carrier and at 100 per cent modulation, an equal amplitude sideband. With no modulation, the carrier may be keyed for c.w. operation.

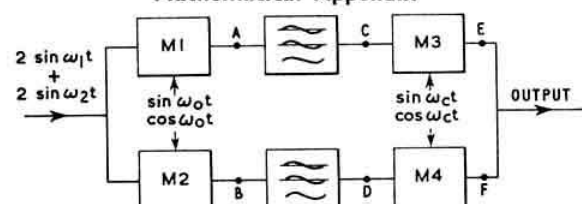
The third method generator may be used as the receiver demodulator by feeding the i.f. output of the main receiver into the 6AK5 grid tuned circuit, the h.t. being removed from this valve. One disadvantage of the third method on receive is that the local 1650 c/s oscillator signal will be present in the audio output, necessitating a notch filter at 1650 c/s and a low pass filter rolling off at 3000 c/s. This does not detract from the performance and, in fact, the overall link distortion of a 1000 c/s tone on s.s.b. from a third method transmitter to the audio output of a third method demodulator is less than 7 per cent.

To summarize, a table has been produced showing the relevant advantages and disadvantages of the filter system, the phasing system and the "third method."

References

- [1] D. K. Weaver, *Proc.I.R.E.*, December 1956.
- [2] H. F. Wright, *QST*, September 1957.
- [3] J. F. H. Aspinwall, *Wireless World*, January 1959.

Mathematical Appendix



Consider an input consisting of two audio frequencies f_1 and f_2 , where $f_1 > f_0 > f_2$.

$$\begin{aligned}
 1. f_1 > f_0 \\
 \text{At A, o/p from M1} \\
 2 \sin \omega_1 t \sin \omega_0 t &= \cos \omega_1 - \omega_0 t - \cos \omega_1 + \omega_0 t \\
 \therefore \text{At C we have a term} &\cos \omega_1 - \omega_0 t \\
 \text{At B, o/p from M2} \\
 2 \sin \omega_2 t \cos \omega_0 t &= \sin \omega_1 + \omega_0 t + \sin \omega_1 - \omega_0 t \\
 \therefore \text{At D we have a term} &\sin \omega_1 - \omega_0 t \\
 \text{At E, o/p from M3 contains} \\
 \sin \omega_1 t \cos \omega_1 - \omega_0 t &= \frac{1}{2} \sin \omega_c + \omega_1 - \omega_0 t \\
 &+ \frac{1}{2} \sin \omega_c - \omega_1 + \omega_0 t \dots (1) \\
 \text{At F, o/p from M4 contains} \\
 \cos \omega_2 t \sin \omega_1 - \omega_0 t &= \frac{1}{2} \sin \omega_c + \omega_1 - \omega_0 t \\
 &- \frac{1}{2} \sin \omega_c - \omega_1 + \omega_0 t \dots (2)
 \end{aligned}$$

*"The G2DAF S.S.B. Transmitter", G. R. B. Thornley, R.S.G.B. BULLETIN, September, October and November 1959. The September 1959 issue is now out of print.

In the output (1) and (2) are combined, producing

$$\sin \omega_c - \omega_0 + \omega_1 t$$

the term

$$\frac{1}{2} \sin \omega_c + \omega_0 - \omega_1 t$$

being, in each channel, equal in amplitude, and opposite in phase. This product is known as Inversion.

$$f_0 = 1650 \text{ c/s}, f_c = 461.65 \text{ kc/s}$$

$$f_1 = 2000 \text{ c/s}, f_2 = 1000 \text{ c/s}$$

(To be continued)

In the output (1) and (2) are combined, producing

$$\sin \omega_c - \omega_0 + \omega_2 t$$

the term

$$\frac{1}{2} \sin \omega_c + \omega_0 - \omega_2 t$$

being, in each channel, equal in amplitude and opposite in phase.

Half-century of United States Amateur Radio Licensing to be Celebrated

AMATEUR Radio operators who were first licensed in 1912 and who are still active today will be honoured at a Golden Anniversary Banquet to be held at the Statler-Hilton Hotel, New York City, on October 13, 1962, to celebrate 50 years of licensing by the United States Government.

Fifty years ago Congress adopted the Radio Act of 1912, bringing order to the then new but rapidly expanding art and science of wireless or radio communication. As one of its features, the Act required for the first time that Amateur Radio operators obtain a licence from the Department of Commerce and Labour after passing an examination.

The celebrations are being organized by a special committee comprising representatives of a number of sponsoring societies including the American Radio Relay League, Armed Forces Communications and Electronics Association, Institute of Radio Engineers, Quarter Century Wireless Association, Radio Club of America, Hudson Amateur Radio Council and the Single Sideband Amateur Radio Association.

A search is now in progress to locate those who obtained their licence during the initial months of licensing in 1912 and are currently licensed by the F.C.C. as Amateur Radio operators. An appropriate award will be made to all such amateurs by the sponsoring societies. The award will be presented in person to those able to attend the Golden Anniversary Banquet.

Travellers' Digest

THE amateur who is interested in more than a stereotyped contact will find that *Travellers' Digest*, a 336-page book issued by British Overseas Airways, is a mine of information on various aspects of life in the country to which he may be speaking. Amongst the practical information given are details of the country, customs and people, and, in addition, particulars of currency and times and distances from London and New York. Designed primarily for the air traveller this publication will be of interest to many others, and with a large number of illustrations and 29 maps it represents excellent value. It costs 5s. and may be obtained through booksellers and newsgagents.

Libyan Amateur Radio Society

AT a meeting held in Tripoli, Libya, on May 13, 1962, it was decided to form a Libyan Amateur Radio Society to which all Libyan amateurs could belong. Meetings are to be held monthly in Tripoli.

Officers at present are Mr. Azzarby, 5A4ZM (President), Mr. Wheeler, 5A5TE, P.O. Box 372, Tripoli (Hon. Secretary), and Mr. Crabtree, 5A4TC (QSL Manager and Hon. Treasurer).

A Stabilized Power Supply for the BC221 Frequency Meter

By MICHAEL J. HUMPHRIES (G3LRQ)*

ACCORDING to the official handbook on the BC221 the power requirements are 6 volts at 850 mA for the heaters and 135 volts h.t. at 20 mA (maximum).

The writer is in possession of a BC221J, and as may be seen from Fig. 1, the cathode of the amplifier valve in this instrument is connected to the "live" side of the heater supply thus making the use of a.c. for the heaters undesirable.

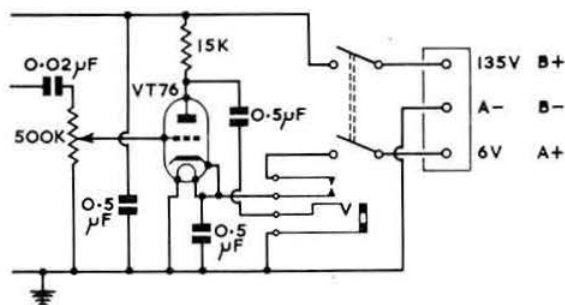


Fig. 1. Amplifier stage in the BC221J frequency meter.

H.T. Supply

Dealing with the h.t. supply first, it was decided to use a voltage regulator tube of the VR150/30 variety which stabilizes at 150 volts for currents up to 30 mA. The circuit of this part of the supply is shown in Fig. 2, and is quite conventional with the possible exception that it employs two 2E1 silicon rectifiers. There are many arguments for and against the use of semiconductor instead of valves in h.t. rectification circuits, particularly when supplying valves whose heaters take a time to warm up, as the full h.t. voltage is applied almost instantaneously. In this case, however, as may also be seen from Fig. 1, the switching employed by the manufacturers also applies l.t. and h.t. voltages from the batteries at the same instant. Another point to be con-

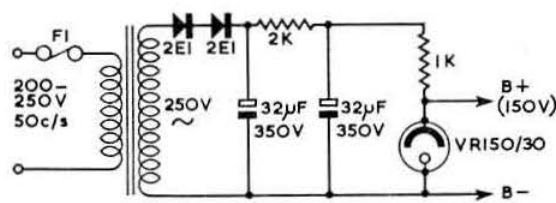


Fig. 2. Circuit diagram of the stabilized h.t. supply.

sidered is that the voltage regulator requires 185 volts to strike, and with the transformer used this voltage can be obtained more readily than if the valves in the instrument were already drawing current.

L.T. Supply

In the l.t. supply the series regulator configuration is employed as the load current is fairly high. This is achieved by connecting the collector of a 2N456 transistor to the rectified l.t. voltage (at F2 in Fig. 3), the emitter to the load,

and the base to a fixed reference voltage which is equal to the required output voltage plus the base-emitter drop of the series transistor. The inclusion of the OC81 transistor gives a lower output impedance, and divides the base current of the 2N456 by α' of the OC81 (where α' is the common emitter current gain), hence minimizing the effect of its variations. At point A the voltage is maintained constant by the Zener diode. In this case an OAZ204 Zener diode was used as this was the only type available when the unit was constructed. The diode stabilized at about 6.5 volts (point A) and this necessitated a potential divider network made up of the 2.7 K ohms resistor and 250 ohms potentiometer in series, which was used to set the base voltage of the OC81 to give the required 6 volt output. If a Zener diode type OAZ202 was available, this potential network could be dispensed with. There is one main disadvantage with using transistors in this application, and that is that the collector leakage current varies with temperature, so that until the 2N456 reaches its operating temperature the output voltage may vary. In this case it was found to vary from about 5.7 to

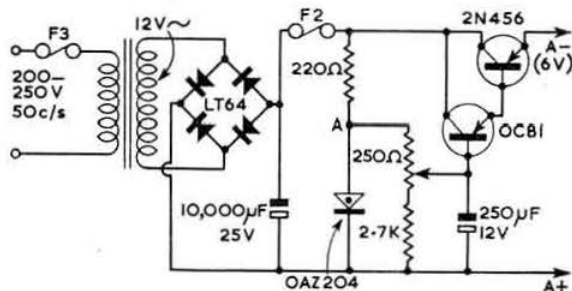


Fig. 3. Circuit diagram of the stabilized l.t. supply.

6 volts in the first two or three minutes, and then stabilize. The l.t. supply gave no hum to a full load current of 1 amp.

The complete supply was mounted in the back of the BC221 case in the space normally occupied by the batteries, the 10,000 µF can electrolytic capacitor being mounted in the spare parts compartment.

In conclusion, the writer would like to thank Señor J. R. Zaratiegui for his invaluable help in the preparation of this article.

Enquiries Regarding Bulletin Articles

MEMBERS who write to the authors of BULLETIN articles are asked to enclose stamped addressed envelopes if they require replies.

LIVE TO ENJOY YOUR HOBBY—

SWITCH
TO SAFETY



* 158 Abbotts Drive, North Wembley, Middlesex.

Mobile Column

By C. R. PLANT (G5CP)*

THE writer has often felt a little critical when noting "correction paragraphs" the month following a constructional article—now it is his turn to do just this with apologies for his own carelessness! The circuit diagram of the transistorised converter on page 586 of the June BULLETIN shows the OC44 crystal oscillator base unconnected; this should be directly connected to the junction of the crystal and the 0.5 Megohm resistor. The capacitor the other side of this resistor to earth may be 0.005-0.1μF. The coils L5 and L6 consist of a medium wave broadcast coil and a 10 turn link coil wound over the earthy end of L5 respectively. If the 240pF fixed capacitor is used the coil should be slug tuned for peaking to the centre of the band, but a more flexible method would be to substitute a variable capacitor so that it is possible to peak any part of the band. The additional control might well prove to be of considerable help. It will be interesting to hear of the success obtained by readers and any suggestions for improvement will be passed on through this feature.

Forthcoming Rallies

The fifth Derby Mobile Rally, which always attracts a large attendance, will take place on Sunday, August 19, at Rykneld School, Derby. The talk-in stations, G3ERD/A on Top Band and G3EEO/A on 144 Mc/s, will open at 10 a.m. and close at 4 p.m. A very full programme has been arranged culminating in a Monster Junk Sale, presided over by G3FGY, who all agree could "sell refrigerators to Eskimos!" Displays will include Police dogs at work, Police radio cars and motor cycles by the Derby Borough Police Department, radio-controlled model aircraft by the Derby Model Aircraft Society and there will also be a Treasure Hunt for the children. It is likely that in addition there will be an Archery Display and a Carnival Band.

An ingenious mobile radio contest with a Star Prize award will also form one of the main attractions. A film show for the children has been arranged and as usual will take place immediately after the junk sale when the "little dears" will probably have exhausted their parents and themselves! Refreshments at moderate charges will be available on the school premises, and if the weather is bad ample accommodation will be available in the school.

In order to encourage manufacturers of radio equipment, radio dealers and other radio clubs to support the event, free stands are being provided; this is a good idea and should make the Rally much more interesting. Admission will be free and there will be no charge for parking your car; all main roads into Derby will be signposted by the R.A.C. with additional signs right to the school. The Organizing Committee has done a tremendous amount of work to ensure success; the Derby Mobile Rally certainly deserves your support.

The Stockport Radio Society Mobile Rally is to be held on Sunday, August 26, at the Pavilion Gardens, Buxton. The main event will be a Radio Mobile and Navigation Contest which will commence at the Davenport Cinema, located on the A6, Stockport, at 13.45 B.S.T. A similar competition will also be held for cars not equipped with mobile transmitters from the same venue. Those not taking part in the contests should proceed direct to Buxton, where various attractions have been arranged to take place during the afternoon. An official sticker at an inclusive charge will admit cars and passengers to a reserved car park and the Pavilion Gardens. The talk-in stations will be G6UQ/A

* "Lynton," 12 Nottingham Drive, Wingerworth, Chesterfield, Derbyshire.



At the R.S.G.B. National Mobile Rally at Belton House, Grantham, on May 13, 1962. From left to right, G3JMA/M, G3H2P/M and G2BYW/M with G5CP/M and G3KEF/M cars in the background. (Photo by G5CP)

on 1920 kc/s until 13.30 B.S.T. and G6DN/M on 1950 kc/s from 13.30 B.S.T. onwards. Further details may be obtained from the Secretary, G6NM, 52 Worsley Crescent, Stockport. The Mobile Contest is always very popular—why not have a "crack at it" this year?

Houghton and District Radio Club are again holding a Rally at the Hetton and District Agricultural and Trade Society Show which is to take place on Saturday, August 25. The talk-in stations will be operating on Top Band and 7 Mc/s, using the club call G3NMD, the operators being G3KQD and G3NSI. Raffles have been arranged and the organizers say that they hope to have some good prizes to distribute. Further information may be obtained from the Hon. Secretary, H. Ward, 6 Whitehouse Crescent, Shotton Colliery, Co. Durham.

As members will have seen in the list of Mobile Rallies in the June issue, the R.S.G.B. National Mobile Rally to be held at Woburn Abbey has been changed to September 9, so

MOBILE RALLIES 1962

July	14	Southern Counties Mobile Rally, Southampton Common, Southampton, Hants.
July	14	Ariel Radio Club (B.B.C.) Mobile Rally at B.B.C. Club Summer Festival, Motspur Park, New Malden, Surrey.
July	15	Harlow & District Mobile Rally, Magdalen Laver, Essex.
July	15	Chiltern Amateur Radio Club Mobile Rally, West Wycombe Park, Bucks.
August	19	Derby Radio Societies Mobile Rally, Rykneld School, Derby.
August	25	Houghton and District Radio Club, Hetton and District Trade Society, Hetton, Co. Durham.
August	26	Stockport Radio Society Mobile Rally, Pavilion Gardens, Buxton.
Sept.	2	Northern Mobile Rally at Harewood House, near Harrogate.
Sept.	2	Thames Valley Amateur Radio Transmitters' Society Mobile Rally.
Sept.	9	R.S.G.B. National Mobile Rally, Woburn Abbey, Beds.
Sept.	16	Lincoln Radio Society Mobile Rally, North Kesteven Grammar School, North Hykeham, Lincoln.
Sept.	22	Region 9 Mobile Rally at Weston-super-Mare.

that it will not clash with the Lincoln Rally. It now means that rally enthusiasts may attend both functions—a good idea!

Activity

G5ZT (Plymouth, Devon) is still very active on both a.m. and s.s.b. mobile. G5CP recently obtained a new s.s.b. rig and during the first few hours of operation had a QSO with Harold whilst he was running between Paignton and Torquay—a really excellent example of the effective unit G5ZT is using.

G3JON (Sheffield) writes to say that his mobile Top Band rig is housed in two small metal boxes. The transmitter, consisting of a 12AT7 v.f.o. followed by a 5763 p.a., modulated plate and screen by a 6BW6, is enclosed in a 7 in. cube. John says that by putting the whole of the primary winding of the SCR522 modulation transformer in the anode circuit of the 6BW6 he gets much more modulation—sounds as though he has struck a lucky match here! The receiver, 5 in. x 5 in. x 3 in., consists of a crystal controlled converter feeding into a BC receiver; the aerial is a centre loaded whip, the loading coil consisting of 240 turns 1.8 in. dia. spaced 20 turns per inch. Many interesting contacts have been made, the best being with G3NVE (Goole, Yorks) whilst stationary in Sheffield.

Rally Reports

The Hunstanton Bucket and Spade Party organized by the Peterborough Amateur Radio Society which took place on May 20 attracted a good attendance. G3JEC judged the Concours d'Elegance with the following results: Smartest all round installation—G3FUR; Safest and most versatile—G3ARD; Neatest installation—G3MMS (he also won the D/F contest by tracing G3EEL (what an ideal call for the elusive station!) and G2NJ to their hidden transmitter near to the Lifeboat House at Old Hunstanton). G6CW (Nottingham) won a bottle of sherry for having travelled the greatest distance to the Rally whilst TT15 transmitting valves went to G3OS and G3JBU. G3ANM received a vote of thanks for his work as talk-in station.

The Belton House Mobile Rally organized, in conjunction with the R.S.G.B. Mobile Committee, by the Grantham and Stamford District R.S.G.B. Groups, which took place on May 13 was attended by about 250 people, 88 of whom held call-signs. There were between 60 and 70 mobile stations. Despite the poor weather conditions there was a brisk sale of R.S.G.B. publications. The draw resulted in a large number of useful prizes being distributed; the lucky ones

included G5PP, G3FUR and G5CP. The rally ended about teatime when all concerned felt that, despite the cold winds, "a good time had been had by all."

The Medway Hamfest and Mobile Rally was held at Elliott's Canteen, Rochester Airport, on May 20, and attracted an attendance of more than 500. Among the visitors were G2MI, G2UJ, W6VHC, and boys from the Whiteness Manor School for Crippled Boys at Broadstairs. The 80 mobiles were talked in on 2 and 160 metres.

In the report on the Thanet Radio Society Rally last month the award for the best mobile equipment was won by G3NPU/M and not as stated.

The Luton and District Mobile Rally took place on May 27 and despite the weather, rain, hail and thunder, 150 people signed in, including 40 mobiles. Unfortunately the weather prevented the Judo demonstration from taking place, but all the other activities proceeded to plan and the XYs were kept busy in the refreshment tent serving hot cups of tea! Amongst the long distance visitors were F8MX, G3LYW, G3PLL, G3HRH and G6FO. The organizers are confident that given reasonable weather conditions future rallies will be even more successful.

The R.S.G.B. National Mobile Rally at the U.S.A.F. Base, Wethersfield, on June 10, 1962, proved to be an extremely successful gathering, over 1,000 people attending together with 350 cars. The weather, though dry, was dull and cool and the large hangar provided by the U.S. Air Force proved to be a welcome shelter where refreshments were consumed in large quantities! The trade stalls displaying modern Amateur Radio equipment were a popular feature.

The programme arranged by U.S.A.F. personnel ran smoothly, interest was shown in the archery display and there was a continuous flow of visitors to look over the jet fighter—similar aircraft took off at intervals during the Rally. Fire fighting was demonstrated to several busloads of visitors who were taken to the Fire Station.

In all, a very successful day which ably proved the friendly and helpful co-operation given by the U.S. Air Force—a special vote of thanks is certainly due to the Officer Commanding for his courtesy and help.

Certificates of Merit, signed by the President of the R.S.G.B., were awarded to the following: (i) The best v.h.f. home constructed mobile installation—G3FUR; (ii) The best l.f. band home constructed mobile rig—G3HRO; (iii) The safest overall mobile installation—G3HRO.

Southampton Show and Southern Counties Rally

THE Southampton R.S.G.B. Group will be operating an Amateur Radio station, GB3SS, from the grounds of the Southampton Show during the weekend July 13-14, 1962. The station will also be used for talk-in purposes in connection with the Southern Counties Mobile Rally which is to be held in Southampton on July 14, 1962.

The European Band Plan

The Plan, which is voluntary and supported by all I.A.R.U. Societies in Europe, is as follows:

Frequency Band	Type of Emission
3500—3600 kc/s	Telegraphy only
3600—3800 kc/s	Telephony only
7000—7050 kc/s	Telegraphy only
7050—7100 kc/s	Telegraphy and Telephony
14000—14100 kc/s	Telegraphy only
14100—14350 kc/s	Telegraphy and Telephony
21000—21150 kc/s	Telegraphy only
21150—21450 kc/s	Telegraphy and Telephony
28000—28200 kc/s	Telegraphy only
28200—29700 kc/s	Telegraphy and Telephony



Norman Fitch (G3FPK), Honorary Secretary of the Amateur Radio Mobile Society, presenting the second Mobile Century Award to Edgar Wagner (G3BID).

The Rig goes Round

By L. LABUTIN (UA3CR)

THIS is the story of a roving s.s.b. transmitter which travelled 20,000 miles last year, and in the hands of a number of operators made a total of 6,500 contacts from the rarest spots in the U.S.S.R.

The story of this travelling transmitter commenced a couple of years ago when sideband operating was a novelty and not then accepted by most operators. The few s.s.b. enthusiasts were concerned with the problem of how to popularize this new mode of operating and how to boost their number. This was the subject under discussion at a round table late in August, 1960 and which included UR2AR, UA3CR, UL7JA, UA3CG and other leading s.s.b. operators. During that discussion an idea was born and it was decided to build a portable rig and send it round the Union. The job of designing and building the transmitter was assigned to three Moscow amateurs, UA3CR, UA3CG and UA3FE, and they at once commenced the task, sparing no midnight oil. At last the rig was ready for test and the signals were checked by UA3DR at his station who gave the verdict that the performance was good. By that time the Soviet Federation of Radiosport had mapped out the first trip of the rig which was to go to the town of Kyzyl in Tuva (Zone 23). This zone was a rare catch on c.w., let alone 'phone, and an s.s.b. station was going there for the first time in history. Problems of organization, including financial issues, were quickly settled and the candidate to man the rig was selected. This was UA3FE, Seva, one of the three creators of the rig and he started off for Tuva on January 25, 1961.

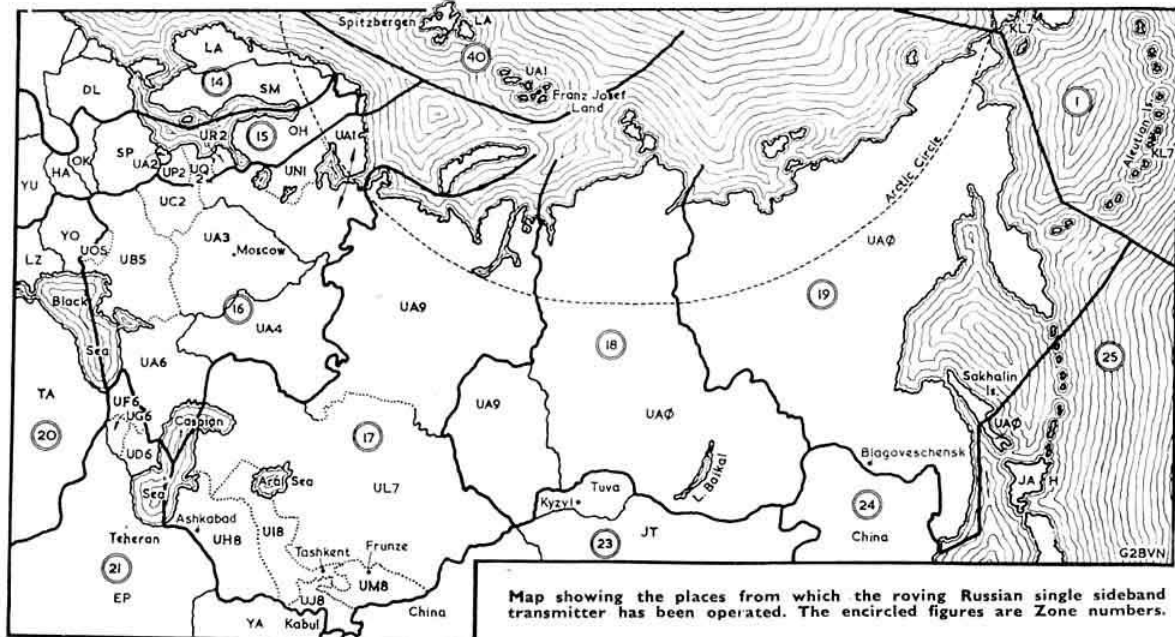
The Tuva area presented to all of us quite a puzzle at that time for on almost any day one could make contacts within 200 miles of Kyzyl, but the amateur station in the city, UA0KYA, was hard to catch. Not being sure of the reason for this and to make certain that we would not miss anything we drew up rigid schedules for Seva to follow. In the early afternoon of the day before the first schedule with Kyzyl, which had been arranged for 07.00 Moscow time, there were



UA3FE/0 operating the Russian single sideband transmitter which is on the right of this picture.

three Leo's, UB5KAB, UA3DR and UA3CR, and one Toly, UB5FJ, taking part in a round table QSO, and saying how hard it would be to contact Seva next morning when we were interrupted by a Swedish station, SM5CO, who said that he had just worked UA3FE/0, who was calling us on c.w. 5 kc/s below our frequency. The portable transmitter was crystal controlled which meant that Seva could not call on our frequency, and so the first s.s.b. QSO between Moscow and Kyzyl was made off schedule. Seva stayed in Zone 23 25 days and enabled many stations to complete their WAZ on s.s.b.

Next, the portable rig was sent on a tour of the republics and regions which did not have s.s.b. stations; it was to travel from hand to hand and to stay with each operator for ten days. First it went to Tashkent in the Uzbek Republic in Central Asia in company with UA4IF, Alexander, a well-known operator from the Volga area, who, with two local amateurs, UI8AE and UI8AG, took turns in operating the



Map showing the places from which the roving Russian single sideband transmitter has been operated. The encircled figures are Zone numbers.



The writer, UA3CR (right), and UA3FE, two of the amateurs who constructed the transmitter.

transmitter for a few days. The roving portable then went to Frunze in Kirghiz, and was ably operated by UM8FZ, Boris, in spite of his great handicap—he has been completely blind since early childhood. The next two operators to borrow the rig were both named Yuri, one UJ8AG in Dushanbeh (Tadzhik) and the other UH8DA in Ashkabad (Turkoman). The rig was returned to Moscow and was then taken to Tiraspol in Moldavia by some Moscow hams who were going there for a fox-hunt (D/F) contest. It landed in the custody of UO5PK, George, and when he was ready to relinquish the transmitter it came back to Moscow again with the noted opera singer, Alexander Ognivtsev, returning from a tour of Moldavia.

The next man in the line-up did not trust anybody with the rig and came to Moscow himself to collect it. This was UA2AO, Anly, from the town of Kaliningrad, and although he was the last to borrow the rig he made more QSOs than any of the previous operators. UA2AO and UJ8AG, the runner-up, both used linear amplifiers but the remainder used the transmitter barefoot.* UO5PK made the third highest number of QSOs followed by UM8FZ and UH8DA. All these operators received prizes from the Federation of Radiosport.

It became apparent last summer that the stumbling block for many amateurs towards WAZ on s.s.b. was Zone 19. It had been represented by UA0LA but it seemed that very few stations had received a QSL from him. It was decided therefore that the roving rig should go to Zone 19 and at a roundtable on a Sunday in August, 1961, the leading sidebanders were deciding on the best place and who should take the transmitter. Both UA0BP, Ros, and UA3AT, Victor, insisted on going, as Ros argued that his QTH was nearest to Zone 19 whilst Victor was prepared to spend his forthcoming holiday operating on s.s.b. In due course both operators went to the town of Blagoveshchensk in the Amour river basin, where the local club supplied all the necessary equipment including a power amplifier and aerials. The station was set up in time for the telephony section of the CQ World Wide DX Contest, and despite poor band conditions Ros and Victor managed to chalk up more than a thousand contacts between them.

That is the story of the rovings of the rig during 1961, but they are not yet over. It is still good for more DX.

* For the uninitiated we understand that "barefoot" in the sense here used means without linear amplifier—EDITOR.

The Coventry Cathedral Festival Station

GB3COV was a special exhibition Amateur Radio station set up to celebrate the consecration of the new Cathedral of St. Michael in Coventry on May 25, 1962, in the presence of Her Majesty the Queen. The intention was both internationally to publicize the Coventry Cathedral Festival and to enable the general public to see radio amateurs in action.

The City Corporation placed at the disposal of the Coventry and District Amateur Radio Group a quarter of the glass enclosed exhibition pavilion beneath the offices of the Department of Architecture and Planning, the 30 ft. frontage being actually on the High Street, and within view of the Cathedral about 150 yards away.

The aerials in use were: (i) An 80m dipole; (ii) A 40m/20m trap dipole between two 20 ft. masts on the roof, (iii) A Mosley V3 Junior 10/15/20m vertical, also on the roof. The measured standing-wave ratio of any of these aerials was not higher than 1.20. The three aerials were arranged at right-angles to each other, as far as was possible, to avoid cross-coupling.

The four separate stations, only three of which were in operation at any one time, comprised Labgear transmitters, Eddystone, G.E.C., Racal and Gelsco receivers.

The station was opened on the evening of May 24, 1962 by Mr. Bill Hayes (G2WK), who is the oldest amateur in Coventry. He was very ably introduced by Alderman Stanley of the City Council. G3PZA, the newest call at that time, was also present.

GB3COV was on the air almost continuously from the morning of May 25, until just before 11 p.m. on June 3, from 7 a.m. until 11 p.m. each day. During that period approximately fifteen hundred people actually visited the station, and over one thousand amateur stations were contacted in 67 separate countries. Many of the more distant QSOs were maintained for upwards of half-an-hour.

It is not possible to thank individually in this report the many people and organizations who generously contributed to the success of GB3COV but without their assistance the operation would not have been possible, and the Coventry and District Amateur Radio Group are deeply indebted to them.

J. L. B.



At the Coventry Cathedral Festival Station. From left to right (standing), G2WK, Alderman Stanley, G3PZA, (seated), G3HVU and G2DK.

Photo copyright of R.S.G.B. Coventry and District Amateur Radio Group

THE MONTH ON THE AIR

A CHRONICLE OF EVENTS ON THE HF AMATEUR BANDS

By R. F. STEVENS (G2BVN)*

CONDITIONS during the past month have generally been disappointing and DX difficult to find. 28 Mc/s has produced openings to South Africa and South America around 17.00 with short skip propagation during the middle of the day. 21 Mc/s has on several occasions carried surprisingly good signals from the Far East and the East Pacific area, including VR4, during the late mornings. 14 Mc/s has been the most reliable band but daytime openings have been mainly unproductive and the strongest signals have come from the Americas during the late evenings.

The early morning path to the Pacific has been completely dead on a number of days in contrast to conditions prevailing six weeks ago. Despite the barrage of jammers and broadcasters, 7 Mc/s continues to offer third layer DX for the persevering few although it does seem that overseas stations are not now using this band as much as in the past.

There has been some misunderstanding and confusion regarding the often-expressed wish for QSLs confirming two way sideband contacts to carry a specific statement to this effect. This request is usually made because it is intended that the card resulting from the QSO shall be produced when claiming an award offered for "s.s.b. only" operation. It is a condition of most of the awards relating to this mode that the QSLs shall carry the words *two way s.s.b.* rather than a statement which might result from a s.s.b./a.m. contact, i.e. *telephony QSO*. Examples of this type of award are the WPX SSB and Worked 100 SB certificates offered by CQ Magazine.

News from Overseas

Timor has at last made a genuine appearance on the amateur bands in the call of CR8AB who is operating c.w. on the somewhat unusual frequency of 14,113 kc/s. It will be noted that the prefix now used is that formerly applying to Goa. CR8AB, who is a naval radio operator, is often active between 10.00 and 14.00 but his signals have not been well heard in Europe up to the present. QSL matters are being handled by W4QCW.

At the end of his third and last visit to Tarawa from June 2 to 7 G3JFF writes to tell of the poor conditions prevailing when only two European stations were worked; G13IVJ and OHITM being the lucky operators. 21 Mc/s was useless and 14 Mc/s was dead by 09.30, so that VR1M was forced to revert to 7 Mc/s. A total of 1,083 contacts in 61 countries was made during the three visits to Tarawa, whilst the two short visits to YJ1MA netted 655 QSOs in 59 countries. The more frequent operation from Fiji as VR2EA accounted for 1,280 contacts in 107 countries, whilst Maritime Mobile operation has yielded 2,094 QSOs. QSLs for both VR1M and YJ1MA are being handled by W1HGT, for in the words of G3JFF "I don't think I could have stood writing out all the QSLs as well!". H.M.S. Cook was due to arrive at Singapore on July 10 and G3JFF hopes to be in the U.K. in early September. The only active station in the Gilbert and Ellice

colony is VR1G on Ocean Island as the former VR1B is now VK3IB. VK9RO is leaving Port Moresby shortly and will sign VK5RG. VR2DK is active on most days between 07.00 and 12.00 on 7 and 14 Mc/s c.w., whilst VR2AP may be heard on s.s.b.

5N2JKO (Zaria) attests to the genuine call of 5N2HJA now operating from Minna, but disclaims knowledge of 5N2HA, 'JCF' and 'JEB', all of whom have operated for short periods. 'JKO' mentions the large numbers of Nigerian amateurs at present on leave, activity being in the hands of 5N2RDG, 'LKZ', 'NFS', 'JKO', 'DCP', 'ATU' and 'BRG'. 5N2JKO has spent little time on the air recently and has found conditions poor. He has, however, heard good signals from Europe on 28 Mc/s during the period 15.00 to 19.00.

From East Africa VQ5AU asks that operators do not contact VQ5CSP, 'DS' and 'VG' who are all unlicensed. The VQ5 Bureau is receiving numerous cards for these characters and all such QSLs are destroyed.

ST2AR will be on leave in the U.K. from the beginning of July until September 20 and offers to fulfil any outstanding QSLs if these are addressed to 119 Raeburn Avenue, Surbiton, Surrey. Eric is keen to make a start on s.s.b. but with temperatures daily reaching 110 degrees the urge to commence construction has not shown itself. ST2AR is one of those who have not made use of a QSL manager, in fact he enjoys receiving cards and he likes to know that QSLs are sent only to those he works.

On the subject of QSL managers it has been learnt that an accident in the shack of K4TWF, the manager for XT2Z (9G1DP), destroyed all the logs and incoming cards held at the time. Additionally, it has been discovered that many operators outside of the U.S.A. had not received cards. To



EP2BQ "Mule Mobile" in Iran. He is ex-ZL4JA, G3KWM and VS5JA.

* Please send all reports to R.S.G.B. Headquarters to arrive not later than July 20.



5N2RSB operates this neat station in Kaduna, Nigeria. Equipment includes K.W. Vanguard, Hallicrafters HT17 and B2 transmitters, an Eddystone 750 receiver and an F.B.5 multiband dipole.

remedy the position 9G1DP is now engaged on the task of writing out cards for ALL contacts made from XTZZ, and these will be distributed through the various bureaux in due course. Operators are asked not to write to 9G1DP in the meantime, as cards will be made out irrespective of whether incoming cards have been received. (Tnx G3AIZ).

DXCC News

To correct misunderstanding that has arisen regarding the requirements for cards submitted to the A.R.R.L. for DXCC credit, it is pointed out that no minimum report is required. In confirming this W1WPO mentioned that this was done as an encouragement to honest reporting. However, there are awards which call for a minimum report of RS33 to be shown on cards submitted and operators are advised to check carefully the conditions of the particular award for which they are applying.

As will already have been heard the Republic of Cyprus prefix for amateur stations is now 5B4, and this change took effect from July 1. The country status is unlikely to be affected and the A.R.R.L. have already refused to give separate status to stations located in the British Sovereign Area.

DXpeditions

Tobago, the island of Robinson Crusoe, will again be on the air during the last two weeks in August when VP4NC will be taking along a Viking II to work some DX using a dipole strung between coconut trees. Special QSLs will be available and s.a.e. and reply postage will be appreciated.

Sark will be represented by GC2HFD during the period July 23 to August 12, and activity will be mainly on 3-5 and 14 Mc/s s.s.b. To those unfamiliar with the island it is mentioned that there is no mains supply generally available, and permission for operation comes from the Grand Dame of Sark (Her son was a member many years ago when she was a frequent visitor to Headquarters in Victoria Street —EDITOR). QSLs should go to G2HFD.

Of interest to county hunters on Top Band will be the trip of GW3OYU/P (G3OYU) between August 5 and 12 when operation will take place from Flint, Denbigh, Anglesey, Caernarvon, Montgomery, Merioneth and Cardigan. The periods of operation will be from 20.00 to 23.00 daily using c.w.

From VU2BK via G3UK it is learnt that a QSL card for every QSO between VU2US/AC5 and U.K. stations has been despatched through the bureau. In addition every card received by VU2BK accompanied by IRC has been acknowledged direct; this also applies to s.w.l. reports.

The rarity value of a number of the new African republics has been considerably diminished by the activities of W0MLY who has so far operated from TR8, TN8, TL8 and TT8. Future plans include operation from TJ8 (Cameroun Rep.), SV4 (Togo), and TY2 (Dahomey). All QSLs should go to KV4AA accompanied by s.a.e. and IRC for direct reply. The operating tactics of W0MLY have caused concern with some operators in as much as he usually operates on 14,001 kc/s either on c.w. or s.s.b. The usual procedure is that s.s.b. stations should call between 14,250 and 14,260 kc/s, but some of the more eager have called on s.s.b. 10 kc/s higher than 'MLY, which is the usual c.w. operating instructions. The activities of W0MLY have been sponsored by the Yasmie Foundation, and KV4AA will be pleased to receive contributions towards expenses.

FW8BH commenced operation from Wallis Island on June 23 and so far conditions have favoured European contacts. There was considerable activity by VK3AHO from YJIRH, but unfortunately conditions did not permit worthwhile U.K. contacts. QSLs should go to W4ANE. Transportation difficulties apparently prevented operation from FW8 according to the original schedule but the present operation should considerably reduce the rarity value of this DX'otic spot.

A last minute note from G5RV gives the revised dates of his trip to Andorra operating under the call PXIRV as August 21 to 31. C.w. and s.s.b. will be the modes used mainly on 3-5 and 14 Mc/s.

Contests

The Eighth WAEDC will take place as follows: c.w. 00.01 August 11 to 24.00 August 12; telephony 00.01 August 18 to 24.00 August 19. The object of this contest is to promote contacts between stations in Europe and those in the rest of the world. The QTC-Traffic feature for the c.w. portion of the contest has been retained, and operators intending to take part may obtain a four page leaflet dealing with this contest by sending a s.a.e. to G2BVN.

The following high claimed scores resulted from the A.R.R.L. DX Contest held during February and March. C.w.—HC1AGI 826,677; W4KFG 728,856; W3ECR 665,873 and W3GRF 642,252. Telephony—W1ONK 374,730; K2GXI 348,445; XE1CV 327,510 and K5MDX 259,530. All these were in the single operator classification.

Awards

From G8PL it is learnt that there have been delays with the W-10-M (Minsk) award, and that delivery by registered mail does not always ensure safe receipt in the U.K.

QTH Corner

AP5JA	via AP5CP
CR8AB	via W4QCPW
FY7YF	via W2FXA
FY7YI	s.s.b. operation during April, via W4JQM.
HH2PW	P.O. Box 943, Port au Prince, Haiti.
HK1AAF	via W2CTN
PXIRV	via G5RV
TG9GZ	Box 25A, Guatemala City, Guatemala.
TG9MO	P.O. Box 115, Guatemala City.
UP2NV	Box 310, Kaunas, Lithuanian S.S.R.
VK2VC/VK2	via W4ZRZ
VPIAM	P.O. Box 411, Belize, Brit. Honduras.
VP2KJ	via W4SSU
VP2SH	Box 142, St. Vincent, B.W.I.
VP4WI	via W4ORB
VR3L	Christmas Is. A.R.C., B.F.P.O. 170, c/o P.M.G., Honolulu, Hawaii.
ZA1GB	via W2FZY
3A2GZ	via ON4QX
4U1ITU	Box 11, I.T.U., Geneva 20, Switzerland.
6W8DD	N. Le Gall, B.P. 190, Dakar, Senegal.
9K2BZ	A. Kesteloot, Box 3488, Kuwait, Arabia.
9Q5HL	Box 427, Elizabethville, Congo Rep.
9Q5PR	Box 281, Cidra, Puerto Rico.
5B4 QSL Bureau	P.O. Box 216, Famagusta, Cyprus.

R.S.G.B. QSL Bureau: G2MI Bromley, Kent.

SP6AAT advises that **Millennium SP-Award** certificates are now available from the printers and will be despatched to claimants in the very near future.

The attention of claimants for **WAC** certificates is drawn to requirements of confirmed contacts with six continents, whereas the **WBE** certificate requires confirmations from only five continents. Full details of R.S.G.B. awards are given on a leaflet available from Headquarters, to whom all certificate claims should be sent.

The attention of non-members is drawn to the requirement that all applications for **WAC** certificates must be accompanied by a remittance for 7/-. This award is issued free of charge to R.S.G.B. members.

If cards for an award offered by an overseas society, e.g. D.U.F. are sent to the Society's Honorary Certificates Manager for checking, sufficient postage must be included to cover (a) return of the QSLs to the applicant, (b) forwarding of the application to the overseas society concerned, and (c) any expenses requested by the issuing society. In the case of the D.U.F. the latter is one I.R.C.

The **Directory of Certificates and Awards** published by K6BX may be ordered through G2BVN. The cost, including supplements for one year, is 30/-. A three-ring binder to hold the **Directory** is available for an additional 7/6d. The **DX-QSL-NL**, published quarterly, and giving QSL information for over 2,000 stations, is available at an annual cost of 11/6d. Both these publications are produced and handled on a non-profit basis.

Around the Bands

The only comment on 3.5 Mc/s conditions comes from B.R.S. 20317 (Bromley) who reports very little of unusual interest, particularly noting that the DX s.s.b. activity has died away, at least in so far as the U.K. is concerned. Our reporter heard UA0PG in Zone 18 at 23.40, whilst from the opposite direction VE1ZZ has been a consistent signal at 23.30, with W1JNL heard at 23.40. From the South 9Q5AAA was heard at 23.00 on 3,508 with weak signals bringing B.R.S. 20317 up to 110 countries on this band.

The 7 Mc/s band is still afflicted by jammers but the level often falls away after 23.00. A good catch by our reporter was VQ9AA on Aldabra with S6 signals at 22.53. After working OH2YV and GW3KSQ, VQ9AA called CQ several times but there were no audible takers! VQ9A was worked by G3PIT at 01.18, but there is little DX reported from the African continent. G3JAG (Rochdale) worked VK3, VK4, VK5 and VK7GV (06.30), ZL2 and ZL3 around 06.00, with PY1 and PY4 between 05.30 and 06.00. Other South American stations contacted were HC1DC (04.00), KZ5MQ (05.30) and YV5BLP (03.45). VP8GQ has been heard several times around 05.00 but no QSO has yet resulted. 'JAG' points out that the band opens on most days to VK between 05.30 and 06.30. From the West B.R.S. 20317 reports VP9AK (23.00) with K6OWE, K5KGC and W6RW around 06.30, the latter being a good signal. Europe provided a new one on this band with 3A2CZ at 06.30.

14 Mc/s has been the most reliable band for DX although the casual listener might well doubt this statement. G3HDA (Stratford-on-Avon) worked on c.w. CP5EZ (21.42), CR6CH (18.40), EP2BN (21.02), FG7XM (21.43), JZ0ML (16.12) W0MLY/TL8 (17.23), W0MLY/TR8 (20.20), UA1KED (07.22 Franz Josef Land), VP2KJ (06.57), VP8GQ (18.37), VQ9A (20.15), ZD7SE (19.15) and ZA1GB (21.40). Heard were BY1PK (21.45), CR8AB (14.52), VR5AA (06.58), ZD8JP (22.00) and ZD8RN (19.00). G2FFO (Burnley) remarks that band conditions are better than one might expect at this stage of the sunspot cycle and records with pleasure a 235/217 total. Recent QSOs include ZA1GB (18.50)—one of the few ZA stations from whom QSLs may be expected—W0MLY at his stops in Gabon and the Central African Republic, VP2KJ (07.05) which resulted in a swift QSL from W4SSU, and 4U1ITU (18.25), the I.T.U.

station at Geneva. G2FFO also QSOd his first Corsican station in F2CC/FC and would appreciate QSL information on this one. VR5AA (09.30) was heard with RST559 signals and mentioned that he was using a rhombic. The operation by this new station is believed to have stemmed directly from the DXpedition to Tonga by VK4RZ. Continuing on c.w. G8PL (London) worked/heard: 05.00-06.00. HH2FA, KH6DKA, KZ5MQ, ST2AR, SU1IM, VP2KJ, VP7NY and 4X4HB. 06.00-07.00. EL4A, FO8AN, KH6s, PK4s, TA3AT, TG9AD, TI2WR, CX3BZ, UI8s, UL7s, ZC4SJ, 4U1ITU, 5A3BC and 9G1CW. 08.00-09.00 yielded E10AB, KL7s and strange sounding YZ3A/P. The latter gave his QTH as Apian Waye, Cairo, and was apparently worked by a number of stations, without much hope one imagines! Before moving QTH G3PSY (Hornchurch) raised EL4YL (07.43), HK1AAF (10.57), K7LET (05.30), KZ5LC (22.37), VS6EC (15.35), YV1AD (07.07) and 6W8DD (22.30). The score at G3PSY is now 74/39 since operation commenced four and a half months ago. B.R.S. 1066 (Cheltenham) used his HRO receiver to log: AP5CP (23.40), AP5HQ (22.40), FG7XE (21.15), FG7XM (22.15), HR2FG (22.55), OA4FM (22.30), SU1IM (23.25), UI, UJ and UM, VU2AS (23.00) and YN1AA (23.00). A.m. has offered little on this band but A.2452 (Addington) reports HC2JF (05.00), MP4MAH (16.00), TF2WGN (06.00), VP9DL (06.00) and ZS4PB/ZS9 (16.00). Sideband vies with c.w. as the mode producing the most DX signals and propagation has permitted QSOs with KB6CL (07.00), KW6CJ (08.30), KH6s, KG4AO (22.15), W0ANJ/KP6 (08.10), WA6AGB/KM6 (07.30), VR3P and VR3S (08.30), VR6AC (06.30) and ZL4JF (07.00 Campbell Island,) which is as good a collection of DX as one could hope to unearth at any stage of the sunspot cycle. DXpedition operator VK3AHO enabled many operators to add the rare FW8BH to their logs when putting in good s.s.b. signals to Europe between 08.00 and 09.00 Africa has produced sideband signals from W0MLY when operating in TL8, TN8, TR8 and TT8, although sideband on 14,001 kc/s is proving unacceptable to some operators. However, as pointed out by 'MLY', if he operates in the conventional portion of the band according to the mode he is using then with the comparatively low power available his QSO rate would diminish considerably, and after all if he is on everybody knows where to look for his signals. This is all probably very worth while providing the habit does not spread to other less skilled operators. Logs are acknowledged from A.2340, A.2404, A.2423 and A.2452, all of whom have obviously heard the same stations at various times.



VQ2AT, seen here with his wife who looks after the station records, is active on all bands, usually on s.s.b.

The 21 Mc/s band has yielded some excellent signals from the Far and Near East and from Africa, typical a.m. loggings being CR7CO (11.15), MP4BCP (17.40), MP4TAC (11.25), TN8AD (18.10), TT8AL (10.00), CR5SP (07.15) JAs (10.00-12.00), VS1GC (07.55), VS4RS (13.45 and a potent signal), ZD6RM (15.10) and 9U5JF (18.15), this information coming from A.2340 (Plymouth). Also worked on this band was VR4CB who was heard at reasonable strength for over an hour around midday on 21,200 kc/s a.m. G3PSY adds EL3AF (14.03), HK3TH (23.30), OH2AD/0 (10.15), VE7CE (08.55) and 6O1MT (17.10), all on c.w. For the month ahead reasonable openings to South Africa (14.00-18.00) and South America (18.00-21.00) are probable, and there will also be considerable sporadic E propagation yielding contacts with Europe.

The 28 Mc/s band produced signals from a southerly direction and B.R.S. 24642 comments on the excellent strength of TN8AD. Other loggings include EP2BE, UA2AW, UA6s, ZE2JA, ZS6s and 5N2JKO. Unfortunately the openings on this band are often of short duration and it seems probable that the paths to South America (15.00 to 20.00) and South Africa (14.00 to 18.00) will be the only ones to yield worthwhile signals during the ensuing weeks.

National Field Day activity by the Cyprus Amateur Radio Society involved two portable stations, one operating with the call ZC4FD/P from a sea level location at Kyrenia on the north coast of the island, whilst the other (ZC4PB/P) was located at Kantara about 1,800 ft. a.s.l. and 33 miles away from the station at Kyrenia. ZC4s AB, FC, IP, JB, PW and TX operated the Kyrenia station where the transmitter was a Viking Ranger running 60 watts with an aerial 320 ft. long orientated in the direction of the U.K. A total of 92 portable stations in the U.K. were worked from this location. ZC4PB/P was manned by ZC4s 'CK, 'CS, 'FB, 'OS, 'PB, 'SB, 'WD, 'WS and members of the club stations ZC4SS, aided by the efforts of G3MNU as cook. The equipment used was a home-built transmitter running 150 watts and aerials comprised a Vee beam (274 ft. per leg), a 14 Mc/s dipole and a ground plane. With the aid of a Racal RA17 and a Eddy-stone 888A, 114 U.K. portable stations were worked. ZC4PB comments that after the first six hours operating conditions became difficult due to strong winds which threatened to deprive the operators of cover, and also that the curtain of inter-U.K. working was difficult to break through.

DX Briefs

From July 1 the Trust Territory of Ruanda-Urundi has been divided into the two independent countries of Burundi and Rwanda. It is believed that these will now count separately for DXCC.

ZD8RN has been heard on 14 Mc/s c.w. usually in the period 22.00 to 02.00. It is understood that the power used is 25 watts only. The address will be found in QTH Corner.

G3AGF, who also holds the call ZC4GF, will be returning to Cyprus in early September when he will again be on the air this time as 5B4GF. It is hoped to operate on 1.8 Mc/s during the coming winter.



ZC4FD/P with the Kyrenia range in the background during N.F.D. The other Cyprus N.F.D. station was on the top of this range. The photo was taken from the top of a windmill which supported one end of the long wire aerial.

VS9AAC recently arrived in the U.K. from Aden and will shortly be operating under the call G3MOJ. VS9AGA, another member of the Kamaran Island DXpedition, is also QRT from Aden and hopes to be on the air with a G call in the near future.

The male side of the family of W9WCE consists of youngest son WN9BHI, who has just acquired his Novice licence at the age of 14 years; Ed, K9LBL, at Indiana University; Tom, K9KFS, with the Indiana State Police, and Charles, K9JGK, now operating as KL7ECO from the Aleutian Islands. Truly a radio active family!

A.2340 of Plymouth raises the question of the legality of QSOs with stations whose licence status in their own country may be open to doubt and quotes TA2BK and TA2AR as examples. Although the latter has permission to operate, no licences have yet been issued in Turkey, although the matter is now under consideration. To the recollection of G2BVN the A.R.R.L. have accepted for DXCC credit QSLs from certain stations whose illegality has never been in doubt, and the example of Bryan Bisley operating /4W1 under the wing of a parked aircraft immediately comes to mind.

4UIITU located in the I.T.U. building at Geneva has been well heard in the U.K. on all modes. Regarding separate country status it is learnt that it is possible that one separate country will be created for all United Nations stations. The QSL address will be found in QTH Corner.

There has been some operation under the call F2CA/FC but the rightful owner is at present in France, and any recent transmissions have been of piratical origin. (Txn GM6IZ).

Acknowledgement is made to the DX'press (PA0FX), the West Gulf DX Club Bulletin, The DX'er (K6CQM) and to our numerous correspondents. Please send all items for the August issue to R.S.G.B. Headquarters to arrive not later than July 20.

QRA Locator Maps

COPIES of the British Isles QRA Locator Map are now available from Headquarters, price 2/6 post paid.

4U1ITU

By JANET MILNE *

4U1ITU, the station of the International Amateur Radio Club, was officially opened on Sunday, June 10, 1962, at the new Headquarters of the International Telecommunication Union in Geneva.

Mr. Gerald C. Gross, Secretary of I.T.U., ex-W3GG and now HB9IA, sent a greeting in Morse to all radio amateurs. This first transmission began a 24-hour period of continuous working of the station by amateurs, some resident in Geneva and some representing national societies. Among the operators were HB9SI, ex-PA0BB, HB9UD, DL3DU, G8KS, W4KVV, PA0FX, SM5ANV and F9DG.

The equipment which includes an HT37, SX101A, HT33A, SX115, HT32B and HT33B was presented to the club by Mr. Travers Marshall (K9EBE) on behalf of the Hallicrafters Company. The station uses a four element tri-band rotary beam presented by W2YEJ. Mr. Gross accepted the equipment on behalf of the governing body of I.T.U. and then spoke of his personal pleasure in seeing the inauguration of the club under the presidency of Mr. John H. Gayer (DL4ZA), who is vice-chairman of the International Frequency Registration Board. Vice-presidents are HB9AAB and OK1WI. The secretary is HB9SI.

After the ceremony of cutting the ribbon had been performed by Mr. Marshall and the first transmission sent by Mr. Gross, the meeting adjourned to the Council Chamber where greetings were received from representatives of national societies and individual amateurs who work in the various organizations in Geneva. Among those who spoke were John Huntoon (W1LVQ) for A.R.R.L., PA0FX for V.E.R.O.N., F9DG for R.E.F., SM5ANV for S.S.A., G8KS, DL3JE for D.A.R.C., SM5ABC. G2MI who had received an invitation to attend was represented by the writer who handed to Mr. Gayer a copy of the R.S.G.B. *Amateur Radio Handbook* for the club library.



From left to right, HB9SI (secretary of the International Amateur Radio Club), HB9UD, OK1WI (Vice-President), DL4ZA (President) and HB9AAB (Vice-President).

The purposes of the International Amateur Radio Club as explained by the Secretary, Walter Baumgarten (HB9SI) are:

- (i) Through Amateur Radio, to further international friendship and understanding;
- (ii) To co-operate with all radio amateur associations;
- (iii) To promote use of the frequency bands allocated to the Amateur Radio service, and
- (iv) To provide the organization through which the I.A.R.C. radio transmitting and receiving station will be managed and operated.

Membership is open to all staff members of international organizations such as the I.T.U., the United Nations, the European Centre of Nuclear Research (C.E.R.N.) and others. Delegate membership is open to all official delegates to conferences held by international organizations and associate membership is open to all other licensed radio amateurs upon their expressed request to become associate members of the club. All amateurs holding an Amateur Radio licence are welcome to operate 4U1ITU in accordance with the station rules. The station will operate on 2, 10, 15, 20, 40 and 80m.

All three modes will be used: c.w., a.m., and s.s.b. The club also plans to take an active part in many contests and may organize some in the future. The Oscar satellite projects will have its full attention and some special equipment which covers the Oscar frequency has already been received and tested.

Many amateurs were present at the opening of the station and more arrived at the reception organized by Hallicrafters in the evening. Among them were PA0CS, HE9KKE, OH2RD, 9Q5JC, G3MIR, IIJKA, W2YEJ, ZC6UC and W3AKS of *CQ* magazine (George Jacobs), who with his engineer recorded the opening ceremony for *Voice of America*.

Many YL's and XYL's were present at a tea party arranged by W2YEJ-XYL and Mrs. Inger Bonthiaux and at the reception in the evening.



This photograph was taken on the steps of the I.T.U. Building in Geneva after the official opening of 4U1ITU. Mr. Gross, HB9IA, secretary of I.T.U., is in the front row, third from the right.

Single Sideband

By G. R. B. THORNLEY (G2DAF) *

OVER the years this feature has commented on many differing aspects of single sideband, considering each from the technical and constructional standpoint. In particular it has been necessary while dealing with linear amplifiers to delve rather deeply into purely theoretical considerations.

This month it is proposed to deal with non-technical, although equally important, matters in a somewhat lighter vein. In particular the intention is to offer help and advice to the newcomer to single sideband who is often considerably disconcerted—should I say, sometimes shattered—by adverse criticism of his transmission.

Here then, in the form of comment and snappy answer is your scribe's advice. Where more than one answer is applicable these are given in alphabetical order. In each case the final answer is designed to "shoot the other man down in flames" and leave no room for further adverse comment. This is given against the appropriate letter (k) for "killer."

Five Years on s.s.b., or Answers I Have Heard

Report: Your v.f.o. is drifting!

Reply: (a) Yes, I know OM, I have just switched on from cold.

(b) Yes, I have complained to the Electricity Board—its due to my mains voltage variation.

(c) My v.f.o. can't drift—it's a Clapp.

(k) I am crystal controlled OM!

Report: Your sideband suppression is very poor!

Reply: (a) That's funny—I have just worked G9BF and he said my transmission was very good.

(b) Sorry OM, this is only a phasing rig.

(c) I normally work on 20 metres and I never get this kind of report on that band. I don't see why my sideband suppression should alter when I come on 80.

(d) This is a two half-lattice filter exciter—the fault must be in your receiver i.f. amplifier.

(k) My transmitter uses the third method of sideband generation!

Report: You are off frequency!

Reply: (a) I don't know who to net on.

(b) I have just built this rig and I haven't put the dial on the v.f.o. yet.

(k) I am zero beat into my receiver. The rest of the net must have moved!

Report: You are grossly overdriving and there is considerable splatter on your signal!

Reply: (a) Sorry OM, I have just come off 20 metres and forgot to turn down the gain control.

(b) You must be mistaken OM. My transmitter has a peak limiter control and this has been set by the maker.

(c) I never get these reports when I work DX on the h.f. bands.

(k) I have just worked G2DAF and he said my transmission was very good!

Questions of the Month—Together with the Answers

(i) Under what conditions does a product detector offer most discrimination to a.m. signals?

Considerable laboratory experiment has shown that this occurs when the heater supply is disconnected.

(ii) If the station you are working complains of interference on the channel and suggests you QSY, what do you say?

Tell him you can't hear anything and that it is cross modulation in his receiver.

(iii) I am testing out my recently completed sideband

transmitter and receive a report that I have 6db sideband suppression, am frequency modulating my carrier, have bad audio quality and considerable splatter. What should I do?

This is a most complex question, but after very careful consideration and after reviewing all the relevant factors, the most appropriate course of action would be to disconnect the power supply.

(iv) I have been working a.m. for many years and enjoy a regular net with three other stations. As we like snappy operating we keep our overs short and pass the transmission round every 10 to 15 minutes with a pause for any break-in station. Will this procedure be all right when I come on s.s.b.?

If you adopt this procedure on s.s.b., you will find when you stop talking that the net is chatting away gaily—but not on your frequency.

(v) Which commercially manufactured amateur receiver is the best available?

This is always the one you haven't got—but the one in use by the station you are working.

(vi) My mechanical filter transmitter has a rather narrow passband and I would like to widen this. Can you offer any advice?

Yes—cut the filter in two with a sharp hacksaw and reposition with the two halves spaced 3 kc/s apart.

(vii) I have built an electronic VOX system into my transmitter, and yet I find on occasions that I have been doubling with the other station. How should I cure this?

This can only occur when sound is going into your microphone at the same instant of time that sound is going into the microphone of the station you are working. This can be easily cured by a simple procedure at your end. Keep your top and bottom teeth clamped together and at the slightest sign of slackness of your jaw muscles, instantly switch off the microphone.

(viii) I am getting persistent reports of carrier on my signal and although I have tried a number of different balanced modulators I have been unable to effect an improvement. Can you help?

If you can't avoid radiating a carrier, this can be turned to your advantage in the following way. Build a second exciter and connect this to your aerial in parallel with the first one. Adjust both transmitters to the same frequency. If the two carriers do not cancel each other out but reinforce, alter the phase of one exciter by reversing the carrier crystal in its holder.

Hints and Tips for All

(i) When calling into an 80m net, never say, "G . . . on the frequency." It will be a miracle if you really are!

(ii) When you get to the end of your transmission don't say, "Break—break!" This ridiculous expression is quite unnecessary. The other man is bursting to talk too. Just stop transmitting and he will be there—faster than the rise time of a Tektronix oscilloscope. Try it and see.

(iii) If you cannot read that weak VE or W calling the 80m net, it is not necessary to admit that you have a rosey receiver. You can usually get away with it by saying that you are getting bad QRM from next door's vacuum cleaner. However, if it is one o'clock in the morning you will have to think of something more likely—how about splatter from an electric blanket?

(iv) If a station comes on the band calling CQ and persisting in using phonetics—particularly the latest version—go back to him, and play him at his own game. This never fails. The following is an example:

"CQ—CQ—CQ 80. Golf 2 Hotel Juliet Kilo calling!"

"G2HJK—G2HJK—G2HJK. This is Gaggie 2 Daggie Aggie Faggie calling. You are Romeo 5 and Sierra 8 with Quebec Romeo Mike. My handle is Delta India Charlie Kilo, I spell D-I-C-K. What is your Quebec Tango Hotel and your handle Oscar Mike?"

If there is no reply, Queen Sierra Yankee and call Charlie Quebec!

* 5 Junice Drive, Fulwood, Preston, Lancashire

RTTY

A Quarterly Review of Amateur Radio Teleprinting News and Views

By ARTHUR C. GEE (G2UK)*

CONTINUING the quarterly effort to get a quart into a pint pot, inclination would suggest that in this month's article, instead of keeping to our programme, we should instead describe the RTTY station at the V.E.R.O.N. Headquarters station PA0AA, which the writer has had the pleasure of visiting recently. However, this must wait, as the promise must be kept to describe the modifications to a transmitter to make it suitable for transmitting f.s.k. RTTY signals.

It has already been seen that what is required is to vary the frequency of the transmitter by a predetermined number of cycles—850 for most amateur RTTY work—so that the two tone signal described in a previous article is obtained. This can of course be done in a number of ways but there is space to deal with only one here, so that chosen is a straightforward, conventional circuit which experience has shown gives little trouble. It has been applied to a popular v.f.o. unit which is available in kit form in the U.K. The same type of circuit can be incorporated into any other v.f.o. circuit.

The circuit diagram (Fig. 1) is more or less self-explanatory. An EB91 double diode is used as a keying valve to vary the voltage on the screen of the v.f.o. The degree of variation is controlled by the 1 Megohm potentiometer. The amount of shift can be varied by the potentiometer from nil to well above the 850c/s required but it is reiterated that the v.f.o. must be really stable. A drift of literally a few cycles per second will produce a most annoying change in the audio tones at the receiving end. The technical standards required in a good RTTY transmitter are consequently high and the crystal

oscillator-mixer type of v.f.o. such as that designed by G. F. Gearing (G3JJG), and described in R.S.G.B. *Amateur Radio Handbook*, has very much to recommend it.

It will be apparent that the simple f.s.k. arrangement described suffers from the disadvantage that when changing from one amateur band to another, the f.s.k. frequency is also doubled or trebled, so that it becomes necessary to adjust the f.s.k. setting every time a change of bands is made. Those with s.s.b. transmitters score heavily here, as they can produce an f.s.k. signal from their transmitters by simply feeding a two tone audio signal in to the modulator section and this does not change on bandshifting. The amateur transmitter of the future will obviously be an s.s.b. one with provision for RTTY along the lines of the Hammarlund HX500. All that is now required is for some firm to come along with a reasonably priced teleprinter designed for amateur use and RTTY will become as common as the present modes of amateur radio communication.

The New RTTY Handbook

In conclusion, a short review of the *New RTTY Handbook*, by Byron H. Kretzman (W2JTP), published by the Cowan Publishing Corp., at \$3.95. Whilst this of course deals solely with American machines, the rest of the book, which covers RTTY receiving and transmitting equipment, accessories, setting up a station and RTTY operation, is thoroughly applicable to RTTY operation here. This book is a "must" for the RTTY enthusiast, no matter in which part of the world he lives. There is little enough published on amateur RTTY and this *Handbook* is a much welcomed effort to fill the gap.

* East Keal, Romany Road, Oulton Broad, Suffolk.

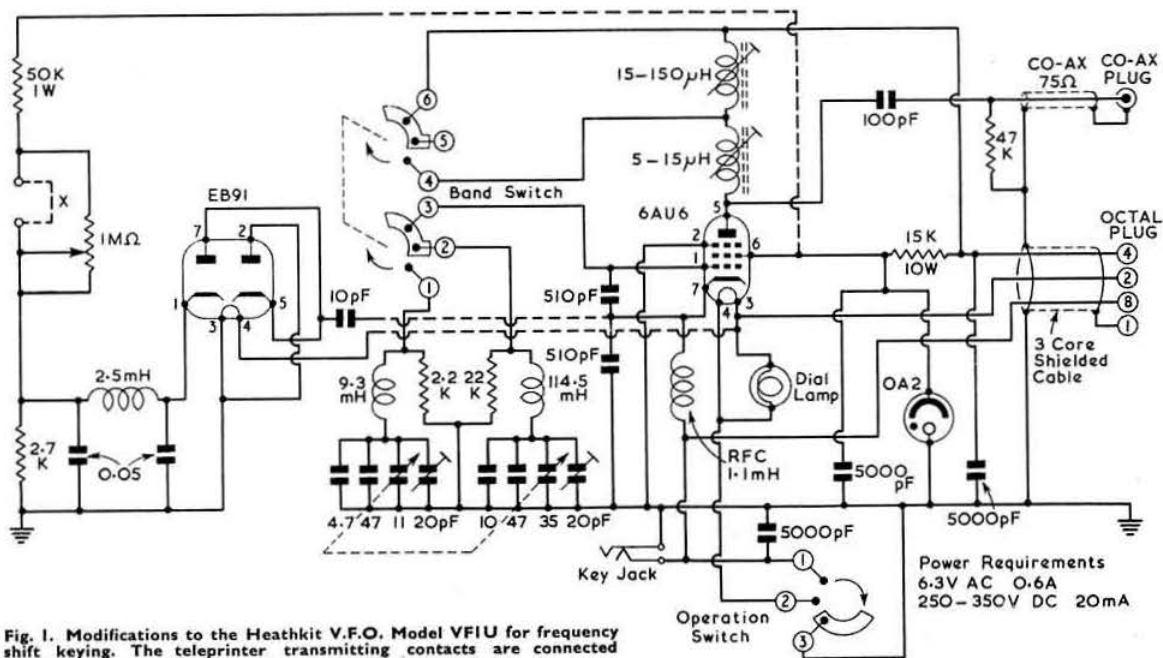


Fig. 1. Modifications to the Heathkit V.F.O. Model VFIU for frequency shift keying. The teleprinter transmitting contacts are connected across point X

Project Oscar

By W. H. ALLEN, M.B.E. (G2UJ)*

AS indicated in the late flash in the June BULLETIN, *Oscar II* went into orbit on Saturday, June 2, 1962, at 00.32 G.M.T. Unfortunately there was no prior warning of the launch available on this side of the Atlantic and it would appear that little if any information was given to the Project Oscar Association until orbit had been achieved.

The first news came to the writer on the Saturday morning via G3OSS that G3CCH (Scunthorpe, Lincs.) had received signals from the satellite between 06.10 and 06.15 G.M.T. and that G3LTF (Danbury, Essex) had heard them about an hour and a half later.

It very soon became obvious that the orbit was not quite that followed by *Oscar I*, but lack of precise details of the orbital elements for some considerable time made it impossible to produce predictions of any reliability. As soon as data was available this was passed to Bill Browning, G2AOX (Hendon), who, repeating his good work on *Oscar I*, kept the Radio Research Station of D.S.I.R. at Slough fully advised of all passes which he received.

Apart from *Oscar II* following a less polar orbit than *Oscar I* (an inclination to the equator of 74 instead of 81 degrees), the initial height was less and decreased rapidly thus causing the time per revolution to decrease also. This brought in its train a number of additional effects due to the shape, weight and attitude of the satellite, all of which added up to the fact that predictions covering more than a day or two ahead were not a practical proposition, and it was decided to omit any reference to these from the Society News Bulletins broadcast over GB2RS, rather than give what could have been very misleading information.

The frequency of *Oscar II* was, to the second decimal place, 144.99 Mc/s, and the "Hi-rate" quite a lot slower than its predecessor. The time taken for a revolution varied from nearly 91 minutes at the start to approximately 87.4 minutes just before signals ceased between 09.10 and 10.31 G.M.T. on June 2, 1962. It is believed the satellite came to an end in the vicinity of Helsinki, Finland.

We should like to take this opportunity of expressing our appreciation of the assistance given by D.S.I.R. via Ray Flavell (G3LTP), Bill Browning for his detailed reports and invaluable service to other observers in making his very accurate short-term predictions available to them on the

* Project Oscar Co-ordinator for the U.K., 24 Arundel Road, Tunbridge Wells, Kent.

GB2RS SCHEDULE

R.S.G.B. News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kc/s	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.30 a.m.	North Midlands
	11 a.m.	North East England
	11.30 a.m.	South West Scotland
	12.00	North East Scotland
145.3 Mc/s	11.15 a.m.	Beaming north east from Sutton Coldfield
	11.30 a.m.	Beaming north west from Sutton Coldfield
	11.45 a.m.	Beaming south west from Sutton Coldfield
145.1 Mc/s	12 noon	Beaming north from South East England
	12.15 p.m.	Beaming west from South East England

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from Affiliated Societies and from non-affiliated societies in process of formation will be welcome.

2 metre band, to Bill Brady of the United States Information Service, to Bernard Howlett (G3JAM) for the provision of prediction charts and last, but not least, to all those who wrote and telephoned details of their observations.

All-Kodak Amateur Radio Directory

A LIST of radio amateurs employed by the Kodak organization throughout the world has been compiled by Larry Triggs (W2YBK).

Corrections and additions for future editions from Kodak employees in the U.K. should be sent to L. H. Fielding (G3MJF), 397 Torbay Road, Harrow, Middlesex.

"V.H.F. Aerial Materials"

ON page 572 of the June 1962 issue of the BULLETIN, the expression in the righthand column for the integration of the power loss over the whole aerial should have read " $0.5 I_{in}^2 R_{r,f}$ or $I_{in}^2 \times 0.5 R_{r,f}$."

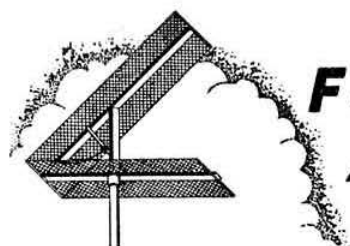
Uncle's Southend Party

THE Annual Southend "Do" organized by W. E. Nutton (G6NU) will be held this year on July 29. The rendezvous will be at the land end of the Pier, top entrance, from 12 noon. All radio amateurs and their families will be most welcome.

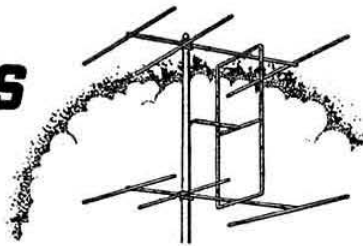
The programme will include visits to local shacks, tea and raffles.



The men behind Project Oscar. Included in this photograph are the directors of the Project Oscar Association Inc together with other amateur consultants called in for the meeting. Those present include W6EJU, W6HEK, W6SAI, VE2AGF/G2CIN (Communications Director), K6LFH (Chairman), W6OON, W4IJC/6, K6JJC and W6OLO.



FOUR METRES AND DOWN



By F. G. LAMBETH (G2AIW)*

THERE has been some comment on the difficulty of obtaining the full number of countries and counties for the 70 Mc/s section of the "Four Metres and Down" Award, and after careful consideration, the V.H.F. Committee has recommended, that, at least for the present, the requirement shall be three countries and 20 counties for this section. The requirement of five countries and 30 counties for the other v.h.f. bands is unchanged. Claims for these awards should be sent to R.S.G.B. Headquarters from where they will be acknowledged and submitted to the V.H.F. Committee for checking. When claiming for any of these awards please make certain to send a detailed list with your cards. Checking is a very tedious process unless this is done, and delay in issuing certificates may occur.

Two Metre News and Views

A welcome letter from F3SK reports that he regularly works EA2BJ (San Sebastian) who is, he believes, the doyen of Spanish amateurs (he is 76 years old). QSOs with EA2DS (Bilbao) are also regular. This is better than it seems as the path is beset by high mountains. F3SK says he cannot understand it at all! He hopes to spend some of August on the Channel Coast with F8MX/A at the block-house, and looks forward to "meeting" old friends again.

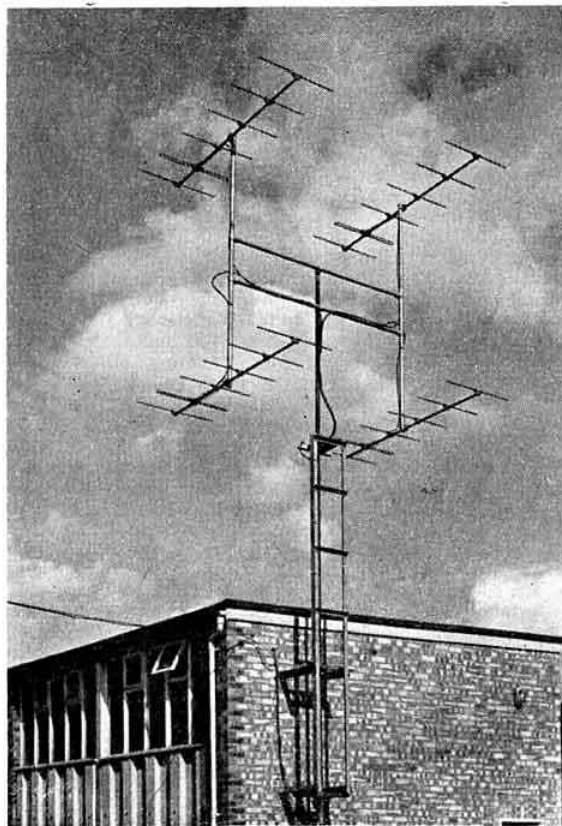
GM3POK (Edinburgh) says that there are two new stations active—GM3PAK (Edinburgh) and GM3PCQ (Dunfermline). GM3GMX/M (home base Cheshire) has been operating from 10 miles south of Edinburgh recently. GM3EGW has been working several Gs and GIs lately. Additions to the recent list of active Gs are GM2TW, GM3FJP, GM6RZ, GM3BBW, GM3BDA and GM3MUT. GM3POK has worked 36 stations since November 1961—all GM calls—somewhat hard going! GM3MUT (Black Isle) has been heard on phone in Edinburgh.

During N.F.D. GM3OFY/A at the N.F.D. site of the Ayrshire Group was situated 600 ft. a.s.l. at Mauchline Hill Top, approximately 10 miles east of Ayr. It was the Group's first v.h.f. project and with fine weather, was generally accepted as a success. The equipment comprised a 6-over-6 aerial; 6CW4 pre-amp and converter into an Eddystone 740; 829B at 60 watts, modulated by two 1625s in zero bias class B. On the Saturday, between 18.25 and 23.30 G.M.T. the following were worked: G13OTF, G15AJ, GM2UU, 3DIQ, 3JRP/P, 3DIQ/M, 2CHN, 3PMB, 3DDE, 3BCD, 6XW, 5VG, 3GUO, 3JFG, EI2W and EI2A. On Sunday at 00.15 G13GXP was worked and between 09.15 and 16.35 G.M.T. G13OYF, G3JZN/P, 3JYP, GM3PMB, 5VG, 2FNF, 6XW, 3FYB, 3JRP/P, 2UV, 3LAW, 3OCV/P, EI2A and EI7D. The most noteworthy contacts were with GM3JFG in Invergordon, Ross-shire, and G3JZN/P (Fleetwood) running only 10 watts at sea level. GW2HIY was heard at S8. All signals were S7 or over with an occasional exception. The contact with GM3JFG was the more interesting because nearly half of the distance was over mountain country rising to 3000-4000 ft. and some of the most rugged in Britain.

* R.S.G.B. V.H.F. Manager, 21 Bridge Way, Whitton, Twickenham, Middlesex. Please send all reports to arrive by July 20.

GM2CHN reports that there were three such groups working during N.F.D.; the other two were GM3JRP/P with the Glasgow Group, near Fenwick, Ayrshire, and GM3OCV/P from the grounds of Carfin Hall, Lanarkshire. All three were worked by GM2CHN from his home QTH and he then visited the Fenwick station, Glasgow, after the usual teething troubles, went on to make 22 contacts including G1. GM2CHN was very happy to provide GM2UU with his first contact into Glasgow on June 2.

G3LTF (Galleywood) had a QSO with GM3EGW on June 7 but the signals were very weak. For a few days up to June 14 things were good to France and Holland, but the favourable conditions did not appear to go further than that.



The 144 Mc/s aerial system at G3EDD (Great Wilbraham, Cambridgeshire). The measured gain of the array, which was designed by ex-G4MW, is 16db. The aerial was manufactured by Telecommunications, Dublin. (Photo by courtesy of Pye Telecommunications)

G3EDD (Gr. Wilbraham) has been hearing **GB3CTC** occasionally, at best 559, but most of the time about 51.

G2DHV/M will be "out and about" between August 11-18, from Exmoor Heights (Somerset). The home station is now running at 40 watts on 145.25 Mc/s with a 6-over-6 slot beam for portable operation.

G3PBU (Wolverton) started on 2m last July running 8 watts to a QOV02-6 with a 6-over-6 slot at 28 ft. and an E88CC cascade feeding two receivers at 4-6 Mc/s. The site is 250 ft. a.s.l. with a good take off. Earlier this year the power went up to 100 watts c.w. and 60 watts phone with a QOV06/40A. The score is now 12 countries, 45 English and one Irish counties, and everything bar four counties was worked on the QRP rig. The usual operating frequency is 144.96 Mc/s. Recent QSOs include four countries on June 15 when **E12W**, **G13GXP**, **GW3JEQ/P** and several northerly Gs were worked. **GB3CTC** is a fairly consistent 51/4 signal.

G3NBQ (Coventry) found conditions on 2m very poor to good with a similar variation in the weather. On the whole the level of activity was lower than last month despite the very good conditions from June 3-7. Many stations in the London area were heard (some complaining about poor conditions) but could not be raised. This, however, does not apply to **G3JHM/A**, **G3OSS**, **G3KEQ**, **G2JF**, and **G3NGS**. May 17 produced very poor conditions and **G3KEQ** was heard to remark that "this must be a new low" with **GB3VHF** falling to S2. After this **GB3VHF** steadily improved, and was about S8 on June 7, when **E12W** was among those worked, after having been heard on the fifth. **GB3VHF** weakened to around S4/6 on June 13-14, but on the 14th **GC2FZC** was worked. On June 6 **G3LHA/M** near Exmouth (Devon) was worked at 56/8. On June 11 **G3NBQ** was out again with **G3KEF** in Norfolk when they were running 10 watts to a 3-over-3 at 20 ft. Despite very poor conditions many stations were worked at distances greater than 80 miles, the best being **G6GN** (160), **G4LU** (150) and **G3ENY** (125). The QTH was nine miles out of Kings Lynn. The following were also worked: **G5MA**, **G3IIT**, **G3BA**, **G4JJ/A**, **G3FUR**, **G3EDD**, **G2XV**, **G2ANS** and **G3OSS**. On June 12 operation was from 2m s.w. of Chesterton (Hunts) from 13.30-16.00. However, it appeared that most people were back at work. Nevertheless, **G6GN**, **G3BNL**, **G3GSO**, **G4LU**, **G3AOS** and **G3OSS** were all worked, most contacts again being over 100 miles. Generally conditions and activity were disappointing, but it was a pleasure to give new counties to many people. They have since had a report from **G5ML** to the effect that their signals were heard RS44/5 whilst travelling through Suffolk.

G3OFT (Belfast) says that the recent high pressure system (up to 1036 mb between June 4 and 10) was disappointing as far as DX was concerned, probably due to the continuing northerly airstream at that time. Conditions were best to the north-east, and little was heard south of Birmingham. **G5MA** (Bookham) who always seems to get through, was only 439 at best.

The **E10AB** expedition to the Aran Islands was successful, with favourable conditions. Reports of RS59 were quickly exchanged with all known active GI and EI stations on Whit Sunday. The station's frequency was 145.992 Mc/s which aroused considerable comment from some G/GM stations worked. However, with few exceptions, all EI stations now operate in the top few hundred kc/s no doubt because neighbouring GI is much more easily worked there. Congratulations to **G13KYP** and **G13FJA** for a first-class effort

despite very considerable difficulties. There are two further points to note: **E17D** (Baldoye, Dublin) claims an all time EI distance record in working **E10AB** (156 miles). Furthermore, a large number of new G/GM stations were worked by GIs as a direct result of **E10AB**'s activities, which appears to confirm the suspicion that if more stations spent a little more time looking westwards from England, good solid c.w. contacts would be possible under quite mediocre conditions.

GM3FYB (Dunfermline) puts a good signal into Belfast since erecting his new aerial. **G13NEB** (Belfast), who has been rebuilding, is now active again on s.s.b. with new 6-over-6 Yagis.

Birmingham University Radio Society are running an expedition to South Scotland during the middle of September. They have been most generously helped by J-Beam Aerials (6-over-6 slot fed aerial), Tom Withers (TW2 and nuvistor converter) and Eddystone (new transistor communication receiver). The frequency will be about 145.78 Mc/s. Excellent sites have been arranged in Argyll, Ayr, Bute, Dumfries, Kirkcubright, Roxburgh, Selkirk and Lanarkshire; the choice of counties may depend on conditions at the time of arrival. At the moment the big effort is concentrated on getting to the Mull of Kintyre for the comparatively rare county of Argyll. Final details will be published when received. If conditions should be poor, it is asked that operators use c.w. and that there be no "zone jumping" if conditions are good and activity high. The operators will be **G3NAQ**, **G3OAD** and **G3PLS**.

In a note about recent activities **G3HRH** (Digswell, Herts), reports that he was able to make a number of portable expeditions to coincide with business trips to the West Country. On May 7-9 and May 15-16, **G3HRH/P** was active from a site 780 ft. a.s.l. three miles west of Dorchester, Dorset (N.G.R. SY616878). During this period of average conditions, 35 QSOs were made with stations in 13 counties, mainly along the South Coast, although reports were exchanged with **G3FUR**, **G5HZ**, **G2JF**, **G2BDX**, **G3DBM**, **G4DC** and **G3LAS** on May 7, and with **G3PBV** on the 15th for some GDX QSOs. On June 5-6, **G3HRH/P** was active from Hanbury Common in Herefordshire, 950 ft. a.s.l. and four miles south west of Ludlow, Salop (N.G.R. SO478711). Conditions on both evenings were good to the south-east and south, although Home Counties stations suffered from deep QSB. Conditions were better on the 5th when **G2UJ** was an outstanding signal from Kent, and **G4DC**, **G5UM**, **G3OHD**, **G3EDD**, **G3JYT**, **G3CLW** and **G3BNE** were also worked to the south-east. On the 6th, conditions were best to the south, although QSB was more in evidence and the best QSO was with **GC2FZC**. Altogether 39 stations in 18 counties were worked from this site in the two evenings. All contacts have been confirmed. Further trips may be made during the summer to either or both sites.

Activity from the home QTH of **G3HRH** has continued steadily and after a period of "teething" troubles the new p.a. stage is running satisfactorily at 150 watts input on A1 and A3. It uses a pair of English Electric C.1108 valves (CV2130 equivalent to Mullard QY3-125) with transmission-line grid and anode tank circuits, and screen neutralising. The drive is at present obtained from the old transmitter—**QOV06/40** p.a.—but it is hoped to complete a new exciter in the near future, which will release the present one for conversion to 70 cm. To cope with the A3 requirements, a new modulator with a pair of 811s has been brought into service. The new p.a. will also be used at 600 watts input on A1 on a frequency of 145.066 Mc/s now that the necessary permit for QRO propagation experiments has been obtained.

After a period of comparison with the performance of the previous transmitter running at 30 watts input, **G3HRH** is convinced that the principal benefit accruing from the use of 150 watts is an improvement in readability in troughs of QSB, the improvement on peak of signals being less readily

V.H.F./U.H.F. BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3CTC	Redruth, Cornwall	144.10 Mc/s	A1	North East
GB3VHF	Wrotham, Kent	144.50 Mc/s	A1	North West
GB3GEC	Hammersmith, London	431.5 Mc/s	A1	East

appreciated. It was, however, instrumental in raising G2DVA (Liverpool, Lancs) and GW3MDY (Broughton, Flints), on June 2, and G3OJY (Penzance, Cornwall) on June 12. These three new counties bring the total since January 1, 1962, up to 50, with ten counties confirmed. There only remain Westmorland, Northumberland and Glamorgan, before the beam will be left due north to work the elusive (to G3HRH) GMS. In an effort to improve the likelihood of this, the double 5-over-5 Yagi aerial, featured in last month's *Four Metres and Down*, is shortly to be replaced by a double 8-over-8 at 40 ft.

There is more news on Cornish activity from G3OJY (nr Penzance): G2BHW is now on 144-07 Mc/s and G3OJY himself on 144-06 Mc/s. G3XC, fixed, is on 144-110 Mc/s; the mobile frequency is not yet known. G3OJY has made arrangements to call CTICO from 20.30-20.35 G.M.T. and from 20.40-20.45 G.M.T. on a frequency of 144-113 Mc/s. CTICO will call from 20.35-20.40 G.M.T. and from 20.45-20.50 G.M.T. whenever conditions appear favourable; frequency 144-020 Mc/s. G3AET and G3PDE will shortly be operative on 2m.

G3OJY reports that G5ZT can be worked under practically all conditions, although there is sometimes some difficulty when he is portable. Many Welsh stations including GW3LJP (Radnor), GW3MOP and GW8SU have been worked, mostly on c.w. but sometimes on phone. A sked with GC2FZC at 18.00 G.M.T. has been arranged and another with GW3MOP at 18.30 G.M.T. GW3MFY, G5TZ, G6NB (phone) and G6OX (c.w.) were worked towards the end of the period. It is good to hear G5TZ again working all the DX, and it is hoped this presages a regular return to the band. GW3ATM and GW2HIN were heard on May 14.

At the end of this article, a list appears of stations worked over the past six weeks or so by G2BHW and G3OJY. These lists are especially interesting because the stations shown have been worked from Cornwall, to many a very elusive county, and DX to most. A perusal of the list may tell you that a contact with Cornwall is a possibility. Remember also the beacon, GB3CTC. Conditions, says G3OJY, have been fairly good but there has not been a real opening this year. Many stations other than those listed have been heard on 2m, but were not worked because they were not beaming on Cornwall. G3CZZ is now operative from Camborne on 2m, and with a new aerial will soon be on 70 cm also. G3XC has a 16 element collinear array as well as several others and is

also able to go out mobile. G3AET is getting his equipment into service.

G3OSS (London N.W.) worked GB2IC on phone and c.w. between June 20/23 and heard them consistently all the week. GB2IC also worked G4LU, G3BA, G2DQ, G3NGS, G3JEQ, G6OX, G5MA and many other southern Gs. GW2HIY and G3CCH were heard but not raised. Among G3OSS's other recent captures were G5ZT (Plymouth) while /M 200 ft. a.s.l. near Torquay, GW3MFY (Bridgend), GW3MDY (Broughton, Flints), GW2HIY (Anglesey) EI2A, EI2W (both on phone), G8SB (Sale), G3BOC (Wirral), G2BHW (Falmouth) and F9JY (Cherbourg). G3OSS is particularly looking for QSOs with GI, extreme Northern England and GM, near 23.00 G.M.T. every night. On June 14, whilst G3OSS was /P at Hampstead Heath ON4MJ was worked on phone.

G3BA and G4LU are going to Wales from July 29 to August 4 and will be active on 2m from some of the more difficult counties.

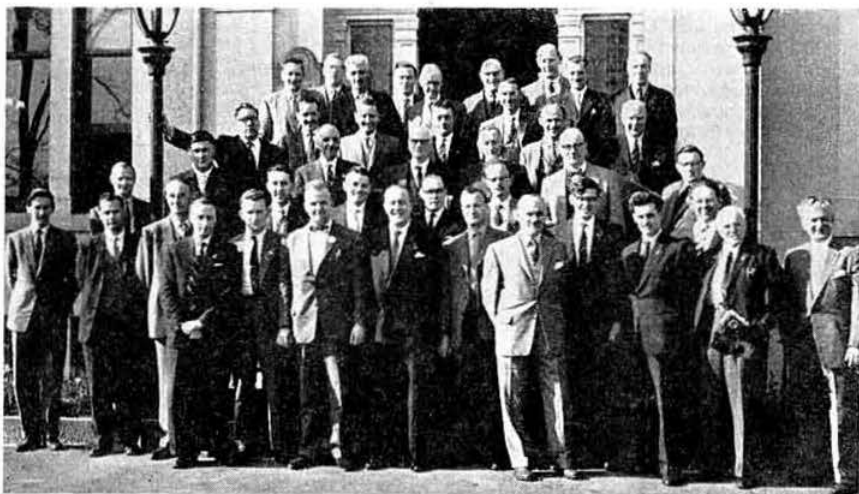
Four Metres

G3LTF (Galleywood) checked the region below 100 Mc/s on June 11, and found intense sporadic E conditions. G3OGX was getting some DX f.m. by the same mode. G3LCK, G2CIW and G3CCH all reported TV QRM from Spanish stations. The area was quite large, including Spanish, Italian, and possibly Russian stations, all coming in on TV and f.m. bands. Calls on 2m until about 20.30 G.M.T. when the condition disappeared brought no result. On 67-76 Mc/s, says G3LTF, there are several DX f.m. stations, which come through well on meteor scatter and also, of course, during sporadic E. It is a very useful check frequency. Unfortunately there is also Dutch f.m. (TV sound) there, but only in the evenings and when sporadic E occurs the Italian f.m. swamps it. People further west could get the Italian f.m. without QRM from the Dutch station.

G3EDD (Gt. Wilbraham, Cambs) went out during the 70 Mc/s Contest on June 16-17, with the newly-formed Pye Telecommunication Amateur Radio Group (G3PYE). They had to work under G3PSA/P, as R.S.G.B. affiliation could not be obtained in time. However, they had some fun. As 70 Mc/s is underpopulated, they did not expect much activity, and with a few exceptions signals were poor. It is thought that a high percentage of 70 Mc/s stations have either poor equipment, or poor aerials, or both. The best DX was EI2W at 56. G3PSA put in a claim for 2243 points from 29 contacts; everything heard was worked in the end.

EI2W also reports; he operated for only a few hours during June 16-17, and worked G3KEU/P, G3OYP/P, G3PJK, G3OHN, and G3PSA/P. The following were received at good strength but not worked: G3JGV, G3PVU, G3BNR/P, G3EHY, and G3BNL/P, who was the best signal heard on the band during the contest. He was at S9+. As from June 19, 1962, the official frequency allocation in the Republic of Ireland is now the same as Gt. Britain (70-2-70-4 Mc/s). EI2W will shortly be found on approximately 70-3 Mc/s.

Great activity is developing in the Manchester area on 4m, reports A.2622 (Oldham). G3AYT's home station feeds into a very compact "ZL special" whilst for /M he uses an 8 watt transmitter into a dipole. G3OHH (Maccles-



This photo was taken at the Scottish V.H.F. Convention held at the Brablock Hotel, Paisley, on April 28, 1962. (Photo by GM3PMB)

field) runs 40 watts and has two aeriels, a four element array and a bisquare. G3PJK (Middleton Junc.) has a 4-over-4 J-Beam and also runs 40 watts. Nearly all the converters in the district are RF27 units. G3PMJ, G3LTS and G4GM all use dipoles for transmission whilst G2JT is temporarily QRT for aerial maintenance. G3OEJ runs 30 watts to a bi-square and G3JII 15 watts to the same type of aerial. G3OUM operates /P on fine days with a dipole. G3LKK is also active with a dipole, and has moved to Upholland, near Wigan. It is a pity that southern stations, apart from G3EHY, are rarely heard. As there is so much potentiality in Lancashire and neighbouring counties, southern operators are asked to look north and break the ice.

G3LTY (Munlochy, Ross-shire) reports that he hopes to be on 4m soon from his new QTH. The transmitter is a modified 440B. The converter comprises a E88CC/6AK5 cascade and 12AT7 oscillator/multiplier and the receiver is a modified BC454B using E180F valves in r.f. and i.f. stages. The aerial is a ZL Special in the loft but improvements are in progress. The input is normally 14 watts and A1 is preferred, although the 440B has a modulator.

Seventy Centimetres

G3LTF (Galleywood) reports on the 420 Mc/s Contest on May 26-27 when activity was high except for the Sunday afternoon. G3LTF thinks there should be a break in the afternoon and about four hours more operation during the Sunday evening. The best QSOs were with G3MPS (60 miles), G3JHM/A (67 miles), G5NF (65 miles), G2CIW (114 miles), G2FNW (93 miles), G3NNG/P (86 miles), G3TWO/P (141 miles) and G3KPT (118 miles). On May 29, tests were held with G3ILD who heard the signals S45/9. This is the furthest north that G3LTF has yet reached. G3ILD is not yet ready to transmit. During June 1-4 G2CIW was worked twice and G3KPT heard at 569. On June 5 G3ILD again heard G3LTF at 58. Later G3JWQ was worked 589 and G3BNL heard at 579. On June 8 G3DGI was worked for the first time. June 9 brought QSOs with PAOKPO and PAOTR (59). Another test with G3ILD on June 12 brought a report of 439 from Darlington. G2CIW was again worked on June 14 (589).

Twenty-Three Centimetres

G2RD (Wallington) and G3FP have made further progress since the last reported QSO. On May 25, G3FP was received at RS59 at Reigate Hill and a QSO was made crossband to 2m. On June 20 a two way contact was made when /M at Reigate Hill with G3FP on 23cm. In both cases G2RD was stationary. G3FP was S9 and G2RD's QRP rig was S6 at G3FP. The aeriels used were a dipole, corner reflector, and 3 ft. parabola; all aeriels were about 8 ft. above ground level. The 23cm rig is driven by the normal 2m mobile transmitter and consists of a QV02/6 tripler to 432.74 Mc/s followed by a 2C39 tripling to 1296.22 Mc/s.

Beacon Station

As previously announced reports on the reception of GB3VHF are greatly appreciated, and will be reciprocated. They should, however, in all cases, be sent either to Headquarters or via the R.S.G.B. QSL Bureau, NEVER to the B.B.C.

R.S.G.B. V.H.F. BEACON STATION GB3VHF

The frequency of the Society's v.h.f. beacon transmitter at Wrotham Hill, Kent, when measured by the B.B.C. Frequency Checking Station, was as follows (nominal frequency 144.50 Mc/s).

Date	Time	Error
June 5, 1962	12.10 G.M.T.	690 c/s high
June 12, 1962	11.13 G.M.T.	22 c/s high
June 19, 1962	19.27 G.M.T.	60 c/s high
June 26, 1962	11.09 G.M.T.	36 c/s high

The station is in operation from 06.30-23.59 G.M.T. daily, but may be on for the full 24 hours for test purposes from time to time.

Stations Worked on Two Metres from Cornwall

G2BHW (Falmouth) worked EI2A, G2JF, G3HI/P (Dorchester), G3EHY, 3GOP, 3IEA, 3KFN, 3KMS/M (St. Agnes Beacon, Cornwall), G3LHA/M (7m NE Exmouth) G3IMG/ (Tavistock), G3LOK, 3MNQ/P (Exmoor), 3MAE, 3OJY, 3OSS, 5DW, 5TZ, 5ZT/P (Hey Tor), 6GN, 6NB, 6OX, 6UI/M (Falmouth), 8VZ, GC2FZC, GW3ATM, 3MFY, 3MOP, 4PG, GW8UH and GB2IC.

G3OJY (Penzance) worked EI2A, G2JF, 2BAR, 2BHN, 2BHW, 3BA, 3XC, 3AET, 3CZZ, 3EGV, 3GOP, 3HRH, 3IEA, 3JFS/M, 3KEQ, 3KMS/M (St. Agnes Beacon, Cornwall), G3LHA/M (7m NE Exmouth), 3LMG (Tavistock), 3LMG/P (Kitt Hill, Cornwall), 3LMG/P (Cocks Tor, Devon), G3MNQ/P (Exmoor), G3MTI/M (Herefordshire and Worcestershire), G3NAE, 3PPB, 3PRC/P (Plymouth), 3PXB, 4LU, 5MA, 5TZ, 5ZT, 5ZT/P (Hey Tor, Devon), G6FK, 6NB, 6OX, GC2FZC, GW3ACF, 3ATM, 3CBY, 3LJP, 3MFY, 3MFY/M, 3MOP, 8SU, 8UH, and GB2IC.

Eire 70 Mc/s Band

WITH effect from June 18, 1962, the Eire Posts and Telegraphs Dept. has allocated the band 70.2-70.4 Mc/s to EI amateurs.

LONDON U.H.F. GROUP

will meet at the Whitehall Hotel, Bloomsbury Square, London, W.C.1.

at 7.30 p.m. on Thursday, August 2 and September 6, 1962

All v.h.f. and u.h.f. enthusiasts welcome.

V.H.F. Band Plans

All v.h.f. operators are reminded of the British Isles Two Metre and Seventy Centimetre Band Plans, which are sponsored by the Society. Observance of these plans will assist in DX working and in avoiding QRM to Service frequencies in the 144-145 Mc/s band.

Zone	2 metres	70 cm.	Area
1	144.0-144.1	432.0-432.1	Cornwall, Devon, Somerset, Berkshire, Dorset, Hampshire, Wiltshire, Channel Isles, Brecon, Cardiganshire, Carmarthenshire, Glamorganshire, Gloucestershire, Herefordshire, Monmouthshire, Pembrokeshire, Radnorshire, Worcestershire.
2	144.1-144.25	432.1-432.25	Kent, Surrey, Sussex, Bedfordshire, Buckinghamshire, Essex, Hertfordshire, London, Middlesex.
3	144.25-144.5	432.25-432.5	Cambridgeshire, Huntingdonshire, Leicestershire, Norfolk, Northamptonshire, Oxfordshire, Rutland, Suffolk, Warwickshire.
4	144.5-144.7	432.5-432.7	Anglesey, Caernarvonshire, Cheshire, Denbighshire, Flintshire, Merionethshire, Montgomeryshire, Shropshire, Staffordshire.
5	144.7-145.1	432.7-433.1	Derbyshire, Lancashire, Lincolnshire, Nottinghamshire, Yorkshire.
6	145.1-145.3	433.1-433.3	All Scotland, Northern Ireland, Isle of Man, Cumberland, Co. Durham, Northumberland, Westmorland.
7	145.3-145.5	433.3-433.5	
8	145.5-145.8	433.5-433.8	
9	145.8-146	433.8-434	

Two Metre Band Guard Channels: The following frequencies in the 144-145 Mc/s portion of the 2-metre band are tabulated on the schedule to the Amateur (Sound) Licence to be avoided as they are allocated to Service use: 144.0, 144.09, 144.18, 144.27, 144.36, 144.45, 144.54, 144.63, 144.72, 144.81 and 144.9 Mc/s. Remember! The safety of aircraft and human lives depend upon the interference-free use of the channels.

Society News

Unlicensed Operation

IT was reported in the August, 1960, issue of the R.S.G.B. BULLETIN that the Radio Services Department had informed the Society that the Engineering Department of the G.P.O. was being hampered in its investigations into unlicensed operation by amateurs who had been known to challenge and sometimes deliberately jam the unlicensed stations involved. It was also reported that on several occasions actions of the kind referred to had taken place just as inquiry officers were about to take D/F bearings on the suspect stations. The Post Office explained that these actions not only prevented the location of the unlicensed stations but necessitated the continuation of lengthy and expensive monitoring, pending further operation by the pirates thus causing a delay which might be attributed to inertia on the part of the Post Office. Members were, therefore, requested to refrain from actions which could embarrass Post Office enquiries into unlicensed operation particularly by giving a pirate reason to believe that he was under suspicion either by contacting him or by interfering in any way with unauthorized transmissions.

Since publicity was given to the request received from the Post Office the Engineering Department have experienced little trouble but it recently happened that a licensed amateur operating on the 14 Mc/s band was heard to be talking about pirate transmissions on frequencies not allocated to the Amateur Service. A visit was made to the licensee who gave the engineers information about several pirates operating on non-amateur frequencies. The amateur in question had not previously made any report to the Post Office about these pirate activities.

The Radio Services Department point out that it is in the interests of licensed amateurs that they should let the Post Office have any information which may come their way about illicit transmissions.

More Pirates Fined

ON April 13, 1962, at Southampton Magistrate's Court, Percy Gladstone Robins of 86 Graham Road, Southampton, pleaded guilty to a charge of using wireless telegraphy apparatus without a licence. He was fined £15 and ordered to pay £5 5s. costs. At the same court on May 7, 1962, Graham John Dowse of 19 Cornwall Road, Southampton, pleaded guilty to a similar charge and was fined £15 and ordered to pay £2 2s. costs. He was also ordered to forfeit the transmitting apparatus to the Postmaster General.

On May 21, 1962, at Worthing Magistrate's Court, Neil James Collins of 82 Broadwater Road, Worthing, pleaded guilty to using wireless telegraphy equipment without a licence. He was fined £10 and ordered to pay £3 3s. costs.

Radio Amateurs' Examination

CITY and Guilds of London Institute announce that in order to meet increasing costs the practice of selling old question papers singly has been dropped. In the case of the Radio Amateurs' Examination the Institute are linking up several previous papers together into one packet for which there will be a standard charge of 2s. for the set. The Institute have also been compelled to make an increase in the charge which is made for their syllabuses. These are now priced at 1s. each, including postage, for students in the U.K., with an additional 1s. 6d. for overseas airmail postage.

As from the examination in November, 1962 the fee will be increased from the present 20s. to 30s. A list of the colleges at which the November examination can be taken appeared in the June issue of the BULLETIN.

Committees of the Council

MR. E. W. Yeomanson (G3IR), who is chairman of the TVI/BCI Committee, has been appointed a member of the G.P.O. Liaison Committee.

Mr. M. Pharoah (G3LCH) of Mitcham, Surrey, and Mr. C. M. Denny (G6DN) of Manchester, have accepted invitations to serve on the Contests and R.A.E.N. Committees respectively. Mr. Denny has also agreed to act as Hon. Secretary of the R.A.E.N. Committee for the time being.

Code Proficiency Runs

FROM time to time members have suggested that the Society should initiate a series of Morse Code Proficiency Runs at speeds varying between say 25 and 45 words per minute.

Members interested in the suggestion are asked to write to the General Secretary indicating their preference for speeds, frequency band(s), day in the week and time for such runs. Postcards, not letters, please.

National Radio and Television Show

MEMBERS able to spare time to help man the Society's stand at the National Radio and Television Show are invited to write to Mr. G. W. Norris (G3ICI), 134 Meads Lane, Ilford, Essex, stating the dates and times they will be available. Volunteers under 21 years of age are asked to give their ages.

Offers of equipment for display are also invited and should be addressed to the Exhibition Committee at R.S.G.B. Headquarters.

The National Radio and Television Show at Earls Court, London, will be open from August 22 to September 1.

New Society Headquarters

IN order actively to pursue the proposals and ideas put forward in *Current Comment* published in the May, 1962 issue of the R.S.G.B. BULLETIN an *ad hoc* Committee has been formed to advise the Council of properties suitable for the proposed new Headquarters. The committee consists of the President, the Executive Vice-President, and a small number of other members who are technically qualified to give advice. A surveyor and an estate agent are among those serving on the Committee, which will meet officially for the first time later this month.

Headquarters Fund—List No. 10

THE following is the tenth list of those who had contributed to the Headquarters Fund up to June 30, 1962:

H. C. Falkner (B.R.S.21813), Lt. Col. N. I. Bower (G5HZ), L. Bodman (B.R.S. 22865), A. B. Pilcher (B.R.S. 23434), R. C. Holt (GW3NWV), P. J. Parker (B.R.S. 24554), F. K. Parker (G3FUR), N. H. Willis (G3CAX), E. C. Hasted (G3BHF), J. M. Alston (B.R.S. 20252), L. S. Gossop (G4MA), R. L. Rooney (W2QCI), S. Gutteridge (G2DAG), W. D. Lacey (G3CWK), A. D. Taylor (GW8PG), G. E. Nixon (G13OEN), J. Shewan (B.R.S. 21929), J. Wilson (G3BGP), Hong Kong Amateur Radio Transmitting Society, B. J. Clarke (G3BEC), T. J. Swain (G2FRI), H. S. Naylor (G3AKO), C. G. Eley (G3HHC), L. F. Ivin (B.R.S. 22991), University of Manchester Amateur Radio Society, C. W. Touch (G2HDJ), K. S. Livermore (MP4BDG), S. Jesson (A.2966), J. McNab (GM2CQI), C. R. S. Moon (G5MN), W. H. Fletcher (G3NXT), V. J. Bartlett (GW5BI), D. Broadbridge (B.R.S. 23094), H. S. Smith (B.R.S. 24587), S. H. Nankivell (A.2506), R. Pollock (G5KU), G. H. Perrett (VQ4DW/GM3PYA).

Total amount contributed to date: £1,476 9s. 10d.

Posting Certificate

ALL copies of the June issue of the R.S.G.B. BULLETIN were posted on Saturday, June 16, 1962, and the Society holds a certificate to that effect from the Letchworth, Herts, Post Office.

Birthday Honours

THE Queen's Birthday Honours List, published on June 2, 1962, contained the names of Commander J. E. Ironmonger, R.N., and Lt.-Col. E. W. Milner, both of whom were appointed O.B.E. Ted Ironmonger, known in Amateur Radio circles as G8PO, is the author of the *Guy Wire Aerial* published in this issue, whilst Eric Milner is the Officer Commanding No. 65 Special Signals Regiment Territorial Army. The regiment operates an Amateur Radio station from Worship Street, London, E.C.2, under the call G3LUN, and the licence is held in the name of Lt.-Col. Milner. As a matter of interest Lt.-Col. Milner's wife (Major Katherine Milner) is already an O.B.E.

Marcuse Memorial Seat

AS previously announced there will be a short ceremony on The Green outside Bosham Parish Church at 3 p.m. on Saturday, July 21, 1962, when the Chairman of the Parish Council (Mr. Frank Parham) will accept from representatives of the Radio Amateur Old Timers' Association a teak seat which has been provided from monies subscribed to the Marcuse Memorial Fund. The seat will commemorate the very close association which the late Gerald Marcuse (G2NM) had with the village of Bosham, West Sussex.

Mrs. Irene Marcuse hopes that as many as possible of her late husband's radio friends will be present at the ceremony and that they will join her and her family afterwards for tea. Radio amateurs who expect to attend the ceremony and to stay for tea are asked to write to Mrs. Marcuse at "Tide-waters," Bosham.

Council Proceedings

Résumé of the Minutes of the Proceedings at a Meeting of the Council of the Radio Society of Great Britain, held at New Ruskin House, Little Russell Street, London, W.C.1, on Friday, May 18, 1962, at 6 p.m.

Present: The President (Mr. E. G. Ingram in the Chair), Major-General E. S. Cole, Messrs. H. A. Bartlett, N. Caws, C. H. L. Edwards, R. C. Hills, A. O. Milne, L. E. Newnham, F. K. Parker, A. D. Patterson, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, P. H. Wade, E. W. Yeomanson (Members of the Council) and John Clarricoats (General Secretary).

An apology for absence was submitted on behalf of Mr. A. C. Williams.

Membership

Resolved (i) to elect 80 Corporate Members and 40 Associates; (ii) to grant Corporate membership to nine Associates who had applied for transfer.

Applications for Affiliation

Resolved to grant affiliation to the Chesterfield and District Radio Society, the Ex-G Radio Club, Kings College (University of Durham) Radio Society, and the Severn Valley Amateur Radio Club.

Headquarters

Resolved to set up an *ad hoc* Committee comprising not less than two and not more than six technically qualified members to seek possible premises for new Society Headquarters.

The Amateur Radio Handbook

Resolved to place an order with Loxley Bros. Ltd. for reprinting a further 5,000 copies of the *Handbook*.

Region 9 O.R.M. and Mobile Rally

Resolved to appoint Messrs Milne, Newnham, and the General Secretary together with the Zonal Representative (Mr. Bartlett) to represent the Council at the Region 9 O.R.M. and Mobile Rally during the weekend September 22-23, 1962.

Multi-Operator Section in Contests

Resolved to request the Contests Committee to give consideration to a resolution passed at the A.G.M. of the Civil Service Radio Society in regard to multi-operator sections in contests.

News Bulletins for Regional Representatives

Resolved to record that it is the intention of the Council as soon as the staff position permits to issue periodic news bulletins to Regional Representatives.

G.P.O. Morse Tests

MORSE Tests will be held at the Head Post Offices in Birmingham, Cambridge, Derby, Leeds and Manchester during the first or second week in September, provided there are sufficient candidates. Application forms may be obtained from the Radio Services Dept., Radio Branch, G.P.O. Headquarters Building, St. Martin's-le-Grand, London, E.C.1. Completed application forms, to which the entrance fee of 10s. must be affixed in stamps, must be posted to the Wireless Telegraphy Section, Union House, St. Martin's-le-Grand, London, E.C.1, to arrive not later than August 17, 1962.

R.A.E. Courses

ORGANIZERS of courses due to commence in September in preparation for the Radio Amateurs' Examination are invited to send details to Headquarters as soon as possible.

R.A.E. Course in Stevenage

PROSPECTIVE students interested in the arranging of a course in preparation for the Radio Amateurs' Examination at Stevenage Technical College are asked to write to F. Collett (G3OVT), 5 Rowlands Road, Stevenage, Herts.

Enquiries Regarding Bulletin Articles

MEMBERS who write to the authors of BULLETIN articles are asked to enclose stamped addressed envelopes if they require replies.

News Bulletin Service

It was reported that Mr. L. Hardie (GM2FHH), had expressed a wish to resign as a News Bulletin Service operator.

Resolved (i) to appoint Mr. G. Jamieson (GM3HTL), as stand-by News Reader for north east Scotland; (ii) to instruct the General Secretary to write, on behalf of the Council, to Mr. L. Hardie (GM2FHH), thanking him for his services to the Society in connection with the News Bulletin Service.

R.E.F. Annual Meeting and Dinner

It was reported that the President had accepted an invitation to attend the Annual Meeting and Dinner of the R.E.F. in Paris.

Isle of Wight Air Disaster

The Council received a report from the Secretary on the part played by radio amateurs in the recent air disaster in the Isle of Wight.

Communications Receivers—Design Considerations

Resolved to accept an estimate from Loxley Bros. Ltd. for reprinting 2,000 copies of *Communications Receivers—Design Considerations*.

Reports of Committees

The Minutes of meetings of the following Committees were submitted as Reports:

G.P.O. Liaison Committee	April 17, 1962
Technical Committee	April 12, 1962
Finance and Staff Committee	May 9, 1962
Scientific Studies Committee	April 14, 1962
Mobile Committee	April 16, 1962
Contests Committee	April 18, 1962
TVI/BCI Committee	April 26, 1962
Exhibition Committee	May 2, 1962
	May 4, 1962

Resolved to accept the Reports and certain of the Recommendations contained therein.

The recommendations dealt with the following matters: the technical aspects of the I.A.R.U. Region 1 Conference 1963, technical development financial provisions, National 144 Mc/s Open Contest, contest results, National Radio Show 1962, R.S.G.B. Radio Exhibition 1962, GB3RS QSL Cards, extending the Amateur (Maritime Mobile) Licence, reopening with the G.P.O. the question of International Amateur Radio reciprocal arrangements.

The meeting terminated at 10.20 p.m.

R.S.G.B. QSL Bureau

MR. K. WALDEN (G3OLN), 1 Hawthorn Road, Cheltenham, Glos., has been appointed QSL Bureau Sub-Manager for call-signs in the series beginning G3RAA. Members with call-signs in this series are asked to send envelopes for the collection of cards direct to Mr. Walden.

Owing to pressure of work, Mr. Frank Ellesmere (G3LGP) has had to relinquish his duties as QSL Bureau Sub-Manager for the series G3OAA-G3PZZ. He is succeeded by Mr. J. H. Brazzill (G3WP), 43 Forest Drive, Chelmsford, Essex.

Receipts

RECEIPTS for subscriptions paid by cheque, bankers' order or postal order are not now issued unless specially requested. Receipts are drawn, however, and kept on file at Headquarters for six months.

Generous Offer

MR. H. F. MILLER (G3CFB), Old Stocks, Monument Lane, Chalfont St. Peter, Gerrards Cross, Bucks. (Telephone Chalfont St. Giles 753), has for disposal, free of charge, a number of periodicals including the BULLETIN and QST dating back to about 1947. Any member living within easy reach of Gerrards Cross who would like to possess these books should telephone Mr. Miller with a view to arranging to collect them.

Index to Volume 37

THE Index to Volume 37 (July 1961 to June 1962) is enclosed in this issue of the R.S.G.B. BULLETIN.

Silent Keys

CYRIL HUNT (G6ZJ)

The death occurred on May 17, 1962, of Mr. Cyril Hunt (G6ZJ) of Sheringham, Norfolk, after a long illness. For him radio was his profession as well as his hobby. He was interested in mobile operation and up to the time of his illness was an active member of R.A.E.N. Sympathies are extended to Mrs. Hunt, to her son Robert (Associate 1851) and the other members of her family.

A. T. GILLIES (GM3FIW)

The death occurred on April 23, 1962, of Mr. A. T. Gillies (GM3FIW) of Motherwell, Scotland, at the age of 57. Andy Gillies will be remembered for his willingness to assist others interested in Amateur Radio and in particular newcomers to the hobby. Up to the time of his last illness he operated regularly on 80 metres. Sympathies are extended to Mrs. Gillies and her family.

GM3GDX

HAROLD MILLINGTON (GW2BMN)

It is our sad duty to record the death of Harold Millington (GW2BMN) of Menai Bridge, Anglesey, on June 17, 1962, at the age of 61. Harold will be mourned not only by North Wales amateurs, but by his many friends of the "pre-breakfast" nets. Amateurs and newcomers were always assured of a friendly welcome at his home high over the Menai Straits, where practical help and advice were freely given.

Heartfelt sympathies are extended to his widow, daughter and family.

GW5YB.

WALTER PENNELL (GW3FV1)

The death occurred on May 29, 1962, of Walter Pennell (GW3FV1) at Bridgend. Walter, essentially an operator, was mainly interested in the h.f. bands and his contacts both on telephony and c.w. were world-wide.

During the Second World War he took a keen interest in the Air Training Corps, and was commended by higher authority for the part he played in Morse training. His ready and willing assistance to newcomers to the world of Amateur Radio was an outstanding characteristic which endeared him to many.

In his early days, Walter had played Rugby football for Bridgend, and his interest in that sport was maintained to the end. For many years, up to the time of his retirement twelve months ago, he had been caretaker of the Bridgend Boys Grammar School, and during the latter part of this period, he had the misfortune to fall and break a leg, an injury from which he never really recovered.

He is survived by a brother and two sisters, to whom the sincere sympathy of the South Wales membership is extended. The funeral on June 1 was attended by GW5VX (Zonal Representative), GW4CG (County Representative), GW3BFH, GW3BQY, GW3MFY and a number of other Society members. C.H.P.

For Your Bookshelf and Shack R.S.G.B. PUBLICATIONS

- The Amateur Radio Handbook (Third Edition) Price 34/- (by post 36/6)
- A Guide to Amateur Radio (Ninth Edition) Price 3/6 (by post 4/-)
- Radio Amateurs' Examination Manual Price 5/- (by post 5/6)
- R.S.G.B. Amateur Radio Call Book (1962 Edition) Price 4/6 (by post 5/-)
- Service Valve Equivalents (Second Edition) Price 2/- (by post 2/6)
- The Morse Code for Radio Amateurs (Second Edition) Price 1/6 (by post 1/9)

AMERICAN PUBLICATIONS

Orders for the following American publications which are usually available from stock can only be accepted from residents in the United Kingdom and British Commonwealth.

- Radio Amateur's Handbook, 1962 (A.R.R.L.) - 38/6
- CQ Sideband Handbook (Cowan) - 25/6
- Mobile Manual for Radio Amateurs (A.R.R.L.) - 25/-
- CQ Mobile Handbook (Cowan) - 24/6
- Diode Source Book (Cowan) - 20/6
- Antenna Book, 9th Edition (A.R.R.L.) - 19/6
- CQ Anthology (Cowan) - 16/6
- Single Sideband for the Amateur (A.R.R.L.) - 14/6
- Hints and Kinks, Volume 6 (A.R.R.L.) - 10/6
- Course in Radio Fundamentals (A.R.R.L.) - 10/6
- How to Become a Radio Amateur (A.R.R.L.) - 5/-
- Learning the Radiotelegraph Code (A.R.R.L.) - 5/-
- QST (A.R.R.L.) Published monthly - (p.a.) 43/6
- CQ (Cowan) Published monthly - (p.a.) 44/-
- 73 Magazine (A.R.P.Co.) Published monthly (p.a.) - 30/-

Prices for American publications are subject to alteration without notice.

R.S.G.B. MEMBERS ONLY

- Society Tie (all silk) - 16/6
- Blazer Badge - 7/-
- Car Badge (R.S.G.B. or R.A.E.N. Emblem) - 7/6
- Car Badge (R.S.G.B. Emblem with call-sign) (5 characters)† - 11/6
- Car Badge (De Luxe type with call-sign)† - 18/6
- (Postage on overseas orders 5/6 extra)
- Call-sign Lapel Badges (5 characters)† - 6/-
- Pennants (R.S.G.B.) 12" long for car - 8/9
- Headed Notepaper (R.S.G.B.) per 100 sheets (Large) 9/- (Small) 6/6

† Delivery 6-8 weeks.

MISCELLANEOUS ITEMS

- Paper Covered Log Book (Webbs') - 6/-
- Mobile Log Book (Martin) - 9/-
- Reference Manual of Transistor Circuits (Mullard) - 14/6
- Short Wave Receivers for the Beginner (Data Publications) - 6/-
- Wireless World Valve Data (Iliffe) - 6/6
- Panel-Signs, Sets 1, 2, 3 and 4 (Data) per set - 4/-
- International Radio Amateur Year Book, 1961/2 Edition (Casling) - 4/-
- Radio Amateur Operator's Handbook (Data Publications) - 4/-
- Guide to Broadcasting Stations (Iliffe) - 4/-
- QRA Locator Maps - 2/6
- Countries List - 6d.

All prices include postage unless otherwise stated.

R.S.G.B. PUBLICATIONS

28 Little Russell Street, London, W.C.1.

CONTEST NEWS



— RESULTS — — REPORTS — — RULES —

South Manchester D/F Event

THE South Manchester D/F Qualifying Event, organized by the South Manchester Radio Club, was held on May 27, 1962, and attracted an entry of 10.

The hidden transmitter (G3FVA/P) was about 17 miles from the starting point, the route being over difficult terrain, including the built-up areas of north Manchester and hilly countryside traversed by electricity grid lines. Heavy rain and hail storms made conditions difficult. There were no suggestions on this occasion that the South Manchester event was too easy!

First to arrive was A. Hitchcock (Derby) at 15.32, followed by F. Allsopp, G3IFA (also of Derby) at 15.37 and J. R. Knight, G3JRK (South Manchester) at 16.15. Mr. Knight was awarded the South Manchester Radio Club D/F Shield and the Region 1 Trophy. No other competitors succeeded in finding the transmitter.

Rules for the R.A.E.N. Rally, 1962

1. The Rally is open to all R.A.E.N. members and will consist of three sections.

- (a) Fixed, Portable and Mobile. This section enables an operator to work as a fixed station for one period and a portable or mobile for the other. It also includes a station who transmits from a fixed site throughout.
- (b) Portable and Mobile. This section is for contestants who operate portable or mobile for two periods of the Rally.
- (c) Receiving (R.A.E.N. members operating as receiving stations only from fixed or portable sites).

Stations must be individually operated and Group operation of a single station is not permitted.

2. The Rally will take place on Sunday, October 7, 1962, in three periods 09.00-12.00 G.M.T., 14.00-17.00 G.M.T. (telephony) and from 18.00-21.00 G.M.T. (Morse Code AI).

Operation will be in the 1.8, 3.5, 28 and 144 Mc/s bands. R.S.G.B. band planning should be observed and licensed power must not be exceeded.

3. Outstation equipment must not be connected in any way to the public mains electricity supply and must be located at least one mile from home or other normal operating site.

4. Scoring: Transmitting Section
- Outstation to outstation: 5 points
 - Outstation to fixed station: 3 points
 - Outstation to non-R.A.E.N. station: 1 point.
 - Fixed station to fixed station: 2 points
 - Fixed station to outstation: 3 points
 - Fixed station to non-R.A.E.N. station: 1 point

Only ten contacts with non-R.A.E.N. stations will be counted for the entire rally.

Not more than one section of the Rally may be entered. The score will be the combined best two periods of operation.

5. Participants will apply to the Hon. Rally Secretary, G3ION, 71 Bassett Green Close, Southampton, for a test phrase and number. These applications may be in bulk but the call-signs of the stations requiring them should be stated and a stamped addressed foolscap envelope provided. Log sheet will be forwarded at the same time. Listeners entering the Receiving Section should apply for the special log sheets.

The test phrase and number will be passed to the first R.A.E.N. station contacted in exchange for a test phrase from that station. This second test phrase will subsequently be passed to the next R.A.E.N. station worked. Test phrases will not be passed to non-R.A.E.N. stations.

6. Stations will call "CQ from Raynet Station..." on telephony and "CQ RR de..." on c.w. The use of the letters or word R.A.E.N. is expressly forbidden.

7. Completed entries should be forwarded to Hon. Rally Secretary, G3ION, 71 Bassett Green Close, Southampton, to arrive not later than first post on Monday, October 22, 1962. The declaration sheet must be completed and signed.

8. Scoring: Receiving stations.

Receiving stations will score three points for each R.A.E.N. station heard in contact with another R.A.E.N. station and two points for every R.A.E.N. station heard in contact with a non-R.A.E.N. station provided that the log is completed as required with all details of the contact. Receiving stations operating portable or mobile will receive a bonus of one point for each contact logged. Rules regarding operation of mobile or portable equipment will apply as for the transmitting section.

The score will be based on the best of two periods of operation. Logs must be submitted on the printed sheets provided and the declaration completed and signed. Entries to arrive as in Section 7 above.

9. Awards will be made to the participants who score the highest number of points in each section.

Low Power Field Day, 1962

THE rules for the Low Power Field Day have been altered this year, the 1.8 and 7 Mc/s bands being omitted. This, it is thought, will be fairer to entrants in sparsely populated areas.

Duration: 10.00 G.M.T. to 17.00 G.M.T. on September 16, 1962.

Eligible Entrants: All fully paid-up Corporate members of the R.S.G.B. resident in G, GC, GD, GI, GM and GWV. Multiple-operator entries will be accepted provided only one call-sign is used (see General Rule 7).

Contacts: May be made on c.w. (AI) in the 3.5 Mc/s band only. Each transmission must include the letters LFD.

Scoring: Five points may be claimed for each contact with a portable or mobile station, and one point for each contact with a fixed station.

Contest Exchanges: RST reports followed by the contact number starting at 001 and the location, e.g. RST59001 Bradford.

Logs: (a) Must be tabulated in columns headed (in this order): "Date and Time (G.M.T.)", "Call-sign of Station Contacted", "My report on His Signals and Serial Number Sent", "His Report on My Signal and Serial Number Received", "Location of Station Contacted as Received", "Points Claimed".

(b) The cover sheet must be made out in accordance with R.S.G.B. Contests General Rule 5 and must include the weight of the equipment used. The declaration must be signed and the location as transmitted given.

(c) Entries must be postmarked not later than October 1, 1962.

Equipment: The total weight of all the radio and electrical equipment taken to the site must not exceed 20 lb.

Awards: At the discretion of the Council, the *Houston Fergus Trophy* will be awarded to the winning station and certificates of merit to the runner-up and to the non-transmitting member submitting the best check log in the opinion of the Contests Committee.

The General Rules for the R.S.G.B. Contests apply to this contest. Printed log forms and cover sheets are available from Headquarters on request.

Two Metre D/F Hunt

THE rules for the 2m D/F Hunt, organized by the Surrey Radio Contact Club, and to be held on September 23, 1962, are now available. Copies may be obtained by sending a stamped addressed envelope to S. A. Morley (G3FWR), 22 Old Farleigh Road, Selsdon, Surrey.

Can You Help?

● K. Harvant Singh (B.E.R.S.886), 31 (774), Upper Museum Road, Taiping, Perak, Malaya, who requires the circuit diagrams and/or manuals for the HRO-MX and AR88D receivers?

● A. D. Tregale (G3LMT), 41 Normandy Road, Heavitree, Exeter, Devon, who requires information on the "Little Giant" aerial? The longest element is understood to be 13½ in. for 10, 15 and 20 metres and 27 in. for 40 and 80 metres. It is reputed to have a gain of 2db.

● C. R. Temple (B.R.S.24616), Parsonage House, Woodbury, near Exeter, who requires the operating instructions for the Capacitance Test Set A.1700?

CONTESTS DIARY

- July 15 — D/F Qualifying Event (Wirral) (see page 605, June 1962)
- August 10-11 — European Fox-Hunting Championships (Ankaran, Yugoslavia)
- August 11-12 — W.A.E. DX Contest (C.W.)
- August 18-19 — W.A.E. DX Contest (Phone)
- August 25-26 — All Asian DX Contest.
- September 1-2 — National 144 Mc/s Open Contest (For details, see page 605, June 1962).
- September 1-2 — Region 1 I.A.R.U. V.H.F. Contest. (For rules, see page 606, June 1962).
- September 9 — D/F National Final
- September 15-16 — Scandinavian Activity Contest (C.W.).
- September 16 — Low Power Field Day (see this page).
- September 22-23 — Scandinavian Activity Contest (Phone).
- October 6-7 — VK/ZL Oceania DX Contest (Phone).
- October 7 — R.A.E.N. Rally (see this page).
- October 12-24 — Goose Bay A.R.C. QSO Parties.
- October 13-14 — VK/ZL Oceania DX Contest (C.W.).
- October 20-21 — Second 420 Mc/s Contest.
- October 27-28 — R.S.G.B. 7 Mc/s DX Contest (Phone).
- November 3-4 — R.S.G.B. 7 Mc/s DX Contest (c.w.).
- November 10-11 — Second 1.8 Mc/s Contest.
- December 1-2 — R.S.G.B. 21/28 Mc/s Telephony Contests.
- December 9 — OK DX Contest.

Letters to the Editor...

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

Subscription Rates

DEAR SIR,—With reference to *Current Comment* in the April issue of the BULLETIN, we note that even with the increase in subscription rates, R.S.G.B. membership will still cost 1/- a year less than the subscription paid for any other magazine in the country catering specifically for the amateur.

It is the opinion of the undersigned that the BULLETIN is of a very high standard, yet it is only part of the story. The R.S.G.B. as our national body provides essential services such as liaison with the licensing authorities, representation at frequency allocation conferences, QSL Bureau, to say nothing of the work done by the various committees (e.g. TVI/BCI, Contests, etc.).

We should certainly not object to paying an annual subscription of say £2 because membership would still be excellent value for money.

Yours faithfully,

THOMAS I. FISHPOOL (G3KEF)
R. L. BASTIN (G3LHA)
P. T. BURT (G3NBQ)

Coventry, Warwickshire.

DEAR SIR,—Having just received the April BULLETIN I note the proposed increase in yearly subscriptions to the Society. I must say that I am in favour of this, especially as it means a bigger and better "BULL." There is little doubt, however, that there will be "moans and groans" from some members, who will not consider the advantages of the increase, and these types will be the very ones who will spend 5s. or 7s. or more in the "local" and consider it little for an evening's enjoyment! Such is human nature.

The enlarged "BULL" might even allow extra space for future "moans," so let's have more room for "Letters to the Editor".

Yours faithfully,

MAL GEDDES (ZE3JO)

Salisbury, S. Rhodesia.

Bulletins—Past, Present and Future

DEAR SIR,—News that the BULLETIN is to be increased in size together with the statement that higher rates of payment are to be made to contributors will receive unanimous acclaim from members. Dealing with these changes in *Current Comment*, April 1962, there appears one announcement which may be viewed with some concern: "It is the intention of the Council and the wish of the Technical Committee that a high proportion of the extra space shall be devoted to technical articles." Does this decision reflect the wishes of the membership as a whole?

In post-war years the general presentation of the BULLETIN has evolved into a type of formal scientific journal at the expense—it is felt—of more informal, friendly, general amateur news and views. Looking back through earlier issues of the late twenties and early thirties the atmosphere of friendly fellow co-operation emanating from those pages is something we seem to have lost in recent years.

The main purpose of the BULLETIN must surely be to serve the membership as a whole. For many it is the only common bond with Society activities. A very large proportion of the total membership comprises non-transmitting enthusiasts and newcomers. They are looking for "do-it-yourself" articles of a semi-technical nature. I venture to suggest that we are not catering conscientiously enough, through the pages of the BULLETIN, for this class of member. After all, from the hobby point of view, we are amateurs—not professing to be scientific egg-heads!

Before the new BULLETIN is finalized I propose that a questionnaire be circulated (and mailed within the BULLETIN) to all members, this questionnaire to carry a list of publication subjects e.g. technical articles, semi-technical articles, DX news, personal news, etc., etc. (*Wireless World* issued a similar questionnaire to its readers a few years ago.) In this way an overall picture of the general wishes of readers can be determined.

Most certainly I would wish to see the BULLETIN maintain a reasonably high standard of presentation but let us not become guilty of losing the common touch with our fellow amateurs.

Yours truly,

Sunbury on Thames,
Middlesex.

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

S.S.B. Amplifiers

DEAR SIR,—I refer to Mr. Thornley's *Single Sideband* column in the May BULLETIN.

Firstly, why "passive-grid"? I find the expression does not convey what it is intended that it should and, furthermore, it seems a pity to use the word "passive" in a new way and having a meaning which is distinctly contrary to the accepted meaning in electrical engineering.

Secondly, we already have at least two adjectives which are more accurately descriptive of the author's intent; these are "aperiodic" or just "untuned". Surely these would be more accurate and less confusing.

Thirdly, the background to Mr. Thornley's contribution seems to imply a novelty, but I can only say that, in various forms, I have known an arrangement of this kind for many years. For example, in the early 50's I was using a sideband adaptor unit delivering a 2 watt output on all bands from 1.8 to 30 Mc/s to an 807 with control and screen grids strapped and having no tuned input circuit. More lately, for the last five years, I have been using the same sideband unit delivering its 2 watts into a 75 ohm load comprising a wideband transformer having an impedance step-up from 75 ohms to 750 ohms (i.e. a voltage step-up of just over 3 to 1). This transformer is flat between 3 and 30 Mc/s and is consequently "untuned". Mr. Thornley does not mention the chief limitation of such a system which is, of course, the basic input capacitance of the driven stage. Under class AB1 conditions where no grid current is drawn there would be no theoretical limit to the step-up one could obtain from such a transformer in order to achieve any desired driving voltage from no matter how small a driving source. The input capacitance of the output stage, however, at the highest frequency at which performance is required, must not be allowed to exceed the value where its reactance is significantly less than the transformed source resistance. In other words, at 30 Mc/s the reactance of the input capacity must not get significantly lower than 750 ohms, i.e. a capacity of approximately 7 pF. At 75 ohms the capacitance could be 70 pF but the drive volts would then be only 30 per cent. In any case the input impedance is much lower than the 2000 ohms mentioned by Mr. Thornley as needed for damping.

I feel sure that a greater use would be made of wideband transformers for class AB1 operation if the advantages of the system were more widely known and in this respect I think that we should be grateful to Mr. Thornley for having brought it to readers' attention.

Yours faithfully,

R. H. HAMMANS (G2IG)

Bramhall, Cheshire.

V.H.F. Propagation and Net Working

DEAR SIR,—When an aircraft gives rise to fading on a v.h.f. signal, it does so by providing an additional propagation path whose length is varying. The resulting total signal at the receiver is the vector addition of the components arriving by the different paths, and fading occurs because the components become successively in and out of phase.

When conditions are suitable for propagation beyond the normal radio horizon, there are always a few, and often several, propagation paths which are simultaneously operative between two DX stations, and the fading which is common on such a circuit is due, in part at least, to the relative variation in length of the different paths—in a manner similar to the aircraft fading, but much slower due to the smaller velocity of the air masses concerned compared with that of the aircraft.

Taking two particular stations which are more than about 50-70 miles apart, and considering a particular instant in time, the signal strengths in the two directions between the stations will, as a rule, be somewhat non-reciprocal—and may well be extremely different—if the frequencies used in each direction are different by even a few hundred kilocycles. The vector resultant depends on the path length difference measured in wavelengths, and over a few hundred thousand wavelengths of path a very small frequency change makes a significant difference.

As the inversion layer changes height or undulates with movement of the air masses, there will be fading observed on one

particular frequency. But if one could take a panoramic observation of the signal strength between the two stations at frequencies across the band, there would be frequencies of maximum and minimum signal spaced across the band depending on the geometry of the paths and the movement and characteristics of the air masses.

The point is that much frustrated calling of a DX station would be avoided if one could be sure of reciprocal propagation conditions, and this is only guaranteed if the same frequency is used. In general, the same kind of fading would be found anywhere in the band, but the minima would occur at different times on different frequencies. With comparatively slow fading conditions, the station heard may be on the crest of the wave, the answering station at the bottom of a trough.

If the same frequency were used by both stations, and fading occurred such that the signal remained low, an improvement might well be effected by moving half or one megacycle; the movements of air masses is not necessarily progressive or regular, and could result in a prolonged minimum over one particular path on a particular frequency.

The v.h.f. worker who wishes to exploit propagation conditions to the full will equip his station with a v.f.o. and use it intelligently. In this way he may avoid not only the QRM but also much of the frustration caused by QSB—which a rigid adherence to a Band Plan could never do!

Yours faithfully,

Douai Abbey,
Woolhampton, Berkshire.

(REV.) P. W. SOLLON, O.S.B.
(G3BGL)

V.H.F. National Field Day

DEAR SIR,—It is all very well Mr. Hum getting elated about a National V.H.F. Field Day and being enthusiastic about putting inter-group rivalry on an organized basis but has anyone stopped to consider how the ordinary member of the Society is affected by these momentous decisions. Did not he and his fellow committee members, when they looked at the lists of participants in the 1961 contests (and in previous years), notice also that a number of "Private" stations entered? Would it not have been, then, a courteous gesture, to say the least, if, before embarking on the new venture, and springing it upon the membership almost at a moment's notice, they had asked individual members for their opinions as well as sounding the views of various club secretaries on the matter? This could have been done quite easily by issuing a notice of intention either on the News broadcast or in the BULLETIN and requesting comments. Surely the individual member, and the R.S.G.B. comprises only individual members, has as much right to be heard as groups or clubs who as such have no standing in the Society. Instead he is faced with a "fait accompli" when he suddenly finds that he is robbed of a traditional event for which he may have spent much time and trouble in preparation, and which is replaced by a contest from which he is barred, since it is only for groups and affiliated societies and not for single operator stations. In any case a stint of 24 hours under portable conditions is a physical impossibility for the lone-wolf operator who is forced into this position not because he is necessarily an individualist at heart but because he resides in an area where his fellow amateurs may not be so keen as he on outdoor competitive events. Surprising as it may seem to members living near the Metropolis there are quite large areas of the country where the amateur density is so low as to preclude organizing a particular event on a club basis.

Here in the North-west Midlands and further north there are quite a few members who have taken a solo part in previous events but who have never objected to competing against groups or clubs and we would have been quite happy to have continued on this basis provided the duration of the contest was such as to keep the strain of operating within our capabilities. We realize that in the past we have put up quite formidable opposition so it is with deep regret that we now find we are eliminated from the contest before it even starts.

The nine hours' duration of previous field day events, which has been the practice since the old five-metre days, was just long enough to be enjoyable and not too exhausting and I would ask the Contests' Committee to consider limiting the duration of the new event to something of this order. Alternatively if it must be a whole day event would they not consider restoring the traditional contest under the old regulations and holding the National V.H.F. Field Day to coincide with the 24-hour contest in September.

Yours faithfully,
S. F. BROWN (G4LU)

Pant, nr. Oswestry.

The G5RV Aerial

DEAR SIR,—I was interested to read G4ZU's comments (page 429, March 1962 issue) on the G5RV aerial in his article dealing with the F.B.5 aerial.

Not having carried out any field strength tests on the G5RV aerial, I cannot say whether or not there is pattern break-up on the 20, 15 and 10m bands as he suggests. Speaking, however, from practical experience, I must join issue with your contributor when he suggests that there is little mismatch on the 80 and 40m bands but that such mismatch becomes quite serious on the higher frequencies. If he will refer to G5RV's article in the BULLETIN dealing with this aerial he will see that the reverse effect occurs. The aerial is principally designed for 20m operation and the s.w.r. is very low on that band, depending to some extent on its height above the ground; the s.w.r. increases somewhat on 15m and increases to a rather greater extent on 10m. However, there is a large increase in s.w.r. on 40m, and a similar ratio, if I remember correctly, also holds for 80m.

I live in a typhoon area about 1,350 ft. a.s.l. One reason for my being a G5RV "addict" will therefore be obvious. Nevertheless, I feel that it is an extremely good multiband dipole which will work any DX heard in the receiver, given a reasonable transmitter. The 102 ft. top of my own aerial is slung between two chimney pots about 10 ft. above the roof of the block of flats in which I live; from the centre of this top I run 34 ft. of open wire line which, with the assistance of another chimney pot, I take off at right angles to the main dipole arms; from the end of this open wire line I run about 40 yards of 71 ohms co-ax direct to the pi-output of my transmitter. The methods of suspension and feed are, therefore, far from ideal.

If it were not for about 80° of cut-off caused by a 500 ft. hill immediately to the north of my QTH I would get 360° coverage from the aerial. On 20m the s.w.r. varies from 1.1 to 1 at the l.f. end of the band to 1.3 to 1 at the h.f. end. On 15m it rises to 1.8 to 1 and on 10m to 2.7 to 1; while on 40m it is slightly in excess of 3 to 1. The reason for the particularly low s.w.r. on 20m is probably partly due to the fact that on that band the aerial is about one wavelength above the level of the surrounding ground.

In a very short period of operating time (using about 50 watts input to the p.a.) I have worked a very fair number of DX stations. My experience in working the African continent suggests that if the break-up in the pattern propounded by G4ZU occurs, it is of no practical importance.

Yours faithfully,

Hong Kong.

R. H. MUNRO (VS6EL).

Radio Amateurs' Examination

DEAR SIR,—I believe that members of the society would welcome the publication of model answers to Radio Amateurs' Examination questions.

For many years the *Post Office Electrical Engineers Journal* has published supplements giving model answers to City and Guilds examinations in Telecommunications subjects. These are very well prepared and presented and are of inestimable value to Post Office employees and other students who take those examinations.

It is my experience, after running an R.A.E. class for ten years, that students, and indeed teachers, find it very difficult to determine exactly what standard is required of them in the examination. Many students have never taken a public examination before and others, some are old age pensioners, have not taken an examination for half a century! Publication of a supplement to the BULLETIN twice a year giving model answers to the R.A.E. question papers would be a great help not only to those working for the examination but also to the old hands who like to keep up with the technical requirements that our hobby imposes.

Members' views on this matter would be most welcome.

Yours faithfully,

Wembley, Middx.

ALAN J. BAYLISS, B.Sc. (G8PD)

Quick Response

DEAR SIR,—My call for help published in the R.S.G.B. BULLETIN for May was quickly answered, in fact, by the same post as I received my copy!

I am most grateful for your help in publishing the plea.

Yours sincerely,

Misterton, via Doncaster.

FRANK WRIGHT (B.R.S.22765)



THE AMATEUR RADIO HANDBOOK



THIRD EDITION

Contents include chapters on Fundamentals, Valves, Semiconductors, H.F. Receivers, V.H.F./U.H.F. Receivers, H.F. Transmitters, V.H.F./U.H.F. Transmitters, Keying and Break-in, Modulation, Single Sideband, Frequency Modulation, Propagation, H.F. Aerials, V.H.F. Aerials, Noise, Mobile Equipment, Power Supplies, Interference, Measurements, Operating Technique and Station Layout, R.S.G.B. and the Radio Amateur and General Data.

Bound in maroon linson buckram..... 544 pages.

Nearly 700 line diagrams and more than 100 half-tones

PRICE 34/- (Postage and packing 2/6)

55-50 post paid U.S.A. and Canada

OTHER R.S.G.B. PUBLICATIONS

A Guide to Amateur Radio (Ninth Edition)

Contains a wealth of information for the newcomer to Amateur Radio. 80 pages well illustrated.

Price 3/6 (by post 4/-)

The Morse Code for Radio Amateurs

A carefully selected series of exercises designed to make learning the Code as simple as possible. 24 pages.

Price 1/6 (by post 1/9)

Radio Amateurs' Examination Manual

Information on Licence Conditions, Circuits and Valves, Receivers, and Transmitters, Aerials and Propagation. 60 pages and many line diagrams.

Price 5/- (by post 5/6)

R.S.G.B. Amateur Radio Call Book (1962 Edition)

The most accurate and up-to-date directory of Amateur Radio Fixed and Mobile Stations in the United Kingdom.

Price 4/6 (by post 5/-)

Service Valve Equivalents (Second Edition)

This invaluable booklet gives the commercial equivalents of the numerous CV coded valves, cathode ray tubes and semiconductor devices available to the amateur. 40 pages, pocket-book size.

Price 2/- (by post 2/6)

Published by Radio Society of Great Britain

28 Little Russell Street, London, W.C.1

Forthcoming Events

Details for inclusion in this feature should be sent to the appropriate Regional Representatives by the 18th of the month preceding publication. T.R.s and club secretaries are reminded that the information submitted must include the date, time and venue of the meeting and, whenever possible, details of the lecture or other event being arranged. Regional Representatives are requested to set out the copy, preferably typed double spaced, in the style used below. Standing instructions for more than three months ahead cannot be accepted.

DATES FOR YOUR DIARY

August 22-September 1.—National Radio and Television Show, Earls Court, London.
September 2.—G6UT's Ham Party.
September 8.—B.A.T.C. Amateur Television Convention, Conway Hall, London, W.C.1.
September 22.—Region 9 Mobile Rally at Weston-super-Mare.
September 23.—Region 9 O.R.M. at Weston-super-Mare.
September 23.—Surrey Radio Contact Club 144 Mc/s D/F Hunt.
October 20-21.—Jamboree-on-the-Air.
October 31-November 3.—R.S.G.B. Exhibition, Seymour Hall, London.
December 15.—Annual General Meeting, Overseas House, London S.W.1.
 Details of Mobile Rallies are given in *Mobile Column*.

REGION 1

Ainsdale (A.R.S.).—July 25, August 8, 22, 37 Hawthorne Grove, Southport.
Blackburn.—Fridays, 8 p.m., West View Hotel, Revidge Road.
Blackpool (B. & F.A.R.S.).—Tuesdays, 8 p.m., Pontins Holiday Camp, Squires Gate.
Bury (B.R.S.).—August 14 ("Brains Trust"), 8 p.m., Knowsley Hotel, Kay Gardens.
Chester.—Tuesdays, 8 p.m., Y.M.C.A.
Eccles (E. & D.R.C.).—Tuesdays, 8 p.m., Congregational Mission Church, King Street, July 24 lecture by D. Atter (G3GRO) on "Amateur Communication Receiver Design."
Liverpool (L. & D.A.R.S.).—Tuesdays, 8 p.m., Gladstone Mission Hall, Queens Drive, Stoney-croft.
Macclesfield.—July 24, August 7, 21, 42 Jordan-gate.
Manchester (M. & D.A.R.S.).—Wednesdays, 7.30 p.m., King George VI Club, North Road, Moston, Manchester 10. (S.M.R.C.) Fridays, 7.30 p.m., Fallowfield Bowling & Lawn Tennis Club, 81 Wellington Road, Fallowfield, Manchester 14.
Morecambe.—August 1, 125 Regent Road.
Preston (P.A.R.S.).—July 24—no meeting; August 14, 28, St. Paul's School, Pole Street (Morse practice, 7.30 p.m.).
Southport (S.R.S.).—Thursdays, 8 p.m., The Esplanade.
Stockport (S.R.S.).—July 18, August 1, 15, 29, 8 p.m., The Blossoms Hotel, Buxton Road.
Wirral (W.A.R.S.).—July 18, August 1, 15, 7.45 p.m., Harding House, Park Road West, Cloughton.

REGION 2

Barnsley.—Summer Recess until September 14.
Bradford.—July 24 ("160m S.S.B." by D. Millard, G3OGV), August 21 (Informal), 7.30 p.m., 66 Little Horton Lane.
Halifax (Northern Heights).—July 18 (Rag-chew), August 1 (Hosts to Manchester Radio Society), August 15 (Ragchew), 7.30 p.m., Sportsman Inn, Ogden.
Scarborough.—Thursdays, 7.30 p.m., Chapman's Yard, North Street.

REGION 3

Birmingham (M.A.R.S.).—July 17 ("Tape Recording" by H. C. Smith), August 21 ("G2DAF Receiver for S. S. B." by G3LNN), 7.30 p.m., Birmingham and Midland Institute, Paradise Street, Birmingham. (South).—July 19, 7.45 p.m., Friend's Institute, 220 Moseley Road, Birmingham 12.
Cannock (A.R.S.).—First Thursday in each month, 7.30 p.m., White Lion Hotel, Bridgtown.

Coventry (C.A.R.S.).—Mondays, 7.30 p.m., R.A.F.A. Club Holyhead Road, Coventry.
Stourbridge (S. & D.A.R.S.).—No meeting in August.
Sutton Coldfield (A.R.S.).—July 26, 7.30 p.m., 92 The Parade, Sutton Coldfield. No meeting in August.
Wolverhampton (A.R.S.).—July 16 (Short Talk), July 30 (Short Talk), 8.0 p.m., Neachells Cottage, Stockwell End, Tettenhall.

REGION 4

Chesterfield (C. & D.A.R.S.).—August 8, 7.30 p.m., Newbold Observatory, Newbold Road, Chesterfield.
Derby (D. & D.A.R.S.).—July 18 (D/F League Fixture 4), July 25 (Open Night), August 1 (Surplus Sale), August 8, August 15 (D/F League Fixture 5), 7.30 p.m., Room No. 4, 119 Green Lane, Derby. (D.S.W. Exp. Soc.).—Fridays, 7.30 p.m. Sundays, 10.30 a.m., Nunsfield House, Boulton Lane, Alveston.
Graham (G. & D.A.R.S.).—Mondays, 7.30 p.m., Club Rooms, rear of Manners Arms Hotel, London Road, Grantham.
Grimsby (G. & D.A.R.S.).—August 2, 16, 8 p.m., R.A.F.A. Headquarters, Abbey Drive West, Grimsby.
Leicester (L.R.S.).—Mondays, 7.30 p.m., Club Rooms, Old Hall Farm, Braunstone Lane, Leicester.
Lincoln (L.S.W.C.).—Fortnightly, Wednesdays, 7.30 p.m., Lincoln Technical College, Cathedral Street, Lincoln.
Nottingham (A.R.C.N.).—Tuesdays (R.A.E.), Thursdays (Lecture), 7.15 p.m., Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood.
Northampton (N.S.W.C.).—Thursdays, 7 p.m., Allens Pram Works, 8 Duke Street, Northampton.
Retford & Worksop (N.N.A.R.S.).—Tuesdays (Beginners), Thursdays (Club), 7.30 p.m., Victoria Institute, Eastgate, Worksop, Notts.

REGION 5

Sheffield (S. & D.A.R.S.).—July 19 ("Receiver Accessories" by P. Wicks, Morse Instruction by D. Roper), July 26 ("Using Transistors," by J. Leviston, G3NFB, Morse Instruction by C. Pettifer), August 2 (Lecture by D. Raby, G3IDR), Digswell House, Sheffield.
March (M. & D.A.R.S.).—Tuesdays, 7.30 p.m., Police Headquarters, High Street.
Cambridge (C. & D.A.R.C.).—Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge. Wednesdays, 7.30 p.m., Junior Section (Morse Instruction, Theory, and Constructional Work).

REGION 6

Cheltenham.—First Thursday in each month, 8 p.m., Great Western Hotel, Clarence Street.

REGION 7

Acton, Brentford and Chiswick (A.B.C.R.C.).—July 17 ("The STD System," by G3OJX), 7.30 p.m., A.E.U. Club, 66 High Road, Chiswick.
Bexleyheath (N.K.R.S.).—July 26, August 9, 23, 8 p.m., Congregational Hall, near Clock-tower, Bexleyheath.
Croydon (S.R.C.C.).—August 14, 7.30 p.m., Blacksmith's Arms, South End, Croydon.
Dorking (D. & D.R.S.).—July 22, 2nd field day, July 24, 8.30 p.m., "Royal Oak," Brockham Green. August 14, 8.30 p.m., "Barley Mow," East Horsley.
Ealing.—Sundays, 11 a.m., A.B.C. Restaurant, Ealing Broadway.
East Ham.—Tuesdays, fortnightly, 8 p.m., Leigh Road, East Ham.
East Molesey (T.V.A.R.T.S.).—August 8, Carnarvon Castle Hotel, Hampton Court.
Edgware and Hendon (E. & D.R.S.).—Second and fourth Mondays in each month, 8 p.m., John Keeble Hall, Church Close, Deans Lane, Edgware.

Enfield.—Fourth Thursday in each month, 8 p.m., George Spicer School, Southbury Road.
Harlow.—Tuesdays, 7.30 p.m., rear of G3ERN (G. E. Read), High Street, Harlow.
Hounslow (H.A.D.A.R.C.).—Mondays, 7.30 p.m., Isleworth Town School, Twickenham Road, Hounslow.
Ilford.—Thursdays, 8 p.m., 579 High Road, Ilford (near Seven Kings station).
Kingston.—Lectures alternative Thursdays. Theory and Morse classes weekly, 7.45 p.m., Y.M.C.A., Eden Street, Kingston. (Morse classes at 2 Sunray Avenue, Tolworth).
Mitcham (M. & D. R. S.).—Lectures alternate Fridays (Morse classes 7 p.m.), "The Cannons," Madeira Road, Mitcham.
New Cross (C.A.R.S.).—Fridays, 7.30 p.m., 225 New Cross Road, S.E.14.
Norwood and South London (C.P. & D.R.C.).—July 21, 8 p.m., C.D. Training Centre, Bromley Road, Catford.
Paddington (P. & D.A.R.S.).—Wednesdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W.2.
Purley (P. & D.R.C.).—July 20 ("The Human Machine as a Radio Operator," recorded lecture by F. Charman, G6CJ), Railway Men's Hall (side entrance), Whytecliffe Road, Purley.
Romford (R. & D.R.S.).—Tuesdays, 8.15 p.m., R.A.F.A. House, 18 Carlton Road, Romford.
Science Museum (C.S.R.S.).—July 17, August 7, 21, 6 p.m., Science Museum, South Kensington.
Sidcup (C.V.R.S.).—July 24, 8 p.m., Station Hotel, Sidcup.
Southgate & District.—No meeting in August.
Slough (S.A.R.S.).—First Wednesday in each month, 8 p.m., United Services Club, Wellington Street.

LONDON MEMBERS' LUNCHEON CLUB

will meet at the Bedford Corner Hotel, Bayley Street, Tottenham Court Road.
 at 12.30 p.m. on Friday, July 20, August 17, and September 21, 1962.
 Telephone table reservations to HOL 7373 prior to day of luncheon. Visiting amateurs especially welcome.

REGION 8

Crawley (C.A.R.C.).—July 25, Mobile Evening at Hogs Back, Guildford, August 8, Informal. For details contact G3FR or G3TR.
Tunbridge Wells (W.K.A.R.S.).—July 20 (Film Show), 7.30 p.m., Culverden House, Culverden Park Road, Tunbridge Wells. August 3, Garden Party at Pembury.

REGION 9

Bristol.—July 20 ("Slow-scan TV" by J. Plowman, G3AST), 7.15 p.m., Carwardines Restaurant, Baldwin Street, Bristol 1.
Burnham-on-Sea.—No meeting in August.
Exeter.—August 7, 7.30 p.m., Y.M.C.A., St Davids Hill, Exeter.
Falmouth (C.R. & T.C.).—First Wednesday in each month, Y.M.C.A., Falmouth.
Plymouth (P.R.C.).—First Tuesday in each month, 7.30 p.m., Guild of Social Service Building, Plymouth. Other Tuesdays, Virginia House Settlement, St Andrews Cross, Plymouth.
Torquay (T.A.R.S.).—August 11 ("Aerial Systems," by E. J. Hayman, G3ABU), 7.30 p.m., Y.M.C.A., The Castle, Torquay.
Weymouth.—August 3, 7.30 p.m., Waverley Hotel, Westham, Weymouth.
Yeovil (Y.A.R.C.).—Wednesdays, 7.30 p.m., Grove House, Preston Road, Yeovil.

REGION 11

Prestatyn (F.R.S.).—July 30 (Quiz), 7.30 p.m., Railway Hotel, Prestatyn.

REGION 14

Ayrshire.—Third Sunday in each month, 7.30 p.m., Royal Hotel, Prestwick.

REGION 16

Basildon (B. & D.A.R.S.).—Last Monday in each month, 8 p.m. For details of venue, etc., contact G3ORT or G3IFN.

Chelmsford (C.A.R.C.).—First Tuesday in each month, 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

Southend (S. & D.R.S.).—Alternate Fridays in the Canteen at E. K. Cole, Ltd., Priory Road, Prittlewell. Next meeting July 27.

REGION 17

Newbury.—July 27 ("Contest Techniques," by

J. Gale, G3LLK), 7.30 p.m., The Cancon, Elliotts of Newbury, West Street, Newbury.

Portsmouth.—Wednesdays, 7.30 p.m., The Community Centre, Twyford Avenue, Portsmouth.

Southampton.—August 11, 7 p.m., Lancaster Building, University of Southampton, University Road, Southampton. (No meeting in July.)

Regional and Club News

Cambridge and District.—Recent activities have included visits to Baldock Radio Station and to the Wethersfield National Mobile Rally and a demonstration of 2m equipment by T. Withers (G3HGE). The local Committee for Education has provided a good kit of tools and furniture for the use of the Junior Section.

Cheltenham.—At the June meeting N.F.D. was discussed and it was agreed in 1963 to make a joint entry with Cheltenham Amateur Radio Society. A gear exchange system has been started by G3PMD. *Town Representative:* John Yeend (G3CGD), 30 St. Luke's Road, Cheltenham.

Cornish Radio and Television Club.—9G1CC showed a selection of colour slides illustrating various aspects of life in Ghana at the June meeting. Other visitors present were G3LIS and G6UI/M. *Hon. Secretary:* W. J. Gilbert, 7 Poltair Road, Penryn, Cornwall.

Crawley Amateur Radio Club.—On July 25, there will be an informal mobile outing to the Hogs Back near Guildford, arriving at about 20.00 G.M.T., when it is hoped to meet members of other local clubs. Mobiles will be in operation on 144-637 Mc/s. *Hon. Secretary:* R. G. B. Vaughan (G3FRV), 9 Hawkins Road, Tilgate, Crawley, Sussex.

Cray Valley Radio Society.—David Deacon (G3BCM) will give a talk entitled "The Radio Amateur and Interference" at the meeting on July 24 at the Station Hotel, Sidcup. *Hon. Secretary:* Stan Coursey (G3JJC), 49 Dulverton Road, London, S.E.9.

Crystal Palace and District Radio Society.—The first meeting at the C.D. Training Centre, Bromley Road, Catford, will be held on July 21 at 8 p.m. Prospective members are cordially invited to attend. *Hon. Secretary:* G. M. C. Stone (G3FZL), 10 Liphook Crescent, Forest Hill, London, S.E.23.

Derby and District Amateur Radio Society.—The fourth event in the D/F League will take place on July 18 and the fifth on August 15. Meetings in Room No. 4, 119 Green Lane, Derby, are arranged for 7.30 p.m. on July 25, August 1 (Surplus Sale) and August 8. *Hon. Secretary:* F. C. Ward (G2CVV), 5 Uplands Avenue, Littleover, Derby.

Lincoln Short Wave Club.—The Annual Dinner was held at the Grand Hotel on June 6. Among those present were the retiring President, Dr. Walters, his successor, Mr. Church, and visitors from Stamford and Derby. The club took part in N.F.D. *Hon. Secretary:* Cpl. T. J. S. Russell (G3PMT), 141 Sqn., R.A.F. Scampton, near Lincoln.

London Members' Luncheon Club.—Guest of honour at the June meeting was John Huntoon (W1LVQ), General Manager of A.R.R.L. Other visitors present included DJ4MY, EP2AT, W2APF, VK2AHR and ZL1WV. The dates of future meetings are shown in *Forthcoming Events*. Visitors from home and overseas will be most welcome.

Loughton and District Radio Society.—Following the successful first meeting at which John Kay (G3AAE) gave an informative talk entitled "Working those difficult stations," a second meeting has been arranged for July 20 when T. Withers (G3HGE) will speak about "V.H.F. Equipment." Details of the venue may be obtained from the *Hon. Secretary:* J. Atkinson (G3OPA), 6 Rochford Avenue, Loughton, Essex.

Manchester and District Amateur Radio Society.—There was a very successful outing to the Lake District on May 20, during which G3HOX/A was operated on Top Band. Later, the party moved on to Morecambe. A Top Band Station was also operated during N.F.D. *Hon. Secretary:* A. B. Langfield, 2 Rowland Street, Moston, Manchester, 10.

March and District Radio Amateurs Society.—"Mystery" parcels of radio gear have been sold at £1 each in aid of funds and a number of members have commented on the good value for money.

Northern Amateur Radio Mobile Society.—The first two meetings of this recently-formed society were very well supported, there

being an attendance of more than 100 at the second. Membership subscription is 7/6 p.a. Plans are being made to hold this year's Northern Mobile Rally at Harewood House on September 2 but it is intended to revert to the third weekend in May next year. Further details may be obtained from the *Hon. Secretary:* B. Crisp (G3LHQ), "Ashmount," Moorhouse Lane, Birkenhead, near Bradford.

Northern Heights Amateur Radio Society.—Recent activities have included a visit to the Holme Moss TV station and participation in the Halifax Charity Gala on June 2 when G3MDW, G3FQH, and Mrs. Mary Shaw (G3OMM) operated G3MDW/A. Equipment included a Panda Cub transmitter for Top Band and a Panda Explorer for the h.f. bands, and an Eddystone 640 receiver. On August 4 G3MDW/A will be in operation at the Warley Charity Gala. Details of future meetings are given in *Forthcoming Events*. *Hon. Secretary:* A. Robinson (G3MDW), Candy Cabin, Ogden, Halifax.

Reigate Amateur Transmitting Society.—At the June meeting there was a quiz arranged by G3NKS during which the controversial query "Should new licensees be restricted to c.w. for a definite period?" was one of the questions raised. On July 21, G3NZP will give a talk entitled "QRO on Two" at the meeting at The Tower, Redhill, commencing at 7.30 p.m. On the 25th, members will be joining the Hog's Back meeting arranged by the Crawley club. *Hon. Secretary:* F. D. Thom (G3NKT), 12 Willow Road, Redhill.

South Dorset Radio Society.—At the June meeting, G3EAT described and demonstrated his s.s.b. transmitter. Other equipment discussed was the Minimitter converter, the DX40U transmitter and a home-built 2m converter. N.F.D. was well supported and there was fine weather throughout. *Hon. Secretary:*



A Harrogate Occasion

When Brian Dean (G3OIX) of Harrogate was married recently he had as support the "hard core" of Amateur Radio in that town in the persons of R. Hodgson, G3DUW (left) and E. Knowles, G2XK (right). The B.R.S. fraternity was represented by Bill Stimpson. We do not know what Janet, his bride, thought about the presence of these "intruders" on her wedding day but we hope she will derive much pleasure from her husband's interest in Amateur Radio.

C. E. Biggs (G2TZ), 54 Prince of Wales Road, Dorchester, Dorset.

Stockport Radio Society.—The following have been elected to serve on the Committee: *Chairman*—Joel Weaving (G3OWN); *Vice-Chairman*—G. R. Phillips (G3FYE); *Hon. Treasurer*—W. H. Banks (G2ARX); *Hon. Secretary*: E. G. Houldsworth (G6NM); *Committee Members*—A. Smith (G3AYT), I. MacArthur (G3NVQ), K. Buxey, B. Simpson (G3PEK) and W. Shaw. E. Wigzell is the A.S.R. A tankard was presented to G3FYE in recognition of his 10 years' service as Hon. Secretary. The society has been allocated the call-sign G6UQ, previously held by the late H. J. Eaves, for many years an officer of the society. The annual mobile rally will be held on August 26, starting from Stockport and finishing in Buxton.

Torbay Amateur Radio Society.—At the June meeting, members said farewell to the Vice-President, F. D. Cawley (G2GM), who is moving to the Isle of Wight. On behalf of the President, Mr. Cawley thanked those who took part in N.F.D., giving the society its best results for some years. At the meeting due to be held on July 14, B. E. Symons (G3LJK) was to give a talk on "BCI-TVI." *Hon. Secretary*: Mrs. Gee Western (G3NQD), 118 Salisbury Avenue, Barton, Torquay.

Verulam Amateur Radio Club.—Members recently visited the B.B.C. transmitters at Daventry and the Amateur Radio Club (G5XX). *Hon. Secretary*: B. D. Cockell (A.2598), 119 Gurney Court Road, St. Albans.

York Amateur Radio Society.—Two meetings a week are to be held in future: on Tuesdays, Morse and other instruction will be given while the club station G3HWW will be on the air on Thursdays. Once a month a special function will be arranged. A social gathering for members and their families is to be held shortly. *Hon. Secretary*: N. Spivey (G3GWI), 80 Melton Avenue, Clifton, York.

PLEASE HELP US...

- When writing to Headquarters do not include BULLETIN items, queries, changes of address and publication orders, etc., on the same sheet of paper. Only one envelope is necessary, but a separate sheet for each subject please.
- Always use block letters, or write clearly, your full name and address. Christian names, call-signs and illegible signatures cause much unnecessary checking.
- Notify Headquarters of impending changes of address several weeks before you move. Alterations to subscription reminders, etc., are not sufficient unless definite instructions are given. Include your B.R.S. number and/or call-sign, your present address and, if possible, the date your subscription falls due. Remember that BULLETIN wrappers are prepared up to three weeks before the publication date.
- When forwarding your subscription please return the reminder card sent to you from Headquarters or, if this has been lost, indicate the date your subscription fell due.

...TO HELP YOU!

GREEN AND DAVIS

2 METRE NUVISTOR CONVERTER
BUILT-IN POWER SUPPLY

6" x 4" SILVER-PLATED COPPER
CHASSIS. XTAL CONTROLLED.
I.F. 28-30 Mc/s (or to order)

£9 : 10 : 0

LESS POWER SUPPLY £8 : 15 : 0

S.A.E., 5 WEIR HALL GARDENS, LONDON, N.18

What about that 12 w.p.m. Morse Code Test ?

You can only reach the goal by keen listening and constant practice with a Morse Key. The amount of "hard labour" involved depends on the method of training.

The CANDLER System

will help you as it has helped thousands of others over many years, and give you a sound basis. It turns a difficult task into a pleasurable pursuit.

Send 3d. stamp for details of our Special Course for Amateur Transmitting Licence and

BE SUCCESSFUL with

The CANDLER System Co.

Dept. G3, 52b ABINGDON ROAD, LONDON, W.8

Candler System Co., Denver, Colorado, U.S.A.

BLANK CHASSIS

Precision made in our own works from commercial quality half-hard Aluminium.

Two, three or four sided

SAME DAY SERVICE

of over 20 different forms made up to YOUR SIZE

Order EXACT size you require to nearest 1/16" (maximum length 35", depth 4")
Specials dealt with promptly SEND FOR ILLUSTRATED LEAFLET
or order straight away, working out total area of material required and
referring to table below, which is for four-sided chassis in 18 s.w.g. (for 16 s.w.g. add 1lb)

48 sq. in.	4/-	176 sq. in.	8/-	304 sq. in.	12/-
80 sq. in.	5/-	208 sq. in.	9/-	336 sq. in.	13/-
112 sq. in.	6/-	240 sq. in.	10/-	368 sq. in.	14/-
144 sq. in.	7/-	272 sq. in.	11/-	and pro rata	
P. & P. 2/6		P. & P. 2/9		P. & P. 3/-	

FLANGES (1", 1 1/2" or 2") 6d. per bend.

STRENGTHENED CORNERS 1/- each corner.

PANELS. The same material can be supplied for panels, screens, etc., at 4/6 sq. ft. (16 s.w.g. 5/3) plus P. & P. up to 72 sq. in., 1/3, 108 sq. in., 2/-, 144 sq. in., 2/6, and pro rata.

H. L. SMITH & CO. LTD.

287-289 EDGWARE ROAD, LONDON, W.2.

PAD 5891/7595

G2ACC offers you—

POPULAR CATALOGUE ITEMS

Woden. Modulation Transformers: UMO, 25 watts R.F. input, 54/6; UMI, 60 watts R.F. input, 73/6; UM2, 120 watts R.F. input, 102/-; UM3 240 watts R.F. input, 110/-. Driver Transformers: DT1, 49/6; DT2, 56/-; DT3, 48/-. Mains Transformers: RMS10A, 44/6; RMS11A, 44/6; RMS12A, 59/6; PTM13A, 81/-; PTM16, 118/6; PTM17, 151/6.

Postage extra on orders under £3.

These are some of the items held in stock for immediate delivery. CATALOGUE No. 12. 56 pages illustrated with over 2,000 new guaranteed items by leading makers. 9d. post free (refunded on first order).

Southern Radio & Electrical Supplies

SO-RAD WORKS · REDLYNCH · SALISBURY · WILTS

Telephone: Downtown 207

CLASSIFIED ADVERTISEMENTS

ADVERTISEMENT RATES. Members' Private Advertisements 3d. per word, minimum charge 5s. Trade Advertisements 9d. per word, minimum charge 12s. All capitals 1s. per word, minimum charge 18s. Write clearly. No responsibility accepted for errors. Use of Box number 1s. 6d. extra. Send copy to Sawell & Sons Ltd., 4 Ludgate Circus, London, E.C.4.

SITUATIONS VACANT

RADIO TECHNICIAN

Kuwait Oil Company requires for overseas a Radio Technician to undertake maintenance and installation of radio communications equipment.

Applicants must have had wide experience in the maintenance of VHF radio telephone equipments including multi-channel carrier systems. Some knowledge of low power MF/HF telegraphy and RTT reception would be an advantage.

Desirable qualifications City & Guilds (Intermediate).

Salary not less than £2,000. Kit allowance of £85 is payable. There is no tax on personal incomes in Kuwait.

Write Box E/27 c/o Hanway House, Clark's Place, E.C.2.

DESIGN AND DEVELOPMENT ENGINEERS

required by S. Coast concern for aerial design (Embracing custom-built communal aerials and U.H.F.) and electronic equipment. Housing facilities available. Full details of experience, qualifications and salary required to: Personnel Officer,

Box No. C.7057, c/o R.S.G.B. BULLETIN, 4 Ludgate Circus, London, E.C.4.

INTERESTING opportunity for Ham exists to train as Assistant R.F. Induction Heating Engineer. Job requires ability in general engineering workshop practice including welding and silver soldering, in addition to a working knowledge of the construction of amateur transmitters.—Apply: Personnel Manager, The Weyburn Engineering Co. Ltd., Elstead, Surrey.

AIR MINISTRY have vacancies for CIVILIAN RADIO TECHNICIANS at R.E.U. Henlow, Bedfordshire for the servicing, repair, modification and testing of air and ground radio and radar equipment. Commencing salary (according to age) is £630 to £810 p.a., maximum salary £930 p.a.—Apply to Officer Commanding (S.J.), R.E.U. Henlow, Bedfordshire, or enquire at any employment exchange quoting City O/N 930.

ELECTRICAL ENGINEER wanted for technical sales office in Central London handling SCRs and transistors. Previous commercial experience a help but not essential. HNC or equivalent background wanted together with design experience in industrial electronics. Salary according to experience.—Please write Commercial Manager, (Rectifier Units), Westinghouse Rectifier Division, 82 York Way, N.1.

FOR SALE—TRADE

METALWORK.—All types of cabinets, chassis, racks, etc., to your own specifications.—Philpott's Metalworks Ltd. (G4BI), Chapman Street, Loughborough.

PYE V.H.F. FIXED AND MOBILE STATIONS, 12 volt, ideal for 70 Mc/s. in good working order but less crystals. Mobiles, £5; fixed £10; plus carriage.—Pendry & Kennedy, 6 Coed Celyn Road, Derwen Fawr, Swansea.

SERVICES OFFERED

GO ONE BETTER. Have your cabinets, panels, etc., stove-enamelled and lettered to your own or original specification.—For by-return quotations, contact: The Universal Productions (Enamellers) Ltd., 22 Aston Road North, Birmingham 6. (Tel.: Aston Cross 2987)

PERSONAL

QSL CARDS. G.P.O. approved log books, cheapest, best, prompt delivery. Samples.—Atkinson Bros., Printers, Looe, Cornwall.

PATENTS and TRADE MARKS. Booklet on request. Kings Patent Agency Ltd. (B. T. King, G5TA, Mem. R.S.G.B. Reg. Pat. Agent).—146a Queen Victoria Street, London, E.C.4. (Phone: City 6161.) 60 years' refs.

FOR SALE—PRIVATE

TAYLOR MULTIMETER model 122A. 5000 O.P.V. As new, £7 o.n.o. 30 Masefield Close, Cheadle, Stoke-on-Trent, Staffs.

FOR SALE.—R208 complete, manual £8 10s. R107, manual £10. R1392E modified version £3 10s. Buyer collects. S.A.E. details.—Thompson, 13 Byass Avenue, Bridlington.

SALE.—"Hammarlund" HQ170. Class D wave-meter. "R.C.A." AR77 receiver. "Advance" E2 signal generator. "Gelosco" VFO. "Labgear" wide-band coupler. "Heathkit" 0-12-U. oscilloscope. Taylor 100A. test-meter. "McMichael" all-wave radio. "Belling Lee" T.V. aerial. Woden. UM4 mod transformer. "Radiovision" 2-stage (A.C.) pre-selector. High voltage mains transformers HT chokes, valves, crystals, short-wave gear etc., all at low prices.—Ellis (G3SN), 12 Hillside Road, Saltash, Cornwall.

R.T.T.Y.—At last what you boys have been waiting for! A limited quantity of type 44 Mk.2 Perforators. Boxed, this time at the right price, 2 for 35/-, carriage extra. Do not miss your chance, for "too late, too late" will be the cry when the man with the perforators has passed you by J. A. Steele (G3KZ), 12 Broadwalk, South Woodford, London, E.18. Telephone: Wanstead 2321. "Correction of June advertisement—Goods NOT new."

FOR SALE, BARGAIN.—A complete ham station plus useful components, carriage paid. NC-200 special ham receiver covers 1 to 32 Mc/s in 10 bands. Perfect bandspread to 1 kc/s. 150 watt trans. 10, 15, 20, 40, 80, MRT/S. 100 watt modulator. All power units, cables etc. plus a host of transformers, etc. £90 o.n.o. W. White, 13a High Street, Hunstanton, Norfolk.

FOR SALE.—R.107 with "S" meter £9 10s. 0d. R.208 10-60 Mc/s £5.—A.2747, 18 Main Street, Littleport, Cambs.

FOR SALE—MINIMIZER M.R. 44/2—(described Bulletin August '61) £42; HRO £18; R109A (new) £3, BC453 £3; P. pack 234A £3; Wavemeter W1191 £3; Crystal Calibrator No. 7 £2 10s. 0d.; Mullard Res/Cap Bridge £5; Furzehill Interference Test Set No. 1 £3. WANTED Bug Key.—30 Abbey Crescent, Sheffield 7. (Tel: 363155).

3-EL 3 band beam, 25 ft. mast, rotator and control with indicator, home-built £15. o.n.o. Buyer to remove but assistance given with stripping. Owner moving to DX (Rutland). Also, AR88D with speaker £30, SX27RX, no case, £15. German S.W. receiver mains or 28 volt, 7 valve £10. Part built table top A3 Xmtr. with 813 final £8. Q 5'er with PSU £3. B2 modified 12 volt PSU & MOD. £8. MCR.1 complete £5. SSB linear with 829B £4. TR 1985/1986 with all valves and relays £10. PSU's 400 volt 250 m/a £5. 400 volt plus Bias 150 volt £6. Audio amplifiers, genemotors, odds and ends. The lot £100 o.n.o.—Miller (G3CFB), Monument Lane, Chalfont St. Peter. Tel.: Chalfont St. Giles 753.

FOR SALE—PRIVATE (continued)

PANDA PRI20V TRANSMITTER.—150wt cw, 120wt fone. FB no TVI. Can deliver reasonable distance £40. Minimitter Converter £10.—K. Wright, 27 Haverstock Court, St. Pauls Cray, Kent. Foo. 4266.

LARGE NUMBER of Vibrator packs for sale, P.C.R.3 type. Brand new, in original cartons, in perfect condition. 12 volt input, output approximately 300 volts at 130mA. 12s 6d. each plus carriage 7s. 6d. Special plug and leads with croc clips 2s. 6d. extra.—West (G3JPN) 188 Warwick Road, Birmingham, 11.

K.W. VALIANT, mint condition, £30.—J. A. Steele, 12 Broadwalk, London, E.18.

HALLICRAFTERS SX24HF. Good condition. £20 or reasonable offer. London area. Box No. C7058, c/o R.S.G.B. BULLETIN, 4 Ludgate Circus, London, E.C.4.

WANTED

WANTED.—All types of communication receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R.T. & I. Service, 254 Grove Green Road, Leytonstone, London, E.11. (LEYton 4986.)

WANTED FOR CASH.—Good clean communication receivers and s.s.b. equipment. Please state price.—Short Wave (Hull) Radio, 30-32 Princes Avenue, Hull. (Telephone 18953).

WANTED: T.C.S. Transmitters, Receivers, Connectors, Loading Coils, etc.—Gilfillan, 98 Dominion Road, Worthing, Sussex. Tel.: Worthing 8719.

MINISTRY OF AVIATION E.I.D. ELECTRONIC INSPECTORS

required for

Radio, Radar, Components and Electrical Ancillaries in laboratories at Bromley and Woolwich, and for inspection at firms' works in various parts of London and Southern England on a resident or a visiting basis. Varied and interesting work with opportunities for gaining valuable experience and further training. Excellent prospects of promotion to grades with pay ranging up to £1,400 a year.

PAY FOR FULLY SKILLED MEN

£13.6.0.—£14.1.0. per week
or:—£14.6.0.—£15.6.0. per week

Rate varies according to ability and class of work available.

FOR MEN NOT FULLY SKILLED

but with several years' experience in electronic work, there are vacancies at BROMLEY & WOOLWICH, with the following scales of pay:

£12.11.2.—£12.19.2. per week
£13. 0.2.—£13.6.2. per week

(with prospects of further progression)

All rates quoted are for the London area and for a 5 day week; in the provinces rates are slightly less. Post coupon (or telephone IMPERIAL 2600 Extn. 19) for further information.

To: The Personnel Officer, Inspection Division, Aquila, Golf Road, Bromley, Kent. (R.S.G.B.)

Please send me further details of inspectors posts in

..... (type of work desired) at

..... area

NAME.....

ADDRESS.....



SAMPLES AND DATA FROM MULTICORE SOLDERS LIMITED
MULTICORE WORKS, HEMEL HEMPSTEAD, HERTS. BOXMOOR 3636



INDEX TO ADVERTISERS

British National Radio School	...	...	...	...	6
Brookes Crystals, Ltd.	...	...	...	...	5
The Candler System Co.	...	...	...	...	46
Crystals & Components Ltd	...	...	...	...	1
Dale Electronics, Ltd.	...	...	...	...	Cover i
Daystrom Ltd.	...	...	...	...	2
Green & Davis	...	...	...	...	46
Home Radio (Mitcham) Ltd.	...	...	...	...	Cover iii
K. W. Electronics, Ltd.	...	...	...	...	Cover ii
The Minimitter Co. Ltd.	...	...	...	...	Cover iv
M. O. Valves, Ltd.	...	...	...	...	5
Mosley Electronics	...	...	...	...	8
Multicore Solders, Ltd.	...	...	...	...	Cover iii
P. C. Radio Ltd.	...	...	...	...	6
Sir Isaac Pitman & Sons	...	...	...	...	Cover iv
R.S.G.B. Publications	...	...	...	...	39, 43
Radio, Television & Instruments Services Ltd.	...	...	...	...	Cover iv
H. L. Smith & Co. Ltd.	...	...	...	...	46
Southern Radio & Electrical Supplies Ltd.	...	...	...	...	46
Tele-Radio (1943) Ltd.	...	...	...	...	Cover iii
Tiger Radio Ltd.	...	...	...	...	5
H. Whitaker	...	...	...	...	Cover iv
T. Withers	...	...	...	...	6
Chas. H. Young, Ltd.	...	...	...	...	4
Z. & I. Aero Service Ltd.	...	...	...	...	4

ALWAYS IN STOCK AT TELE-RADIO (1943) LTD.

METER CASES

Black Crackle Finish with removable aluminium panel.

4 x 4 x 4 in. sloping front	...	...	10s. 6d.
5 x 5 x 8 in. sloping front	...	...	16s. 0d.
6 x 6 x 12 in. sloping front	...	...	£1 5s. 6d.
4 x 4 x 2½ in. rectangular	...	...	8s. 6d.
6 x 4 x 3 in. rectangular	...	...	10s. 0d.
8 x 6 x 3 in. rectangular	...	...	12s. 6d.
10 x 6 x 2½ in. rectangular	...	...	14s. 6d.
10 x 7 x 7 in. rectangular	...	...	£1 7s. 6d.
12 x 7 x 7 in. rectangular	...	...	£1 14s. 0d.
14 x 7 x 7 in. rectangular	...	...	£1 17s. 6d.
14 x 9 x 8 in. rectangular	...	...	£2 7s. 6d.
16 x 9 x 8 in. rectangular	...	...	£2 12s. 6d.
16 x 11 x 8 in. rectangular	...	...	£2 17s. 6d.
19 x 8 x 11 in. rectangular	...	...	£3 4s. 0d.
19 x 11 x 10 in. rectangular	...	...	£3 6s. 0d.

P. & P. extra on above prices.

ALSO FULL RANGE OF CHASSIS

Chassis and Case List Free on request.

ROTARY SWITCHES TO ORDER

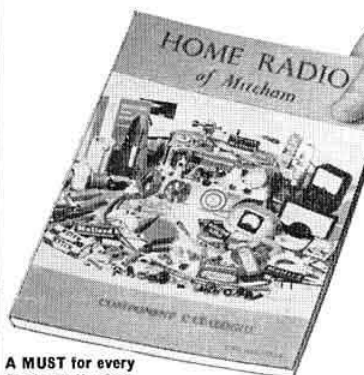
LARGE STOCKISTS OF COMPONENTS AND EQUIPMENT

By well-known Manufacturers including: A.B. METAL Products, Avo, Belling-Lee, Bulgin, Colvern, Dubilier, Eire, Morganite, Mullard, Panton, Welwyn, T.C.C., Westinghouse.

TELE-RADIO (1943) LIMITED

189 Edgware Road, London, W.2. PAD 4455/6

ACKNOWLEDGED THE BEST COMPONENT CATALOGUE



NOW

166 Pages

600 Pictures

5000 Components

2/6

Plus 9d. post

A MUST for every Radio Enthusiast

This is today's most up-to-date and most comprehensive component catalogue for the radio amateur, constructor, experimenter, electronic engineer, and Hi-Fi enthusiast.

Post Coupon
Today

Write CATALOGUE
on top left of en-
velope. Enclose P.O.
3/3d.

Name

Address

HOME RADIO LTD., 187 London Road, Mitcham, Surrey.

MINIMITTER 'Top 2-7'



An extremely compact, efficient 24 watt transmitter for lower frequency bands: 1.8, 3.5, 7.0 Mc/s. Completely Self-Contained, with built-in Aerial, change-over and control relays—Input and Output monitoring—V.F.O. and Crystal Control—Large "slide rule" V.F.O. dial—"Picture Frame" front panel—Complete remote control facilities.

PRICE £28.10.0 Complete

The MINIMITTER F.B.5. Ferrite Loaded All-Band Antenna	£5. 0. 0
Double Stack as above 12DB Gain	£9. 10. 0
The Minibeam 10/15 G4ZU Antenna	£16. 10. 0
The "X20" 20 Metre. G4ZU Antenna	£10. 0. 0
34 foot Telescopic Mast with all fittings	£10. 0. 0
Ferrite Beads as used in our F.B.5 Aerial. 50 for	12. 6
The MR44/11 Communications Receiver	£65. 0. 0
The MINIMITTER Mobile Transmitter, 20 Watts	£16. 10. 0
Transistor Power Supplies	£11. 11. 0
Mobile Whip Antennas 160-80-40 Metres	£6. 0. 0

For full details of any of the above, please send S.A.E. to—
THE MINIMITTER Co. Ltd, 37 DOLLIS HILL AVENUE, LONDON, N.W.2. Tel: MAldo Vale 5588

PROBLEMS IN RADIO ENGINEERING

By E. T. A. Rapson, M.Sc.(Eng.), London, A.C.G.I., D.I.C., M. Brit. I.R.E., M.I.E.E.

This is the eighth edition of this well-known textbook. It has once again been brought fully up to date. A number of early descriptive questions have been omitted and many new numerical problems have been added. A new section on transistors has also been included. Although designed particularly for the needs of the National Certificate student in Radio Communication, it is also well suited to the needs of those who are preparing for the examinations held by other recognized examining bodies and particularly those engaged in private study. 15/- net.

PITMAN

PARKER ST., KINGSWAY,
LONDON, W.C.2

H. WHITAKER G3SJ

COURT ROAD, NEWTON FERRERS, SOUTH DEVON

Precision Crystals of all Types

AMATEUR BANDS

We can give immediate delivery from stock of practically any frequency covering the entire amateur bands and model control band. 100 and 1000 kc/s for frequency standards from stock.

SPECIAL OFFER

400 crystals in the range 7090 kc/s to 7150 kc/s, all frequencies available. Post-war production. Zero temp. BT cuts, gold plated electrodes, ½ in. pin space holders. Unrepeatable, 18/- each, post free. This price applies only to the above range.

As above, 8050 kc/s to 8110 kc/s inclusive, same specification, 18/- each, post free. All frequencies available throughout the range.

H. WHITAKER G3SJ

Contractors to the War Office, Air Ministry, Post Office and Government Departments the world over.

A.R.B. Approved.

Tel.: NEWTON FERRERS 320

RADIO TELEVISION & INSTRUMENT SERVICE

Communications Receivers—Test Equipment

BC-221 FREQUENCY METERS, with charts	£13/10/-	(15/-)
LM14 FREQUENCY METERS, with charts	£16/-	(15/-)
KW160 TRANSMITTER, as new	£22/10/-	(15/-)
CLASS "D" WAVEMETER (1.2-19.2 Mc/s) 12 volt D.C. or 230 volt A.C., new condition	£6/10/-	(10/-)
CLASS "D" WAVEMETER, 6 volt D.C., easily converted to 230 volt D.C.	£3/-	(7/6)
GRAMPIAN AMPLIFIER, with radio tuner, excellent	£16/-	(20/-)
E.M.I. COMPONENT BRIDGE, Type Q/D211, snip Advance D1/D Sig. Gen. (10-300 Mc/s)	£12/-	(10/-)
AVO SIGNAL GENERATOR (grey type) (50 kc/s-80 Mc/s)	£65/-	(20/-)
COSSOR D.B. Oscilloscope, Type 1035	£15/-	(10/-)
TYPE 1049	£75/-	(40/-)
AIRMEC Signal Generator, Type CT212 (85 kc/s-32 Mc/s)	£85/-	(40/-)
LABGEAR 2 metre converter, Type E5030, mains powered	£40/-	(20/-)
AVO ELECTRONIC TEST METER	£12/-	(10/-)
EVERSHED & VIGNOLES BRIDGE MEGGERS, 250 volt	£25/-	(15/-)
EVERSHED & VIGNOLES BRIDGE MEGGERS, 500 volt	£22/-	(15/-)
WEE MEGGERS, 250 volt	£60/-	(15/-)
WEE MEGGERS, 500 volt	£11/-	(6/-)
TAYLOR OUTPUT POWER METER, Type 150A	£15/-	(6/-)
PCR RECEIVERS, one type with built-in loudspeaker and 2-100 Ohm jack sockets (2080-860m., 565-190m., and 5-8-18 Mc/s)	£8/-	(10/-)
PCR RECEIVERS, second type has no built-in speaker but has 2½ ohm jack socket, (565-190m., 2-3-7-2 Mc/s., and 7-2-23 Mc/s)	£6/10/-	(10/-)
R206 RECEIVERS complete with power unit, (550 kc/s-30 Mc/s)	£7/10/-	(10/-)
NATIONAL HRO SENIOR RECEIVERS complete with nine coils (50-430 kc/s and 480 kc/s-30 Mc/s)	£22/10/-	(30/-)
Carriage up to 200 miles of London shown in brackets. Please enclose s.a.e. with enquiries.	£22/-	(15/-)

RADIO TELEVISION & INSTRUMENT SERVICE

Ashville Old Hall, Ashville Road, London, E.11.

Tel: LEYtonstone 4986

IF UNDELIVERED

Return to:—
R.S.G.B., NEW RUSKIN HOUSE,
LITTLE RUSSELL STREET, W.C.1

IF UNDELIVERED

Return to:—
R.S.G.B., NEW RUSKIN HOUSE,
LITTLE RUSSELL STREET, W.C.1