

The SHORT WAVE Magazine

4/-

VOL. XXVI

MAY, 1968

NUMBER 3

KW 2000A

Deliveries from stock.

SSB TRANSCEIVER

The finest value available, with no extras to buy. 180 watt PEP operation on all amateur bands 10-160 metres, complete with AC psu, VOX control, crystal calibrator, Independent receiver tuning, Upper/lower sideband tuning, Top band included, Automatic linearity control or transmit. Special attention to TVI proofing.



KW VESPA Mark II

KW VESPA Mark II TRANSMITTER

Transmitter for all H.F. Bands. 220 watts PEP SSB, AM, CW. Now in full production, complete with psu.

KW 1000

LINEAR AMPLIFIER

1200 watts PEP complete with built-in psu and SWR indicator.

KW 201

Amateur Bands Communications Receiver

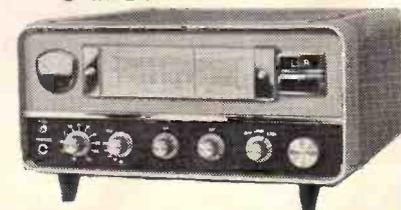
The KW 201 is now being manufactured with 2 detectors (i) product detector for SSB and CW, (ii) diode detector for AM. The KW 201 has been specifically designed for optimum performance on SSB. 11 ranges give coverage 1.8 mc/s. to 30 mc/s. A mechanical filter gives an IF selectivity of 3.1 kc/s. at 6 dB, and 6 kc/s. at 60 dB. A "Q" multiplier is available giving a variable range of 3.1 mc/s. to 200 cycles selectivity.



KW 1000



KW 201



**BUY KW
EQUIPMENT
IT'S BRITISH**

There are alternative crystals available for full coverage of the 10 and 15 metre bands.

Write for our list of KW Tested, 'Trade-in' equipment

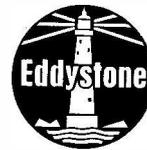
K. W. ELECTRONICS LTD.

1 HEATH STREET, DARTFORD, KENT

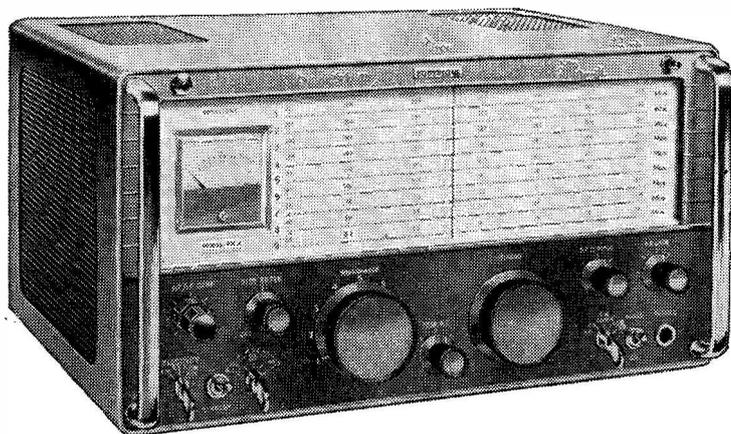
TELEPHONE: DARTFORD 25574 CABLES: KAYDUBLEW DARTFORD

KW
ELECTRONICS
LIMITED

Eddystone

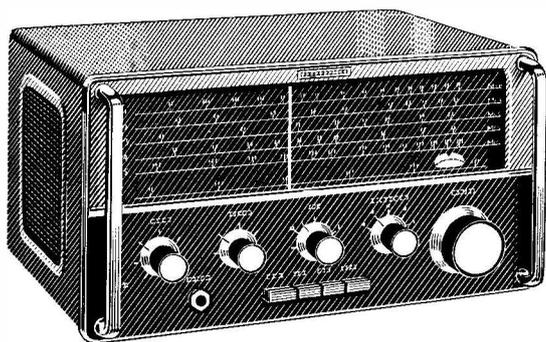


Amateur communications receivers



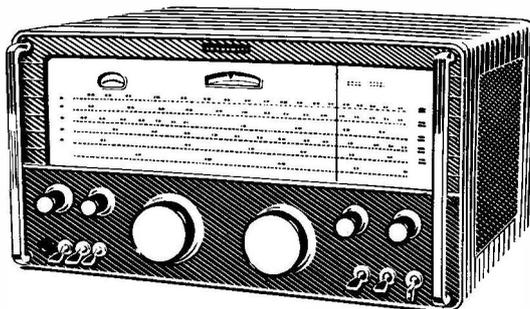
EA12 An amateur bands double-conversion superheterodyne receiver, for a.m, c.w, and s.s.b reception. For all amateur channels between 1.8 MHz and 30 MHz in nine 600 kHz bands with 28 MHz to 30 MHz in four bands.

Primary features. Crystal-controlled 1st oscillator, 2nd oscillator with continuously variable selectivity to 50 Hz, muting switched or by external relay, twin noise limiters, for a.m/c.w, and s.s.b, short-term drift better than 20 Hz and less than 100 Hz in any one hour, 'S' meter calibrated in nine levels of 6 dB and dB levels beyond 'S9', two a.g.c time constants, deep slot filter, independent r.f, i.f, and audio gain controls with outputs for f.s.k and panoramic adaptor.



EC10 communications receiver

The fully transistorized EC10 communications receiver, supreme in its class, covers both medium-wave broadcasting and all shortwave service to 30 MHz. Incorporating the famous Eddystone tuning drive, with logging scale and auxiliary vernier, shortwave reception is particularly simple. Battery-operated or from optional a.c mains unit.



940 H.F communications receiver

An outstanding 13-valve receiver with two r.f and two i.f stages, silicon diode noise limiter circuit and high quality push-pull output. Built to a professional specification, facilities include provision for c.w, a.m, and s.s.b reception over the range of 480 kHz to 30 MHz in five bands. Suitable for 110/125 V and 200/250 V. 40-60 Hz a.c mains.

Comprehensive information from your Eddystone distributor or: Eddystone Radio Limited, Eddystone Works, Alvechurch Road, Birmingham 31. Telephone: 021-475 2231. Telex: 33708

Radio Shack Ltd

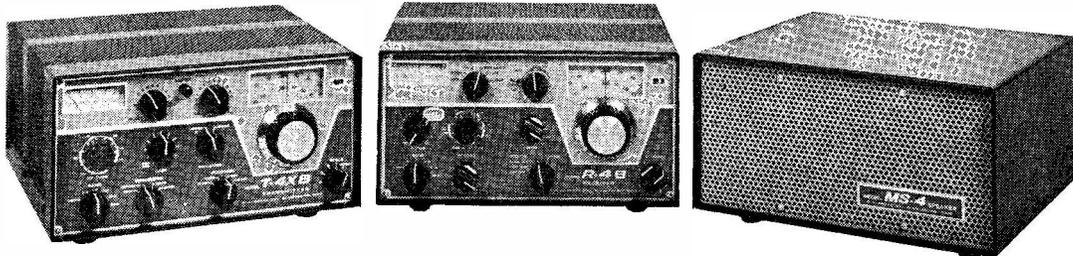


London's Amateur Radio Stockists

Just around the corner from West Hampstead Underground Station

R. L. Drake's Magnificent 4B

T-4XB Transmitter and R-4B Receiver



T-4XB £225.0.0 AC-4 p.s.u. £59.10.0 R-4B £225.0.0 MS-4 £12.10.0

All the rest of the Drake equipment including 2-NT CW Transmitter and the TR-4 transceiver.

Entire range of Hy-Gain and Mark Mobile Antennas amongst the rest of the gear at

RADIO SHACK LTD.

182 BROADHURST GARDENS, LONDON, N.W.6.
Just around the corner from West Hampstead Underground Station
Telephone: 01-624 7174

THE MOST RELIABLE SERIES OF TRANSCEIVERS EVER OFFERED

SWAN EVOLUTION

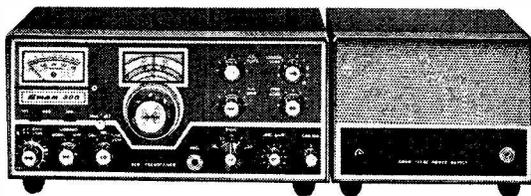
ASK THE AMATEUR WHO OWNS ONE

The new model 500C is the latest evolutionary development of a basic and well proven design philosophy. From the very beginning, with the introduction in 1961 of the first single band SSB Transceiver, Swan has followed a steady course of improvement by evolution. You might think that we would finally reach the point of leaving well enough alone, but with some 18 licensed hams in the engineering, sales and production departments of our organisation, it just isn't possible. Thus, the new model 500C, with greater power and additional features for even more operator enjoyment.

RCA recently introduced a new heavy duty "blast rated" tetrode, the 6LQ6. With a pair of these rugged tubes the final amplifier operates with increased efficiency and power output on all bands. PEP input rating of the 500C is conservatively 520 Watts. Actually, an average pair of 6LQ6's reach a peak input of over 570 Watts before flat-topping!

Further refinement of the famous Swan VFO results in even greater mechanical and thermal stability and more precise dial calibration. Custom made planetary drives, machined to extremely close tolerance, provide velvet smooth tuning.

The 500C retains the same superior selectivity, of course, that we have been offering. The filter is made specially for us by



THE NEW SWAN 500C 5 BAND - 570 WATT TRANSCEIVER

VX-2 now fulfils a dual function, both automatic voice control and break-in CW keying. Grid block keying of a pure CW carrier is employed with off set transmit frequency.

The 500C embodies the Swan's well known dedication to craftsmanship, performance and reliability, with a service policy second to none. When you visit your Swan dealer and look over the 500C, we are sure that you will be glad we couldn't "let well enough alone".

SWAN 500C. Our improved standard model, now in production, 570W ACCESSORIES MATCHING AC POWER SUPPLY, 230XC

C-F Networks, and it's no secret that it is a better filter than is being offered in any other transceiver today. By moving the I.F. to 5500 KC, and increasing the number of tuned circuits in the receiver, we have achieved substantial improvement in image and spurious rejection. These improvements, coupled with additional TVI filtering, result in what we believe is the cleanest transceiver on the market.

For the CW operator the 500C includes a built-in side-tone monitor. Also, by installing the Swan Vox Accessory (model VX-2) you will have break-in CW operation. Thus, the model

... £263 0 0
... £216 0 0

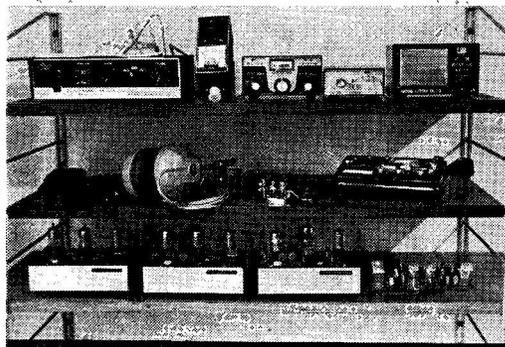
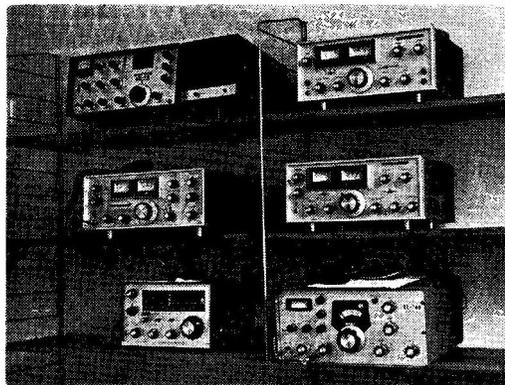
PETER SEYMOUR LIMITED

410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone: 41938 (43353 after 7.30)

J. B. LOWE 50-52 Wellington Street, Matlock, Derbyshire

Tel.: Matlock 2817 (2430 after 6 p.m.)



It's about time I had some pretty pictures in my ads., so here goes. My young son took some snaps around the shop and the above is the result. I hope they print well. Top left shows the Paros 3 band transceiver (£120), Sommerkamp FL-500 (£145), FT500 (£250), FR-500 (£130), Star SR200 (£40) and Star ST-700 (£135). For sheer honest-to-goodness value, I truthfully don't think they can be beaten. Lower left shows a typical range of second-hand stuff in part of the shop, which like all the stuff I flog, is in tip top condition, fully serviced, aligned and thoroughly checked. The top right photo shows some of the goodies which include DAI Electronic Keyer (£16), Hansen SWR bridge (£3 10s.), Katsumi Speech Compressor (£7 15s.), Katsumi Electronic Keyer (£7 15s.), Katsumi Code Monitor (£7 15s.), Teisco PTT dynamic mike (£2 15s.), Alpha padded earphones (low impedance) (£2 2s. 6d.), plain key (18/6), bug key (£4 10s.) and converters for 15 and 10 metres, with an Electroniques I.F. strip thrown in for good measure. The lower right shows more goodies—walkie talkies at £12 10s. per pair, Hansen FI02 transistor g.d.o. at £11, Hansen VT300 V.T.V.M. at £15 and Tech TE65 V.T.V.M. at £16. These prices include r.f. probe, by the way.

Of course, I have many more things in stock—obviously I can't show everything—a good range of test gear, surplus bits and pieces, small components, horrible surplus unmentionables and a good range of new and second-hand Rx's and Tx's. So if you want something, given the chance I will do my best to get between you and your wallet.

Month before last I offered a free mike to the sender of the best classical quotation applying to Amateur Radio. I got an enormous response and the best will appear in *Short Wave Magazine*—they will come out from time to time as opportunity offers, thereby conserving my advertising space! I think you'll get a kick out of them and you will undoubtedly realise the difficulty in picking the winner. Everyone will have different ideas, but in my opinion the winner is Ian Pritchard, Pontypool, with the Amateur's Lament :—" I sought him but I could not find him ; I called him, but he gave me no answer."—*Solomon 5 v. 6.*

Neat and to the point. To all of you lads who sent quotations, my very best thanks. I wish I could give you all a free mike—you all deserve one, but I do like to eat once in a while! To return to flogging stuff—if you get a chance, come along and have a look at my latest import—the Inoue line. All transistor Rx using FET's and companion transistorised Tx. Complete 80-10 Rx, Tx, psu for £180. I'm keeping this quiet for the present because the demand very much exceeds the supply (like most things worth having!) so if you're interested, get your name down on the waiting list right smartly!

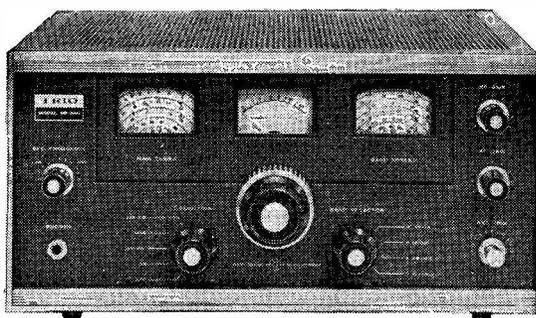
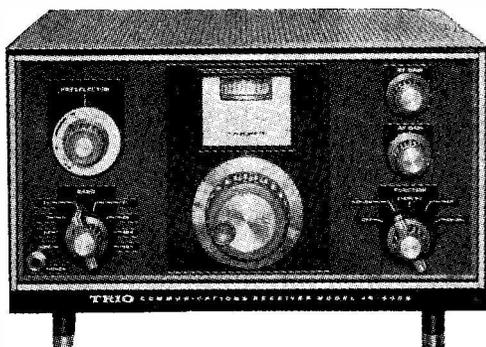
A s.a.e. will get you my latest lists. Postage, please include plenty, any excess will be refunded.

Hire Purchase—Certainly—there has been no increase so it is still 25% down and the balance over 12, 18 or 24 months. Service Department :—John is winning the battle, so if you want a good servicing job done give us a yell.

73, Bandit Bill, VE8DP/G3UBO.



♣ Technicians Marvel Over The Complete Perfection



Model JR-500SE CRYSTAL CONTROL TYPE DOUBLE CONVERSION COMMUNICATION RECEIVER

- * Superior stability performance is obtained by the use of a crystal controlled first local oscillator and also, a VFO type 2nd oscillator.
- * Frequency Range: 3.5 MHz—29.7 MHz (7 Bands)
- * Hi-Sensitivity: 1.5 μ V for 10 dB S/N Ratio (at 14 MHz)
- * Hi-Selectivity: ± 2 KHz at -6 dB ± 6 KHz at -60 dB
- * Dimensions: Width 13", Height 7", Depth 10".

Model 9R-59DE BUILT IN MECHANICAL FILTER 8 TUBES COMMUNICATION RECEIVER

- * Continuous coverage from 550 KHz to 30 MHz and direct reading dial on amateur bands.
- * A mechanical filter enabling superb selectivity with ordinary IF transformers.
- * Frequency Range: 550 KHz to 30 MHz (4 Bands)
- * Sensitivity: 2 μ V for 10 dB S/N Ratio (at 10 MHz)
- * Selectivity: ± 5 KHz at -60 dB (± 1.3 KHz at -6 dB) When use the Mechanical Filter
- * Dimensions: Width 15", Height 7", Depth 10".

TRIO

a product of TRIO Corporation, Tokyo, Japan.

Sole Agent for the U.K.

B.H. MORRIS & CO., (RADIO) LTD.

84/88, Nelson Street, Tower Hamlets, London E.1. Phone: 01-790 4824

TO: B.H. Morris & Co., (Radio) Ltd. SW

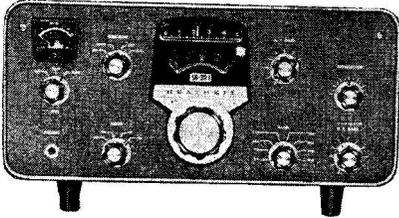
Send me information on TRIO COMMUNICATION
RECEIVERS & name of nearest TRIO retailer.

NAME : _____

ADDRESS : _____

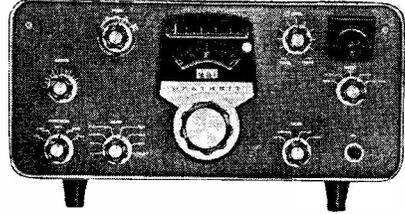
HEATHKIT Amateur Radio Equipment

ASK FOR DETAILS OF EXTENDED PAYMENT PLANS OVER £10 (UK only)



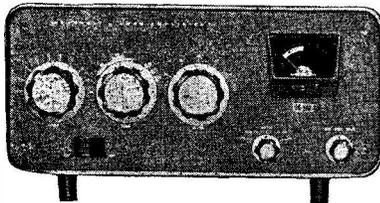
SB-301E Amateur Band Receiver . . . SSB, AM, CW and RTTY reception on 80 through 10 metres + MHz WWV reception. Tunes 2 metres with SBA-300-4 plug-in converter.

Kit SB-301E, 23 lbs. (less speaker) £140. 12. 0
Ready-to-use £170. 12. 0



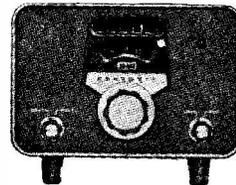
SB-401E Amateur Band SSB Transmitter . . . 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates "Transceive" with SB-301—requires SBA-401-1 crystal pack for independent operation.

Kit SB-401E, 34 lbs., £157. 10. 0
Ready-to-use £192. 10. 0
SBA-401-1 crystal pack, 1 lb., £17. 3. 0



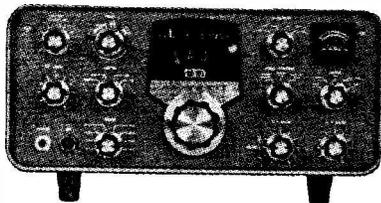
SB-200 KW SSB Linear Amplifier . . . 1200 watts PEP input SSB, 1000 watts CW on 80 through 10 metres. Built-in antenna relay, SWR meter, and power supply. Can be driven by most popular SSB transmitters (100 watts nominal output).

Kit SB-200, 41 lbs., £120. 18. 0
Ready-to-use £145. 18. 0



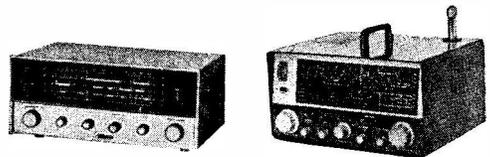
SB-640 External LMO for SB-101 . . . Provides Linear Master Oscillator frequency control or either of two crystal controlled frequencies for a total of five frequency control options. Power supplied from SB-101 Trans.

Kit SB-640, 9 lbs., £51. 6. 0
Ready-to-use £56. 6. 0



SB-101 80 Through 10 Metre SSB Transceiver . . . 180 watts PEP SSB, 170 watts CW (the practical power level for fixed/mobile operation). Features USB/LSB on all bands, PTT & VOX. CW sidetone, and more. Unmatched engineering and design.

Kit SB-101, 23 lbs., £185. 12. 0
Ready-to-use £225. 12. 0

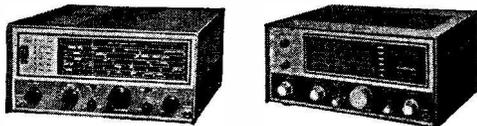


GR-64 Short Wave Receiver . . . Covers 1 MHz. to 30 MHz., plus 550 kHz. to 1620 kHz. AM band. Many special features for such a modest price. For 115, 230v. 50/60 Hz. A.C. mains operation.

Kit GR-64E £22. 9. 0
Ready-to-use £29. 9. 0

GC-1U "Mohican" General Coverage Receiver . . . 10 transistors, 5 diode circuit. Tunes 580-1550 kHz. and 1-69-30 MHz. in 5 bands. 6" x 4" speaker.

Kit GC-1U £37. 17. 6
Ready-to-use £45. 17. 6



RG-1 High Sensitivity General Coverage Receiver . . . High performance at lowest cost. Covers 600 kHz. to 1.5 MHz., 1.7 MHz. to 32 MHz. Full specifications available.

Kit RG-1, 18 lbs., £39. 16. 0
Ready-to-use £53. 0. 0

RA-1 Amateur Bands Receiver . . . Covers 10-160m. Half-lattice crystal filter at 1.6 MHz. Switched USB and LBS for SSB. Provision for fixed, portable or mobile uses.

Kit RA-1 £39. 6. 6
Ready-to-use £52. 10. 0

Showroom: GLOUCESTER, Bristol Road.

HEATHKIT

Please address all mail order enquiries to—
DAYSTROM LTD., Dept., SW5, GLOUCESTER

Enclosed is £ post paid U.K.

Please send model(s)

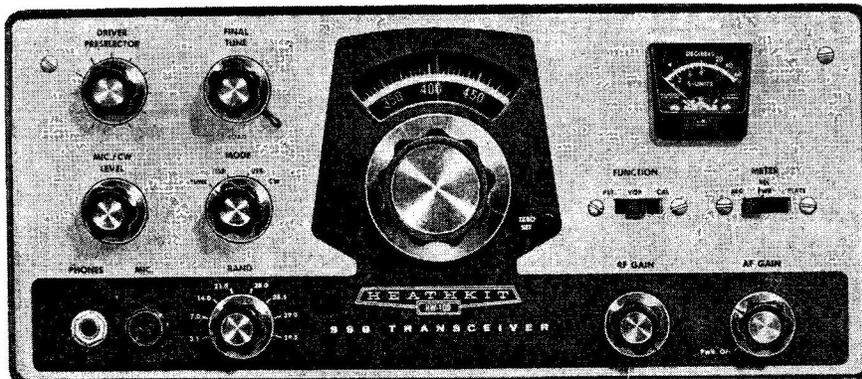
Please send FREE Heathkit Catalogue.

NAME

ADDRESS

Prices and specifications subject to changes without notice.

NEW HEATHKIT HW-100 5-BAND SSB-CW TRANSCEIVER



£125 KIT

EXTENDED PAYMENT PLAN
Deposit £31 16 0
19 monthly payments £5 9 0

Total Credit
Price :
£135 7 0

You asked for it... a multi-band version of the Heathkit "single-banders"... low-cost SSB operation on 10 or 15 metres... an SSB transceiver equal or superior to many assembled rigs, but at *much lower cost*. That's the HW-100.

How did Heath do it? We expanded on the "single-band" design... borrowed from the heritage of the famous SB-101... took a look at the competition... and produced the most SSB equipment you can get for the money.

Check the features and the specifications:

- Solid-state (FET) VFO ● 80-10 metre coverage ● Switch selected upper or lower sideband or CW ● 180 watts input PEP SSB—170 watts input CW ● Crystal filter ● Full coverage on all bands with 500 kHz. per band segment ● Smooth vernier control of frequency with patented Harmonic Drive™ dial mechanism ● Built-in 100 kHz. calibrator ● Separate offset CW carrier crystal ● TALC ● Quiet, enclosed relays ● Fixed or mobile operation with HP-23 or HP-13 power supplies ● Easy assembly with circuit boards and wiring harness.

Kit HW-100, 18 lbs.	£125 0 0
Kit HP-13, DC power supply, 7 lbs.	£37 2 0
Kit HP-23, AC power supply, 19 lbs.	£30 18 0
Kit SB-600, 8 ohm speaker, 6 lbs.	£10 2 0

HW-100 SPECIFICATIONS — RECEIVER. Sensitivity: Less than .5 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. Selectivity: 2:1 kHz. minimum at 6 dB down, 7 kHz. maximum at 60 dB down (3.395 MHz. filter). Input: Low impedance for unbalanced coaxial input. Output impedance: 8 Ω speaker, and high impedance headphone. Power output: 2 watts with less than 10% distortion. Spurious response: Image and IF rejection better than 50 dB. Internal spurious signals below equivalent antenna input of 1 microvolt.

TRANSMITTER. DC Power input: SSB: (A3a emission) 180 watt P.E.P. (normal voice: continuous duty cycle). CW: (A1 emission) 170 watts (50% duty cycle). RF Power output: 100 watts on 80 through 15 metres; 80 watts on 10 metres (50 Ω nonreactive load). Output impedance: 50 Ω to 75 Ω with less than 2:1 SWR. Oscillator feed-through or mixer products: 55 dB below rated output. Harmonic radiation: 45 dB below rated output. Transmit-receive operation: SSB PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. CW Sidetone: Internally switched to speaker or headphone, in CW mode. Approximately 1000 tone. Microphone input: High impedance with a rating of —45 to—53 dB. Carrier suppression: 45 dB down from single-tone output. Unwanted sideband suppression: 45 dB down from single-tone output at 1000 Hz reference. Third order distortion: 30 dB down from two-tone output. RF Compression (TALC): 10 dB or greater at .1 ma final grid current. GENERAL. Frequency coverage: 3.5 to 4.0; 7.0 to 7.3; 14.0 to 14.5; 21.0 to 21.5; 28.0 to 28.5; 29.0 to 29.5; 29.5 to 30.0 (megahertz). Frequency stability: Less than 100 c/s per hour after 30 minutes warmup from normal ambient conditions. Less than 100 Hz for ± 10% line voltage variations. Modes of operation: Selectable upper or lower sideband (suppressed carrier) and CW. Dial calibration: 5 kHz. Dial mechanism backlash: Less than 50 kHz. Calibration: 100 kHz. crystal. Audio frequency response: 350 to 2450 Hz. Front panel controls: Main tuning dial. Driver tuning and Preselector. Final tuning. Final loading. Mic and CW Level control. Mode switch. Band switch. Function switch. Meter switch RF Gain control. Audio Gain control. Side controls: Meter Zero control; Bias; VOX Sensitivity; VOX Delay; ANTI-TRIP; Neutralizing. Valve complement: OA2 Regulator (150 V); 6AU6 RF amplifier; 6AU6 1st receiver mixer; 6AU6 Isolation amplifier; 6AU6 1st IF amplifier; 6AU6 2nd IF amplifier; 6BN8 Product detector and AVC; 6AU6 VFO Amp; 6CB6 2nd transmitter mixer; 6CL6 Driver; 6EA8 Speech Amplifier and cathode follower; 6EA8 1st transmitter mixer; 6EA8 2nd receiver mixer and relay amplifier; 6EA8 CW sidetone oscillator and amplifier; 6GW8 Audio amplifier and audio output; 12AT7 Heterodyne oscillator and cathode follower; 12AT7 VOX amplifier and calibrator oscillator; 12AU7 Sideband oscillator; 6146 Final amplifiers (2). Diode complement: 6 Germanium Diodes: Balanced modulator, RF sampling, and crystal calibrator harmonic generator; 9 Silicon Diodes: ALC rectifiers, anti-trip rectifiers, and DC blocking; 1 Zener Diode: cathode bias. Transistors: 2N4304 FET-VFO; 2N3393 —Voltage regulator. Rear apron connections: CW Key jack; 8 Ω output; ALC input; Power and accessory plug; RF output; Antenna; Spare. Power requirements: 700 to 850 volts at 250 ma with 1% maximum ripple; 300 volts at 150 ma with .05% maximum ripple; 115 volts at 10 ma with .5% maximum ripple; 12 volts AC/DC at 4-76 amps. Cabinet dimensions: 14-13/16" W. x 6-5/16" H. x 13-3/8" D

DAYSTROM LTD.,

Dept. SW-5 (Use coupon left)
GLOUCESTER ENGLAND. Telephone: 29451

Retail Stores: LONDON, 233 Tottenham Court Road. BIRMINGHAM, 17-18 St. Martins House.

PETER SEYMOUR LIMITED

410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone: 41938 (43353 after 7.30)

	£	s.	d.
The New TRIO Transceiver TS.500 , complete with power supply, speaker and remote VFO, inclusive at £199, ex-stock. Full details on request.			
DRAKE SW4A , with matching speaker, cost £187 New	145	0	0
DRAKE TR4 , as new, complete with matching speaker and P.S.U.	295	0	0
NATIONAL HRO500 , recent full works up-dating	550	0	0
SONY closed circuit TV recording system, complete with monitor TV and £90 additional lens and camera, cost £590 ...	450	0	0
COLLINS 51S1 , the latest general coverage multi-band receiver, 200 Kc/s-30 Mc/s in 30 bands, cost new £850	650	0	0
KW2000A , new with matching P.S.U.	220	0	0
K.W. Vespa	128	0	0
KW VICEROY Mark IIIA . Mint condition throughout	120	0	0
EDDYSTONE 680X . Latest model	85	0	0
COMMUNICATOR (T. W. Withers), 4 meter model	45	0	0
COMMUNICATOR (T. W. Withers), 160 model	50	0	0
HALLICRAFTERS SXIII . Full coverage, all bands 80-10 Mtrs., selectable side bands. 100 Kc/s. Calibrator variable selectivity with "T" notch filter, etc. Outstanding condition	65	0	0
SEMI-AUTOMATIC Bug Key	4	12	6
LEVELL , transistor A.C. Microvolt meter, type TM3A, 15 microvolts to 500 volts in 16 ranges	35	0	0
VOLSTATIC V.H.F. SKYMASTER . Covers long, medium and 108-138 Mc/s. The best aircraft band portable in the U.K. (including carriage)	24	10	0
DENTSU . Fully automatic all-transistor electronic keyer, mains or battery input, 2-60 w.p.m.	16	10	0
TRIO 9R59DE . 550 Kc/s-30 Mc/s. Immediate delivery	39	15	0
MULTIBAND DIPOLE TRAP SETS , with full instructions, fully encapsulated per pair	2	10	0
TRIO JR500 SE crystal-controlled Osc. tunable IF system, full coverage 80-10 meters. Amateur bands only. Two mechanical filters, transistorised VFO, etc. New	68	0	0
LAFAYETTE HA500 80-6 metres. Amateur bands only. Dual conversion, etc. New	44	2	0
HA-700 550 Kc/s-30 Mc/s, mechanical filter product detector, "S" meter, etc. New	37	16	0
EDDYSTONE 770U/2 . 150-500 Mc/s AM/FM, works reconditioned at a cost of £90. Brand new condition	175	0	0
EAGLE DE LUXE SWR INDICATORS , reads forward and reflected power directly calibrated in SWR up to 10-1 plus direct reading RF wattmeter 0-15w. FSD 2-200 Mc/s	9	19	6

	£	s.	d.
DRAKE TR4 New	295	0	0
MATCHING A.C. P.S.U.	59	10	0
MATCHING SPEAKER MS4	12	10	0
DRAKE R4B receiver	225	0	0

Full details of the Drake equipment are available on request.

RF40 field-strength indicators 1.2 to 300 Mc/s. Complete with telescopic aerial ...	3	19	6
LAFAYETTE HA350 80-10 metres, xtal crystal-controlled front end	78	15	0
LAFAYETTE HE30 , 540 Kc/s to 30 Mc/s	25	0	0
EDDYSTONE EC10 New	53	0	0

We are now in a position to take orders for the latest G.E.C. Digital read-out receiver, delivery August, £1,248; also the latest Redifon R408.

FOR fine quality receivers, consult us.

NOTE: Should you wish to part-exchange any good quality photographic equipment, our mail order camera department can quote you on trade-ins. We can also supply any new photographic equipment, and can take into stock items of Amateur Radio equipment, existing H.P. settled.

FULL H.P. FACILITIES ON EQUIPMENT OVER £35.

25% DEPOSIT, UP TO 24 MONTHS TO PAY. LET US KNOW YOUR REQUIREMENTS.

"CALLBOOK"

SPRING EDITION

Now Available

Limited Quantity Only

Known the world over as the CALLBOOK, this comprehensive reference lists about 297,800 licensed radio amateurs in the United States Directory and 142,800 or more in the rest of the world (contained in the "DX Section"). The listings grow with every issue! In the new U.S. Section, licence classifications are now being shown. Each issue is an entirely new book with revised listings of new licences, names and addresses. The CALLBOOK also includes much incidental DX information. Every amateur operator and SWL needs the latest CALLBOOK to get the most out of Amateur Radio.

DX Listings 42/6 US Listings 64/6

The two together, covering the World, £5/2/6

Available only from

Publications Dept.,

SHORT WAVE MAGAZINE

55 Victoria Street, London, S.W.1

01-222 5341

INDEX TO
ADVERTISERS

	PAGE
Baginton Electronics ...	181
Charles H. Young ...	191
D. Cursons	183
Daystrom	132, 133
Derwent Radio	183
Eddystone Radio	<i>cover ii</i>
Eley Electronics	183
Finnigan Speciality Paints	183
G3HSC (Morse Records)	190
George Francis	182
Globe Scientific, Ltd. ...	190
G.W.M. Radio	184
Halson Electrical Services	181
Hamgear Electronics ...	183
Henry's Radio, Ltd. ...	183
Home Radio, Ltd. ...	181
A. Imhof, Ltd.	189
J. B. Lowe	130
Jack Tweedy, Ltd. ...	181
John's Radio	<i>cover iii</i> , 180
JXK Converters	189
K.W. Communications Ltd.	181
K.W. Electronics <i>front cover</i>	
Minitenna Products ...	183
Mosley Electronics ...	191
Nova-Tech. Inc.	136
N.W. Electrics	182
Peter Seymour, Ltd. ...	129, 134
Radio Shack, Ltd. ...	129
Rex Radio	185
R. T. & I. Electronics ...	185
Small Advertisements ...	184-190
Smith & Co., Ltd. ...	180
Spacemark, Ltd.	183
S.S.B. Products	<i>cover iii</i>
Stephens-James, Ltd. ...	185
Swanco Products, Ltd. ...	186, 187
S.W.M. Publications <i>cover iv</i> ,	134, 181, 192
Taurus Electrical Services	188
Trio Corp.	131
Yukan	181

SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXVI

MAY, 1968

No. 295

CONTENTS

	Page
Editorial	137
Getting Down to TVI	138
Small PA Anode Efficiency, <i>by F. G. Rayer, A.I.E.R.E., G3OGR</i>	139
Monitoring The Speech	140
Transistorised Speech Amplifier With Symmetrical Clipping, <i>by W. Burton, G8ANQ</i>	143
Radio Astronomy—Successful Amateur Installation	145
Aerial Theory and Practice, Part IV, <i>by E. P. Essery, G3KFE</i>	150
The Mobile Scene—Rally Calendar, 1968	152
“SWL” — Listener Feature	154
Simple Ten-Metre Transmitter	159
ZC4RB on Top Band, <i>by G. C. Moore, ZC4GM</i>	160
Communication and DX News, <i>by E. P. Essery, G3KFE</i>	161
VHF Bands, <i>by A. H. Dormer, G3DAH</i>	167
The Month with The Clubs—From Reports	172
Shacks I have Known, <i>by G3COI</i>	177
The Other Man's Station—G3WPR	178
New QTH's	179

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

Advertising: Maria Greenwood

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

Annual Subscription: Home and Overseas, 45s. (\$6.00 U.S.) post paid

Editorial Address: Short Wave Magazine, BUCKINGHAM, England

AUTHORS' MSS

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

© Short Wave Magazine Ltd.

THE BIG FOUR BY NOVA TECH



NOVA PAL

3-band R.D.F. 9 transistors
 190-400 Kc. with rotating ferrite antenna
 550-1600 Kc. and connection for external
 1600-4500 Kc. aerial.
 Suitable for yachtsmen.

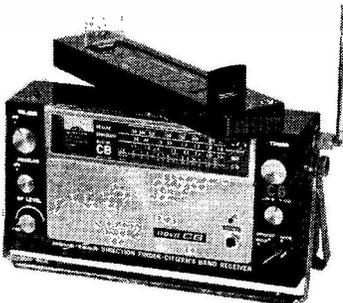
£27.0.0



AVIATOR II

12 transistor 4-band R.D.F./VHF.
 190- 400 Kc. with rotating ferrite antenna,
 550-1600 Kc. 3 removable telescopic whip
 1600-4500 Kc. antennas, twin plug antennas for
 108- 136 Mc. best air-borne reception. Long
 range extendable whip provides
 maximum signal input on the
 ground.

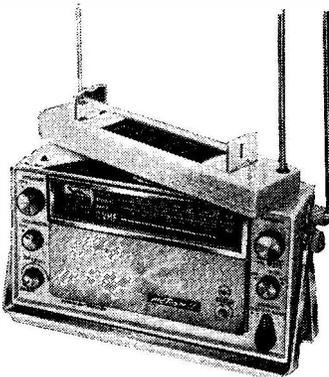
£47.0.0



NOVA CB.

13 transistors 5-band R.D.F./CB.
 190- 400 Kc. With rotating ferrite antenna
 550-1600 Kc. twin-plug antennas and tele-
 1600-4500 Kc. scopic antenna.
 CB low 72 Mc. For CB BAND SQUELCH
 CB high 72 Mc. CONTROL.
 23 channels over 2 Bands.

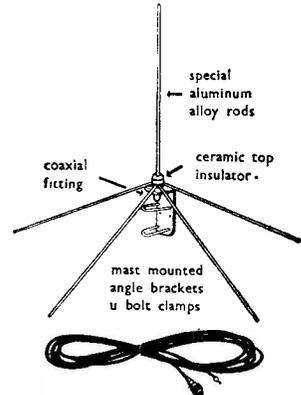
£53.10.0



ACTION

5-Band R.D.F./VHF. AM-FM. 14 transistors
 190- 400 Kc. with rotating ferrite antenna,
 550-1600 Kc. twin plug V.H.F. antennas,
 1600-4500 Kc. telescopic V.H.F. antenna.
 30- 50 Mc. For V.H.F. BAND SQUELCH
 (low AM-FM) CONTROL.
 150- 175 Mc.
 (high AM-FM)

£53.10.0



£7.15.0.

IMPROVE YOUR VHF RECEPTION WITH MODEL NT-4 ROOF ANTENNA

The Nova-Tech Model NT-4 Roof Antenna is designed to provide maximum signal input to your Aviator II. It consists of non-directional antenna cut to the aviation band, 4 drooping radials for positive ground plane, co-axial fittings and 50 feet of matching 52 ohm coax cable.

Units are completely portable and operate on 4 x 1.5v. internal batteries and are covered by our unconditional 10-day money back guarantee

FULL PARTICULARS OF TRADERS TERMS, CREDIT TERMS AND LITERATURE from :

nova tech inc.

72 WARDOUR STREET, LONDON, W.1. Telephone : 01-437 4589

The SHORT-WAVE Magazine

EDITORIAL

Possibilities *Since our comment on the suggested Beginner Licence appeared here last month, we have had a change of PMG, the new incumbent of the office being Mr. Roy Mason, MP—who has already explained that he will need time to familiarise himself with his new Department—we can well imagine!*

Assuming that the Beginner Licence proposal—with the principle of which we are fully in sympathy—is to go ahead, and that the arguments already put forward here on the difficulties are valid, what in fact can be done to meet the requirement?

Our suggestion is that the G.P.O. should revert to the Artificial Aerial concept, by which it would be possible to build, possess, use and experiment with transmitting apparatus for operation into a dummy-load, or non-radiating aerial, only. At first sight, this looks like neither one thing nor the other—but in fact a great deal can be done (and used to be learnt, in pre-war days) under AA conditions. All the principles of transmitter construction and operation, in any mode, can be studied and practised, and in general the AA-Licencee, when finally qualifying for full on-the-air operation, would start open-aerial work with a good deal more practical knowledge and experience than many of his contemporaries under the present regulations.

In the past, one of the official objections to the AA Licence was that it tended to encourage piracy and illegal operation generally. But we consider the very reverse could be the case. In the first place, AA licences would only be granted to applicants with good character references, and minors would be under parental control, to a certain extent. Secondly, because the AA licensees would be known to the G.P.O., they would be well aware that in any cases of piracy reported in their neighbourhood, they would be the first to be suspected. Thirdly, like everyone else holding a U.K. amateur licence, their stations would be subject to official inspection at any time.

An indirect benefit for the AA-licence holder would be that he would come to the R.A.E. with a good deal more knowledge and experience, and therefore confidence, making the examination a simpler proposition than it is at present for many candidates.

As we all know, the system of Artificial Aerial licensing worked well in the years between the Wars—all the G2/3 callsigns in the present U.K. lists are original holders—and there seems no reason why this intermediate grade should not be re-introduced for the benefit of the beginners of today.

*Austin Forsyth,
G6FO.*

GETTING DOWN TO TVI

PRACTICAL APPROACH

—HPF FOR THE TV RECEIVER

Where the cause is shock excitation of nearby TV aerials from a local amateur-band transmitter, the high-pass filter described here could go a long way towards reducing, if not eliminating, TVI—especially in areas where the local TV stations lay down a strong signal. As the article makes clear, this approach requires the co-operation of the affected neighbour—in the majority of cases (most people being reasonable) this can be obtained if you go the right way about it. Anyway, the ideas put forward in this article are worth trying—and they have worked in a particular instance.

—Editor.

IN a district getting a fairly good TV signal, a considerable amount of trouble was being experienced when working 10 and 15 metres, due to the swamping of the front-ends of neighbours' TV sets when tuned to BBC Ch. 1. A check-up on the situation made it clear that about fifteen separate rejector units would be necessary to clear the trouble if complete peace was to be restored.

Since 15 commercially manufactured filters could cost a lot of money, it was decided that an attempt must be made to produce a cheap and simple device which, if necessary, could be given away free to sufferers. The end-product so evolved and described here may possibly be the answer for others in the same sort of spot. Three of four different versions have been made up and tried, but as the simplest design was found to work well on 90 per cent of the TV receivers affected, it is as well to try it first.

Making The Filters

Equipment required consists simply of a calibrated grid dip oscillator, for tuning adjustments; a flat 2 oz. tobacco tin; a standard plug and chassis-mounting coax socket; a short length of TV coax cable; some tag strip; wire in 16g. tinned for making up the coils; and one fixed condenser, any value from 100 to 200 μF . Also required, and this is important, is faith that a simple old-fashioned wavetrap of the type shown in Fig. 1 should do the job!

Tune the L1, C1 section on the bench, using the GDO, by opening or closing the coil spacing; as a megacycle either way will not seriously affect performance, it is sufficient to get the circuit resonant at mid-band on either 21 or 28 mc, as required. Solder L1, C1 into place in the tin and check the tuning again; when that is done, solder in L2 and fit the terminals.

Better Filter

For really obstinate cases, two such filters can be placed inside the same tin, in series, with a shield between the two sections. This now begins to look more difficult, but if both sections are tuned separately before fitting C2 the job is easy—see Fig. 2.

At this point, it will become evident that a two-band

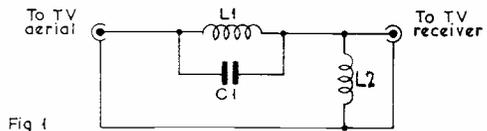


Fig. 1

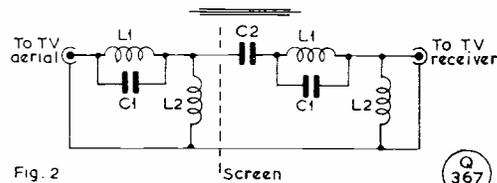


Fig. 2

Q
367

Circuitry of the Filters discussed in the text—and see table below.

COIL DATA

FOR THE 21/28 MC FILTER

- L1 21 mc: 8 turns 16g. tinned, $\frac{1}{2}$ in. diameter, self-supporting and spaced to tune.
28 mc: 4 turns, as for 21 mc.
- L2 21 mc: 8 turns 16g. tinned, $\frac{1}{2}$ in. diameter, self-supporting and spaced to tune.
28 mc: 7 turns, as for 21 mc.

(C1, 100-200 μF , see text; C2, 20 μF)

rejector can be made in exactly the same way, to the circuit of Fig. 2, if one section tunes to, say, 21 mc, and the other to 28 mc. It may be advisable to solder down the lid of the box at a few points, in order to complete the screening, but as most flat tobacco tins are made with tight-fitting lids, this may not be necessary.

Embellishment

Finally, give the tin a smooth coat of grey enamel to smarten it up and complete the job. There is an important psychological point here, for no self-respecting viewer will tolerate the idea of having a loose, grubby-looking tobacco tin hanging down behind his precious "telly"—but a technical looking grey box, with coax connectors, is quite another matter, and will be accepted with grateful thanks! The filter unit is, of course, fitted in the aerial lead to the TV receiver, close to the set.

Insertion Loss

The insertion loss of these simple rejectors can be quite large, which means advancing the gain control of the TV set somewhat. It also means that in the form as described, the device is unsuitable for fringe areas, or where there is no gain in hand on the TV receiver itself. In such cases, series tuning of L2 could be tried, to improve performance and reduce insertion loss.

Since these filters can be knocked up for a couple of shillings—depending on what you have in the junk box and whether you have to buy the tobacco to get the tin—it is well worth supplying them gratis where a definite cure is affected. The "public relations" value of a successful result is out of all proportion to the cost of making and fitting the filter—that is the point that matters.

SMALL PA ANODE EFFICIENCY

COMPARING RF AMPLIFIERS ON THE LF BANDS

F. G. RAYER, A.I.E.R.E. (G3OGR)

WHEN building a new transmitter intended to run about 10 watts input on 160 metres and 12 watts on 80m., it was decided to try various PA valves on an input/output basis. It was thought one type might furnish worth-while increased output. This was not actually found to be the case. It is hoped these notes may help anyone thinking about a small Top Band or similar transmitter, and as yet undecided on the PA valve.

Valves actually tried were the 5763 (B9A VHF beam tetrode), 6BW6 (B9A audio and RF beam tetrode), 5B/254M (B8G beam tetrode or "miniature 807"), 807 (UX5 based, inexpensive), 6V6G (octal audio tetrode) and 6146 (octal VHF power tetrode).

The circuit used is shown in the diagram and substitution was by re-wiring and changing the valveholder, as required. R1 was 6.8K, R2 22K, R3 75 ohms, R4 the usual 47-ohm or similar resistor with anti-parasitic choke winding (5 turns, 20g., 3/8 in. dia. occupying 1/2 in. length with resistor inside).

M1 was 0.50 mA, and M2 0.350 mA thermo-couple. The HT supply was 300v., checked with each test. Grid current was in each case adjusted to the figure giving best RF output.

Test Results

Anode input is *Anode Voltage x Anode Current*. RF output is $I^2 \times R3$ (using meter M2). Efficiency as a percentage is:

$$\frac{\text{Watts Output}}{\text{Watts Input}} \times \frac{100}{1}$$

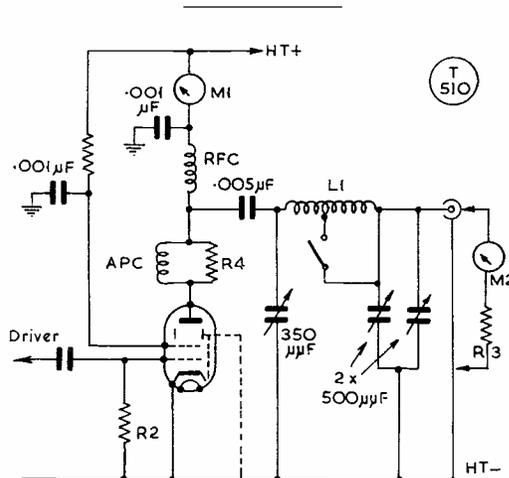
Efficiencies were around 60 per cent, and the maximum difference in RF output, as between the "worst" and "best" valve type, was just under 0.1 watt. This is normally totally insignificant, and was much less than introduced from time to time by almost invisibly small errors in tuning L1.

Tests were on 3.7 and 1.85 mc. The 5763, 6BW6, 5B/254M and 807 all gave results so similar it was not really possible to decide the reading of M2 had changed! The 6V6G provided almost exactly similar RF output. The 6146 was, surprisingly, the worst, with very slightly less output than the 6V6G. (No doubt this arises because the 6146 is intended for much higher inputs.)

With single-ended valves (5763, 6BW6 and 6V6G) a lead passed directly through the chassis to the anode tag. The other valves have top anode caps. All were perfectly stable on 160 and 80 metres.

Results were so nearly similar that the tests proved any of these valves, or similar types, could be used. The 5B/254M was eventually adopted, but only because of its relatively small size, top anode connection, and occasional appearance at low price as surplus. The 6146 was most susceptible to changes in grid current.

Valve	Heater	Input $\mu\mu\text{F}$	Output $\mu\mu\text{F}$	G/A $\mu\mu\text{F}$
EL84	6.3V 0.76A	11	6	0.5
6BW6	6.3V 0.45A	8.5	7.5	0.6
6CH6	6.3V 0.75A	14	5	0.25
6L6	6.3V 0.9A	11.5	9.5	0.9
6V6	6.3V 0.45A	10.5	9.2	1.2
807	6.3V 0.9A	12	7	0.2
5763	6V 0.75A	9.5	4.5	0.3
6146	6.3V 1.25A	13.5	9	0.22



Circuit of the PA unit used for the efficiency tests described in the article. In fact, it was found that there was not much to choose between the valves tried—see table above. Note: The screen resistor is R1, of 6,800 ohms.

The other valves could receive drive resulting in anything from 0.75 to 2.0 mA grid current before any change in RF output became apparent (loading of course being adjusted for the same anode current).

The efficiency of all valves fell off when the HT voltage was reduced, anode current being increased by loading to get the same power input.

The single-ended valves, and particularly the 6V6G, suffered the largest changes in grid current, as a result of tuning the anode very slightly HF or LF of the correct frequency. But any of these valves, and also the EL84, 6CH6 and 6L6 can apparently be used successfully and with barely perceptible changes in results. The Table lists Input (grid circuit), Output (anode circuit) and Grid-to-Anode capacitances of the valves.

Heater current is often unimportant, but could be so with a limited supply. The 5763 is commonly run from 6.3v. The G/A capacitance is largely responsible for the unwanted feedback from anode to control grid.

MONITORING THE SPEECH

DISCUSSING MODULATION GENERALLY—AND A USEFUL MONITOR UNIT

UNDER the present congested conditions prevailing on the amateur phone bands, the importance of making the fullest possible use of one's talk-power is well understood by most telephony operators. But there are many, particularly among the beginners, to whom a simple explanation of the methods of obtaining full modulation on AM may be helpful—and there are others to whom a practical form of modulation percentage checker might be useful.

The original purpose of this article was to describe an easily constructed modulation meter—*cum*—phone monitor, but it is felt that some discussion on the subject of modulation would be helpful to beginners.

Obtaining Full Modulation on AM

All methods of modulation aim at producing the maximum of audible output in the receiver, and (leaving aside SSB for the moment) this is effected entirely by variation of either the amplitude or the frequency of the transmitted carrier. In this article amplitude modulation will be considered mainly, since this is the system still in general use on our communication bands.

Any full discussion of the theory of amplitude modulation would require a much longer and more detailed treatment than is possible here, and as the average beginner requires practical advice rather than large doses of theory, some knowledge of the principles of modulation will be assumed.

Supposing, then, we have our unmodulated 100-watt carrier. To modulate this carrier to the 100 per cent level requires the addition of 50 watts of audio to be superimposed upon it. This extra 50 watts is expended in the generation of the two sidebands on either side of the carrier.

Under perfect conditions of modulation the positive and negative excursions of the radiated sidebands will be equal and opposite in amplitude, with the result that the S-meter of a receiver tuned to the signal *should* show no variation due to modulation. If the S-meter moves up or down to any degree it must be because the positive or negative modulation peaks are excessive.

When the carrier is 100 per cent modulated, using a sine wave input, the average carrier power is increased by 50 per cent, whilst the *peak* power is increased to four times the carrier power. To modulate the carrier 50 per cent only 12.5 watts of audio are required on a 100-watt carrier (again assuming a sine wave input) but in this case the peak power reaches only 2.3 times the carrier power.

As mentioned earlier, the audible output from the other fellow's receiver depends entirely upon the *range of*

variation in the sideband power and from the figures given above it is clear that a 50 per cent modulated carrier falls far short of the 100 per cent modulated carrier in producing the maximum possible level of audio in the distant receiver. There is, in fact, a steep falling off in peak carrier power and aerial current for lower values of modulation percentage—and even this assumes a sine wave input to the modulator, as represented by a pure audio tone or a whistle. With normal speech input rather different conditions obtain, as speech wave-forms are very peaky and when a transmitter is adjusted for 100 per cent control on speech *peaks* the *average* depth of modulation is in the region of 40-50 per cent only.

Effects of Over-Modulation

The latter statement will make it clear why it becomes so easy to over-modulate on speech inputs, and why some method of modulation monitoring is necessary if BCI trouble and reports of spurious radiation are to be avoided.

But it is a common experience to be given, over the air, a report of under-modulation when a glance at an oscilloscope shows the signal to be fully modulated or even over-modulated on *speech peaks*. The explanation is, of course, that the station at the receiving end is judging modulation percentage by comparing the *average* speech level with the strength of the carrier. The high speech peaks, which on the oscilloscope are giving evidence of full modulation, contain very little power and simply add nothing to the audible signal—but at the same time they may over-modulate the carrier causing "sideband splash."

The only remedy for this state of affairs is speech clipping—or cutting-off the high frequency speech peaks—in the speech amplifier or modulator, by means of suitable audio filters. It is the only answer to the problem of putting out an AM carrier which is as fully modulated as possible on speech, while at the same time avoiding over-modulation. Briefly, by cutting off the peaks, the average depth of control can be increased without reaching over-modulation.

Observing Modulation Effects

The whole problem of modulation makes it a virtual necessity to have in the station some means of estimating modulation depth if over-modulation is to be avoided—or conversely, if it is evident from reports that modulation is not as full as it should be.

It will now be clear that one cannot altogether rely on reports received over the air unless the distant station is checking the transmission on an oscilloscope—though the effects of an excessively over-modulated or very under-modulated carrier are obvious without actual measurement being necessary.

All the text-books say that when modulating the PA plate meter needle must be stationary, and that an upward or downward kick of the needle is proof of faulty operation.

A downward kick of the needle can, however, indicate poor regulation of the PA plate power supply,

Table of Values

The Modulation Meter

C1, C3 = .001 μ F, mica	RFC = 2.5 mH, RF choke
C2 = 100 μ F, air-spaced trimmer	J = Closed circuit jack
C4 = 0.1 μ F, paper	M = 0-1 mA, milli-ammeter
R1, R2 = 50,000 ohms	S = SPDT toggle
R3 = 150,000 ohms	V = 6H6

especially where the PA and modulator are receiving current from the same power pack—always bad practice. Under these conditions it will usually be found that an RF ammeter in the aerial feeders will kick upwards despite the fact that the PA meter would seem to indicate “downward modulation.”

The usual reason for the unsteadiness of the PA plate meter is *carrier shift*, caused by the carrier power moving upwards when the average power in the positive half-cycles of the speech wave-form exceeds that of the negative half-cycles, and *vice versa*. A similar movement can be observed on the receiver S-meter, or on the meter of a phone monitor.

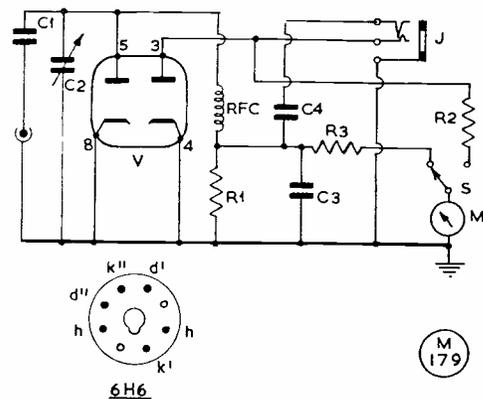
Several conditions can cause carrier shift. First, for 100 per cent modulation the PA must be capable of *quadrupling* its power output on peaks. Most modern RF valves, if run under the conditions and within the ratings specified by the manufacturers, can be used in a PA with the assurance that a modulation capability of 100 per cent is possible, provided the following precautions are taken:

(1) The driver stage must be capable of supplying sufficient drive to the PA grid or grids. Lack of drive is the most common cause of downward carrier shift and should be the first point to be given attention if “downward modulation” becomes evident.

(2) Secondly, the PA must be adequately biased to beyond twice the cut-off value if it is to be run in true Class-C. It is no use decreasing the bias on the PA in an endeavour to increase the grid current, as by so doing the operating conditions are changed and the PA will no longer present a pure resistance to the modulator, as it would do in Class C—that is, the PA plate current will not vary in direct proportion to the plate voltage when the latter is swung upwards and downwards under modulation.

(3) Thirdly, it is clear that to preserve these conditions the correct load must be applied to the PA by varying the aerial coupling until the PA is drawing the current specified under given values of plate and screen voltages.

Thus, any attempt to increase the PA output by increasing aerial coupling beyond its optimum value will result in improper conditions of modulation, as the downward kick of the PA plate current meter will show.



The Modulation Monitor as described. It can be calibrated to give direct reading of modulation depth on AM, and on SSB will show the maximum speech drive for normal Sideband modulation—see text. It will also read visually when the Tx is on CW.

Visible Indications

Upward carrier shift, as shown by a kick up of the plate meter or receiver S-meter, can mean over-modulation, but can also be caused by self-oscillation in the PA stage, either parasitic oscillation caused by wrong disposition of the components or wiring, incorrect values of by-pass condensers, or by self-oscillation due to incomplete neutralisation.

And so, whilst the plate needle will indicate whether or not all is well with our modulation, we are still in the dark regarding the actual *depth* of modulation.

Use can be made of a lamp link-coupled to the PA tank to indicate modulation—the old and well-known device—but here the indication is rough-and-ready, and merely gives visible assurance that the PA is being modulated. With practice it does become possible to judge by the relative increase in brilliance of the bulb whether the carrier is being adequately modulated—but that is all.

Then, again, it is possible to estimate modulation depth by noting increase in aerial current. The usual thermo-coupled meter is, however, heavily damped and sluggish in operation and while a sustained sine wave input (or whistle) to the speech amplifier will produce an increase in the meter reading, it cannot possibly even notice the rapid fluctuations produced by speech.

On speech input the increase in aerial current is a measure of modulation percentage only to this extent: No increase means very low percentage; a slight increase, of from 5 to 10 per cent, indicates a fairly high percentage; while an increase of 15 per cent is almost certain to mean over-modulation.

The only certain method of checking modulation depth is by using a cathode ray oscilloscope, which will give a picture of the actual carrier under modulation. An oscilloscope is the only instrument which will follow, faithfully, the vagaries of speech wave-form, enabling one to see at a glance whether the speech peaks are over-

modulating the carrier. The actual modulation percentage can also be estimated with some degree of accuracy by connecting the oscilloscope so as to present the familiar trapezoid pattern when the carrier is being modulated, and then comparing the lengths of the vertical sides of the trapezoid pattern.

But again, unless the source of modulation is a sine wave (which it never is on speech!), the shape of the trapezoid will be constantly changing and it is difficult to measure the actual percentage of modulation when speech input is being used.

Simple Modulation Meter

The circuit herewith shows a simple form of modulation meter which does not require the use of an oscilloscope (apart from the initial calibration of the instrument) and yet enables the operator to form a fair estimation of the depth of modulation.

It is the basis of most modulation monitor circuits. Whilst it will naturally not follow the peaks of speech, the *average level of speech modulation* can be read off from the meter, due allowance being made for peaks. The instrument will function as an excellent phone monitor and can also give a visible indication of the level of hum and noise on the carrier.

In effect, the modulation meter consists of a linear AC voltmeter, which compares the average RF carrier voltage with its audio frequency component, one diode of the 6H6 serving as a rectifier of the carrier RF voltage, the other diode rectifying the audio voltage.

SSB Monitoring

While the foregoing discussion has dealt with the AM aspect—AM still being very widely used and the principles of getting the speech out under properly controlled conditions being the same for either AM or SSB—the unit here described can be used just as effectively for watching a Sideband transmission. In fact, the application is even simpler.

Under no-modulation conditions, the meter needle will be at rest. On speaking into the microphone, it will kick upwards. If the point of maximum deflection can be found by 'scope reference—when the oscilloscope is showing that the Sideband signal is going out correctly (and a CRO is practically essential in any properly-equipped SSB station)—it follows that in normal use it is only necessary to place the Modulation Meter where it can be watched while operating, and to keep the meter movement at or a bit below the point of maximum deflection.

Once the habit of constant monitoring—whether on CW, AM or SSB—is formed, an indicating device of this kind, which comes on automatically when the station is switched on, will be found to be one of those indispensable aids to good operating.

Constructional Points

Construction of the meter can take any convenient form. The actual disposition of the components is not

critical so long as the audio side is kept well clear of the RF components. Voltage is picked up by a 2-turn insulated link placed a few inches from the PA tank and is fed into the modulation indicator *via* a length of 72-ohm coax cable.

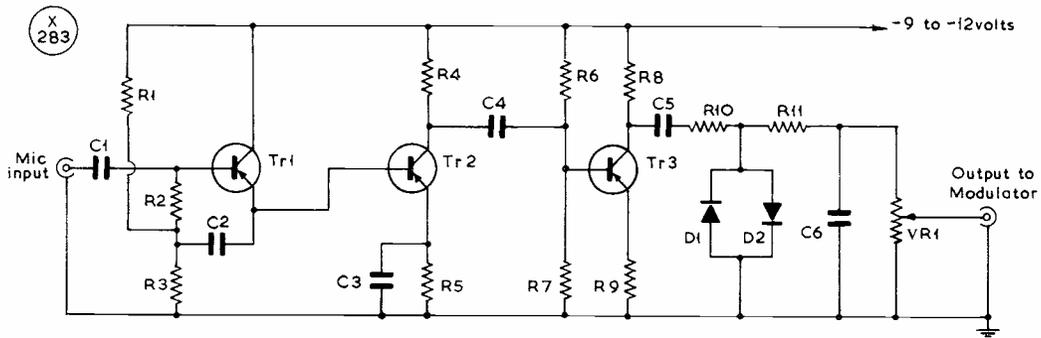
With the carrier on and the meter switched in series with R3 the needle will be deflected to an extent dependent upon the proximity of the link to the PA tank coil. C2 should now be adjusted to balance out the reactance of the length of transmission line, and should be tuned for maximum deflection of the meter. The coupling of the link to the PA tank coil should then be adjusted so that the meter reads, say, 0.8 mA, in an 0.1 mA instrument—although the setting is purely arbitrary and may be adjusted to any convenient figure. The meter is now reading the *average carrier voltage* (in an AM transmission).

Switching the meter in series with R2 will return the needle to zero unless there is hum or noise on the carrier, when the meter will be deflected accordingly. A sustained whistle into the microphone will send the meter needle upwards to an extent depending upon the depth of modulation and if the carrier is being modulated 100 per cent the needle will go to the point of the original setting—in the example just given, 0.8 mA. Modulation percentages of less than 100 per cent will result in correspondingly lower readings, whilst any deflection beyond the carrier level figure indicates over-modulation. The meter reading is linear and modulation percentages may thus be read off directly from the meter.

In this connection it would probably be more convenient to set the carrier level figure at precisely 1 mA when the percentages can be read off with greater ease, although in this case little allowance can be made for over-modulation indication. Plugging a pair of headphones into the jack enables an AM transmission to be monitored, although under these conditions the meter reading is meaningless.

COMMEMORATION DINNER AND CONVENTION, RAF AMATEUR RADIO SOCIETY

To mark the 50th Anniversary Year of the Royal Air Force, the RAF A.R.S. is holding a convention at No. 1 Radio School, Locking, on Saturday, July 6, opening at 1330 hrs. There will be tours of the Station's radio and radar facilities—including the Hq. station G8FC and the radio museum. Talk-in on 2m-160m. will be provided for mobiles, with field-strength and frequency-measuring contests. In the evening there is to be a celebration dinner at the Grand Atlantic Hotel, Weston-super-Mare (charge 31s. 6d.). Though the detailed programme has been circulated to all paid-up members of the RAF Amateur Radio Society, ex-members or those concerned with radio, radar or telecommunications in the Royal Air Force may like to get in touch with the Admin. Secretary, Amateur Radio Society, RAF Station, Locking, Weston-super-Mare, Somerset.



The Unit described in the text, for which values are : C1, C2, C4, C5, 8 μ F; C3, 20 μ F; C6, 0.1 μ F; R1, 33K; R2, 100K; R3, 10K; R4, R7, R8, 2.2K; R5, R10, 1K; R6, 27K; R9, 220 ohms; R11, 470 ohms; VR1, 100K potentiometer; Tr1, Tr2, Tr3, OC72's; D1, D2, any germanium diodes. See text for discussion on using the Speech Amplifier.

TRANSISTORISED SPEECH AMPLIFIER WITH SYMMETRICAL CLIPPING

DESIGNED FOR MAXIMUM
IMPACT

W. BURTON (G8ANQ)

THE writer, having modified a couple of the *Pye* PTC-704 series transmitters for two metres, started to modify the same for a crystal microphone input. This transmitter was originally designed for a dynamic microphone and it was found that not enough amplification was available to drive the modulator valves to sufficient output for 100 per cent modulation.

A transistorised speech amplifier was designed as an outboard unit so that it could be used with both transmitters (one for two metres, the other as a 70 cm driver to a varactor multiplier). Speech clipping was incorporated to improve the talk-power of the transmitter, and after careful examination of the pro's and con's of various types of clipping, symmetrical clipping was chosen.

A stabilised 10-volt supply was already in use to feed the transistor converters and this was taken as the design voltage, although in fact the unit will operate quite satisfactorily on voltages between nine and twelve. The parameters were worked out so that any audio p.n.p. type of transistor could be used and in the version constructed by the writer OC72's were found suitable. The diodes (which in this circuit must be germanium in order to obtain effective clipping, germanium types

conducting at a lower voltage than their silicon counterparts) were unmarked but any germanium diode could be used.

As shown in the circuit, Tr1 is connected in a "bootstrap" configuration, thus ensuring a high impedance input for the crystal microphone. In the writer's case the microphone is the *Eagle* 100C and gives an average output (with G8ANQ's voice) of 10 mV, peak-to-peak. Tr2 is directly coupled to Tr1 and, together with Tr3, gives a total gain in excess of 500, dependent on the transistors and applied voltage used. Negative feedback is applied to Tr3 in order to keep the gain down to a suitable level for feeding the clipper diodes D1 and D2.

The output of Tr3 is fed to the clipper via C5 and R10, which are isolating components, R10 being used to drop the voltage applied to the clipper down to a suitable level. D1 and D2 clip the peaks and the resulting waveform is rounded off by the low-pass filter R11, C6. This filter starts to cut at 2.8 kc, further audio bandwidth restriction being applied in the main Tx. The output is developed across VR1, the slider of which is connected to the output socket, about 0.5 volt peak-to-peak appearing at this point.

The original unit was made up on copper-clad board, the layout following the circuit diagram, and AF being fed in and out on coax sockets. One version has been built with its own internal 9-volt battery, a switch being incorporated in the battery supply lead to increase battery life.

Impact

Signal reports are now two S-points up on the amplifier without clipper, and most stations remark on the added punch to the G8ANQ signal since its incorporation. Setting up the clipper is simplicity itself—simply turn up the output control until full modulation is achieved, and leave it at this setting.

DAYSTROM TOURING EXHIBITION

We are informed by Daystrom, Ltd. that they are now operating a mobile show-room, in which can be seen all products in the Heathkit range, as a touring exhibition. The itinerary for the first tour, during May 18-29, is: Belle Vue, Manchester, Amateur Convention (*Sunday 19th*); then for the period *Monday 20th* to *Saturday 25th*, the show-room will visit, for one-night stands, St. Helens, Blackpool, Glasgow, Edinburgh, South Shields and York, for the convenience of local Radio Clubs and Societies in those districts. On *Sunday, May 26*, the show-room will be at the Bridlington Mobile Rally, moving on to Leeds, Nottingham and Northampton—in that order for the next three evenings—to be available for local Clubs in those parts. One of the items on view will of course be the new Heathkit SSB Transceiver, HW-100, as featured in Daystrom's current advertising.

HONOUR FOR "RADIO SERVICES"

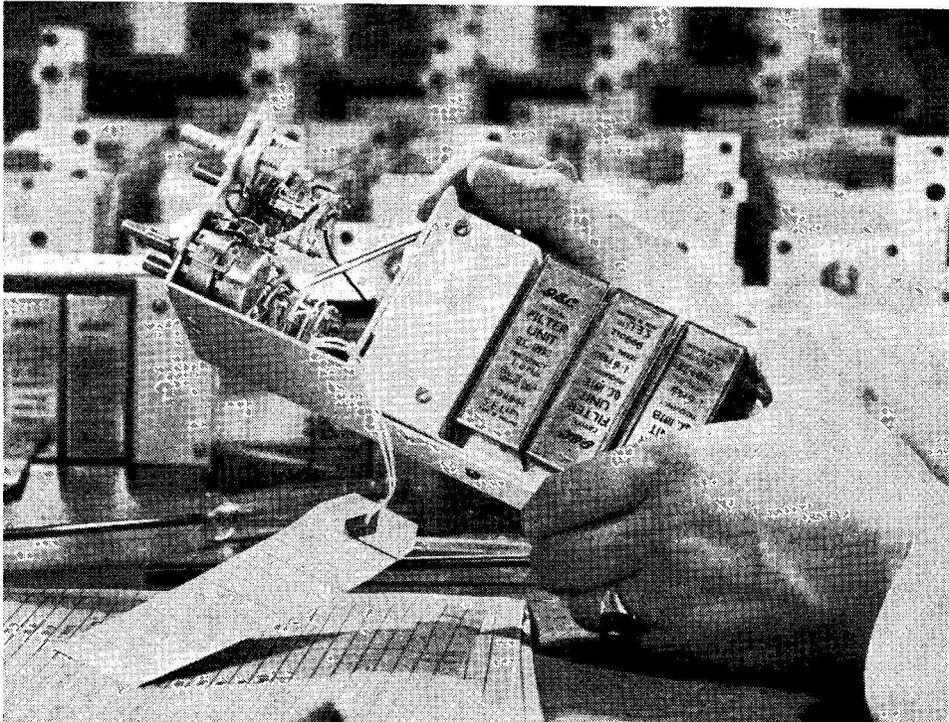
We were very glad to hear, officially from the G.P.O., about the presentation recently, at the American Embassy in London, of a certificate and plaque subscribed by the Long Beach, Calif., radio amateur group, in recognition of the issue by the Post Office of the special callsign GB5QM/MM for the old Queenship *Mary* on her last

deep-sea voyage. It will be remembered that she is now the Long Beach "show boat," and that on her way over GB5QM/MM was operated on the DX bands.

Fittingly, the recipient of the honour was Eric Godsmark, G31WL, now in charge of the Amateur Licensing Section of the G.P.O. Radio Services Department. Modestly, he remarked: "Making these arrangements was part of my job. I regard my acceptance of the presentation as being on behalf of my department." Well said! And we are fortunate in having, for the first time in the history of Amateur Radio in the U.K., in charge of our affairs at G.P.O. Headquarters, a higher executive officer who is himself a licensed radio amateur with an active callsign.

AMERICAN CITIZENS' BAND

Further to the notes on p.480 of the October issue of *SHORT WAVE MAGAZINE* on this subject, we get it (from February's excellent *Collector and Emitter*) that a CB licence for the 27 mc band is issued on request, with a fee of \$8.00, accompanied by a sworn statement that the FCC regulations have been read—rather like the undertaking you sign about having read the Highway Code—and an indication of intended usage. As to how CB-licences are used—listen around 27 mc any time Ten is well open to the States.



For their RA-1217 solid-state HF-band receiver, Racal Communications, Ltd., use S.E.I. crystal filters for the IF stages. Up to five of these filters can be fitted in each receiver, three being the usual number. Salford Electrical Instruments, Ltd. developed crystal filter units to give the required performance for this particular application. By early this year, more than three hundred RA-1217's had been sold, many of which have gone for export.

RADIO ASTRONOMY — SUCCESSFUL AMATEUR INSTALLATION

BEAM DESIGN FOR A PRACTICAL RADIO TELESCOPE — AND SOME RESULTS

THE approach, the equipment and the results described here are due to what—in the radio amateur context—was the original work of John Osborne, M.A. (G3HMO), lately of Stowe School, and now in charge of the Science Dept. at Westminster School, London. Though many readers will know of his enterprise in this field, there has been a continuing amateur interest in the subject, and this article has been compiled from various *Magazine* sources.

Another reason for re-opening the subject is that it shows what can be done with simple equipment, intelligently used, with a knowledge both of the possibilities and the limitations. In a sense, from the radio amateur point of view, there are two aspects: One is the tracking and identification of the many satellites now in orbit round the earth, and the other is looking out into space. It is the latter with which we are concerned here.

The Stowe radio telescope was resonant at about 200 mc—a matter of convenience with the equipment, as much as anything else—and consisted of a 32-element array based on a standard Band III design manufactured by J-Beams, Ltd., of Northampton. This was made up of two slot-fed 16-element sections working in phase,

each section comprising an 8-element pair. The two 16-element sections thus formed were connected through a phasing unit to give "additive" matching of the two sections into a single coax feedline to the receiver. Band III aerials and circuits being available saves much tedious development effort. Working just outside the occupied part of the ITV band reduces interference from this source to tolerable limits.

The aerial system chosen, after consultation with G2HCG of J-Beam Aerials, Ltd., Northampton, was a pair of fringe-area skeleton-slot Yagis, making 32 elements in all. The two arrays were arranged side-by-side on an equatorial mounting; that is, a rotatable pole set at 52° to the horizon and pointing at the Pole Star, so that any source in the sky could be kept in the beam by rotating the mast alone.

Fixed about two wavelengths apart, the two sections of the array were mounted on a boom secured to a short, rotatable mast, itself set on the equatorial axis—that is to say, held parallel to the polar axis of the earth, so that rotation of the mast kept the array headed on the sun, without any adjustment in elevation being needed. The mast was easily set up on the correct alignment by aiming it straight at the Pole Star (which for this purpose can be taken as a fixed point bearing true north).

Since the system itself does not call for mounting at any great height, the mast can be quite short, and the mechanics of supporting it at a steep angle are much simplified. Fig. 1 is a diagrammatic representation of the set-up. All parts of the telescope can be readily accessible—indeed, one of the advantages of any aerial system used for Radio Astronomy is that it can be as near ground level as the "dimensions of movement" will permit.

The beam width of the system was estimated at about 5° in azimuth, and 15° in elevation. Thus, though it had no great resolving power, noise sources in the heavens could be located with a degree of accuracy to

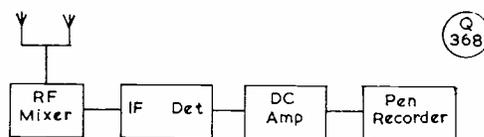
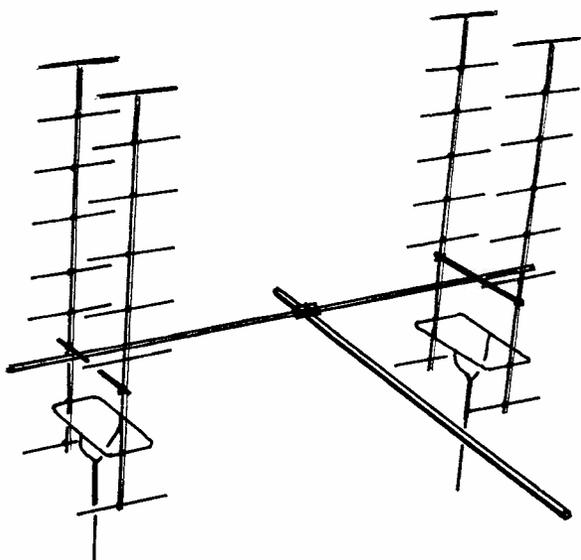


Fig. 1

Fig. 1. Block schematic of the assembly for the amateur Radio Telescope discussed in the article. The beam array is set up on an equatorial mounting, so that the sun can be followed round without any adjustment in elevation being necessary. The receiving system is explained in the article.

make them at least interesting.

Receiving Equipment

The single coax feed-line went to a modified commercial Band III converter, which incorporated an ECC84 cascode RF stage and adjusted to have an IF of 45 mc; so the converter fed into a well-known item of "surplus"—a Pye 45 mc IF strip, which has five stages using EF50's. The receiver side was lined up with a noise generator.

Indication

From the IF strip, the output was taken directly to a Cossor valve voltmeter (built from their 1044K kit). With the aerial disconnected, the V/VM is zero'd on a scale convenient for observing maximum deflection—say, 1.5 volts, backed off—which will be the inherent "steady noise level" of the receiving system alone, without the aerial. On switching in the beam, there is a change in noise, producing a deflection to a new level on the scale. And on aiming the telescope at the sun, further changes and irregular deflections are obtained, depending on the sun's activity.

The general sensitivity of the whole set-up was such that noise of some sort could be read off the sun at almost any time—in fact, the indicator could only be zero'd with accuracy by making sure the beam was aimed well away from the sun. Periods of high activity gave very good deflections, some noise peaks being sufficient to drive the meter off scale. The deflection obtained on the Telescope as illustrated here was of the order of 0.2v. on the 1.5v. scale during periods of average solar activity. This is, of course, not an absolute figure, as it takes no account of the gain of the system—it is quoted merely to indicate the sort of meter reading that might be expected in a similar installation.

Apart from the sun, some very interesting noise indications have been obtained from other directions in our Galaxy—see reproduced plots, which are from the original traces. For any regular or serious work, however, an obvious requirement is continuous operation of the Telescope. For this a drive mechanism, rather like a piece of clockwork, was developed to keep the beam headed on the sun all the time it is above our horizon; this mechanism simply moved the beam against the rotation of the earth. For reasons already explained, no controlled movement in elevation is necessary. Secondly, since nobody has time to sit watching a

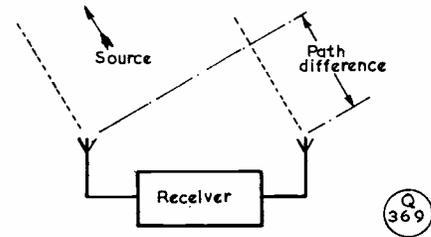


Fig. 4. Diagram to illustrate the principle of the Interferometer. The signal arriving at the "far aerial" travels further, thus causing a phase lag. Depending on the path length between antennae sections—which can be fairly short or very long—the noise-signal on the far aerial may either reinforce or cancel out that from the "near aerial." Thus, successive maxima and minima will occur as the noise-source passes through the beam. A most convincing trace from the array used as an Interferometer is shown in Fig. 5.

meter needle all day, a pen recorder soon took the place of the valve voltmeter, operated from a suitable amplifier following the IF unit.

From what has been said, it is clear that there is ample scope for interesting amateur work in Radio Astronomy, either individually or on a group basis. Indeed, radio amateurs, particularly those experienced in VHF techniques, are very well qualified to join in the exploration of this fascinating new field. The practical limitation of aerial size, combined with the desirability of using receiving systems of the accepted VHF types, suggest that the useful frequency range for amateur investigation of noise from outer space—whether from the sun, the Milky Way, or other noise sources—is about 60-400 mc. A start could, in fact, be made by anyone who, having two-metre receiving equipment, can install a beam with a tiltable head.

Results

The waves reaching us from outer space have, for the most part, the characteristic of noise—entirely random radiations over a very wide and loosely defined band of frequencies.

Solar Radiation. The most powerful extra-terrestrial radio source is the sun. A convincing and informative experiment is to turn the aerial ahead of the sun and let the sun "drift" through the beam. Fig. 2 is reproduced from an original trace showing several features of this

Fig. 2. (A) Trace obtained as the sun drifted through the beam of the Telescope. A sudden burst of solar activity is indicated on the left, as the sun enters the beam. The steady noise-level is clearly suggested by the appearance of the trace as the sun moves across the beam. The severe effects of local man-made interference can be seen to the right.

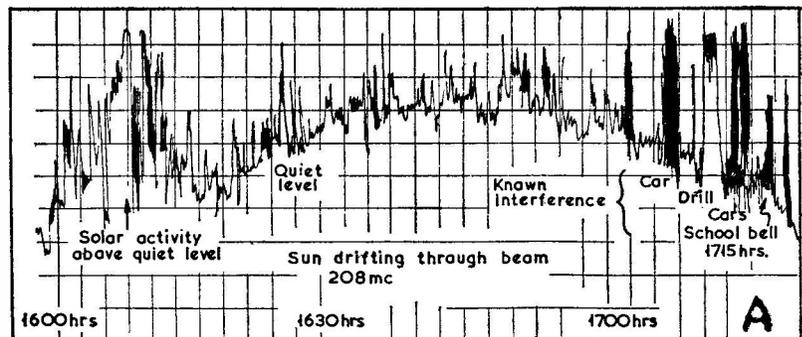
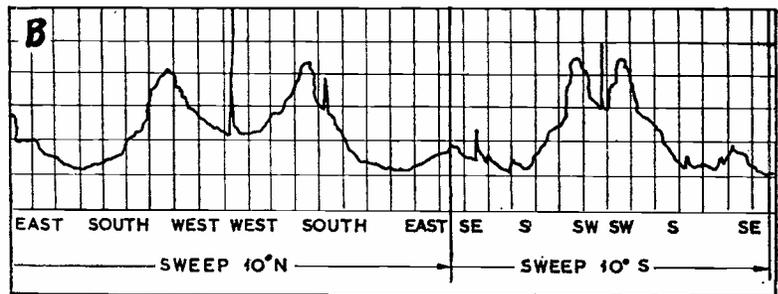


Fig. 3. (B) Sweeps through the Milky Way at 10° above 10° below the equator, showing clearly the noise maximum in the plane of the Galaxy. After a sweep from the eastern horizon through south to the west, the Telescope was returned from west to east, as a check. The traces should then be mirror-images—which, indeed, they very nearly are, except that the second trace shows a greater maximum because it passed nearer the centre of the Milky Way. This simple experiment was an indirect proof of the validity of all the observations discussed in the article.



experiment. In the first place, the polar diagram of the beam can be seen from the general shape. (Of course, the diagram would have to be replotted in polar coordinates to get the usual picture.) That this shape can be recognised follows from the fact that the sun is, for most of the time, a fairly steady noise source. However, as is well known in DX circles, the sun occasionally exhibits great activity. At sunspots periods and at many other times great outbursts of radio noise exceed the "quiet" level by factors of up to a thousand times. These bursts last from a few seconds to hours or days. Indication of such "enhanced activity" is clearly seen in Fig. 2 just as the sun started to enter the beam. The amplitude of the disturbance can be judged by comparing it with what the quiet level would have been at this time. That such activity affects long-distance propagation is well established, but much scope exists for research. The extra-terrestrial noise levels are down in the receiver noise, and almost any interference produces catastrophic effects on the trace. Most of the interference on the right of Fig. 2 was caused by known sources. Limiting in the DC amplifier is indicated by the trace not reaching to full-scale deflection. Experience is needed to differentiate between enhanced activity and local man-made noises. Since no fundamental difference exists between the traces given in the two cases, this can be difficult.

The Milky Way

Our own galaxy, the Milky Way, shows a steady background of radiation which is strongest towards the centre of the galaxy. This radiation is the extra-terrestrial "hissing" discovered by Jansky. The centre of the galaxy is obscured visually by dust clouds (interstellar matter). That we can see further into our own galaxy in the radio spectrum is illustrated by sweeps across the sky. Two sweeps are shown in Fig. 3, the first with the aerial set at 10° above the equator and the second 10° below. The aerial was swept from horizon to horizon at 20° per minute and then back. (Being lower in the sky, the second sweep is through a smaller arc.) Each sweep shows a maximum on crossing the plane of the Milky Way, the value being greater as one approaches the galactic centre, which lies 28° below the equator. The trace has been made smoother than in Fig. 2 by increasing the time constant of the detector. The sweeps were made at full sensitivity (greater than was used on the sun) and recorded after midnight, when normal interference is low. The object of the return sweep was to check the reproducibility and lends validity to the results. For

instance, a large asymmetric kick appeared on one trace (not shown here) which coincided with an aircraft flying through the beam.

Interferometry

If two aerials separated by many wavelengths are connected to the same receiver, the output depends on their relative phase. Consider the receiver in Fig. 4 situated centrally (in terms of feeder length) between two aerials. Suppose there is a source of radiation, e.g. the sun, in the direction shown. The path of the waves reaching the right-hand aerial is longer, and if this distance is a whole number of wavelengths greater, then the two signals are added. Should the distance by a half wavelength greater, or less than this, then the signals from the two aerials, being 180° out of phase, will exactly cancel each other. As a source passes through the beam, successive maxima and minima will occur.

The Yagis were removed from the equatorial mounting and set up 36.5 wavelengths apart on an east-west base, both looking south, and a recording was taken of the sun drifting through the beam (Fig. 5). Comparison with Fig. 2 will make the interference pattern clear. It

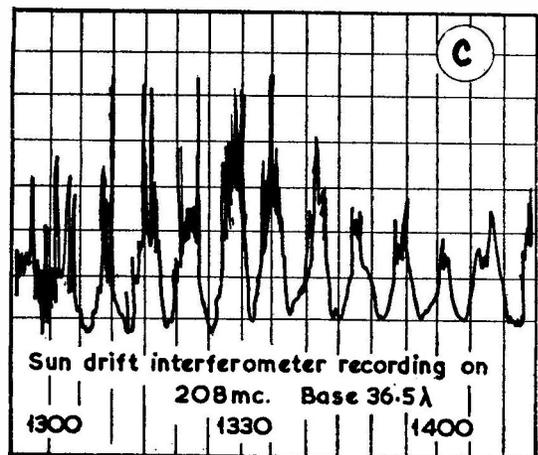


Fig. 5. Interferometer recording of the sun—using the equipment described in the article—with the two aerial sections of the Telescope spaced at 36.5 wavelengths at 208 mc—this dimension happening to be convenient for the available space. In this sort of set-up, scan is obtained simply by the rotation of the earth.

will be seen that this technique gives good identification of solar disturbances, as these show up only on the peaks, while terrestrial or local interference can occur all the time. However, the method reduces the effective observing time, and reduction of interference by improved aerial siting would be better. Nevertheless, it is this technique which enabled two discrete sources to be positively identified with the Stowe Radio Telescope, in all essentials an amateur installation.

Radio Stars. Several thousand discrete sources have been observed in the heavens, although relatively few have been independently confirmed. The two most powerful occur in the constellations of Cassiopeia and Cygnus. They are known as *Cassiopeia-A* and *Cygnus-A*, and are several times more powerful than any other discrete source. Even so, they are only one-fiftieth or so of the strength of the *quiet sun* and weak in comparison with the background radiation from the Milky Way. (Detection of such a source with the beam-width and gain available at Stowe was analogous to trying to find a candle with an exposure meter when it is in front of a white floodlit wall!) But as these sources are *point radiators in a uniform background*, an interferometer drift recording shows them up as a weak interference *pattern* superimposed on the radiation from the galaxy. Figs. 6 and 7 show this pattern if one studies the trace carefully. In each case the period of fluctuation has been measured and this, together with frequency and base-line, enables the declination of the source to be calculated. In both cases, the result is within one degree of the accepted declination of these sources—which can be taken as a satisfactory result using amateur equipment.

Cygnus-A is now known to be two galaxies in collision 200,000,000 light years away and, of course, we are observing waves which started on their journey through space 200,000,000 years ago.

It may be agreed that the traces shown at Figs. 6 and 7 make a convincing demonstration of what can be done amateur-wise with readily available apparatus.

* * *

NOTES ON EQUIPMENT

The Converter. The performance of the converter determines the capabilities of the Radio Telescope. The vital requirement is that the signal-to-noise ratio of the RF stage should be not just good, but should approach the theoretical maximum. The Band III converter available incorporated an ECC84 cascode RF stage and an ECF80 oscillator-mixer. The Band I filter, the Band I/III common aerial connection and the two-channel switching were removed. Painton high-stability carbon resistors were fitted in place of the usual composition types, the latter being a potential source of excess noise.

This converter, as received from the factory, gave adequate results on solar noise. However, the use of a simple noise-generator, as shown in Fig. 8, enabled a considerable improvement in the signal-to-noise ratio to be obtained, partly at the expense of gain. The noise-current generated in a silicon diode is passed through a resistor matching the feeder impedance. By varying the DC current through the diode, a variable noise output

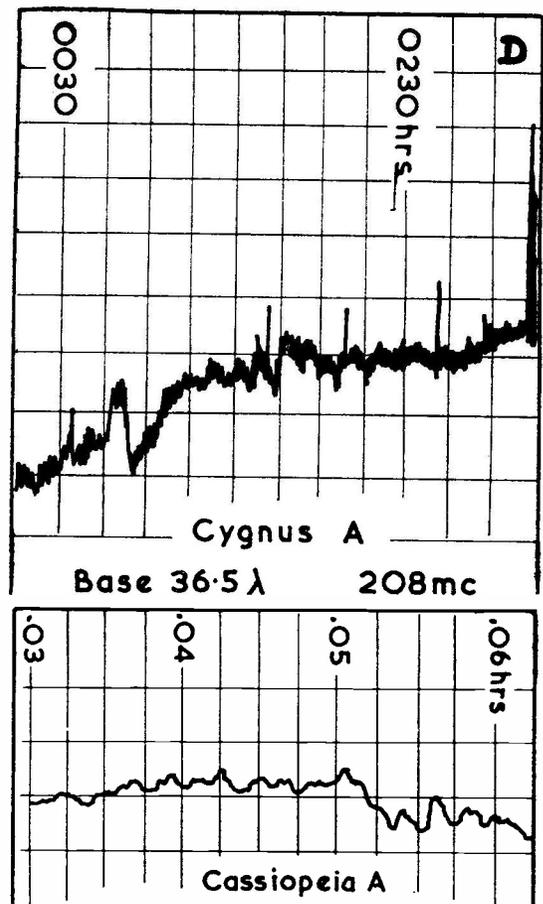


Fig. 6 (above) and Fig. 7 (below). These traces are remarkable in that they disclose the presence of radio stars ("quasars")—probably the first time it was ever done using equipment ordinarily available to the amateur, of the kind discussed in the text. The small under-noise wave-like motion in this trace (reproduced directly from the original) indicates a distant noise-source moving through the beam. The Rx problem is that at the sensitivity to produce traces like this, minute variations in receiver gain, mains voltage variation or general local noise can produce relatively large masking disturbances. Thus, it becomes a matter of being able to interpret recordings correctly. In these markings are those of radio signals that started out more than 200 million years ago.

can be obtained. This was fed to the converter, which was in turn connected to the IF strip. Readings were taken of the *change* in volts across the diode detector load on switching the noise generator on and off. Any adjustment or modification which increased this change was made permanent.

The following modifications, little by little, gave a large overall improvement—so much so that the noise-generator output had to be reduced to the minimum setting towards the end. The ECF80 triode-pentode was strapped as a triode-triode. Injection was reduced by removing the inductive coupling and relying on stray injection. The relative position of the oscillator coil to the mixer grid coil was adjusted for optimum signal-

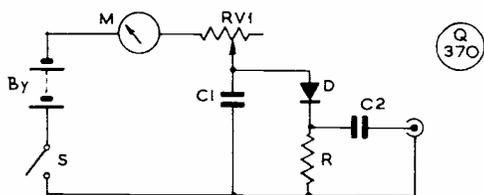


Fig. 8. Noise generator for setting up the receiver, to simulate noise signals from outer space. Values are: C1, C2, .001 μ F; R, 72 ohms; VR variable, 25K; D, silicon diode; and M, 0-1 mA meter.

noise ratio. The aerial coupling coil was dispensed with and the input taken to the bottom of the first tuning coil. The coil and trimmer were adjusted for resonance and matching. All signal frequency coils were rewound with silver-plated copper wire. The two valves were accidentally interchanged in their sockets (which ruined them!) and they had to be replaced. Although then useless for the purpose of this converter, they showed no deterioration in a commercial FM receiver—from which the importance of having good specimens should be obvious.

The second harmonic of a standard signal generator set up on 104 mc was used for adjusting the coils, the precise value of frequency being of no consequence. It is advantageous to have a wide bandwidth in a radio telescope, as one is then collecting more noise energy, so that the usual bandwidth/SNR relationship no longer applies. There is no point in de-grading the performance of the receiver, however, merely to extend the bandwidth.

The IF Section. The IF was chosen as 45 mc, so that use could be made of a Pye 45 mc IF strip. This useful piece of "surplus" provided a large part of the electronics, ready-made for a few shillings. The only modification was to scrap the last stage, a cathode follower, and to fit a new diode load of a 5-megohm leak and 0.1 μ F or a 1.0 μ F condenser. The latter value gives a suitable time-constant for discrete source observation, while the former is more appropriate for watching rapid solar fluctuations. The power supply was stabilised and with 240 volts on the plates of the EF50's and 120 volts

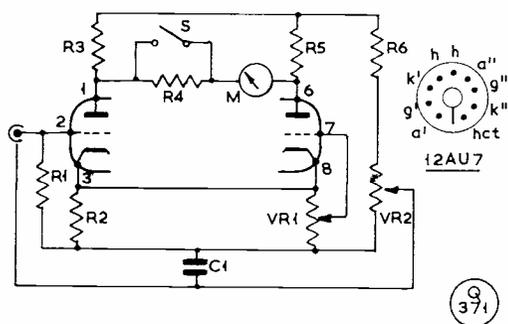


Fig. 9. DC amplifier for driving a Pen Recorder—see text. M is the pen recorder, zero-set by VR1 and R4 is used to limit sensitivity when investigating the sun. Values are: C1, 100 μ F, 25v.; R1, 20 megs (optional); R2, 500 ohms; R3, R5, 5K; R4, 20K; R6, 43K; VR1, 25K; VR2, 5K; M, 0-1 mA pen recorder, by Evershed & Vignoles.

on the screens, the bias was adjusted to about -0.75v., so that the total plate current to the strip was in the region of 30 to 35 mA. These figures were arrived at by trial and error in the absence of any known published date on the strip itself.

The DC Amplifier. The output from the diode detector with the aerial and converter connected was of the order of -10 volts, this being a measure of the total noise. It is necessary to be able to detect the very small increases in this value which occur when the aerial is directed at extra-terrestrial sources. The additional voltage output of the receiver, due to the quiet sun, was one-twentieth of the existing receiver noise, and that due to the most powerful discrete sources only about one-fiftieth of that of the sun! As such signals were to drive the 3000-ohm 1 mA pen recorder, a DC amplifier was needed. The major part of the negative output from the diode was balanced out, as is shown in the circuit diagram of Fig. 9. By using a separate power supply, the chassis potential can be slid up the potentiometer VR2 across the supply, thus backing-off the diode output volts to give a reasonable bias to one half of the 12AU7; the other half is approximately balanced by VR1. A fixed resistance R4 in series with the meter reduces sensitivity to a suitable value for solar work; it may be shorted out for full sensitivity. Any increase in aerial noise will drive the first grid more negative, thus upsetting the anode-to-anode balance and causing a reading on the pen recorder.

The Pen Recorder. For the Stowe Radio Telescope they were fortunate in having a pen recorder for the output. (This cost several times more than the whole of the rest of the gear put together!) The instrument chosen was an Evershed and Vignoles recording milliammeter. The chart, 4in. wide, could be driven by a synchronous motor at a variety of speeds between 12 inches a minute and one inch an hour. For serious radio astronomy, even of the amateur variety, it is doubtful if any substitute exists for a pen recorder. However, with patience, the movement of a meter needle can be plotted against time. It simply means long periods of careful watching. It is also known that a self-balancing potentiometric pencil recorder—made with surplus motors, a volume control, a cord dial drive mechanism and a few valves—has been built at a cost of little more than time, labour and ingenuity. It should be well within the scope of a competent amateur model maker.

(Editorial Note: In the reproduction of the pen recordings for printing, some of the fine detail has unavoidably been lost. In the Cygnus-A trace on p.148, the steady rise from left to right is due to the Milky Way moving into and across the beam. Superimposed on this there is also a weak rise and fall about every 8-9 minutes, and careful inspection of the trace will show seven minima between 0115 and 0215—this is the evidence referred to in the caption. The trace for Cassiopeia-A, made at full sensitivity, is smoother than for Cygnus-A because of the larger time-constant used in the detector. The period in this case is about 12 minutes, because Cassiopeia-A is nearer the Pole and therefore moves more slowly through the beam.)

AERIAL THEORY AND PRACTICE

AN INDOOR LAYOUT AND THE REINARTZ LOOP—METHODS OF FEEDING VARIOUS SYSTEMS

Part IV

E. P. ESSERY (G3KFE)

This concludes the series of articles on Aerials, in four parts, which was started in our issue for October last. The whole forms a useful summary of the practicable systems in the amateur context for the bands 10 to 160m., as well as covering some of the lesser-known types.—Editor.

CARRYING on from p.621 of the December issue of SHORT WAVE MAGAZINE, where we left the compacted groundplane, we come now to some other arrangements.

It should be realised by those without garden space, or who are otherwise inhibited from putting up elaborate systems outside, that good results can be obtained with directional antennae in the loft or roof-space—which is very often wasted space anyway.

The first arrangement to think of is a pair of dipoles side-by-side, fed either in phase or out of phase by means of a simple reversing switch, as shown in Fig. 8. The general result of this switching is to transpose the lobes of radiation and the nulls, so that it has considerable potential as a QRM-removing device, even though the forward gain is not very great. The feeders should be brought down separately, right into the shack, and the reversing switch—which can be a simple double-change-over toggle type if no great power is to be put through it—be mounted adjacent to the ATU, where it is not only convenient to operate but where the run of feeder from the switch to the ATU, which will have standing waves on it, is kept as short as possible. Clearly, at most locations this is an aerial to be used on ten metres, as it will become a bit too large on the lower frequency bands.

At Fig. 9 is shown the Reinartz aerial, which has directivity in the direction of the arrow, and could easily be adapted for rotation within a fairly large loft, as no boom would be required if it were to be supported at the point of balance. (Incidentally, the name of Reinartz is one that is printed in letters of gold in the early annals both of Amateur Radio and of the professional side, in connection with many of the early developments.) A, the distance between the ends of the wire can be 0.2in. per metre of wavelength, e.g. 2in. for ten metres. B should be similarly one inch per metre of wavelength, e.g. 10in. at ten metres. The circumference of each loop is half-wave at the design frequency, and B of course is the spacing of the two loops.

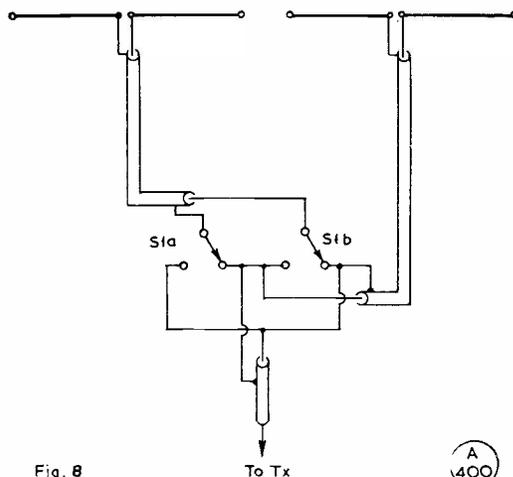


Fig. 8

Fig. 8. Showing a pair of dipoles, side by side, for feeding in or out of phase. S1 is the phase-reversing switch. Each dipole is connected to S1 through an equal length of feeder—see text.

Some General Hints

The most general feeder impedances that will be encountered in published aerial designs are the 50 or 75-ohm coaxials, 300-ohm in ribbon feeder, and the 600-ohm open-wire line types. To make the former types is hardly practicable but the construction of 600-ohm open wire line seems to be becoming a lost art. Hence, the old recipe is repeated here.

The actual feeder wires are made of 16g. copper wire, which should be pre-stretched by fixing one end to a tree or something similar and giving it a good pull. This treatment makes the normal soft copper stuff behave like hard-drawn, which does not stretch so much once it is up. This gauge of wire needs 5-inch spacing to give 600 ohms, and so a few pieces of wooden dowel are obtained and cut into 5in. lengths. Enough should be cut to give a spacer about every three feet if the line is to be held reasonably taut, and at least twice this number if it is expected that the line will be able to move appreciably.

Near each end of the embryo spacers is drilled a small hole—say, about a 48 drill or thereabouts. When this is done, acquire a pound of paraffin wax, and some beeswax. The ploy is first of all to simmer the spacers in paraffin until they are well impregnated—a state of affairs usually indicated when bubbling ceases. Incidentally, if you boil the wax too hard it will lose its electrical qualities to quite a considerable extent.

After the spacers have been fished out of the dip with pliers and allowed to dry and become stone-cold, it is best to preserve them by dunking in beeswax which is *only just* molten, so that they come out with a good thick layer of beeswax all over them. In this state it is true to say they will last for years.

To make the actual feeder, the 16g. wire is bound to the spreaders, using something 26g., threaded through the holes in the spacer, wrapped round the feeder line nice and tight, so that the spacing of the line wires is

fixed at the desired 5 inches and the spreaders cannot slide.

Where aerials are concerned there is no doubt that every site is less than perfect, and no two are ever the same; it follows, therefore, that often a mere hint of an adjustment to an aerial length is likely to make an astonishing difference to the results. Thus it behoves even the most non-constructional minded type to do a little of this cutting-and-trying on his aerial system—it may waste some wire but it will often double the effectiveness of a station, or better. To do that any other way, such as a bigger transmitter, costs money, and doesn't, help the receiver!

When testing out an aerial, it is best to do so against some other aerial which can be retained as a standard, so arranged that the receiver can be switched instantly from one to the other. The point here is that one gets a "feel" for the bands on an aerial that is up for some time, and so, when the new wire is being used, a quick flip of a switch will tell you if the band is dead—or the new aerial!

Points on Tuners

All the aerials mentioned, other than the purely coax-fed ones, need a Coupler or Aerial Tuning Unit of some sort, to ensure that whatever the aerial has to offer can be transformed into an impedance of about 75 ohms for the benefit of the transmitter, receiver, and, most important, the low-pass filter which keeps TVI at bay.

All of them consist of a tuned circuit, normally parallel-tuned, but for low impedances it will be found the series-tuned circuit seems to be easier to work. Add to the tuned circuit a link to couple the transmitter, and taps to the aerial or feeders which can be adjusted to choice, and you are in business.

Fig. 10 shows the basic configurations. To get one to go, first arrange the coil to be of such an inductance that a capacitance of $1\frac{1}{2} \mu\mu\text{F}$ per metre of wavelength resonates it as desired. The transmitter is then set up to give its full output into a dummy load of 75 ohms, and the settings then *left alone*; transfer the transmitter from the dummy load to the ATU, and fiddle with the

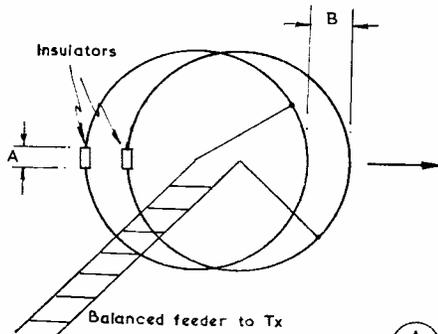


Fig. 9

Fig. 9. Electro-mechanical layout for a compressed aerial of the Reinartz type, which has been proved to be a very good radiator in the direction of the arrow.

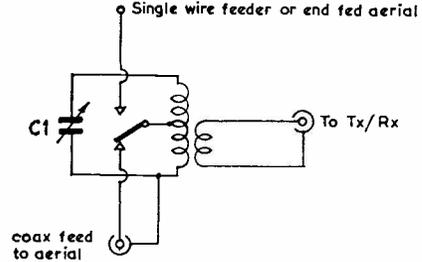


Fig. 10 A

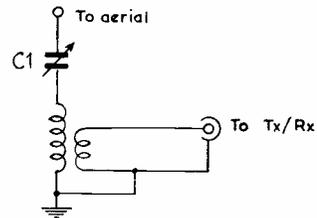


Fig. 10 B

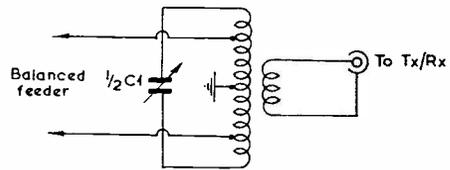


Fig. 10 C

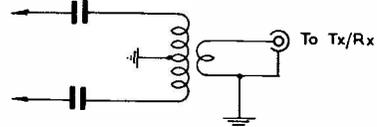


Fig. 10 D

(A 402)

Fig. 10. Showing various ways of feeding and connecting aerials, as discussed in the text. Note that in Fig. 10D the condensers should be shown as variable.

ATU until maximum power into the aerial is obtained at the same anode current and settings found on the dummy load. If any choice in the matter is observed, the aerial or feeders should be as far away from the earthy point of the coil as possible, provided the ATU does not tune too sharply; the need for a slow-motion drive should *not* be felt, even on 28 mc. If the device is intended for multi-band use, it is not a bad idea to note the settings for each band and make labels to show where they are on the front panel, so that there is no need to fumble when a band change is made. Fig. 10A shows an arrangement which will deal with either end-fed pieces of wire or coax feeders by shifting a switch. The point of tapping on to the coil of the aerial connection is variable, the adjustment being as mentioned earlier.

[over

At Fig. 10B, we see a convenient way of dealing with an aerial shorter than quarter-wave. Fig. 10C is a balanced-feeder version of Fig. 10A; the centre-tap can be on the coil, as shown, or may be obtained by making the condenser from a split-stator type and earthing the rotor, or with two capacitors ganged together, taking the stators to each end of the coil and earthing the rotors.

Fig. 10D is the balanced-feeder version of Fig. 10B, to deal with very low impedances presented by the tuned

feeder. Inspection of this circuit will show instantly that it is easier to change the circuit from 10C to 10D if the coil centre-tap is made to earth than if the centre of the capacitor is grounded.

It should be noted that the value of C1 is not too critical; a value of about $1\frac{1}{2} \mu\text{F}$ per metre and the pruning of the coil to suit will be about right. In every case (except Fig. 10A) the capacitor is required to have both sides insulated from ground.

THE MOBILE SCENE

ADDITIONS TO THE RALLY CALENDAR

It is early in the Season for there to be so many Rally events already scheduled—and there may yet be a few more to be notified.

As in previous years, we intend to run "The Mobile Scene" regularly over the next few months, to give illustrated reports on as many as possible of these events. To this end, organisers are asked to let us have the necessary details covering attendance, points of special interest and, in particular, some estimate of the actual number of vehicles fitted /M arriving for the occasion—it would also be helpful (and very useful for record and statistical purposes) if the numbers of mobiles could be given by bands. Because the peak time for any Mobile Rally is usually about 3.0 p.m., any count should be taken around that hour. The talk-in stations' log records are also useful for extracting data of this sort—though, of course, every /M attending does not necessarily get a QSO with the talk-in station for his band.

We would suggest to Rally organisers that some member of the committee should be asked to make it his job to prepare the report and get it in to us just as soon as possible after the event, so that it can be covered in "next month's issue."

Finally, and most important, good photographs are also wanted, of Rally stations, personalities and scenes. By "good" is meant not only good photographic quality but also imaginative posing—and please be very careful about listing callsigns with absolute accuracy! The picture should be accompanied by the descriptive detail on a *separate* sheet, and *not* scribbled on the back of the print itself. All photographs that we can use are paid for on publication.

Mobile Rally Calendar, Season 1968

- April 28:** North Midlands Mobile Rally, at Drayton Manor, near Fazeley, Tamworth, Staffs.—Hon. Organiser, G. V. Farrance, G3KPT, 106 Turnberry Road, Birmingham 22A.
- May 5:** Medway Society's annual Rally event at British Uralite Works, Higham, Kent.—Hon. Secretary, P. Carey, G3UXH, 29 Miskin Road, Hoo, Rochester, Kent.
- May 12:** Thanet Radio Society Rally, at a cliff-top site in Ramsgate, attractions being fresh air, sea and sand, with AM talk-in on 160m., 4m. and two metres.—R. Trull, G3RAD, 1 Approach Road, Broadstairs, Kent.

May 12: Northern Amateur Radio Mobile Society's annual Rally at Harewood Park, near Leeds, Yorkshire.—Organiser, Denis Binns, G3MGI, 80 Gipton Wood Road, Leeds 8, Yorkshire. (Tel.: *Gledhow 426*.)

May 11-12: International Week-End at the Hotel Lido, Rue de Limalart, Rixensart, Genval, Belgium. A big programme has been laid on, of interest to mobiles (but *no* Top Band in Belgium) and their families. Temporary mobile licences for U.K. visitors will be available on request (*before March 30*) to M. le Directeur-Général des Radiocommunications R.T.T., 42 Rue des Palais, Bruxelles I, Belgium. Full programme details, including accommodation arrangements, can be obtained from: M. Freddy Detraux, ON5KP, 42 Rue de Renivaux, Ottignies, Brabant, Belgium.

May 22-26: Second international convention, organised by the Spanish Radio Amateur Union (U.R.E.) in connection with the Saragossa (Zaragoza) Spring Festival. A busy 5-day programme has been arranged, the mobile events taking place on May 22-23. The all-in registration fee is 1,500 pesetas (say, £9 sterling). Address for applications and information: Delegación U.R.E., Apartado 86, Zaragoza, Spain.

May 26: East Coast Mobile Rally, organised by the Scarborough Amateur Radio Society, at the Spa Hall, Bridlington, East Yorkshire, with talk-in on Top Band (G3GBH/A) and two metres (G3PEJ/A).—P.R.O., Major J. E. Agar, G8AZA, 69A Newborough, Scarborough, Yorkshire.

June 15: (*Saturday*). Annual Air Day at Royal Naval Air Station, Lee-on-the-Solent, Hants., (H.M.S. *Daedalus*), with GB3RN of the R.N. Amateur Radio Society providing talk-in on 2-4-160m. Ample car parking facilities, and attractions include a static exhibition of Fleet Air Arm equipment, also a flying display by some of the latest aircraft operating with the Royal Navy. Information and details: Hon. Secretary, R.N.A.R.S., H.M.S. *Mercury*, Leydene, Petersfield, Hants.

June 16: Hunstanton Annual Rally (on the Norfolk coast).

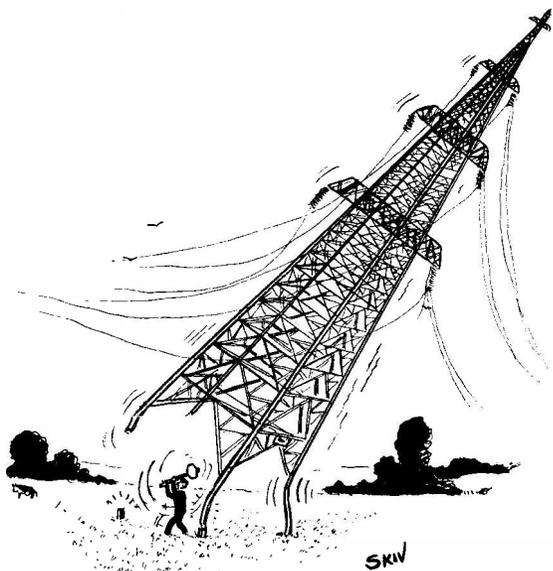
June 30: Amateur Radio Mobile Society's annual Rally, being held as usual on an American U.S.A.F. base, this year at Mildenhall, Suffolk. During Hitler's War, it was one of the operational stations in Bomber Command (No. 3 Group), from which went out first the Wellingtons and then the Lancasters, of immortal memory. Now, it is one of the largest American Air Force bases in the U.K. On this

- A.R.M.S. occasion, entry to the Rally will be on the basis of the purchase of raffle tickets at the gate (in connection with which "better prizes than ever before" are being offered). There will also be a big Trade show (apply F. J. Barns, G3AGP, 60 Alverstone Avenue, East Barnet, Herts.) and the usual A.R.M.S. rally attractions, laid on and conducted with all their usual *aplomb, joie de vivre, sang-froid* and go-go Go.—Hon. secretary, Norman Fitch, G3FPK, 79 Murchison Road, London, E.10.
- June 30:** Annual Mobile Rally at Longleat Park, Warminster, Wilts., organised by Bristol Group assisted by the Bristol Amateur Radio Club.
- July 7:** South Shields Mobile Rally, the ninth in their series, put on by the South Shields & District Amateur Radio Club.—Organiser, Derek Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.
- July 6-7:** Cheltenham Festival Rally, arranged by Cheltenham Amateur Radio Society and local RSGB group members, covering a wide range of tastes and interests, to coincide with the Cheltenham Festival of Music, which for years has been one of England's intellectual occasions. On the Amateur Radio side, there will be competitions, a raffle, and a radio-controlled model power boat display, with camping and touring caravan facilities close to the Rally site. Full details as to the programme, charges and accommodation arrangements from: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham, Glos. (Tel.: Cheltenham 24217, or STD 0242-24217.)
- July 14:** Annual mobile picnic organised by the Reading Amateur Radio Club. Details: L. F. Taylor, 58 Nightingale Road, Woodley, Reading, Berks.
- July 14:** Mobile Rally to be arranged by the Colchester Group, at Colchester Zoo—with "new faces in front and behind the bars!" Talk-in will be by GB3ZOO on the 2-4-160m. bands. Information: V. Levitt, Park Street, Stoke-by-Nayland, Suffolk.
- July 14:** Second Mobile Rally put on by the Worcester & District Amateur Radio Club, at the Hill County Secondary School, Upton-on-Severn, one mile west of the town, with adequate local sign-posting. There will be trade stands, an amateur TV demonstration, model aircraft display, raffles and competitions, with ample cover in case of bad weather. Talk-in will be given on 2-4-160m., and the Rally will start at 2.0 p.m. Details from: R. L. Avery, G3TQD, 24 Alexander Road, Droitwich, Worcs.
- July 21:** Cornish Amateur Radio Club's annual Rally at Pentire Headland, Newquay, Cornwall, with talk-in on 4-80-160m. Hon. Secretary: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.
- July 28:** Saltash & District Amateur Radio Club annual Mobile Rally, to be held this year at Saltash Grammar School, Wearde Hill, Saltash, Cornwall, with the facilities and attractions of recent years.—Hon. Secretary, J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.
- August 18:** Torbay Amateur Radio Society Mobile Rally, at Dartmouth, South Devon.
- August 18:** Derby & District Amateur Radio Society eleventh annual Mobile Rally at Rykneld Schools, Derby, as in previous years.—T. Darn, G3FGY, Chairman and Hon. Rally Organiser, 1 Sandham Lane, Ripley, Derbys. DE5-3HE.
- August 25:** The Swindon Club's annual event at Lydiard Park, near Swindon, Wilts.
- September 2:** Peterborough Mobile Rally, with boat trips on the river and an exhibition stand of antique wireless apparatus. Talk-in station G3DQW will be operating on 1980 kc from 1.0 p.m. Rally enclosure is the river bank car park near the swimming pool, with plenty of free parking space. Ideal for a picnic in a sylvan setting. Information and details from: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.

Closing date for reports and information to appear in the June issue: *Monday, May 13*, addressed "Mobile Scene," SHORT WAVE MAGAZINE, BUCKINGHAM.

WORLD AMATEUR POPULATION

According to the latest statistics, there are now about 440,600 known AT-station operators—meaning listed in some *Call Book*—in the world. The proportions are, approximately, 298,000 in the U.S.A. and 142,000 in the rest of the world. But these figures do *not* include the amateurs who may be licensed in certain Eastern *bloc* countries, notably the U.S.S.R., for which figures are not issued and no *Call Book* listings exist.



"... should stop the noise-QRM on Top Band ..."



SHORT WAVE LISTENER FEATURE

DISCUSSING RECEIVER SELECTIVITY—RESULTS

ON TV/DX—QSL's AND THE BUREAUX—NOTES,

NEWS AND IDEAS—THE HPX LADDER

By Justin Cooper

PERHAPS this time round it would be as well to clear up a few misconceptions on the subject of Selectivity. In a superhet receiver there are two kinds of selectivity; that which discriminates against signals on channels adjacent to the one on which we have chosen to listen, and is thus known as "adjacent-channel selectivity," and the other which provides discrimination against a signal on the opposite side of the local oscillator frequency by the same amount as the wanted signal.

Dealing briefly with the latter first, the "image" or second-channel signal should ideally be about 120 dB down but in practice the figure is never approached—in any case, apart from the marginal effect of ATU's and so on, the matter is determined by the basic design of the receiver, usually varies over the receiver range by a very large amount, and is, in general, greater with a high first IF.

Turning to the adjacent-channel question, this is where a lot of work can be, and often is, done on the receiver by its owner, with fine effect—providing he is quite clear, on the measures needed to produce the effects. Obviously, if we plot a graph of the IF amplifier response against frequency, we want to see a rectangle rising from the baseline straight to its maximum, continuing at that level as far as desired, and then falling straight back to zero. For CW, the range at the top may be as little as a hundred cycles, for SSB a couple of kilocycles or so, and for AM taken in what we may describe for want of a better term, as "broadcast-station style," five or six kilocycles is not enough width for the flat top of the curve, if good quality is to be given by the Rx.

Now, in order to trim up our receiver to more like heart's desire, we have to use some sort of resonant circuit, whether mechanical, crystal or coil-and-capacitor, and at this point we start to part company with our logic. Look at the graph of a resonant tuned circuit of reasonable Q where dB or volts are plotted on the Y axis and frequency t'other way. The general shape and the explanation of the operation are in any simple text on Amateur Radio. Now, clearly, increasing the Q is going to sharpen up the peak, or "nose," of the curve but a moment's reflection will make equally obvious that it is not going to help away from the resonant frequency. However, if the result of passing a signal through two tuned circuits after each other is plotted, a change in the general shape becomes evident—the nose is very much as before, but the "skirts" go down more steeply to a lower value. This is a general rule—a single tuned circuit of high Q (Q-multiplier or similar) improves the nose

selectivity, but several tuned circuits improve the skirts, whether the circuits are coil, or crystal or whatever. Furthermore, if we have a few more tuned circuits than we really need, we can broaden out the nose a little by judicious adjustment of the resonant frequencies about the centre, nominal frequencies.

It is interesting to note that if we have a single crystal, there is nothing whatever we can do to make it more useful for SSB or AM other than that which is achievable by correct operation of the receiver—but if we have a receiver designed for SSB reception, all that is required to make it really superb for CW is an AF filter or Select-o-ject (see SHORT WAVE MAGAZINE, November, 1967), because the SSB selectivity involves very steep sides falling to a very low level, so that the AF filter only has to sort out a suitable tone to choose; always, of course, given that the receiver is driven correctly—and maybe that is a topic for another time!

TV/DX Notes

B. Thomas (Castleford) writes to bring his HPX Ladder entry up to date, and mentions that he has finally erected his mast with VHF and UHF TV arrays at thirty feet, which has already raised the TV score to 19 Countries; incidentally he received the whole of the game between Standard Liege and A. C. Milan on 28 February from Belgium on Channel E10.

On the same day *D. Boniface (Ripon)* found the bands humming, and signals were noted on VHF channels E2, E4, E6, right through to E11; while on UHF, channels 21 to 27, 29 to 34, 37, 39 to 47, 50, 53 to 56, 59 and 62 were all "giving" with TV/DX from Germany, Holland, Belgium, France, distant BBC2 stations, and, in addition, Dublin on Channel 1H. On the technical front, things are also happening, with a Bush TV Rx under modification to give it two, switchable, IF strips of different bandwidths, and facilities for taking the output of various front-end converters as desired into either IF strip.

How nice to hear from *Frank Smales of Pontefract* that he is once again sitting up and taking notice—18 weeks down with bronchitis is somewhat daunting, but the lad is now doing things in the shack with the soldering iron. The three TV receivers used for DX/TV have all had a thorough going-over, and one has a new IF strip along the same lines as mentioned by Dennis Boniface. On the HPX front an entry only awaits the chore of writing it all down, while the HF constructional side has been taken care of by constructing a new double-conversion receiver using ten valves out of the junk box—

all that was bought was the first IF (1.6 mc) transformer. The RF front-end was made up by an ingenious homebrew conversion of a TV turret-type tuner. Turning to the TV/DX results, Frank also mentions the opening on January 28 and 29, when he even took his meals in the shack! On the first day, 21 stations included the rare (in this country) Tele-Luxembourg on E7, the ancient Hanseatic port of Lübeck, and Heidelberg of University fame; the former on E23 and the latter on E7 channels. Of these 21 not one was in the U.K.—a situation remedied the following day, when 26 stations were heard, six being UHF/BBC channels other than the local one, plus ITA Croydon, Mendlesham, Sandy Heath and Dover, nine West German stations, five Dutch, and a solitary French one; all but two positively identified as to station and country. What a day!

Spring—and All That

It seems to have smitten two readers; the first has been so affected by the bug—plus a computer-programming course in London and a change from shift-work to normal hours—that he has signed himself just “Martyn” from Leamington Spa(?).

As for *J. Singleton (Hull)*, he has not made any great advance in HPX, due to searching for a house to move into when he marries in September, and to teaching the YL all about this SWL game. She has an FB location for radio. To both, congratulations and best wishes.

Talking of YL's, perhaps this is an appropriate point to mention one of the “regulars”—*Mrs. M. Worbey (Dartford)* who has been setting herself to the R.A.E. grindstone and hence has been somewhat inactive. None the less for that, a little time was spent on CW, and some 52 prefixes booked in, including Top Band DX by way of W1BB, VO1FB and ZC4RB. In addition to these, DI2LE/MM off St. Helena on his world cruise, 9I3, the special prefix for Zambia; XW8, Laos; and K8/XV5 in Saigon were also hooked.

The HPX Rules

Although these appeared in March “SWL,” on p.30, a couple of incorrect entries came in; the first, from *D. Robinson (Birmingham 24)* springs from a misunderstanding of the construction of an amateur callsign. The actual callsign is “3SWM” for instance in “G3SWM,” while the bit in the front is the *prefix of nationality*. Thus, if one has heard two calls with the prefix G3, such as G3SWM and G3KFE, then only one can be counted as a prefix, although hearing G6FO would give another prefix, because for HPX purposes

SWL's TO NOTE

Next appearance of this feature is in our July issue, due out on June 28. Closing date for all SWL correspondence is Friday, May 24, addressed “SWL,” Short Wave Magazine, Buckingham. Remember also that we are always interested in good photographs of SWL stations (and operators), any that can be used in these columns being paid for on publication—but they must be clear, sharp prints.

the different prefix numerals also count. Knowing this should make clear all the rest in the Rules. Sad to say, reader Robinson, as a result of this slip, has lost enough prefixes to put him below the 200 mark.

I. Hazleton (Burnham-on-Crouch) wants to know how to make an entry to HPX—well, all we can say is simply that Rule 8 seems to cover the situation fairly well, as given on p.30 of the March issue.

Here, There, and Everywhere

Our old friend *Bill Felton* writes in from *Lincoln*, where he is busily preparing for examinations, which means in essence that there is not much hope of getting on the air till later in the year, the time depending to a considerable degree on the rate of improvement of the CW. *J. H. Weiner (Coventry)* uses a 1155 receiver in conjunction with a 110 foot wire, and is quite amazed at the way these war-surplus devices pull in the DX. Jon hopes for an HA-500 or Heathkit RA-1 to appear in the shack later on in the year.

Lucky fellow! *J. A. Ennis (Saltash)* says that his HPX score has taken a lift this time, partly because of the improvement in conditions, but more thanks to an easing of the QRM from work.

Unlucky chap! Receiver playing up, and aerial parted company from down-lead; thus *A. W. Nielson (Glasgow)*, but like the old-timer he is at this game he still managed to snag Aldabra, ZS1, UA9, and a shoal of W6's on the remains.

D. Sapsworth (East Ham) has been giving attention to Top Band of late, and also to the 80m. net on Friday evenings; his score rises to 501.

A couple of new chums to welcome now; the first being *I. Gildersleeve (Newton Abbot)* who is mainly addicted to 28 mc listening. He queries a station signing IØARI, name Rocco, and QTH Catawzaro—could be OK although J.C. has not any direct knowledge.

R. Hodge (Gloucester) has an R.107 and a CR-45 in his station, the latter being mainly used on 21/28 mc. A converter is “in the oven” for these two bands as he finds the latter receiver a bit short on bandspread. The aerial makes use of a tree as a support, the wire having been got over by means of a bow-and-arrow—a technique to which G2YT introduced him. A fine system, but spectacular if the string on the arrow breaks; it once took your scribe a couple of days to find the arrow after such a *contretemps*!

VHF is attracting *T. Bucknell (St. Albans)* who has made himself a five-over-five array and a rotator for it, which are to go up in the near future, after a TV aerial has been removed.

A letter from *Stewart Foster (Lincoln)* is always welcome and not just for its HPX entries at that. Stew mentions hearing a couple of oddball characters in 5AØZZ, and BY2AA. The pair of them one naturally tends to dismiss as phoney—but a nagging suspicion fills the minds of SWL Foster and your scribe that the BY may turn out to be legitimate, so a card has duly been sent off to Box 88, Moscow, like the man said. It remains to be seen whether the thing bears fruit, or just “runs to seed” as it were.

An eventful month is the description given by *B. Geary (Leicester)* of his doings. The events have included

the acquisition of a CR-100, a trap dipole, and a Codar Preselector; while a Codar Q-Multiplier is on order. All of which means Brian has some work to do setting things up and getting the best out of the station.

It is not often your conductor receives a benison for mislaying a score—but one *did* come from *Chris Claydon (Kinghorn, Fire)*, whom as a result of the non-publication of his revised score had to sit down and rewrite his home check-list; but, as he says, it was getting so dog-eared anyway that the new one is twice as useful!

One of the useful items that sometimes appears in surplus is the variometer from the 19 Set; this, as *M. A. Lount (Leicester)* has found out, is very handy as an LF Band aerial-coupler for SWL applications. The gales of late weeks have done injurious things to the Lount aerial system, but doubtless by now all is back to normal.

During the past period *M. G. Toms (Ilford)* has completely rehased things in the shack, with an SR-550 receiver now in use, coupled to an end-fed Vee aerial which has already proved its worth.

QSLs—and QSL Bureaux

I. Cooper (Alnwick) has recently received his first batch of cards from the bureau, after a lapse of six months. This is pretty fair going; one has to realise that the whole point of using a QSL Bureau is the acceptance of slower delivery for the sake of saving postage. Obviously, most of the Bureaux in the world are run by clubs or national societies, by voluntary effort and usually on a shoestring for the benefit of all—so the bureaux themselves will take every chance they have to save expense by letting a batch pile up, for, say, PY, and then sending them in bulk, probably at sea-mail rates. The main snag with the bureaux is not really their fault—the sender cannot know whether the chap at the other end in fact has his own Bureau topped up with envelopes!

Trouble with the receiver caused *P. L. Spindler (Barkingside)* to spend a period off the bands, thanks to an IF transformer which shorted to earth and blew itself up; G3WKV gave great help in getting it back in service again, and the time was used to considerable effect in getting the filing system bang up to date—always a great help in sending out first-class SWL reports.

Talking of QSL's, *A. Hydes (Enfield)* is waiting for one from a 5V in Togo, which Alan feels is doubtful—but we can relieve him of anxiety, as this one is quite OK and has been around for some time now. Incidentally Alan "brought home the bacon" in the December R.A.E., on which we congratulate him.

The two *Plumridges*, father and son, have been doing a bit of swapping round; Keith has acquired a Codar Mini-Clipper, so Dad has now taken over the HRO. The latter is undoubtedly one of the classics of electronic circuitry and mechanical design, and is, when properly set up and operated, capable of standing up to a lot of 1968 receivers.

A technical point is raised by *I. Poole (Leeds)*, who has fitted a BFO in his 19 Set, and wonders if he should decrease the injection achieved by running a wire near the last IF can. Normally one would say "no" instantly to this one, but there is the point that unless the AGC

is disabled and manual RF/IF gain control used, the BFO volts may produce such a bias as seriously to affect the receiver sensitivity.

* * *

That hoary old controversy about Phone and CW crops up again in the letter from *C. P. Davis (Leicester)*. Peter is obviously anti-CW, but equally is a capable CW reader, and to discuss to the full depth his very penetrating letter would take the whole of this piece, and drown us in argument for a year! Incidentally, he is a R.1475 receiver addict, and suggests that if R. Geary of Leicester cares to ring him—*Leicester 455204*—he may be able to help.

Those O-Level exams are looming up for *J. Jenkinson (Oxford)* and will soon reduce his activity on the bands. He is a new correspondent and entrant to HPX, with a CR-100 and a BC-779B, which are mainly employed on Twenty.

Another new entrant to the lists is *B. Gilbert (Aylesbury)* who started way back in 1944 with crystal sets at school, progressing to a much-altered RA-1, which he says "has a definite mind of its own!" The early training was with the GPO, but after National Service in the R.A.F. and a further spell with the GPO, Bernard trained as a nurse, and is now charge-nurse in the operating-theatre of the local hospital. R.A.E. has been passed but progress on Morse is rather slow, the present claimed speed being four words per hour!

* * *

Two more newcomers are next on the pile, and both have 19 Sets on the go; *C. R. Adams (Chorltoncum-Hardy)* seems to be a keen experimenter, and has made various gadgets, both valve and transistor; he claims that all the valve ones have worked first time and all the transistor ones have been a flop! *Neil Whiting (Leeds)* is now on his second 19 Set after the first one expired last year. The present specimen now boasts an internal PSU and output stage, plus a BFO, and rumours reach these old ears of an RF-24 which is to be converted to give HF band coverage.

S. M. Phillips (Dukinfield) has a few Phone prefixes to add to the score but is much more interested in getting the last few to enable him to put his entry in for the CW Table—good show!

Harking back to the hint given last time round by *N. Hembrey (Northiam)* that he was seriously thinking about R.A.E. Norman lets it be known this time that he has purchased the needful books and reckons to make it in about ten years! However, it is reasonable to expect that son *Dave*, who seems to be catching Dad in the HPX list, will apply some sort of goad to bring the target date forward of that.

The home-brewing of beam aerials is not an art practised to any extent by SWL's in this country for some reason, but *D. Skidmore (Derby)* is an exception, having a three-element array for Ten in addition to the 100 footer.

J.C. put his great clumping foot in it last time as far as *R. Allisett (Guernsey)* was concerned, by putting him in Jersey—sorry!—but this time is asked just what gear your conductor uses. The answer to that is simple:

an Eddystone 888 and K.W. Vespa, to a ½-G5RV and a "best bent wire" fed through an odd ATU, the reserve gear being an MR-44 somewhat modified which is made to go alongside a Valiant transmitter. There is of course, the usual collection of miscellaneous test-gear to keep all in going order.

D. L. Hill (Edinburgh) is keen on VHF, for which he has got a converter perking, and CW, for which an HPX entry is soon to come. The UJ5 prefix is a query, which sounds rather like a misreading or bad sending of UJ8.

A long and interesting letter from H. M. Graham (Harefield) mentions that switching on at unusual times is liable to produce unusual results—as when his son went to an away football match and had to be collected at 0400 hrs.; a quick look on the band at 0315 yielded KC4USG as the first signal resolved! Eighty gave an all-time new one for the band in VP2AA.

I. Bateman (Bradford) is a member of Pudsey club, and is hard at work on R.A.E. and Morse, with intervals for HPX'ing on an AR-88D. He queries the status of JX and 5B4—Jan Mayen and Cyprus respectively.

D. S. Henry (North Berwick) wonders about the

suitability of the CR-70A receiver as part of a transmitting station. This is difficult to answer—your old J.C. used to have a single-valve detector as the receiver years ago! Seriously, though, one would feel that the choice of a receiver is a personal thing, which depends a lot on the individual likes and dislikes so that it is difficult to give a firm answer.

The W9WNV controversy has made J. Dutton (Ilkeston) all hot under the collar—so much so that he wrote that it doesn't matter where the DX-pedition is, so long as it signs with a DX call—which J.C. is sure is not what he meant to say!

Also rather steamed up is W. C. Torode (London, W.C.1) who, in effect, wants to know why there are "lids" on the bands. A Very Good Question, Wally!

The first HPX list from R. Schofield (Liverpool) is enclosed with a few "wonders." The IØ and I7 prefixes are OK, but 9Ø4 can only be classed as NG, along with the brace of ZN6 stations heard; probably all three were in fact misreadings. Roy, incidentally is in for A-Levels and the R.A.E. in May.

One SWL often generates another, and in the case of R. C. Waterman (Aberlady, E. Lothian) the essential spark was provided by David Henry of North Berwick; since then Richard has had a lot of help from a couple of licensed types as well.

HPX LADDER

(Starting January 1, 1960)

Qualifying Score: 200

* * *

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
S. Foster (Lincoln)	945	R. Glaister	
A. W. Nielsen (Glasgow)	877	(Haywards Heath)	336
D. Rollitt (Navenby)	874	J. M. Dunnett (Singapore)	326
J. Singleton (Hull)	814	J. E. Jenkinson (Oxford)	324
W. Felton (Lincoln)	770	K. Jeeves (Huddersfield)	322
K. Southgate (Leigh-on-Sea)	765	G. W. Brind	
P. Milloy (Doncaster)	755	(Kingston-on-Thames)	308
C. Squires (Saltash)	738	M. L. Jones	
R. G. Preston (Norwich)	670	(Leamington Spa)	305
T. Pinch (Plymouth)	627	T. J. Bucknell (St. Albans)	302
J. Dutton (Ilkeston)	626	I. Gildersleeve	
G. Bowden (Crawley)	622	(Newton Abbot)	297
J. Fitzgerald (Gt. Missenden)	618	A. Long (Coventry)	290
D. Skidmore (Derby)	611	P. Duvoisin (Witham)	287
S. Swain (Hayling Island)	603	B. Gilbert (Aylesbury)	286
R. T. Jackson (Leigh-on-Sea)	597	D. Richards	
N. Henbrey (Northiam)	584	(Welwyn Garden City)	284
W. Moncrieff (Hampton)	559	H. N. Plumridge (Eastleigh)	283
A. Hydes (Enfield)	554	B. W. Lowe (Worsley)	282
J. P. Scragg (Stockport)	550	H. H. Symonds (Manchester)	278
M. A. Lount (Leicester)	545	D. Stuart (Caistor)	273
Mrs. M. Worbey (Dartford)	533	S. M. Phillips (Dukinfield)	268
C. P. Davis (Leicester)	526	M. Watson	
R. Allisett (Guernsey)	523	(Williton, Somerset)	267
E. Parker (Hove)	502	J. A. Ennis (Saltash)	259
D. Sapsworth (East Ham)	501	R. Bence (Cardiff)	258
A. P. Legg (Sutton)	496	G. T. Theasby (Keighley)	253
M. G. Toms (Ilford)	490	J. N. Weiner (Coventry)	241
W. I. Rees (Llandudno)	488	N. Whiting (Leeds)	235
I. Poole (Leeds)	486	R. C. Waterman (E. Lothian)	232
B. Thomas (Castleford)	472	R. Hodge (Gloucester)	212
W. C. Torode		K. M. Duggan	
(London, W.C.1)	456	(Huddersfield)	211
C. Claydon (Kinghorn)	453	C. R. Adams (Manchester)	209
H. M. Graham (Harefield)	448	R. Schofield (Liverpool)	208
K. Plumridge (Eastleigh)	445	I. Bateman (Bradford)	207
D. Henbrey (Northiam)	406	R. E. Barrett (Manchester)	203
J. Edwards (London, S.E.20)	385		
R. Geary (Leicester)	382		
M. Broadway (Selby)	381		
D. Henry (N. Berwick)	379		
D. L. Hill (Edinburgh)	378		
P. L. Spindler (Ilford)	376		
S. Cusworth (Wakefield)	375		
I. Cooper (Alnwick)	373		
A. Pyne (Budleigh Salterton)	352		

CW ONLY	
C. Claydon (Kinghorn)	530
P. Cayless (Exeter)	457
J. M. Dunnett (Singapore)	436
C. Harrington (Maidenhead)	380
K. M. Duggan	
(Huddersfield)	280
J. Edwards (Penge)	202

From the youngsters to the old-timers—Bill Puffett (Canterbury) is 70 years of age, and has been at the game for a very long time. He can recall the thrill of the first crystal set in 1923, followed by his first hearing of a Stateside station, when the receiver was a single bright-emitter valve. From this progress was made up to double superhet designs, and in the early days, be it noted, Bill even wound his own mains and output transformers. Three years ago, the first commercial receiver was bought, a G.E.C. BRT-402/E which has provided a lot of pleasure both in listening and in modifying it. It now boasts a bandspreading system using a varicap diode, and, to improve the SSB reception a low-pass filter is added between the two AF stages, which gives 3 dB down at 3 kc and 40 dB down at 6.5 kc. The latter is a good scheme which does not seem to have been used much by amateurs.

Sixty feet of feeder unites the Joystick with the receiver in use by R. Bence (Cardiff), who started with an RX60, graduated to an Eddystone 840C, and on to an AR88D. With the latter set-up, VS6DO has been heard on 80m., GM3SVK on Top Band, and KR6SE on 20 metres.

R. Hyde has now moved to Rutland—Oakham, in fact—and hence almost comes into the category of rare DX himself! As the new spot is better provided for in the important matter of space to erect aerials, we hope for great things.

Withdrawing from the HPX List, but not losing interest, is the gist of the note from R. Glaister (Haywards Heath); the reason is quite simple, in that SWL Glaister now operates mainly as a mobile.

A first entry for the Table from P. Duvoisin (Witham) is accompanied by a threat of lower activity for the next few weeks—not unreasonable, as he is in for the R.A.E. in May, and is giving most of his attention to making sure of a pass.

[over

(NOTE: Listings only include recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the Table. Next list, July issue, for which the deadline will be May 24.)

Likewise a new entrant is *R. E. Barrett (Manchester)* who queries I3CTL—a special-activity variety of II, and 8P6BH, also OK from Barbados, among as nice a first crop of prefixes as your old scribe has seen for some little time.

Away in *Singapore*, *Jim Durnett* has become rather disconnected from the *Magazine* as a result of the continued absence of traffic down the Suez Canal, and so his list for last time was a little adrift. An AR88 has joined the R.1475 and HRO, and is, we gather, undergoing restorative surgery at the local R.C.A. establishment. Even before this it had made the job of wrinkling out those European DX stations (!) much easier.

Two "BC set operators" are *A. Pyne (Budleigh Salterton)* who uses another BC set local oscillator to give front-end injection for SSB, but finds that the S9 Europeans wipe out everything for him, and *K. M. Duggan (Huddersfield)* who wants to know of the circuit and details for a transistorised add-on BFO. Dealing with Alex Pyne's problem first, this is probably a result of the BC set having AGC, which should be shorted out and the IF gain (and RF, if there is one) controlled manually by a pot. in the cathode. This, of course will *not* deal with the rough signals! As far as reader Duggan is concerned, may we suggest that anyone with suggestions contact Ken at 50 Thirstin Road, Honley, Huddersfield direct.

It is one of the privileges of the addict of a particular band to permit him perpetually to grouse about lousy conditions; this privilege is taken up by *P. Scragg (Stockport)* about 14 mc in the past few weeks, but he promptly destroys the illusion with a fine collection of new prefixes gleaned from the band, of which something like ten per cent is classifiable as less than rare DX!

* * *

In conclusion, a couple of mentions which may save headscratching later. SM7AX, John-Ivan Winbladh, advises that from March 22, all Swedish *club* stations are going to have SK prefixes, with the exception of those connected with the military, who will retain the SL prefix.

The second takes us up on the three-letter calls mentioned last January, and in particular MTD 54/2 and similar ones; G3HZL advises that the MTD series of calls is allocated to the Royal Naval Auxiliary Service, and three of their allocated frequencies, namely 1875, 3660 and 3710 kc are within the shared amateur bands. The Navy League Sea Cadet Corps have a series such as MAB plus a couple of numbers. The point here is that G3HZL emphasises that such calls are often operated by amateurs in the course of giving instruction and training. Fair comment—and we can only add that the value of such training will undoubtedly prove its worth in the future, apart from the introduction of new entrants to our hobby.

Finally, to all readers of this piece who will be grappling with Subject No. 55 in a very short time—good wishes for good luck!

Deadline

And on that gentle note we wrap it all up for this time; your news, views, and what-have-you will be as welcome as ever for the next piece, addressed as always to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, to reach us on or before **first post, May 24**. Till then, 73, es DX.

SPECIALLY ON THE AIR

Further entries for this space—see p.112 April issue SHORT WAVE MAGAZINE for details—should reach Editor, Short Wave Magazine, Buckingham by *Monday, May 13*, for the June issue.

GB3PRC, May 12: Operated by members of the Pudsey & District Radio Club to provide talk-in on all bands 2m.-160m. for the Northern Mobile Rally, Harewood Park, near Leeds. Special QSL card for all contacts.—M. S. Gaunt, G3WGW, 1 Woodlands Court, Pudsey, Yorkshire.

GB2BVC, May 19: Station to be operated, on all bands 70 cm. to 160m., in conjunction with the Northern Radio Societies Association annual convention and exhibition at Belle Vue, Manchester.—R. M. Clarke, G8AYD, Hillside, Quikedge Road, Mossley, Ashton-under-Lyne, Lancs.

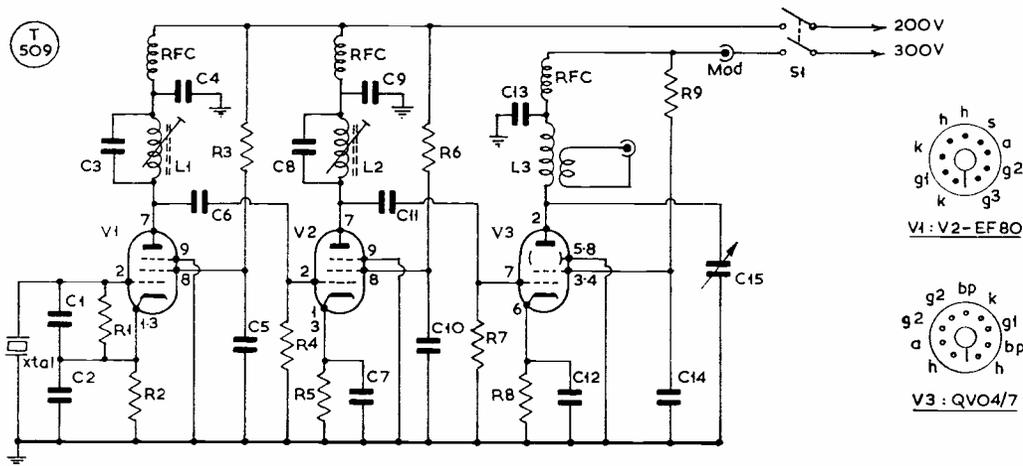
GB3RHE, May 31: Organised by South Shields & District Amateur Radio Club for the Rotary Club Hobbies Exhibition at Gosforth Park Race Course, Newcastle, over the Bank Holiday weekend, Friday, May 31 to Monday, June 3 (excluding Sunday). Activity will be AM/SSB on all bands 10-160m.—D. Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.

GB3LRS, June 5-8: For the "Leisure 68" Exhibition at Granby Halls, Leicester, at which some 36 clubs and societies in the neighbourhood will be represented. At the last such event, in 1966, a total of 18,000 people visited the show. It is hoped to operate GB3LRS, of the Leicester Radio Society, as a typical AT-station.—N. Tomlinson, hon. secretary, Leicester Radio Society, 33 Merton Avenue, Leicester. LE3-6BF.

GB2LO, July 8-20: Organised by the Radio Society of Great Britain in connection with the City of London Festival, using equipment (loaned by K.W. Electronics, Ltd.) to operate SSB only on the 10-80m. bands.—Sylvia Margolis, p.r.o. RSGB, 95 Collinwood Gardens, Clayhall, Ilford, Essex.

GB3NEW, August 5-10: To be provided by the local College of Further Education Radio Society for the Welsh National Eisteddfod, to be held this year at Barry, South Wales. This is the first time Amateur Radio will be represented at this internationally known event. Further details later.—D. H. Adams, GW3VBP, College of Further Education, Colcot Road, Barry, Glam., South Wales.

To ensure a regular copy, become a Direct Subscriber — 45s. post free, year of twelve issues, starting any month.



Circuit of the QRP ten-metre transmitter.

SIMPLE TEN-METRE TRANSMITTER

USEFUL DESIGN FOR THE BEGINNER

It is surprising what little power is required for working on the DX bands when a reasonable aerial is available. The low-power transmitter described here was initially designed for use on the 10-metre band; but with suitable changes to the coils and the selection of an appropriate crystal, it could be used on any of the HF bands.

The circuit consists of a Pierce crystal oscillator, V1, on 9.38 mc, the third harmonic output of which is taken at 28 mc and amplified by a tuned buffer amplifier, V2, which drives the QV04-7 PA. Any miniature high gain RF pentodes can be employed for the oscillator and buffer stages. EF80's were used in the original, but others such as EF91 or 6AK5 would be suitable. The PA could likewise be a 5763 or any other efficient modern type, although the circuit is designed for the QV04-7 specified.

Oscillator and buffer stages can be set up by inserting a meter in the grid circuit of the following stage, and peaking coils L1 and L2 for maximum drive current. The PA tuning is best carried out by means of a field-strength meter, or RF indicator. This can consist simply of a crystal diode connected across a 500 μ A meter with a short piece of wire fastened to one of the connections for RF pick-up. If the meter is not sensitive enough,

Table of Values

The QRP-10-metre Tx.

C1, C6,	R8 = 100 ohms
C11 = 47 μ F silvered-mica	R9 = 10,000 ohms
C2 = 180 μ F silvered-mica	RFC = 1.25 mH RF choke
C3, C8 = 12 μ F silvered-mica	Xtal = 9333 to 10,000 kc crystal, for 10m.
C4, C5,	L1, L2 = 12½ turns, 26g. ena. close wound on 5/16in. former, with iron-dust core
C7, C9,	L3 = 7 turns, 16g. enam. copper, self-supporting, 7/16in. inside diameter, with 1-turn link at 'cold' end.
C10, C12,	
C13, C14 = .001 μ disc-ceramic	
C15 = 50 μ F miniature variable	
R1, R4,	V1, V2 = Mullard EF80
R7 = 47,000 ohms	V3 = Mullard QV04/7
R2 = 2,200 ohms	
R3, R6 = 4,700 ohms	
R5 = 180 ohms	

the other terminal may be earthed—the little finger of your left hand should suffice!

Modulation and Power

The transmitter can be run from the modulator and power supply of an existing Top Band rig. But any power unit capable of supplying about 300 volts at 60 mA will suffice.

Originally, the transmitter was used for low-power experiments on ten metres, to test the capabilities of QRP for local working on this band. However, during good 10-metre openings it has been found possible to raise American stations using this simple Tx and no better than an indoor dipole.

Our regular Book Lists include all titles of general Amateur Radio interest and cover the whole field for specialised texts.

ZC4RB ON TOP BAND

REPORTING SOME REMARKABLE RESULTS

G. C. MOORE (ZC4GM)

WHEN ZC4RB of Akrotiri, Cyprus, decided last September to give 160 metres a try—with no great hope of success—little did he realise that in the space of a few months he would create something of a record for Top Band, as well as achieving some notable "Firsts."

After an inauspicious start, with very little heard and nothing at all worked, the first encouraging sign came on September 27, 1967, when a contact with 9H1AM gave 579/339 reports. In itself this was a good effort, but it was a mere *hor d'oeuvres* for the banquet that was soon to follow!

The first real break-through was on November 4, when ZC4RB had a sked with VQ9JW on Aldabra Is.—he was heard at 239 in Cyprus, but no contact resulted. Later that day, 9H1AE was heard and worked at 599 both ways. A few OK's followed, and then G3VIP was raised, with reports of 559/579. As the days went by, the contacts mounted, and included such DX as GM3SVK (Shetlands), GI6TK, G3TZZ, OE3SPW and other EDX.

Having gained considerable experience and know-how in the technique of Top Band, ZC4RB decided to make an all-out effort for the duration of the CQ World-Wide DX Contest over the weekend of November 25, as it was realised that this would be a period when 160-metre activity would be at its highest.

G/ZC4 SSB "First"

Until now, all contacts had been on CW. On the evening of the Contest, ZC4RB made an early start, intending to have a few QSO's just to let people know he was about. After working some OK's, he heard G3TZZ (London) calling CQ on the key. He was called but went back to another G—and the same thing happened again—with ZC4RB still trying to raise G3TZZ on CW. For some reason, which even now he cannot explain, '4RB then gave G3TZZ a short call on SSB—he came back straight away, still on the key, and then went over to Sideband. The first G/ZC4 SSB contact had been achieved, with ZC4RB giving 5-6/9 and getting 5-7/8! Three more G's were then worked on SSB, followed by GM3SVK, the best DX to date.

Conditions during the Contest were good for Top Band, and the session produced no less than 14 countries in three Zones. (The local Zone 20 was worked on CW/SSB by arrangement with a rather wistful ZC4GM!) TG0AA and several W's were heard at ZC4RB but no contacts resulted with them. The final Contest score for ZC4RB on 160m. was 4,000+ points. When one reflects that the world winner on 160m. last year was VO1FB with a score of 4,156 pts., this is a pretty remarkable effort.

As time went on through the winter, the tally of U.K. counties worked on CW was mounting, and many

W's had been heard, but still without a W/ZC4 contact. The next big date was February 23, when ZC4RB had a sked with G3TFX. Just before sked time, while tuning over the band, '4RB heard an English-speaking operator at about S9, taken to be a shore-station in the U.K.—but it turned out to be G3RXH, and a very solid QSO resulted, followed by more Sideband contacts with U.K. stations.

The Big Effort

With the approach of summer in Cyprus, the local noise level, due to static, was increasing considerably, and ZC4RB decided to make a final, intense effort before the season ended. This produced Sideband contacts with ZB2AY, DJ4SS, DL9KRA, GW3UCJ, GW3SRG and HB9ZE—all new ones, with ZB2AY as an all-time new country on Top Band. At 0230 on February 24, W1BB/1 was heard at 569. As he had previously tried to work Stew without success, ZC4RB asked DL9KRA to call W1BB/1 to let him know '4RB was waiting for a QSO—and the W-barrier was at last broken!

Summary of Results

By the beginning of this April, ZC4RB had worked no less than 183 different stations on Top Band, the breakdown being approximately as follows: U.K., 83; OK, 75; other EU's, 25. These give: *Countries on CW*, 14; *Countries on SSB*, 8; *Zones* 5, 14, 15 and 20; *Continents*, Europe, Asia and North America; *British Counties*, 35.

Gear Used

The equipment in use for all this 160-metre work at ZC4RB was a KW-2000A transceiver throttled back to 10 watts, with a dipole at 90ft. fed through open-wire line.

It is certain that everyone who understands the problems of Top Band DX operating will agree that ZC4RB's performance last winter must rate as a *tour de force* of the highest order.

G3BZU CODE TESTS

Reference the note on p.25 of the March issue of the *Magazine*, we are informed that the Royal Naval A.R.S. station G3BZU will, with immediate effect, run the Code tests on the *first Tuesday* each month, schedule being as follows: 1900 BST on 1880 kc for practice, and 2000 BST on 3520 kc for the qualifying transmissions, at speeds of 20, 25, 30, 35 and 40 w.p.m. We are told that though a record entry of 30 was received for the March run, nobody has yet claimed the 40 w.p.m. certificate! QTH for entries: R/S M. J. Matthews, R.N., G3JFF, R.N. Amateur Radio Society, H.M.S. *Mercury*, Leydene, Petersfield, Hants.

KEELE UNIVERSITY OPEN DAY

Readers in the Midlands may be interested to know that for the University of Keele Open Day on Saturday, May 4, 2.15 to 5.30 p.m., the Department of Communication will welcome visitors. Talk-in will be given on two metres and 160m., using the University's own callsign G3UOK, and among those concerned will be: G3COY, G3PAE, G3RPG and G3USF. The Dept's chief technician is G3COY.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

AS this is being written, with spring well and truly in the air—surely it must be the best time of the English year—one is, as every year, tempted to lock the door of the shack, turn in the ticket, and watch the cricket on a village green. And why not; for life is at its lowest ebb just before the spring starts, and a few days spent watching the transformation will in the long run, surely do more for the “score,” than a great effort on the bands over the spring holiday period.

And what, you may wrathfully ask, has all this pontification to do with the matter in hand? Nothing, unless it be the lingering thought that the absence of HF-band news at a time when a sunspot peak is so near is not unconnected with spring—after all, the heavy mail once again is of Top Band, whose devotees know not of daylight anyway!

Ten Metres

So much for sunspots—only three reporters mention the 10m. band at all in terms of actual QSO's, and as far as your scribe is concerned there is only one word applicable—*rhubarb!*

G3NOF (Yeovil) opens the batting with the opinion that the band is definitely down on the equivalent period last year; sometimes, nary even a W all day, on others only West Coast stations audible all afternoon, and whereas last year VK/ZL were coming in over the long path around 2200z, not a peep has been heard of them this year. However, a few hits were registered, by way of PY's, CE0AE, and all W call areas, including K7HUJ, W7DLF, WA7HLD, and W7IRZ, all in Arizona.

It was rather amusing to read G2HKU (Sheppey) congratulating the *Magazine* on sticking to the well-known units for cycles per second—thanks!—but in fairness to the folk who thought up the present grotesque nomenclature it has to be said that they had no gripe about “megacycles per second” but with plain “megacycles” which is

meaningless without specifying the time unit. *Our gripe* is that, accepting their argument, the cure should have been to beat people into using the unit correctly, rather than devise another which panders to laziness and sloppy thinking by saying a megahertz equals one megacycle per second—wonder what would happen if some bright spark tried to decimalise the unit of time? However, it was 1500 GMT in each case when Ted rang the bell with VO1AW, ZS5QU, ET3USA, and 5H3KJ.

An explanation of the conditions can be found in the sunspot count, and here G2DC (Ringwood) comes in. The predicted figure for March was 115, but G2DC says it was as low as 92.4, topping the hundred mark only on the first two and last nine days of the month; between the 5th and 17th it never rose beyond 89, and on March 7 the figure was down to 52. As for April, at the time of writing it rather looks as if this state of affairs is continuing.

A move up in the Tables resulted from a QSO by G3DO (Sutton Coldfield) with VQ9JW on Ten; in addition ZD7DI, 5R8DX, and ZS9L were worked, again all around the 1500 GMT period.

Fifteen Metres

Here the picture does not seem much better. G2HKU hooked a couple of new countries in the shape of VQ9B (Seychelles) and 9J2VB, plus VK4ZB, all around 0900 GMT, and heard JA1LYZ, the mode in each case being CW.

G3NOF damns 15 metres with faint praise; in the mornings a few VK/ZL and VS6's were heard, albeit weakly. Contacts were made with the usual East Coast W's plus a few W6's, and elsewhere MP4MAY, and 9V1OV.

This patchiness is likewise the theme of G2DC, who also refers to the odd good morning on which the VK's, ZL's and Far East stations have been workable between about 1100 and 1140z, although Jack raised nothing of great interest himself.

By far the longest list comes in from our 21 mc specialist, GM3JDR (Golspie). CW netted him CT2AA, CR7BN, EA8FJ, FH8CF, I7RUI, JA's, KZ5JO, LA2MA/MM (when near CR7-land), LU1EVG, LU7AU, PY1CPC, PY2SO, TI2LA, TR0PF, UA9's, UA0KFG, U18's, UJ8, UH8, VK3AZY, VP7DX, VQ8CC, VS6FX, VU2JA, VU2VZ, all W call areas, YV, ZC4GM, ZE1CY, ZL, ZS's, 5N2AAF, 5H3, 5Z4, 6W8BF, 8P6BU, 9J2, and 9Y4. This is augmented by an SSB list almost as long, with CR6FH, EP2DA, G3BID/6W8, G3RTU/4X4, HB0LL, HR1KAS, HR3AC, I9RB/4U, JA's, KR8EA, LU, PY, LX1DB, MP4MAY, OD5, OX3, TJ1AL, VK, assorted rare U varieties, ditto W's, YN1GLB, ZD3, 5, and 7, ZS5DRC, 4S7PB, 5H3JL, 5Z4AA, 9H1BD and 9X5MW.

This SSB lark seems really to have got into the bones of G3IGW (Halifax). Quite a proportion of his contacts this time are in this mode, including, on 21 mc, MP4MBC and YS1XEE, who should have cards for him routed via WB4BOJ. Ownership of a K.W. Vespa II is the reason for the sudden change of heart—and a very good reason it is, at that.

Only one station is considered worthy of mention by G3DO—9Y4VT, worked about 1900 GMT with QSL to W0DJZ.

Good Old Twenty

Even in the doldrums the 14 mc band usually stumps up with *some-*

ALL-BAND ZONES AND PREFIXES TABLE

Starting date: January 1, 1968

Station	Zones	Prefixes
G3LZQ	38	158
G3SED	24	110
G3IDG	18	52
G3WJS	15	160
G3AAQ/M	15	116
G3VPS	7	95

thing and, of course, the mail shows it up directly in the size of the clip.

The morning period, from 0700 to 0830z has been of most interest to G2DC. Jack mentions KX6ER, EAØTU, VU2DIA (who peaks about 1100 to 588, but is usually engrossed in W's), UA1KAE and ZL5AA (both in the Antarctic), and 4A1WS and 4A1EK, both the latter being in Mexico City using the special prefix allotted for the Olympics.

Don, G3NOF, found the band gave him most of the interesting QSO's during the period under review. Early mornings have shown quite good conditions to VK and ZL, with many S9 signals. Evenings have been pretty fair as well. Contacts with the following are mentioned: AP2MR, CE9AT, CEØAE, DU1FH, FG7TI/FS7, HPIJC, K7YWZ, KG6AAY, KL7USA, PJ5MM, PK1SH, TG9EP, VK's and all W call areas. Gotaways were FK8AB, FO8AB, FM7WO, VR6TC, 9N1MM and KG6IF.

Twenty for G2HKU seems to have been a matter of early mornings and late evenings. CW yielded VK8NO, VK3GA worked in the morning, and HK3RQ, 9Y4RA, FG7TG, YV5AE, ZD8J, FM7WO, PY, LU, OA, all heard around 2300. SSB produced the regular contacts with ZLAGT,

ZL2KP, ZL3JQ and ZL3SE, while the "heard" list comprised KG6ALY, KL7DNC, ZP5JN, KC4USA, all in the mornings, with VP2AA sometimes S9+ around 2200z. Another one of interest was W2ZXM/MM, trying out a new SB-101 somewhere in the Mediterranean.

G3DO was justifiably pleased to hook K8NHV/XV5 for a new country both on the band and for all-time. Also heard was KH6EDY in Kure Is., around 0700. For chasers of *counties* of America, Doug mentions the County Hunters Net which appears on 14336 kc at 1800z onwards, and often produces the odd new country.

SSB was the only mode used by G3IGW to work his stuff, and it did the trick with HRIKAS (QSL via VE1ASJ), VP2MW, whose QSL address is Box 274, Montserrat, and YS1AG.

After all that shouting about the LF Bands, G3WJS has deserted them, and Dorchester now resounds to the noises of DX being worked or escaping. Assorted W's, of course, VE and VO, PY and LU, EA, EA6BD, ZB2A, and ZB2BF, ITI's, PX1KT, 3AØEJ, UV9AH, UW9FS, UL7KKB, YA5FC, UAØTN, UAØCF, plus G6ZY/CN, all made a

violent but nonetheless delightful initiation into the mysteries of Twenty.

Testing out the NFD rig is as good an excuse as one could need for a spot of QRP operation on 14 mc, and this is just what GI3WSS (Holywood, Co. Down) has done. A crystal-mixer arrangement to a TT-11 PA and an indoor dipole were the ingredients in the tests, which appear to have yielded 569 from WIAH and quite a few surprised reactions to the signal strength from the Europeans.

G3WZD (High Halstow, Rochester) enquires as to the status of a thing signing QQ7A, and about the SK callsigns. Easy—the latter is OK; effective March 22, SK calls are given to club-stations, other than the SL ones which are retained by the military chaps, according to SM7CRW, to whom our thanks for the information. As for the QQ thing, Heaven only knows what activates it—but unless your scribe has become disconnected wholly from reality it is not an amateur callsign but a pirate or an intruder. Has anyone any knowledge, please?

Liverpool must be a busy place if G8DI is anything to judge by—he has been hit by pressure of work, absence of teachers and a bus strike, quite apart from the necessity for putting up a Hy-Gain 18AVQ and testing it. As a result of all this, activity was somewhat low, but on the other hand HV3SJ and YK1AM were both new ones, the latter being very prompt indeed with a card direct. A recent contest resulted in QSO's with several old friends such as 9J2BC, 5N2AAF, 5Z4KO, VS6FX, 5Z4KL, ZL1AH, 9H1R and 9V1NV.

Nice to hear G3NMH (Swindon) back again, and to receive a long letter on twenty-metre doings. A new one for him was CE9AT, with VE3IG in close attendance. At 2326 Hal was first on frequency, and at 0010 VE3IG was still picking up the stations on the frequency, no attempt at QSO's having resulted. G3NMH comments that to call QRZ for that length of time without attempting to work anyone is surely far and away slower than the "QRZ as and when required" ploy. To that, E.P.E. would add a rider to the effect that the whole business is about as sporting as shooting at a sitting bird; when all stations can put a signal into all parts of the world, and queueing is

SIX-BAND DX TABLE
(All-Time Post War)

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc
G3DO	334	188	230	327	90	83	9
G2DC	335	169	306	327	163	108	20
G3NOF	310	151	201	294	34	39	1
G3LZQ	238	116	146	188	70	37	8
G3IAR	192	81	125	171	64	56	—
G3IGW	204	123	152	167	122	86	42
G8DI	186	80	132	163	77	46	8
G3VDL	130	45	93	95	45	22	—
G3MDW	115	46	66	82	20	15	7
G3PQF	134	78	41	60	82	49	8
G3SED	85	2	18	55	38	32	37
G3IDG	119	69	85	54	27	19	11
G3WJS	48	—	—	38	21	35	9

Note: Placings this month are based on the "14 mc" Column.

universal, there will be no essential difference between working the DX and lining up to pay out of a supermarket; and the end-result also the same in the form of a piece of paper which says what the date was, where it was, and some numerical data. It is a far cry from the chase as it used to be known, and while it gives the addicts great pleasure, there is no doubt that it has degraded operating standards enormously; and it has done this because it has removed the essential parts of the QSO from the control of the participants into the hands of a third party, sometimes with the effect of reducing enormously the QRM, but as often as not increasing it and raising grave doubts as to how many of the "QSO's" that result were genuine. But back to our subject, and to G3NMH, who raised VP8JG (Chris, G3UAU), 8R1S (who wrapped the S-meter round the pin), ZL4BO, VP8HZ, CE0AE, VP8IE, VP8JN, 7X0AH, 4S7PB, 9M2NF, UA0AI, HK5AZA, TL8DL, VP2LA, TR8AG, ZD7DI, 9V1NP, JW2BH, HR6EB, VR3DY, XE2YP, 5U7AN, VP8DJ, ZL4BO and 7P8AR. Not a bad little haul for one band; Hal has not made any mention of the other channels in his letter.

And that, gentle folk, wraps up the story as far as the HF bands are concerned. We now have the three LF Bands to consider, and here it is to be said that even though the HF Bands have not come up to expectations, Eighty and Forty have not been seriously combed through by many people during the past month, and, indeed it is only in two letters that any serious reference is made. G3WJS (Dorchester) has acquired a QRO CW rig, which loads very nicely into his 80-metre wire but has not as yet given any new countries, albeit 4X4, UA9's, DJ6LI/LX, and a crop of East Coast W's have been booked in. On Forty, the picture was more melancholy—just one QSO, with K3KGF in Delaware telling him the old transmitter was u/s—lucky he had the new one!

G2HKU worked VO1AK, F9VN/FC as a new one on the band, on



Station CR6BX, operated by Jorge Rego, P.O. Box 2163, Luanda, Angola, Portuguese West Africa—one of the more settled and controlled areas in that turbulent part of the world. He is the leading DX operator in CR—where there are nearly 200 amateurs licensed—and is usually one of the first African stations to get through in the pile-ups.

CW, also heard UH8DU and MP4BEU, with SSB from CN8AW and 9M2NF.

Top Band

Here, for a change, the news is quite spectacular, with rich rewards being reaped by the tough chaps who specialise in DX on 160m. Conditions, of course, are far from ideal at the peak of a sunspot cycle, and it is quite remarkable how the erratic conditions have been taken care of.

Let us start with G3IGW. Mike has a few comments to make on the band over the season in terms of the Grafton Contest, when things were just about as bad as could be, to absolutely superb—the night when a genuine 5Z4 came back to his CQ! SSB yielded ZC4RB, who must appear in darn near everyone's log by now (except that of your conductor) in his efforts to hook as many U.K. counties as may be while the going was good—see article on ZC4RB in this issue, p.160. And

on CW G3IGW had 5Z4LE and EP2BK/MM.

G3SVK/A (Oakham, Rutland) chimes in at this point with the information that EP2BK/MM is none other than Bob Snyder, of 9V1LP and W0GTA/8F4 fame. By the time this is in print Fred will have taken a little stir at the pudding with his trip to Huntingdon; as he says, the county interest is definitely on the upswing nowadays.

In the way of real DX, possibly the biggest news is that VK5KO was peaking 449 in London at 2040z on March 23 at G3TZZ, who had a QSO, while Fred himself heard the VK on the 30th at 2050 in Rutland, peaking 339, although, at the time of writing, he did not know whether he had, in fact, made a QSO for certain.

Another to have delighted many hearts is 5Z4LE, who at times was better than 569, the level at which G3SVK/A exchanged reports. Add to that ZB2AY, ZC4RB and, on the counties tack GM3NWL/A, who has been putting life into the band from Ross-shire.

As regards countries G3SED (Portsmouth) mentions VP2VL and PZ1AH. Mike is doing his best to get VP2VL to listen around the G

Reporting the HF Bands

area of 1825 kc. G3SED tried a QSO by calling him on 1806 kc and told him, as did several W's, how many were calling him on 1825 kc, but he refused to listen! Frequency to look out for, and transmit to, PZ1AH is 1827 kc, who will be on every Sunday morning 0430 till 0600z, on watch for U.K. stations.

From W1BB and his admirable news flashes, as well as G3SED, we have mention of the proposal to try JA/EU tests next season; and a hint that the likely time would be around 2100 to 2200z. All those interested to contact JA3AA as soon as possible.

On a slightly different tack, when we mentioned that W1BB was off the beam in saying only four WAC had been made on Top Band, it transpires he was talking about the W's; and in clearing the record, Stew says he would like to know just how many G's have indeed made the WAC grade. Just step forward, and leave it to your scribe to count heads and pass on the gen. to W1BB. But we are prepared to lay a small bet that there is no one who can even

approach the W1BB country score—he only wants one more for the century, since 5Z4LE gave him number ninety-nine!

At a more parochial level, there are the county-chasers, with aerial systems usually that cannot match the Big Boys; but they still have their fun. G2HKU says that when he worked DL9KRA the latter was S9 when DHJ was a mere S4; also worked were GM3UVK and GM3PPJ, (in Ayrshire both), GM3IAA, GM3EOJ, G13XGI, OE2JG and DJ7YR. On SSB, ZC4RB was notable for the speed of his QSL, and there were also PAØPN and PAØBRM.

G3WJS complains that his average report on the band is 459, suggesting he is not getting out too well, but rather spoils the tale by mentioning QSO's with PAØBRM, EI9D, GD3TNS, GM's, G13FFF and GW3HUM on Anglesey. Up in Glasgow, GM3UVL is temporarily QRT—but fully occupied building a transmitter—and so merely reminds all and sundry that he still requires Merioneth, Sark and Guernsey for the 98 worked, and five QSL's to bring the "worked and confirmed" total into a state of balance.

Another one with a shorter than usual report this time is G3VLX (Sidcup) who has been off the air owing to his XYL being under the weather, but he managed G3BRV (Huntingdon) and G3JYF (Cornwall) to keep scores rolling along. G3WUD goes up a couple in Countries by way of EI and ZC4RB, with Roxburgh, Oxford, Londonderry, Anglesey, and Ross and Cromarty as new counties.

Little activity on Top Band is reported by G13WSS, who is spending much time cogitating over ways and means to obtain a better aerial and earth system, which rather looks as though he is going to have to extend a long wire over the roof-tops. The lack of activity has not been all thought, though; there has been the pleasure of beginning to see the cards coming in, with no less than thirteen more confirmations, to bring the total up to 39.

Contests

The Ferrie International Competition is organised by REF in memory of Gustave Ferrie, and runs from 1201z May 25 to 1800z May 26, all bands 3-5 to 435 mc. CW and Phone

are allowed, and contacts may be made once per band in each mode, providing there is a gap of fifteen minutes minimum between the two QSO's. Call "CQ Test Ferrie," and exchange RS(T) plus a serial number starting at 001 for the first contact. One point per QSO, plus ten points per band worked, plus ten points for each mode used on a band. Logs are to contain date, time in GMT, band, contest exchange each way, and have each contact for which bonus points are claimed underlined. Send them, before July 1, to REF, BP 42-01, Paris R.P., France. Each participant will receive a commemorative card, and the winner in each country will receive an award.

April CQ gives full details of the rules and scoring of the USSR DX Contest, running from 2100 May 4 to 2100 GMT May 5, logs for which go to Central Radio Club, Box 88, Moscow, USSR.

The OZ-CCA CW Contest is, like the Russian affair, a worldwide one. CW only, 10 to 80m. bands. Swap RST plus serial number starting from 001. Score three points for each completed QSO, or six if the QSO is with OX, OY, or OZ stations. The multiplier is the sum of the countries worked on all bands, with call areas of W/K, VE/VO, PY, LU, VK and ZL each counting as a country. The final score is the QSO points times the sum of all the multipliers. Logs, with a summary sheet and signed declaration of observance of the rules and acceptance of the decision of the Committee, are to be mailed to EDR Contest Committee, P.O. Box 335, Aalborg, Denmark, with an IRC for the Contest Results, before June 15.

The DX Mail

GM2HIK writes in to pass the word to everyone that he is now settled down and holding the call VK3ET at 18 Kauri Grove, Glen Waverley, Victoria 3150, Australia.

From 9M2NY/9V1NY comes a long and chatty letter which was sparked off by a picture over this piece last time, and a slight slip in the caption; however, much more germane to this column is the fact that he looks after the Outward QSL Bureau, and has nearly 1,000 cards for ex 9V1, 9M6 and 9M8 callsign holders! In particular he mentions 9M6JP, 'AP, 'DH, 'KS and 'LR,

TOP BAND COUNTRIES LADDER

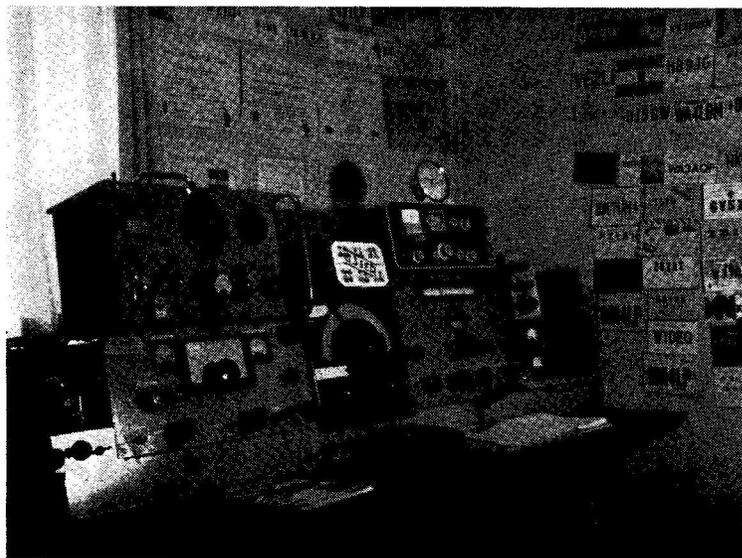
Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NJ	98	98
GM3UVL	90	95
G3VYF	86	88
G2HKU	76	78
GW3PMR	72	78
G3WDW	55	80
G3SVK/A	?	68
G3IDG	55	59
G3VTY	54	86
G3WQQ	41	60
G13WSS	39	59
G3VLX	37	61
G3WJS	17	49
<i>Phone only</i>		
G2NJ	96	96
G3VYF	73	78
G3MDW	57	73
G3PQF	14	42

(Failure to report for three months entails removal from this Table. Claims may be made at any time.)

who all are out of touch—so if any of them should see this, please contact Rex Williams, 9V1NY, Officers' Mess, RAF Seletar, c/o GPO, Singapore, with instructions for disposal, lest their cards regretfully end up in the "laugh and tear up" category, to the chagrin of their senders. Rex also makes clear the validity of the PK callsigns, but is rather cross since the QSL from PK8YAK for a QSO from 9M2NY came back addressed to the home call 9V1NY.

Pressing on again we have a letter from VQ9HB (Mahé, Seychelles) which kicks off by questioning the validity of certain calls which have recently been heard around there. 'Twould seem that, until the Administration gets round to doing something about the BIOT area, callsign-wise, the VQ9 prefix, issued from Mahé is the only "good" one. In addition there seems to be some doubt as to when Nelson Island first became part of the BIOT.

On more pleasant matters, Harvey mentions the exercise of getting to Farquhar. He and VQ9B will be off sometime after April 15, which is



G3SED, Mike Devereux, 15 Severn Close, Paulsgrove, Portsmouth, Hants., is well known on Top Band as a very successful DX operator. However, as he says, he also has gear for the other bands—on which he is equally active—and much of it is home-built, apart from the K.W. Vespa Sideband Tx and the CR-100 receiver. His aerial is an all-band inverted Vee, resonated against a large earth mat.

TOP BAND LADDER

(G3V-- and G3W-- stations only)

Station	Counties	Countries
G3VMW	95	19
G3VGR	94	16
G3VYF	88	19
G3VTY	86	13
G3VLT	80	16
G3WDW	80	8
GW3VPL	78	16
G3VMQ	73	15
G3WUD	66	13
G3VMK	63	17
G3VES	63	16
G3VOK	61	15
G3WQQ	60	12
G3VSL	60	11
G3VLX	59	9
GI3WSS	59	9
G3WDG	52	8
G3WJS	49	9
G3VPS	48	12
GW3WWN	41	6
G3VWC	34	7

"officially" the date when the cyclone season finishes. It is rather a sobering thought that the vessel in which they will probably travel left Mahé last July for the Amirantes, got lost, and turned up five weeks later at Dar-es-Salaam, whence Harvey eventually had to go and fetch it—so it pays to be hot on the navigational side. Incidentally, Harvey mentions that ARRL are now applying the requirement for "proof of presence" and proof of a genuine licence—he had to provide this evidence after his Desroches exercise in January last.

Miscellany

As and from February 22, the callsign G3TBL has been dropped in favour of G3NSI, his father's old call, with the permission, of course, of the licensing authorities. Norman points out that although his father was a Top Band addict, he himself operates mainly on 80 metres, and he hopes his old friends will take note of the change in his callsign.

G3OVC writes to say that he is receiving cards from here, there and everywhere "confirming" contacts on Eighty, Twenty and Fifteen, CW/AM/SSB and even /A operation.

The real G3OVC operates Top Band, Ten and Two, entirely mobile and has no fixed station gear at all!

Region 4 of the IRTS will be running a DX-pedition on the first three days of June to Bere Island, signing EIØRF, with Swan 350's on Forty, Twenty and Fifteen. QSL manager for the whole affair will be EI2AW. This exercise is rapidly becoming a feature of the Region Four year—but they will soon be scratching a bit for islands to go to!

Aboard the deep-sea motor tug *Englishman*—currently towing an old tanker out to Hong Kong—the radio officer is G3WAX of Lytham, Lancs. He had hoped to be /MM on this trip, but sadly the station could not be passed in time. He hears all sorts of interesting things *en route*, but, oddly enough, not as many G's as he would have expected.

Reading between the lines of G3IDG's letter, one suspects that Allan had dropped a transmitter on his toe a few minutes before! The absence of the Zones and Prefixes Table is easily explained—the presence of much news—which makes things rather difficult when the allotted space is taken too tightly. Allan makes a valid point though,

when he mentioned that from July 1 the GPO will only accept, for postage at the lowest rates, envelopes that fall between $3\frac{1}{2}$ by $5\frac{1}{2}$ and $4\frac{3}{4}$ by 9 $\frac{1}{4}$ inches. The thing to remember here is the fact that the sort of envelopes used for QSL's can easily fall outside these dimensions and so qualify for the higher rates. Be warned!

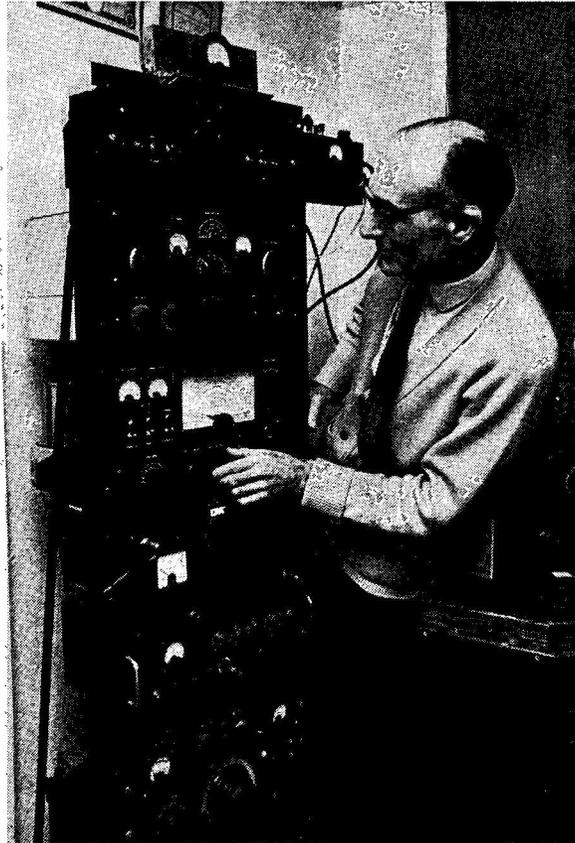
Among the letters for our "New QTH" page, one from G3XDA (Peterborough) who is sixteen and has played radio for five years. As for gear, there is AM/CW tackle for Top Band and the HF Bands at full licensed power levels, with an SSB set-up on the stocks, and partly completed. On the receiving side there are three to choose from, an SP-600J, R.107 and R.1155. The shack is a caravan, and the aerial at the moment a 180-footer at 25 feet.

Finally, a note about the DX-pedition to Brunei. This will come off for a week in late May or early June, signing VSSRCS, on all bands 10 to 80 metres. The operator will be Dennis Bowden, 9M2NF, and the cards go to WA6VVJ, 1628 151st Avenue, Amityville, New York 11701.

Deadlines

And there it is for this month. Your news and views are welcomed as always, posted to arrive by **May 13**, addressed to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. Till then good hunting.

Readers in distant places, and those who keep in touch by airmail, might like to note that forward deadline dates for this feature are June 10, July 8 and August 12.



It is not very usual nowadays to see an amateur station constructed on the rack-and-panel principle—though in fact it can be neat, handy, convenient and economical of floor space. If the rack is properly constructed, on castors with the heavy units on the lower decks, it is both stable and easily manoeuvrable. The assembly shown here is that at G3AGN and operated by C. J. Curtis, 58 Queens Road, Felixstowe, Suffolk.

Courtesy "Felixstowe Times."

NORTHERN RADIO SOCIETIES ANNUAL CONVENTION

A consortium of the radio amateur Clubs and Societies in the north-west of England—called the Northern Radio Societies Association—holds an annual exhibition and convention at Belle Vue, Manchester, and is now a well-known event. This year, it is to be on Sunday, May 19, with the Assistant Chief Constable of Manchester to perform the opening ceremony at 11.0 a.m. The local club groups will have their own stands, there will be attractions such as a colour TV demonstration, A/TV by local amateurs, and a row of trade stands. For many people, it is only at an exhibition like this that they have the opportunity to see the advertised commercial equipment. For general information and stand details apply: R. M. Clarke, G8AYD, Business Manager,

Northern Radio Societies Association, Hillside, Quick-edge Road, Mossley, Ashton-under-Lyne, Lancs.

LATEST INTERNATIONAL "CALL BOOK"

The U.K. section of the Spring 1968 edition of the *Radio Amateur Call Book* is the most up-to-date listing of licensed U.K. amateurs available. Running to 45 pages, it includes all QTH's and changes of address as published in the "New QTH's" feature in SHORT WAVE MAGAZINE up to and including our January, 1968, issue, together with the earlier notifications received by us for February's "New QTH" page. And, of course, this edition of the *Call Book* also covers the rest of the world outside the U.S.A. Price of the "DX Listings" section of the *Call Book*, as this edition is called, is 42s. 6d. post free, available from stock. Orders, with remittance, to: Publications Dept., Short Wave Magazine, Ltd.

VHF BANDS

A. H. DORMER, G3DAH

ANOTHER disappointing month as far as conditions and activity on VHF/UHF are concerned. There has been no good Continental opening on any of the bands and even inter-G contacts have been difficult to make and maintain due to prolonged and deep QSB over unstable paths. On Two, best DX from G3DAH has been with G3CCH (Scunthorpe), G3VNQ in Southport and GW3RBM in Wrexham, Denbighshire. Incidentally, '3RBM mentions that there has, as yet, been no request for skeds in spite of his offer, published last month, to come on at almost any time and give a QSO with that county. It cannot be that Denbighshire is all that easy, and with the reintroduction of the VHFCC Certificate, details of which are given below, here is an opportunity for many which seems too good to miss.

It was good to hear many G8/3's on Two so soon after the announcement of the change in the licence regulations. The activity level would have been even more abysmal but for their enthusiasm and intelligent anticipation, to which the four contacts with G8/3 stations on the Friday night of the announcement gave ample witness. We are now more in line with Continental countries who have for long permitted

Phone operation by holders of restricted licences on Two Metres and Seventy Centimetres, with beneficial results both inside and outside their boundaries.

The highest level of Four Metre activity, coinciding with a slight lift in generally mediocre conditions, appeared on Sunday, April 7, with North/South contacts predominating. G3RLE (Cleckhampton) was a very good signal in the morning but got away, although G3DGI (Sheffield) and G3RIR (Kenilworth) were both worked at good signal strength before midday and G3OHH (Mow Cop) was booming in on Phone just before midnight.

Seventy has been very quiet, but then this was not entirely unexpected with the opening of the Two Metre band to B-Licence holders. It is to be hoped that this diminished activity is only temporary, although several G8/3 stations worked from here stated that they have so "cannibalised" their 70 cm. rigs in order to get on Two quickly that there is little chance of hearing them back on the higher band for some time to come. From *some* of the extraordinary noises to be heard on Two, the mere transfer of an antenna and modulator to the 144 mc exciter stage does not appear, in every case, to be producing quite the expected results! However, we obviously have a keen set of chaps here, and the additional Two Metre activity is very welcome. It seemed a little strange to work three G8/3's last week and find that they had never been on 70 cm.

Barometric charts for the month show a dreary and persistent level of low pressure over most of the country and this has been reflected in conditions generally. As this is being written, April 10, the barograph is showing 1038 mB, the highest reading for the last few weeks, and there are slight indications of a minor lift to the South, but GB3GW is still only just audible in Herne Bay and contacts over one hundred miles are subject to deep QSB. It is possible that, even though pressure is high, the humidity is too low to produce good VHF tropospheric propagation.

VHFCC Certificates

As indicated last month, VHFCC Certificates are being re-issued with such changes as are necessary to

reflect modern practices. There will now be three separate Certificates to replace the single one originally awarded to operators working one hundred stations on frequencies above 50 mc. These new Awards will be available to operators who provide satisfactory evidence of QSO's with one hundred different stations on one of the three major bands—Four Metres, Two Metres or Seventy Centimetres. Application can, of course, be made for more than one band if the required number of contacts has been made.

You are *not* required to send *any* QSL cards with your claim, just a list of stations worked giving call-signs, date and time. This list will be checked on receipt and you will be asked to send two or three QSL cards for verification purposes. If all is in order, these will be returned to you with the Certificate. Claims should be addressed to "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, and sent in forthwith.

No Tables will be published this month as there are insufficient claims in at present.

VHF Converters

There seems to be some misunderstanding among newcomers to the VHF bands concerning the performance of converters at the higher frequencies, particularly as far as noise figures and cross-modulation are concerned. The limiting factor in the reception of weak signals on the HF bands is the noise coming in on the aerial, whether this be locally generated or atmospheric noise. Reception of weak VHF signals at quiet sites is limited mainly by the noise generated within the receiving apparatus itself. A very simple test can demonstrate this. Tune to a frequency a little below 30 mc where no signals are being received. Turn off the AVC and advance the gain control until noise is heard. Now remove the antenna. If your receiver is working properly, the output from the loudspeaker will drop to negligible proportions. Now do the same test at VHF. It will almost certainly be found that there is little change in the noise level and this indicates that most of the noise at those frequencies is generated in the receiver, or converter, itself. If you want to do precise measurements, you should terminate the input to

the converter with a non-inductive resistor of the same value as the input or antenna impedance, that is 50 or 75 ohms, and make the noise measurement before proceeding with the remainder of the test. From this simple check the conclusion can be drawn that for the most satisfactory results every effort should be made to ensure that the front end of the receiving set-up introduces as little inherent noise as possible. Although this is true, there is small advantage to be gained in carrying the process too far.

There comes a point beyond which it is neither practical or necessary to go. For example, a good, modern FET converter for Two Metres will have a Noise Figure of about 2 dB. Any improvement on this figure will be either technically complex and therefore expensive, or will be below the limit of atmospheric noise for the band in question. Similarly, on 70 cm, a good noise figure readily obtainable with FET's in cascade is of the order of 3.5 dB. This can be achieved by using, say, the TIS-34. The noise figure claimed by the manufacturers for the TIS-88, for example, is below this but it costs about four times as much and, as the limit of atmospheric noise is approached, for general purposes, there seems to be little point in using the more expensive item with standard techniques.

Replacing a noisy valve converter with a modern, low-noise, transistor model can sometimes trap the unwary into a false conclusion. No "sharsh" coming from the loudspeaker until the receiver gain controls are advanced beyond the normal position and an increase in ignition noise combine to give the impression of inferior results. But, assuming that there is no fault on the converter, this is just what *should* happen and all that is required is an adjustment to the IF strip to take advantage of the higher performance. First of all, reduce the IF and/or RF gain controls and increase the AF gain. Tune in a weak CW signal and note how much easier it is to copy. It is the *readability* of an S1 signal that is important, not the thump of RST 599 from a local, although this does have a bearing on the cross-modulation problem, of which more anon. Of course, ignition noise will be more prominent than you are accustomed to since

you will now hear a car with non-existent or defective suppression at x-times the distance that you did before since the QRN is no longer masked by the converter noise. The remedy is simple—make sure that you have a good noise limiter or blanker in the receiver and use it intelligently.

Another popular misconception is that cross-modulation by strong local signals invariably occurs in the converter RF stages. This is by no means always true. What is certain is that most modern valves used in front-ends introduce *less* cross-modulation distortion than do bipolar transistors used in similar circuits because of differences in the signal handling characteristics of the two devices. An improvement, and results comparable with valve performance, can nearly always be achieved by the substitution of an FET for the bipolar type if, and it's a big if, the cross-modulation is in fact occurring in the first RF stage. This is by no means always the case. It is quite likely, indeed sometimes more likely, to occur in the mixer stages of the converter or the receiver, at which points signals have undergone considerable amplification. It is to be preferred therefore, that the circuit design should allow for plenty of selectivity in the pre-mixer stages, even at the expense of some gain, and plenty of post-mixer amplification, which is in any case easier to come by at the lower IF. The replacement of a bipolar transistor by a FET type in the converter mixer is to be recommended in cases which have not yielded to other treatment.

Sideband on Two

The comments in last month's "VHF Bands" about the spread of SSB operation around the calling frequency of 145.41 mc have provoked some useful discussion. There seems to be a general agreement that a calling frequency is required and that co-channel working should be the order of the day, but a general reluctance to revert to the "tuning the band" procedure and operation within the Zone Plan. In an interesting and constructive letter, G3BA (Sutton Coldfield), makes the suggestion that the international calling frequency should be retained but that an "SSB Zone" should be established to extend from 145.400

mc to 145.500 mc. The *modus operandi*, and that seems to be an appropriate phrase, would then be to call a station on 145.410 mc and, when a reply had been received, to QSY up or down a few kc to complete the contact, returning to the calling frequency for the next QSO. Obviously this practice would do much to relieve the QRM situation but it still does not overcome the objection to using a large slice of a band allotted for more general use by operators in a particular area. An extension of the idea would be for the QSY to be to a frequency within the Zone of one station or the other and this would certainly relieve the congestion. G3BA makes another comment which is very apposite in the QRM context when he stresses the point that it behoves us all to vary our output power to the level that is required to maintain the contact, and no more, and to make certain that we are not creating more QRM by maladjustment of equipment. Certainly, care in adjustment to proper transmitting conditions is absolutely essential if broad signals and consequent QRM are to be avoided—and yet, alas, all too frequently stations are heard with the flat-topped, spreading signals which result from too much input to the linear or failure to observe the 10 dB ratio between the conversion frequency and the SSB drive.

As a start in the right direction, why not give the QSY idea, in one form or the other, a trial? If the results show that this is what is needed, then the appropriate representations can be made to those concerned for the allocation of an SSB Zone centred on the international calling frequency. Greater use of Vox and p-t-t should make it possible to avoid clashes with AM stations operating in their own Zone and, as Tom says "... no SSB man worth his salt would want to rob any AM man of his rock-bound channel."

Knokke Ham Convention

The dates for this popular get-together are September 13 to 15. Attractions include, apart from the general amenities of this delightful Belgian seaside town, a mobile rally with valuable prizes for the winners, a fox hunt (Continental Style D/F contest), the "Night of the Amateur," which means a first-class dinner and

an evening in the Weinstube, and presentations by experts in various fields of Amateur Radio. Because of currency restrictions, it will not be possible to pay for more than the return fare in sterling, but the organisers on the Belgian side are making special arrangements for accommodation and meals at reduced prices during the Convention so that the drain on foreign currency reserves need not be more than about £10 per head. Further details and bookings from Lucien Vervarcke, ON4LV, Lippenslaan 284, Knokke, Belgium.

VHF Beacons

The Table herewith lists VHF Beacons of interest to operators in this country. Amendments will be issued as further data come available.

News Items

Harry Wilson, EI2W (Dublin), is back on Two again from a self-constructed shack in the nearby mountains which took him about fourteen months to complete. He was audible in Herne Bay on April 10, so it must be a pretty good location. Did you know that Harry can claim ten firsts on Two, six on 70 cm, six on Four and four on 50 mc? He has been well known on the VHF air—and in these pages—for many years.

G3UVR (Neston), sending in an impressive list of counties and countries worked on Four Metres, offers skeds to operators who need Cheshire on that band.

To those wanting a 70 cm or Two Metre contact with Berwickshire, comes news from GM8BDX (Duns) that he is now QRV on those bands and is looking for QSO's on Friday nights and Saturday and Sunday mornings, running 5 watts to an 18-element Parabeam on Seventy and 20 watts on Two.

Another DX-pedition to GI is planned by G3VPK (Gt. Baddow). Operation is due to start on Sunday, July 14, and continue until Friday, July 19. Counties visited will be Antrim, Londonderry, Tyrone, Fermanagh and Down in that order. Frequency is 70.16 mc and operation mainly on A1 but also on A3 when conditions permit. Callsign will be G13VPK/P during this period and also during the Portable Contest on July 21, when operation will be from

either Antrim, Fermanagh or Louth (EI). Send an s.a.e. for skeds between 1800z and 0001z direct to G3VPK now, *QTHR*.

Don Hayter, G3JHM (Worthing), points out that any G/ZE QSO on Four would most likely be by TE (Transequatorial) propagation rather than by Sporadic-E. Best times are 1800z to 2000z during March/April or September/October. He advises that if ZB2VHF is heard sending a callsign and a mark he is operating as a Beacon, but if the callsign is followed by a carrier break, it is being

operated manually and Ossie is looking for breakers on 70.26 mc.

G8AJC (Canterbury) is now fully operational with SSB on 70 cm. He has already worked PAØ, ON4 and DJ/DL. Output is about 30 watts to 2 x 18-element Parabeams. Skeds with PAØ stations can be arranged through AJC if details of QTH, QRA, QRG and dates and times are sent to him. There is plenty of interest in Holland for transmission on this mode and frequency.

Bill Browning, G2AOX (Hendon), reports that the *Australis Oscar* is due

VHF BEACONS

Frequency	Callsign	Location
144.002	DL ØDE	Deggendorf
144.005	OESTHL	Linz
144.010	SP2VHF	Kielce
144.100	GB3CTC	Redruth
144.100	DL ØRG	Niederaussen
144.150	OE7IB/P	Innsbruck
144.250	GB3GW	Swansea
144.500	GB3VHF	Wrotham
144.678	OK1KCU/1	Bournak
144.800	OH3VHF	Oulu
144.929	OH3VHF	Oulu
145.000	SM4UKV	Gryhyttar
145.068	DM2AKD	Konigswusterhausen
145.150	LA1VHF	Gausta
145.200	LA2VHF	Trondheim
145.250	LA3VHF	Harstad
145.260	OY7VHF	Faeroes
145.300	LA4VHF	Bergen
145.800	GB3ANG	Dundee
145.900	DL ØSG	Straubing
145.950	OE1XXA	Vienna
145.960	SM4MPI	Borlane
145.960	OK1KVR/1	Zaly
145.971	DL ØPR	Garding
145.987	OZ7IGY	Copenhagen
145.990	GB3GI	Strabane
145.990	YU1VHF	? (JD29G)
145.995	OESTHL	Linz
146.000	YU2VHF	? (HF28J)

for launch in June. Frequency is 144.050 mc. He can supply report forms on receipt of s.a.e. Those interested should also ask for the instruction sheet for compiling the forms as this contains some useful information which will help considerably in the compilation. This *Oscar* will carry a 50 mW transmitter, xtal controlled, and the modulation will be AM between 400 and 2000 c.p.s. Six telemetry channels are being monitored, each of 6½ second duration in the 52 second cycle. Reports to G2AOX.

That well-known figure in the Meteor Scatter world, EA4AO (Madrid), is now back in business with a kilowatt and 4 x 7-element long Yagis. His best contact to date has been over a 1850 km path to OK2WCG but he expects to improve on this during the May shower. Readers may recall that EA4AO has made contacts with G3LTF and G5YV and has had five QSO's with EI2A when the latter was only running 100 watts. His new station will use the callsign EA4KM and he would like to arrange skeds with any U.K. station, whether they have had a QSO before or not. Details of any skeds arranged will be published in "VHF Bands" so that others may listen to the resulting QSO's and so get some idea of how M/S signals sound, if conditions permit. The address for skeds is Radio EA4AO, Jesus Martin-Cordova Barreda, Paseo de Extremadura 170.4, Madrid 11, Spain.

G2CIW (Birmingham) is back on Two after eighteen months' absence and two changes of QTH during that time. He runs a Sommerkamp FL-200B to a QQV03-10 mixer and QQV06-40A linear. Converter is an FET job into the Sommerkamp FR-100B and the antenna a six-element Yagi. Jack urges correct use of the CW section of Two Metres. He moved down there from the SSB calling frequency to answer a CQ call only to hear the operator sign with QHL!

No results as yet from the G3CCH /OH2BEW sked on 144.102 mc on Friday nights, but with the *Lyrids* and *Aquarids* to come in late April and early May there is still a good prospect of making it—see list p.94, April. G3CCH also gives information of the proposed launch of a translator balloon from Finland on

the last Monday in May. The exact frequencies are not known at present but will be published when they are and will be in the 144 mc and 432 mc bands.

The South East UHF/VHF Group had another very successful meeting at Kent University, Canterbury, on March 8 when G3FRV (Crawley) gave a talk on Contest and /P operation. The interest which this subject aroused was well confirmed during the question-and-answer period and from the frantic note-taking which was going on it looks as if the Sussex Club operators are going to have to watch it! The next Meeting of the Group is at Wye College, University of London, Ashford, on May 10 at 7 p.m., when Peter Jones, G2JT, will be speaking on Aerial Power Tactics.

The evening QRM on 70.67 mc audible in some parts of the country appears to come from the North Weald/Ongar area. Enquiries have elicited the response that all should shortly be well when new transmitters are installed.

Hopes of a 70 mc Beacon at Sutton Coldfield rise again. Tests are shortly to be arranged to show whether there will be interference with the stereo channels there and, if successful, may result in permission to erect an antenna on the site.

F1MJ/P is operating with SSB on 145.350 to 145.450 mc from a 10,000 feet site on the Italian border at "DEO4J" for the next few weeks. He has already been heard by G2JF (Ashford) and, bearing in mind the sort of signal that F9NL was putting in from much the same range last year from an inferior site, it will only want a bit of a lift in conditions to make a QSO possible.

G3MPS (Bridgwater) now has a pair of 4CX250's on Two. So have other stations—but have they got them in one transmitter cabinet with a pair of 2C39's for 23 cm and a single 4CX250 for 70 cm? Not only that, but there is a TV modulator built in as well. All transmitters are driven from a single transistorised exciter. Sounds a very nice set-up.

* * *

Further details have come to hand on the equipment used for the recent G/F contact on 13 centimetres. G3RPE/P was using two transmitters, one taking an input of 8 watts for an output of 300 milliwatts on 2320 mc.

The valve was a DET-22 modulated AM by transistors. The second was a transistor oscillator followed by a transistor amplifier giving 400 milliwatts out for an input of three watts. Modulation was A2. On the receiver side the valve converter used half-wave lines with an A.2521, xtal controlled oscillator chain multiplying from 31.667 mc and an IF of 20-30 mc. The antenna was a 4ft. parabola. In spite of the narrow passband in the following IF strip, only 4 kc, the contact was made without difficulty.

Deadline

Deadline for the next issue is **May 11**. Address is: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now and 73 de G3DAH.

Late News

Stop Press

In the early hours of April 14, 0020-0120z, G3LTF worked W2NFA on 1296 mc (23 cm.) by E-M-E, with reports of 349/339, this of course being a notable G/W2 "first." The contact was repeated on April 15, 0220-0245z, reports then being W2NFA 449 and G3LTF 229. Gear at this end is a 15ft. dish, with crossed dipoles and reflector, to give left-hand polarisation, the 23 cm. Rx unit incorporating a parametric amplifier with NF of 1.5 dB; the G3LTF Tx runs a pair of 3CX100A5's, giving 100 watts RF out on 1296 mc, the gain of the paraboloid being about 15 dB. During the same session, W2NFA also worked HB9RG. Congratulations to Peter Blair, G3LTF, and his helpers—G3ORL, G3VPK and Dr. Rodney Conlon—on their outstanding success. Further details next time.

* * *

Detailed results of the Region I IARU (all-Europe) VHF Contest of last September just to hand. In *Section I*, Two-Metre fixed stations, there were 450 entrants, G2JF coming into 6th place with 35,191 points; G3UKV 194th, 5,306 pts.; and G2NH 286th, 2,365 pts.

In *Section II*, Two-Metre portable/mobile, with 318 entrants,

GC3WMS/P came first in all-Europe with 52,340 pts.; GW4LU/P 33rd, 28,177 pts.; G2HIF 99th, 17,087 pts.; and G3MAX/P 138th, 13,156 pts.

Section III, for 70-Cm. fixed stations, with 48 entrants, G3MCS 1st, 4,022 pts.

Section IV, 70-Cm. portable/mobile, had 33 entrants from all-Europe, led by GC3VXK/P, 1st with 12,118 pts.; G3NNG/P 2nd, 6,991; G3MAR/P 3rd, 6,419; G3MRA/P 4th, 5,103; G3UHF/P

7th, 1,461; and G8AAC/P 16th, 1,106.

Section V, 23-Cm. fixed stations, four entrants, G3MCS 1st with 1,351 pts.

Section VI, 23-Cm. portable/mobile, eight entrants, with G3NNG/P first, 1,003 pts.; G3MAR/P 2nd, 878; G3OBD/P 3rd, 845; and GC3VXK/P 4th, 650 pts.

It is evident that in this all-European VHF Contest on three bands, the U.K. entry has done very well against impressive competition

—congratulations to them all.

* * *

Rhodesian 4-metre Beacon: Just reported that ZE1AZE now in operation on 69.998 mc, with 30 watts RF output and 500-cycle FSK at 18 w.p.m. Any reports to: Radio Society of Rhodesia, Box 2377, Salisbury, Rhodesia. And as the ZE's now have the 4-metre band, there will be opportunities for some real DX on 70 mc this season.—*73 de G3DAH.*

B.A.T.C. CONVENTION, 1968

The British Amateur Television Club—which takes care of the interests of those engaged in amateur TV transmission on the 430 mc band, and publishes its own *CQ-TV* magazine—holds an annual convention, open to all who want to know about A/TV. It is always a very good exhibition and symposium, and this year takes place on September 14, at the I.T.A. Conference Suite, 70 Brompton Road, London, S.W.3. The G.P.O. issues a special callsign for A/TV, and the current listing shows about 200 amateurs holding these permits, in the G6AAA/T sequence. Our information is that, though a lot of closed-circuit work is done, in fact relatively few of them are able actually to put amateur TV on the 70-centimetre air. Those wanting to know more about the B.A.T.C., A/TV and *CQ-TV* should write to: Donald Reid, 71A Rose Valley, Brentwood, Essex.

PASSING OF AN OLD FIRM

Many readers with memories of the early days will be sorry to hear that the firm of Burndept passed into the hands of a receiver and manager at the end of last year. With effect from February 23, substantially the whole of the business was taken over by Ever-Ready (Great Britain), Ltd., and re-named Burndept Electronics (E.R.), Ltd. Both Ever-Ready and Burndept are very old names in the radio industry—the difference is that the one is associated with batteries, and the other with receivers, coils, valves, components and all the paraphernalia that went with “wireless” 40 and more years ago.

FINANCIAL STATEMENT—R.A.I.B.C.

We are interested, and pleased, to see from the March issue of *Radial* (of the Radio Amateur Invalid and Bedfast Club) that their donations for last year amounted to £395. On a balance-total of £660, a sum of £299 is carried over, after meeting all expenses, including *ex-gratia* payments of £168 to members, for which the funds exist. They also get *Radial* each month, and that cost £175 for the year.

Of course, this very satisfactory financial statement

takes no account of the large unpaid—and never to be charged—bill due to G3ESR and G3LWY, who between them run the whole show on an entirely voluntary basis, serving the needs of nearly 300 radio amateurs and SWL's who are either blind, incapacitated by incurable disease or suffering from some crippling disability. The R.A.I.B.C. is essentially a self-help organisation. They do not ask for anything but the occasional visit to some bed-ridden member, who could be in your immediate neighbourhood, and assistance with local transport when needed. But of course money does help! Any radio amateur in a charitable mood could do worse than remember the Radio Amateur Invalid and Bedfast Club, whose honorary secretary is Mrs. Frances Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.



“... the 70-centimetre aerial here is a bit unusual...”

THE MONTH WITH THE CLUBS

By "*Club Secretary*"

(Deadline for June Issue: May 10)

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

CLUBS need members. Possibly a rather obvious statement—but how many groups can *honestly* say they do their best to make the first few visits of a new member easy, until he gets to know the others? And if so, what proportion of visitors are scared off?

Look at things from the viewpoint of Jim, an SWL, coming to an old-established Club for his first visit. He is not a "good mixer" and he claims to know "nothing much about radio"—omitting to mention, through modesty, that he can take 25 w.p.m. CW and has been constructing radio gear for twenty years. He sits down, nobody speaks to him after the initial enquiries, and at the end of the meeting he disappears, never to return. Meanwhile, the Club goes on, saying "Welcome to visitors" each month in SHORT WAVE MAGAZINE, and wondering why they never stick.

How does it all come about? Mainly because each member leaves it to someone else. The only way to cope is to have members briefed each week to take the visitors in tow, *for the whole evening*, and then to introduce them to members of like interests, so that the opportunity is made for the shy folk to begin to feel part of the group—and it's not a bad idea to find them a job as soon as possible!

And talking of jobs—we are supposed to be telling what's on, not what's wrong—so, back to our muttuns.

Notes From Reports

Edgware are top of the pile this month, and say they have a couple of evenings; on May 13, there will be "something" which has yet to be decided, and May 27 is quite definitely booked for Part II of their very popular "Radio Question Time" event.

Dire forebodings from the Hon. Sec. of **Northampton Radio Amateur Social Club**; he is quite determined to end his period of office by the end of the summer, no one has come forward to replace him and so, when he gives up, the group folds. Surely *someone* can spare the time and energy required? May 8 is the date for their next visit, which is to the GPO Tower at Charwelton, leaving at 7.15 p.m. promptly. Anyone wishing to go, must be in contact with the Hon. Sec. at the address in the Panel *before May 4* so that the right-sized coach may be booked.

Mansfield have passed through the AGM with the same secretary, and the same forward policy. This can be summed up as a speaker at each meeting, but no formal programme, so that switches can be made easily and quickly when necessary. The first Friday in each month, at the New Inn, Westgate, Mansfield, is the date and venue, which for May will make it the 3rd.

Bury have the annual dinner to deal with on May 14, at the Goerge Hotel; G2BTO and his wife will be providing the post-prandial entertainment with a film show, which is of a nature to interest both the members and the ladies. If anyone is interested in attending this one, it will be necessary to contact the Hon. Sec. right away.

Things came a little unstuck at **Stevenage** in April, due to G3KFE having to "cry off" at the last moment—but G8BBO filled up the gap with a talk on Printed Circuits quite admirably. May 16 is a limited-number affair, visiting Brookmans Park BBC, and as it is already fully subscribed, intending visitors will need to wait till June, or talk to the Hon. Sec. about the informals. Hq. is at Hawker Siddeley Dynamics, Gunnels Wood Road, Stevenage.

Kick-off time for the **Cambridge** crowd is 7.30, who foregather at Hq., Corporation Yard, Victoria Road, Cambridge, each Friday. May 3 is an informal affair, but on the 10th it is hoped to have the red carpet out for Partridge Electronics, who are to demonstrate the famous Joystick. A week later, May 17, is likely to be the day someone flogged the red carpet—because that evening is given over to a Grand Junk Sale! Novelty events for the 144 mc mobiles are planned for May 24, and the month will be rounded off by a repeat of the latter event, using Four Metres, on May 13.

Maidenhead recently had the pleasure of a visit from G6CJ, which attracted fifty members and visitors, including folk from as far afield as Reading and Portsmouth. May will see two sessions; the lecture date is May 6, the topic "Interference," and the speaker G3JGO. The informal follows on May 21. Hq., as for a long time now, is Victory Hall, Cox Green, Maidenhead, where the Club rig is often put on the air during the informal meetings.

Down in the West Country, to **Saltash**, who are at Burraton Toc H Hall every other Friday. May 3 is booked for a visit to the Decca Transmitting Station at Bolberry Down, Kingsbridge, Devon; but nothing is as yet firm as regards the May 17 do—but something of interest is in the pipeline.

Bishops Stortford have the local British Legion Hq. for "home" where they are to be found on the third Monday of each month. There is always something laid on, and always there is a back-up to cater for the risk of last-moment cancellations. However, the Hon. Sec. is firmly convinced that the main attraction is the bottle of wine which is raffled at each session, and which pays the costs of the room.

A crowded month is forecast for the **Norwich** lads

in May. The 6th gets the business out of the way for a while, and on the 13th, G3IOR will discuss Propagation. May 20 promises to be an evening of heartsearching for all, with its title "R.U.A. Lid?" May 27 is back on the technical side with G3PTB talking about the misuse of components. It should be noted that June 3 is a "no meeting" date, due to the Bank Holiday.

April 29, May 6, May 13, May 27 are the dates for **Wolverhampton**, where each one is preceded by a 45-min Morse practice. May 20 is the "odd one out" among the list of dates, because it is on this evening, at the Pack Horse Hotel, Thompson Avenue, Wolverhampton, that the Annual Dinner, with suitable reverence, is dealt with. Tickets are 20s. apiece, and are obtainable from R. Packham, 94 Victoria Road, Oxbarn, Wolverhampton.

Hq. problems are afflicting **Chesham**, who are, as a result, only running Natter Nites every Friday, at 5 Boismoor Road for the moment, although there are several outdoor events in the cooking-pot. Since a move is to be made as soon as convenient, it may already be affecting things by the time we are in print—so a line to the Hon. Sec., at the address in the Panel, would be a wise precaution.

* * *

The first AGM of the **Hereford** crowd recently took place, and went through quite smoothly; owing to the large expansion in numbers which has occurred, the question of moving Hq. from Mortimer Hall has been very much in the mind of the committee, and so it is very likely that the May meeting—a Junk Sale—will be held at a new venue.

Five evenings in May are booked by the **Shefford** lads, at the Church Hall, Ampthill Road, Shefford, the details being as follows: May 2 is set apart for Field Day discussions and preparations, while G3EUS will talk about the Use of the Oscilloscope on May 9. "The Cornishman" SSB Exciter will be the theme on the 16th, with G3TKJ doing the telling, while on the 23rd there will be a D/F Hunt, which will be organised by G2AUA. Finally, on May 30, an evening will be devoted to Morse and Operating Procedures for Field Day.

Worthing have not reported in for some time, but it is nice to hear they are still very much alive; every Tuesday evening at the workshop in rear of the Rose Wilmot Centre in Littlehampton Road, starting at 8 p.m. is the routine, and there is usually evidence of the goings-on to be heard either on Top Band or Four, signing G3WOR. For the younger element, Morse classes are also being run.

A little to the East is **Brighton**; and here is the home of the Brighton Technical College A.R.S., who are in session on May 8 and 24, in the Engineering Department, Richmond Terrace, Brighton. This group ask specially that we mention they do *not* exist solely for students, and that visitors and potential members are always very welcome.

Another special request, from **Bradford** this time, results from their Annual General Meeting, at which they had a reshuffle. G3OTO, after four strenuous years, has given up the Secretarial chores, and the lads want to make known their thanks to him. An extra meeting appears on the agenda this time, as they are going to Spen Valley for a joint evening when they will be addressed by John Graham, G3TR, the date being

May 9. May 7 is a normal meeting, devoted to NFD preparations, and on the 21st, Mr. K. Walton will talk about "Lightning, its nature and Effects." This crowd gather at the Bradford Technical College, Great Horton Road, Bradford, 7.

Mutual Aid

That Clubs can and do help each other on occasion is a fact; but there are not many groups where the mutual aid goes as far as it does with *S.A.R.A.*, the group comprising **South London Mobile, Wimbledon and Purley**, with **Addiscombe** on the fringe. It has already proved its worth in saving South London Mobile from extinction, and there are many areas where other kinds of co-operation exist. **Purley** have a Natter Nite on May 3, and a discussion on NFD on the 17th; this is followed over the 18/19th by a weekend Field Day dummy run. **Wimbledon** are "at home" at the St. John Ambulance Hall, 124 Kingston Road, South Wimbledon, on the second and last Friday in each month, but at the time of writing we have no exact details, while **Addiscombe** have their usual meetings in the Coal 'Ole, 158 Lower Addiscombe Road. As they have a question of more suitable accommodation in committee hands, it would not be a bad idea to check with the Hon. Sec. if a visit is contemplated on May 14 and 28th.

Also on the subject of Club co-operation, last time out it was mentioned that the *Wiltshire Hams* newsletter had been expanded to cover other Clubs in the area; and this time it is noted that **Swindon, Oxford, Nailsworth and Cheltenham** are all involved, with a change of title to *Circuit*. The first number is a rather ambitious affair, very well done by G3PRR, and we can only hope that support from the members in the form of contributions can keep up the very high standard of the first issue. From it, we find that Swindon have an informal on May 8 at Hq., while the May 22 date is the opening of the Leisure Time Activities Exhibition at the Town Hall, so the usual evening at Hq. is cancelled as a result.

Oxford have the second and fourth Wednesdays in each month, at the Cherwell Hotel in Water Eaton Road. **Nailsworth** appear to take the first Tuesday in each month, at the Boys' Club, Nailsworth, and in April were treated to a talk on the PAL system of Colour TV by G8BEL. A line to the hon. sec. seems indicated for anyone wishing to look in on the May meeting. Last of this group of clubs is **Cheltenham**, who have no less than two evenings each week booked—Tuesday is a Constructional Evening, while Wednesdays are more general, with the last Wednesday in each month reserved for the formal lecture or what-have-you.

Quite a long time has elapsed since last we heard from **Fareham**—but this state of affairs has been rectified by drafting someone into the job of writing each month! They have about *forty* members who attend the Portchester Community Centre, each Sunday evening at 7.30 p.m. to hear what the committee has provided for their entertainment. Future details are a little "up in the air" at the moment, with some switching of dates, but it may be taken as firm that *something* will be going on, and that by the time our next issue is being prepared, the problems will have been ironed out.

Culcheth want visitors with "own paint-brushes!" This all stems from a decision to redecorate the Hq.

but it does not mean any reduction in the number of talks and activities. May 10 is the one the Top Band addicts will be looking forward to, when G3FGI will discuss ways and means of getting the odd extra S-point into the signal. Every third Friday is devoted to a Question Time session. Any Friday, it is possible to look them up at the Chat Moss Hotel, Glazebury, Nr. Leigh, Lancashire.

* * *

There are now no less than 148 members on the books of the **Cornish** group, who have sub-sections also dealing with SSB and VHF. The first Thursday in each month is the regular date for the main meeting, which is held at the SWEB Clubroom, Pool, Camborne. The second and third Thursdays are given over to the SSB and VHF groups at the "Barley Sheaf" in Truro.

May in **Crawley** means, as usual, an informal, on May 8, for details of which contact with the Hon. Sec. is necessary—see Panel—while on the 22nd there is to be a formal, subject to be arranged, at Trinity Congregational Church Hall, Ifield, Crawley.

At **Peterborough**, the lads are collecting items of ancient radio gear for display at the Mobile Rally in September. The need for cat's-whiskers is so great that it is said the Hon. Sec. is speculatively eyeing his own three moggies for samples—but we suspect he will be disappointed, as these tinned foods do not produce the desired electrical characteristics!

Over at **Leicester**, there seems to be a lot going on; G3PBC has finished and tested the first of a batch of fourteen "Cornishman" SSB excitors built in the Club Project, while the R.A.E. class is going great guns, and several out-of-doors events are planned for the summer. For all the details, contact the Hon. Sec.—see Panel.

Marle Place Further Education Centre is now the Hq. of the **Mid-Sussex** gang, where their meeting on May 2 is devoted to judging the Constructional Contest, and, if time permits, Alan Jones will talk about his latest version of the "G3JJG SSB Transmitter." On Wednesday May 15 there is an informal get-together at the home of G3VAK.

Your conductor always looks forward to his copy of the **Cray Valley QUA** for its lively approach and correspondence column. For May, we find that the talk is to be An Introduction to DX Television, by Mr. C. R. Dykes, at the Congregational Church Hall, Court Road, Eltham, on May 2. The other evening, an informal, is set for May 16, and the venue this time is All Saints' Church Hall, Bereta Road, New Eltham.

The Social Hall, Fulford, is the address given for the **Fulford Hq.**, where they get together every Tuesday evening for a varied programme of lectures and activities. For the full details of this new Club, contact the Hon. Sec. at the address in the Panel.

This idea of a weekly meeting with one of the weeks specially set aside for a lecture seems to be quite popular of late; **Chippenham** are at Chippenham High School for Boys, Hardenhuish Lane, Chippenham, every Tuesday but the lecture is on the last meeting of the month, May 28, when G3JMY does an "Aerials" lecture-demonstration.

Rapid expansion has forced the Committee of the **Silverthorn** group to think seriously about the need

for re-organisation to spread the load. Every Friday *except the first* in each month, at Hq., Friday Hill House, Simmons Lane, Chingford. For further details, contact the Hon. Sec.—see Panel.

An evening at the "Otter" with the ladies is arranged for the **Guildford** chaps on May 10, and on the 24th, they return to Hq., which is at the Model Engineering Club, Stoke Park, Guildford, for a discussion on the final details of the Field Day effort.

Successful Gathering

Ernest Turner Electrical Instruments is an honoured name among the professionals; and once a year the managing director—Norman Turner, G4NT—runs a Hamfest at the works. This year, the event was on March 17, and, apart from the normal items there were three speakers, all at the top of their own specialities in Electronics and all licensed amateurs, with a large attendance from a wide area. Prizes, of course, were much-appreciated Ernest Turner instruments, and after the prize-giving the bar was opened and the ragchewing started in earnest.

After three months "out of bounds," due to the foot-and-mouth disease epidemic, **Bromsgrove** are now back in residence. The lecture for May should be rather interesting, as G3LQB is to tell about his experiences in *Eastern Europe*, working on the *amateur bands*.

Salop are great believers in getting out and about during the summer months, and so on May 9, they are going to Bridgnorth, to visit the works of A.T. & E., gathering outside the door at 2 p.m. The informal comes up on May 23 and, as always will be at the Old Post Office Hotel, Milk Street, Shrewsbury.

"Nothing succeeds like success" is as good a motto for a Radio Club as it is for the French, who coined it. It certainly applies to **Burslem**, who have attracted so many members that they are henceforward calling their group the **North Staffs** Amateur Radio Society to take account of the wider geographical spread. The Moorland Junior School is the QTH and for the details, contact the Hon. Sec., at the address in the Panel.

Temporary Hq. have been found for one month with the local Scout Association by the **Coventry** lads, whose old Civil Defence place is now denied them. May 3 is a tape-lecture on Aerials, May 10 sees all the Club gear being got ready for NFD, the 24th is a night-on-the-air with the KW-2000, and the month is rounded off by G3TFC who is to talk about "Aircraft Receivers." Any visitor or prospective member should contact the Hon. Sec. in case of a last-minute change to a new venue.

Lothians have a constructional competition with prizes to be won on May 9, but on May 23 are off up to Kirk o' Shotts to see the BBC TV Transmitter. The "home" venue, of course is the Board Room of the YMCA, 14 South St. Andrew Street, Edinburgh.

Reigate next, where the group are to be addressed by G2UJ, who will talk about oscillators, at the George and Dragon, Cromwell Road, Redhill, on May 1. At the other end of the month we have **Echelford** getting together on May 30, at the Hall, St. Martins Court, Kingston Crescent, Woodthorpe Road, Ashford, Middx.—their topic being Amateur TV, by way of a lecture-demonstration.

It's a hard life, doing this feature—your "Club

Secretary" is in the doghouse with the **South Birmingham** Hon. Sec. this time—but he sent his information in for the January issue, which is *always* devoted to the annual MCC report! Essentially, the news is that the meeting-night has been altered to the first Wednesday in each month; thus, on May 1 there is to be a film show, and on June 5 a Surplus Equipment Sale. The Hq. is unchanged, at the Scout Hut, St. Stephen's Church Hall, Pershore Road, Birmingham. In addition there are to be a series of Constructional evenings for the SWL's and Beginners, which will be held on Tuesdays—details of these may be obtained by reference to the Hon. Sec.

North Kent always produce an interesting *Newsletter*, but for some reason this month we seem to be out of synchronisation, so all that can be said is that Hq. is at the Congregational Church Hall, adjacent to the Clock Tower, Bexleyheath, Kent—for all other details, ask Hon. Sec.—his address is in the Panel.

Amusing!

Quite a novel idea occurs in the letter from the **Rhondda** group. It seems that they run a technical quiz evening in which the victims have one minute to answer the questions. All the members are listed on the blackboard, and handicapped according to their past form; bets are then taken on the winner, and the quiz proceeds, each member having to answer, dropping out if he fails, until at last a winner is declared and given a prize. The bets taken at the beginning cover the cost of the prize and put a "little something" into the kitty.

The British Legion, Micklegate, York, is the scene of most of the **York** group's activities, where they operate the Club station, G3HWW, every Thursday evening; however, on June 6 they have an outing to a glass-works to make an interesting change.

G5ACX is the speaker at the May session of the **Acton, Brentford and Chiswick** crowd, when he will

Names and Addresses of Club Secretaries reporting in this issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.
 ADDISCOMBE: S. V. Knowles, G3UFY, 66 Oakfield Road, West Croydon, CR-02-UB.
 BRADFORD: W. G. Scarlett, G3RXS, 12 Otley Road, Eldwick, Bingley, Yorks.
 BRIGHTON TECH. COLLEGE: R. A. Bravery, G3SKI, 7 Copse Hill, Brighton (506418), Sussex BN1-5GA.
 BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
 BROMSGROVE: J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.
 BURSLAM: P. Wild, 9 Red Lion Close, Talke, Stoke-on-Trent, Staffs.
 BURY & ROSSENDALE: A. Cooper, G3VVQ, 411 Holcombe Road, Greenmount, nr. Bury.
 CAMBRIDGE: F. A. E. Porter, G2CDX, 37 Metcalfe Road, Cambridge.
 CHELTENHAM: A. B. Fletcher, G3LDA, 40 Chelmsford Avenue, Warden Hill, Cheltenham.
 CHESHAM: D. Kind, 19 Hollybush Road, Chesham, Bucks.
 CHIPPENHAM: N. Cutter, G3PQG, 1 Fosseyway Close, Colerne, Chippenham. (Box 664.)
 COLCHESTER: V. Levitt, Part Street, Stoke-by-Nayland, Suffolk.
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.
 COVENTRY: C. Jaynes, 20 Belgrave Road, Wyken, Coventry CV2-5AY.
 CRAWLEY: R. G. B. Vaughan, G3FRV, 5 Filbert Crescent, Gossops Green, Crawley (23359), Sussex.
 CRAY VALLEY: D. Buckley, G3VLX, 234 Halfway Street, Sidcup, Kent. (ELTham 6945.)
 CRYSTAL PALACE: G. M. C. Stone, 11 Liphook Crescent, London, S.E.23. (FORest Hill 6940.)
 CULCHETH: A. N. Edwards, 6 Ellesmere Road, Culcheth Nr. Warrington, Lancs.
 ECHELFORD: D. Walmsley, G3HZL, 153 Worple Road, Isleworth, Middx. (POPesgrove 3329.)
 EDGWARE: G. S. Fitton, G3RAA, 18 Beverley Drive, Edgware, Middx.
 EXETER: G. Wheatcroft, G3HMY, 27 Lower Wear Road, Countess Wear, Exeter, Devon.
 FAREHAM: J. A. Rampton, G3VFI, 23 Oxford Close, Fareham, Hants.
 FARNBOROUGH: D. G. Arigho, G3NVM, 6 Frensham Close, Yateley (2174), Camberley, Surrey.
 FLINT: J. H. Jones, GW3TMP, 3 Bryn Clyd, Lees Wood, Mold, Flint.
 FULFORD: G. B. Widnall, G3XTJ, 5 Heslington Croft, Fulford, York.
 GUILDFORD: A. Wilkes, G3SLH, Schiehallion. Hookley Lane, Elstead, Godalming, Surrey.
 HALIFAX: R. Millar, G3WLW, 17 Brooklands, Bradley, Huddersfield.
 HEREFORD: B. Edwards, G3RJB, 5 Powys Walk, Hereford.
 LEICESTER: N. Tomlinson, 33 Merton Avenue, Leicester.
 LOTHIAN: A. J. Masson, GM3PSP, 20 Merchiston Park, Edinburgh, 10.
 MAIDENHEAD: E. Palmer, G3FVC, 37 Headington Road, Maidenhead (20107), Berks.
 MANSFIELD: F. N. F. Bewley, G8HX, 116 Westfield Lane, Mansfield, Notts.
 MID-HERTS: H. R. Thornton, G3PKV, 43 Fordwich, Welwyn Garden City.
 MIDLAND: C. J. Haycock, G3JDJ, 29A Wellington Road, Handsworth, Birmingham, 20.
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.
 NAILSWORTH: F. J. D. Hills, G8BEL, 1 Oxlease Close, Tetbury, Glos.
 NORFOLK: M. J. Cooke, 76 Falcon Road West, Sprowston, Norwich (46093), NOR-73R.
 NORTHAMPTON: B. Hayes, G3JBU, 31 Beverley Crescent, The Headlands, Northampton (33944).
 NORTHERN HEIGHTS: A. Robinson, G3MDW, The Candy Cabin, Ogden, Halifax (44329).
 NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath Kent. (01-303-8655.)
 OXFORD: P. Bradley, 114 Nethererton Road, Appleton, Abingdon, Herts.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
 PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey, CR4-6DB.
 READING: M. F. Taylor, 58 Nightingale Road, Woodley, Reading.
 REIGATE: D. Thom, G3NKS, Bankside, 58 Garlands Road, Redhill, Surrey.
 RHONDDA: C. M. Parry, GW3PHH, 34 Ca'er-er-Gwerlas, Tonyrefail, Porth, Glam.
 RHYL: A. Antley, GW3UTG, "Fairholme," Fairfield Avenue, Rhyl (1362).
 ROYAL NAVY: R/S W. Metcalf, G3TIF, H.M.S. Mercury, Leydene, Petersfield, Hants.
 SALOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
 SALTASH: J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.
 SHEFFORD: M. B. Goodwin, G3WKR, 16 Roe Close, Storfold, Hitchin, Herts.
 SILVERTHORN: G. E. Fenner, G3VMO, 80 Larkshall Crescent, Chingford, E.4.
 SOUTH BIRMINGHAM: W. V. Shepard, 174 Gristhorpe Road, Selly Oak, Birmingham, 29.
 SOUTHGATE: R. Wilkinton G3TXA, 23 Ashridge Gardens, Palmers Green, London, N.13.
 STEVENAGE: W. P. Sheppard, G3WMA, 83 Spring Road, Letchworth, Herts.
 SURREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon CRO-7HS. (01-654-5982.)
 SWINDON: E. J. Andrews, G3JAP, 56 Windsor Road, Swindon (21402), Wilts.
 VELULAM: J. Thomas, G3RXA, 9 Highland Rive, Hemel Hempstead (55136), Herts.
 WIMBLEDON: K. Alexandra, 23 Pepsy Road, West Wimbledon, London, S.W.20.
 WIRRAL: J. J. M. Phillips, G3PXX, 16 Collingham Green, Little Sutton, Wirral, Cheshire.
 WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton.
 WORTHING: P. J. Robinson, G6KFH/T, 46 Hillview Road, Worthing, Sussex.
 YORK: J. A. Rainbow, 14 Temple Road, Bishopthorpe, York.

discuss and demonstrate his Heathkit SB301-SB401 rig. The date is May 21, and the Hq. Chiswick Trades and Social Club, 66 High Road, Chiswick, London, W.4.

Lecture

Mr. Maurice Child will be reminiscing to the chaps at the **Farnborough** affair on May 14 about his own efforts and experiences in the early years, from 1900 onwards. This one should be well worth a visit, to listen to a well-known pioneer who has been "in the thick of it" right from the very beginning, and whose writings were probably among the few sources of information available in those days.

Only one home meeting is laid on for the **Northern Heights** lads, on May 22, when G3USH will talk about the building of an Electronic Organ. However, they are going out on May 8, to the Leeds and Bradford airport, Yeadon, for a look round, and in June a trip to the Manchester club and NFD should give them some fresh air.

Wirral have the first and third Wednesday in each month booked, at the Scout Hq., Harding House, 76 Park Road West, Claughton, Birkenhead; May 15 is the formal meeting, when G3OKA will talk about Linear Amplifiers.

* * *

It is hoped that by careful wording of the piece about **Halifax**, your scribe will be able to net them a lot of new members—the reason being the fact that they have now more members from the Brighouse and Huddersfield area than in Halifax. Let us just say that anyone who lives within a fifty-mile circle of the Sun Inn, Rastrick, and has not joined, just hasn't lived! On May 3, a visit to Teteleys Brewery should please all concerned, while on May 12 it is hoped to fix up a bus to the Harewood Mobile Rally. May 17 sees them going over to Pudsey, and the return game is played on May 29.

"Harwarden Castle," Church St. Flint, is the home of the **Flint** group, who have five members in for the R.A.E. this time, and have just managed to organise a Club station; good going for a group that has only been in existence for less than a year. For more details, contact the Hon. Sec. at the address in the Panel.

Not so very far away are the **Rhyl** crowd, who seem to have the second Tuesday as their date, although they do not say so explicitly, neither do we have any information as to what is going on in May. Nonetheless, we can say that in March they had a demonstration of a large assortment of amateur gear, thanks to a firm in Liverpool who made it all possible. April was devoted to SSB as a follow-up, so one would expect an interesting evening in May. Headquarters: The Rhyl Silver Band Room, Windsor Street, Rhyl.

At the Midland Institute in Margaret Street, Birmingham, the lads of the **Midland** group get together on the third Tuesday—this month, sad to say, their *Newsletter* does not give us the gen about activities—but this is excusable, as they have just finished the Birmingham Boat Show stint. However, your scribe can say that there is *always* something doing, even if the newsletter doesn't say so.

Another group your conductor has personal know-

ledge of is **Southgate**; and here also there seems to be a little "irregularity" in the information-chain. We can say that for April they persuaded G6CL to talk about the international aspect of things, and that Hq. is the Parkwood Girls School, near Wood Green Town Hall, but for the rest, you'll have to talk to the Hon. Sec.—see Panel.

Alternate Tuesdays at 8.0 p.m. at St. Pauls Hall, Whitley Wood, is the recipe for success at **Reading**; May 7 will see them progressing the 144 mc gear they are putting together for the Club net as a project, and a fortnight later they will have a final briefing on the Field Day arrangements.

Direction-finding, and a simple receiver for the purpose, will be the theme of G2HAR at **Verulam** on May 1, at the Cavalier Hall, Watford Road, St. Albans. The informal takes place on May 15, and will be in the form of an NFD briefing. It is pleasing to note the compiler of the *Newsletter* for this group saying he has *too many* contributions for this month, which is a good indication of the popularity of this side of the group activity.

Like Coventry, **Crystal Palace** have been hit by the Civil Defence shut-down, and we have no immediate idea where the next meeting will be—all we *can* say is that there will be a meeting in May, it will probably be a technical talk by G3OOU and G3FZL, and it will probably be on May 18—but it is suggested that a quick call to the Hon. Sec. will resolve the problem, either by 'phone or letter.

Having changed to a better headquarters, attendances have fallen off somewhat at the **Surrey** meetings; but it is fair to say that the reason given, namely, parking problems at the Blue Anchor, is just not true, as those who have tried will testify—so the Committee want to see the customers back again! April 16 was the date of the Annual General Meeting, when several stalwarts stood down to give others a crack of the whip. It is known that one of those bowing out is the present Hon. Sec., but as it will not be possible for us to have the revised address for publication this time, we have to say "contact G3KGA at the address in the Panel," and we will correct this next time round.

* * *

Not many of the national groups report in this time, but one of the few is **British Rail**, who are associated with the International FIRAC group of railway-men radio amateurs; it is pleasant to note they have members active behind the Iron Curtain.

The **Royal Navy** has its own Amateur Radio Society, which produces an interesting and informative news-sheet, with technical articles, news of members, some cartoons, and an active correspondence. One would feel that serving and retired R.N. types would join in droves—which they have done—but, of course, like all other groups, they could always do with more members.

Deadline

And that sees the bottom of the pile; deadline for next time is **first post May 10**, with the information on your *June* meetings and affairs. The address, as always is "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM.

SHACKS I HAVE KNOWN

J. Worthington (G3COI)

Our cartoonist describes some of his experiences over the years—and many readers will know exactly what he means about getting comfortably installed with the gear!—Editor.

IN the last twenty years I have had as many shacks, and my present one is an old 8 x 8 x 6ft. coalhouse—and one of the best I have ever had. I can keep it warm with a small fan heater; its window overlooks the rolling Shropshire countryside; there is ample shelf space and finally it is handy to the aerials.

On the other hand, there are few poor situations that I have not encountered at one time or another and I suppose the worst was a glass-house, in a poor state of repair, tottering at the rear of one of my previous QTH's. In summer the heat was hardly bearable and in winter of course, the cold was ditto. It used to take three paraffin stoves working full blast for two hours to raise the temperature to a level making CW operation possible. All ferrous parts of the gear used to rust freely and my operating time was severely curtailed merely through physical discomfort.

My first shack was an attic at the top of an old terrace house—at fifty feet above ground this made an excellent end-on feed point for a 132ft. aerial and I used to do well on 80m. with a single 807. However, although there was plenty of space horizontally, the roof was sloping and low and after a time I persuaded the XYL to allow me a corner of the living room, five floors below. Here I assembled the station on an old office desk and the XYL fitted a curtain to lessen the aesthetic shock to the rest of the room's decor. However, the rig slowly grew and the curtain bulged until there came a time when it became obvious that either we moved or the rig did. So we moved and I had the whole place to myself—however the victory turned to ashes in my PA because I was turned out by the landlord.

The next shack was a conventional one—in fact there are probably more shacks of this type in the U.K. than any other—the small spare bedroom of a one-floor "semi." As shacks go it was nearly ideal I suppose, although the accompanying aerial space was restricted to a 60 foot run at the other side of the house which required considerable feeder lengths and I wasn't sorry when the XYL turfed me out into a larger room at the back. But this was only temporary—as I have never made any of my installations permanent I was quite nonchalant about removing my stuff to the garage later. Here for the first time I became aware of lack of heat and I tried to overcome this by operating from the living-room by remote control. (The trials and failures of this became the source of inspiration of a "Fred" story published in the *Magazine* some years ago.)

We looked for another QTH and after many months found a place which of course was a compromise between what the XYL wanted, what I wanted, and what we could both afford. Naturally enough, it was far from the ideal of either interested party but it had definite possi-

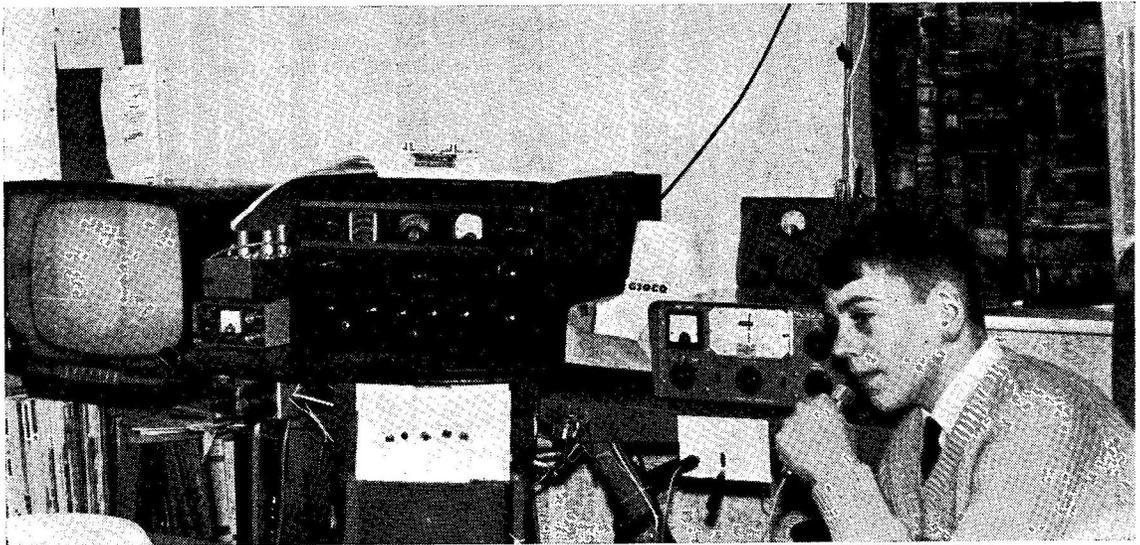
bilities and, as a glass-house built on to the back of the property seemed to be in the "natural" position for antennae, I took up residence. The discomfort of it has already been described. Certainly, it was handy for all aerials, both VHF and HF and a real D-I-Y man would have made a proper go of it. But after a while I worked my fading charm on the XYL and moved into a tiny (3 x 4 x 6ft.) box-room with my AR88 and home-built monster Tx. This shack became the subject of a cartoon depicting the cramped operator listening to his "contact" who was saying that there was room echo on his signal. Echo was about the last thing one could have had in that shack as the tiny space was solid with junk, working and defunct. It was, however, very economical from a heating point of view as the PA soon brought the ambient temperature to the point of shirt off. In that shack I used to feel like the operator of the gear in a two-man submarine and had to make frequent excursions for oxygen. Then one day I was struck by a brilliant idea—that of XYL'ising the gear—that is, rendering it invisible to the casual eye by painting it in living room colours, mainly white and deep green. Then while she was out I quickly fitted up a newly painted BC-348 and a Top Band rig into the bookshelf by the fireplace in the living-room.

She spotted it immediately. However, no doubt out of pity I was allowed to stay and for the first time enjoyed operating by a real coal fire. For those who have never done this I can say that it is as nice as you can imagine it to be—the trouble is that one tends to go on and on with one's "overs" and nobody likes people who have long overs. (I don't know, though, they are useful if you're building something during a QSO.) The main snag with the living room rig was that it is a real test of human relationships to hold QSO's when the rest of the family is watching TV.

But we were again looking for another QTH and this time after many, many months we found something that really suited all parties—this is how I came into my aforementioned coal house. The smell of small nuts is receding under waves of solder flux and burning insulation and I'm up to my neck in junk and everything is just as it should be—I'm even getting ready to go RTTY!

THAT BBC RADIO CAR

We don't want to seem to be labouring this theme but surely somebody in the BBC Engineering Dept. should be doing something about it . . . we had occasion to mention (on p.99 of the April issue) the shocking standard of transmission quality from the "BBC radio car"—presumably a highly-sophisticated commercial portable/mobile installation, which ought to be capable of giving impeccable speech output in terms of quality and modulation of the main carrier. But once again there was a *gaffe*, when on March 27 the "BBC radio car" was at Transport House for the Sunday 'World at One' programme, which now has an audience of many millions. The transmission quality was so bad, with explosive noise and a hiss background, that William Hardcastle, in charge back at the studio, had to apologise for it! From a car radio-mobile installation, operated static, by an authority like the BBC, this is quite inexcusable.



THE OTHER MAN'S STATION

G3WPR

CHRISTOPHER Richmond's interest in radio was awakened before he even reached his 'teens. This culminated in the obtaining of his call sign, G3WPR, last autumn. As has happened in other cases, because he was only 13, he could not get into an R.A.E. class. Eventually he was accepted elsewhere, and although it meant a fair journey, his 100 per cent attendance, with hard slogging on his own, brought its reward. He had already been coached in Morse by the late G2BRH so, taking a chance on the R.A.E. results, he successfully passed the Test in the summer of last year.

Our photograph, which has a distinctly commercial flavour, does not really do justice to the station at 1 Grangeway Gardens, Redbridge, Ilford, Essex—G3WPR is in fact an ardent constructor and is at present making a very neat job of a solid-state two-metre converter, visible on top of the AR88. After that will come a transmitter for the 144 mc band, and it should not be long before a new two-metre signal is on the air from Ilford. He is fortunate in being blessed with plenty of garden space, so that there are no problems as regards antennae.

Interest at G3WPR is not solely centred on the transmitting side, and new pieces of electronic gadgetry frequently appear in the shack—he has the modern approach to the age in which we live.

The Silverthorn Radio Club is very happy to have G3WPR as a member, and he can always be relied on to be doing all he can to help other young members working for a licence.

TRAFFIC IN SPACE

The satellite communication bands must be fairly buzzing with signals just now—there are no less than 73 transmitting space vehicles of various categories listed as being in orbit, using frequencies in the range 136.020 to 138.98 mc. In addition, there are six satellites in the *Explorer* series with channels at 20.00, 20.005, 40.00, 40.010, 41.00, 41.010 and 54.0 mc. Other frequencies used, in megacycles, are 150, 162, 324, 360, 400 and the band 400.25 to 400.85 mc for the highly successful American *OGO* family engaged on geophysical studies. In the great majority of cases, anything that might be heard by the casual listener would be in the form of coded CW or telemetry signals, intelligible only at the ground station working the satellite.

B.S.I.—METRIC PROGRESS

It is announced that the British Standards Institution—which by common consent in the U.K. technological context is the arbiter of measurement standards through the whole field of engineering—will “go metric in two years' time.” This is a far bigger decision than it may seem at first sight. It means that all quantities will then be expressed in terms of centimetres and grammes, and their derivatives, instead of inches or feet and pounds/ounces *avoirdupois*. With this is bound up the new frequency nomenclature, *i.e.*, Hz (for cycles), kHz (for kilocycles), and MHz (for megacycles). These ugly, Teutonic-looking terms are not by any means universally accepted. So far as we are concerned, we shall stick (for the next two years, at any rate!) to the more elegant and generally understood cycles, kc and mc.

NEW QTH's

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

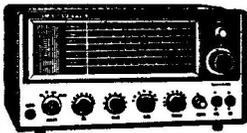
- EI4BT**, J. S. J. Craig (*G3SGR* *G3SGR*), Cloonagh, Ballymote, Co. Sligo. *QSL via G3SGR*.
- GM3JPW**, W. G. Thomson, 40 Woodend Road, Alloway, Ayrshire. (*re-issue*.)
- G3WOP**, Mrs. Mary Goldsbrough, 56 Kings Lane, Bebington, Cheshire.
- GM3WPA**, S. McHutchison, 4 Foggley Gardens, Dundee, Angus.
- G3WRO**, K. L. Haynes, 10 Fullers Close, Collier Row, Romford, Essex.
- G3WTJ**, P. H. Ellis, 26 Westbourne Road, Whitby, Yorkshire.
- G3WYZ**, K. Smith, Ashlee, Blackwater, Newport, Isle of Wight. (*Tel. Newport 3534*.)
- G3XDA**, R. J. Holderness, 149 The Station, Deeping St. James, Peterborough.
- GI3XEQ**, J. A. Bailie, 35 Ardvarna Park, Belfast. *BT4 2GH*.
- G3XFD**, R. Mannion, 43 Elgar Road, Sholing, Southampton, Hants.
- G3XGA**, Barnsley College of Technology, Church Street, Barnsley, Yorkshire.
- G3XGJ**, K. Jeeves, Meltham Hall, Meltham, Huddersfield, Yorkshire.
- GW3XHD**, B. B. Walters, 21A Wenallt Road, Tonna, Neath, Glam.
- GM3HXY**, C. C. Tinline, Ramornie, Elm Park, Selkirk. (*Tel. Selkirk 3788*.)
- G3XIB**, B. A. Johnson, 34 Phillips Street, Birmingham 6.
- G3XIC**, H. M. Symonds, 225 Hale Road, Hale, Altrincham, Cheshire. (*Tel. Ringway 2903*.)
- G3XII**, F. Harrison, 66 Dunkirk Lane, Leyland, Preston, Lancs. *PR5-3AX*.
- G3XIJ**, A. J. Binning, A.R.I.B.A., Brook Cottage, East Harptree, Bristol.
- G3XIM**, R. Ratcliffe, 71 Segars Lane, Ainsdale, Southport, Lancs.
- G3XIV**, G. G. Bulleyment (*ex-9V100*), 111 Browning Avenue, Paulsgrove, Portsmouth, Hants.
- G3XIV/A**, G. G. Bulleyment, S.T.W., R.M., R.M.B. Eastney, Southsea, Hants.
- GW3XJF**, Flint and District Radio Society, Hawarden Castle, Church Street, Flint, Flintshire.
- G3XJI**, W. A. Wilkinson, 25 Huntley Avenue, Penrith, Cumberland.
- G3XJL**, D. E. Thomas, 49 Bath Road, Felixstowe, Suffolk. (*Tel. Felixstowe 4128*.)
- G3XJO**, A. L. Jones, 7 Poulton Avenue, Sutton, Surrey.
- G8BAG**, G. Rowley, 64 High Street, Howden-le-Wear, Crook, Co. Durham.
- G8BGE**, P. M. Jones, 24 Beechwood Court, Monyhull Hall Road, Kings Norton, Birmingham, 30.
- G8BGQ**, K. A. Juson, 25 Church Lane, Sarratt, Rickmansworth, Herts.
- G8BIV**, H. M. Owen, The Linnets, Good Easter, Chelmsford, Essex. (*Tel. Good Easter 493*.)

CHANGE OF ADDRESS

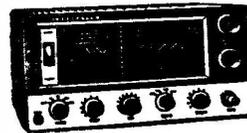
- EI6AR**, E. G. Houldsworth, 25 Lower Grange, Waterford.
- G2BZQ**, R. Q. Marris, Flat 20, Fairview, Norreys Drive, Maidenhead, Berks.
- G2CAT**, W. C. Alcock, Orchard Hill, Kingston, Corfe Castle, Wareham, Dorset. (*Tel. Corfe Castle 514*.)
- G2GM**, F. D. Cawley, Bay Sound, Freshwater Bay, Isle of Wight.
- G2MV**, S. E. Martingell, 107 Foxon Lane, Caterham, Surrey.
- G2OF**, W. G. D'Arcy, 40 Northwood Road, Harefield, Middlesex.
- G3CVW**, R. F. Saunders, 1 Churchfields, Sandiway, Northwich, Cheshire. (*Tel. Sandiway 2512*.)
- G3JHI**, R. L. S. Hathaway, c/o Officers' Mess, R.A.F. Fylingdales, Pickering, Yorkshire.
- G3JVU**, F. B. Allen, Vipers Cottage, Hastingleigh, Ashford, Kent. (*Tel. Elmsted 226*.)
- G3MGQ**, Dr. T. H. Parkman, 93 Parkstone Road, Hastings, Sussex. (*Tel. Hastings 30354*.)
- G3PBV**, W. D. Sellars, Wisteria, Hennock, Newton Abbot, S. Devon. (*Tel. Bovey Tracey 3468*.)
- G3PXR**, R. Hodson, 51 Fairmead Avenue, Westcliff-on-Sea, Essex.
- G3RKC**, W. J. Brayn, 83 Bishopscfield, Harlow, Essex. (*Tel. Harlow 27795*.)
- G3RUR**, A. E. Roberts, 62 Oak Way, Bedfont, Feltham, Middlesex.
- G3RWP**, D. M. Bell, 36 The Crescent, Woodthorpe, Nottingham. *NG5 4FX*.
- G3RYE**, J. D. Harris, 38 Grafton Avenue, Southill, Weymouth, Dorset. (*Tel. Weymouth 4236*.)
- G3STG**, G. A. Griffiths, 3 Lower Lickhill Road, Stourport-on-Severn, Worcs.
- GW3SWC**, B. Tinton (*ex-G3SWC*), 32 St. Margarets Road, Whitchurch, Cardiff, Glam.
- G3TEY**, Miss Patricia Stansfield, Flat 2, Shelton, Trafford Road, Alderley Edge, Cheshire. (*Tel. Alderley Edge 4109*.)
- G3TJY**, D. R. H. Jolly, Little Russel, Lytchett Minster, Poole, Dorset. (*Tel. Lytchett Minster 142*.)
- G3TPN**, W. Knox, 7 Lindisfarne Avenue, Chester-le-Street, Co. Durham.
- G3TWE**, G. H. Lucas, 1 Rossetti Road, Birchington-on-Sea, Kent.
- G3UEG**, D. I. Gould, Westholme, Kiln Lane, Stokenham, Kingsbridge, S. Devon.
- G3UMT**, B. D. Turvey, 3 Weston Road, Olney, Bucks.
- G3VDC**, V. C. Cheesman, 70 Willow Way, Hurstpierpoint, Hassocks, Sussex.
- G3WAF**, A. J. Fullbrook, 33 Ardmore Avenue, Guildford, Surrey.
- G6NM**, E. G. Houldsworth. *QSL via EA6AR*.

AMENDMENT

- G3KXT**, R. I. Richardson, 50 Hayes Street, Bromley, Kent. *BR2 7LD*.



LAFAYETTE HA-500 AMATEUR RECEIVER
HAM Bands 80/40/20/15/10/6 metres. incorporates 10 valves, product detector, 2 mech. filters, S meter. Xtal calibrator, B.F.O. noise limiter. Dual conversion 220/240v. A.C. Brand new 42 gns. Carr. 10/-



LAFAYETTE HA-700 RECEIVER
General coverage on 5 Bands. 150-400 Kc/s., 550 Kc/s.-30 Mc/s. RF stage, AE trimmer, noise limiter, BFO, product detector, electrical bandspread, S meter. 220/240 volt A.C. Brand new 36 gns. Carr. 10/-

R.C.A. AR88 SPEAKERS
Eight-inch, 3 ohm speakers in metal case. Black crackle finish to match our 88 receivers. Brand new and boxed with leads, 59/6. Carr. 7/6

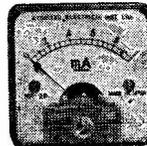
GRID DIP METERS
KYORITSU. 360 Kc/s.- £ s. d.
220 Mc/s. Mains operated ... 12 10 0
TE.15 Transistorised. 440 Kc/s.-270 Mc/s. ... 11 11 0

ADMIRALTY B.40 RECEIVERS
Just released by the Ministry. High quality 10 valve receiver manufactured by Murphy. Five bands 650 Kc/s.-30 Mc/s. I/F. 500 Kc/s. Incorporates 2 R.F. and 3 I.F. stages, bandpass filter, noise limiter, crystal controlled B.F.O. calibrator, I.F. output, etc. Built-in speaker, output for phones. Operation 150/230 volt A.C. Size 19 1/2 in. x 13 1/2 in. x 16 in. Weight 114 lbs. Offered in good working condition, £22/10/-, Carr. 30/- With circuit diagram. Also available B41 L.F. version of above. 15 Kc/s.-700 Kc/s., £17/10/-, Carr. 30/-



CLEAR PLASTIC PANEL METERS

First grade quality, Moving Coil panel meters, available ex-stock. S.A.E. for illustrated leaflet. Discounts for quantity. Available as follows. Type MR. 38P. 1 2 1/32 in. square fronts.

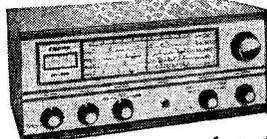


100µA	37/6	5mA	25/-	1A	DC 25/-	
500µA	35/-	10mA	25/-	2A	DC 25/-	
2000µA	32/6	20mA	25/-	5A	DC 25/-	
500µA	27/6	50mA	25/-	3v	DC 25/-	
50-0-50µA	35/-	100mA	25/-	10v	DC 25/-	
100-0-100µA	32/6	150mA	25/-	20v	DC 25/-	
500-0-500µA	25/-	200mA	25/-	50v	DC 25/-	150v AC 25/-
1-0-1mA	25/-	300mA	25/-	100v	DC 25/-	300v AC 25/-
1mA	25/-	500mA	25/-	150v	DC 25/-	500v AC 25/-
2mA	25/-	750mA	25/-	300v	DC 25/-	50v AC 22/6

5' Meter 29/6

Larger sizes available—send for lists

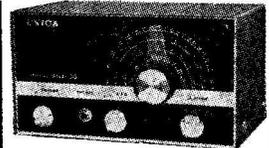
CODAR EQUIPMENT



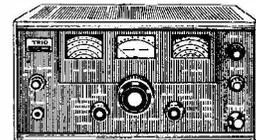
CR.70 Receiver ... £ s. d.
... 19 10 0

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

Comprehensive 152 page illustrated catalogue of Components and Equipment (Contains Discoun. Coupons worth 5/-) 5/- P. and P. 1/-



UNR.30. 4 BAND COMMUNICATION RECEIVER
550 Kc/s.-30 Mc/s. Incorporates variable BFO. Speaker, Phone Jack. 200/250v. A.C. Brand New £12/10/-, Carr. 7/6.



TRIO 9R59DE RECEIVER
General coverage on 4 bands. 550 Kc/s.-30 Mc/s. RF stage, electrical bandspread, noise limiter, BFO, S Meter, 115/230v. A.C. Brand new, £37/10/-, Carr. 12/6.

EX-AM CONTROL BOX with two louver 7026 24v. D.C. Aerial Change-over Relays. New, 39/6 Carr. 5/-
BUG KEYS £3 19 6
ELECTRONIC KEYS £16 10 0
JOYSTICK AERIALS ALL MODELS IN STOCK
ELECTRONIQUES STOCKISTS

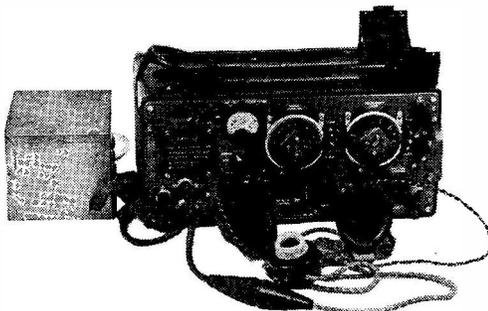
OPEN
9 a.m.—6 p.m.
EVERY DAY
MON. to SAT.

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

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

Phone: GERRARD 8204/9155

PART EXCHANGES WELCOME



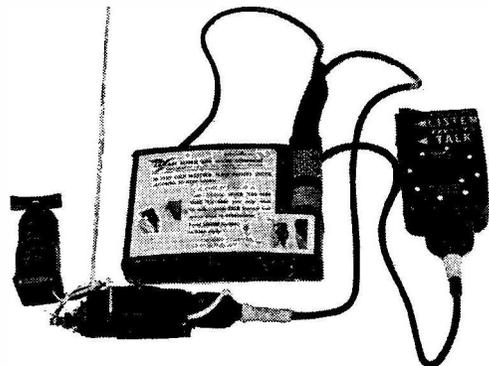
TRANS/RECEIVER TWO TWO

This is one of the latest releases by the govt. of an extremely recent R/T set covering 2-8 Mc/s. in two switched bands, containing 13 valves (3 EL32s in Tx output) which can be used for Morse, CW or R/T. Also has netting trimmer, BFO, RF and AF controls, switched meter for checking all parts of set, size 17" x 8" x 12". Power required LT 12 volts D.C., HT 325 volts D.C. Supplied Brand New and boxed with Headphones and Mike also Two Spare Valves and circuit of set. Few Only at £5/10/-, carr. 30/- New plug-in power supply made by us for either 12 volts D.C. input, £3/10/- or 200/250 volts A.C., £3/17/6.

LARGE QUANTITY OF SARAH V.H.F. TRANS/RECEIVERS

AVAILABLE FOR IMMEDIATE EXPORT

General Information. This set is normally carried in the life jacket of Airmen, it is a complete miniature lightweight radio Trans/Receiver, which is used to give a Beacon plus two-way speech communication in the event of finding themselves in the sea. It comprises a Transmitter-Receiver, a speech unit, a coding unit and a power supply either Battery or Transistor. These three items are permanently interconnected and all units are completely sealed and water tight using a combined speaker/mike, press to talk or listen buttons, fold-up aerial, a total of three valves is used, power required 6-3 volts LT 90 volts and 435 volts D.C. HT. Frequency 243 Mc/s. Transmitter output pulse power—Beacon 15 watts, Talk 3 watts. Supplied in maker's boxes in Grade 1 condition, singly at 45/-, post 5/- with circuit. New batteries if available, 7/6 each.



JOHN'S RADIO

OLD CO-OP, WHITEHALL ROAD, DRIGHLINGTON, BRADFORD

Telephone: DRIGHLINGTON 7232

HOME RADIO (Mitcham) LTD. Dept. SW, 187 London Rd., Mitcham, Surrey, CR4 2YQ. (01-648 3282)



THE ELECTRONIC COMPONENTS CATALOGUE THAT SETS THE STANDARD

Used and acclaimed by:-

- SCIENTISTS**
- ENGINEERS**
- TECHNICIANS**
- TEACHERS & STUDENTS**

This edition of the Home Radio Catalogue is the result of ten years of careful selecting, compiling and indexing. It is the finest, most comprehensive we have ever produced—it has 256 pages, over 7,000 items listed and over 1,300 illustrations. It is a must for anyone interested in radio and electronics. With each catalogue we supply our unique Bargain list, Book Mark giving Electronic Abbreviations, an Order Form, an addressed envelope, and 5 vouchers each worth 1/- when used as directed. All this for only 7/6 plus 2/- post and packing. Send the attached coupon today, with your cheque or P.O. for 7/6.

Of course no catalogue is ever really finalised. As soon as we have one edition off the press, our researchers get busy finding out what is the latest in the world of Radio and Electronics—ready for the next printing.

Please write Name and Address in block capitals

NAME

ADDRESS

Home Radio (Mitcham) Ltd., Dept. SW, 187 London Rd., Mitcham, CR4 2YQ

YUKAN SELF-SPRAY SO PROFESSIONAL THE YUKAN AEROSOL WAY—
Get these air drying GREY HAMMER NOW! OR BLACK WRINKLE (CRACKLE) finishes

Yukan Aerosol spraykit contains 16 ozs. fine quality, durable easy instant spray. No stove baking required. Hammers available in grey, blue, gold, bronze. Modern Eggshell Black Wrinkle (Crackle) all at 14/11 at our counter or 15/11, carriage paid, per push-button self-spray can. Also Durable, heat and water resistant Black Matt finish (12 ozs. self-spray cans only) 13/11 carriage paid.
SPECIAL OFFER: 1 can plus optional transferable snap-on trigger handle (value 5/-) for 18/11, carriage paid. Choice of 13 self-spray plain colours and primer (Motor car quality) also available.

Other Yukan Air Drying Aerosols, 16 ozs. or 13/11 each, plus includes: Zinc Chromate Clear Lacquer Metallica: Grey, Blue, Bronze and Gold.

Please enclose cheque or crossed P.O. for total amount to: **YUKAN, SW/E, 307a, EDGWARE ROAD, LONDON, W.2.**
We supply many Government Departments, Municipal Authorities, Institutes and Leading Industrial Organisations—We can supply you too.
Open all day Saturday. Closed Thursday afternoons.

“DX ZONE MAP”

In four colours, on durable paper for wall mounting, 35in. wide by 25in. deep. Giving essential DX information—bearing and distance of all parts of the world relative to the U.K. The 40 Zone area into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long. close enough for accurate plotting. About 1,000 place names, mainly the unusual ones, and most of the rare islands.
Revised to October 1966

Immediate delivery from stock
Price 14s. 9d.
including postage and special packing in postal tube to avoid damage in transit.

Publications Dept.
Short Wave Magazine Ltd., 55 Victoria Street,
London, S.W.1. (01-222 5341/2.)

BAGINTON ELECTRONICS

G3TFC	(SALES)	Ex ZC4JC
XTAL CONTROL UNITS.	34 xtals, 3 outputs, 36-495 to 39-74 in 250 kc. steps. 13-54 to 13-99 in 50 kc. steps and 29-697 to 30-597 in 100 kc. steps. 3 valves type CV138:	
	With connection data. P. and P. 4/6	£3
BURNDEPT TX/RX.	116-132 mc. BE256. 11 channels	£45
A.R.C. RX.	108-135 mc. VOR-ILS Indicators	£150
A.R.C. TX.	T11B. 118-135 mc.	£20
STR9Z/50kc	44 ch. 115-145 mc.	£95
STR.	12D/100 kc. 140 ch. 118-131 mc.	£100
STR.	12D/50 kc. 300 ch.	£200
LEAR TX.	118-126.9 mc. 90 ch.	£25
COLLINS AUTOMATIC ATU.	18CL-2...	£90
BEAM DIRECTION INDICATOR SYSTEM.	6 volt DC 50 ma.	£4
CO-AX RELAYS.	N type connector	£2
MARCONI TF104L.	Valve Voltmeter	£60
MARCONI TF144G/4.	Signal Generator	£65
ADVANCE DI SIGNAL GENERATOR.	10-300 mc.	£30
BOOM HEADSETS.	150 ohm, mic 300 ohm EM.	£3
RX UNIT.	108-112 mc. 12B7G valves, xtal	£3
RX UNIT.	329-235 mc. 10B7G valves, xtal	£3
MARCONI MODULATORS.	90w. 829Bs, Clipper, Filter	£4
107 ATU.	2-18.5 mc. Meter. 2000pf variable	£4
107 TX	P.A. 3 x 829Bs. Blower Meter. 2-18.5 mc.	£5
XTALS	rom 8/- . List 1/- stamps. 8000-8050 kc. New HC6/U within 5 kc your choice	each 21/-

Specific enquiries only please.—S.A.E.

BAGINTON ELECTRONICS (SALES)

MARKET CORNER, BAGINTON, WARKS. (near Airport)
Postal Code CV8-3AP. Tel. TOLL-BAR 3688 (Robophone).

HALSON MOBILE ANTENNA—THE MOBILE SCENE
The Most Efficient! The Most Unobtrusive! and Best Loaded too
A COMPLETE MOBILE ANTENNA SYSTEM
Complete for one band, £6/17/6 + 3/6 P.P. Extra coils, £3/17/6 + 3/- P.P.
SWR and FSL, £4/19/6 + 3/6 P.P.

Our Agents: K. W.—Kent. N. W.—Manchester.
Chas. Young—Birmingham. Swanco Products—Coventry.
G. Francis—Newark. G. W. Smith—London.
Glasgow Electronic Services—Glasgow C.3.

Or direct from **HALSON ELECTRICAL SERVICES**
DOVER ROAD WORKS, ANSDLE ROAD, BLACKPOOL
Tel. 62740

GEORGE FRANCIS

G3TWV

FRANCIS for EDDYSTONE

EB35	...	...	£60 6 3
EB36	...	...	£54 0 0
EC10	...	...	£53 0 0
EA12	...	...	£195 0 0

All in stock including full range of dials.

FRANCIS for K.W.

KW2000A	...	...	£220 0 0
KW VESPA	...	...	£128 0 0
KW201	...	...	£105 0 0
KW1000 Lin	...	...	£128 0 0

Full range of L.P. and H.P. Filters,
Q Multiplier, Dummy Loads,
PEP Meter, EZ-Match.
All in stock.**FRANCIS for SWAN**

SWAN 500 and A.C. P.S.U.	...	£283 0 0
Remote VFO Adaptor	...	£57 0 0
Extension Speaker	...	£1 15 0

All in stock.

FRANCIS For TRIO and LAFAYETTE

9J-59DE Rx	...	35 gns.
JR500SE Rx	...	59 gns.
HA500 Rx	...	42 gns.

All in stock.

FRANCIS for JOYSTICK

JOYSTICK De Luxe	...	£5 19 6
3A Tuner	...	£3 12 6
4A Tuner	...	£6 6 0

FRANCIS for PARKAIR ELECTRONICS

Skybandit	...	£23 10 0
Jet set	...	£12 0 0
2-metre Tx complete	...	£80 0 0

FRANCIS SPECIAL OFFER

0-01, 0-02, 0-1 μ F 500 volt TCC	...	...
Condensers	...	per doz. 4 6
T-1K 1,000 Ω /volt only	...	1 19 6
I-T2 20,000 Ω /volt only	...	3 2 6

Discount for quantity.

Metal Jack Plugs ... each 2 0

FRANCIS for TOWERS, ANTENNAS and CABLES, etc.

BXI TOWERS AVAILABLE
HIGH GAIN ANTENNAS AVAILABLE
 75 Ω Ordinary, 7d. per yd.; 75 Ω Low Loss, 1/6 per yd.; 52 Ω Ordinary, 1/4 per yd.; 52 Ω Low Loss, 2/3 per yd.; 300 \bullet Flat Twin, 6d. per yd.; 75 Ω Flat Twin, 6d. per yd.; Coax Plugs, 1/6 each; Coax Sockets, 1/6 each; Coax Couplers, 1/3 each; PL259 Plugs (American), 7/6; PL259 Sockets, 8/-; PL259 Angled Couplers, 1/6; Egg Insulators, 6d. each. All in stock.

FRANCIS for MICROPHONES

SHURE 201	...	£4 10 0
SHURE 444	...	£9 10 0
Crystal Hand Mics	...	15 0
Crystal Lapel Mics	...	4 0
BM3	...	£1 15 0
BM3 and stand	...	£2 5 0
Acos metal	...	£1 2 6
Acos plastic	...	£1 0 0

This is just a selection we have over 24 different mics. in stock.

FRANCIS for TRANSISTORS and VALVES

See previous adverts in SWM.

FRANCIS for RESISTORS, CAPACITORS, CHASSIS, VALVE HOLDERS, etc., etc.**FRANCIS for SECOND-HAND GEAR**

KW2000 D.C./P.S.U., £25. Eddystone EB36, £45. Eddystone 940, £85. Eddystone 640, £18/10/-, DX100U, £65. KW Vespa, £87/10/-, KW Viceroy, £87/10/-, G2DAF Transmitter, £40. AR88, £21/10/-, RAI, £35.

COMPONENTS—S.A.E. FOR LISTS VERY COMPETITIVE.

NO ORDER TOO SMALL PART EXCHANGES

GOODS DISPATCHED RETURN OF POST POSTAGE EXTRA

93 BALDERTON GATE, NEWARK, NOTTS.

Tel. 4733; after 6 p.m. 2578

N. W. ELECTRICS52 GT. ANCOATS STREET
MANCHESTER 4

CEN 6276

G3MAXBusiness hours : 9 a.m.—6 p.m. Tuesday—Saturday
CLOSED ALL DAY MONDAY

Stamped addressed envelope please, for any inquiries.

Receiver Unit R3673 20 to 90 Mc/s. Size 13in. x 8in. x 8in. 10 channel. Motor selected. High quality converter unit into 7.5 Mc/s. IF strip. 19 valves. (13 EF91, 3 EB91, 1 EL91, 1 616, 1 EAC 91.) Small blower, 2 relays. Supplied with circuit and modifications. £3 10s., plus postage 10/-. All tested before despatch.

Low Resistance Headphones. 100 ohms, D.C. Brand new, boxed, 7/6. Postage 3/-.

R.A.F. Modulator Ex. TRI986 VHF Transmitter. EF92—EL91—P.P.6C4. Circuit supplied, 15/-, post 4/6.

RF 25 Bandswitched Converter. Pre-set frequency. Excellent component value. Contains: 15, 30pf Philips trimmers, ceramic switch, 1-pole 5-way, 3-bank, 3 $\frac{3}{8}$ x 1" ceramic formers, 3 SP61 valves, 2 $\frac{3}{8}$ " Aladdin formers, standoffs, etc. The complete unit for 7/6. Postage 6/- unfortunately.

HEADPHONES & MIKE, 19 Set Type, Moving Coil, Rubber Muffs, 7/6. Postage 4/6.

Transistor Boards. 2, 3 and 4 transistors plus components. Diodes, etc. Mixed boards with at least 20 transistors, £1 lot, plus 2/6 post.

'S' Meter. 200 u.A. Scaled 0—200 marked in 'S' points + 20 + 60 dB's. 2 $\frac{3}{8}$ " dia. 2 3/32" mounting hole, 30/- plus 1/6 postage.

Coaxial Relays, 'Londex' 24v. D.C. 70 watts. RF at 200 Mc/s. Supplied with 3 plugs (ex-cable), 22/6, plus 2/6 postage.

We still have some items from previous adverts.

G3SMI**G8SB**

CURSONS TRANSISTORS

ALL GUARANTEED

- 1/- each. BAY31, BAY50, DK10, OA70, OA81.
- 2/- each. XA101, XA102, OC71, OC72, OC81, OC81D, OC44, OC45, GET16, FST3/1, ACY22.
- 3/- each. OC139, OC140, 2N706, 2N708, 2N2894, BY100, RAS310AF, 2N914, BSY26, BSY27, BSY95A, AFZ12, BFY18, BFY19, BFY26.
- 7/6 each. RAS508AF, CRS3/40, BLY10, BLY11, BUY10, BUY11, ADY22, ADY23, ADY24, OC26.

ZENER DIODES

- 3.9v. to 26v., 1/2w., 3/- each. 1.5w., 4/- 7w., 5/- each.

D. Cursons

78 BROAD STREET, CANTERBURY, KENT
S.A.E. LATEST NEW LIST

PRINTSET

KITS FROM WEST GERMANY

Eays to build—English Manuals—Printed Circuits—LOW priced!

NEW! 28/144 MHz TRANSVERTER TRV4

Basic kit only £2 17s. 6d.

NEW! FREQUENCY SHIFT KEYS FSK5

Adapts VFO or Xtal (SSB) TX for RTTY.
Choice of FSK5-VFO or FSK5-CO kit, 12/6

Ask for catalogue SP5 about these and other VHF, SSB, CW and RTTY kits.

SPACEMARK Ltd.

14 PICCADILLY, MANCHESTER 1
(Tel: 061-237 0817)

CATALOGUE

The most COMPREHENSIVE—CONCISE—CLEAR—COMPONENTS CATALOGUE. Complete with 10/- worth discount vouchers FREE WITH EVERY COPY.

- ★ 25 pages of transistors and semiconductor devices, valve, and crystals.
- ★ 150 pages of components and equipment.
- ★ 50 pages of microphones, decks and Hi-Fi equipment.

SEND TODAY 8/6 POST PAID

LATEST EDITION
240 pages
6,000 items
1,000 illustrations



HENRY'S RADIO Ltd.

303 EDGWARE ROAD, LONDON, W.2

(01) 723-1008/9
Mon.-Sat. 9/6 p.m.
Thurs. 9/1 p.m.

THE MINI-TEN

Two element beam for ten metres.

G3XKF

G3XKF

The lowest priced two element beam for ten metres available to the Radio Amateur.

The Mini-Ten is of all Dural construction, all fittings cadmium plated and built to an extra rigid construction, having withstood 75 m.p.h. gales as quoted by a Radio Amateur.

The overall length is only 10ft.—Bins. and weighs only 8½ lbs.

Price only £8/19/6 (Post and Packing 10/-)

Immediate Delivery.

Send (9 x 4) S.A.E. for Illustrated Leaflet to:—

MINITENNA BEAM PRODUCTS

(J. Sharratt)

EDLESBOROUGH, DUNSTABLE, BEDS. Tel. Eaton Bray 297

SCA 63982

DERWENT RADIO

S.A.E. LISTS

CLOSED FOR SUMMER HOLIDAYS MAY 23—JUNE 6

CODAR. Good stock of mobile items, we are doing a package deal on AT5 and T28 sold together, £29.

HALSON. G3FIF whips and all coils in stock.

NOVA PAL. D.F. receivers, £27.

28.5 MHz walkie talkies, £12 10s. pair. Postage extra all items.

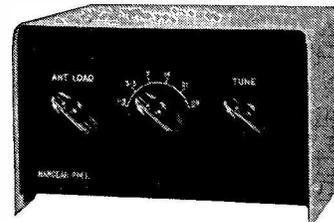
SECOND-HAND

Eddystone 750 ...	£38	Eddystone EB 35 ...	£44
Eddystone 640 ...	£18	KW201 receiver ...	£90
Codar T28 receiver ...	£13	KW Vanguard 160-10 ...	£48
Hallcrafters SX111 ...	£85	National NC185D ...	£65
Hallcrafters HT40 ...	£18	Eagle R.F. sig. gen. ...	£10
HRO psu/8 coils ...	£16	Codar CR70A receiver ...	£11
Eagle RX-80 ...	£28	Hallcrafters SX28 ...	£20

During the summer, we shall be visiting most large towns in Yorkshire with a mobile display of amateur radio equipment. We should be pleased to hear from any club secretary or group who would like us to visit their area.

28 HILLCREST AVENUE, SCARBOROUGH, YORKSHIRE

Recipe for better listening



Take one pentode pre-amp covering 1.8/32 mc/s. completely, add an antenna tuner so that no spicy DX is lost. Pop in a crystal oscillator to check dial calibration every 1 mc/s., plus a built-in power supply, place the whole lot in a small box of modern styling. You will find this unbeatable at £9/18/-. Less Calibrator £6/18/-. Send for leaflets.

HAMGEAR ELECTRONICS
29 CARLYLE ROAD, NORWICH

UNUSUAL OFFERS

SURPLUS EMIDICTA DICTATING MACHINES

record that Q.S.O. on plastic magnetic disc (available from stockists, 2/6). Less disc, but otherwise complete, untested ... (15/- carr.)

TF144G SIGNAL GENERATORS. 85 kc/s. to 25 mc/s. Excellent condition in transit case with spares ...

30 mc/s. RACAL ELECTRONIC COUNTER ...

155 mc/s. RACAL ELECTRONIC COUNTER ...

CINTEL MISSED PULSE ELECTRONIC COUNTER ...

CINTEL ELECTRONIC COUNTER/TIMER ...

3 cms. PANORAMIC ADAPTORS. Mains operated ...

BUYERS TO COLLECT LAST 5 ITEMS

ELEY ELECTRONICS

112 GROBY ROAD, GLENFIELD, LEICESTER

HAMMERITE HAMMER PATTERN BRUSH PAINT FOR PANELS, METALWORK, ETC.

TRIAL TIN (covers 5 sq. ft. only 3/9 + post 9d.

COLOURS: blue, silver, black, or bronze.

2½-oz. tins, 3/9. ½ pint, 8/-. 1 pint, 16/-. Very special prices for larger sizes. Carr. up to 5/-. 9d., up to 10/-. 1/9, over 10/-. 3/-.

HAMMERITE produces the cellular pattern known as hammer finish. Just brush on. It air dries in 20 minutes to a smooth, dust repellent tough finish. Withstands 150 C, oil, water, etc. Adheres to practically anything without a primer. Ideal for metalwork. One coat on hardboard makes fabulous panels. (No primer needed). Government tested. Amazing results, just try it!

RETURN OF POST SERVICE, Monday to Friday.

Fireproof spray thinners, tinters, panel transfers, etc. List Free.

FINNIGAN SPECIALITY PAINTS (SW)

MICKLEY SQUARE, STOCKFIELD, NORTHUMBERLAND
Tel.: Stockfield 2280

G3ZY

G3ZY

J. & A. TWEEDY (Electronic Supplies) Ltd.APPOINTED DEALER AND STOCKIST FOR
EDDYSTONE, K.W., ELECTRONIQUES, CODAR, SOMMERKAMP, ETC.**New Equipment****EDDYSTONE** :-EC10 £53, 940 £140, 840C £70, EA12 £190.
K.W. ELECTRONICS :-Full range in stock KW2000A £220 incl. psu. KW201 £105. KVV Vespa Mk. II with AC psu £128.**CODAR** :-AT5 £16 10s., AC psu £8; DC psu £11 5s.; RQ10X £8 8s.; RQ10 £6 15s.; PR30X £7 4s.; PR30 £5 10s.; T28 £15 10s.; CC40 £6 10s.; CR70A £19 10s.**SOMMERKAMP** :-FT500 £115, FL500 £145, FR500 £120, FT100B, one only, £180.**"TAVASU" MOBILE AERIAL** :-100" chrome telescopic whip terminated with 50 ohm co-ax and weatherproof base loading coils for 160-80-40-20-15 £12 10s. complete set. Parts available separately.**LELANE LECTRONICS** :-"LYNX" 10 watt transistorised top band Tx £29.**TRIO** :-9R59DE 35 gns., JR500SE 59 gns.**G3LKG** :-432 mhz and 144 mhz converters with built-in psu's £8 5s. + 6/- postage.**PARTRIDGE ELECTRONICS** :-Joystick Std. £4 15s.; de Luxe £5 19s. 6d.; Tuners Type 3 £2 15s.; 3A £3 12s. 6d.; 4 £4 4s.; 4RF £6 6s.**Used Equipment**

KW2000 with AC and DC psu £145; BC348 £12 10s.; HRO 5T £12 10s.; CR100 £14; Hallicrafters SX110 £42.

See you at Drayton Manor Park

We will be pleased to quote for your used equipment and arrange HP if required. Evening demonstrations by appointment at home Qth (QTHR).

64 Lordsmill Street, Chesterfield, Derbyshire

Tel: Chesterfield 4982 or Holmewood 506 (Evenings)

SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

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

ANTARCTIC ADVENTURE**The British Antarctic Survey** requires **Wireless Operators** to serve in the Antarctic (VP8). Interesting and well-paid job for competent radio amateurs. Candidates must be able to transmit and receive CW at 20's. For details of pay, qualifications required and conditions of service apply:—**Personnel Officer, British Antarctic Survey, 30 Gillingham Street, London, S.W.1.****SITUATION****TV Service Engineer** required for new department. Genuine career post for experienced technician, under congenial conditions. — **Eric Parvin, 201 Acomb Road, York. (Tel. York 78283).****TRADE****RESISTORS**: Half-watt carbon film 5 per cent, all preferred values in stock from 10 ohms to 10 megohms, 2d. each (send s.a.e. for free sample).
Capacitors: Mullard miniature metallised polyester for PC mounting, all 250v. DC working, .01 mF, .022 mF, .047 mF, 0.1 mF, 0.22 mF, all at 6d. each. Hunts tubular 0.1 mF, 200v. working, at 3d. each. Send 6d. stamp for extensive list of low-priced Electronic Components, Instruments and Equipment. Please include 1s. post and packing on all orders less than 20s. — **Dept. S.W.11, Brensall Electronics Ltd., Charles Street, Bristol, 1.****SERVICE SHEETS**: On Radio, Television and Tape Recorders, 1925-1968 models, from 1s. each by return post, with free fault-finding guide. Catalogue covering 6,000 models. 2s. 6d. Please include s.a.e. with enquiries.—**Hamilton Radio, 54 London Road, Bexhill, Sussex.****QSL CARDS**: Attractive two-colour designs, 25s. per 100. Send s.a.e. for samples.— **G3OYI, 16 Banks, Honley, Huddersfield, Yorkshire.****LIGHT-POWER AC/DC**: The new Carter Champ Generator weighs only 12½ lbs. but gives big performance. Three independent electrical outputs on each model. Ideal for lighting, battery charging and small power tools. Indispensable for radio enthusiasts. Write for full details of this rugged go-anywhere Generator.—**Carter's, Dept. SW, Taco Works, Sycamore Avenue, Burnley, Lancs.****LEICESTER G3ACQ**: Eddystone 840C, EC-10, etc., and Sphinx, Cannonball, Trio JR-500, Trio 9R-59, Eagle, Codar, Joystick and Component items. Also Garrard, Armstrong, Hi-Fi, Wharfedale, Goodmans, Nombrex and Sinclair products and equipment. — **Mays, Churchgate, City Centre, Leicester.****QSL Cards**: Two-colour, attractive design, variable features, from £3 3s. per 1,000 (inclusive). Send foolscap s.a.e. for samples.—**ARA Press, 46 Moat Avenue, Green Lane, Coventry.****HUNDRED-PAGE Illustrated Catalogue No. 17 of Government and Manufacturers' electronic and mechanical surplus, including a completely new section covering the latest semi-conductors and miniature components, with a credit voucher worth 2s. 6d. Send for your copy now, price 3s. post free. The reading alone is worth the money!**—**Arthur Sallis (Radio Control), Ltd., 93 North Road, Brighton, Sussex.****QSL and SWL Cards**: From 20s. per 100; 25s. for £250; 37s. 6d. per 500; and 56s. 6d. the 1,000. Post paid. Send s.a.e. for samples (state whether Tx QSL or SWL card required).—**H. Beaumont, G5YV, 8 Ashfield Avenue, Morley, Leeds, Yorkshire.****G. W. M. RADIO LTD.****RECEIVERS****ADMIRALTY B.40**. 640 Kc/s. to 30.5 Mc/s. 14 valves. Speaker, A.C. power unit built in. Bandwidth switched 1, 3 and 8 Kc/s. Crystal calibrator. Large vertical calibrated illuminated dial. Circuit diagram, £22/10/- . Also B41 low frequency version, 15 Kc/s. to 700 Kc/s., £10, carriage 30/- per set.**OSCILLOSCOPES**. Cossor 339, £10. Miniature type CT52, £20, both carriage paid.**HEADSETS** for 19 or 22 set with mike, used, 10/-; new Chamois padded type, 17/6. 19 set control boxes, 8/6, all post paid.**R1475**. 2-20 Mc/s. Large slow motion dial, etc., with original power unit for 12 volts D.C. or 230 volts A.C. Less connecting cable, all connections marked, £10/10/-, carriage £1.**RECEIVERS PCR2**. 900-2000, 200-550 metres, 6-22 Mc/s. No power unit, £6/10/-, carriage 15/-.**RECEIVERS MARCONI CR100**. £18/10/-, carriage £1.**GEIGER COUNTERS**. Meter contamination No. 1. GM type CV2247 tube. Battery operated. Half scale reading on average luminous wrist watch. Good working order, £3/10/-, post paid.**R.F. UNITS** type 136 (RF27) tunable. Ideal for 4 metre conversion, 35/-, post 5/-.**MAINS TRANSFORMERS**, standard tapped input, 340-240-0-240-340 volts at 75 mA., 0-4-5-6-3 volts 2 amps, 25/-, also 240-0-240 volts at 133 mA, 5v, 2a, 6-3v, 2a, 6-3v, 2a, 6-3v, 5a, 35/-, both post paid.**10X CRYSTALS**, 100 or 500 kc/s., 12/6, post paid. 19 set rotary power unit 12 volts D.C., 30/-, carriage paid.**METERS**. 2½" dia. Round 500 ma., 14/-; 100 volts D.C., 12/6; 50 Mic/amps., 25-0-25 Mic/amps., 500 Mic/amps., 17/6; 1 ma in desk case, 17/6; 2½" dia. Round 50 Mic/amps., 30/- . Ex-equipment 500 Mic/amps, calibrated 0-15, 0-600 volts, 8/6, postage 1/6 per meter.**ROLLER** inductor tuners, 30 turns 1½" dia., 12/6, post 4/6. Ceramic transmitting switches, 6 wafers 2½" dia. each 1 pole 6 way, 7/6, post 2/6. Parmeko 230 volt transformers 24v. 2a. fused and shrouded, 25/-, post paid. Goodmans Speakers 3" 15 ohms, 10/-, post paid. All the above are in new condition.**STC** absorption wavemeters, type R502. 100 kc/s. to 47 Mc/s., £5, carriage 10/-.

Spares kits for R209. 7 valves types, 75B1, 2 x IT4, 2 x IS5, EF92, IR5 and 12 volt 4 pin vibrator, 12/6, post paid.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges quoted are for England and Wales only.

Telephone 9097

Terms: Cash with order. Early closing Wednesday.

40-42 PORTLAND ROAD, WORTHING, SUSSEX

SWANCO PRODUCTS

LIMITED
G3NAP AMATEUR RADIO SPECIALIST G3PQQ
NEW EQUIPMENT

Sommerkamp F-Series Equipment:	£	s.	d.
FR-DX 500 double conversion superheterodyne with crystal-controlled first mixer, 160-10 metres	125	0	0
FL-DX 500 SSB/AM/CW transmitter, 240 watts PEP, complete with built-in power supply and antenna relay	145	0	0
FL-DX 2000 linear amplifier, 960 watts PEP	100	0	0
Sommerkamp FT-DX 150 transceiver, 80-10 metres	215	0	0
Sommerkamp FT-DX 500 transceiver, 80-10 metres	250	0	0

Swan Line Equipment:	£	s.	d.
Swan 500 SSB transceiver, 80-10 metres	250	0	0
Swan 350 SSB transceiver, 80-10 metres	216	0	0
Swan 230-XC power supply (to suit 500 or 350)	49	0	0
Swan 410 VFO and adapter	61	15	0

Hallcrafters Equipment:	£	s.	d.
SX-130 Communications receiver	86	15	0
SX-122 Communications receiver	148	5	0
SX-146 SSB receiver, 80-10 metres	137	5	0
HT-46 SSB transmitter, 80-10 metres	192	5	0
HA-1 electronic keyer	42	15	0

Eddystone Radio Ltd.:	£	s.	d.
Eddystone EA12 Amateur bands receiver, 160-10 metres	185	0	0
Eddystone EA12 Communications receiver	133	0	0
Eddystone 840C Communications receiver	66	0	0
Eddystone EC10 receiver	53	0	0
Eddystone EB35 receiver	60	6	3
Eddystone EB36 receiver	54	5	7

Trio Communications Receivers:	£	s.	d.
Trio JR-60 14 tubes amateur communications receiver, 540 kc/s.-30 mc/s., plus 142-148 mc/s.	61	19	0
Trio 9R59 9 tube communications receiver	34	13	0
Trio 9R59DE 9 tube communications receiver	36	15	0
Trio JR500SE Amateur bands receiver 80-10m.	61	19	0

Lafayette Communications Receivers:	£	s.	d.
HA-500 Amateur bands receiver, 80-6 metres	44	2	0
HA-700 Communications receiver (with product detector)	37	16	0
HA-350 Amateur bands receiver, 80-10 metres	67	10	0

K.W. Electronics Ltd.:	£	s.	d.
K.W. 201 Amateur bands receiver, 160m.-10m.	105	0	0
K.W. Vespa Mk. II transmitter (with P.S.U.)	128	0	0
K.W. 2000A SSB transceiver, 160m.-10m. (with P.S.U.)	220	0	0

Mosley Electronics (Beams):	£	s.	d.
TA-33Jr. Triband three element beam	27	5	0
TA-32Jr. Triband two element beam	19	5	0
TA-31Jr. Triband dipole	11	11	0
V3Jr. Triband vertical	8	5	0
TD-3Jr. Wire trap dipole	6	15	0
Channellmaster rotators	13	13	0
Channellmaster rotators (automatic)	18	18	0

Park-Air Electronics Ltd.:	£	s.	d.
2 metre transmitter (complete with mic., etc.)	80	0	0
Jet Set Aircraft receiver	12	0	0
Sky Bandit Aircraft receiver	23	10	0
Kürer Aircraft, short, medium, and long wave receiver	41	9	6

Swanco/CSE Equipment:	£	s.	d.
Swanco/CSE 2A10 solid state transmitter	43	7	0
Swanco/CSE 2AR solid state receiver	44	0	0
Swanco/CSE type II A.T.M.A. mobile/fixed/portable antenna	9	15	0
Swanco/CSE safety mobile microphone, Type MM2	2	17	11
Swanco SP.44 2 metre converter	10	10	0
Swanco SP.144 with mains P.S.U.	13	13	0
Swanco 100 kc/s. calibrator	5	19	6
Helson Mobile antenna, now all weather, all bands system	6	17	6
Extra coils (when more than one band is required)	3	17	6
Swanco Quad Spiders (per pair)	6	10	0

Echelford Communications Equipment:	£	s.	d.
Echelford B1/4 transmitter for 4 metres	30	0	0
Echelford M1/4 transmitter (mains or mobile)	40	0	0
Echelford C1/4 4 metre converter	10	10	0

Full range of Drake Equipment available to order.
 Full range of Heathkit Equipment available to order.

Codar Radio Company:	£	s.	d.
CR.70A receiver	19	10	0
PR30	5	10	0
PR.30X	7	4	0
R.Q.10	6	15	0
R.Q.10X	8	8	0
CC.40	6	10	0
CR.45K	9	10	0
CR.45RB	11	7	0
AR5 transmitter	16	10	0
250 volt P.S.U.	8	0	0
12/MS P.S.U.	11	5	0
12/RC control	6	17	6
T28 receiver	15	10	0
Mini-Clipper	1	19	6

Partridge Electronics:	£	s.	d.
Joystick std.	4	15	0
Joystick de-luxe	5	19	6
Type 3 tuner	2	15	0
Type 3A tuner	3	12	6
Type 4 tuner	4	2	0
Type 4RF tuner	6	6	0
Shure Microphones:	£	s.	d.
Shure 201	4	10	0
Shure 202	5	0	0
Shure 444	10	12	6
Shure 401A	5	10	0
Shure 275SK	4	2	6

SECOND-HAND EQUIPMENT
 Many items in stock including: LG-50, Tiger TR100, DX-100, SB10, K.W.76, K.W.77, 840C's, etc. Your enquiries please.
 Full Service Facilities—receivers re-aligned, transmitters serviced, etc.
 Illustrated Catalogue 7/6, post paid.

SWANCO PRODUCTS LIMITED

247 Humber Avenue, COVENTRY

Telephone: Coventry 22714 Hours: Mon.-Sat. 9 a.m.-6 p.m.

SMALL ADVERTISEMENTS, READERS—continued

DISPOSAL: G.E.C. BRT-400 receiver, £45. K.W. Vanguard Tx, covering 10 to 80m., £25. Avo Model 7 Test Meter, £7. SWR indicator type SWB-1, £4. Proceeds of this sale to widow of the late G2BOJ. Buyers to collect.—Waterhouse, G2CRG, QTHR, (or ring Doncaster 65094 after 7.0 p.m.).

SALE: KW-77 receiver, £65; can deliver to about 50 miles. Also a BC-453 as Q5'er, front panel controls, 50s., and Woden UM-1 mod. xformer, 30s.—German, G3OZT, 10 Beverley Road, Dibden Purieu, Southampton, Hants. (Tel. Hythe 3198).

SELLING: Phone transmitter, runs 120 watts, all-band coverage, with Geloso VFO, 2/807 PA and 2/807 Mod., TVI-proof, complete in AR88-type cabinet and professionally built, price £25. Prop-pitch motor, £5. Selsyn beam indicators, £4. B2 Tx complete, but less Rx, 40s. Unused TZ-40's, 10s.—Wyatt, 17 Harbour View Road, Parkstone (2368), Dorset.

FOR SALE: Heathkit RA-1 receiver, professionally built, in good condition, price £30, buyer to collect.—Higgs, 187 Churchill Road, Bentley, Walsall, Staffs.

WANTED: Receiver such as R.16, S.27, S.36 or similar. Selling: Eddystone S.640 Rx, with S-meter, in mint condition.—Kerley, 23 Rushton Road, Cheadle Heath, Stockport (9245), Cheshire.

PERFECT VHF Location for sale: Four-bedroom detached house on the outskirts of Northampton, architect-designed for G2HCG. Large radio room, with 3-phase wiring, built into upper storey, with access door on to flat roof. Site is 400ft. a.s.l., with 10-mile-plus horizon in all direction. Price £8,500. Mortgage can be arranged.—B. Sykes, G2HCG, 41 Booth Lane North, Boothville, Northampton.

FOR SALE: Complete 150-watt all-band station, consisting of Heathkit DX-100U transmitter and RA-1 amateur-band receiver. All in at £85, or offer? —Edwards, 18 St. John's Avenue, Friern Barnet, London, N.11. (Tel. ENTterprise 7586).

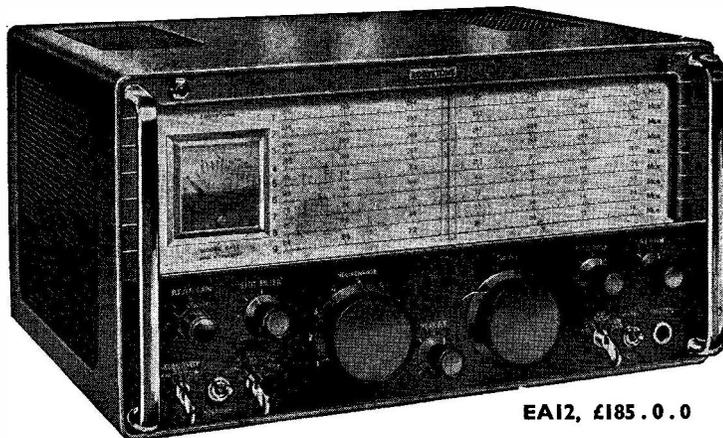
SELLING: Marconi CR-150/4 receiver, coverage 1.6 to 30 mc, with built-in AC/PSU, speaker and manual, £25. Buyer to collect. **WANTED:** Electronics QP.166 unit.—Harwood, 32 Franky Grove, Upton, Wirral, Cheshire. (Tel. Arrowbrook 5985).

SALE: Receiver R.1155B, unmodified, with separate PSU and output stage, £10. Also a Hallcrafters SX-28, 15 valves, covering 550 kc to 42 mc, with bandsread, S-meter, etc., price £20. Both items in perfect working order.—Harland, 6 Dart. Road, R.A.F. Station Abingdon, Berks.

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

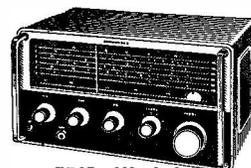
BARGAIN Sale! Amphenol transistor transceiver, 10-channel xtal controlled, coverage 27 to 31 mc, for 230v. AC or 12v. DC, fixed or mobile, size 9 x 7 x 4 inches, p-t-t microphone, in mint condition, original cost £68, will accept £20, or offer? Mini-mitter TR-7 Top Band Rx, needs aligning, 40s. Part-built K.W. Vanguard Tx, with Geloso VFO, all controls, knobs, meters, 807, etc., including all info, price £5. PSU Type 247, 1000-volt, 60s. Wave-meter Class-D No. 2, cased 19 x 12 x 12 inches, with spares and manual, and in excellent condition, at £10. Modulator, 20s. Qty. 27 hi/lo power variable capacitors, ceramic, etc., 20s. Pair Inducta shrouded HT/LT transformers, 20s. Qty. 15 PSU transformers and chokes, 10s. Resistors: Rated 1/4 to 5w., 100 new, 60 p.c. type and 300 used, 20s. Condensers, new and used; ceramic switches; valveholders; ball-race pot/meters; Sprague multi-cap, 30s. the lot. Anything over 40s. delivered to 10 miles. Callers after 6.30 p.m., pse.—Bedford, Flat 1, Ashfield House, Lawnswood Road, Wordsley, Worcs.

SWANCO PRODUCTS LTD. of COVENTRY

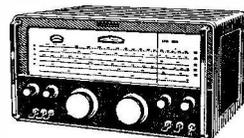


EA12, £185.0.0

Stock



EB35, £60.6.3



940, £133.0.0



EC10, £53.0.0



840C, £66.0.0

S.A.E. Illustrated Brochure to:

SWANCO PRODUCTS LTD.
 247 Humber Avenue, COVENTRY
 Telephone: Coventry 22714

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Two Labgear wide-band Multipliers Type E.5026.—Thornbory, G30IK, Old Cott, Thorverton, Devon.

SALE: K.W. Viceroy Mk. III, in first-class condition, £90 or near offer. Prefer buyer inspects and collects but could deliver to 50 miles.—Sykes, 8 Uplands, Ashtead (2546), Surrey.

JUNE Issue will be published on May 31. Single-copy orders (4s. post free) should reach us by 29th, for despatch on May 30. Just send a postal order, with a note saying "June issue, pse," with name and address. (Don't forget the QTH, as has happened on occasion!) And to get your Small Adv. into the June issue, send it in just as soon as possible—we cannot say how many we can render into print before the June issue has to close for press. Rate is 3d. a word, with a minimum charge of 5s. (which gives you 20 words, to include QTH).—Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Valves type 4X150, with bases and chimneys. Also a 24v. DC or 240v. AC blower motor (state performance); a Mullard QV02-6; portable AC generator rated one to three kilowatts; and a KW-2000 or KW-2000A. State price and condition.—Deacon, 69 Apsley Road, Oldbury, Warley, Worcestershire.

FOR SALE: Drake RV3 remote-control VFO, brand new and unused. Offers?—Doré, 5 Neston Way, Handforth, Cheshire. (Tel. Wilmslow 28979).

ULTIMATE in unpatriotic American Transceivers! A National NCX-5 Mk. II, with digital read-out to 100 cycles, and including AC/PSU-Speaker unit. In perfect order and appearance. Current price (if you could get one), over £350. Asking £200.—Jolly, G3TJY, Little Russel, Lytchett Minster (142), Near Poole, Dorset.

FOR SALE: Complete Heathkit SSB Station, comprising DX-100U with SB-10U Sideband Adaptor, at £80; Receiver RA-1, amateur bands spread, with Q-Multiplier and 1 mc Calibrator unit, at £30. All in excellent condition and including inter-connecting cabling, Ae. c/o relay and Rx mute. — Cammies, G3VNI, QTHR, or ring Deal 3409.

SALE: Successfully used R.A.E. postal course, complete, plus file of 1958-'65 question papers, with model answers and useful additional notes. Bargain at £5 5s., post paid.—Box No. 4628, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: A first-class CW transmitter, covering 10 to 80 metres and running 100-150 watts. The self-contained table top type preferred but other possibilities considered. All offers will be acknowledged and collection can be arranged.—Box No. 4629, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE or SELL: B.40 Type B, in excellent condition, front panel and cabinet stove-enamelled grey, new valves fitted (and set of spare valves), complete with manual; also an Eddystone S.640. Would Exchange for AR88 or DCR-100, in first-class condition and working order. — Bach, 27 Greville Hall, London, N.W.6.

ANY Offers? Minimitter Mercury 150-Watt Tx, 10-80m., with manual. HRO-MX with PSU, speaker, two bandspread and four general coverage coil packs, with manual. Wanted: Circuit and manual for T.W. Communicator, loan or buy.—Wheeler, G3RTW, 22 Brickhouse Lane, Stoke Prior, Bromsgrove (3313), Worcs.

WANTED: Quartz Crystals at 5.225, 5.275, 5.475 or 10.450, 10.550, 10.950 megacycles.—Evans, 10 Grasmere Road, Purley, Surrey, CR2-1DU. (Tel. 01-660 8379).

K. W. COMMUNICATIONS LTD.

The most experienced Staff in the Country are wishing to give you the best Service possible.

HY-GAIN ANTENNAE

	£	s.	d.
1BAVQ Vertical 10-80m	27	10	0
14AVQ Vertical 10-40m	16	0	0
12AVQ Vertical 10-20m	14	0	0
14RMQ Roof Mount Kit for 14AVQ	5	0	0
12RMQ Roof Mount Kit for 12AVQ	4	10	0
LC80Q 80m Loading Coil for 14AVQ	4	5	0
TH3JR 3-Element 3 Band Thunderbird Junior	35	0	0
TH3Mk2 3-Element 3 Band Beam Thunderbird 2kw p.e.p.	58	0	0
TH2Mk2 2-Element 3 Band Beam Thunderbird 2kw p.e.p.	35	0	0
204BA 4-Element 20m Beam	58	0	0
203BA 3-Element 20m Beam	42	0	0
153BA 3-Element 15m Beam	24	10	0
103BA 3-Element 10m Beam	20	0	0
BN242 Balun 10-80m (Latest model)	7	10	0

MOBILE ANTENNAE. Halson, Webster, Hustler Send for Lists

MECHANICAL FILTERS

Kokusai MF455-10CK and MF455-15CK	each	10	0	0
Sideband Carrier C-crystals	each	2	10	0

MOSLEY ANTENNAE

TA33JR 3-Element 3 Band Beam	27	5	0
TA32JR 2-Element 3 Band Beam	19	5	0
TA31JR 3 Band Dipole	11	11	0
V3JR Vertical 10-20m	8	5	0

CDR ROTATORS

TR10 £16 0 0 AR22R £22 0 0 TR44 £37 10 0 HAM-M £65 0 0
--

Carriage extra on all items above

KW Tested Equipment—ALWAYS CONTACT KW FIRST

Agents for—COLLINS, SOMMERKAMP, DRAKE, SWAN, DAVCO, HAMMARLUND, GALAXY, etc.
also a large range of "TRADE-IN" EQUIPMENT

KW offer the BEST deal—best terms—best Performance (all equipment Tested to manufacturers' specifications before despatch)—best Service backed by our own long experience in the Amateur Radio Market.

K. W. COMMUNICATIONS LTD.

1a Heath Street, Dartford, Kent. Telephone: Dartford (DA) 21919

TAURUS ELECTRICAL SERVICES

Prop.: G3T2D

Transistor Panels Ex NEW Equipment.

OC35 on Heat Sink, 8/9, post paid.
OC36 on Heat Sink, 9/3, post paid.
Mixed Transistors on Panels with Diodes, etc. Types: BCY30, 2N1500, 2N1499A, MDS31, GET882, 2S103, GET104, OC203, 12 and 15v. Zenors, etc. All guaranteed panels with at least 20 transistors, plus various components. All new Bargains at 20/-, post paid.
Silicon Planar Transistors by Fairchild P346 N.P.N. 550 Mc/s. working, 7/6 each, post paid.
600Ω Amplifiers. 19" rack mounted. Mains supply, £3.
Lightweight headsets. 600Ω imp., 9/6, post paid.
Transistors. A.F., 3/9 dozen, post paid.
New Ferrite Pot Cores, 1/6 each or 15/- dozen, post paid.
Transistorized Morse Oscillator Modules. Will drive speaker or phones, 18/9, post paid.
GGV03/12 or 10, 15/-, post paid.
New and Boxed Mains Relays, 2 pole 2-way octal base, 17/6, post paid.
New Nylon 2 1/2" Jack Sockets, 2/9 or 5/- pair, post paid.
Tank Aerials. Three 4' sections making 12', 8/6. P. & P. 5/- any number. Bases, 4/6. P. & P. 2/-.
Breast Sets. Safe for Mobile Operation, 10/-, post paid.
Xtal Insets to fit above Breast Sets, 7/6. P. & P. 9d.
Creed 7B Teleprinters. Used, £15. P. & P. 30/-.
Creed 7B Teleprinters. As new, £30. P. & P. 30/-.
All spare parts for Creed 7B Teleprinters in stock.
Head Sets. 19 set type or type DLR, 11/-, post paid.
Small Stand-off Insulators by Eddystone, 1/- each.
Dry Battery Packs. 72 and 1 1/2 and 1 1/4, 4/6 each. P. & P. any number 3/-.
New Key Switches. Less knobs, 2/6. P. & P. any number 1/-.
New Small Condensers, Not Junk, 200 for 25/-, post paid.
Multi-Test Meters. 1000Ω/V., 37/6.
Multi-Test Meters. 20,000Ω/V., £35/-.
Xtal Lapel Mikes. Complete, 6/6.
Class D Wavemeters with Headset and Instruction Sheet, £55/-, post paid.
Instruction Books for above with Circuit Diagrams, 7/6, post paid.
SPECIAL OFFER OF MIKES. D x 73 Pizo Dynamic, £32/6, post paid.
M.S.11 Dynamic with Flexible Desk Stand, £412/6, post paid.
ACOS Xtal (metal), MIC45, £12/6, post paid.
CM20 Xtal (plastic), 9/6, post paid.
CM70 Xtal Sock with Accessories, £27/6, post paid.
VALVEHOLDERS, B9A and B7G, 8d. each, Octal Ceramics, 1/3.
BY100 Rectifiers, 3/9 each, SM78P Sillicoms 800PIV 750M/A, 3/9.
Thyristors, 400 PIV 8 amps, 9/6 each.

TRANSISTORS

ATTENDING MOST MOBILE RALLIES

26/28 NOTTINGHAM ROAD, LOUGHBOROUGH, LEICS.

Telephone 5131

SMALL ADVERTISEMENTS, READERS—continued

SALE: Hallicrafters S.27C receiver, £22. Waveform Generator, £4. Mains PSU, output 1200v. at 200 mA DC, price £6 10s. TBY-8 Tx/Rx. coverage 28-80 mc, £10.—Box No. 4630, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Manuals, for B.40, 38s.; AR88LF, 15s.; Type 339 'Scope, 33s.; S.27C, 25s.; SX-28, 20s. AR77E and others, send s.a.e. — Brook, 5 Farrant House, Winstanley Road, London, S.W.11.

FOR SALE: M. & G. SSB Transmitter/Receiver, 90 watts p.e.p., with mains PSU, coverage 20-80-160m. compact, ideal for portable/mobile. Offers invited. —Hurst, G3JJU, 7 The Laurels, Burnside, Fleet, Hants.

SELLING: A Collins KWS-1 Tx, for SSB/AM/CW, with press-to-talk or voice control, pair 4X250B's in final, capable 1 kW p.e.p., including solid-state PSU, Variac controlled. These rare transmitters cost originally about £1,000. Asking £275. — Kirkbride, 15 Greenfield Road, Colne, Lancs.

TOP Price paid for Tri-Band Beam, new condition essential. Send s.a.e. for surplus sale lists. — Trowell, G2HKU, Hamlyn, Saxon Avenue, Minster Sheppey, Kent.

EXCHANGE or Sell: Swan 350, with PSU and Vox, in perfect condition and little used, price £200, or Exchange for KW-2000A, in similar condition and near new. (Midlands).—Box No. 4631, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WHEN Visiting EI via Holyhead, why not bed-and-breakfast with GW3MQX. Garage available, and few minutes only from car ferry and railway. —QTHR.

WANTED: DC/PSU suitable for NCX-3 (12v. negative earth). Selling: T.W. Communicator for 160m., excellent condition, price £45. — Phillips, GW3XCR, 40 Castle Drive, Cimla, Neath (4998), Glam., South Wales.

BARGAINS! Miniature Oscilloscope Type CT-52, with manual, £15. Double-superhet Rx for 10-80m., IFT's fitted for 3rd conversion to 85 kc, £15. SSB transceiver for 80m., with mechanical filter and linear. £30. PSU, 500v./1000v., £5. Avo Model 8 Testmeter, £10. 4X150A, 40s. 4X250B, 60s. QGV06-40A, 20s. 829B, 832A, A.2521, 15s. Postage extra. (West Wales).—Box No. 4632, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: A specimen R.216 receiver, coverage 19 to 157 mc, with brand new matching PSU, and all pluggery, full details on request and can be seen by appointment; sensible offers only, please, and best secures. Also an R.209 Mk. II, 12-volt, 1-0-20 mc, with spares pack and in good condition, £12 or near offer. High quality 8 mF 600v. capacitors, cost over 40s., ex-equipment but in good condition. 5s. post paid. RTTY tape, ten 8-inch rolls in sealed packs, 25s. the lot, post paid.—Adamson, Woodend, Victoria Road, Kingsdown (288), Deal, Kent.

SALE: National HRO-5T receiver, BS coil packs for 10-40-80-160m, also GC coils, with mains PSU, speaker, manual, no mods., and in mint condition, £30. Tx and Rx for 145-45 mc, with built-in PSU, single-switch control, modified TR.1986 plus R.114 and pre-amp. IF 7-6 to 9-6 mc, in smart case, price £10. — Jones, G3RCU, 90 Abbey Road, Sandbach, Cheshire.

MANUALS: Used but complete, for AR88D and HRO-MX, 7s. 6d. each, post free. Valves for AR88, HRO, R.1132A, RF-24 and RF-26 Units, BC-342, etc., 3s. each, post free. Teleprinter Relays Type BN. 320AN, 12s. 6d.; Carpenter Type 5, with base, 10s., postage extra.—Cook, G5XB, QTHR, or ring Kidmore End 2195.

WANTED: Faulty receiver, such as R.1155, CR-100, CR-300, R.107, AR77 or what-have-you, any condition acceptable, state price. Collection arranged anywhere.—Bentley, 27 De Vere Gardens, Cranbrook, Ilford, Essex. (Tel. 01-554 6631).

SMALL ADVERTISEMENTS, READERS—continued

COLLECTORS! Am selling a variety of early valves and components, dating from the 1914-18 War. Send s.a.e. for lists or appointment to view. (Berkshire).—Box No. 4633, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Eddystone EC-10, as new and complete in carton, with manual, price £34, buyer to collect. Also Radio School Morse record, 3s. (London).—Box No. 4644, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Panda ATU, first-class condition and appearance, at your own fair price, to include carriage.—Wylie, G3MEF, QTHR, or ring Barnstaple 2665.

BARGAIN! Swan 350 Transceiver, complete with PSU. Absolutely as brand new, used only twice, log book as proof. Genuine reason for sale is that I have no time whatsoever to operate this fine example of amateur-band equipment. Price £215, no offers.—Cross, G3OZD, 38 Doncaster Road, Hatfield, Doncaster, Yorkshire. (Ring Hatfield Woodhouse 693, or 383-348 between 9.0 and 10.30 a.m.).

FOR SALE: T.W. Twomobile, complete with mains PSU and speaker unit, genuinely as new. (West Herts. area).—Box No. 4645, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Quartz crystals 3.5 to 3.6 mc, also 7.0 to 7.05 mc, fundamentals. And a Minimitter Top 2-7.—Sweeney, 58 Grosvenor Road, Epsom Downs, Surrey. (Tel. Ashstead 2689).

WANTED: An Edometer GDO, Hammarlund HQ-170A receiver and 2-4 amp. Variac. — Eaton, G3SMK, 54 Yoxall Road, Shirley, Solihull, Warks.

WANTED: Pye Cambridge "Vanguard" or "Ranger" mobiles, also fixed stations, high or low band, in any condition. Also R.216 receiver with PSU; tuning gearbox assembly for Hallicrafters for S.27 or S.36 receiver.—Box No. 4646, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1, or ring Manchester 061-BRO 1214.

FOR SALE: R.220 VHF receiver, covering 60 to 150 mc, £5. Amplifier Type 1413, with PSU and 6V6 o/p stage, 60s. R.1475 Rx (Type 88), £9. Test Oscillator Type TS-32D/TRC-1, coverage 70 to 100 mc, range easily extended, 60s. R.1137A VHF Rx, tunable 80 to 150 mc, £4. Marconi 52 Set, £8. Waveform/Pulse Generator Type 51, £5. All carriage extra. Pse include s.a.e. with enquiries.—Hayward, Sunnyfields, Lighthouse Road, St. Margaret's Bay, Nr. Dover, Kent.

WANTED: Eddystone receiver EC-10, 680X or 940; also STC 4032 microphone, and Brown's "A" headphones and JJK converters. **FOR SALE:** Cossor Type 1049 double-beam 'scope, with manual, £20. Geloso 4-metre VFO/driver, new, cased and with PSU, £7 10s. AR88D, as new, with speaker, tools and manual, £55. Microphones: Reslo RBT and Grampian DP4/6, £6 each; STC 4021, £8. Swift (English) microscope in as-new condition, price £60, details on request. Would deliver sales items to any reasonable distance.—Pike, G3WDY, 27 Cintra Park, Upper Norwood, London, S.E.19.

SELLING: Eddystone 940 receiver, 18 months old and in excellent condition. Price £85.—Monson, 73 Appledore Road, Speke, Liverpool, 24.

FOR SALE: Three-gang 310 mmF tuning condenser, 15s.; three Denco coils range 3T, aerial, RF interstage, and 465 kc oscillator, 12s.; factory-aligned TSL 465 kc IF strip, £4. All bought brand new for a planned multiband receiver and not used since.—Caddick, 40 Ferndown Road, Solihull, Warwickshire. (Tel. 021-705 7295.)

WANTED: Cheap RA-1 Heathkit receiver for young beginner, in any condition. Please write with details.—Parkin, 34 Pendeen Road, Birmingham 14.

EDDYSTONE SHOWROOM



Visit the Eddystone Showroom at Imhofs and see all the popular models on permanent side by side demonstration. You can hear and compare the models that interest you and obtain the most expert advice about this range of superb communication receivers and accessories. Same day despatch to any part of the world, tax free for export and free delivery in the U.K. After sales service second to none.

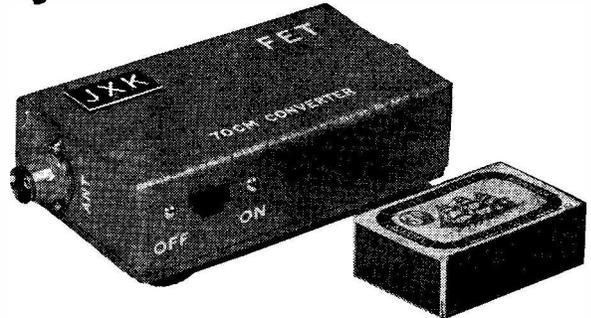
- EB35 — £62.10. 0.
- EB36 — £56. 5. 0.
- EC10 — £53. 0. 0.
- 840C — £70. 0. 0.
- EA12 — £195. 0. 0.
- 940 — £143. 0. 0.
- 830/7 — £295. 0. 0.

Send today for full details

AT IMHOFS

Main Eddystone Retail Distributors for the London Area
 Alfred Imhof Limited, Dept.11/5,
 112-116 New Oxford Street, London WC1. 01-636 7878
 R46

JJK CONVERTERS



- Introducing a new 70 cm FET Converter at a reasonable price :
- 1 **AF239 FRONT END (selected)** NF 2.5 dB. TIS34 FET low-noise mixer. Power 12v, at 9 ma. DC. Positive earth. I.Fs. 28-30, 24-26, 18-20, 12-14 MHz ... £16
 - 2 **METRESB TRANSVERTER CONVERTER.** TIS34 FET cascode RF, NF 1.8 dB. 2N3819 FET mixer. High-Q break tuned to injection frequency. 28 MH. IF (116 MH. injection). 14 MH. IF (130 MH. injection) ... £12
 - 2 **METRE FET CONVERTER.** TIS34 cascode RF, NF 1.8 dB. RF bandpass transformer preceding 2N3819 low-noise mixer. Cathode VHF crystal. Silicon planar injection stages. Power: 12v, at 9 ma. DC. Positive earth. I.Fs. 28-30, 24-26, 18-20, 12-14 MHz ... £16
 - 4 **SATELLITE BAND CONVERTERS.** 136-137 MH. Specification as 2 metre unit I.Fs. 28-29, 20-21 MH ... £16
 - 4 **METRE FET CONVERTER.** TIM12 cascode RF, NF 1.8 dB. RF bandpass transformer preceding TIM12 low-noise mixer. Cathode VHF crystal. Silicon planar injection stages. Power: 12v, at 7 ma. DC. Positive earth. I.Fs. 29-1-29-7, 18-1-18-7, 4-1-4-7, 2-1-2-7 MH ... £16
 - 2 **METRE FET PREAMPLIFIER.** TIS34 cascode RF, NF 1.8 dB. RF bandpass transformer preceding 2N3819 source-follower 75 ohm output stage. Power: 12v, at 5 ma. DC. Positive earth. For mast-head use may be fed via coax. output feeder ... £12
- Post and packing 3/9 per item
- 2N3819 19/6, TIS34 25/-, TIM12 12/6, GM290A 15/-.

JJK CONVERTERS
 PEEL HOUSE, PORTERS LANE, OSPRINGE, FAYERSHAM, KENT

G5JV REX RADIO G3JVM

TRIO JR500SE. Double conversion front end, amateur bands receiver (3.5-29.7 mc/s.). Really good on S.S.B. 59 gns.

TRIO 9RS9DE. General coverage receiver (5.50kc/s.-30 mc/s.) with bandspread on 80m.-10m. amateur bands 35 gns.

ONE OF THE RARE MARCONI, all transistor, 19" colour TV RECEIVER 284 gns.

PICKSTONE instant heat soldering irons. Considered by all our staff to be the best £3 9 6

BELLING-LEE HIGH PASS FILTERS. Kill that T.V.I. £1 5 0

COMMUNICATION RECEIVER TYPE S.8 with A.C./P.S.U. and speaker. No one seemed to want this at £15 (last month) so how about £12 10s? Works well £12 10 0

AGENTS for B. & O. Hi-fi. equipment. All in stock including the BEOLAB 5000.

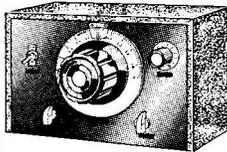
DRAKE to order. But we can give you a practical demonstration any time by appointment.

329 Kilburn Lane, London, W.9

Telephone Ladbroke 1770

SHOWROOMS AT 301 KILBURN LANE W.9

COMMUNICATION RECEIVER TYPE GDX



Brand new fully transistorised Communications Receiver, Type GDX/25/C. Specifications: 4, complete ranges 550 Kc/s. to 30 Mc/s., covering all amateur bands, shipping and trawler bands, and broadcast band. A highly efficient double tuned superhet, comprising R/F aerial tuning section, A.V.C. and built-in B.F.O. for C.W. or SSB reception. Operates from internal 9v. batteries provided. Ideal for Fixed or Mobile reception. With speaker and headphone output. Hammer finish robust steel case of pleasing modern design. Size approx. 9" x 7" x 7". British manufacture. Due to huge purchase we can offer these excellent receivers at less than half their normal price. Complete with handbook, £16 10s., carriage and insurance £1. Headphones if required 15/- extra, p.p. 3/6.

COLLAPSIBLE AERIAL

IN 5 SECTIONS
CLOSED 13"
OPEN 5'-6"

Aerial Tuner units for Tx/Rx use. Will load almost anything. Calibrated control dial. Housed in compact steel case. Ideal for all radio amateurs and S.W.L.s, 25/-, p. and p. 7/6.

A fully adjustable highly efficient Whip aerial made to exacting specifications. Copper plated sections. Brass base. An ideal aerial for Tx/Rx use. Easily adaptable for cars, scooters, walkie-talkie. Brand new in makers boxes. Only £1 each, p. and p. 2/6. Two aerials for 35/-, post free.



GLOBE SCIENTIFIC LTD

Dept. No. S.W.10.

24 Cawoods Yard, Mill Street, Marsh Lane, Leeds 9

SMALL ADVERTISEMENTS, READERS—continued

SELLING: Swan 350 with AC/PSU, £220. Trio JS-500R, new January, 1968, coverage 10 to 160m., £50. Both in mint condition and original packing. Reason for sale, have bought new transceiver. Also available, G3HSC Morse Course, 30s.—Ring G3XJN, Epsom 21486.

FOR SALE: Heathkit DX-100U and National HRO receiver, at £55 or near offer. HRO rough but works. Station can be heard on 40m. most weekends. Reason for sale, emigrating.—Wiggins, G3TTX, 19 Devon Walk, Cottesmore, Rutland.

SELLING: Heathkit DX-100U Tx, covering 10 metres to Top Band, factory built and little used, bargain at £45.—Glover, Richmond Road, Catterick Camp (3311), Yorkshire.

TIDYING UP: Xtals, FT-243 mounting, 7950, 8125, 8150 kc at 5s. each. TMR5/6 Rx, not working but all there. Any offers? Converter, 12v. DC to 230v. AC 50w. vibrator, 60s. "Ham 1" Rx, very utility, £7. Valves, ex-equipment, no guarantee, all at 5s.: 12H6, 12SJ7, 12SH7, JTL-955, JRC-9004.—Jarvis, G8APX, Royal Masonic Senior School, Bushey, Herts.

SALE: Complete Amateur Station, Geloso G.210 Tx and companion G.207 Rx, both covering 10 to 160m., in first-class order, £65 the lot. Space-mark SSB printed circuit, phasing type, all parts, with crystal, valves and Vox relay, brand new, built and working, only requires final alignment, cost £23, selling at £11. Type 19 Set, brand new, converted for 80/160m. fixed or mobile Tx/Rx, with Clapp VFO and mobile PSU, £8. BC-348 receiver, £6. BC-453 as Q5'er, £5. Reasonable transport possible.—Sketch, GW3DDY, 30 Dan-Yr-Heol, Cyncoed, Cardiff (753914), South Wales.

EXCHANGE: A B.S.A. "Airsporter" 0.22 calibre air rifle, with 3X-9X variable telescopic sight, in beautiful condition and cost over £40 — would Exchange for a communications receiver in good condition, such as a HA-500, HA-700 or what-have-you. — Swinney, 11 Lower Fosters, New Brent Street, Hendon, London, N.W.4.

CLEARING: At reduced prices, a few copies each of "Automobile Electrical Equipment," useful book for the mobileer, at 30s.; "Technical Topics," 1st edition, 8s. 8d.; and U.K. "Call Book," 1967 edn. of the G-listings only, 4s. All post free. Cash will be refunded or held to credit if stock sold out. — Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Hy-Gain TH3jr. three-element beam, for 10-15-20m., as new, price £28. Unused CDR AR-22R rotator, £18. HW-32A, complete with calibrator and GH.12 microphone, three months old, £50. HP-23E AC/PSU, with SP.600 cabinet and speaker, £32. Would take £120 for The Lot as a complete station, costing £170 when new three months back. (Herts.)—Box No. 4647, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: A Leak Trough-Line FM Tuner, little used, at £20.—Moseley, 51 Bradbury Road, Olton, Solihull, Warks.

WANTED: T.W. "Communicator" or similar commercial two-metre Transceiver. Must be in perfect working order and complete with AC/DC PSU's.—Morton, GMBBJJ, Mount Stuart Street, Millport, Isle of Cumbrae, Buteshire, Scotland.

MORSE MADE EASY !!!

FACT NOT FICTION. If you start RIGHT you will be reading amateur and commercial Morse within a month. (Normal progress to be expected.)

Using scientifically prepared 3-speed records you automatically learn to recognise the code RHYTHM without translating. You can't help it, it's as easy as learning a tune. 18 W.P.M. in 4 weeks guaranteed.

For details and course C.O.D. ring, s.t.d. 01-660-2896 or send 8d. stamp for explanatory booklet to:
G3HSC/F, 45 GREEN LANE, PURLEY, SURREY.

Fast Mail Order for the Amateur Radio Enthusiast!

AERIAL EQUIPMENT

TWIN FEEDER. 300 ohm twin ribbon feeder similar K25, 8d. per yard. 75 ohm twin feeder, 6d. per yard. Post on above feeders, 2/- any length.

COPPER WIRE, 14G. H/D. 140ft., 30/-; 70ft., 16/- . Post and packing 3/3. Lengths are approx. only, actually sold by weight.

FEEDER SPREADERS. 6" Ceramic type F.S., 10d. each. Postage 2/6 up to 12.

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

2 METRE BEAM, 5 ELEMENT W.S. YAGI. Complete in box with 1" to 2 1/2" masthead bracket. Price: £3 7s. Carriage 5/-.

SUPER AERAXIAL, 70/80 ohm coax, 300 watt very low loss, 2/3 per yard. 50 ohm 300 watt, 2/6 per yard. P. & P. 2/6.

TOUGH POLYTHENE LINE, type ML1 (100lb.), 2d. per yd. or 12/6 per 100 yds. Type ML2 (220 lb.), 4d. per yd. or 25/- per 100 yds., ML4 (400 lb.), 6d. per yd. Ideal for Guys, L.W. Supports, Halyards, etc. Postage 1/6 on all line.

CALLERS PLEASE NOTE

Our NEW Hours of Business
Mon., Tues., Wed., Fri., and Sat.

9.00 a.m. - 5.00 p.m.

Special

LATE SHOPPING NIGHT
THURSDAY

9.00 a.m. - 8.00 p.m.

NEW BOXED VALVES. 3/6 each, 4 for 10/- . P. & P. 2/-.

Types 6N7GT, 6AB7, 6AC7, 6SK7, 6SF7, 6SH7, 6F7, 956, U10, MSP4, IUS, 6G6G, X22, 958A.

ABSORPTION WAVEMETERS. 3.00 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 25/- EACH. P. & P. 1/6.

SHORT WAVE KITS. One valve only, 45/-, phones, ant, and batts, 40/- extra if required. Ideal for Junior op.

VARIABLE CONDENSERS. All brass with ceramic end plates and ball race bearings. 50pF, 5/9; 100, 6/6; 160, 7/6; 240, 8/6. Extension for ganging. P. & P. 2/-.

SEALED RELAYS, 12v. 105Ω Coil Type A. 4 Pole, C.O., 15/- . Type B. 2 Pole, C.O. + 2 Pole Norm. on, 12/6. P. & P. 1/6.



The Widest Range in the Midlands

★ **HIRE PURCHASE**
 ★ **PART EXCHANGE**

CHAS. H. **YOUNG LTD.**

At your service **G2AK, G3LAY, G3VVF**

Please print your-address. No C.O.D. under £1.

'phone 021-236-1635

170-172 Corporation Street,
 Birmingham 4

IT'S HERE

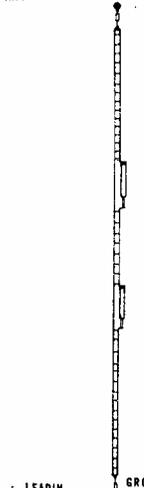


IT'S SPRINGTIME!

MOSLEY

AND SPRINGTIME IS ANTENNA TIME

ANY SUITABLE MOUNTING



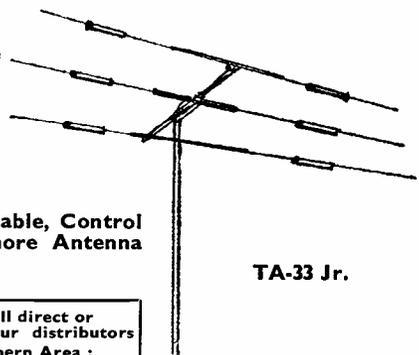
TW-3X Jr.

BACK BRITAIN
 Manufactured 100% in England

ELAN	SWL-7
TA-33 Jr.	RD-5
TA-32 Jr.	A-315
TA-31 Jr.	A-215
V-3 Jr.	A-310
VTD-3 Jr.	A-210
TD-3 Jr.	TW-3X

Imported Antenna's

Classic-33	Lancer Mobile
A-203-C	V-4-8
TA-36	A-92-S
TA-33 Snr.	TD-2
TA-32 Snr.	DI-10
V-4-6	RV-4RK
RV-4	



TA-33 Jr.

Rotators, Towers, Polythene cord and rope, Coax cable, Control cable, Twin feeder, SWR indicators and many more Antenna accessories.

Send for complete Catalogue, containing full details and prices of Antenna's and technical information. 26 pages 1/6.

We sell direct or through our distributors
 Southern Area :
K.W. Electronics Ltd.
 Midland Area :
Swanco Products Ltd.

Carriage and Insurance Extra

Telephone: Costessey 2861, orders only

Mosley Electronics Ltd. 40, Valley Road, New Costessey, Norwich, Norfolk Nor. 26K

MORE TITLES

Amateur Radio Construction Projects	21/-
Beginner's Guide to Radio (Newnes)	9/-
Beginner's Guide to Colour Television (Newnes)	15/8
Beginner's Guide to Electronics	15/6
Dictionary of Electronics (Penguin)	8/6
Electronic Transistor Circuits (Foulsham)	25/9
Q. & A. On { Audio	10/-
(Newnes) { Electronics	10/-
{ Transistors	10/-
Handbook of Transistor Circuits (Foulsham)	36/-
Introduction to Valves (Hilffe's)	9/4
Radio Astronomy for Amateurs (by Frank Hyde)	31/-
Remote Control by Radio (Philips)	10/9
Radio and Electronic Hobbies (by F. C. Judd, G2BCX)	22/-
Radio Engineers Pocket Book (Newnes)	11/-
RCA Silicon Power Circuits Manu. I	23/-
RCA Receiving Tubes Manual	23/-
RCA Transistor Manual	23/-
RCA Transmitting Tubes	15/-
Shop and Shack Shortcuts (by W6TNS)	34/6
Short Wave Amateur Radio (by PAØHH, Philips Technical Library)	23/6
Short Wave Listening (by J. Vastenhoud)	13/2
Short Wave Listener's Guide (Foulsham)	13/6
Transistor Transmitters for the Amateur (Foulsham)	22/-

CALL BOOKS

"G's" (1968) 6/7

SPRING EDITION

"DX Listings" £2/2/6

"U.S. Listings" £3/4/6

The two together, covering the World £5/2/6

MORSE COURSES

G3HSC Rhythm Method of Morse Tuition

Complete Course with three 3 speed L.P. records with books	84/-
Beginner's Course with two 3 speed L.P. records with book	60/6
Single 12" L.P. Beginner's with book	50/-
Single, 12" L.P. Advanced with book	50/-
Three speed simulated GPO test. 7" d.s. E.P. record	15/-

MAPS

AMATEUR RADIO MAP OF WORLD

Mercator Projection — Much DX Information — In Colour. Second Edition	8/9
---	-----

DX ZONE MAP (GREAT CIRCLE)

In colour (Revised to October 1966)	14/9
(See S.W.M. page 643, January 1967)	
Black and White only	5/6
(See S.W.M. page 661, January 1967)	

RADIO AMATEUR MAP OF THE U.S.A. AND NORTH AMERICA

State boundaries and prefixes, size 24" by 30", paper	7/3
--	-----

RADIO AMATEUR'S WORLD ATLAS (NEW EDITION)

In booklet form, Mercator projection, for desk use. Gives Zones and Prefixes	16/-
--	------

LOG BOOKS

RSGB Standard Log	7/3
RSGB Log and VHF Contest Log	7/3
RSGB Receiving Station Log	7/3
RSGB Radio Station Log Book	7/3

A.R.R.L.

(Spiral bound)	12/-
--------------------------	------

A.R.R.L.

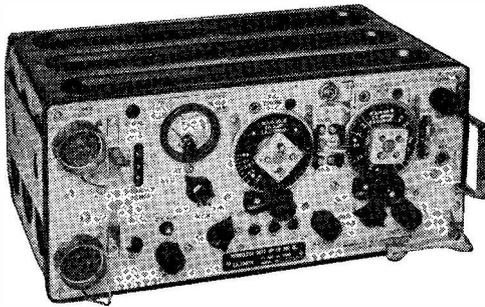
(Minilog) 4" by 6"	5/6
------------------------------	-----

Please see main list on back cover.

Available from **SHORT WAVE MAGAZINE**

Publications Dept., 55 Victoria Street, London, S.W.1 . . . 01-222 5341

(Nearest Tube Station, St. James's Park)



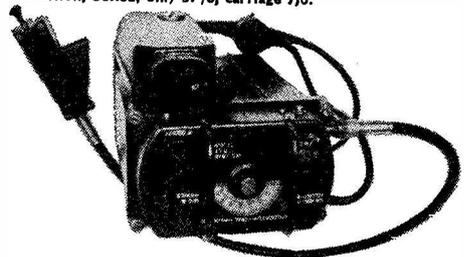
FAMOUS ARMY SHORT-WAVE TRANSRECEIVER MK.III

This set is made up of three separate units (1) a two valve amplifier using a 6V6 output valve; (2) (some only, not built in the very latest models) a V.H.F. transreceiver covering 229-241 Mc/s. using 4 valves; (3) the main shortwave transmitter/receiver covering, in two switched bands, just below 2 Mc/s.-4 1/2 Mc/s., and 4 1/2 Mc/s.-8 Mc/s. (approx. 160-37.5 metres) using 9 valves. For R.T., C.W. and M.C.W. The receiver is superheterodyne having 1 R.F. stage, included for C.W. or single side-band reception. T.X. output valve 807 other valves octal bases. Many extras, e.g. netting switch, quick flick dial settings, squelch, etc. Power requirements LT 12 volts, HT receiver 275 volts D.C., HT transmitter 500 volts D.C., size approx. 17 1/2 x 7 1/2 x 11 ins. Every set supplied in new or as new condition in carton with book including circuits, only £4 10s. 0d., or Grade 2 slightly used 50s., or Grade 3 used but complete 35s., MAKE A MAINS 200/250 VOLT POWER UNIT in louvered metal case to plug direct into 6 pin set power socket to run (1) receiver, 70s., post 5s.; (2) TX and RX, £6 10s. 0d., post 7s. 6d. A charge of 10s. to unpack and test the receiver of these sets is made only if requested. Headphones and mike new boxed, 15s., post 2/6

FEW ONLY LEFT

WALKIE-TALKIE MK III and CRYSTAL CALIBRATOR No. 9

This set is housed in a waterproof diecast aluminium case made by Murphy Radio for the Govt. having only reliability and quality in mind. Range 7.3-9 Mc/s. also on side of set is crystal calibrator No. 9 which gives pips on marks provided on the tuning dial. Set uses a total of 5 valves; power required L.T. 4 volts D.C. H.T. 100-175 volts D.C. Sets supplied in NEW or as new condition, boxed, only 37/6, carriage 7/6.



V.H.F. TRANSRECEIVER MK.1/1

This is a modern self contained tunable V.H.F. low powered frequency modulated transceiver for R.T. communication up to 8-10 miles. Made for the Ministry of Supply at an extremely high cost by well known British makers, using 15 midjet B.G. 7 valves, receiver incorporating R.F. amplifier, Double superhet and A.F.C. Slow motion tuning with the dial calibrated in 41 channels each 200 Kc/s. apart. The frequency covered is 39 Mc/s.-48 Mc/s. Also has built-in crystal calibrator which gives pips to coincide with marks on the tuning dial. Power required L.T. 4 1/2 volts, H.T. 150 volts, tapped at 90 volts for receiver. Every set supplied complete with valves and crystals. New in carton, complete with adjustable whip aerial, and circuit. Price £4 10s. 0d. carriage 10s.



JOHN'S RADIO

(Dept. F)

OLD CO-OP, WHITEHALL ROAD,
DRIGHLINGTON, BRADFORD
Telephone: DRIGHLINGTON 2732

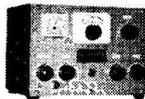
SSB PRODUCTS DERBY



PYRAMID

SPHINX Mk.II

(Same size as Pyramid) 160-80-20 m. SSB/AM/CW. Quality construction throughout. Built in power supply. (£21 deposit) Part exchanges. £84.0.0 (£1 carr.). Fully assembled.



CANONBALL

"CANONBALL" TX. SSB/AM/CW. 1.8-2 mc/s. or 3.5-4 mc/s. 12 watts of real punchy signal, for either mobile or fixed. Size 8" x 6" x 6". £38.0.0 (7/6 carr.). This Tx. is ready made. 260v. H.T. 70 mA required.



DELTA

"DELTA" CONTROL UNIT. 240v. A.C. input. Provides AE. co-ax c/o up to 2 mtrs. Many auxilliary contacts, plus 12v. D.C. o/p. £7.5.0 (4/6 carr.). Assembled price.



NAPOLEON

"NAPOLEON" S.W.R. BRIDGE. 1-50 mc/s. 80Ω. Sensitivity control. For/rev. switch. £5.5.0 (4/6 carr.). Assembled Price.

"SCARAB" Xtal Filters, £8/7/6 (2/-).
"SCARAB" Xtal Filter Kits, £6/19/6 (2/-).
Complete with carrier xtal. All filters are complete with CCT. and easy to build instructions. No test gear needed. (436 Kc/s.). You cannot go SSB with good quality any easier. Imported filters as good as this cost twice the price. Build a TX yourself and learn a lot.

SILPLUG units, 500v., 30/-, 750v., 40/- (2/-).
D.A.I. electronic keyers in stock, £16/10/- (6/-).
KY.102 bug keys in stock. £4/10/- (4/6).
R.F.45. FIELD STRENGTH meters, only 45/- (2/-). RF40, £4.
DM16 HL dynamic mic. and table stand, only 92/6 (4/6).
6146. BRAND NEW and BOXED, only 32/6 (2/3 each, P. & P.).
6HF5. 36/6 each (2/3 each Post). Base 4/6 each (6d. P. & P.).
BM3 Mic's. Few left at 32/- each (4/6).
PI-CHOKE. 1 kW, 9/6 (1/-).
Only 2-10m/- (1/6).

TRIO REC'S
New models just received!
9R-59DE, £39.15.0.
JR500SE, 160 m. to 10 m., £73.5.0.

PI-CHOKE



SCARAB



SILPLUG

Special Offer LAFAYETTE HA350-240v. 1/P. models. Covering 160-10 m. with calibration xtal. Complete boxed new. 2 only, £82 ea. carr. paid. Last of stock.

7A EDWARD ST., DERBY. Telephone: 42909-42961

MANUFACTURERS OF FINE QUALITY ELECTRONIC EQUIPMENT!

TECHNICAL PUBLICATIONS

LATEST ISSUES

	Post Free
ABC OF ANTENNAS (Foulsham).....	16s. 9d.
AERIAL HANDBOOK by G. A. Briggs (2nd Edn.).....	15s. 9d.
AMATEUR RADIO (by F. G. Rayer).....	26s. 0d.
AMATEUR RADIO ANTENNA HANDBOOK. (by H. D. Hooton, W6YTH).....	28s. 0d.
ANTENNA HANDBOOK Vol. 1, by K7GCO (Cowan Publication).....	33s. 6d.
ANTENNA ROUND-UP (by CQ) Vol. I.....	27s. 6d.
ANTENNA ROUND-UP (Vol. 2).....	33s. 6d.
ANTENNA HANDBOOK (A.R.R.L., 10th Edition).....	21s. 6d.
BASIC MATHEMATICS FOR RADIO AND ELECTRONICS.....	18s. 3d.
BEAM ANTENNA HANDBOOK, 3rd Edition.....	33s. 0d.
BETTER SHORT WAVE RECEPTION.....	27s. 6d.
CHART OF INTERNATIONAL FREQUENCY ALLOCATION—GENEVA (Official 10 Kc to 40 Gc), New Edition. 24in. x 16in. wide folding pages.....	35s. 0d.
CQ ANTHOLOGY 45-52.....	18s. 6d.
CQ ANTHOLOGY (1952-1959).....	27s. 6d.
COURSE IN RADIO FUNDAMENTALS (A.R.R.L.).....	11s. 6d.
DICTIONARY OF ELECTRONICS (Penguin).....	8s. 6d.
ELECTRONIC CIRCUITS HANDBOOK Vol. I.....	27s. 6d.
ELECTRONIC CIRCUITS HANDBOOK Vol. II (Tom Kneitel).....	27s. 6d.
FOUNDATIONS OF WIRELESS.....	22s. 6d.
GUIDE TO AMATEUR RADIO.....	O/P
GUIDE TO BROADCASTING STATIONS.....	6s. 9d.
HAMS INTERPRETER.....	9s. 6d.
HANDBOOK OF HAM RADIO CIRCUITS (by W9CGA).....	28s. 0d.
HINTS AND KINKS Vol. 6.....	11s. 6d.
HOW TO BECOME A RADIO AMATEUR (A.R.R.L.).....	11s. 0d.
"HOW TO LISTEN TO THE WORLD".....	27s. 3d.
LEARNING MORSE (Iliffe).....	2s. 3d.
THE MORSE CODE FOR RADIO AMATEURS (R.S.G.B.).....	1s. 9d.
LEARNING THE RADIO TELEGRAPH (A.R.R.L.).....	4s. 6d.
MOBILE HANDBOOK (Published by CQ).....	26s. 6d.
MOBILE MANUAL (Published by A.R.R.L.).....	27s. 0d.
NEW RTTY HANDBOOK.....	35s. 0d.
NEW SIDEBAND HANDBOOK (by CQ).....	27s. 6d.
NOVICE HANDBOOK, Tx and Rx, 150 pages.....	25s. 0d.
OPERATING AN AMATEUR RADIO STATION (A.R.R.L.).....	2s. 8d.
PORTABLE TRANSISTOR RECEIVER.....	3s. 0d.
QUAD ANTENNAE.....	25s. 6d.
RADIO AMATEUR EXAMINATION MANUAL.....	5s. 9d.
RADIO AMATEUR HANDBOOK (A.R.R.L.), 1967 (Few copies).....	35s. 0d.
RADIO AMATEUR HANDBOOK (A.R.R.L.), 1968.....	Paper Edition 50s. 0d. Buckram Edition 60s. 0d.
RADIO AMATEUR OPERATOR'S HANDBOOK (Data Publications).....	5s. 6d.
RADIO AMATEUR CALL BOOK (U.K. only, 1968).....	6s. 7d.
RADIO CONTROL FOR MODELS (F. C. Judd).....	16s. 0d.
RADIO DATA REFERENCE BOOK.....	14s. 0d.
RADIO HANDBOOK (Wm. I. Orr) (17th Edition).....	88s. 6d.
RADIO VALVE DATA (Iliffe), Eighth Edition.....	10s. 7d.
SERVICE VALVE AND SEMI-CONDUCTOR EQUIVALENTS (R.S.G.B.).....	5s. 6d.
SSB EQUIPMENT.....	3s. 3d.
S9 SIGNALS.....	9s. 6d.
SHORT WAVE LISTENING.....	13s. 2d.
SHORT WAVE RECEIVERS FOR THE BEGINNER (Data Pubs.).....	6s. 6d.
SHORT WAVE RADIO AND THE IONOSPHERE (Iliffe).....	11s. 9d.
SINGLE SIDEBAND FOR THE RADIO AMATEUR (A.R.R.L.) (4th Edition).....	26s. 0d.
SURPLUS CONVERSION MANUAL Vols. 1, 2 and 3.....	each 27s. 6d.
SURPLUS HANDBOOK (E. & E.).....	27s. 6d.
SURPLUS SCHEMATICS (Published by CQ).....	23s. 0d.
SURPLUS CONVERSION HANDBOOK (including "Command Sets").....	26s. 0d.
TECHNICAL TOPICS FOR THE RADIO AMATEUR.....	10s. 8d.
TELEVISION EXPLAINED (Iliffe).....	13s. 6d.
TRANSISTOR RADIO HANDBOOK (Editors and Engineers).....	46s. 0d.
UNDERSTANDING AMATEUR RADIO.....	21s. 6d.
VHF HANDBOOK (Orr W6SAD).....	27s. 6d.
VHF MANUAL by A.R.R.L.....	23s. 0d.
VHF FOR THE RADIO AMATEUR (CQ).....	30s. 0d.
WORLD RADIO AND TV HANDBOOK, 1968.....	36s. 0d.

Available from **SHORT WAVE MAGAZINE**
 Publications Dept., 55 Victoria St., London S.W.1 • 01-222 5341
 (Counter Service, 9.30-5.15, Mon. to Fri.) (Nearest Tube Station: St. James's Park)