

# The SHORT WAVE Magazine

VOL. XXIV

MARCH, 1966

NUMBER 1

## KW ELECTRONICS

EUROPE'S LEADING MANUFACTURER  
OF EQUIPMENT FOR THE RADIO AMATEUR



**KW2000**  
SSB TRANSCEIVER

A complete mobile or fixed station transceiver, with built in VOX, crystal calibrator, plus topband and selectable sidebands  
*complete for only £173 AC PSU £32 DC PSU £32*

With either a KW2000 or a KW2000A, driving the KW600 Linear Amplifier you will have a most outstanding potent signal

*Outstanding Success*

**THE KW 'VESPA'  
TRANSMITTER**

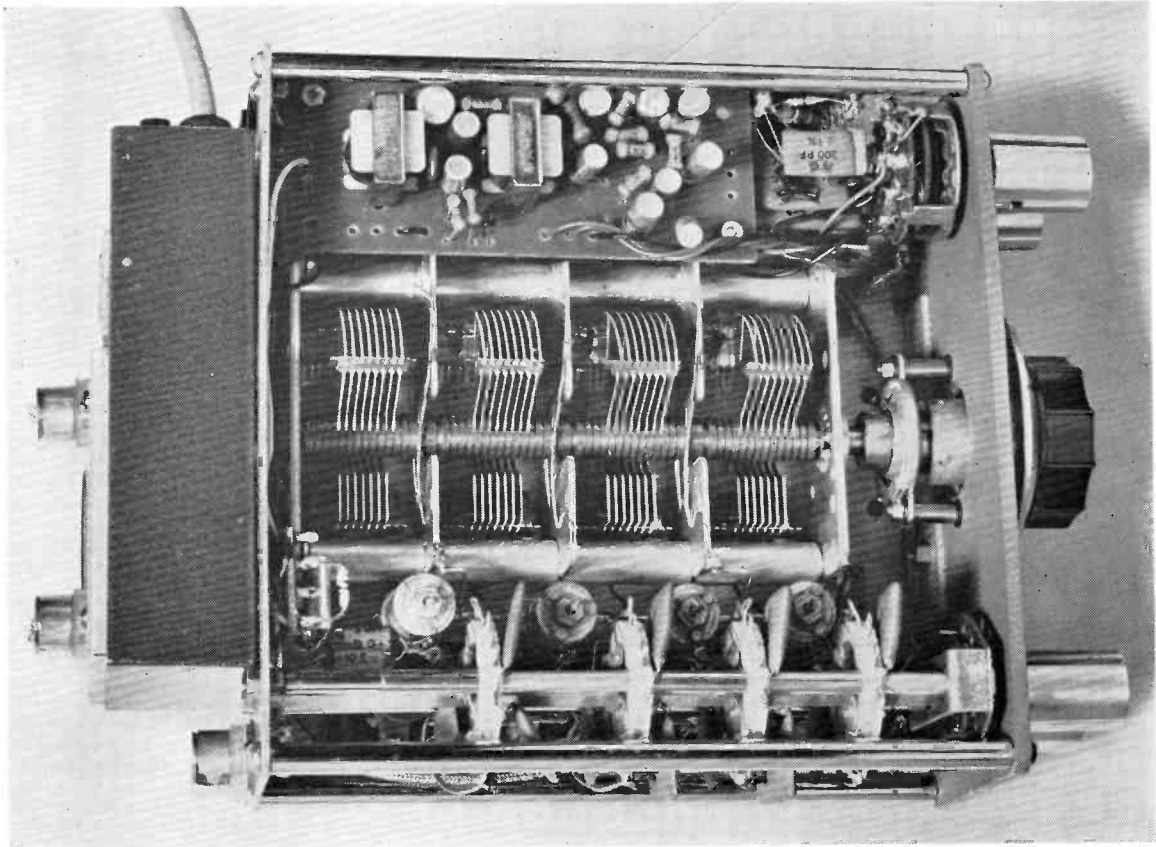
10-160 metres SSB, CW and AM.  
Price £110. Power Supply £25

**CONTACT YOUR LOCAL DISTRIBUTOR**

**G. FRANCIS**—Newark. **LONG BROTHERS**—Dunkineedy, Co. Donegal.  
**STEPHEN JAMES**—Liverpool. **G. W. SMITH & CO. (Radio) LTD.**—London.  
**W. J. McCONAGHIE**—Bangor. **BRIAN J. AYRES & CO.**—Wimbledon.  
**CHAS. H. YOUNG LTD.**—Birmingham. **L. HARDY**—Aberdeen.  
**J. A. TWEEDY LTD.**—Chesterfield. **PETER SEYMOUR LTD.**—Hull.

**KW 'BALUN'**

Helps eliminate TV interference. Broad Band 3-30 Mc/s. Water-proof—For use with Antennas fed with unbalanced Co-Ax. No insertion loss. Will handle a Kilowatt.  
Price 35/- including UK postage.



## INSIDE FIRST Next month we'll show you TMR-5's impressive face

We have developed and produced the TMR-5 in our own unhurried time  Stability, sensitivity and selectivity are very very good. (100 c/s.  $1\mu\text{V}$  and 4.2 kc/s.)  Write or phone for its full specification (3 foolscap sheets on what 20 semi-conductors in a box just 6" square by two and a bit high can do  160, 80, 4, 2 and 70 cm. bands calibrated in Mc/s. on its engraved dial  The TMR-5 above (a prototype) has its 230v. a.c. psu attached. Into this is clipped a Mk. V 70 cm. Converter  As a mobile Rx the B.C. band will prove useful  Manufacture and testing of a receiver like the TMR-5 requires a good deal of patience and time  We have lavished upon our new-born, all the expensive test equipment it has wanted  We make no apologies for the result  A receiver, out-performing your own (except the most expensive) that's twenty times smaller as well  As with other GREEN equipment, more so in this case, we built the TMR-5 and Mk. FIVES to please ourselves and are delighted with the result.

*TMR-5 COMMUNICATION RECEIVER ... ..	£35.0.0	*Mk. V 70 cm. Solid state Converter ... ..	£19.0.0
*TMR-5 SPEAKER AND DC UNIT (3Ω speaker so may be used with any Rx) ... ..	£6.0.0	Conv. + TMR-5 forms a TRIPLE CONVERSION 432 Mc/s. RX.	
*TMR-5/A.C. PSU (can also be used with any 12v. transistor equipment) ... ..	£5.0.0	*Mk. V 2m. Solid state Converter ... ..	£12.0.0
		Conv. + TMR-5 forms a DOUBLE CONVERSION 144 Mc/s. RX.	
		*Mk. V 4m. Solid state Converter ... ..	£10.0.0
		Conv. + TMR-5 forms a DOUBLE CONVERSION 70 Mc/s. RX.	

See

**GREEN** 1966  
**PRODUCT LIST**

in February SWM for full range of equipment which is available from stock.

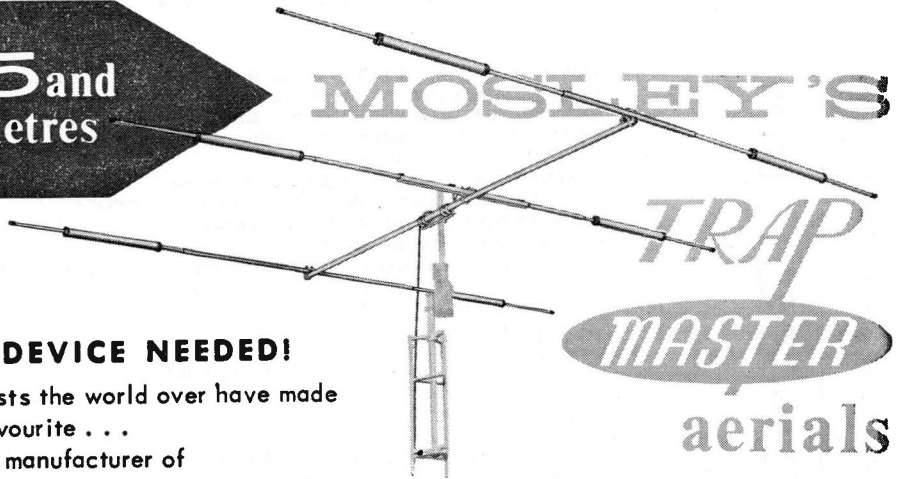
**GREEN ELECTRONIC & COMMUNICATION EQUIPMENT LTD**

79-91 BRAEMAR ROAD LONDON N.15

TEL.: STA 1387

DISTRIBUTORS: G. W. Smith &amp; Co. Ltd., Chas. H. Young Ltd., J. &amp; A. Tweedy Ltd., Peter Seymour Ltd., Taurus Electrical, James-Stephens Ltd.

for 10  
15 and  
20 metres  
its



### NO MATCHING DEVICE NEEDED!

Amateur radio enthusiasts the world over have made TRAPMASTER their favourite . . . and Mosley the leading manufacturer of beam aerials in the United States!

- Beams** TA-33, TA-32, TA-36. 2 kw. p.e.p. s.s.b. 10, 15, and 20 metres.  
 TA-33 Jr. TA-32 Jr. 700 watts p.e.p. s.s.b. 10, 15 and 20 metres.  
 A-203-C. A-310. A-315. A-210. A-215. Single band power beams. 10, 15 or 20 metres.  
 A-142. 14 Element 2 Metre Beam.  
 RV-4 Vertical. 10, 15, 20 and 40 metres, requires no radials.  
 V-4-6 Vertical. 10, 15, 20 and 40 metres.  
 V-3 Jr. Vertical. 10, 15 and 20 metres.  
 VTD-Jr. Vertical. 10, 15 and 20 metres. For chimney or pole mounting.  
 TW-3X. El Toro. Vertical. 20, 40 and 80 metres, requires no radials.  
 TA-31 Jr. Vertical or Horizontal Dipole. 10, 15 and 20 metres. Self-supporting from centre. 700 watts p.e.p. s.s.b.  
 TD-3 Jr. Trap wire Dipole. 10, 15 and 20 or 40 metres.  
 D-4BC. Base loading Coil for 80 metres with V-4-6.  
 MA-3. Mobile Whip. 10, 15 and 20 metres.  
 SWL-7. Receiving Dipole kit. 11, 13, 16, 19, 25, 31 and 49 metres.  
 RD-5. Receiving Dipole kit. 10, 15, 20, 40 and 80 metres.

**Indicator** Indicator units type LED-50 & LED-75. These units now indicate S.W.R., Power Output, Carrier Suppression, percentage of Modulation. Can also be used as Field Strength Meters. Basic Movement 50 Micro-amps. Price £6. 18. 0.

**New** Polystyrene rope.  $\frac{1}{4}$ -ton breaking strain, for supporting beams, etc. ML-6. No breaking up of guy ropes now necessary.

All Antenna Accessories. Rotators, Coax, Wire, Polystyrene Cord, Towers, etc.

## We are the Antenna People

Write now for new Catalogue of all products, 6d. stamp please.

**Mosley Electronics Ltd.** 40, Valley Road, New Costessey, Norwich, Norfolk Nor. 26K

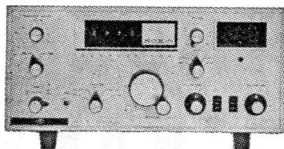
# TECHNICAL PUBLICATIONS

	Post Free
AMATEUR RADIO CIRCUITS BOOK (by R.S.G.B.) .....	8s. 0d.
AERIAL HANDBOOK (by Biggs) .....	13s. 3d.
AMATEUR RADIO HANDBOOK (R.S.G.B.) .....	36s. 6d.
AMATEUR SINGLE SIDEBAND (Collins) .....	30s. 0d.
ANTENNA ROUND UP (by CQ) .....	25s. 0d.
ANTENNA HANDBOOK (A.R.R.L., 10th Edition) .....	19s. 6d.
BASIC MATHEMATICS FOR RADIO AND ELECTRONICS .....	18s. 3d.
BEAM ANTENNA HANDBOOK, New Edition .....	28s. 0d.
BETTER SHORT WAVE RECEPTION .....	24s. 0d.
CHART OF INTERNATIONAL FREQUENCY ALLOCATIONS—GENEVA, 1960 (Official), 10 Kc. to 40 Gc., 51" x 34", wall mounting .....	8s. 6d.
COMMUNICATION RECEIVERS .....	3s. 5d.
CQ ANTHOLOGY 45-52 .....	16s. 9d.
CQ ANTHOLOGY (1952—1959) .....	25s. 0d.
COURSE IN RADIO FUNDAMENTALS (A.R.R.L.) .....	10s. 6d.
ELECTRONIC CIRCUITS HANDBOOK .....	24s. 0d.
FOUNDATIONS OF WIRELESS .....	22s. 3d.
GETTING STARTED WITH TRANSISTORS (GERNSBACK) .....	28s. 6d.
GUIDE TO AMATEUR RADIO (New Edition) .....	5s. 7d.
GUIDE TO BROADCASTING STATIONS (Hiffe) .....	5s. 6d.
HAMS INTERPRETER (4th Edition) .....	8s. 6d.
HINTS AND KINKS Vol. 6 .....	11s. 0d.
HOW TO BECOME A RADIO AMATEUR (A.R.R.L.) .....	10s. 0d.
HOW TO IMPROVE SHORT WAVE RECEPTION .....	20s. 0d.
HOW TO LISTEN TO THE WORLD (1965 Edition) .....	20s. 0d.
LEARNING MORSE .....	1s. 9d.
LEARNING THE RADIO TELEGRAPH CODE (A.R.R.L.) .....	4s. 6d.
MANUAL OF TRANSISTOR CIRCUITS (Mullard) .....	13s. 6d.
MOBILE HANDBOOK (Published by CQ) .....	24s. 0d.
MOBILE MANUAL (Published by A.R.R.L.) .....	24s. 6d.
NEW RTTY HANDBOOK .....	32s. 0d.
NEW SIDEBAND HANDBOOK (by CQ) .....	25s. 6d.
NOVICE HANDBOOK, Tx and Rx, 150 pages .....	23s. 6d.
OPERATING AN AMATEUR RADIO STATION (A.R.R.L.) .....	2s. 8d.
PORTABLE TRANSISTOR RECEIVER .....	3s. 0d.
QUAD ANTENNA .....	23s. 0d.
RADIO AMATEUR EXAMINATION MANUAL .....	5s. 9d.
RADIO AMATEUR HANDBOOK (A.R.R.L.), 1966 .....	Paper Buckram 42s. 6d. 52s. 6d.
RADIO AMATEUR OPERATOR'S HANDBOOK (Data Publications) .....	5s. 6d.
RADIO AMATEUR CALL BOOK, U.K. only .....	6s. 7d.
RADIO CONTROL MANUAL .....	25s. 0d.
RADIO CONTROL FOR MODELS (F. C. Judd) .....	16s. 0d.
RADIO DATA REFERENCE BOOK .....	14s. 0d.
RADIO HANDBOOK (Wm. I. Orr) .....	86s. 0d.
S9 SIGNALS .....	8s. 6d.
SHORT WAVE RECEIVERS FOR THE BEGINNER (Data Pubs.) .....	6s. 6d.
SHORT WAVE RADIO AND THE IONOSPHERE (Hiffe) .....	11s. 9d.
SINGLE SIDEBAND FOR THE RADIO AMATEUR (A.R.R.L.) (4th Edition) .....	22s. 6d.
STEREO HANDBOOK .....	11s. 4d.
SURPLUS SCHEMATICS (Published by CQ) .....	21s. 0d.
SURPLUS HANDBOOK (Editors and Engineers) .....	24s. 0d.
SURPLUS CONVERSION HANDBOOK (including "Command Sets") New! .....	24s. 0d.
SURPLUS CONVERSION MANUAL Vols. I, II and III, each .....	24s. 0d.
TECHNICAL TOPICS FOR THE RADIO AMATEUR .....	10s. 8d.
TELEVISION EXPLAINED (Hiffe) .....	13s. 6d.
TRANSISTOR RADIO CIRCUITRY AND SERVICING (Mullard) .....	5s. 9d.
TRANSISTOR TECHNIQUES (Gernsback) .....	12s. 6d.
TRANSISTOR RADIO HANDBOOK (Editors and Engineers) .....	45s. 0d.
UNDERSTANDING AMATEUR RADIO .....	19s. 6d.
VHF HANDBOOK (Orr W6SAD) .....	24s. 0d.
VHF MANUAL by A.R.R.L. .....	21s. 6d.
VHF FOR THE RADIO AMATEUR (CQ) .....	28s. 0d.
WORLD RADIO HANDBOOK (1966) .....	29s. 0d.

Available from Stock SHORT WAVE MAGAZINE

Publications Dept., 55 Victoria St., London S.W.1 · Abbey 5341

# NATIONAL NCX5 MKII TRANSCEIVER



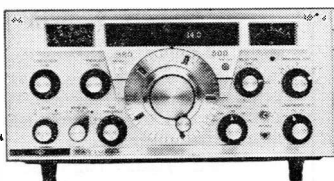
**IMPROVED PERFORMANCE—LOWER PRICES**

Complete 10 to 80 metre station. 200 watts P.E.P. NEW SOLID STATE BALANCED MODULATOR. **NOW ONLY £235.10.1.** NCX-A p.s.u./speaker console, £48.9.11. Write for full details. Undoubtedly the NCX-5 Mk. II is the most outstanding value in transceivers today.

# NATIONAL HR0500 RECEIVER

Professional solid state receiver,

5 kc/s. to 30 Mc/s. £705

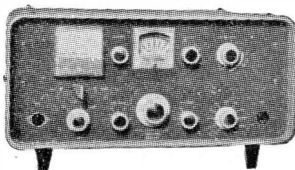


## KW EQUIPMENT NOW AVAILABLE FROM STOCK

KW ELECTRONICS

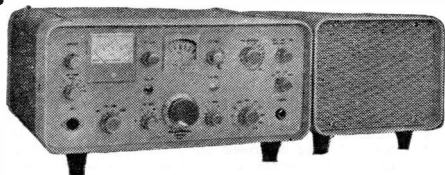
# KW VESPA TRANSMITTER

10 to 160 metres. 90w. PEP SSB, 75w. CW, 65w. AM. Transmitter, £110. P.S.U., £25



KW ELECTRONICS

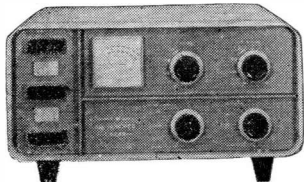
# KW2000 KW2000A TRANSCEIVERS



Complete 10 to 160 metres stations. KW2000 : 90w. PEP SSB, 75w. CW, £173. A.C. P.S.U., £32. D.C. P.S.U., £32. KW2000A : 80w. PEP SSB, 150w. CW., £195. A.C. P.S.U., £40. D.C. P.S.U., £40.

KW ELECTRONICS

# KW600 LINEAR AMPLIFIER



Over 500 watts input on SSB/CW, £115.

**SECOND-HAND GEAR ALWAYS AVAILABLE  
3 MONTHS GUARANTEE**

### WODEN MODULATION TRANSFORMERS

	£	s.	d.
UM0 (10 watts of audio)	P.P. 3/3	2	19 6
UM1 (30w.)	...	3	19 6
UM2 (60w.)	...	5	10 0
UM3 (120w.)	...	5	19 6

### JOYSTICKS

	£	s.	d.
Joystick de luxe	...	5	5 0
Joystick standard	...	4	4 0
Joymatch, type 3 tuner, for receiving	...	2	5 0
Joymatch, type 5 tuner, for transmitting	...	1	10 0

### DIGITAL CLOCK FOR THE SHACK



Features a precision synchronous motor. 220/260 volts, 50 cycles. £9 9 0  
Write for leaflet.

### VEROBOARD

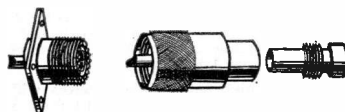
	s.	d.
3 1/2 x 3 1/2 in.	...	3 8
2 1/2 x 5 in.	...	3 8
3 1/2 x 5 in.	...	5 2
Pkt. of terminal pins	...	3 0

P.P. 6d. per item extra. Orders over 10/- post free.

### CODAR EQUIPMENT

	£	s.	d.
CR70A communications receiver	P.P. 7/6	19	10 0
T28 160/80m. mobile receiver	P.P. 3/6	15	10 0
CC/40 control unit	...	6	10 0
PR30 preselector	...	5	10 0
PR30X (self-powered)	...	7	4 0
RQ10 Q-multiplier	...	6	15 0
RQ10X (self-powered)	...	8	8 0
AT5 transmitter	...	16	10 0
250/S mains p.s.u. for AT5	...	8	0 0
12 M/S mobile p.s.u. for AT5	...	11	5 0
12 R/C control unit	...	2	7 6

Leaflets sent on request



SO-239

PL-259

UG-175/U

	s.	d.
PL-259 co-axial plug	...	5 0
PL-259F co-axial plug with (Teflon) insulation	...	7 6
SO-239 co-axial socket	...	5 0
UG-175/U reducer	...	1 3
UG-176/U reducer	...	1 3

Orders over £1 post free.

More details in January "Short Wave Magazine."

**HIRE PURCHASE PART EXCHANGE  
DEMONSTRATIONS DELIVERIES**

# BRIAN J. AYRES & CO.

8 HARTFIELD ROAD, WIMBLEDON, LONDON, S.W.19

100 yards from Wimbledon station

Tel.: WIMbledon 6063

Open Monday to Saturday, 9 a.m.—6 p.m.



“It Really Works” WA5LEM

# Joystick

## ANTENNAE SYSTEMS FOR TX AND SWL

The Joystick Systems really do work—much to the surprise of many people. Sceptics have tried to explain away the success stories by saying that it is just the feeder which is radiating. Have they tried working across the pond on just 8ft. of feeder? It is no good going on about it! We at Partridge Electronics are keeping ‘mum’ on why it works and our patent applications are firmly filed!

### CQ Magazine, December '65

(extracts from readers' letters)

“I bought a Joystick antenna from Partridge Electronics Ltd., in England and believe you me, your recommendation wasn't far off. I live in an apartment complex in New York and I tried window verticals, an indoor doublet and a few other configurations. When I got the Joystick I was skeptical. But after hooking it up I was amazed. The other antennas I had tried in my particular location were far below the Joystick's performance. I was allowed to mount it on the top of the building (which I did with a special bracket I made) and when I hooked it up to the matching network also supplied by Partridge I was able with my KEM-2 to work Europe without the difficulty I had before...”

“If you are up high enough the antenna will operate (especially at 15-20) as well as the well known 3 element beam with which we compared it. The tests were ‘operational not theoretical!’ We find that if we can hear ‘em we can work ‘em... and in most cases with a 100 watts input.”

There is now a whole range of Joystick Systems—made to match your QTH, your rig and your pocket. The SYSTEMS cover TX/RX, SWL, indoor and outdoors, mobile and even a new JOYMAST! Made only in the finest materials the SYSTEMS are reliable and permanent. TRADE ENQUIRIES INVITED.

# MORE JOYSTICK TRANSATLANTIC 160 METRE QSO'S

## W2EQS sends these latest reports

Worked HB9CM (extract from QSL letter) “It was great to QSO you again this morning on 160 metres at 0635Z. When I was RST 569 I was using my half-wave inverted vee antenna. When I became RST 229 that wasn't QSB. I changed over to my English made Joystick antenna which is only 7½ feet long, 22 feet above ground.

“... On the Joystick I also QSO'd G3RFS at 0755Z getting RST 329. On my half-wave inverted vee antenna I was RST 569...”

“... With this Joystick I've worked on 160 the following: W1, 2, 3, 4, 5, 8, 9, 0; VE1, 2, 3; 6Y5, VP2; VP9; G; HB.

“Another one to list in my 160 metre DX with the Joystick. It is now 0730Z and at 0613 QSO'd G3PQA. On my half-wave inverted vee got RST 579 when in clear but bad QRM from fish Phone on 1799 and 1806 kcs. I was on 1803 5 kcs. On Joystick John got me RST 229 through this fish Phone QRM.”

## Here are a few more extracts from the letters we get every day:

WA5LEM—Henry Wilkins III, of Houston, Texas, writes: “The Joystick really surprised me; it really works like you said it would... I took all my dipoles down.”

L. G. Rigden, Leighton Buzzard: “I cannot speak too highly of my internal Joystick which continues to give most excellent reception.”

G3UGB—A. Woffenden, Bristol: “I have used the Joystick for some months now and am more than pleased with its performance... extremely good reports on 160M and 80M.”

Frank McAuley, Glasgow: “I am beginning to make quite a few contacts with my De-Luxe Joystick and tuning units on 80 and 160 metres using 8 to 10 watts. The Joystick is indoors using the 8 feet feeder and some of my contacts are quite surprised when they hear my Joystick is indoors. As you stress many times I have removed all other antennae and am finding quite a difference. Quite a few of the local amateurs are using the Joystick.”

G2FMR—F. W. Broomfield, Nr. Leamington Spa. “Joymast... is giving satisfactory service on transmitting and receiving using DX100TX, SSB100 adaptor and AR88.”

G4PJ—William L. Honeywill, Salcombe. “I am still using the Joystick indoor, with 40 ft. feeder and getting results all-round on every band, needless to say I am very pleased.”

K6MDJ—Fred Tulpin, California. “Early results are astounding. I've been using a trap dipole for 40-20-15. This Joystick out-performs the dipole 2 x 1.”

LOWER YOUR SKYWIREs and HOIST the JOYSTICK !

## GUARANTEE

Partridge operate a rigid, 100% Money Back Guarantee if you're not completely satisfied!

Read all about this amazing antenna in the new brochure—  
Send this coupon today for your copy!

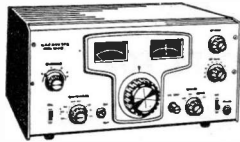
PARTRIDGE ELECTRONICS LTD.,  
Prospect Road, Broadstairs, Kent

NAME..... CALL SIGN.....

ADDRESS .....

SWM3

**SUPERB LAFAYETTE AMATEUR EQUIPMENT**



**HA.350 10-80 METRE AMATEUR RECEIVER**

A superb receiver. Dual conversion with mechanical filter. 12 valves, crystal controlled osc., producer detector, 100 kc/s. crystal calibrator, crystal B.F.O., A.N.L., "S" meter. Rock like stability. Brand new and guaranteed. 75 gns. S.A.E. for full details.

**HA.230 DE LUXE GENERAL COVERAGE RECEIVER.** Wonderful value. 8 valves + rectifier. Coverage 550 kc/s.-30 Mc/s. 1 RF and 2 IF stages, "Q" multiplier, B.F.O., A.N.L., "S" meter, electrical bandspread, aerial trimmer, etc. Brand new and guaranteed, £33. S.A.E. for full details. Also available in easy to assemble semi-kit form at 25 gns.



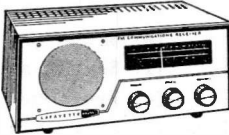
**HA.63 GENERAL COVERAGE RECEIVER**

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



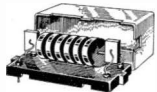
**HA.55 AIRCRAFT RECEIVER**

108-136 Mc/s. High selectivity and sensitivity. Incorporates 2 RF stages including 6CW4 Nuvistor. 8 tubes for 11 tube performance, solid state power supply, adjustable squelch control, slide rule dial, built-in 4" speaker and front panel phone jack, 220/240v. AC. Supplied brand new and guaranteed. £19/7/6, carriage 10/-.



**PRECISION MECHANICAL FILTER**

As used in HA.350 Receiver. For superb selectivity. For 455 kc/s. I.F. provides 60 dB attenuator at 2.5 kc. either side. Complete adjacent channel rejection, £9/19/6, post paid.



**NUVISTOR GRID DIP METER**

Compact true one hand operation. Frequency range 1.7-180 Mc/s. 230v. AC operation. Supplied complete with all coils and instructions, £12/10/-, carr. 5/-.



**TM-59'er "S" METER**

Signal strength meter using VTVM principles. Calibrated in S units. Sensitivity and zero adjustments for any superhet receiver with AVC. Requires 150-200 volts and 6 or 12 v.c.t. Complete with valve and full instructions, 59/6. P.P. 2/6.



**DE LUXE V.F.O.**

5 bands covering 80-10 metres. Employs high "Q" series tuned Clapp Osc. High output of 10-20 volts to drive any TX. Large slide rule dial. Dual impedance O/P. 230v. AC operation. Size 6 1/2" x 5 1/2" x 7 1/2". Supplied complete with all instructions, 16 gns., carr. 7/6.

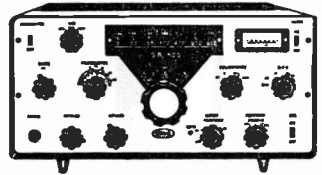


**TRANSISTORISED FIELD STRENGTH METER**

3 bands, 2.5 to 57 Mc/s., permits easy tune up for max. transmitter output. Earphone jack to monitor audio. 200µA meter cal. 0-10. Supplied complete with battery, telescopic aerial, £5/19/6 each. P.P. 2/6.

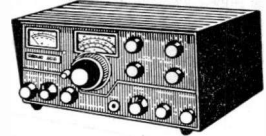
**STAR SR.600 AMATEUR COMMUNICATION RECEIVER**

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

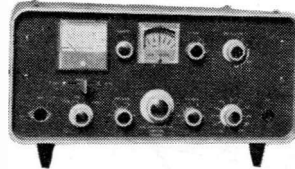


**SWAN-350 10-80 METRE Amateur Transceiver**

The most reliable complete transceiver available to the amateur yet. 5 bands-400 watts P.E.P. Price complete with AC supply/speaker console, £250. S.A.E. for brochure. Appointed London Agents.



**APPOINTED LONDON AGENT FOR K.W. EQUIPMENT**



**K.W. VESPA TRANSMITTER**

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

IMMEDIATE DELIVERY

ALSO AVAILABLE :

KW 2000, £173. PSU, £32

KW 2000A, £195. PSU, £40  
KW 600 Linear Amp., £115

**CLEAR PLASTIC PANEL METERS**

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



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

Larger sizes available - send for lists

ILLUMINATED "S" METER. 1 21/32" sq. front. Cal. in S units, 6v. lamp, 29/6. P.P. 1/-; 2 5/16" square, 39/6. P.P. 1/-.

**MODEL DA-1 TRANSISTORISED FULLY AUTOMATIC ELECTRONIC KEYS**

230 v. AC or Battery operated. Precision automatic bug keys, £4/10/-, P.P. 3/6.



**SILICON RECTIFIERS**

200 P.I.V. 200 mA	2/6
400v. P.I.V. 3 amp	7/6
1,000v. P.I.V. 650 mA	7/6
800v. P.I.V. 500 mA	5/6
400v. P.I.V. 500 mA	3/6
800v. P.I.V. 5 amp	7/6
70v. P.I.V. 1 amp	3/6
150v. P.I.V. 165 mA	1/-

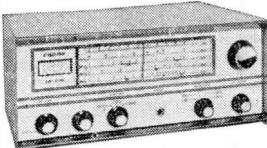
Discount for quantities. Post extra.

**TRANSFORMER**

200/250v. Primary. 600-0-600v. 250mA. 6.3v. 2amp. 4v. 7 amp. 39/6, Carr. 5/-.

**NATIONAL H.R.O. DIALS**  
Brand new, 27/6. P.P. 1/6.

**CODAR AMATEUR RADIO EQUIPMENT**



**MAIN LONDON STOCKISTS**

**CR.70A GENERAL COVERAGE SHORT WAVE RECEIVER**

7 valves. 550 kc/s.-30 Mc/s. ONLY £19/10/-.

**A.T.5 TRANSMITTER**

160 and 80 metres. 12 watts. ONLY £16/10/-.

NEW T.28. 2 BAND 160/80 metre Transistor Receiver	£15 10 0		
		Postage extra	
P.R.30 Preselector	£5 10 0	A.T.5. Remote control and Aerial Switching Unit	£2 7 6
P.R.30X Self powered	£7 4 0		
R.Q.10 "Q" Multiplier	£6 15 0	C.C.40 Station Control Unit	£6 10 0
R.Q.10X Self powered	£8 8 0		
A.T.5. Amateur TX	£16 10 0		
A.T.5 Mains P.S.U.	£8 0 0		
A.T.5. 12v. Trans. P.S.U.	£11 5 0		

Postage extra

**PORTABLE OSCILLOSCOPE CT.52**

A compact (9 x 8 x 16in.) general purpose scope-T/B 10cs.-40 kc/s. Bandwidth 1 Mc/s. Sensitivity 40 mv./cm. Mullard DG7/5 2 1/2in. C.R.T. For operation on 200/250v. AC. Supplied complete with metal transit case, strap, test leads, and visor hood. Brand new and guaranteed, £22/10/-, carr. 10/-. Complete with instructions.



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

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

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

Phone: GERRARD 8204/9155

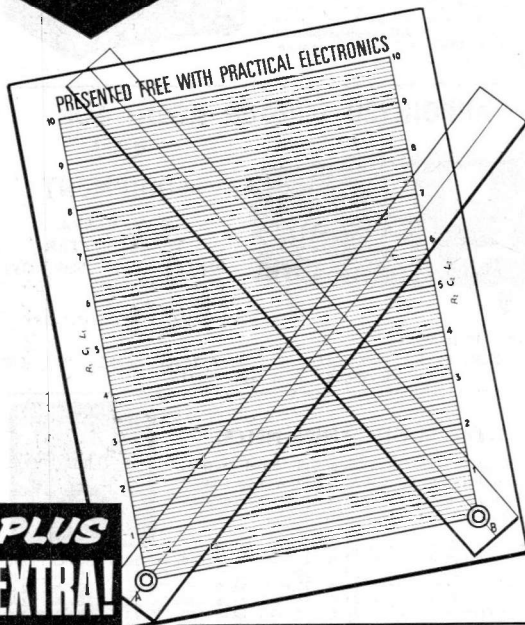
Cables: SMITHEX LESQUARE

PART  
EXCHANGES  
WELCOME

**FREE**  
inside  
**Practical  
Electronics**

## CAPACITANCE & RESISTANCE CALCULATOR

For at-a-glance evaluation of capacitors in series and resistors in parallel, with how-to-use directions and detailed examples



**PLUS  
EXTRA!**

8-PAGE SUPPLEMENT

### ELECTRONIC AIDS FOR THE HOME

Includes full instructions for these easy-to-make units:

- BABY ALARM ● AUTO NIGHTLIGHT
- RAIN SENSOR ● HEATER OR FIRE MONITOR

ALSO: Privilege Price Book Offer

### BEGINNER'S GUIDE TO ELECTRONICS

for only 6s. 6d. post free

194 pages of essential know-how, copiously illustrated with explanatory diagrams.

**Practical Electronics**

APRIL ISSUE OUT MARCH 17th — 2/6

## S. S. B.

### OPPORTUNITIES FOR USING YOUR 'KNOW-HOW' TO ADVANCE YOUR CAREER

If you have constructed your own S.S.B. equipment or if you work professionally in the Radio and Electronic Engineering Industry you may be able to fill one of the following vacancies:—

- (1) Production Engineer
- (2) Performance Acceptance Engineer
- (3) Assistant Development Engineer
- (4) Senior Development Engineer
- (5) Service and Installation Technician
- (6) Prototype Constructor

Our present and future programmes are so far-reaching that these positions are quite unusually attractive to suitable applicants.

Please write in confidence, giving full details of both private (i.e. Amateur) and/or professional experience to

Box No. 4225, Short Wave Magazine, Ltd.,  
55 Victoria Street, London, S.W.1.

## PETER SEYMOUR LTD.

All items in stock at time of going to press. Full Hire Purchase facilities for equipment over £35.

	£	s.	d.
HALLICRAFTERS SX117 with matching LF tuner, speaker and extra xtals ... ..	115	0	0
NATIONAL HRO MX with 5 coils to 30 Mc/s. ... ..	18	0	0
MARCONI GUARDIAN. 100 Kc/s.-4.5 Mc/s. with built-in a.c. power unit ... ..	10	0	0
NATIONAL NCX5 as new with matching power unit ... ..	225	0	0

For the mobile season a complete station, comprising KW76 receiver, 160-10 metres, Codar AT5 tx, Codar matching power units, 240 a.c. and 12v. d.c. with control unit ... ..

45 0 0

COLLINS 51J-2 RECEIVER, 30 bands 0.5-30.5 Mc/s. Kc/s. accuracy ... ..

195 0 0

EDDYSTONE "S" METER suitable for 640, 750, 888 and 889a ... ..

5 0 0

NEW HA350 mechanical filter 80-10 metres ... ..

78 15 0

Do you need a linear. The following are available. Rather stark but well made G2DAF type with 2 4X150 ... ..

35 0 0

"G LINE" KW600 linear as new ... ..

90 0 0

JOHNSON VIKING 500w. p.e.p. ... ..

55 0 0

S.B.E. SBI LA. 1 kW with auto transformer ... ..

100 0 0

Urgently required for cash—large stocks of modern SSB transmitters, receivers, etc.

410 BEVERLEY RD., HULL, YORKSHIRE

Telephone: HULL 41938 (43353 after 7.30 p.m.)



## S.S.B. PRODUCTS DERBY

"SPHINX" TX. S.S.B./A.M./C.W. 160M, 80M, (40M), 20M 70 watts P.E.P. Built-in power unit. Handbuilt. Most reliable, £78.

"CANON-BALL" TX. S.S.B./A.M./C.W. 160M. only 8" x 6" x 6". 260v. H.T. 100 mA. 6v. or 12v. models (80M version available), £28/10/-.

"DELTA" control unit. Co-ax c/o plus 2 sep. c/o contacts and make pair with press to talk button. A.C. mains 1/P, £7/5/-.

"NAPOLEON" S.W.R. bridge. 160M to 10M. 72-80 ohm, small, robust. 800w. to 10w. Sensitivity control. Only £5/5/-.

"SILPLUG" replaces 5v. Rects. in RX's and TX's, 500v. one, 39/6. 750v. one, 49/6 + 1/- P. & P. Reduces heat and drift.

"PYRAMID" Linear. 80M-10M. 800 watts 1/P. A.C. mains power unit built-in, £63, carriage extra.

"PYRAMID" Parts. 600-0-600v. 1 amp. impregnated Trans., 10 gns. + 10/- carriage. Filis. Trans. 6v. 12 amp., £3/5/-, 6HF5 tubes 31/6 each. Bases 4/- each. Cabinets, etc., etc.

"SCARAB" Filter Kit. All parts inc. carrier xtal—436-1 Kc/s. 250-3500 c.p.s. S.B. suppression on speech 35 dBs, £6/19/6. Ready made and aligned. 3" x 1" x 2" high, £8/7/6 + P. & P.

"HA350" Receivers. 80-10M. Carefully checked and adjusted before despatch, 75 gns. 160M. version (professionally done internally), 80 gns. 100 Kc/s. calibrator, 35/-, Speaker, 55/- + P. & P.

"BUG" Key. Very Robust and adjustable, 85/- + 2/6 P. & P.

"KEYER" Automatic, transistorised. Many other facilities, £16/10/- + 5/- P. & P.

"AUDIO MIXER" Pre-amp. 4-HI-Z 1/P's HI-Z. O/P, complete with 9v. battery. 45/- each.

"DYNAMIC" Mic's, 95/-, BM3 mic's, 37/6 + 3/- P. & P. Stands extra.

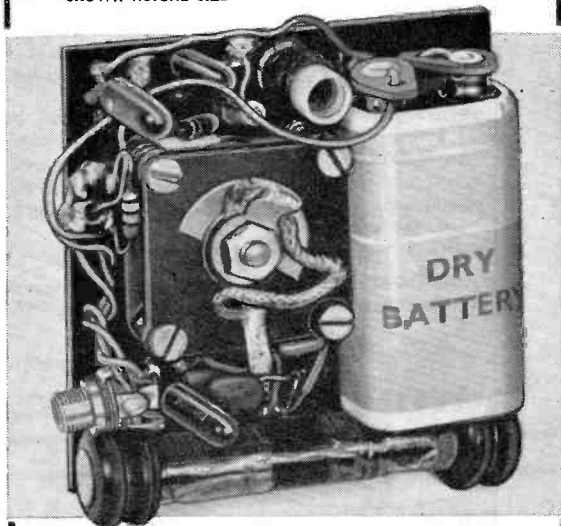
"RECONDITIONED" Rx's and Tx's always in stock. Eddystone—640-750-EC10 as new, £40. Rx-80, new, £45.

S.A.E. with all enquiries please.

**7A EDWARD STREET DERBY 42909**

# BUILD THIS REFLEX 2 TRANSISTOR RECEIVER

SHOWN ACTUAL SIZE



You'll enjoy constructing this easily assembled 2-transistor, 4-stage pocket radio. SPECIAL FEATURES: twin-gang tuning for added selectivity and sensitivity—output suitable for crystal earpiece—eyeleted circuit board for easy construction—plastic case and dial available. Simple, step-by-step assembly instructions in Practical Wireless.

PLUS PRIVILEGE PRICE BOOK OFFER  
RADIO AND TELEVISION REFERENCE DATA  
for only 5/- (value 10/6)

# PRACTICAL WIRELESS

APRIL ISSUE OUT NOW 2/-  
Make Sure of Your Copy!

## SHORT WAVE (HULL) G5GX

Second-hand

	£	s.	d.
T.W. TOPBANDER 1:8 to 2 mcs. ....	12	0	0
CODAR PRESELECTOR with PSU ....	5	0	0
HEATHKIT MOHICAN. Transistorised receiver, 580 kcs. 1-5 mcs. and 1-7-30 mcs. bandspread on amateur bands 80-10 ...	25	0	0
HALLCRAFTERS HT 33A LINEAR AMPLIFIER. Up to 1kW, 80-10, Pi-network, passive grid circuit, RF output meter. Little used ...	95	0	0
HALLCRAFTERS SX108. 550 kcs. to 32 mcs. Amateur bandspread. Excellent condition ...	44	0	0
NATIONAL NC270. Amateur bands, Xtal controlled 2nd Oscillator, Calibrator, 'S' meter, Notch filter ...	75	0	0
FT241A CRYSTALS. Channels 0-15, 17-30, 61-68, 71-79 ... each	4	0	0

New Equipment

HALLCRAFTERS HT 40 TX KIT. AM/CW, 75 watts, 80-10 plus 6. Xtal controlled but provision for VFO. 117 volt AC mains ...	24	0	0
HALLCRAFTERS SX140 RECEIVER KIT. AM/CW/SSB, 80-10 plus 6. 'S' meter, Xtal Cal, 105/125 AC mains ...	25	0	0
RX80. 535 kcs. to 30 mcs. Amateur bandspread, Q multiplier, 'S' meter, AM/CW/SSB. ...	48	0	0
STAR SR550. 1-8 to 54 mcs, 7 bands, double conversion, product detector, Xtal Calibrator ...	61	19	0
EDDYSTONE 840C ...	66	0	0
EDDYSTONE 940 ...	133	0	0
EDDYSTONE EC 10. Transistor receiver ...	48	0	0
EDDYSTONE EA 12. Amateur bands receiver ...	185	0	0

Carriage extra on all the above

£65 allowed on your Eddystone 888A against a new EA 12 Radio Control gear by Grundig, REP, MacGregor, O.S., etc. Models by Keil, Veron, Frog, Graupner, Ripmax, etc.

Wanted—your modern receivers, SSB gear, etc.

**12a NEWLAND AVENUE, HULL**

Telephone : 408953

**GET OUT AND ABOUT THIS YEAR**

MOBILE

FIXED

PORTABLE



V.H.F. £69

160m. £64

WITH A TW "COMMUNICATOR"

- **EASILY INSTALLED**—Just four connections to plug at rear of unit. No messy wiring.
- **FACILITIES**—Push to talk. AM and CW TX heaters independently switched thus conserving battery power during prolonged listening periods.
- **RECEIVER SECTION**—All solid state. V.H.F. models, double conversion. Easy to read illuminated dial. Backlash free tuning. Separate R.F. and A.F. controls. Really efficient noise limiter. Full 1 watt of audio.
- **TRANSMITTER**—10-15 watts input. High level plate and screen modulation, crystal supplied.
- **POWER SUPPLY SECTION**—Solid state. 12v. + earth. Better than 85% efficiency.
- **FINISH**—Contemporary styling in eggshell grey and matt black. Front panel with chrome trim. Neat carrying handle for ease of transportation.
- **SIZE**—12" wide, 4½" high and just 7" deep. *Write for illustrated leaflet.*

ALSO AVAILABLE—TW-2 10w. TX with high level mod., companion mains P.S.U. TW Nuvistor Converter. TW 70 CM A2521 Converter. Solid State Converters. 2 metre and 160 metre Mobile Receivers. TW Top Bander 10w. TX. 2 metre Solid State V.F.O.

A superb range of equipment from the first name in V.H.F.

**T. WITHERS (ELECTRONICS)** 15(B) GILBERT STREET . ENFIELD . MIDDLESEX  
Tel.: WALTHAM CROSS 26638

AMATEUR RADIO  
CHAS. H. YOUNG LTD.

**EDDYSTONE**

EA12 £185

940 £133

840c £66

EC10 £48

PSU for EC10 £5

**AT YOUR SERVICE**

G2AK, G3LAY  
G8AKI, G8AMF

**NOW IN STOCK AT  
YOUR LOCAL AGENTS****WITHERS  
COMMUNICATORS**

2 MTR £69

160 MTR £64

**HALSON THE  
COMPACT WHIP**

160 MTR £6-10-0

**K.W.**

VESPA £110 psu £25

2000 £173 psu £32

2000A £195 psu £40

**ROTATORS**

AR 22 £21

TR11A £14

**TERMS & EXCHANGES**

170-172 Corporation St., Birmingham 4.

Please print your address. No C.O.D. under £1. 'phone CEN 1635

**INDEX TO  
ADVERTISERS**

	PAGE
Amateur Electronics ...	54
B. J. Ayres & Co. ...	3
B.I.E.T. ... ..	10
Britec, Ltd. ... ..	60
Cathodeon Crystals, Ltd.	62
Charles H. Young ...	8
D. Cursons ... ..	58
Data Publications ... ..	63
Daystrom ... ..	cover iv
E.M.S.A.C., Ltd. ... ..	64
Finnigan Speciality Paints	63
G3HSC (Morse Records)	64
Green Electronics, Ltd. ... ..	cover iii, 64
G.W.M. Radio ... ..	58
Halson Radio Services ...	60
Henry's Radio ... ..	60
Home Radio ... ..	10
A. Imhof, Ltd. ... ..	61
J-Beam Engineering, Ltd.	55
John's Radio ... ..	60
K.W. Electronics ...	front cover
J. B. Lowe ... ..	59
Lustraphone, Ltd. ... ..	58
Mosley Electronics ...	1
Multicore ... ..	61
N.W. Electrics ... ..	62
Partridge Electronics, Ltd.	4
Peter Seymour, Ltd.	cover iii, 6
Practical Electronics ...	6
Practical Wireless ... ..	7
RCA Great Britain, Ltd.	57
Short Wave (Hull) ... ..	7
Small Advertisements ...	56-64
Smith & Co., Ltd. ... ..	5
Stephens-James, Ltd. ...	54
S.S.B. Products ... ..	7
S.W.M. Publications	cover iii, 2, 56
Tweedy (Electronic Supplies), Ltd. ... ..	63
Withers ... ..	8
Yukan Products ... ..	60

# SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXIV

MARCH, 1966

No. 269

## CONTENTS

	Page
Editorial ... ..	11
An LF-Band Transmitter, by F. G. Rayer (G3OGR) ... ..	12
RTTY Topics, by W. M. Brennan (G3CQE) ... ..	17
The Morse Test at G.P.O. Headquarters ... ..	21
Oscilloscope for the Amateur Station, Part I, by C. Bowden (G3OCB)	22
VHF Bands, by A. J. Devon ... ..	30
Communication and DX News, by L. H. Thomas (G6QB) ... ..	33
"SWL"—Listener Feature ... ..	40
Amateur Radio in The U.S.S.R. Notes by G3KPT ... ..	44
Where Do We Go From Here? by Sylvia Margolis (xyl/G3NMR) ... ..	45
The Mobile Rally Programme ... ..	47
New QTH's ... ..	48
The Other Man's Station—G3RLI ... ..	49
The Month with The Clubs—From Reports ... ..	50

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

*Advertising:* Maria Greenwood

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

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

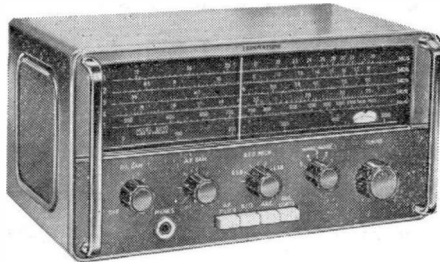
*Editorial Address: Short Wave Magazine, BUCKINGHAM, England*

### AUTHORS' MSS

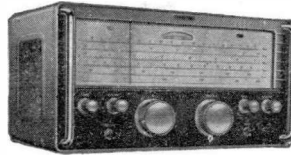
*Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance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

© Short Wave Magazine Ltd.

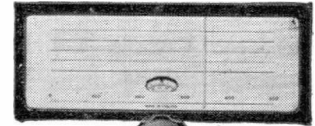
**HOME RADIO (MITCHAM) LTD.** 187 London Road, Mitcham, Surrey. 'Phone: MIT 3282



The Eddystone EC 10 is a transistorised Communications Receiver operating from six U2 cells (a mains unit is available). Gives continuous coverage from 550 Kc to 30 Mc/s, £48. (H.P. Terms available.) Send for free brochure.



The Eddystone 840C is an 8-valve Superhet covering from 480 Kc to 30 Mc/s in 5 ranges. For A.C. mains operation. A fine receiver at a moderate price, £66. (H.P. Terms available.) Send for free brochure.



Eddystone Drive E898. A professional unit for the amateur, £4.19.6.



Headphones. 4000 Ohms Impedance. Prices from 15/- plus 2/6 Postage and Packing.

Our Catalogue comprising 210 pages, plus a 21-page supplement, containing some 5800 items (900 illustrated) is available price 7/6, plus 1/6 postage and packing. Every Catalogue contains 5 coupons, each worth 1/- if used as directed. Send the attached Coupon with your cheque or P.O. for 9/-.

Please write your name and address in block capitals

NAME .....

ADDRESS .....

HOME RADIO LTD., DEPT. SW, 187 LONDON ROAD, MITCHAM.

**FREE TO AMBITIOUS ENGINEERS** — THE LATEST EDITION OF ENGINEERING OPPORTUNITIES

**Have you sent for your copy?**

ENGINEERING OPPORTUNITIES is a highly informative 156-page guide to the best paid engineering posts. It tells you how you can quickly prepare at home for a recognised engineering qualification and outlines a wonderful range of modern Home Study Courses in all branches of Engineering. This unique book also gives full details of the Practical Radio & Electronic Courses, administered by our Specialist Electronics Training Division—the B.I.E.T. School of Electronics, explains the benefits of our Employment Dept. and shows you how to qualify for five years promotion in one year.

**SATISFACTION OR REFUND OF FEE.**

Whatever your age or experience, you cannot afford to miss reading this famous book. If you are earning less than £30 a week, send for your copy of "ENGINEERING OPPORTUNITIES" today—FREE.

**BRITISH INSTITUTE OF ENGINEERING TECHNOLOGY**

(Dept. 305B) 29 Wright's Lane, London, W.8

**THE B.I.E.T. IS THE LEADING INSTITUTE OF ITS KIND IN THE WORLD**

**WHICH IS YOUR PET SUBJECT**

- Mechanical Eng.,
- Electrical Eng.,
- Civil Engineering,
- Radio Engineering,
- Automobile Eng.,
- Aeronautical Eng.,
- Production Eng.,
- Building, Plastics,
- Draughtsmanship,
- Television, etc.

**GET SOME LETTERS AFTER YOUR NAME!**

- A.M.I.Mech.E.
- A.M.I.C.E.
- A.M.I.Prod.E.
- A.N.I.M.I.
- A.I.O.B.
- B.Sc.
- A.M.I.E.R.E.
- City & Guilds
- Gen. Cert. of Education, etc., etc.

**PRACTICAL EQUIPMENT**

Basic Practical and Theoretical Courses for beginners in Radio, T.V., Electronics, etc.,

- A.M.I.E.R.E., City & Guilds
- Radio Amateur's Exam
- R.T.E.B. Certificate
- P.M.G. Certificate
- Practical Radio
- Radio & Television Servicing
- Practical Electronics
- Electronics Engineering
- Automation

**INCLUDING TOOLS!**

The specialist Electronics Division of B.I.E.T.

NOW offers you a real laboratory training at home with practical equipment. Ask for details

**B.I.E.T. SCHOOL OF ELECTRONICS**

**POST COUPON NOW!**

Please send me your FREE 156-page "ENGINEERING OPPORTUNITIES" (Write if you prefer not to cut page)

NAME .....

ADDRESS .....

SUBJECT OR EXAM THAT INTERESTS ME .....



(305B)

# The SHORT-WAVE Magazine

## EDITORIAL

**Service** *All through the years—and that means since long before Hitler's War—there has been a sufficiency of licensed radio amateurs willing to give their time and apply their skill to some activity in the national interest. These services are given with neither hope nor expectation of any reward—merely because there are amateurs who would like to use their knowledge and ability to help some local organisation.*

*Many A.T.C. (Royal Air Force) squadrons are desperately in need of instructors in radio, radar and W/T. The Air Training Corps is the cadet force for the R.A.F. In most districts there is a squadron, consisting of youngsters up to the age of 17 or so, who are taught elementary aviation, gunnery, navigation, aircraft recognition and the use of instruments and apparatus.*

*They also learn that discipline involves not only the giving of orders but the accepting of them.*

*Most A.T.C. squadrons have their own social organisation—involving parents and friends—and there is an "annual camp" during which they spend some time on a regular R.A.F. station, with opportunities for flying. Officers of A.T.C. squadrons are almost always ex-R.A.F. types who take the job on as a duty to the Service. The fact that they are given local rank and draw certain small allowances is a secondary consideration—all officers of the A.T.C. give in time and effort far more than they get back in terms of payment for hours-put-in.*

*Squadrons of the A.T.C. are permitted to operate on the 5 mc training band, using their own call-signs and Service W/T equipment. The difficulty for many of them is that they have nobody to teach them Morse or how to use the gear.*

*This means that there is an opportunity for licensed amateurs to give a little time—usually not more than a couple of hours on one evening a week—to instructing keen youngsters. You can make contact with the commanding officer of your neighbouring A.T.C. squadron by getting his name from the local newspaper and giving him a ring. If you are really keen to help, and cannot make contact otherwise, write to: The Air Secretary, Royal Air Force, Ministry of Defence, Main Building, Whitehall, London, S.W.1, saying that you wish to be put in touch with the C.O. of your local A.T.C. squadron.*

*You will not get anything out of it, financially—but you will find that you are doing a worth-while job for the young, which will be a satisfaction for its own sake.*

*Austin Forster,  
G6FO.*



## AN LF-BAND TRANSMITTER

FOR TOP BAND AND EIGHTY  
METRES — CIRCUITRY AND  
CONSTRUCTION

F. G. RAYER (G3OGR)

THE circuit used for this rig is basically that described in "Eighty Metres with a Top Band Transmitter" in the October, 1963, SHORT WAVE MAGAZINE. It is straightforward and reliable, running 8-12 watts on 1.8-2.0 mc and 3.5-3.8 mc. The cost of building is small and the finished appearance not unpleasing.

Fig. 1 is the transmitter circuit. V1 is a 6AM6 or equivalent, and the VFO tunes 1.75-2 mc by means of VC1, through a small ball drive. To avoid any difficulty with the VFO coil, a *Wearite PHF6* can be used. This is a fixed inductance coil, manufactured to a high degree of accuracy, and connections are made to it so that the two windings are in series. It is thus only necessary to adjust trimmer C18 for correct coverage. Other coils, modified to give suitable coverage if needed, could be used. But the PHF6 is an easy means of obtaining correct coverage without experiment. The VFO is operated from a stabilised 150v. supply.

A second similar stage acts as buffer/amplifier, and as doubler for 80 metres. L2 is broadly resonant at about 3.65 mc, and L3 at about 1.9 mc. The nuisance of home-wound coils or experimentation to obtain the correct coverage can be avoided by using *Osmor QA5 (Blue-blue)* coils in each position. For

160 metres, initially screw L3 core fully into the winding. Remove 31 turns from the other coil, for L2, re-solder the end, and set the core flush with the coil end.

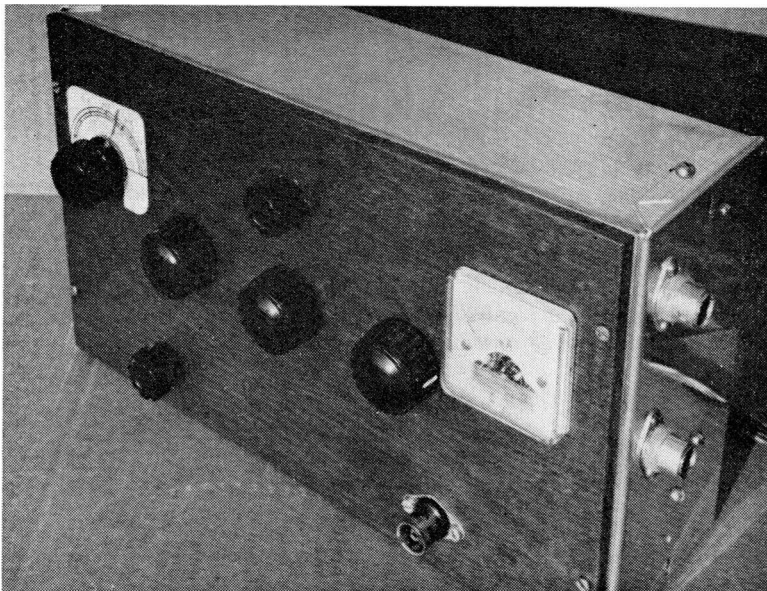
For the PA, V3, a 5763 is used, and grid current with the values shown was approximately 2 mA on 80 and 3 mA on 160 metres. This can be checked by placing a meter between R7 and chassis (positive to chassis). The usual *pi*-output circuit is employed, with a two-band coil L4; this consists of 70 turns of 24g. double-cotton-covered wire, side by side, centre tapped. Bandswitches S5 and S6 are separate, with small knobs, and both are rotated clockwise for 80 metre coverage.

Normal operating anode current for the PA is about 30-40 mA and a 0-100 mA or 0-50 mA meter will do. An 0.5 mA meter, shunted to read 0-50 mA, was actually fitted.

V4 is a high-gain two-stage amplifier, C14 and C15 being selected to lift response a little towards the higher frequencies. No gain control was provided, as modulation was about right with normal speaking into a crystal microphone, and it is not difficult to get accustomed to having the mike at a fixed distance.

V5 is the Class-A modulator, and the 6BW6 is adequate for this PA input. Any attempt to over-modulate causes bad distortion, not because of splatter but due to breaking the carrier. So reports of distorted speech indicate the need to get back from the microphone a little! The modulation choke Ch. can be an 80 mA or 100 mA mains pentode output transformer, with the secondary ignored. Temporarily connecting a speaker to the secondary is a good way to check the modulator section. (Keep the loudspeaker away from the mike.)

A 3-way switch provides for *net* (VFO and buffer on), *receive* (aerial switched to receiver) and *transmit*



General appearance of the 80/160m. Tx as built by G3OGR, which is only 10 inches on the maximum dimension. It is neat, compact and effective, and would be very useful as a No. 2 set, or for anyone just starting on the air.

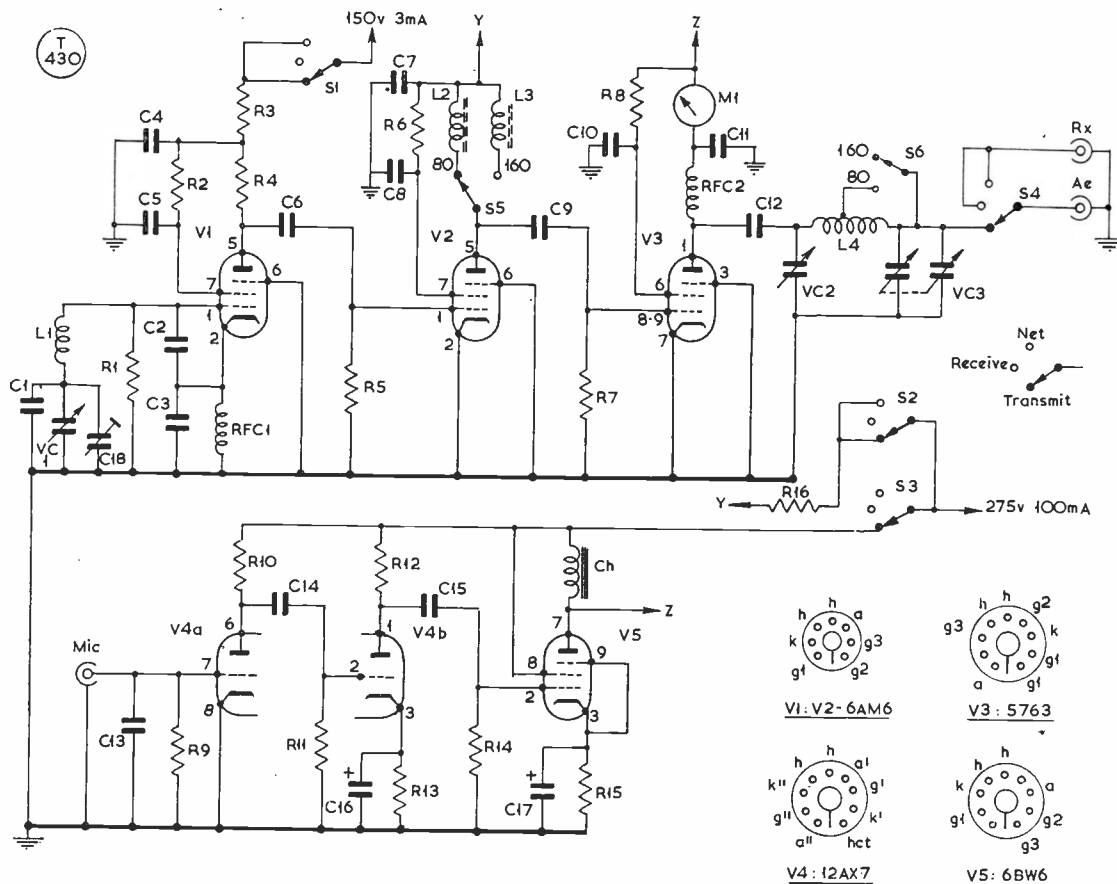


Fig. 1. Circuit complete of the VFO-BA-PA transmitter and modulator described and illustrated in the article. The PA (V3) is a 5763, a highly efficient miniature type, and the modulator (V5) is a 6BW6. The BA stage (V2) effectively isolates the VFO (V1) from the PA. With the exception of L4 (see text), commercial coils are used throughout. A transmitter built to this design would make a very handy job for 80/160m. working, or as a first Tx for a beginner starting on the air.

positions. Section S1 switches the VFO, S2 the buffer HT, S3 the modulator and PA, and S4 the aerial.

**Chassis and Case**

Fig. 2 is the layout on top of the chassis. A neat and inexpensive case is derived from a *Home Radio (Mitcham)* "universal chassis" measuring 10in. by 6in. by 3in. An extra 10in. by 3in. runner forms the chassis. Cut the corners of this so that it will fit inside the 6in. by 3in. runners. The chassis is bolted about four inches from the top of the panel. Most of the transmitter can then be assembled and wired. Cut and check large holes before matching any parts. A number of quarter-inch holes are also punched for ventilation and for leads.

[over p.14]

Notes: Ch\* can be primary of pentode-type speaker transformer. All resistors rated 1/2-watt except where stated. Meter can be miniature 0-50 or 0-100 mA, or 0-5 mA shunted. Case is 10in. by 6in. by 3in. universal chassis, with 10in. by 3in. runner (*Home Radio*).

**Table of Values**

Fig. 1. Circuit of the LF-Band Transmitter

C1 = 56 $\mu$ F, 1%	R9, R11 = 1 megohm
C2, C3 = .001 $\mu$ F, 1%	R10 = 220,000 ohms
C4, C7, C8 = .01 $\mu$ F	R13 = 1,000 ohms
C5, C10, C11, C14 = .002 $\mu$ F	R14 = 470,000 ohms
C6, C9, C13 = 100 $\mu$ F	R15 = 270 ohms, 1w.
C12 = .001 $\mu$ F	R16 = 4,700 ohms, 1w.
C15 = .005 $\mu$ F	RFC1 = 2.5 mH, min.
C16 = 50 $\mu$ F, 6v.	RFC2 = 2.5 mH, 60 mA
C17 = 50 $\mu$ F, 50v.	L1 = PHF6, <i>Wearite</i>
C18 = 30 $\mu$ F trimmer	L2, L3 = QA5, <i>Osmor</i>
VC1 = 30 $\mu$ F, tuning	L4 = see text
VC2 = 300 $\mu$ F, tuning	Ch = 100 mA choke*
VC3 = 500 + 500 $\mu$ F, BC 2-gang, load	S1, S2, S3, S4 = 4-pole, 3-way rotary
R1 = 68,000 ohms	S5 = 1-pole, 2-way rotary
R2 = 47,000 ohms	S6 = SP on-off
R3 = 2,200 ohms	V1, V2 = 6AM6, EF91, 8D3 or similar
R4, R7 = 22,000 ohms	V3 = 5763
R5, R12 = 100,000 ohms	V4 = 12AX7, ECC83
R6 = 33,000 ohms	V5 = 6BW6
R8 = 5,600 ohms, 2w.	

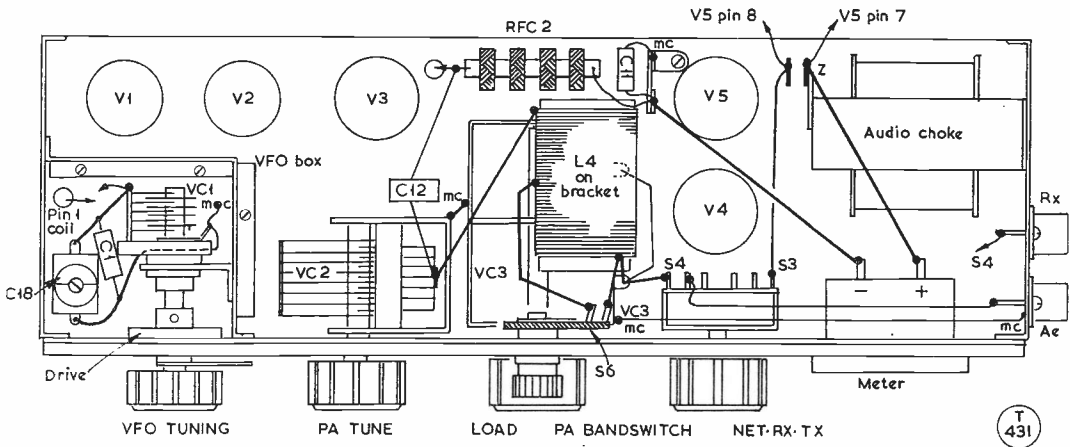


Fig. 2. Upper chassis layout for the transmitter described in the article. By using the chassis dimensions recommended and keeping fairly closely to this plan, a compact and efficient parts arrangement would be achieved.

VC2 can be about 250  $\mu\text{F}$  to 500  $\mu\text{F}$  and was a non-miniature air-spaced capacitor as used for receiver tuning. VC3 is a 2-gang capacitor with its sections in parallel; a 2/365  $\mu\text{F}$  or similar condenser could be used, but occasionally the extra capacity given by a 2/500  $\mu\text{F}$  condenser could be useful. With fairly large capacitors, and L4 switched, loading into most normal aerials or tuners is easy.

The audio choke (speaker transformer) is mounted to one side, which also carries two coax sockets, for aerial and receiver; these sockets were actually one over the other. A small tag strip supports C11. V1, V2 and V4 need cans. The use of cans on V3 and V5 seems optional.

**VFO Box**

The VFO screening box is essential for Top Band. It is bent from aluminium, and bolted to the panel

and chassis. VC1 is on a strong bracket. L1 is below VC1, a 6BA bolt through the panel going into its tapped hole. C18 is bolted to the chassis, and can be reached through a hole in the box top.

When the VFO is wired, bolt on the 6in. by 3in. side, which further strengthens it. A small plate is secured on top of the box with self-tapping screws. The ball-drive lug is bolted to the panel, and a small pointer travels over a scale, later calibrated.

**Under the Chassis**

Fig. 3 shows the under-chassis wiring. A tag strip provides anchorage for the power supply leads and some other items. The microphone socket connection did not need screening, but runs against the chassis. (The external microphone lead must of course be screened.)

The heater circuit, tags X, is wired first. Keep

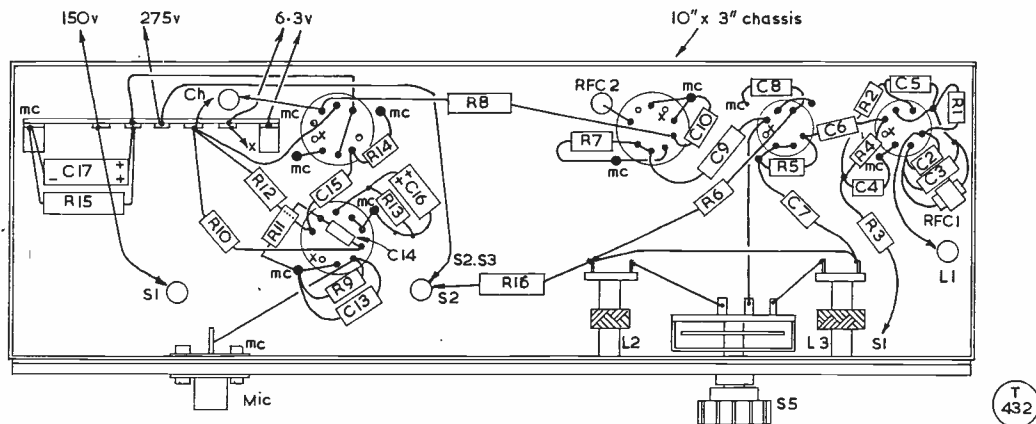
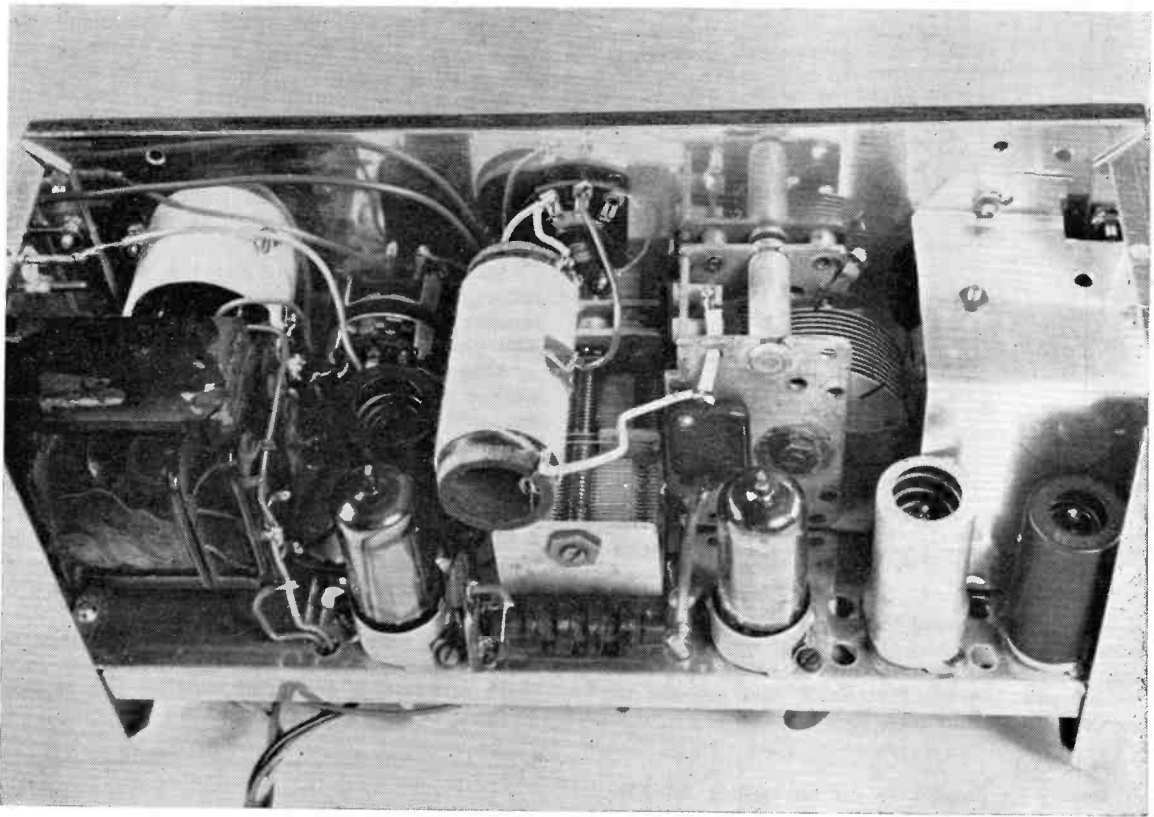


Fig. 3. Underneath the chassis, showing positioning of the coils L2, L3 and several of the minor components. If working to the layout exactly as described, this drawing and that at Fig. 2 identifies all parts, while the general arrangement and final appearance can be checked from the photographs.



Inside the 160/80m. transmitter, showing general layout and construction. The VFO section is in the screened compartment on the right, with the PA tuning condenser VC2 next in view. The valves visible, from right to left, are V1, V2, V3 (the RF section) and V5 (modulator) — see circuit diagram Fig. 1 and layout sketch Fig. 2. The iron-cored component at left front is the modulating choke, with the panel meter (white case) immediately behind. The switched coil L4 is the central winding, and the load capacity VC3 is immediately below.

these and HT connections against the chassis. C6, C9, and similar parts in the RF circuits are placed as directly as possible. The cores of L2 and L3 can be reached from behind. Small disc or tubular ceramic capacitors are most easily accommodated.

### Adjustments

VFO coverage can be checked, but calibration is left until last. Accurate calibration is possible with a receiver and 100 kc crystal marker. With the switch at "net" the VFO is adjusted to zero beat at 2 mc in the receiver, with VC1 nearly open. This is achieved by rotating C18. Then 1.75 mc will be found at 3.5 mc on the receiver (VFO harmonic) with VC1 nearly closed.

Calibrate first at 1.8, 1.9 and 2.0 mc. Then 1.8 is also 3.6 mc, and 1.9 is also 3.8 mc. Tune the receiver to the 100 kc crystal marker beats at 3.5 and 3.7 mc, to calibrate the VFO for these frequencies. (The 50 kc points can be put in by tuning the receiver through 7 mc, etc.) The 10 kc points can be inserted by eye.

VC1 was the easily obtainable small SW type

of tuning condenser having 9 plates on the rotor. A 75  $\mu\text{F}$  condenser was originally fitted, and plates were removed one by one until the coverage was 1.75-2.0 mc with a little rotation unused each end of the bands. The capacitor then had 5 moving and 6 fixed plates left, and was measured as approximately 30  $\mu\text{F}$ .

Put a meter in between R7 and chassis. With the VFO at 1.9 mc and S5 at 160m., rotate the core of L3 for maximum grid current. Repeat with L2, with S5 set for 80m. and the VFO at 3.65-3.7 mc. Any grid current between about 2 mA and 3 mA is satisfactory. If necessary, the value of R6 can be changed to raise or lower grid current. This should not be necessary.

### Panel

A varnished plywood sheet the same size as the aluminium panel was fitted to cover the numerous bolt heads. Knobs, microphone socket, and meter have to be removed. The panel is held by the meter bolts, mike socket, and the two bolts each side which go into the 6in. by 3jn. members. Control bushes and nuts rest in clearance holes. The remaining

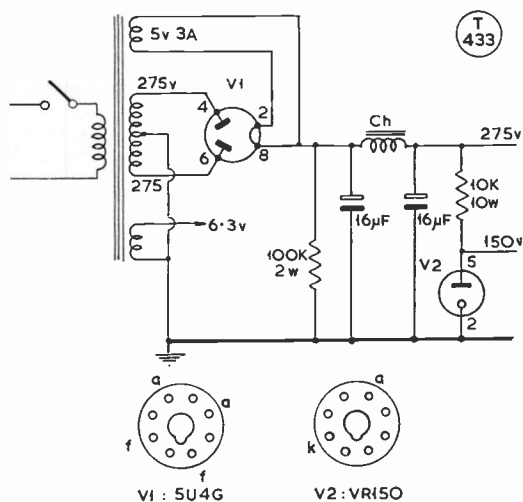


Fig. 4. A suitable power supply unit for the 80/160m. transmitter described by G3OGR in his article.

panel bolts were round-headed, so depressions to suit were made in the rear of the panel with a counter-sink bit. Drilling positions can be found by putting ink or paint on the bolt heads, and pressing the wooden panel on to these marks.

#### Power Supply

It may be possible to use an existing 250-300v. pack. Heaters require 2.1 amps. at 6.3v. The VFO drain is under 5 mA, preferably regulated. Reasonable results can be expected with a 80 mA 250v. supply, but a pack maintaining the full 275v. or a little more, at 100 mA, allows a larger input.

If the HT supply is a little meagre, a radio-frequency output meter will show that RF tends to fall off when loading raises the PA anode current above 30 mA or so. With an adequate HT voltage, RF output continues to increase. Insufficient grid drive (low grid current) gives a similar effect. Maximum input for the 5763 is 50 mA at 300v. (15 watts) but an input of between about 8 watts and 12 watts seems most satisfactory.

PA input is, of course, Anode Voltage  $\times$  Anode Current. So 30 mA at 300v. would be 9 watts, while 40 mA at 250v. is 10 watts. Top Band input loading should not exceed 10 watts.

Fig. 4 shows a suitable power supply. The VR150 could be an OA2. A transformer and choke of adequate rating help to maintain the voltage on load.

#### Operating Notes

A newly-licensed operator may welcome a few working details. A first test can be made with a 15 watt 200/250 volt household lamp connected across VC3, or to the aerial socket by a spare coax plug. A short aerial lead from the receiver can be placed near the lamp.

S5 and S6 must always be set for the same band. With the switch at "net" find the carrier on the

receiver. Then with the switch at "transmit" and VC3 closed, rotate VC2 for a dip in anode current. Open VC3 progressively, restoring the dip with VC2, until the meter shows the required input (30-40 mA). This is best done with two hands. The bulb should then light fairly brightly.

With the receiver RF gain well back, speech in the microphone should be clearly heard in the speaker. (Avoid feedback to the mike which will cause "howling round the loop.")

Working into an aerial involves the same procedure. Some 75-ohm coax with a plug connects the receiver to the transmitter Rx socket. A dipole for 80m. can be plugged directly into the aerial socket.

Many random length end-fed aerials can be worked directly from the transmitter. Load up into the aerial in the same way as described with the lamp. A good earth is helpful with end-fed aerials. End-fed wires can be used on either band. Should an ATU be employed, fit a short coax lead from the transmitter to this.

The "net" position is used either to tune the VFO to a clear channel found on the receiver, or to allow the VFO to be set up on the frequency of another station, to which a reply is made.

A solid metal plate back must *not* be used on the case. But a back cut from expanded metal, small mesh wire-netting, or similar material, can be fixed to the back with self-tapping screws.

#### JOIN YOUR LOCAL CLUB

One of the best pieces of advice for anyone with ideas about starting in Amateur Radio is "First of all, become a member of your local radio club group or society." It is by contact with active members, already on the air or keen SWL's, that most can be learnt and help obtained on the practical side. Indeed, it is fair to say that no amount of reading will get you going sooner than making the most of your opportunities as a club member. To find whether there is an active group in your locality, look through the addresses of Club Secretaries as given on p.52 of this issue—but remember that because all secretaries do not report every month for our Clubs' feature, you need to check the address list over a period of about three issues (months) to cover them all. Of course, this advice is of no help to anyone right out on a limb, away from the main centres of population where no local radio club group exists. In such a case, it is then reading (which anyway is essential to get a good grasp of radio amateur theory and technique), combined with regular listening on the amateur bands, which is the only way to get on. The most useful books at present available are *A Guide to Amateur Radio* (5s. 7d.), *The Radio Amateur Examination Manual* (5s. 9d.), *Radio Amateur Operator's Handbook* (5s. 6d.), and *The Amateur Radio Handbook* (550 pp., 36s. 6d.). All these are available from stock through our Publications Dept., at Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. Prices are post free.



## RTTY Topics

DX NOTES AND OPERATING  
NEWS—B.A.R.T.G. SPRING  
CONTEST RULES AND SCORING  
—TUNING FORK FREQUENCY  
STANDARD

W. M. BRENNAN (G3CQE)

*This feature normally appears bi-monthly (that it was not here in the last issue was due to unavoidable circumstances) and deals with the technical interests and on-the-air activities of radio teleprinter operators on the amateur bands. Our contributor is himself an outstanding exponent of the mode, and is well placed to provide reliable technical information for his feature as well as up-to-date news coverage.*

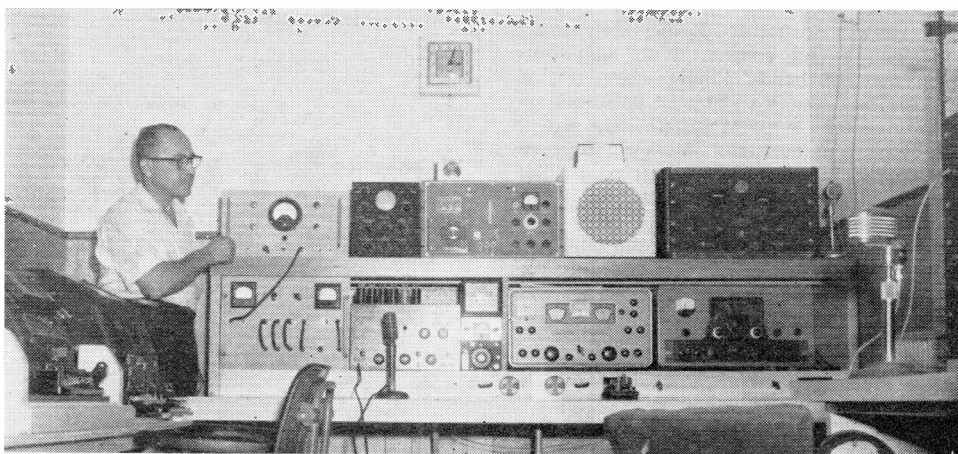
—Editor.

A GAP of two months since this feature last appeared has produced a fair pile up of news and so it's straight down to happenings in the RTTY world.

On the DX side, there are a number of newcomers and as usual, some of them are real collector's pieces on any mode. In Korea, amateurs are now permitted to use RTTY on all bands and two stations there that are rapidly digging themselves in on 14090 kc are HL9KG and HL9TM. They expect to be joined by HL9TT very shortly. Another rare one due to appear in the near future is FB8XX (Kerguelen Island) and his appearance on 20m. is

guaranteed to create a monumental pile up at any time; late afternoon and early evening here is the time to watch for him. Another addition to the list of starters is XU2EN (Cambodia) and although this country does not appear on the ARRL "Official Countries List," it does not appear to have greatly reduced the demand for QSO's with him. Still another country to join in on RTTY is Uganda, 5X5FS being the callsign to watch for—again on 20m. Many stations have reported working this newcomer recently. Also from Africa, EL2F (Liberia) has been spending many hours on the air trying to keep pace with the country hunters. The operator at EL2F is W9GEK when back home in the U.S.A. RTTY also appears to be catching on pretty well behind "The Curtain" with both Hungary and Czechoslovakia now being available, represented by HA5KBP and OK1KUL respectively. In the Ukraine we have both UB5AC and UB5UN. From Estonia there is regular activity by UR2BK and UR2KAX, whilst UA4KN and UA4KED are on from European Russia. It is good to hear of activity building up from these directions since it was only a few months ago that many RTTY operators had grave doubts about there ever being any hope of such QSO's due to the difficulties of different alphabets, let alone the language barrier.

Difficulties are also caused by "non-standard" licensing regulations for RTTY operation in some countries. Belgium is a case in point, where originally RTTY was limited to a speed of 50 bauds only. This restriction tended to confine the ON4 stations to 80m. and 2m. operation only, since on the HF bands the speed used, almost without exception, is 45.5 bauds. The situation has now been resolved by permission for Belgian stations to use both speeds. Japan, on the other hand, is still an "odd one out" country since over there RTTY is confined to the 10m. band. However, both KA2RJ and KA2LD are looking for DX QSO's in the neighbourhood of 29 mc. This information comes from W6CG who mentions that



The station of Tom Serur, P.O. Box 2309, San Marcos, Texas, who has an interesting array of equipment and is a keen RTTY operator. The teleprinter gear is along the bench on the left. He also works CW and Sideband phone and is well heard on the DX bands.

there is a Japanese beacon station (JA1IGY) on CW on 29 mc and listening for this can be a useful guide for 10m. openings to Japan. It does seem as if 28 mc might be producing such openings. Both KA stations are there regularly at weekends.

ZL1WB's FSK and CW signals have been heard in Australia on 432 mc via the Oscar IV satellite and, according to W6CG, a recent bulletin from the ARRL Hq. station WIAW announced "K2MWA and K2GUN have reported their own FSK signals through the satellite Oscar IV for continuous periods and they say that the translator can capture continuous inputs such as FSK (RTTY)." It certainly looks as though the first RTTY QSO via a satellite may not be all that far off. This is, of course, an instance where automatic tape equipment will come in very handy indeed.

A nice example of some more normal DX working was a recent contact between VK2EG and W6CG over the long path. This works out to an actual path length of 17,374 miles—which must be something of a record for RTTY. Any advance on this mileage? VK2EG and VK3KF have spent a lot of time operating recently; the latter can be found on 40m. most mornings around 0800z looking not only for 40m. contacts but also for RTTY'ers willing to give it a whirl on 80m., too!

Other new callsigns noted from recent mail are: KP4CMK, KP4CMP, JA8RUL, ZS6BCT, HB9ET, HB9IT, PY2ON, YV3LD, and W8NTZ/VO2 (Labrador). The latter callsign is quite a handful for the keyboard but it is worthwhile reminding readers that VO2 counts as a separate country during the three RTTY Contests and so may be worth the struggle! Another longish call reported recently is HB9XJ/MM aboard the m.v. *Arania*; the gear on board includes an HT-32 Tx, a 51J4 Rx and an American Navy CV57 T.U.

**B.A.R.T.G. Spring RTTY Contest**

The event of the coming month is undoubtedly the RTTY Contest sponsored by the U.K. RTTY society (The British Amateur Radio Teleprinter Group) and open to all comers. With conditions improving on the HF bands almost daily, this is a chance to see how the RTTY gear performs on DX with plenty of RTTY QRM just to help give it a real going-over! Not everyone wants to, or even can, operate for the full 48-hour Contest period but if everyone puts in a few hours of operating it will add to the zest of the occasion and give other contestants something to chew on. At the same time you will most likely be able to add to your list of countries worked. The rules are as follows:—

- (1) The contest starts at **0200 GMT 12 March** and finishes at **0200 GMT 14 March 1966**,
- (2) Bands to be used are 3.5, 7, 14, 21 and 28 mc,
- (3) In order to qualify for points the messages exchanged must contain the following: *Message Number, Report*

(RST), Time in GMT and Country of origin,

- (4) Countries will be as per the ARRL Country List with the exception that KL7, VO, and KH6 will count as additional countries,
- (5) Stations may not be worked more than once on any band but additional QSO's may be made with the same station on each other band.
- (6) **Scoring** :—All two-way RTTY contacts with stations in one's own Country will earn two points.  
All two-way RTTY contacts with stations outside one's own Country will earn ten points.  
All stations will receive a bonus of 200 points per Country worked, including their own.
- (7) **Final Score** : (A) Two-way exchange points *times* total Countries.  
(B) Total Country points *times* Continents worked.  
Add the results of (A) and (B) together for final score.

**Example** :—

(A) Exchange points (302) x	Countries (10) ... ..	= 3,020
(B) Country points (2,000) x	Continents (3) ... ..	= 6,000
(C) Add (A) and (B) scores ...		= 9,020

Total score is 9,020.

- (8) The Contest will be divided into two sections, one for single-operator entries and the other for multiple-operator stations. The transmission of RTTY on more than one channel at a time will be disallowed.

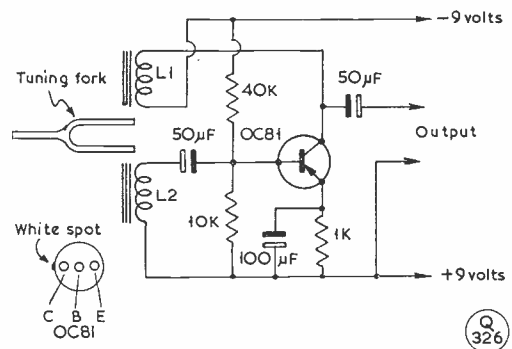


Fig. 1. Simple audio tuning fork standard suitable for checking the various frequencies used in amateur teleprinter equipment. Details for the coils L1, L2 are given in the text, and the general construction shown in Fig. 2.

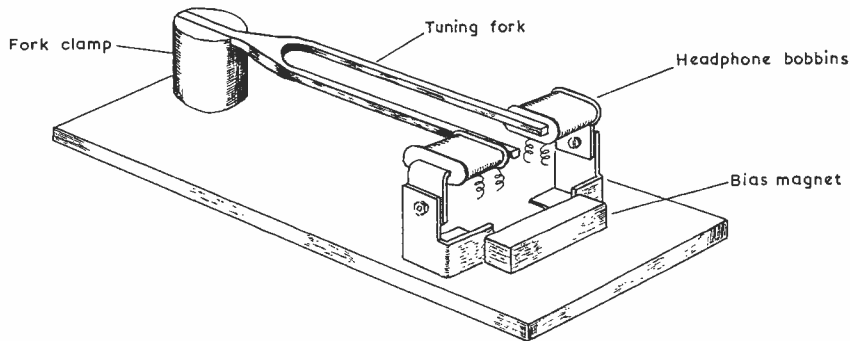


Fig. 2. Mechanical arrangement for the tuning fork oscillator discussed by G3CQE in his article. The essential requirement is to get the fork firmly clamped at its root. The fork is driven by the coils (removed from old headphones) which are themselves energised by the oscillator circuit shown in Fig. 1. The result is a highly stable and reliable AF source, enabling RTTY equipment to be accurately adjusted. While it might be supposed that the 50-cycle AC mains would provide a suitable frequency standard, in fact not only does this frequency vary too much (under overload and compensation conditions) but it is possible to obtain, from a good musical instrument shop, forks very near to the frequencies required—see text.

(9) Logs and score sheets should be sent to:—

The Hon. Secretary, B.A.R.T.G.,  
A. Walmsley, G2HO,  
The Woodlands,  
Bath Lane,  
Moirs,  
Nr. Burton-on-Trent, Staffs., England.

In order to qualify, they should arrive not later than **1st May, 1966**. N.B. It would also be of great interest to have check logs from SWL's able to print on RTTY.

With the exception of the ruling on multi-operator entries, it will be seen that the rules for this Contest are the same as for last year—but it is worth noting that in some details they are different from those for the Worldwide RTTY SS Contest.

#### Tuning Fork Audio Frequency Standard

For several years now the writer has relied upon either tape recorded tones or a simple two tuned-circuit AF discriminator with a channel level indicator as an aid to the setting up of the 850 c/s carrier freq. shift required for FSK operation. Of the two systems, the recorded tapes were the most accurate, the original tones having been taken from a calibrated AF signal generator, whereas the discriminator circuits, although of high-Q by most standards, are still flat enough on their peak response to mask a tuning error of some tens of cycles. Even the tape recorder is somewhat dependent on the frequency of the mains supply and this can be a variable factor. During periods when the Supply Authorities are reducing excessive load the mains frequency falls somewhat and later the frequency is increased above the normal 50 c/s in order to bring electric clocks back to the correct time. The final blow to both systems came when during a contest an Italian station reported that the shift was about 30 c/s short and this in spite of careful checks having been made prior to the contest! As the tape recorder

was fished out to the sound of several exotic RTTY signals emanating from the Rx, it was decided that an accurate frequency standard would have to be produced. Of course, with the advent of 170 c/s shift it becomes even more essential to have accurate standards available and accordingly it was decided to build one or two simple audio frequency tuning-fork oscillators, preferably driven by transistors in order that they could be self-contained units.

Tuning fork oscillators as frequency standards are by no means a new idea. At least two other circuits have been published for use as RTTY standards and before the advent of the xtal oscillator, tuning fork oscillators followed by several stages of frequency multiplication were used to provide the RF drive for radio transmitters.

Fig. 1 shows a simple oscillator which is quite adequate for RTTY purposes. Originally, the writer experimented with a more complex circuit incorporating a limiter stage for controlling the amplitude of the fork vibrations in order to produce a pure sine-wave output. However, it was found that providing circuit values were carefully chosen and it was accepted that the oscillator would take a few seconds or so to build up to its full output, the limiting circuitry was unnecessary. The freqs. normally used by RTTY stations running at a carrier shift of 850 c/s are 850, 2125 and 2975 c/s. The two higher frequency tones are those fed to the terminal unit from the receiver and are of course the tones produced by the receiver BFO from the 850 c/s shift at signal frequency. These freqs. are all harmonics (2nd, 5th and 7th) of 425 c/s and therefore this frequency was chosen for the standard.

Construction of the whole unit is more of a mechanical problem than anything else and Fig. 2 is a sketch of the layout. The end of the fork must be solidly clamped to the baseboard and how this is effected depends upon the actual cross-section of the fork. In the writer's case this section was square and

so the mount consisted of a piece of  $\frac{3}{8}$  in. diameter brass rod with a slot slightly smaller than the width of the fork "handle" cut into it. The fork was simply hammered into the slot and this gave an extremely rigid mounting. Incidentally, operations on this end of the fork have only a slight effect on the fork's resonant frequency. The bottom of the brass rod was drilled and tapped to take two 4BA brass screws and these secure the fork mounting to the baseboard. The excitation coils were removed from an old headphone of the 2,000-ohm impedance variety. (There are four such coils in a pair of headphones and so each coil is of about 500 ohms.) The two coils are removed from the single headphone along with their original armatures and each coil is mounted with the business end of its armature parallel to and about  $\frac{1}{32}$  in. away from the tines of the fork. A pair of brackets had to be made to carry the coils and their armatures. The gap between the two mounting brackets must be such that with the addition of a small permanent bias magnet they form a complete magnetic path from one fork tine to the other. In this particular application most of the small *Eclipse* magnets (generally available from ironmongers and tool merchants) are rather too powerful unless the reluctance of the magnetic path is increased by introducing an air-gap or a piece of some non-magnetic material such as paxolin between the magnet and the armature brackets. This gap can be between  $\frac{1}{16}$  and  $\frac{1}{8}$  in. and is not critical.

From an electrical viewpoint, the circuit requires little explanation. It can be looked upon as a transformer coupled oscillator, the transformer having a core which is highly frequency selective and therefore performing only as an effective transformer at the resonant frequency or a harmonic of the core, *i.e.* the tuning fork. The transformer used was an OC81 but almost any small transistor will do. Provided that the collector current is held down to 1.5 to 2 mA by a suitable base bias, the output waveform is reasonably sinusoidal. To adjust the base bias, alterations can be made to the value of the 40K resistor shown in the circuit. The oscillator starts quite readily and its output is sufficient to give a good signal into a pair of high-impedance phones, or to the Y-amplifier on an oscilloscope for frequency checking. An additional AF amplifier can be added if it is desired to use a speaker.

The tuning fork itself was obtained from a local musical instrument shop and here it is best to tell them what frequency is required since there appear to be several different pitches for a given note. (The shop usually carries a catalogue which gives the frequencies.) In fact, it seems that there is not an exact 425 c/s fork available but the nearest frequency will do since the final output frequency will depend to some extent on the mounting of the fork and its coils and will have to be adjusted to the desired frequency anyway. Once the fork is working satisfactorily, it can be brought to its final frequency by filing the tines an equal amount if the frequency is too low, or by filing the crotch if the frequency is too high. Having produced a unit which is capable of maintaining a high degree of stability it

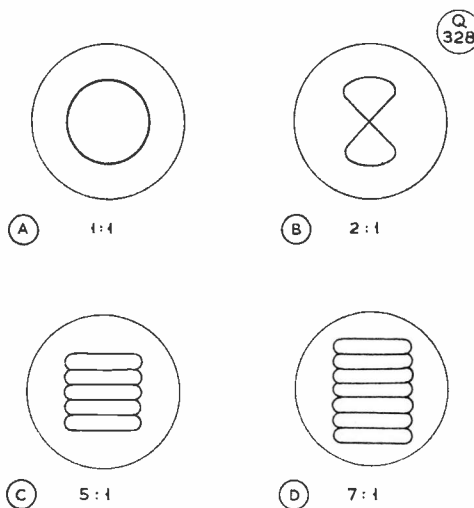


Fig. 3. Lissajous figures as obtained on a CRO when a 425-cycle tone is fed to the Y-axis, showing (A) 425 c/s, (B) 850 c/s, (C) 2125 c/s, and (D) 2975 c/s, on the X-axis of the oscilloscope.

is worthwhile going to a lot of trouble to obtain the use of some instrument such as a frequency counter as an aid to setting it up accurately.

### Results

The combination of the standard and an oscilloscope will permit extremely accurate freq. checks to be made using the type of oscilloscope display known as Lissajous figures. Readers who are not familiar with such measurements may find it useful to read up the subject in the appropriate chapter in one of the *Handbooks*. The output from the fork is fed to the Y-amplifier of the oscilloscope and the frequency to be checked is fed to the X-amplifier (if one is available) or direct to the X-plates if not. The normal timebase is of course disabled. The actual 'scope displays that will be obtained for the fundamental, second, fifth and seventh harmonics are shown in Fig. 3 (A), (B), (C) and (D) respectively.

For example, to check carrier shift, the station receiver audio output is fed to the X-plates of the 'scope and with the transmitter in the "net" condition, the mark signal is tuned to zero beat on the receiver. The FSK keyer is then held over to space and the shift adjusted until the 'scope shows the Fig. 3 (B) trace. This exercise may then prove to be a surprising demonstration of the poor short-term stability of the Tx/Rx combination!

An extension of the frequency checking facilities at the writer's QTH is the provision of another fork standard for 170 c/s and harmonic amplifiers which provide a direct output from the 425 c/s stage of 850, 2125 and 2975 c/s at a high output level via a switched AF amplifier. This can be used as an alternative to checking with an oscilloscope, allowing a quick reference to be made using audio beat—but

more about this another time.

Finally, a further reminder about the B.A.R.T.G. Contest: Please put in an hour or so of operating at least, preferably on both the Saturday and the Sunday. Twenty should be busy most of the day and evening but 15m. can produce equally good QSO's with a great deal more comfort. The European stations will be available on 80m. almost day and night and there should be some DX available on Forty if you can beat the QRM! Ten cannot be ignored either—it has a habit of springing surprises these days. Jump in, get your feet wet, enjoy yourself and when it is all over please send in your logs to G2HIO even if you only had time to make a couple of QSO's.

73, and see you in the Scramble—*de G3CQE*.

## THE MORSE TEST AT G.P.O. HEADQUARTERS

*(The piece following is based on a contribution by G3UXA to the January issue of the Echford Amateur Radio Society "Newsletter". It is reproduced here for the guidance and information of those who have yet to take a Post Office Morse Test.—Editor)*

IT is hoped that these notes will be of interest to those who will be taking the official Morse Test; they are based on the writer's recent experience.

At Union House take the lift to the 6th floor and in Room 603 ring for service; you will be provided with a form to fill up. You may then have time for a cup of G.P.O. tea (at 3½d., but bring your own cup!).

The examiner will appear at the appointed time and conduct you to the Examination Room on the ground floor. Do not be alarmed at the array of marine Tx and Rx equipment—it is there for candidates for the P.M.G.'s 1st and 2nd class certificates, who have to pass at speeds of up to 25 w.p.m. and show how to carry out emergency repairs.

Your interest will be in the two Morse keys screwed to a table in the centre of the room. You are allowed one or two practice runs, and then you're off! First receiving, and then sending. The writer was checked out at 11½ w.p.m. Easy, you say? It didn't seem so at the time, in spite of the fact that 14's could be copied word-perfect before attempting the official Test. So the writer advises the following:

- Even if you are not normally a nervous type, you may be when it comes to the Test. So get some practice in beforehand with a comparative stranger, preferably someone who regards 15-16 w.p.m. as just idling.
- Practice sending with a heavy brass key, never faster than 12 w.p.m., aiming to be perfect in character formation and spacing.
- Since the audio oscillator used for the Test

appears to have enough output to drive at least a hundred pairs of phones, if you object to being deafened, make up and take along an attenuator. This can consist of a P.O. jack-plug across a 50K potentiometer, with a jack-socket across the slider and one side of the potentiometer; you can then adjust the audio level to suit yourself. (You can also take your own headphones, if you wish.)

- And do arrive at the appointed hour, if possible with a little time in hand. A dim view is taken, and rightly, of candidates who arrive late and upset other people's appointments.

The officials concerned are invariably courteous and helpful, they know you may be nervous and you are given time to get settled. The only thing you have to do is to show them that you do know the Code, at up to the required standard.

*Editorial Note:* The official requirements for the Morse Test, and all other regulations affecting the issue of a U.K. amateur licence, are laid down in the G.P.O.'s own pamphlet *How to Become a Radio Amateur*, obtainable free on request to: Radio Services Dept., Radio Branch, Hq. Building, General Post Office, St. Martins-le-Grand, London, E.C.1. Much practical information covering the licence examinations in general is contained in *A Guide to Amateur Radio*, price 5s. 7d. post free from: The Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.



The new Burgess instant-heat soldering gun produces full heat in 5 seconds, and is equipped with 8 inter-changeable tips to suit the work. The instrument is well balanced, fully insulated and control is by trigger action. The price complete is £3 19s. 6d.



## OSCILLOSCOPE FOR THE AMATEUR STATION

### CIRCUIT CONSIDERATIONS FOR ADEQUATE PERFORMANCE—AND A PRACTICAL DESIGN

#### Part I

#### C. BOWDEN (G3OCB)

*Our well-known contributor has produced a very nice design for a CRO, suitable for home construction, with a wide variety of applications. First, he discusses the theoretical aspects and the choice of values for the Y-amplifier—the most important factor in the design for good wide-band performance. Part II will follow to complete the circuitry and construction.*

—Editor.

THE Oscilloscope is undoubtedly one of the most useful "tools" ever invented, and the owner of one can greatly increase his enjoyment of Amateur Radio. There are several good 'scopes available on the market these days but they are still rather expensive to buy and the constructor can build his own at quite a saving in cost—and he can often obtain better performance than from 'scopes in the medium-range.

Many constructors fight shy of building an oscilloscope, in the belief that it is beyond their ability. Very few published circuits try to provide a very exciting performance and there is seldom any discussion of wideband-amplifier techniques.

When the present 'scope was designed it was decided to keep the circuitry simple so that the construction would be straightforward without unduly sacrificing performance. As the whole project depends on the Cathode Ray Tube and Y-amplifier circuit, we will, with the Editor's permission (*granted—Ed.*) go into the design of this part of the equipment in some detail. This will enable the constructor to alter the design to suit his own requirements. (It will be assumed that the reader has some knowledge of valve amplifier and cathode ray tube circuitry.)

The ideal oscilloscope will be one in which the deflection of the spot will be the same for a given input whether the frequency is zero (DC) or thousands of megacycles. However, it is very difficult to design an amplifier with a level response over such a wide range as this.

If we look at the circuit (Fig. 1a) we see that in addition to the physical components, there are hidden stray capacities  $C_s$  due to the wires and valve electrodes forming capacitors. At medium frequencies

(from about 100 c/s to 10,000 c/s), the circuit amplifies very well (*Equation 1 in Appendix, p.28*).

As the frequency is lowered the reactance of the capacitor  $C_1$  will rise and a potentiometer will be formed as shown in the circuit (Fig. 1b) and the voltage reaching the grid of the valve will be reduced causing a drop in gain. At DC, the reactance of  $C_1$  will be infinite and the gain will be zero. Also, as the input frequency to the amplifier is lowered the increasing reactance of the condensers  $C_{sg}$  and  $C_k$  will result in ineffective decoupling of the screen and cathode. This will cause negative feedback and loss of gain.

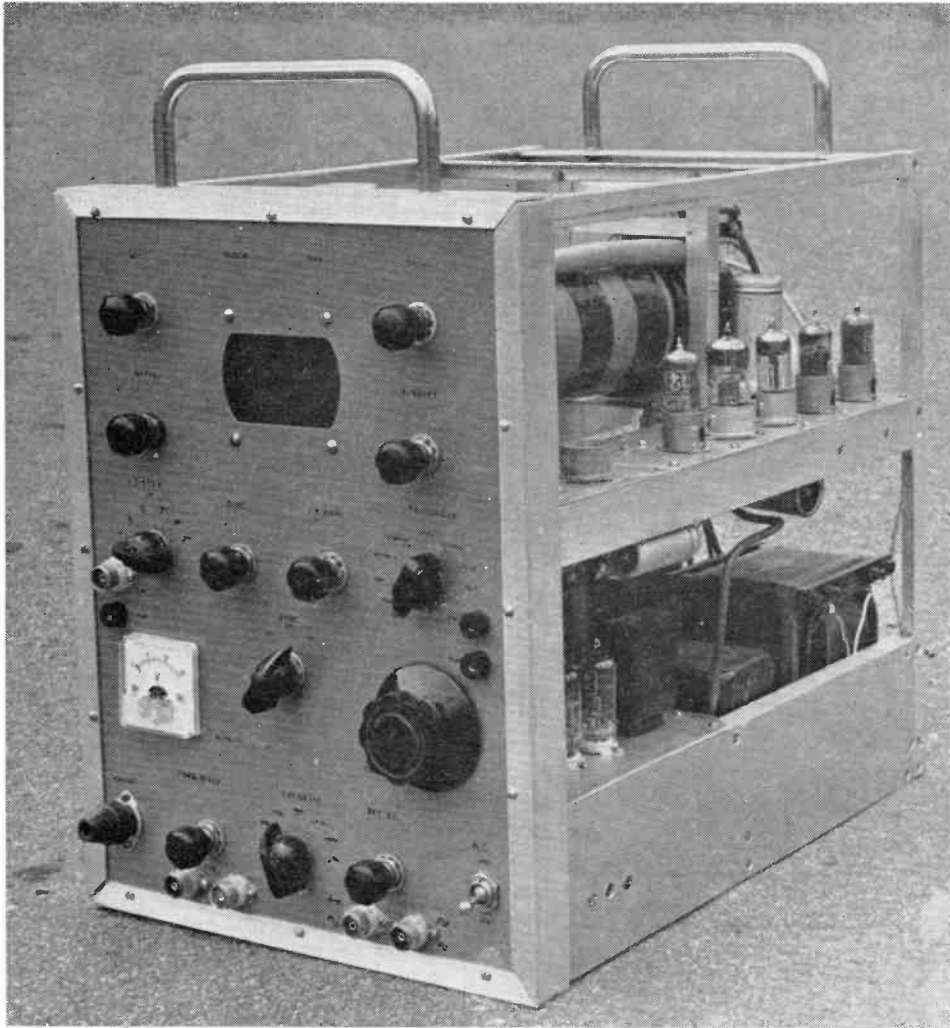
The amplifier can be made to give constant gain down to zero frequency by the use of DC coupling between stages, and by other low-impedance circuitry. But to make the amplifier give this sort of performance would require circuit complexity out of all proportion to the benefit obtained. It is rare for the amateur to need to amplify and display DC levels. However, careful design will ensure a level response down to a few cycles, which should be adequate for all normal purposes.

Reference to the diagrams (Fig. 2a and 2b) shows how the effect of  $C_s$  is felt at high frequencies.  $C_p$  is the power supply smoothing capacitor and as its reactance, and that of  $C_1$ , are very low at high frequencies they can be ignored. Thus we see that  $C_s$  is in parallel with  $RL$  and  $R_g$ . In an audio amplifier typical values would be  $RL=100K$ ,  $R_g=2M$ ,  $C_s=30 \mu F$ . The reactance of  $30 \mu F$  is about  $95K$  at 50,000 c/s and hence the effective anode load of the valve is due to the  $100K$  and  $2M$  resistors and the  $95K$  reactance, all in parallel. The effective load impedance is thus only about  $68K$ . Hence, the gain at 50,000 cycles will come out at 70 per cent or so of its value at medium frequencies, i.e., 3 dB down, and will be even lower at higher frequencies. (The bandwidth of an amplifier is the range over which the gain is within 3 dB of its gain at medium frequencies.)

In order to make use of our oscilloscope for analysis of TV signals, SSB signals, IF alignment, etc., we will require a level response up to 10 mc or more, with useful gain to even higher frequencies. It is thus obvious that we need to consider our circuit more carefully with a view to removing or overcoming the effects of capacitance at high and low frequencies.

#### High Frequency Performance

The basic method of improving the high frequency response of an amplifier is by reducing its anode load, thus ensuring that the reactance of  $C_s$  cannot appreciably shunt  $RL$  until a higher frequency is reached. This is all very well, but as  $RL$  is reduced the gain at all frequencies is reduced. To compensate for this we must use valves with a higher mutual conductance in our amplifier. Thus, two circuits may both exhibit a gain of 20. In one case we may employ an  $RL$  of  $10K$  in conjunction with a valve having a  $G_m$  of 2 mA/v. and in the other case we may use an  $RL$  of  $2K$  and a  $G_m$



*General appearance of the Amateur Oscilloscope described in the article.*

of 10 mA/v. The second amplifier will have a level response to a frequency some five times greater than the first amplifier.

A popular method of counteracting the effect of  $C_s$  is to place a coil in series with the anode load resistor. If the coil is correctly chosen, its rise in reactance with frequency will offset the fall of reactance of  $C_s$  up to a certain frequency, above which the gain will fall off even more rapidly than before. This circuit is better avoided in home-built equipment because the required value of inductance will depend on the value of  $C_s$ , which is difficult to measure or estimate accurately. Too large a coil will give rise to "ringing," which may distort high frequency components of the display, while too low a value will have little effect at all.

The use of negative feedback is also useful as a measure to overcome this problem, but any increase in bandwidth is always accompanied by some loss of gain. Negative feedback can be useful, however, as it reduces distortion in amplifier stages operating at high signal levels. One common way of introducing negative feedback is to omit the cathode bias condenser. This results in loss of gain at all frequencies (Eqn. 7) but overcomes the main shortcoming of the normal cathode by-pass capacitor, *i.e.*, the rise in reactance of the by-pass capacitor at low frequencies which results in negative feedback at LF only.

For example a cathode bias capacitor of 10  $\mu\text{F}$  would start to lose its decoupling effect at several hundred cycles when a bias resistor of 300 ohms is in use. At 50 c/s there would be a noticeable drop

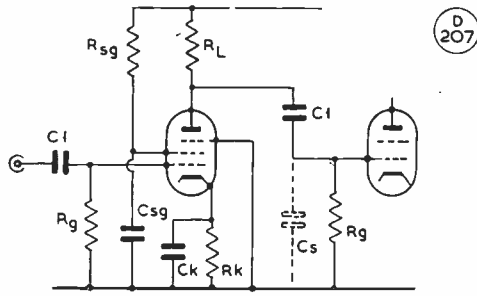


Figure 1a

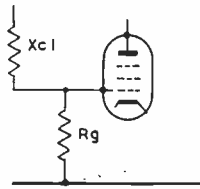


Figure 1b

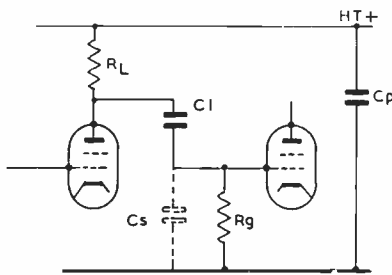


Figure 2a

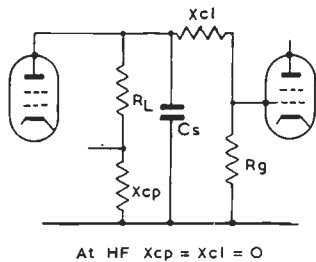


Figure 2b

in gain while at 5 c/s the capacitor would be ineffective. When the capacitor is omitted this variation in gain is not apparent but the overall gain of the circuit is reduced.

It is possible to shunt the bias resistor with a very small condenser which starts to decouple the cathode resistor at the same frequencies at which the stray capacitances in the anode circuit begin to reduce the gain. In this way the frequency at which the gain falls by 3 dB can be considerably increased. Too large a capacitor in this case can result in excessive gain at the higher end of the response curve which can cause distortion of the display, so

care must be exercised when applying this sort of compensation. The circuit finally described does not use cathode capacitive or anode inductive compensation—see Part II.

There are other circuits which can be considered, such as the anode follower and the long-tailed pair (Fig. 3). These circuits are slightly more complex making it most difficult to obtain a satisfactory performance over a wide frequency range. The long-tailed pair has certain advantages, however, especially as far as the application of shift voltages is concerned and is very popular. Normally, anode compensation is used with this circuit in order to obtain a good high frequency performance. In view of this fact and also that it is difficult to obtain a well balanced output over a wide frequency range the circuit will not be dealt with in any detail here.

There is another way in which the undesirable capacitance effects can be overcome to some extent. This is by the use of cathode followers. The cathode follower stage has three peculiarities, all of which are of extreme importance and usefulness in wide-band circuits :

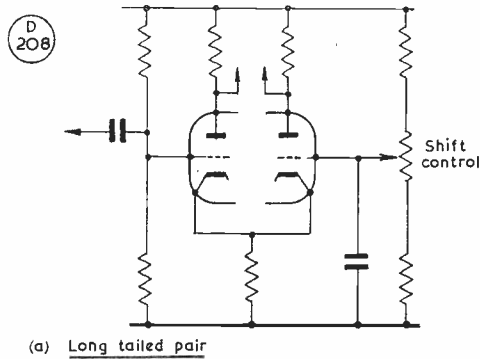
- (1) The input resistance is very high, (Eqn. 2);
  - (2) The input capacitance is very low, (Eqn. 3); and
  - (3) The output impedance is very low (Eqn. 4).
- In addition to these features the gain of the stage is never greater than unity (Eqn. 5). Usual values range from 0.5 to 0.99. This point is not so attractive but the other features are so useful that we can afford to ignore the loss of gain.

Let us consider how we can make use of these features:

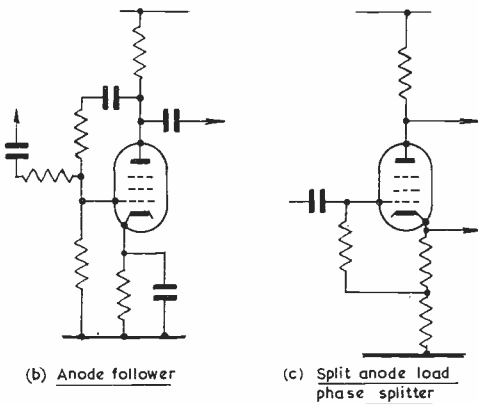
- (1) *High input resistance.* If we refer to Eqn. 2 we see that the actual physical value of  $R_g$  wired in the circuit (Fig. 4) appears to the preceding stage as a resistor  $(1/1-A)$  times larger (where  $A$  is the gain of the stage). As an example, if we assume  $A=0.8$  and that the actual resistor wired in circuit is 2 megohms, then as far as the preceding stage is concerned the actual resistance looks like:  $2.0 (1/1-0.8) M=10M$ . Thus, the effect of the increase in reactance of  $C_1$  (Fig. 4) will not now become effective until the frequency is five times lower. Consequently, the higher input impedance of the cathode follower helps to improve the LF response. Conversely, we could use a value of  $C_1$  five times smaller for the same LF response as we had previously; this would be a smaller condenser physically, thus helping to reduce the value of  $C_s$  (Fig. 1).

- (2) *Low Input Capacitance.* The input capacity of most valves is in the region of 8-20  $\mu\mu F$ , when used as a normal amplifier. When connected as a cathode follower however, the effective capacity is reduced by a factor of  $(1-A)$  times. If we assume that the input capacity of the valve is 10  $\mu\mu F$  then the effective input capacity will be:  $10 (1-0.8)=2 \mu\mu F$ .

Thus, there is a considerable reduction in input capacitance. The average output capacity of the preceding stage will be about 2-3  $\mu\mu F$  and by careful layout wiring strays can be kept to about 3-4  $\mu\mu F$  making a total stray capacity ( $C_s$ ) of about 8-10  $\mu\mu F$  compared to some 16-20  $\mu\mu F$  in the case of two



(a) Long tailed pair



(b) Anode follower

(c) Split anode load phase splitter

BASIC CIRCUITS

Fig. 3.

amplifying stages coupled directly together. This effective halving of the stray capacity results in a doubling of the bandwidth at the HF end of the range.

(3) *Low Output Impedance.* The output impedance of a cathode follower stage is quite low. An average value would be about 120 ohms. This, despite the fact that the actual resistors wired into the circuit ( $R_k$  and  $R_b$  in Fig. 4), may total thousands of ohms. The input capacity of the next stage, together with strays, may total  $20 \mu\mu F$  or so. The frequency at which the reactance of these strays falls to 120 ohms is so much higher than the "3 dB" frequency of the preceding amplifying stage that its effect on the overall response curve can be neglected.

The fourth factor—loss of gain—must be allowed for by designing the amplifiers to have a little more gain than would have been required in the absence of the cathode follower stages.

It should be realized that when stages are connected in cascade, *i.e.*, one after the other, then if they are identical and each has a bandwidth of say 10 c/s-mc, then the overall bandwidth will be less than this. With  $n$  stages the response at these frequencies will now be  $3n$ dB down and the bandwidth will be reduced. If in fact we wish our amplifier to have a bandwidth of from say 2 c/s to 20 mc, then

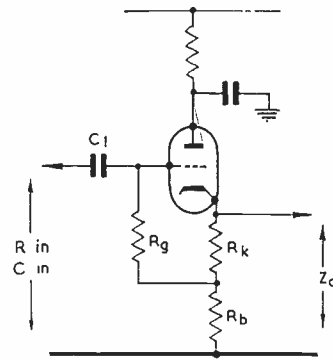


Fig. 4: Cathode follower

with  $n$  stages the gain of each stage must be not less than  $3/n$ dB down at these frequencies (Fig. 5).

Low Frequency Performance

Strays have no effect at low frequencies but as already mentioned the reactance of coupling and decoupling capacitors cause loss of gain. In addition to the use of cathode followers there is another method by which the gain at low frequencies can be improved. (Fig. 6). As shown in the diagram it is normal practice to decouple the HT supply to the anode of an amplifying stage;  $R_d$  and  $C_d$  are the decoupling components. At very low frequencies the reactance of  $C_d$  increases and the capacitor becomes ineffective as a decoupler. The impedance formed by

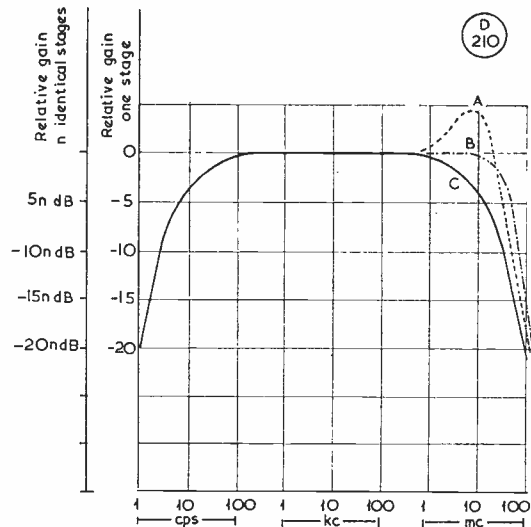


Fig. 5. General bandwidth characteristic of an RC amplifier. At (A) is the general effect of excessive inductive or capacitive compensation; (B) shows correct compensation; and (C), the effect of no compensation at all. LF compensation would show similar effects at the LF end. Curve is taken with approximate values of  $C_s$ ,  $10 \mu\mu F$ ;  $C_g$ ,  $0.1 \mu F$ ;  $R_L$ ,  $1.5K$ ; and  $R_g$ ,  $150K$ . See text for discussion.

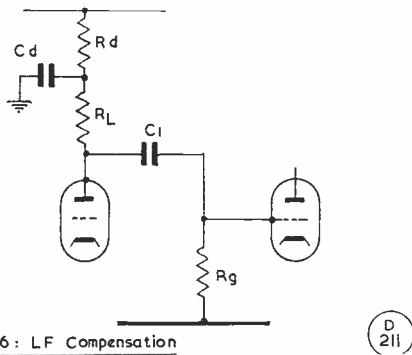


Fig. 6: LF Compensation

D 211

$R_d$  and  $C_d$  in parallel increase the effective anode load and this results in an increase in gain. If the frequency at which this effect occurs is chosen (Eqn. 6) to be the same as that at which loss of gain due to increase in the reactance of the grid capacitor occurs, then the effect is compensated to some extent.

As with the other forms of compensation mentioned application of the wrong amount can cause distortion due to an uneven gain-frequency characteristic. It is, however, easier to calculate the performance of an amplifier at low frequencies since the capacities are known values, so compensation can be more accurately applied.

**Non-Sinusoidal Inputs**

So far we have only considered the behaviour of an amplifier when *sine* waves are applied. But it is often necessary to view square or pulse waveforms, e.g., TV signals, multivibrator outputs, and such. We must therefore consider how our circuit responds to such waves.

A square-wave consists essentially of a sine wave combined with an infinite number of odd harmonics added in phase. We thus require that the bandwidth of our amplifier is wide enough to accept these harmonics. One important consideration is the *time* involved for the leading or trailing edge of a pulse waveform to rise or fall. Rise time ( $Tr$ ) is commonly taken as the time it takes for the wave edge to rise or fall from 10 per cent to 90 per cent of its full value (Fig. 7).

If a square-wave is applied to the grid of a valve the anode current will follow this change of state instantly. The anode voltage, however, is controlled not only by the resistive load, but by the stray capacities present. Hence the anode voltage cannot follow instantly, but only as fast as the strays can charge or discharge through the anode load resistor (if we ignore the grid resistor which is effectively in parallel with the strays but is much larger than the load resistor).

It takes a time of about  $5C_sR_L$  secs. for a capacitor fully to charge or discharge through a resistor (where  $C_s$  is the value of the stray capacitances and  $R_L$  is the load resistor in this case). For example

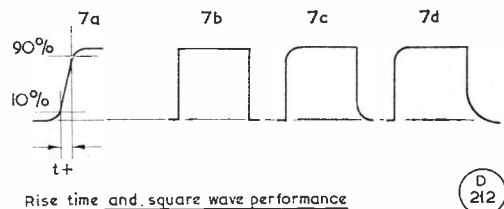
if we assume a load of 1,000 ohms and strays of  $10 \mu\mu\text{F}$  then  $Tr = 5 \times 1,000 \times 10 \times 10^{-12}$ secs.—which is about 50 milli-microseconds. Any wave-front rising or falling *faster* than this at the grid of the valve will emerge from the anode circuit with its wave-front slowed to this figure.

Due to their low output impedance cathode followers are much better in this respect. In the case above if we assumed an output impedance of 100 ohms in place of the load of 1,000 ohms then  $Tr$  would now be only 5 milli-microseconds. However, the overall rise time of an amplifier cannot be faster than the rise-time of its slowest stage. As cathode followers are so much superior in this respect it is usually the amplifying stages that determine the overall  $Tr$ . It should be noted however that if the fall-time of the negative going edge of any waveform is faster than the time constant of the cathode circuit of a cathode follower, then the grid will fall much faster than the cathode can follow. The valve will therefore cut off and the time constant of the cathode circuit will increase as the output impedance is no longer  $1/Gm$  but is  $Rk + Rb$  in series (Fig. 4). This could result in distortion of very high speed waveforms if the performance of the amplifiers were extremely wideband or where a cathode follower input stage is used.

The rise time of an amplifier can be related to its bandwidth by the expression  $Fh \cdot Tr = 0.4$ , where  $Fh$  is the high frequency 3 dB point and  $Tr$  is the rise time. For example, if an amplifier has an upper 3 dB point of 15 mc, the rise time will be about 26 milli-microseconds. Such a performance should be sufficient for all normal amateur requirements. As the latter formula implies, if the Y-amplifier is designed for a wide bandwidth then the rise time will automatically be short.

The final performance factor which concerns us is the effect that the LF response may have on a square wave. It is this factor which determines the amount of "sag" in the "top" of the waveform. Whereas it is the stray capacitances that effect the performance as far as the edges of the waveform are concerned, it is the effect of the coupling and decoupling condensers that cause the droop in the top of the waveform.

If a square wave is applied to the grid of an amplifier the leading edge will cause the valve current to rise or fall and the anode voltage will then



Rise time and square wave performance

D 212

Fig. 7. (A) illustrates rise time. (B) a perfect square wave. (C) poor HF performance results in inferior rise time. (D) effect of cathode follower cut off by negative-going edge.



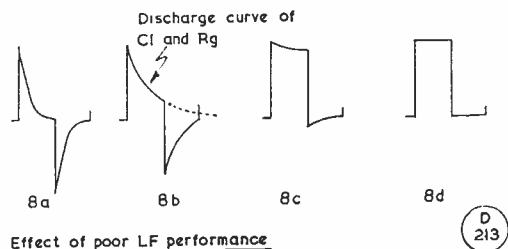


Fig. 8. (A) very poor response. (B) effect of increasing C1 or Rg, Fig. 1. (C) fairly good LF performance. (D) the ideal condition.

follow as fast as the anode time constant will allow (or at the speed of the waveform if this is slower). The coupling capacitor C1 (Fig. 1) had until the arrival of the wavefront been charged to a voltage equal to the anode voltage of the valve, as its one end is grounded (via the grid resistor) and the other is connected to the anode. After the waveform edge causes a change in anode potential due to change of valve current, the plates of the condenser connected to the anode follow the anode voltage as it changes. The capacitor cannot alter its original charge instantly because it takes a finite time to charge or discharge through the circuit resistances. Since the capacitor cannot change its charge instantly, it follows that the voltage on the plates on the grid side must respond instantly by the same amount as did the anode plates and in the same direction, i.e., more positive or more negative, depending on polarity of input waveform.

The capacitor then begins to charge or discharge through Rg so as to return the voltage on the grid side to zero. It is this change of charge that causes the "droop" of the waveform. If the trailing edge of the pulse is a long time coming the coupling capacitor may have completely discharged through Rg before it arrives. When it does arrive the charge again cannot change instantly, resulting in the grid now being taken in the opposite direction. The resulting waveform is shown in Fig. 8A. The remaining diagrams (Figs. 8B, C, D) show the improvement in performance obtained by increasing C1 or Rg, i.e., increasing the time it takes for C1 to discharge through Rg.

From Fig 8B it can be seen that the droop is really the first part of the charge or discharge curve of C1 through Rg. If these components are large enough, the trailing edge of the pulse will arrive before appreciable droop occurs.

Over the first part of a C-R discharge curve, the rate of change is almost linear. At this rate of change the time that would be required for a complete discharge would be CR secs. (Fig. 9). Let us consider the minimum value of C and R required such that a 50 c/s square wave would be passed with only 1 per cent droop. (The droop of each stage will add to make the overall figure even worse.) The time between successive leading and trailing edges

of the wave is .01 sec. Thus, the charge on C must not change by more than 1 per cent in .01 sec. If this is a linear rate of discharge then the capacitor would be completely discharged in one second. This is therefore the CR required, and we could use either 1 μF and 1 megohm, or 0.1 μF and 10 megohms, or a similar combination.

### The Cathode Ray Tube

We have now considered quite fully the behaviour of the Y-amplifier. Before we can finally design our circuit, however, we must look at the performance of the CR tube itself.

Unfortunately it takes quite a considerable voltage to give a reasonable deflection of the spot on most cathode ray tubes, and to obtain such a large deflection demands that we use output stages with high anode load resistors. This is what we wish to avoid in order to preserve a good HF response. The only course open to us is to select as sensitive a tube as possible and to use high-gain, high-current output stages feeding into low anode loads.

As the anode voltages on a tube are reduced the deflection sensitivity increases but the focusing and brilliance are usually poorer, and it becomes more difficult to eliminate the effects of stray fields. A 3BP1 and also a VCR-138 were available and some comparisons were made. It was found that minimum acceptable performance was obtained with a final anode voltage (relative to cathode) of about 1,000 volts with the former tube and about 900 volts on the latter. Under these conditions the focus and brilliance of the 3BP1 was superior but the VCR-138 was far more sensitive. The VCR-138 gave a deflection of one inch when 5 volts r.m.s. was applied to each Y-plate, but the 3 BP1 required about 18 volts r.m.s. to each Y-plate for the same deflection. (It is considered that a deflection of one inch is about the minimum acceptable in a high-performance 'scope.) In fact, the VCR-138 is one of the most sensitive tubes available on the surplus market. A larger tube could be used but as those available as surplus are no more sensitive it is impossible to obtain a greater deflection without undue sacrifice of HF performance.

Undoubtedly, one of the more modern PDA tubes could be employed; the focus and brilliance would be superior and the sensitivity would probably be better in most cases, but a much higher EHT

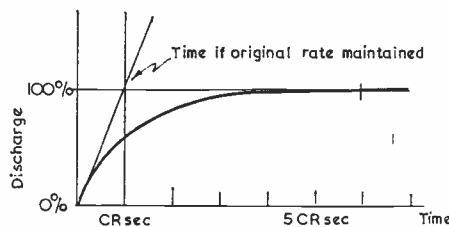


Fig. 9: Discharge curve of a CR circuit

voltage would be required. The tubes are also rather expensive.

The performance of the VCR-138 is quite adequate for general purpose work and if the brightness control is kept down quite a good focus can be obtained, although under these conditions some screening of the tube becomes desirable in bright locations, especially at fast time base speeds.

The VCR-138 unfortunately has rather high input capacitances to the deflection plates (about 25  $\mu\mu\text{F}$ ) but by using cathode follower driver stages the bandwidth can be kept quite high.

The chosen tube requires a drive voltage of 10 volts r.m.s. to one plate, or 5 volts

r.m.s. in push-pull to both plates. The latter is a better choice for the following reasons: If an anode load of say 1,000 ohms is to develop 10v. r.m.s. in one driving stage, then only 500 ohms will be required by two push-pull stages. If the bandwidth of the single stage using 1,000 ohms is in the region of 10 mc, then it will be about 20 mc in a stage using 500 ohms. The overall bandwidth of two stages in push-pull, each with a bandwidth of 20 mc, will be about 14 mc. Thus, in the push-pull mode we obtain a better bandwidth and any tendency to trapezium distortion or deflection defocusing is eliminated.

(To be continued)

#### APPENDIX

Eqn. 1 Gain of RC Amplifier when RL is small compared with Ra:

$$A = Gm.RL.$$

where  $A$  is the gain  
 $Gm$  is the mutual conductance in mA/v.  
 $RL$  is the load resistor in K ohms

Eqn. 2 Input resistance of cathode follower:

$$R_{in} = \frac{Rg}{1-A}$$

where  $A$  is the gain  
 $R_{in}$  is the effective input res. in megohms  
 $Rg$  is the grid resistor in megohms

Eqn. 3 Input capacitance of cathode follower:

$$C_{in} = Cgk(1-A) + Cag$$

where  $A$  is the gain  
 $C_{in}$  is the input capacitance in  $\mu\mu\text{F}$   
 $Cgk$  is the grid — cathode cap. in  $\mu\mu\text{F}$   
 $Cag$  is the anode — grid cap. in  $\mu\mu\text{F}$

Eqn. 4 Output impedance of cathode follower:

$$Z_o = \frac{1}{Gm.}$$

where  $Z_o$  is the output impedance in K ohms  
 $Gm$  is the mutual conductance in mA/v.

Eqn. 5 Gain of cathode follower:

$$A = \frac{u.Rk}{Ra + u.Rk}$$

and  $u = Gm. Ra.$

where  $Ra$  is the anode res. of the valve in K ohms  
 $u$  is the amplification factor  
 $Gm$  is the mutual conductance in mA/v.  
 $Rk$  is the cathode resistor in K ohms

Eqn. 6 For compensation at Low Frequencies:

$$C1. Rg = Cd.Rd.$$

where  $C1$  is the coupling cap. in  $\mu\text{F}$   
 $Cd$  is the anode decoupling cap. in  $\mu\text{F}$   
 $Rg$  is the grid leak in megohms  
 $Rd$  is the decoupling resistor in megohms

Eqn. 7 The gain of an amplifier with unbypassed cathode resistor:

$$A = \frac{Gm.RL}{1 + Gm.Rk}$$

where  $A$  is the gain.  
 $Gm$  is the mutual conductance in mA/v.  
 $RL$  is the anode load in K ohms  
 $Rk$  is the cathode resistor in K ohms (unbypassed portion)

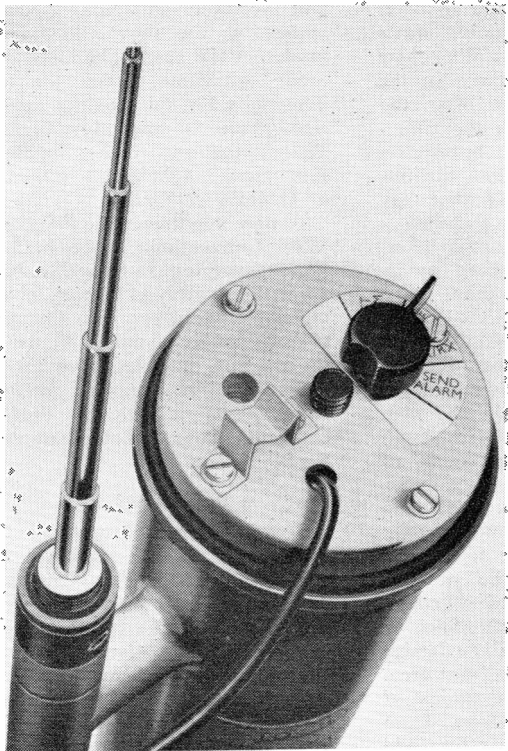
#### THE SMALL ADVERTISING

Anyone looking through pp.56-64 of this issue will see that we carry an enormous amount of Small Advertising—readers who have something to buy, sell or exchange—and it is fair to say that the volume of this advertising is such as not only to establish prices, but also to constitute a market-place for anyone who wishes to do a deal. It hardly needs

saying that it is no use offering worthless junk; that your price must be fair; that you must be ready to come to terms as regards despatch or delivery; and that if a prospective buyer calls, you must be prepared to show that what you may be offering will do its stuff on the air. While we do not guarantee either results to an advertiser or a satisfactory bargain for

a buyer, we can say that complaints are so rarely heard (about three in the last five years) that they are negligible.

All advertising is accepted in good faith. The cost in the Reader space is 3d. a word, with a *minimum charge* of 5s. (which means that there is no use sending us a postal order for 3s. 9d. if your words only count up to 15). To prepare a good Small Adv. to earn the cheapest rate, make a few rough drafts using the accepted abbreviations, be sure that you have said all that it is necessary to say to make your meaning clear, and send the final copy, with remittance, to: Advertising Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. We cannot take small advertisements over the phone, and the acceptance of *any* copy, whether paid for or not, is strictly at Editorial discretion.



The well-known firm of K.W. Electronics, Ltd., manufacture for other fields besides Amateur Radio. Here is their new K.W. "Safcom" emergency R/T beacon, the only such unit so far to obtain G.P.O. type approval for a safety device that is soon to become compulsory equipment on every sea-going fishing vessel or auxiliary craft over 60ft. long. The beacon operates on 2182 kc (the small craft distress channel), weighs only 9½ lbs., floats and will withstand the severest conditions. It is simple to operate, works from mercury cell batteries giving a long life powering a solid-state transceiver, and has a telescopic aerial. It is complementary to the rubber life-raft which recently became mandatory in small craft, has passed the most stringent tests, and its B.o.T. certificate is pending.

#### LOCAL AGENCIES FOR K.W. APPARATUS

In order to give better sales service to the customers of K.W. Electronics, Ltd., a number of selected local agents have been appointed, who will carry stocks of K.W. apparatus and will be in a position to give after-sales service. Following is the list of agencies so far arranged:

*London Area:* G. W. Smith & Co. (Radio), Ltd., 3 Lisle Street, London, W.C.2.

*Liverpool & North-West:* Stephens-James, Ltd., 70 Priory Road, Anfield, Liverpool, 4.

*Derbyshire & District:* J. & A. Tweedy, Ltd., 64 Lordsmill Street, Chesterfield, Derbyshire.

*Southern Counties Area:* Brian J. Ayres & Co., 8 Hartfield Road, Wimbledon, London, S.W.19.

*Birmingham & Midlands:* Chas. H. Young, Ltd., 170-172, Corporation Street, Birmingham, 4.

*Nottingham & District:* G. Francis, 93 Baldertongate, Newark, Notts.

*Aberdeen & N/E Scotland:* L. Hardie, 542 George Street, Aberdeen.

*Northern Ireland:* W. J. McConaghie, 72 High Street, Bangor, Co. Down.

*Eire:* Long Bros., Main Street, Dunkineely, Co. Donegal.

Many of these names are already well known in the Amateur Retail trade, with years of experience of catering for the radio amateur market. At any of these addresses, you will find keen and expert interest in K.W. products, with a full range of K.W. equipment available for inspection and discussion.

#### AWARD OF "THE FARADAY MEDAL"

One of the most sought-after distinctions in the fields of radio and electrical engineering is the Faraday Medal, bestowed annually by the Institution of Electrical Engineers in recognition of some outstanding contribution to the progress of the art. The 44th Faraday Medal goes to J. A. Ratcliffe, CB, CBE, FRS, now retired and until lately Director of the Radio and Space Research Station, Slough, Bucks., at which much of his work was done on the physics of the ionosphere and the related problems of radio-wave propagation on the LF bands. It should be mentioned that the annual Faraday Medal award—commemorating one of the founders of electrical communication—is not confined to I.E.E. members or even to citizens of the U.K. The award is made purely for "conspicuous service rendered to the advancement of electrical science." It is this that makes it such a signal honour.

*The series "Discussing Single Sideband" will be resumed with Part IV in the April issue*

# VHF BANDS

A. J. DEVON

FIRST of all, of course, your A.J.D. must apologise for last month's non-appearance—which some readers, at least, did notice!—and since the reasons would take too long to explain here, it can only be said to have been due to "circumstances unexpected and unavoidable."

In fact, there has not been much in the way of operating interest to report—with the possible exception of the advent of *Oscar IV*, with rather indifferent results. Launched just before Christmas, *Oscar IV* was a cross-band translator, accepting signals on 144.1 mc and re-transmitting them on 431.9 mc, power being about 3 watts. The satellite also radiated a beacon signal (still audible at the time of writing) on 431.9 mc. The cross-band feature enabled an operator to check whether he was, in fact, coming back on 70 cm. Unfortunately, shortly after the orbit had been established as being at an inclination of 26.35°, with a periodicity of 9 hrs. 50 mins., an apogee (maximum distance out) of 20,600 miles and a perigee (minimum height) of 127 miles, the communication system started to play up. The malfunctioning then became progressively worse until by about January 10, even G3LTF could barely get recognisable call-signs through. The failure took the form of the CW being returned badly broken up, with a marked intermittency which gradually became more pronounced, until finally the translator failed altogether. This must be a great disappointment to the "Project Oscar" boys—and not the first one they've had—as the cross-band idea was a very good one and the system had been rigorously tested. However, it is probably just not feasible to guard against all the eventualities of a rocket launch. In spite of this early failure of *Oscar IV*, there was an opportunity for some very interesting 144/432 mc cross-band DX to be worked. G3LTF was particularly successful in that he heard (or was heard by)

a number of DX stations, including K2MWA, but no full two-way contact was obtained due to this malfunctioning. In other words, the signals were there all right, and would otherwise have been quite workable.

Yet another amateur airborne device is the German translator balloon (ARTOB), which receives between 144.08 and 144.10 mc for CW only, and 144.10-144.12 mc for SSB, with re-transmission over 145.88-145.92 mc. The equipment belongs, in fact, to DJ4ZC, and has already made several successful flights, with good translator results. But there are certain practical difficulties involved: When it can go up and in what direction the balloon drifts depends entirely on the Wx; there are considerable problems in the recovery of the gear after the balloon bursts, though the equipment includes a signal beacon on 145.95 mc; and for obvious reasons, it is desirable that any flight should take place during a weekend, either a Saturday afternoon or Sunday morning, as by a simple system of monitoring, it is easier to alert the VHF fraternity. The next ARTOB flight is planned for some suitable occasion during April-May, from the Aachen area, when the met. condition forecasts a drift from west to east, up to a height of about 30 km., roughly 25 miles. However, even at this height, on such a course the transponder would be of little use to anyone in the U.K. (with the possible exception of G2JF and others in the south-east district). Such a device can only be really effective for those right in its fall-out area.

Lastly, on the general subject of satellites and emanations from space, it is of interest just to add that those remarkable picture and telemetry signals from *Luna 9*, on the Moon from 1845z on February 3, were centred on a frequency of 183.5 mc.

## Convention Time

This has now come round again, and the first is the big London affair, the VHF Convention at the Kingsley Hotel, Bloomsbury Way, W.C.1, on Saturday, April 2, when there will be a lecture programme and an exhibition, winding

up with the dinner in the evening, which is the highlight of the event. All-in cost (Convention and Dinner) is 32s., with tickets obtainable from: Frank Green, G3GMY, 48 Borough Way, Potters Bar, Herts. The London convention is always one of the big events of the VHF year, and should on no account be missed if you can possibly get to Town on April 2—and book straight away, as the dinner sitting is limited.

Up in Scotland, their annual VHF convention will be held at the Mill Hotel, Rutherglen, on Saturday, April 30, starting at 3.0 p.m. with an exhibition (SWL's and younger amateurs specially invited, as the show will feature modern VHF gear). The all-in cost—for exhibition, talks, tea and dinner—is 27s. 6d., but the exhibition alone is open for 2s. 6d. Tickets and any further information from: GM3PMB (*QTHR*), or GM6ZV (*QTHR*).

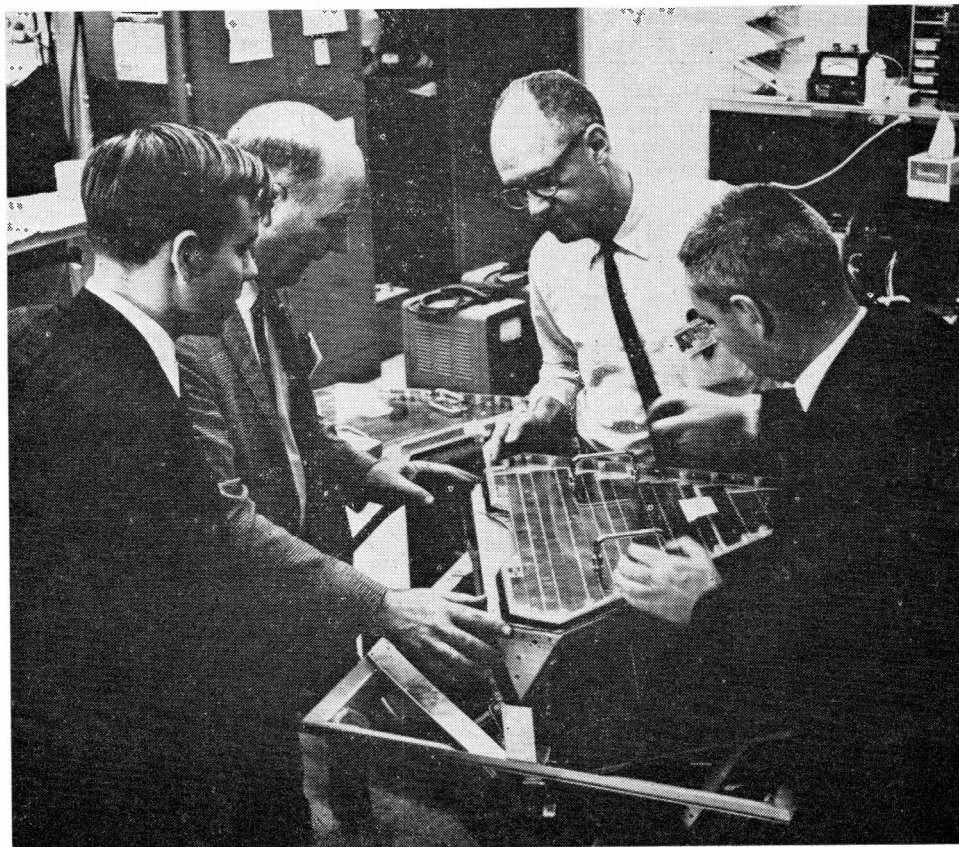
A new venture is the Midlands VHF Convention, to be held at Wolverhampton on Saturday, May 14, with assembly at 1.0 p.m., chairman of proceedings Tom Douglas, G3BA, and of course, a dinner in the evening. The inclusive charge is 30s., and tickets can be obtained from F. T. Smith, 5 Pinfold Crescent, Penn, Wolverhampton, Staffs.

## Band Plan

This has been thrown into the melting-pot again, and will be coming up for discussion and decision before this appears in print. It is not the intention here to prejudge the issues nor to attempt to give advance information—but to make it clear that whatever Plan does emerge will have been worked out by collaboration between the *Magazine* and the RSGB, and the agreed draft will be published by both journals.

## Tabular Matter

Space only to show the Three-Band Annual this time—and please read carefully the *small print*, under the Table on p.32. For the first time, we are trying multipliers (*see small print*), and though at first sight it may look as if the two-metres-only types will be left



The "Oscar IV" satellite in the final stages of assembly. Left to right are: K6MWR, responsible for the design of the receiving side; Dave Moore, who undertook the mechanical design; W6ZPX, who did much of the final electrical assembly and check-out; and on the right, W6RTG who was associated with the system engineering involved in "Project Oscar." The work is under the control and direction of members of the TRW Radio Club, Redondo Beach, Calif., with W6NLZ as project manager, and W6SAI as president of the Club and "Project Oscar." All the work is done by Club members strictly in their amateur capacity; much of the equipment has been donated by American manufacturers in the radio and electronics field, and the cash outlay so far (met from Club funds) is less than £70.

far behind, in fact there are ways of compensating for that and, in any event, the Two-Metre Annual is being kept running.

All claims made for the various Tables have been carefully entered and it is hoped to make space, in an early issue, for another spread of all the current ones.

#### Set Listening Period

It will be remembered that this was set for four metres, over two periods on January 16 last—when, by the immutable Law of Murphy, conditions went off and activity fell low. However, several logs were received, mainly listing a few locals only, together with the rather more successful results obtained by SWL Pete Cayless

(Exeter), who heard a dozen different 4-metre stations, with GC3OBM as best DX; and by SWL Trevor Brook (Leatherhead, Sy.), who turned in a log listing nearly 20 different stations, though none at any great distance. It is interesting that both these SWL's make the same remark—to the effect that though the activity was disappointing compared with what it can be under good conditions, little or nothing would have been heard by either if the SLP had been held even a few months ago, so much has occupancy and activity increased on the 70 mc band.

So we will plod doggedly on, and set another SLP for 4-metre CW and Phone, on Sunday, April

10 (*Easter Sunday*), periods as before: 1000-1300z, and 1500-1900z. Your A.J.D. looks forward to seeing some rather fuller logs for this one, and transmitting operators are reminded that, in the knowledge that there is an SLP on, they should transmit as much and in as many different directions as possible.

#### General News

There have, of course, been some flashes of good conditions during the last few weeks, when the Wx pattern showed the signs clearly enough. The benefit during the early part of January was in the southerly direction from the southern part of the country, down into France—for instance, G2JF

THREE-BAND ANNUAL VHF TABLE  
September 1965 to August 1966

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3EDD	25	2	49	17	15	4	112
G3HRH	23	2	44	12	14	2	98
G3FIJ	18	2	36	12	19	4	91
G3OWA	22	2	33	7	13	1	78
G3RST	8	1	49	17	—	—	75
G3TLB	8	1	50	13	—	—	72
G2AXI	14	2	36	10	7	1	70
G5SUM	15	1	27	7	16	2	68
G3AHB	—	—	34	10	20	3	67
G2CIW	—	—	14	9	32	6	61
G3LAS	17	1	31	8	1	1	59
EI6AS	9	5	29	7	4	3	57
G3KQF	—	—	23	7	21	2	53
G3FNM	2	1	33	8	—	—	44
G5FK	20	2	7	3	10	1	43
G3UCS	—	—	34	5	—	—	39
G3UFQ	—	—	28	8	—	—	36
G3EKP	8	5	6	3	5	2	29
G3HWR	10	1	8	1	8	1	29
GW3CBY	2	2	19	4	—	—	27
G3UFA	—	—	22	4	—	—	26
G8ACB	—	—	—	—	22	4	26

Scores are since September 1st, 1965, and will accrue until August 31st this year. Position is shown by last-column total, as aggregate of all scores. Own county and country score as one each. Entries may be made for a single band, any two, or all three. From time to time, multipliers will be announced (with at least one month's notice) to give a loading in favour of some particular band. Points so earned will be taken into the aggregate and carried right through till the end of the VHF year. N.B. *Multipliers Announced:* With effect from April 1st until May 31st, all aggregate 4-metre scores can be multiplied by two and all 70-centimetre totals by three. As an example, at his present standing in the Table above, G2AXI could claim 32 points for the 4-metre column and 24 pts. on 70 cm., making (with his x 1 two-metre score of 46), a total of 102 points. New entrants on either band within the April-May period may claim multipliers accordingly.

worked F9NL in the Pyrénées, a nice 600-mile contact. The January two-metre contest missed good tropo. conditions by just 24 hours (old Murphy again)—and, of course, the weird Wx since has been all against anything in the way of stable EDX, or even GDX, conditions developing.

Inevitably on the VHF bands, conditions are always up-and-down, and it is this mysterious propagation factor that lends enchantment to VHF. You, as a new boy, could come on two metres with your bit of a rig just at the time the band is wide open

for EDX—and how often *that* has happened—only to have to wait months before you can work a few more U.K. counties. You can have been on the band for years without ever having encountered an Auroral opening (a stupendous experience); a Sporadic-E manifestation or a Tropospheric occasion — taking you into, say, Scandinavia or *Mittel-Europa*. Or you can just be perfectly happy working locals on a band without TVI problems (provided you have arranged your multiplier sequences correctly!).

During the Easter vacation,

which means towards the end of March, the Cambridge University Wireless Society will be mounting an all-band expedition to GD: skeds for 70 mc and two metres can be arranged by getting in touch, as soon as may be, with P. K. Cripps, G3SKT, 61 Devonshire Road, Cambridge. (We hope that ON4FG makes the necessary arrangement and succeeds in getting through!)

The 70-centimetre (430 mc band) boys are working hard and doing well. G8AKQ (Barnsley) lists no less than ten 70-cm. stations in that area, all regularly worked or heard—and as G6ABK/T he exchanges A/TV pictures with G6ABN/T (Tadcaster), while G3RND and G8AAN take pictures from him. The G6ABK/T Tx runs 35w. on 432.57 mc for sound, and 436.07 mc vision. (A picture of his aerial system appeared on p.677 of our January issue.) A job in hand at the moment at G6ABK/T-G8AKQ is the converting of a UHF TV tuner to 23 cm. Another to write in is G8ACB-G6KQJ/T (Wolverhampton), whose beam is a pair of 14-ele Yagi's on a telescopic tilt-over tower, swinging up to 50ft. In the last five months, he has heard, and mainly worked, more than 100 different Midlands stations on 70 cm. His bench project is a 150-watt Tx, and in the meantime he is trying to separate the local ITA/BBC-2 signals from his 433.4 mc mixer diode, as they produce a very objectionable bunch of birdies; a high-Q break and a tuned emitter circuit give some relief but also attenuate all signals.

Developing on 23-cm. are G3HWR and G5FK (Wembley), who have made a few contacts. G3DBF (Mansfield, Notts.) says he has built the 5-transistor two-metre converter described by G3JAM in our June, '65, issue—having heard about 50 stations on it, he has been converted to VHF and is now at work on a Tx.

So that must be it for this time. Your A.J.D. hopes to get into gear again, with more space next month, for which the closing date is: **Friday, March 18**, addressed to VHF Bands, SHORT WAVE MAGAZINE, Buckingham. 73 *de* A.J.D.

# COMMUNICATION and DX NEWS

L. H. Thomas (G6QB)

CONDITIONS from mid-January to mid-February were pretty disappointing, with all bands below par for much of the time. Spring, it seems, will be a little late this year. And the general dullness was not so much a matter of the MUF, or the behaviour of one particular layer—it applied to all bands, so that One-Sixty, which is so often extremely good when the others were bad, fell in with the general depression. So here we all sit, waiting impatiently for a sign that the sunspots are about to do their stuff.

The CQ Top-Band Contest missed the boat by just one week, after catching it brilliantly last year. This year, the weekend of January 29-30 was nothing to write home about, but the previous weekend was very interesting. W1WY says that at this time (January 23) he was actually passing over all the G's he had worked before, in order to look for new countries. During that one night he raised 9L1HX, DL1FF, OL1AEF, OK1ANG, HB9CM, PAØPN and three or four new G's.

The contest weekend was most peculiar as regards conditions. Over here one could hear W8's, 9's and 5's working each other; very few W's or VE's working Europe; and the old faithful W1's and 2's were notable by their absence. There's no doubt about it—something has gone wrong somewhere!

## Sun-Spotting

G2TA sends some information from the January 15 issue of *Nature*, in which D. G. King-Hele discusses the prediction of dates and intensities for the next sunspot maxima. You will remember that the last maximum (1957-58) reached the highest figure ever recorded, not far short of 200. Two schools of thought grew up,

one predicting that the next might be higher still, and the other suggesting that we were in for a period of *very low* maxima. Well, the writer referred to has evolved a formula for predicting the maximum from various recorded figures, and he suggests that the next two peaks will approximate to the figures of 140 (January, 1968) and 110 (May, 1978). The minima, according to the formula, should occur in July, 1974, and March, 1985. So this makes it seem that 1957-58 was an exceptionally high peak; and it also gives a certain amount of authority to the pessimistic American prediction that the 10-metre band might not be fully operational again (in the sense of its 1947 and 1957 performances) for the rest of this century.

Perhaps it is just as well that the 1947 peak was only observed by a small fraction of the operators now on the air! That was the year when, with 100 watts and a rudimentary aerial (in your conductor's case, a 33ft. Windom) one could work the whole of the Pacific on Ten practically every morning, to say nothing of Japan, China, Hong Kong, North Australia, Papua and the like. Yes, a pair of 807's, breadboard layout, and a piece-of-wire brought in more real DX that year, on *Ten*, than most of the succeeding years have yielded on all bands put together. And we say it is just as well that only a few tasted those joys, because there would be an awful lot of disappointed DX'ers otherwise!

## Pounding Brass and Tinkling Symbols

The CW fraternity are coming to life—not on the air (they have never been otherwise) but in the mail, in defence of their chosen way of life. Their "outmoded form of communication" is rivalled in

popularity by all this new-fangled SSB stuff, it seems; but one comment that we enjoyed was that "SSB is rapidly making Phone almost as efficient a mode of communication as CW has been for the last fifty years"!

Certainly it behoves the Phone boys to keep quiet about their antipathy to CW . . . if all CW operators were to change their spots and appear in the Phone bands on AM or SSB, what a mess that would be. Another comment that crops up in the mail so frequently that it almost looks like a plot, is "I prefer CW because people using it don't talk such a load of tripe as the preachers on Phone."

Ah, well, we've no intention of starting a war, but it does seem to us that most of the Phone brigade's jibes concerning CW are off the beam, and read as if they have no real knowledge of what CW is all about. What would be valuable would be a letter from someone who has attained real proficiency in the art of CW, but nevertheless has decided that it isn't good enough, and changed to Phone . . . we have never yet had such a missive. It seems that all those who decry CW are those who have at some time tried to master it, but have failed. A touch of the sour grapes, could it be?

## The Overseas Mail

VO1FB (St. John's) found Top-Band conditions only fair during January, with high static levels and only short openings. He made only 17 European QSO's during the Contest, as against 64 last year. An interesting sideline—during MCC, in November (actually between the hours of 1930-2000 on the 14th) he logged G3AFT, 3AMW, 3GRS, 3SVC, 3TLM, 3TRF, 3UOK, 3UQD and GM3RCS. And Joe is hoping that his contact with



ZB2AJ (January 8) was an official "first" for VO/ZB2.

9V1LP (formerly 9M4LP) worked some W6's and W7's during the Top-Band contest, also DL1FF for their very first QSO after three years of trying. And during this contest Bob says he heard VK5KO calling CQ for two hours, but he couldn't make a contact. Many G's have been heard and worked in Singapore; sometimes the band is open for two hours, around 2230-2300 onwards, and sometimes for a few minutes only.

VS6BJ writes to say that he is leaving Hong Kong in April for London, after which he will be resident on Ascension Island, ZD8. ZC4KF reports that he is active, mostly on Fifteen CW and AM, and always on the lookout for G's: on Sundays he has a try on 28200 kc. ZC4LK is also on the same bands. Conditions on Fifteen have been very good, but Ten has produced nothing, so far.

WA2WOR, who is also W4WFL, comments on G8ON's outspoken criticism last month of worthless SWL reports. Morgan writes "I still possess with pride and pleasure the cards from my old SWL days. The QSL's, so many with thoughtful words of advice and encouragement, will always have an honoured spot on my wall . . . I have received my share of reports in the vein mentioned by G8ON, but fortunately they have been insignificant in number, and where possible I have tried to pass along a few words of advice to put them on the right track."

6Y5XG, who has been globe-trotting now for many years (VU2XG and 4S7XG, remember?) is leaving the Diplomatic Service in May, and hopes to "grow some roots" in England, reverting to his original call G3HVG. He says he has become "a real Top-Band fanatic" while in Jamaica, and though success came rather slowly he has been having a good time this year. On January 22 he worked HP1IE, and for the 29/30th his list runs like this: HI8XAL, HK4EB, VP7NY, KV4CI, DL1FF, VE2UQ and 2LI, VO1FB, 6Y5FH, G3RPB, and all W call areas (in 19 States)! Until he leaves at the beginning of May he will be pleased to work any G who wants

a snappy QSO and cares to break-in on his skeds with "Dad" (G8VG), which are at 1200 GMT, 14080 CW, on Mondays, Wednesdays and Fridays. (It will have to be snappy, as he has to get off to the office and can't hang around.)

Peter adds "Of course, as G3HVG I shan't attract the attention I am used to, but at least I'll be able to renew old friendships and enjoy long ragchews—something which is almost impossible when one holds a DX call. It's easier for a G or a W to hold a DX ragchew, or indeed to raise a rare DX station, than for a 6Y5 . . . the lids invariably break up contacts, or when I hear some juicy DX they VFO on the frequency and call me." (But that's not unknown, even in G-land.)

VP2VD (Tortola) is Dave Gynn, G3SPB and ex-5N2RDG, running an SR-150 to dipoles on all bands from 1500ft. up on a mountain. He hopes to sign G3SBP/KV4 shortly—awaiting FCC permit at present. His VP2 operations are weekend affairs, the rig being put in a suitcase and taken for a two-hour boat trip and a half-hour ride up the mountain in a Land-Rover. Then it's "start the engine, put up the antennas and we're in business . . . some people have it too easy."

9H1AA asks us to mention that his QTH is now "234 Signal Sqdn. (Malta) Club Station." There was some confusion because the original licence was issued to an individual who has now left the island, but the licence is being re-issued as above. The present operator is W.O. II B. W. Thomas.

#### FIVE-BAND DX TABLE

(All Time)						
Station	21 mc	14 mc	7 mc	3.5 mc	28 mc	Countries Worked
GW3AHN	302	330	71	21	151	336
G2DC	291	316	169	112	170	328
G13VJ	263	319	103	83	181	325
G3NOF	192	266	33	39	132	283
G3LZQ	113	117	54	26	53	169
G3KMQ	99	212	101	55	10	237
G3UML	84	168	31	20	31	182
G3IDG	70	54	27	18	60	101
VP8HJ	56	169	25	11	6	174
GM3RFR	53	88	37	15	7	106
G3RJB	26	113	50	2	11	120
G3PQF	24	39	56	40	7	82
G3UBI	20	69	9	29	10	95
(New Cycle)						
Starting Date: January 1, 1966						
Station	21 mc	14 mc	7 mc	3.5 mc	28 mc	Countries Worked
G3UDR	10	14	0	10	1	30
G3LZQ	4	45	10	12	0	57



Although licensed as G5UZ pre-war, this call being relinquished prior to 1939, Harold Leonard of 47 Windsor Road, Westbury Park, Bristol 6, found that by 1962 all his old enthusiasm had been revived — so he took the R.A.E., passed the Morse Test again, and the G.P.O. (by virtue of his old-timer status) helpfully issued him with G4UZ. A founder-member and official of the Bristol Amateur Radio Club, G4UZ now runs a 10-160m. Vanguard, with an Eddystone 680X as receiver, and has a variety of aerials for operation on all bands. His favourite modes are telephony on 80/160m. and CW on 20 metres, with DX worked as it comes, as typified by the QSL's in view. One of his regular CW skeds is with K1YCS of Bristol, Maine. The car-plate type call sign plaque was presented to G4UZ by members of the Club.

### From Russia With Love

G3KPT forwards a letter from UW3HR (Moscow) concerning Top Band, on which he has heard the following: G3KKO, 3PQA, 3RAU, 3SDX, 3PEZ/A, 3LIQ, 3OIT, 3LOQ, 3NXZ, 3RJH, 2FT, 3RSD, 3SYS, 3ORA, 3ORH, 5AQ, 3HJG, 3REM, GM3IGW/A, GM3SDZ and GW3HUM. With only a few exceptions, all were logged at 579, mostly between 1900 and 2300z.

G3SOP sends some interesting information from UQ2-land, via UQ2KFG, who wants British amateurs to know that in Latvia they are only allowed to work SSB between 3600 and 3650 kc. George and the other club operators would like to work more U.K. stations, and hopes they will listen in this

part of the band.

Apparently the Italians are also restricted on this band, where they are only permitted to use 3613-3627 kc and 3647-3667 kc (though they *have* been heard off these frequencies, calling DX).

### Around the Bands

G2DC's admirable band-summary reveals that even Jack has not found much to enthuse about this month. He still laments the dullness of the 0730-0830 periods on Twenty, where even VK and ZL have been quite scarce and "a CQ only brings back a single JA, whereas not so long ago they would come back in hordes." Fifteen has produced some nice surprises, though, especially during the afternoons,

when "anything from the Caribbean area is likely to pop up with a thumping signal out of an apparently dead band." For the other bands, G2DC dismisses Ten as spasmodic, with nothing new or exciting on it . . . and he admits to having neglected Eighty and Forty, having heard little worth while.

This leaves Top Band, and devotees will be interested to hear that G2DC has been using a base-loaded 45ft. vertical for some time, on which he can raise anything in Europe with ease, including ZB2, but could never get across the pond. So, although he had decided that he had finished with long wires, he strung up a simple end-fed half-wave (only 22ft. high). This brought in a 579 report from VO1FB! So some

re-thinking is going on concerning Top-Band aerials.

G3NOF has, as usual, been round the three HF bands, and reports practically nothing on Ten except for one single morning, when ZE2JA and ZS9G were both S9, AM Phone, on an otherwise dead band. Fifteen was patchy, but with occasional VK's around 1000 and the East Coast W's in the afternoons. Several of the latter were worked on SSB, as well as TL8SW, ZD5R and 9Q5FV.

Twenty has shown unusual conditions at times, with some strange re-openings after the band has apparently died. For instance, ZL2JO was worked at 1920 with the beam due South, and VE7PV as late as 2125. KR6UL, VK's, ZL's and sometimes JA's have been active on the long path up to about 1000, and then the short path to the same area has been open until 1300. W6 and 7 signals have been heard weakly around midnight. Best contacts, all SSB, have been CR4AJ, FG7XX, VU2CK, VKØGW (Mawson), VP2AA, 2AC, 7Q7PBD, M1B and OY6ML. ZD8HL, operating from Montserrat as VP2ME and 2MG, was heard several times, though weakly, around 2100.

G3LZQ (Hull) runs a Swan 400 with two VFO's for split-frequency working, a ground-plane for Twenty and Fifteen, and a "very bent trap dipole" for Eighty and Forty. He is back on the air after nearly six years of QRT except for short spells, and thinks he may hold some sort of record for the fewest QSO's (only 2,100 in nearly eight years). However, full steam ahead now, and a couple of days on Twenty CW fetched in VP8HJ, 9V1NM, 9J2AB, OY4R, VK, ZL, VE6 and 7 and so on. He has joined both Five-Band Tables and is obviously intending to make a mark therein.

#### Forty Metres

G3RRF (Epsom) says a few words "in defence of Forty," where he finds the QRM bearable compared with the frightful noises on Eighty after dark. On Forty he has worked VK4SS, CR7IZ, HZ3TYQ/8Z4, OD5EK and sundry W's. He also remarks that some of the Europeans on the band are

really good operators. He welcomes SWL reports (from outside Europe!).

#### Country Status

Last month we quoted a *CQ* Editorial about the iniquitous business of "buying QSL's," and DX in general. We didn't mention at the time that K2MGA continued this theme to deal with the absurdity of "inventing" new countries, and suggested that no place should be granted DXCC status unless it possessed a resident amateur.

Colin Squires, who compiles the Saltash A.R.C.'s excellent *Tamar Pegasus*, forwards us his own comment, written quite independently of the *CQ* tirade, in which he says very much the same thing. He suggests that the time has come for a complete re-think concerning country-status, and that the Amateur Radio world should stop making itself ridiculous in the eyes of outsiders by giving the word "country" a completely false meaning. As he says, all these little islands and

rocks would still remain available for chasers of WPX and, of course, the Islands-on-the-Air Award, and they would qualify in many of the international contests. The situation has become farcical . . . if someone were to land on Rockall from a helicopter, work one single American station and send him a QSL, Rockall would thereupon become a "country"—even if it had no inhabitants but sea-birds for the next century.

#### EI Sortie

There will be no "country" nonsense about this one, but an ordinary honest expedition to the Skerries is being run by G3UOL (Coventry), who will be signing EI6BB from thence, April 14-22, Top Band CW and Phone. He will be using a Codar AT5, a G3ROD all-transistor receiver, and a long wire. All reports welcomed, including SWL's.

#### Top-Band Contest

Grafton's Annual Top-Band Contest is now a well-established



"... Oh, I've chucked the AM gear right out of the window here ..."

event, and it will be held this year on March 26 (CW) and April 2 (Phone), between the hours of 2130 and midnight each day. The usual exchanges of RST (or RS) and serial numbers will take place, but the serial numbers may begin at any figure between 001 and 100—thus enabling crafty ones to fox the enemy! The numbers for the two sections will follow continuously. Certificates for 1st and 2nd place go to the leaders on total score, with further ones to the winner of each section separately.

**More Contests and Awards**

We are reminded by CQ that their Worldwide SSB Contest will take place this year on April 16

and 17, with rules and times exactly as last year.

Gus Browning, W4BPD *et al*, in conjunction with 73 Magazine, is at work on a new DX Award which will be known as "WTW" (Worked the World). Ideas for this have not yet been correlated, but Gus says that his chief hope is to evolve something that allows for no doubts or ambiguities. It will be based on a list of "countries," and opinions are being sought from all over the DX world on how they should be defined. Perhaps here is a chance to avoid some of the nonsense that now besets the country-chasing craze? Although we must admit we would sooner see some of the old awards scrapped than the mere addition of new ones.

However, let it not be said that we can't see both sides of the argument. G2DC writes "Once again you are slating the poor old DX hunter! If you mean the owner of a high-powered commercial rig who will do almost anything to get up one more rung of the Honor Roll, then I agree with you. However, as you know, I'm an ardent DX-hunter and a keen contest worker—at least in the major events which one can enter in a keen spirit of competition and have the satisfaction (if all goes well) of knowing that one's efforts in building and improving equipment and antennae have been worth while.

"While I also like a good ragchew, I do think a lot of the waffling one hears is an awful bore. Listen to some of those so-called 'nets' on Sunday mornings . . . I would sooner sit and meddle with an old crystal set, hoping to get something new. I also like to see how others are doing, and one can only do this through tables, ladders and DX notes."

So says G2DC, and we agree with every word. But read on . . . a new source of complaints is with us. It has been so for a long time,

but it's only recently that the chorus of resentment has begun to swell.

**The DX Net**

G3UDR comments "The top end of Eighty is becoming more and more ridiculous. The 'big boys' and their net just control the frequency, and unless you are one of the privileged ones there is no hope of working DX. So much so, that at the time of writing they take up the whole of the top end, thus making this slice of the band absolutely useless for anyone else. I think many people are getting very angry, and I have already heard some very rude words being voiced over the air. Though they may be in the right, this is not true Amateur Radio . . . if only you can mention it often enough they might see the light. This doesn't happen on any other band—why should it happen on Eighty?"

Well, we have mentioned it—but we don't expect any drastic change to result. There are some who will argue that the formation of a net, all listening for and trying to work any DX that comes on the frequency, is a space-saver—although it does result in the continuous occupation of one frequency. What spoils the whole idea is the fact that some people can't net accurately; that all members of the group are not getting similar signals, either from the DX or from other members; and that nine-tenths of the time is apt to degenerate into pointless "waffle." The end-result is very often a short and very scratchy QSO with a DX station, and the information passed is little more than a signal report.

**Top Band Topics**

G3LIQ (Hull) is incensed by the types who talk about One-Sixty as "Grandad's Band," and invites any of them to visit him for

# Reporting the HF Bands

**TOP BAND COUNTIES LADDER**

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2CUZ	98	98
G2NJ	98	98
GM3KLA	98	98
GM3IKD	98	98
G3PLQ	92	95
G3SED	82	82
G3NTI	80	80
G3SWH	70	80
G3PPE	67	80
GW3PMR	66	75
G3UBW	59	77
G3SVW	57	75
G3IDG	55	59
G3SHY	53	71
GW3TLW	53	65
G3TSS	43	53
G3KPT	41	70
G3UVR	35	58
G3SQX	34	64
<i>Phone only</i>		
G2NJ	61	61
G3PLQ	55	58
G3MDW	44	64
G3RTU	35	37

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

a weekend and see for themselves whether they are tough enough to take it. Part of the agenda : Digging 6ft. holes (perhaps three in an afternoon); climbing trees, up to 140ft., in total darkness and with a biting wind blowing; throwing a small weight, with cord attached, up to 60ft.; raising a dipole with 160ft. of feeder attached; splicing two 30ft. telegraph poles together, topping them with a lighter 30-footer, and erecting the whole 85ft. pole with 600ft. of  $\frac{1}{2}$ in. hawser. (As an afterthought, they might try erecting 34 other different aerials and supports, all around the 75ft. height, with feeders up to 500ft. long.)

O.K., Grandads? Your help will be most welcome. Then we come to the results, which, one feels, would have to be pretty good to justify the hard labour described. Well, out of 40 DX stations heard on 160 metres during January, 28 were worked. WØVXO and W9YYG were raised on the morning of January 9, and a long list of W's in the late evenings. G3LIQ finds that between 2130 and 2335 the W signals are very weak, but they will give him good reports; in the mornings they pour in but one can barely raise them. He has worked W1JJS thirty times between the evening hours mentioned, the longest QSO being forty minutes with solid copy.

His present aerial follows mobile whip practice, being a 75ft. vertical with three 60ft. wires fastened to the top and sloping outwards to form a very large "capacity hat"—so large that a series condenser has to be used to resonate the system. The whole is backed up by a good earth system—four 20ft. copper tubes sunk vertically and soldered together with automobile-battery cable, together with four 132ft. radials, two 150ft. fences, an aluminium pre-fab and a 12ft. square of aluminium plates.

Go to it, Grandads—you have nothing to fear but your lumbago. For the rest of the Top Band news, the DX claims are a bit short, many of the regulars having been discouraged by sub-standard conditions, it seems. GW3PMR (Bangor) tried to get a "mammoth aerial" up to the top of a cliff, but the wire broke,

and he is awaiting a new drum thereof. He worked LZ1ARN on the band, and would like to know whether he is believed genuine or not. He found the contest conditions disappointing, also the operating standards which, as he says, are normally excellent. However, at one time the whole of Europe seemed to be calling the DX on its own frequency.

G3RRF mentions that one night he heard four or five W's, including two W8's, calling a certain G3T-- station, who heard none of them and went on calling CQ DX. Perhaps he fancies himself as a beacon? G3RRF himself raised OE1ZVW/5 and VO1HN.

G3TXZ sends in one of the very few entries for the new Top-Band Ladder (and we hope to see many more next month). He uses a 132ft. inverted-L with a 45ft. vertical section, "draped round a garden 25ft. by 95ft." A homebrew all-band SSB transceiver is on the way, and meanwhile CW is the main enthusiasm.

G3UBW (Sevenoaks) was very pleased to work VO1FB in the First-Timers' Test on February 6, and now hopes to raise his aerial (and his signal-strength). Cards arrived recently from ZB2AM and OE1FLW.

#### Tragic DX-pedition

At the time of writing it seems only too certain that Chuck Swain (K7LMU) and Ted Thorpe (ZL2AWJ) perished in the Pacific hurricane at the end of January. They left Wallis Islands in the 38ft. ketch *Marinero*, bound for American Samoa, and disappeared without trace. Four or five other boats and about 68 people were reported missing, and a full-scale search went on for many days, in the hope that they were out of fuel and sheltering at one of the many small islands in the area. K7LMU was personally known to many DX'ers the world over, and stood for much more than just another rare prefix cropping up from time to time. It is a great tragedy that the yearning for rare DX should have been the indirect cause of the loss of these two amateurs, together with the captain of the boat and two other crew members.

#### TOP BAND LADDER

(G3T-- and G3U-- stations only)

Starting Date, January 1, 1966

Station	Counties	Countries
G3UBW	48	12
G3TXZ	44	10

#### General Chat

VK2AWH (ex-VKØWH, Macquarie) is looking for an amateur in the U.K. with whom he can make a regular sked, preferably on Twenty SSB. Anyone willing is asked to write him direct (Harold Wright, 75 Invercauld Road, Goonellabah, N.S.W.). Thanks to SWL John Woodham, Bristol, for this note.

G3RFH (ex-VP8HF and /MM) is now serving in H.M.S. *Hermes*, at present refitting in Plymouth. He will not be signing /MM on his next trip, because of "difficulties and extra hazards aboard an aircraft carrier," but he will have plenty of listening time.

G3IDG brings up the interesting point—how old is an Old Timer? The term is a comparative one, of course, and back copies of the *Magazine* constantly remind one of events already half-forgotten. For instance—do you remember when Top Band was 1715-2000 kc and was known as the 1.7 mc band? Or when Forty was three times its present width? Not to mention the compulsory year on CW and the extra fee for /A operation. All these things date back less than twenty years, but to some of the pre-war amateurs they seem quite recent.

If nostalgic reminiscing continues, G3IDG comments that the present G3U-- types will be able to say in the distant future "Why, I remember when the W's couldn't get a permit to transmit in the U.K." (A nasty streak in our nature suggests that a good gambit might be "I remember when Top Band stations used 10 watts.")

#### Non-Aerial Antennas?

R. T. Dale (Exeter) sends in an account of his short-wave listening with a coax-fed "aerial" consisting of 60-70ft. of bare wire

lying on the ground. Long-wave reception was excellent, Canadian broadcast was heard on medium-wave, and Top Band reception was possible up to 350 miles. Right down to Fifteen metres, strong signals from most parts of the world were heard on occasions. Signals may have been weaker than with an elevated aerial, but it is claimed that noise was reduced even more, giving an improved S/N ratio. A low-resistance earth connection is highly desirable, and various intriguing effects have been observed, such as varying DC voltages between different earths (due, presumably, to electrolytic action of various kinds).

SWL Dale reminds us that an early textbook (pre-1914) states that a scientist in 1881 measured "a spontaneous EMF of 120 volts" in a line 220 miles long, and was presumed to be due to electro-magnetic induction (no overhead HV lines in those days!) A very possible line of research here for keen SWL's who want to study a new field.

#### Late Flashes

MP4BFO (c/o I.A.L., Box 144, Manama, Bahrain) came on the air in January with 150 watts "thrown together"—CW only on Twenty and Fifteen. No G's worked until January 28, when

a string of them were contacted on Fifteen, which is "definitely the band for G." MP4BFO is also around on Twenty and Fifteen CW, with 25 watts to inverted-V dipoles, and he keeps an eye on Ten. MP4BEU uses an S-line and ground-plane, but is moving to a block of flats and hopes to be using a Quad before long. Others, also active, are MP4BFH, 4BBL and 4BBA, but roughly 15 attend monthly club meetings—a much higher average than at home! (MP4BFO says that activity is high—there's little else to do.)

6Y5XG sends a late note to say that he worked OK1ADM and 1AEZ on Top Band, February 6. A new country for him and, he hopes, a "first."

9M2DQ now runs a Drake TR-4, which gives five times the output of his old rig. On Twenty he finds most of Europe coming in well, but *not* G-land. Fifteen is a better bet, but still difficult. He is very sad about the loss of Chuck, K7LMU, who was a personal friend, very popular out there, and organised the S.E.A. Net.

#### DX Shorts

If you hear an IC1 during March, it will be 1IKDB operating from the Isle of Capri . . . VQ9HB will probably be on soon from

Desroches Island, but not from Farquahar until late April . . . 9M8PH is ex-VSSPH and DJ6PH, and works on 14325 kc SSB at 1500.

VP5AB (Caicos Is.) is operated by W1WQC . . . ZD8HL will return to VP2M (Montserrat) later in the year . . . PX1YR is said to be QRX on 3790 kc SSB, Saturdays at 2330 . . . PJ5ME (Sint Maarten) will be activated by a team of W's during the ARRL Contest, March 26-27.

HKØ (Malpelo Is.) will be operated by a gang of HK's during June . . . G3HS is considering a round-the-world expedition, and already has been issued with the calls 6Y5HS and VR1H . . . W's licensed to operate from the U.K. under the reciprocal arrangement will receive three-letter calls beginning with G5 - -.

#### Sign-Off

We could go on much longer, but space won't allow. So we must close with the usual reminder that the deadline for next issue is first post on **March 14**, with everything addressed to "Communication and DX News," SHORT WAVE MAGAZINE, Buckingham, England. Let us have some more entries for the two new tables, which are only in the embryo stage this month. Good Hunting, 73 and—BCNU.

### RECIPROCAL LICENSING

Readers in this country who are in the category of "foreign nationals with whose administrations reciprocal licensing has been agreed" are reminded that they can obtain U.K. amateur transmitting facilities on application to: Radio Services Department, Radio Branch (Amateur Licensing Section), Headquarters G.P.O., St. Martins-le-Grand, London, E.C.1. In the first instance, do not apply for the licence itself, but for the form which you have to complete to get it. In the main, of course, this facility applies to U.S. licensed amateurs who are in the U.K. for business or on Service appointments.

Conversely, if you hold a U.K. licence and will be in the States for employment or on a protracted visit, you should apply to the Federal Communications Commission, Washington D.C., 20554, for Form 610-A, allowing at least two months to complete the formalities.

Any amateur, on either side, obtaining a reciprocal licence is invited to let us have the call sign, with full details. A great deal of effort has gone into the

arranging of these facilities, for which credit is due to the RSGB.

### "BECOMING A MEMBER"

Every now and again, we have a letter asking "How do I become a member to get the Magazine?" The answer is, of course, that no qualification or membership fee is involved. All you have to do is one of three things: Either (1) You order SHORT WAVE MAGAZINE at a reliable local newsagent for regular monthly delivery, or (2) You send us a remittance for 42s., covering a year of copies sent monthly through the post, or (3) You buy a 4s. postal order on the Tuesday before the Friday of any month, and send it in to us, with a note saying simply "Next issue, please." We publish on the first Friday of any month, and all direct-subscriber copies are posted (for the U.K.) on the morning before the day of publication. The address for all cash transactions is: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.



## SHORT WAVE LISTENER FEATURE

### MORE ABOUT SLP LOGGING—PREFIXES EXPLAINED—QUOTES FROM READERS—TOP BAND COMMENTS—DX/TV NOTES—NEWS AND VIEWS—HPX LADDER

ONE of the pleasant things about writing this feature is that its readers are certainly not shy about saying what they think. And of course we welcome criticism of all kinds, since without it we would be working completely in the dark.

One thing that has emerged, over the last two years or so, is that most of our readers want this to be more of an informal chat than a series of technical snippets about "SWL". They seem to prefer reading about other SWL's problems (even personal ones) to being harangued on the technical side.

This is as it should be, for SWL's are now being served exceptionally well in our pages. In the February issue alone, for instance, there were articles of SWL interest on pages 717 (*the 52 Set*), 719 (*the HRO*), 723 (*IF Amplifier*), and 751 (*S-meter circuit*). In January they had articles on the HRO and the S.640 as well as this feature. And there are frequently dissertations on subjects, e.g. Aerials, which are of both transmitting and receiving interest.

So, as the small number of letters asking "Why don't you say more about converting surplus?" or "When are you going to write about ATU's again (or aerials, or crystal filters, or what have you?)" are heavily outnumbered by those who write and say "Don't change 'SWL'—it's already the way we like it," we intend to do just the latter, and leave it alone.

At the same time we *should* like to hear of readers' ideas and tips, whether on modifications to old receivers, original designs, or gadgetry in general. Don't hide your light under a bushel, if you have done anything in this line. Either tell us, for inclusion in this feature, or send it to the Editor, in the form of a short article, or *D-Y-K-T* item, which he may be able to use. Then everyone will be happy. . .

#### More About SLP's

Concerning the last SLP (and for a few new readers we have to explain that the letters stand for "Set Listening Period"), there have been quite a few comments. They are equally divided between those who write to say "What a shocking lot those listeners must have been" and those who claim that the fault lies to a large extent with the transmitters, who don't use correct phonetics.

Colin Beale (*Twickenham*) points out that "F" and "S" are easily confused (as they were in some

cases) but that "Fox" and "Sugar" could not possibly be. In particular he blames the man who rattles everything off too fast, the one who calls CQ twenty times and gives his call once, and the type who meticulously spells out his country prefix and then slurs over his callsign. He quotes an imaginary "G3YYO" who might sound like "Gee Three Whoa", and adds "however good the equipment which follows the microphone, the first and most important step occurs *before* the microphone is reached."

Andrew Niblock (*Ilkeston*) puts up the same point of view, and says he has heard many contacts in which the operators themselves have got the calls wrong, and no one has spotted it. D. H. Foster (*Rainham*) says much the same, and suggests that some transmitters need to brush up their "Alpha, Bravo" technique. He thinks that careless SWL's are possibly in a minority.

On the other hand Pete Cayless (*Exeter*) maintains that he always strives for accuracy and has no time for those who "scribble down anything and hope for the best, just to fill the log"; and James Brown (*Llandaff*) was sorry to see that so many of the "spider brigade" sent in such bad logs. Colin Squires (*Saltash*) suggests that people would be more careful if their loggings were printed together with their names!

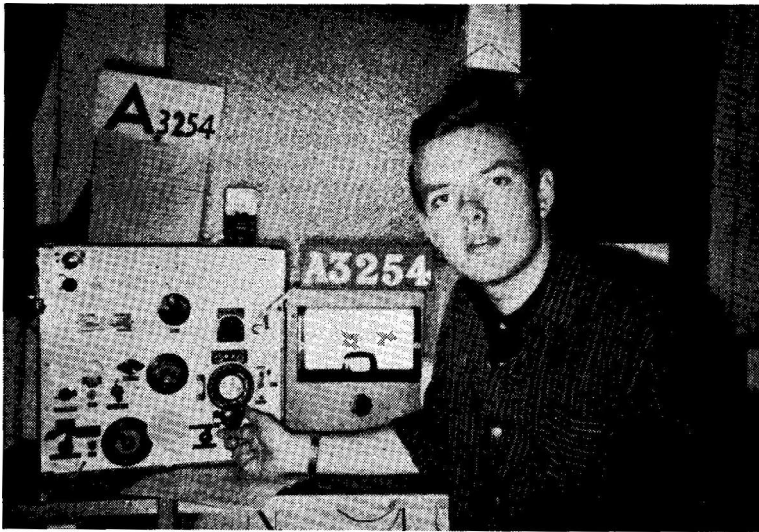
Ah, well . . . and when it comes to the *next* SLP, we have so many different suggestions, all cancelling each other out ("Any band except 20" . . . "Make it 20 on a Sunday afternoon" . . . "Don't choose an afternoon, it's all W's . . . and so on) that we feel like instituting an SLP for 160-metre CW from midnight to 2 a.m.! But we promise not to do that . . .

#### Prefixes Again

We are continually having to keep up with new readers who don't understand the prefix situation. B. Macklin, *Winchester*, surprised us by sending in his very first list with the handsome figure of 402, but then we found that they were *callsigns*, not *prefixes* (we have explained to him!). For the benefit of others . . . only *one* DJ5, only *one* G3, and so on. Disregard the actual callsign *letters*, which come after the numeral, or, in the case of these 4X4-type calls, those which come after the *second* numeral.

Other newcomers include Andrew Marriott (*Bishops Stortford*), with a Lafayette HA-230 and a score of





The SWL station of R. G. Preston, 42 Freshfield Close, West Earham, Norwich, who has recently acquired a Geloso amateur-band converter to improve his reception facilities.

222 to join the ladder; and *Anthony Jones (Crewe)*, who says he is now a "fully-fledged SWL" with an HE-30 and a liking for Eighty and Top Band.

#### Oldest Reader ?

In contrast to these relative novices is the veteran *T. W. Moss (Exeter)*, who has just passed his eighty-first birthday! He has spent a lot of his years of listening in chasing elusive SW broadcast, and has many verifications from really rare ones. Nearly 30 years back he received a card from VPD2 (Suva, Fiji), using 400 watts in the 31-metre band; this station was heard on a two-valve home-brew battery receiver. He's still as keen as ever, and is setting about improving his S.640 on the lines suggested on p.672 of our January issue.

Similarly engaged is *P. Freeman (Chessington)*, who has several faults in his, and is now engaged on improving it, with the help of the same article. He reports a 10-metre opening during December, when he heard a CN8 and a CX2, very unexpectedly.

Life's small tragedies flow through our post-bag . . . here is *Andrew Niblock (Ilkeston)*, writing "I was sitting in front of my CR-100 when I noticed a smell of burning and felt grease dripping on to my knee. There is now one receiver less in existence!" But surely it's not so bad when there's an obvious clue . . . it's when they pack up with no smell, no dripping, no apparent overheating, that the fault can be such a devil to find.

#### Which Mode ?

We have always known the SWL as the kind of person who revels in achieving the impossible, and who thrives on difficulties (even if of his own contriving). So we were not surprised to hear from *Pete Cayless (Exeter)* that he has been gathering prefixes for a new entry on the Ladder—by copying AM Phone *only*. With this mode he comes in at the 221 level, and admits that he's never been too en-

thusiastic about SSB, anyway.

If anyone else is voluntarily sticking to one mode (SSB, or AM) we will annotate their Ladder entry accordingly. If no comment is attached, we will take it that they are "mixed".

#### Quick Quotes

"Modifying my superhet to double-conversion with crystal-controlled second oscillator, Q-Multiplier, and so on" (*B. J. Turner, Westcliff*) . . . "Would be very interested in more information about what sort of aerials people have—for instance, what B. Curnow used on 40 metres, where he always seemed to be hearing the more elusive DX" (*J. R. Daws, Leeds*) . . . "Best time for DX, I think, is around 1900 GMT on 20 metres, when I have heard ZS3B, ZS8L, ZL3DX, XW8AX and 6O1AU, also many South Americans" (*David Rollitt, Navenby*).

"I am now nail-biting, awaiting the result of my R.A.E., and have been 'brass-pounding' with the aid of G3TQK and G3THZ, to whom many thanks" (*Wilfred Smith, West Bromwich*) . . . The borrowed S.640 has been returned to its owner, and I am back on my BC set, which keeps conking out. Now

#### SET LISTENING PERIOD

*Sunday, March 20, 1966*

*21 mc Band, Telephony Only*

*1500-1800 GMT*

Listen to everything you can hear on Phone (either AM or SSB) during this period, and send in your list of stations heard with your next letter to "SWL". *Do not* log Europe, or the East Coast of U.S.A. and Canada. Logs should include (a) Time GMT; (b) Station Heard; (c) RS Report; (d) Station being called (or CQ).

Mark the log plainly "Second SLP" and address it to "SWL," SHORT WAVE MAGAZINE, Buckingham.

the only cure I know (a bang on its side) doesn't work" (*Trevor Pinch, Plymouth*) . . . "What would be the point of hearing rare DX without all the lids, creepers and Heavy Brigade? The main satisfaction is picking it out from all the clutter" (*James Brown, Llandaff*).

### Top-Band Interest

There are some who look on Top Band as "kid's stuff" and "old hat"; on the other hand some find that it has a fascination of its own. For instance, *D. H. Foster (Rainham)*, when he was surprised to log two ZB2's—ZB2AJ was R4, S6 on SSB. And *Steve Wilson (Ossett)* says "I am so interested in Top Band that I am getting rid of my old gear and completely rebuilding. New receiver (probably CW only and 160m. only), new aerials, a new ATU, and then I shall be building a Tx, too, as R.A.E. comes up in May." He has an idea for the receiver of using an IF of 1630 kc, with four crystals in cascade to give a really sharp notch. (This really sounds like business for CW only . . . he has already logged ten W8's, two VO's, one VE, two ZB2's and about 50 OK's, together with many other Europeans.) Yes, Top Band can really become an obsession, once you get in tune with it. Unfortunately so few of our readers can cope with CW that a Top-Band SLP would be a waste of time and only attract about six entries, one fears. What a good thing it would be if the authorities brought back the rule which kept new licensees on CW only for the first twelve months. (And now we'd better build a shelter to retire to when next month's mail comes along.)

*Steve Wilson* also brings up the subject of blatant pirates on Top Band, including a "VK" at 599, and EA11K, calling himself "Radio Madrid," running 14 kW and refusing to work amateurs. In true Spanish style, he called them "twits" and would not move off the frequency!

### Nine-Hundred Plus

The 900 figure has been broken at last, and on top of the HPX Ladder is *Terry Popham (Exeter)*, now with 909. He reports that "the 21 mc band is terrific, especially for African DX, at most times of the day—in particular the late afternoons." A lot of the Exeter local activity has been transferred to Four Metres, so he has now got to get busy down there; and the local club is looking forward to a lecture on D/F Operating, so that's another line to pursue.

*John Fitzgerald (Great Missenden)* is now at Birmingham University, which curtails his listening hours, but the University Radio Society's station, G3IUB, is being renovated and . . . need we say more? He found (from home) that Fifteen was excellent, and noted the way VK2NN gets through when no other VK's are around (he has a rhombic set for the U.K., by the way). SWL Fitzgerald also reports that the stations in the Algerian Sahara now have a separate prefix and sign 7XØ instead of their former 7X3.

### DX—TV Results

The real rip-roaring season for sporadic-E, tropospheric and other abnormal forms of propagation is not yet with us, of course, but there have been some freak VHF conditions which have enlivened DX/TV reception. *Frank Smales (Pontefract)* made good use of the opening on December 11, and logged, among others, Tallinn (Estonia) on Channel R2; Stalingrad (R1); West Germany—various stations—(E4); TVE-Espana (E2); Stockholm (E2); Ostrava (Czechoslovakia) on E3; and a "mystery" station on E2, later identified as *Cyprus*. As Channel E2 corresponds with a BBC sound channel (48.25 mc), this is a little difficult!

On January 6 there was also some good reception from Europe on Bands III, IV and V. *Frank Smales* now has a UHF pre-amp, kindly sent him by fellow-enthusiast *Roger Bunney (Romsey)*, so is hoping for interesting things to come.

Meanwhile *Dennis Boniface (Ripon)* also used the December 11 opening to cover much of Europe, and received the BBC from Crystal Palace on UHF, also Lille on Channel 27. For UHF he has a 23-ele aerial through a two-valve tuner into a Bush TV-53. He has logged 79 stations in 21 countries. Final word—"If any SWL's want to start up on DX/TV,

## HPX LADDER

(Starting January 1, 1960)

Qualifying Score 200

SWL	PREFIXES	SWL	PREFIXES
<i>PHONE ONLY</i>			
T. R. Popham (Exeter)	909	R. Hooper (London, N.16)	314
D. Douglas (Dundee)	842	H. M. Graham (Harefield)	311
P. A. Cayless (Exeter)	812	W. Angerson (Leeds)	306
A. W. Nielson (Glasgow)	719	G. Case (Widnes)	305
S. Foster (Lincoln)	667	J. Dixon	
R. G. Preston (Norwich)	552	(Barrow-in-Furness)	303
E. R. Chilvers (Lydney)	542	A. Papworth (Over)	303
A. Huggett (Lamberhurst)	528	D. Edwards (Coalville)	296
D. Poulter (Morden)	528	C. Warburton (Sale)	295
P. J. Lennard (Wartling)	490	G. Christie (Gainsborough)	294
K. C. Staddon (Stroud)	483	C. Freeman (Nuthall)	290
J. E. Hart (Leeds)	479	C. P. Martin (Chertsey)	287
C. S. Taylor		A. Hardwick	
(Wolverhampton)	470	(Burton-on-Trent)	278
P. Baxter (Winchester)	460	M. Silverstein	
D. Rollitt (Navenby)	460	(London, N.W.7)	277
J. P. Fitzgerald		R. J. Basford (Nottingham)	275
(Great Missenden)	449	D. Nichols (Bristol)	263
C. Sparrow (Mill Hill)	440	P. Freeman (Cheshington)	258
W. Smith (West Bromwich)	439	Mrs. Janet I. Davis (Strood)	250
W. Moncrieff (Hampton)	435	T. Pinch (Plymouth)	225
C. Pedder (Preston)	432	D. Thomson (Hamilton)	223
C. Squires (Saltash)	422	A. Marriott	
A. Niblock (Ilkeston)	422	(Bishops Stortford)	222
W. Chaffer (Edgware)	393	P. A. Cayless (Exeter)	221
A. Parker (Chesham)	391	<i>AM only</i>	
S. W. Edwards (Warwick)	389	R. T. Sutton (Birmingham)	219
W. Felton (Lincoln)	376	S. Shaw (Stockport)	209
P. D. G. Milloy (Doncaster)	375	K. Walker (Halifax)	208
D. G. Evans (Neath)	368		
S. Hardisty (Accrington)	367		
A. G. Scott (Liverpool)	363		
J. Butler (Bargoed)	363		
D. H. Foster (Rainham)	361	P. J. Lennard (Wartling)	573
P. Crust (Loughborough)	357	C. Harrington (Hounslow)	565
D. E. Fitzgerald (Dublin)	333	S. Wilson (Ossett)	412
S. Wilson (Ossett)	332	D. Douglas (Dundee)	407
B. J. Turner (Westcliff)	328	D. H. Foster (Rainham)	384
R. Coates (Lancaster)	321	R. De Buis (Felixstowe)	373
D. J. Mortimer (Gloucester)	318	M. Woollin (Leeds)	336
		P. Etheridge (Hull)	303
		<i>CW ONLY</i>	

(NOTE: Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the table. Next list, May 1966 issue—deadline April 1.)

the time is *now*. Don't wait till the season starts, or you will miss some good DX. All that's wanted to start with is an old five-channel BBC-only set, and a single dipole." And letters to him on this subject, at 11 Holmefield Road, Ripon, Yorkshire, will be welcomed.

Yet another recruit to this branch is *Trevor Brook* (*Effingham*), with a renovated Sobell T-278 and a 4-metre beam, which proved its worth on January 4 and 5 with stations from all over the country on Channels 2 to 13, and a French station on Channel 7.

#### Plenty on Twenty

*Wilfred Smith* (*West Bromwich*) reports quite a lot of rare prefixes on Twenty during the past month, and adds "last weekend I heard 28 JA's, 13 KA's and 34 VK's, so that area has been excellent." And now he's all set with a two-valve pre-selector. *D. J. Mortimer* (*Gloucester*) likewise has a goodly list on Twenty SSB, but says his future projects include a pre-selector to improve his CR-100 on Fifteen and Ten—and also an attack on the CW problem—but with finals coming up in June, he's subject to heavy QRM.

*P. D. G. Milloy* (*Doncaster*) parted with his old receiver to a school friend, and now is landed with an HRO with only one coil—and Top Band at that! Others are on the way, though, and hopes of more DX. *John Daws* (*Leeds*) has swapped his S.640 for an AR-88LF, and has put up a dipole for 7 and 21 mc. On 7 mc he has heard 4X4, UL7, SU, ZC4, PY's and W1-4, which makes a good start; this is on CW, of course, and he remarks "Forty is certainly not the beginners' band for CW". Although he says he is quite happy as an SWL, he is "gradually turning towards R.A.E." and may have a go this year, A-Levels permitting.

#### Deputation

Three SWL's, *Dave Bailey* and *Bill Baker* (*Dagenham*) and *George Mansbridge* (*Basildon*) write a joint letter, mainly to make a plea about commercial QRM and the need for action by all amateurs. They say "Sort out those stations from countries who were in the Geneva Convention, and complain unceasingly about their piracy. And then use the power of numbers." They also suggest that Forty might well be made a CW-only band—as CW all over the band might cause a few head-scratchings about the pirates. (We rather doubt this, though—they are mostly listened to in areas where their signals are overpoweringly strong, and a couple of hundred amateurs on CW would be only a fleabite). But keep on griping—that's the main idea of their plea!

(They also ask whether the dates of the regular meteor showers are available, for the benefit of SWL's who are keen on Two Metres . . . we have not got these to hand in time for this instalment, but will dig them out as soon as possible.)

Finally, two sad complaints from *James Brown* (*Llandaff*): First, "I took my first paddle into Twenty last week, with an RF-24 unit . . . I quickly went

#### SET LISTENING PERIOD

*Sunday, March 20, 1966*

*21 mc Band, Telephony Only*

*1500-1800 GMT*

Listen to everything you can hear on Phone (either AM or SSB) during this period, and send in your list of stations heard with your next letter to "SWL. Do not log Europe, or the East Coast of U.S.A. and Canada. Logs should include (a) Time GMT; (b) Station Heard; (c) RS Report; (d) Station being called (or CQ).

Mark the log plainly "Second SLP" and address it to "SWL," SHORT WAVE MAGAZINE, Buckingham.

back to Eighty." Secondly, the old, old story: "Although I am drenched in Amateur Radio, I find other people rather unsympathetic . . . I've just lost a girl-friend through my continual nattering about a new type of tripole I've invented!"

#### The Second SLP

We have fixed the next Set Listening Period for the afternoon of **March 20**, since that date allows plenty of notice after this issue has reached you, and also ample time for your logs to catch the deadline of April 1.

The band chosen—and we only hope it will be well open by that time—is Fifteen Metres, and the time 1500-1800 GMT. Phone stations only, whether AM or SSB, anywhere in the band. As before, no East Coast U.S.A. or Canada, and no Europeans.

Please send your loggings on a sheet separate from your letter—this is important—with name, QTH, and list of stations heard in alphabetical order of prefixes, giving time, RS report and station (or CQ) being called.

We hope the choice of time and band will work out successfully, but remember—mediocre conditions are liable to make it more interesting than just a wide-open band on which everyone logs scores of DX calls.

So with that we leave you once again. Remember the date for the SLP (March 20) and for the next deadline (April 1), and may all the bands turn up something interesting for your listening. Good Hunting!

Next appearance of this feature—May 1966. All correspondence and photographs (of SWL stations and equipment) by April 1, addressed to Editorial Department, Short Wave Magazine, Buckingham, England. Head the letter "SWL."

#### MARITIME MOBILE LICENCES

We are informed by the Post Office that /MM permits are now available for the 10-15-20-40m. and two-metre bands. Applicants must hold a current U.K. licence, and all enquiries are dealt with through the Radio Services Dept., G.P.O.

## AMATEUR RADIO IN THE U.S.S.R.

*From Notes by G3KPT*

FOR a period of 44 days during August-October of last year, G3KPT was in Moscow on business and managed to make contact with a number of local amateurs. A visit was paid to the Moscow City Radio Club and the QSL Bureau, the famous "Box 88."

Like radio amateurs the world over, the Muscovites answered as well as asked questions quite freely and openly. G3KPT found himself very warmly received, and some 15 or so licensed operators in the Moscow district were met personally, and much information exchanged.

Amateur licensing conditions differ considerably from those obtaining in the United Kingdom, and some details are given herewith.

### Licence Groups

#### Ultra Short Wave

Operators from 16 years old ;  
28 mc and all amateur frequencies above ;  
three classes of licence :

- Class 1**—200 watts on 28 mc.  
40 watts on 3.5 mc SSB,  
5 watts on 144, 430, 1296 mc.  
**Class 2**—40 watts on 3.5 mc SSB,  
40 watts on 28 mc,  
5 watts on 144, 430, 1296 mc.  
**Class 3**—5 watts on 28, 144, 430, 1296 mc only.  
All telephony only.

#### Short Wave

- Operators from 18 years old :  
**Class 1**—200 watts on all amateur bands for A1,  
A3 and SSB,  
5 watts on USW (144 mc up),  
RTTY on specified bands.  
**Class 2**—40 watts on 80-40-20m., A1, A3,  
SSB on 80m.,  
5 watts on USW,  
RTTY on specified bands.  
**Class 3**—10 watts on 80 and 40m.,  
SSB on 80m.,  
5 watts on USW.

#### Club Ultra Short Wave

Operators from 12 years old.

#### Club Short Wave

Operators from 14 years old.

The Moscow City Radio Club has approximately 2,000 members ; around 7-8 per cent are females. It is divided into four sections : USW, SW, D/F and Construction. Test equipment and apparatus are donated by Soviet institutes and the Services.

All would-be amateurs are examined in theoretical knowledge orally and in a written paper by a group of licensed amateurs. The Morse test is also conducted by licensed operators. Three-letter calls starting with K are club stations.

Other three-letter calls are those issued under the USW group. Two-letter calls are those issued in the SW category. All SWL's may be registered after the age of 12 years.

You may hear U.S.S.R. stations working between themselves using a different CW code ; this of course is essential if they wish to converse in Russian.

UW3HR and UW3AX intend to apply for Top band permits. Apparently this is possible—and a word of warning here : The Russians lost 160 metres because of lack of activity !

VE3UC, VE3BUL and VE3BZA were also in Moscow around the same period, and they also managed personal contacts with the Russian boys.

There is no commercial Amateur Radio equipment available in the U.S.S.R., so the accent is on home brewed rigs. The standard of design and construction appears to be pretty good, too.

It would seem that radio periodicals sent direct to private persons in the U.S.S.R. are accepted as they stand, although the writer understands that those entering through official channels (for libraries and technical schools) are photostated selectively and a selective distribution is made. Advertisements tend to disappear in this process !

G3KPT

### RUSSIAN CALL AREAS

UN1, UA1, UW1, UV1	— N.W. Area U.S.S.R.
UA2, UP2, UQ2, UR2, UC2	— Baltic Sea Coast and White Russia
UA3, UW3, UV3	— Upper Volga, central districts of Europe and U.S.S.R.
UA4, UW4, UV4	— Central Volga district
UB5, UT5, UY5, UO5	— Ukraine, Moldavia
UA6, UW6, UV6, UF6, UD6, UG6	— Astrakan Region, Caucasus, Georgia, Azerbyjan, Armenia
UL7	— Kazakistan
UJ8, UI8, UM8, UH8	— Central Asia
UA9, UW9, UV9	— Urals
UA0, UW0, UV0	— Siberia and Far East
UN, UA, UW, UV	— Russia
UB, UT, UY	— Ukraine
UC	— BeloRussia
UD	— Azerbyjan
UF	— Georgia
UG	— Armenia
UH	— Turkoman
UI	— Tajikistan
UJ	— Uzbekistan
UL	— Kazakistan
UM	— Kirghistan
UO	— Moldavia
UP	— Lithuania
UQ	— Latvia
UR	— Estonia
UA1KAE	— Mirny Antarctic
UA1KED	— Franz Josef Land

*NOTE: There are further sub-divisions, by the figure in the prefix, within Regions.*

### INDEX—Vol. XXIII

Every copy of this issue, the start of a new Volume, should contain, as a free Loose Supplement, the Index to the Volume just concluded. Any reader who may find his has been missed can obtain one on request with a large stamped addressed envelope.

## OBITUARY

It is with deep regret that we have to record the passing of:

—James Norman (Jerry) Walker, G5JU, of West Heath, Birmingham, on January 30, at the age of 60. His death came as a great shock to his many friends and colleagues, not only in the amateur context, but also in the radio industry—for, as Eddystone's technical sales engineer for 20 years, he was a well known and welcome figure all over the country. As an amateur, G5JU was keen and active in the whole field of Amateur Radio, from Top Band to VHF—indeed, he was one of the handful of pioneers on five metres in pre-war days—and he will also be remembered as a prolific contributor to *SHORT WAVE MAGAZINE*. He was typical of the keen and intelligent "professional amateur"—because radio communication was part of his being, he was able to do a first-class job as a business man, and at the same time he could use his amateur interest as a relaxation. Jerry Walker served in the R.A.F. during Hitler's War, and came out as a squadron-leader, having had considerable responsibilities as a Signals officer concerned with radio-countermeasures—and by the time he left the Service he had 500 operational hours in his log-book. His widow, his daughter, his three sons, and his brother G2WO (Stevenage) will have the sincere condolences of all who knew G5JU. And for nearly 40 years he was a good friend of the writer of this memorial. *A.J.F.*

—William Squires, GW3IYI, of Bryn, Llanelly, on January 6, the son of Mr. and Mrs. J. Squires, of 53 Penllwyngwyn Road, Llangennech, Llanelly, Carmarthen.

—Norman Jones, G3JVI, of Bishop's Stortford, Herts., a founder member of the Harlow & District Radio Society, who had been blind since boyhood. He died on January 15 after a long illness.

—Anthony Stimson, G3RKY, of Harrogate, Yorkshire, on January 17, at the age of 61. He was an engineer with wide interests, from radio to music, and during Hitler's War was commissioned from the ranks. At his death, he was an official of Harrogate Corporation, in a post he had held since 1939.

—Edward Moor, G2CIP, of Southport, Lancs., aged 46 years. He was a keen member of the Ainsdale Radio Club and came of an Amateur Radio family, in that he was the son of G2AG, Bournemouth.

—Peter Birks, G3FBQ, of Stoke-on-Trent, Staffs., who died suddenly on February 10, at the early age of 37 years. He was in the radio/TV business in the Newcastle, Staffs., district and had helped many locals to get their licences.

## WHERE DO WE GO FROM HERE?

### THOUGHTS ABOUT MOBILE RALLIES

SYLVIA MARGOLIS (xyl/G3NMR)

*Our authoress is well known as an enthusiastic worker on the social side of Amateur Radio. With a nice style of her own, she has succeeded in making the Amateur Radio Mobile Society and her "Mobile News" quite a factor on the contemporary scene. Asked to comment on how we now stand in the Mobile Rally context—after ten years of /M rallying—what she says here, on the opening of the new season, will be of interest not only to those responsible for Rally organising, but also to those who attend them.—Editor.*

JUST over a hundred years ago a mathematician named Charles Dodgson, lazing on a river bank near Oxford on a hot Summer's day, improvised a story to entertain three little girls. Did he know, when he first sent Alice down the rabbit hole, that he was to write the most famous of all children's books?

And in that same Alice-in-Wonderland Oxford, in 1955, did the man, who thought that a gathering of "mobile" radio amateur enthusiasts might be amusing, know just what he was starting?

They chose the Perch Inn at Binsey—just outside Oxford. This was such a very small, esoteric group that only a very small room was booked for tea. For little could come of this new bizarre technique! (It was reported in the November, 1955, issue of *SHORT WAVE MAGAZINE*, and was the first /M Rally report ever published, in any Amateur Radio periodical.)

The tenth anniversary of that first mobile rally was celebrated with another Rally last summer in Oxford. How far had we come since 1955?

The location for the Anniversary Rally was pleasant and efficient. There was little organised entertainment. But those who came—and many came—did so in the spirit of nostalgia, rather than seeking diversion. Expecting little, they went away quite happy at the end.

Ten years is a hefty slice of Amateur Radio's fifty-odd and this had been as hectic a decade as it had ever known. Since 1955 we had seen the ever-growing interest in mobile operation, the increasing popularity of SSB, great strides in VHF and satellite techniques and, just as significant, the inexorable advent of commercial equipment. Each innovation generated its own chain reaction of pontification, dogmatism and pompous burlings.

In 1965 an attempt was made to round up as many possible of the original amateurs who had been at Binsey, to photograph them. A little greyer, a little heavier than before; slightly sheepish, for the Englishman is mighty embarrassed at any public display of sentiment. If this had been France there

would have been processions, flags a-flying, kissings-on-both-cheeks, a military band and wine. None of that here, except for the wine—raffle prizes of Spanish Sauternes, heaven help us! There was a lot of shuffling to be decently inconspicuous, the inevitable jokes about breaking the camera and QSY-up-the-frequency and the image was recorded.

How will that picture look in another ten years' time? Rally organisers are continually asking *Where Do We Go From Here?* Rallies have become huge, sophisticated events, lavish with entertainments. They vie with each other to provide more elaborate attractions and unusual locations. Service bases, air-fields, factories, stately homes, with all manner of films, lectures, competitions, exhibitions and demonstrations—so far no Amateur Radio event has taken place in Wembley Stadium, nor in a Royal Park, but the peak must surely have been reached last year when the Amateur Radio Mobile Society collaborated with the Red Cross on an occasion which drew several thousand people, where a pageant with a cast of over 150 players was only part of a programme which included three bands, Scottish dancing, Army displays, flower and baby shows, tombola, bingo, dancing and a barbecue!

### Shape of Things

Organisers agree on only one firm principle. Experience proves that the British radio amateur deplures competitive events, particularly when they entail further driving after the ordeal of negotiating Summer-Sunday roads. This is vividly, and shamefully demonstrated when G's have attended Continental events.

European rallies nearly always involve fierce technical and achievement contests, on the car-rally plan, no holds barred, where the competitors play to win. British visitors inevitably come at the bottom of the list because they will not go to a rally to work. They want to enjoy themselves.

So the London SSB Dinner, when people flocked in from 27 countries to attend an evening which had to cost nine or ten pounds a couple, was a huge success. Large numbers of Britons, too, attended the 1965 nosh-ups at Knokke and Geneva, both sophisticated and expensive. But whether the radio amateur is drinking Bollinger '59 or Truman's Brown is immaterial. The wonderful annual Barnet Party, six bob and a buffet supper thrown in, is always crowded. There are no contests, no *concours d'elegance*, no safety or building competitions—all that is provided is an excuse for people to get together and talk.

Lately there has been a tendency to run these purely social occasions. The reason for their success is two-fold.

Of all hobbyists the radio amateur is, by the very nature of his hobby, immensely articulate. He likes to *talk*. Some, of course, who prefer CW, like to *tap*. When he goes to a rally where little is demanded of him except to enjoy a pleasant location, he can meet his cronies and rag-chew in peace, putting a face to a voice that has been only a call sign for years.

Proof of this is to be found at Woburn, Barford,

Longleat, Derby, all big events. At Barford, with an attendance up in the second thousand on a fine day, the technical contests which the organisers feel ethically bound to provide attract, perhaps, a dozen entries.

The social event scores, in the second place, over the purely technical event, because of its appeal to the amateurs' wives, who can imagine they are at an ordinary party, not a symposium on advanced electronics. And, let's face it, women are here to stay.

First, then, an attractive location. And local knowledge, which is an immense asset if our rallies are to improve and not regress—the committee member who is a Rotarian or local big-wig can put the black on those who can provide all kinds of attractions. Another gimmick is to hitch your waggon to a bigger star, like that Red Cross event. All you need is to set up your talk-in stations—and bingo!

### Publicity Factor

A great asset, which can now be exploited to the full, is reciprocal licensing. Judicious publicity at U.S. Bases and in overseas publications can bring not only an increase in attendance, and the resultant lolly, but spices up the mixture-as-before with overseas visitors.

Publicity, of course, is one of the main secrets of the successful rally and an element which is sadly neglected by the inexperienced. The Amateur Radio press will collaborate, provided they get the information in good time and that it is properly presented. A few, illiterate, scrawled words on a page torn from an exercise book is hardly likely to induce a professional Editor to give space to a Coming Event. The voluntary periodicals are usually only too glad of the extra copy that a detailed write-up will provide. Local newspapers will help and most public libraries will permit the display of posters. A note (competently written, too, please) to the nearest British or American Service base—addressed to the Entertainments Officer—often gives gratifying results. Local schools and youth clubs are glad to be kept in the picture.

All this assumes that success depends on large attendance. We once went to a dreary, never-repeated affair in Kent. They foolishly asked what I thought of it and I told them, but prettily, and they said that their rally had never been intended to attract a big crowd, but to appeal to a small, select group of experts! (Go away—this is my pub and I'm going to drink all the beer in it!)

One clear fact emerges and the organisers who ignore it might just as well go home and look for Don Miller. All the fierce effort put into Mobile Rallies is destined to attract and please that capricious, terrifying, omnipotent, demanding and sinister figure, who hovers continually in the radio amateur's conscience, ready to pounce and make him feel guilty—his *Wife!*

What do these fearful women really want? Recently I wrote in *Mobile News*:

“Engage the Beatles and the Royal Marines Band, give a Rolls Royce as a prize and hold the thing in the gardens of

Buckingham Palace—and somebody will be bored, offended, peeved or won't be able to find the lavatory. . ."

I talked to them at Oxford. One woman had come along for the ride. A harassed Mum was determined *her* husband shouldn't dodge his Sunday chore of taking the kids off her hands; so the whole family had come, enjoying this Sunday afternoon like a wet Monday morning. One woman thought there should be a cookery demonstration. I invited her to work with me on a committee and, herself, get the demonstration laid on. She disappeared, sharpish-like. Another wife wanted to know why her spouse no longer came home every night. Was it my business to tell her?

The same characters appear at every Rally. The faces may change but the dialogue and action don't. There is the type who comes not only prepared for boredom or personal slight, but who goes to look for it. Ostentatiously detached, she reads her newspaper. Then there is the Never-let-it-be-said-I'm-not-a-staunch-companion-to-him Brigade, bringing to the rally that same joyous enthusiasm that they would contribute to a cervical smear session. And there is the "nit-picker." If there's a raffle, she wants a tombola; she saw the beauty demonstration at last week's Rally; she can't go in for the fashion competition because she left her glasses at home and that police dog has a nasty look in its eye.

But there are, too, those precious few sensible wives who admit that Amateur Radio is the finest of hobbies—that with it their husbands are happily and healthfully relaxed—that there are far worse ways for a man to spend his spare time and that Amateur Radio is as rewarding a social sphere as any. They enjoy the Rallies. They meet their friends, gossip, make gentle fun of those eternal boys, arrange to have dinner together at the Communications Exhibition, and who is that gorgeous man over there?

To rally organisers—find a couple of these unique females, appoint them to your committee and you are home and dry.

---

## THE MOBILE RALLY PROGRAMME

The dates are filling up rapidly, and below is the latest listing. As in previous years, we shall give some general information (where it is supplied) about each event, and organisers are specially asked to get their paper-work through to us in proper time—by *March 12* latest for the April issue.

**March 20:** RSGB booking (*no details*).

**April 24:** North Midlands Mobile Rally, at Trentham Gardens, near Stoke-on-Trent, on the A.34, with Bob Palmer, G5PP, as chairman of the organising committee. This is always one of the biggest Rally events of the year, with an exhibition section, closed-circuit amateur TV, an RTTY demonstration, fully licensed catering, ample parking on hard standings, and plenty of covered accommodation in case of bad weather. The talk-

in will be by G3GBU/A on 160m. AM; G3COY/A on 80m. SSB; and by G3MAR/A on two metres. For any enquiries or further details, write G5PP, *QTHR*.

**April 24:** RSGB booking (*no details*).

**May 8:** Thanet Mobile Rally.

**May 22:** Annual A.R.M.S. Rally at Barford St. John, near Deddington, Oxon.

**May 30 (Whit Monday):** Saltash Mobile Rally, Cornwall (*details later*).

**June 12:** RSGB booking.

**June 26:** Hunstanton (Norfolk) bucket-and-spade party. Details from J. G. Taylor, G3SAW, 42 Station Road, Heacham, Kings Lynn, Norfolk.

**July 10:** Wessex Amateur Radio Group Mobile Rally at Hurn Airport, near Bournemouth, in conjunction with the British Aircraft Corporation Radio Club. There will be plenty to see and do, as this is also the B.A.C. Open Day. For information apply: W. G. West, G3MKN, 23 Palmer Road, Poole, Dorset.

**July 10:** South Shields (Co. Durham) Mobile Rally (*details later*).

**July 17:** Worcester & District Amateur Radio Club Mobile Picnic (*details later*).

**August 29 (Bank Holiday):** Peterborough Mobile Rally.

**September 11:** RSGB booking.

**September 16-18:** International Amateur Convention and Mobile Rally at Knokke, Belgium, with three-day programme of meetings, demonstrations, parties and tours, at all-in prices. Further details later. U.K. amateurs can obtain full information in due course from: J. C. Foster, G2JF, Wye College, near Ashford, Kent.

**September 25:** Harlow Mobile Rally.

---

## SPECIALLY ON THE AIR

This space is available to Amateur Radio groups and societies intending to put a station on the air for the public gaze. This is always an important and worthwhile undertaking, because one of the things we have to do is to explain Amateur Radio to the mass of the people. Please set out your notice in the general form shown here, with full details.

**GB3LRS, April 20-23:** At the Hobbies Exhibition, Granby Halls, Leicester, where the Leicester Radio Society will be operating an AM/SSB station on 15-20-80 and 160 metres. The QSL address is: J. Ball, 45 Bryce Road, Leicester.

**GB3PAS, July 19-21:** At the Peterborough Agricultural Show, running 80m. and other bands as conditions allow. Address for QSL's and other details: D. Byrne, G3KPO, Jersey House, Eye, Peterborough, Northants.



# 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.

**EI4BB**, B. Daly, 20 Captain's Avenue, Crumlin, Dublin, 12.

**EI6BB**, W. F. M. Hahn, Skerries, Co. Dublin. (QSL to G3UOL, QTHR.)

**GW3SHP**, W. J. Weaver, 52 Llanmiloe Estate, Pendine, Carmarthen.

**G3SSE**, R. Trevitt, 28 Delves Avenue, Tunbridge Wells, Kent.

**G3UHM**, F. E. Fatcher, Maughold, Buckshaft Road, Cinderford, Glos.

**GW3UVD**, E. G. Thomas, 3 Landor Avenue, Killay, Swansea, Glam.

**GM3UWU**, W. Mansfield, 7 Carnegie Hill, East Kilbride, by Glasgow.

**G3UYD**, E. T. Clarke, 34 Pitman Close, Basingstoke, Hants.

**G3UYM**, H. J. Groves (*ex-ZD2HJG/5N2HJG/VP7NV*), 76 East Road, Langford, Biggleswade, Beds.

**G3UZF**, A. J. Green, (*ex-G8AEK*), 178 Long Chaulden, Chaulden, Hemel Hempstead, Herts.

**G3UZL**, F. A. Cook, 120 Hulham Road, Exmouth, Devon.

**G3UZM**, C. P. Haddock, 12 Seymour Road, Exmouth, Devon.

**G6SSE/T**, R. Trevitt, 28 Delves Avenue, Tunbridge Wells, Kent.

**G8AKI**, J. T. Eden, 14 Broadwell Road, Solihull, Warks. (Tel. SHE 7321.)

**G8AMF**, K. W. Fowler, 30 Somerset Avenue, Draycott Park Estate, Rugeley, Staffs. (Tel. Rugeley 2074.)

## CHANGE OF ADDRESS

**EI5P**, P. J. Fitzsimons, 27 Sweetmount Park, Dundrum, Dublin, 14.

**G3AGF**, R. L. Edginton, (*ex-ZC4GF/5B4GF*), 8 Springfield, Ashby Gardens, Kegworth, Derby.

**G3BG**, N. M. Button, 31 Gold Street, Hanslope, Wolverton, Bucks.

**GW3BOC**, H. M. Synge, Plas Draw, Ruthin, Denbighshire. (Tel. Ruthin 2917.)

**G3CMI**, J. A. Scott, 24 The Grove, Potters Bar, Herts.

**G3DPJ**, A. E. Smith, Westering, The Drive, Ifold, Loxwood, Sussex.

**G3EDD**, B. D. A. Armstrong, 39 Angle End, Gt. Wilbraham, Cambridge.

**GD3ESV**, Rev. F. Ness, 24 Bowling Green Road, Castle-town.

**G3HLW**, D. A. Pillely, 27 Oxted Rise, Brocks Hill, Oadby, Leicester. (Tel. Oadby 4714.)

**G3IOA**, A. B. Langfield, 201 St. Mary's Road, Moston, Manchester, 10. (Tel. Fallsworth 5406.)

**G3IZJ**, M. Faulkner, (*ex-VP8AZ*), 35 Abbey Way, Farnborough, Hants.

**G3JWZ**, A. Rowley, 6 Woodrow Way, Ashley, Market Drayton, Salop.

**G3LB**, A. R. Yates, Kangel Acre, Littlethorpe Road, Ripon, Yorkshire.

**G3MKU**, A. F. Bower, 82 Anson Road, Shepshed, Loughborough, Leics.

**G3OAZ**, J. Akehurst, (*ex-DL2VM / 5A4TZ / DL2BC / GW3OAZ*), 2-A Downs Avenue, Eastbourne, Sussex.

**G3OHX**, I. Jackson, 9 Lothian Avenue, Hayes, Middlesex.

**GW3PEX**, L. France, 15 The Green, Trefechan (*Breconshire*), nr. Merthyr Tydfil, Glam.

**GM3PIP**, P. I. Park, Kranji, South Street, Mintlaw, Aberdeenshire. (Tel. Mintlaw 319.)

**G3REA**, C. F. Peers, 21 Abbotsbury Gardens, Eastcote, Pinner, Middlesex. (Tel. PINer 6959.)

**G3RFB**, F/Sgt. R. W. Lanchbury, 10 Hornet Road, Thorney Island, Emsworth, Hants.

**G3RFH**, K. J. Randall, (*ex-VP8HF*), 6 Mortimer Close, Woolavington, Bridgwater, Somerset.

**G3RGA**, P. J. Toynton, Wildhern, Old Mead Lane, Henham, Bishops Stortford, Herts.

**G3RLF**, D. J. Price, 8 Newland Road, Droitwich, Worcs.

**GW3RSI**, I. Trays, (*ex-GM3RSI / G3RSI / 5A3CAD / ZC4AK / 5A2CV*, 2 Sqdn., 5 Flight (Radio), No. 32 Maintenance Unit, R.A.F. Station, St. Athans, Barry, Glam.

**GW3TRW**, D. H. White (*ex-DL2DW/G3TRW*), 13 Ar-Y-Bryn, Pembrey, Carmarths.

**G3TYG**, B. D. Winslow, 18 Sycamore Drive, Twyford, Reading, Berks. (Tel. Twyford 335.)

**G3UAP**, P. Parker, 23 St. Michaels Close, Rough Common, Canterbury, Kent.

**G3UOI**, J. C. Firby, 7 Salisbury Avenue, West Lane, Baildon, Shipley, Yorkshire, W.R.

**G3UQV**, D. M. Cliff, 49 Derby Road, Belper, Derbyshire.

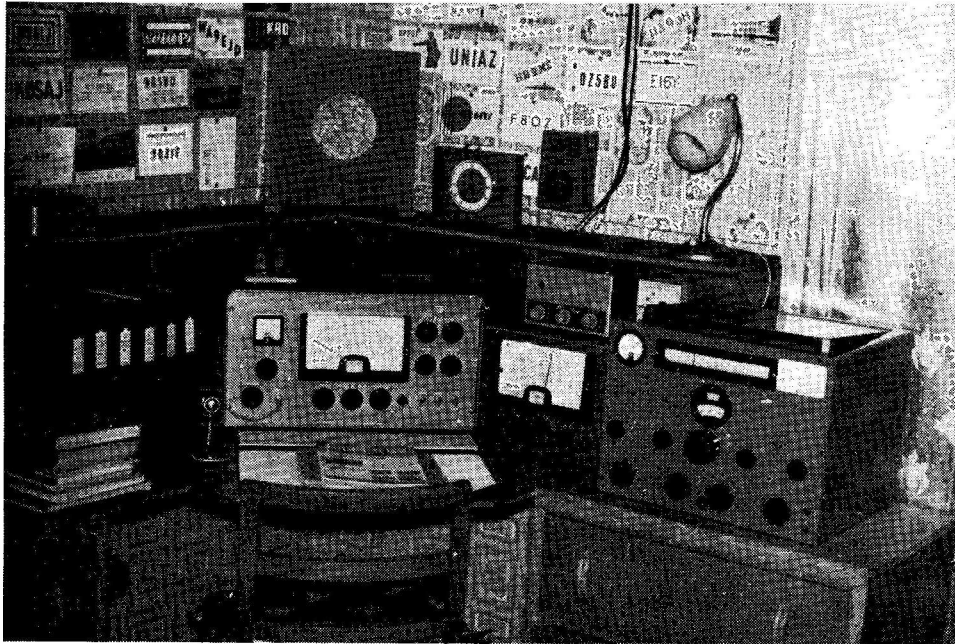
**G5UQ**, P. H. Trafford, 32 Queens Road, Banbury, Oxon. (Tel. Banbury 2283.)

**G6OG**, F. Gee, White Croft, Dean Swift Crescent, Lilliput, Poole, Dorset. (Tel. Canford Cliffs 79460.)

## AMENDMENT

**G8CMF**, T. de Putron, Green Acres Hotel, Les Hubits, St. Martin's, Guernsey.

"Short Wave Magazine" covers the whole field of Amateur Radio, has been established for nearly 30 years, is independent and unsubsidised, and circulates in 80 countries outside the U.K.



## THE OTHER MAN'S STATION

G3RLI

THE station of G. W. Lawrence, G3RLI, is established at 44 Elizabeth Road, Leamington Spa, Warwickshire. Himself an ex-operator, Royal Signals, he says he wishes he had taken out an amateur licence long ago, and "regrets the lost years".

Basically, the equipment consists of a K.W. Vanguard for 10 to 80 metres, with a CR-100 as receiver. The latter has been considerably souped-up by the addition of an S-meter, a Heathkit Q-multiplier, a converter for the amateur bands, and a facility for sidetone monitoring. The ancillaries include an SWR meter, a Raymart band checker/monitor, a band-edge marker with 100 kc crystal oscillator, a straight pump-handle key, and a Jap xtal microphone.

Outside, the aerial system involves a full-size multi-band doublet, a Mosley trap vertical, a 20-metre ground plane, and a Quad for 10 and 15 metres.

Naturally enough, the operating preference at G3RLI is for CW on the HF bands, but telephony is worked on 80 metres at weekends. Though G3RLI says he would like to go QRO, he feels that the right line to take is to improve the antennae to make the most of the power he has got. Eventually, of course, he will be going SSB. In the meantime, he has a neat and effective station.

Readers who follow this feature are reminded that we are always glad to see suitable contributions—the primary requirement is a good, clear photograph accompanied by full descriptive notes.

This means not only a run-down on the equipment in view, but also such personal details as are acceptable for publication—what your amateur operating interests are, what you do for a living, how much (if any) of your gear has been built from *SHORT WAVE MAGAZINE* articles, when you were first licensed, and how you acquired your first interest in Amateur Radio. All this can be expressed in "own words". We write the story round the picture, and payment is made at full space rates, on publication. We do not mind whether you are an old timer or a new timer, or whether you have been licensed for 30 years or three months. What we want to know about is the gear you use and your personal interest in Amateur Radio, and how you got started. Send your story, with a good picture, to: Editor, *SHORT WAVE MAGAZINE*, Buckingham.

### CORRECTION NOTE—"Control Circuit for Quick Change-Over"

In this article in our February issue, it should be pointed out that the relay RLB ought to have been specified as "with two normally-closed contacts and four normally-open," and that in the circuit the contacts RLB/4 should be shown as normally-open. It might also be added that multi-contact relays can usually be adapted (by alterations to the contact mountings) to give any motion required.

# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for April Issue: March 11)

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

ONE of the most remarkable features of the Club scene, noticeable over the last five years or so, has been the enormous growth in the number of Club publications reaching us each month—every local group now feels that it should be putting out some sort of a newsletter. They come in all shapes and sizes, and one often wonders whether one can judge the nature of the Club itself from that of its published effort.

On reflection, this seems improbable, since so many of these newsletters-cum-magazines depend so very much upon the effort of one individual, or a small group of members. Among these, certain Clubs may even have a local professional journalist who helps the thing along as a labour of love, while others are unable to free themselves from the slavery of an ancient hand-duplicator (which has seen better days) and a few willing but inexperienced amateurs who feed in the material.

Taken all in all, between them they cover much of Amateur Radio interest, and one who had the time to read and collate every word in every such publication would indeed be a real gen-man.

This whole manifestation is a very healthy feature of the Club movement, and long may it continue. We can only hope that those who spend much time and trouble in the production of local newsletters are duly appreciated. On the average, we should say that for every one enthusiastic and dedicated Club member, there are between 20 and 50 more or less apathetic types who are just willing to "go along," without being keen to take any active part. (However, without their subscriptions most Clubs would be in a bad way, so *they* have their uses, too !)

A Club periodical is surely a useful way of getting at these non-productive members, and we are glad to see that this is becoming recognised more and more. So—if you run any sort of publication—don't be afraid to come out with some strong opinions. Nothing is as interesting as controversial stuff, nothing as boring as platitudes on which everyone agrees.

## ACTIVITY REPORTS

**Basildon** report a most interesting talk by G3DGN on Communications by Light at their February meeting; on March 24 they will hold a Junk Sale in the restaurant of the "Van Gogh," Paycocke Road, Industrial Estate. Basildon, first lot to be

auctioned at 8 p.m. All are welcome.

**Clifton** hope to have a demonstration of a transistor SSB exciter on March 11. Recent meetings have included a Junk Sale and a talk on Air Traffic Control (with slides and recordings) by G3TR of the Crawley Club. **Acton, Brentford & Chiswick** held their AGM and elected G3IGM chairman, G6RC vice-chairman, and G3GEH secretary, treasurer and press agent—he is the chap who does the work! On March 15, 7.30 p.m., there will be a discussion on Power Supplies (at 66 High Road, Chiswick).

**Mid-Warwickshire**, at their AGM, reported a very successful fourth year of activity, but they enter their fifth determined to increase the membership and improve the financial basis thereby. On March 7 they have a Mullard Film Show, and on the 21st G3LJW will talk on Using an Oscilloscope. April 4 is booked for a visit to the Leamington Telephone Exchange.

**Basingstoke** held their Annual Dinner on January 29, and report that it was enjoyed by all present. On March 12 (at 7 p.m. in the Immanuel Hall, Wote Street), G3MED will be talking on SSB. **York** also held an AGM, and elected new officials (*see* panel for new secretary's QTH). They now meet every Thursday, 8 p.m. at the British Legion Club, 61 Micklegate, York.

**Bedford**, yet another AGM and another new secretary (*see* panel). This Club meets at Westfield School on the second Tuesday and the fourth Thursday at 7.30 p.m. (except during school holidays and half-terms). **West Kent** will discuss NFD plans on March 11, and will hear a progress report on the Club's constructional project on March 25. April 15 is the date of their AGM. They will welcome new members "especially youngsters who are just getting interested." Local SWL's and beginners take note.

**Chester** have a full programme for March, with a Net Night (160 and Two) on the 8th; a lecture by Mr. Gray of the G.P.O. on the 15th; a Junk Sale on the 22nd; and a talk on the "Two-metre Quick-starter" by G3UWV on the 29th. All meetings are on Thursdays (except the first in the month) at the YMCA, Chester, 8 p.m.

**Weston-super-Mare** will be meeting on March 4, 8 p.m., for some instruction in Model Control. On April 1 (same time) the subject will be Hi-Fi and Stereo. **Bristol** will be hearing about Receiver Alignment from G3OUK on March 24—7 p.m. at 41 Ducie Road, Barton Hill, Bristol, 5.

**Chiltern** will be conducted "around the shacks" on March 31—not by car or on foot, but through slides shown by members, who will describe their own equipment—British Legion Club, St. Mary Street, High Wycombe, at 7.30 for 8 p.m. **Dorking** drew up a full programme for 1966 at their AGM, and contemplate forming a special section in the Club for junior members.

**Civil Service**, meeting in the Science Museum, will hold an Informal get-together on March 15. On March 1 they were due for a lecture by Mr. A. Nash (Cosmocord, Ltd.) and demonstration on Piezo-Electric Devices. **Echelford** will hold their main meeting on March 30 (at the Links Hotel, Fordbridge Road, Ashford, Middx.), when Mr. B. Ayres will be demonstrating the HRO-500 and other receivers. This event will start at 8 p.m.

A new Club, known as the **Dynamics Group**, has been formed among employees of Hawker Siddeley Dynamics, Ltd., Coventry. They hope to have a station on the air shortly, and projects include Amateur TV, satellite working, and moon-bounce communications—quite a programme! But then, they have the facilities.

**Derby** will have an Open Evening and Committee Meeting on March 9; on the 16th there will be a Film Show; and on the 23rd a group of members will visit the local Telephone Exchange. They held their AGM on February 2, and the Annual Dinner and Dance on February 12.

**Loughborough** announce a Junk Sale on March 11, a Film Show on the 18th, and a Night on the air on the 25th. **Torbay** will have their Annual Dinner and Social on March 12, at the Telplestowe Hotel, Torquay.

**Magnus Grammar School** have arranged their programme up to Easter, and report that G3UVT and G3UYU (a newly-licensed member) will have the Club station G3PAW on the air most lunch times. Arrangements are in hand for a visit to see an industrial computer in action. Incidentally, in last month's report, p.756, the "G3TWB" should have read G3UWB. Apologies to both.

**Reading**, at their AGM, elected G5HZ chairman, H. Hindle vice-chairman, and G2FQR secretary. In view of his past services as secretary over a long period, G3EJA was elected the first honorary member of the Club. Meetings: March 15 (G8AAG on Unusual Tools) and 29th (Wobulators and 'Scopes). **Luton**, on March 8, will have a talk on SSB by an invited speaker. On the 16th (Wednesday) they will spend an evening at Tektronix (U.K.) Ltd., at Harpenden. On the 2nd a two-metre converter using surplus valves will be described (with the Shefford Club as visitors) and on the 29th there will be a Junk Sale. The Constructional Contest will take place on April 5.

**North Kent** will meet for a Hi-Fi Demonstration by Broadway Radio on March 10—Congregational Church Hall, Clock Tower, Bexleyheath, 8 p.m. **Oxford University** Radio Society will join forces with the Broadcasting Society on March 6 for a lecture on Informational Broadcasting (what on earth is this?); on the 9th there will be an end-of-term

talk and discussion, the subjects being low-cost Hi-Fi and Radio Control.

**Purley** will have a "general natter" with the four-metre Tx on the air on March 4, followed by a Junk Sale on the 18th; April 1 will be another "General Natter" evening. **Southgate** held an Extraordinary General Meeting in February to vote on their new constitution, full details of which have been circulated in their *Newsletter*. Future meetings have not yet been confirmed, but there are plans to cover Aircraft Radio, Electronics in Medicine, Licence Regulations and the (inevitable) Junk Sale. All meetings will now be at Parkwood Girls' School, Wood Green, at 7.30 p.m. on the second Thursday.

**Spen Valley** are having a talk on Transistorised Transmitters, by the University of Sheffield Radio Society, on March 10; the meeting on the 24th is "to be arranged." **Surrey** (Croydon) had talks on an amateur-band receiver and a transistorised SSB exciter at their February meeting. The March event, on the 8th, will be a Junk Sale. Cash and/or surplus gear will be needed for full participation, members are warned. The AGM will be on April 12, which all members should attend.

**Swindon** will be meeting on March 9 and 23—no details yet, but the venue will be The Deer's Leap, Penhill Drive. **Wakefield** report 53 names on their roll, but quite a number do not attend the meetings (and where have we heard *that* before?). They have an R.A.E. Course, a constructional class, and a full programme up to the time of their AGM in July. Thirteen of their members hold callsigns. Sessions are on alternate Tuesdays (March 15 and 29) at the Ings Road School, Wakefield.

**Worcester** continue their meetings every Saturday, 8 p.m. at 35 Perdisswell Park, Droitwich Road. They



"... Could we put the old aspidistra in the junk sale, please, Fred ..."

report a successful Club Dinner, and announce their Constructional Contest on April 23, and a Mobile Picnic on July 17. Full details from the hon. secretary—see panel.

**Shefford** report a number of lively discussions sparked off at their Open Evening at the end of January; on February 4 G3RXW gave a talk on a transistor receiver, and other items of home-built gear. Meetings continue every Thursday, starting with Morse practice at 7.45 p.m.

**Plymouth** have appointed a publicity officer (G3SGV) to relieve their hard-working secretary (G3UKI) of some of his load, and incidentally, to let him get on with his "A" levels! They report that their GB2USA operations brought them some good publicity in the local press, and also that activities over the last two months have been very successful. Their March programme includes an RTTY demonstration by G5ZT, G3LMG and SWL Colin Jones.

**Peterborough**, at their February meeting, saw some of the latest colour films on micro-circuits, transistors and electronics. A special-activity station (GB3PAS) will be run at the Agricultural Show on July 19-21, and their annual Mobile Rally is fixed for August 29. **Pembroke** will be taking the air on Two Metres from the top of the Preseli Mountains on March 5-6, in the contest. Special QSL cards are being prepared.

**Barnsley** attracted an attendance of 65 for the Annual Dinner and Dance, a very successful event organised by G5KM, who will also be talking on Stabilised VFO's on March 11. Then, on the 25th, G6LZ will discuss Recent Developments in SSB. Both meetings at the King George Hotel, Peel Street, 7.30 p.m.

**Harrow** held their AGM in January, and G2TA was elected secretary (see panel for QTH). The March programme includes two Practical Nights (on the

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

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, London, W.3.  
 A.E.R.E. (HARWELL): V. J. Galpin, Building 347.3, A.E.R.E., Harwell, Didcot.  
 AINSDALE: N. Horrocks, G2CUZ, 34 Sandbrook Road, Ainsdale, Southport, Lancs.  
 A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchison Road, London, E.10.  
 BARNLSLEY: J. A. Ward, G4JJ, 44 Northgate, Barnsley.  
 BASILDON: C. Roberson, G8AAO, Milestone Cottage, London Road, Wickford.  
 BASINGSTOKE: P. J. Sterry, G3CBU, Ashley, Orchard Road, Basingstoke.  
 BEDFORD: K. Hatton, 49 The Briars, Kempston, Beds.  
 BRISTOL: E. J. Davis, G3SXY, 72 North View, Westbury Park, Blackpool 6.  
 CARDIFF: E. F. Taylor, GW3SQX, University Hall, Penylan, Cardiff.  
 CHESTER: P. J. Holland, 19 Kingsley Road, Great Boughton, Chester.  
 CHILTERN: G. Leonard, 13 Priory Road, High Wycombe.  
 CIVIL SERVICE: G. Lloyd-Dalton, 2 Honister Heights, Purley, Surrey.  
 CLIFTON: J. Rose, G30GE, 63 Broomfield Road, Beckenham, Kent.  
 CORNISH: M. J. Harvey, Oak Farm, Carnon Downs, Truro.  
 COVENTRY: W. F. M. Hahn, G3UOL, 11 St. Patrick's Road, Coventry.  
 CRAWLEY: R. G. B. Vaughan, G3FRV, 5 Filbert Crescent, Gossops Green, Crawley.  
 CRAY VALLEY: S. W. H. Harrison, G3KYV, 30 Plaistow Grove, Bromley.  
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.  
 DORKING: J. Greenwell, G3AEZ, Eastfield, Henfold Hill, Beare Green, Dorking.  
 DYNAMICS RADIO: J. Wall, c/o Hawker Siddeley Dynamics Ltd., Whitley Works, Coventry.  
 ECHELFORD: A. G. Wheeler, G3RHF, 88 Village Way, Ashford, Middx.  
 EDGWARE: G. S. Fitton, G3RAA, 16 Beverley Drive, Edgware, Middlesex.  
 GRAFTON: A. W. H. Wennell, G2CJN, 145 Uxendon Hill, Wembley Park, Middlesex.  
 GREENFORD: J. A. Hedges, G3MMQ, 35 Ferrymead Avenue, Greenford.  
 HARROW: R. C. Ray, G2TA, Wintons End, Springfield, Bushey Heath.  
 HUDDERSFIELD: R. Higton, 5 Brian Avenue, Datone, Huddersfield.  
 LOUGHBOROUGH: D. Winters, G3IPL, 52 Walton Street, Leicester.  
 LUTON: A. W. Morgan, G8ADS, 97 Victoria Street, Dunstable.  
 MAGNUS: R. Wallwork, B.Sc., Magnus Grammar School, Newark-on-Trent.  
 MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead.  
 MID-WARWICKSHIRE: K. J. Young, 180 Northumberland Court, Leamington Spa.  
 NORFOLK: A. Marcantonio, G3TLC, 10 Hellesdon Mill Lane, Norwich, NOR.21.L.

NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax.  
 NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath.  
 OXFORD UNIVERSITY: A. J. Garratt-Reed, Brasenose College, Oxford.  
 PADDINGTON: A. E. Copperwaite, la St. Mary's Mansions, St. Mary's Terrace, London, W.2.  
 PEMBROKE: K. E. Godfrey, Kimberly, Ludchurch, Narberth, Pembroke.  
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.  
 PLYMOUTH: B. J. Curnow, G3UKI, 112 Mount Gould Road, Plymouth.  
 PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Croydon.  
 R.A.I.B.C.: Mrs. F. E. Woolley, G3LWY, 331 Wigan Lane, Wigan.  
 RADIO CLUB OF SCOTLAND: A. Barnes, GM3LTB, 7 South Park Terrace, Glasgow.  
 READING: N. W. Austin, G2FQR, 20 Worcester Close, Reading.  
 REIGATE: F. D. Thom, G3NKT, 12 Willow Road, Redhill.  
 SALTASH: D. Bowers, 95 Grenfell Avenue, Saltash, Cornwall.  
 SHEFFORD: G. R. Cobb, G3IXG, 75 Amphill Road, Shefford, Beds.  
 SOUTHGATE: R. E. Wilkinson, G3TXA, 23 Ashridge Gardens, London N.13.  
 SOUTH LONDON MOBILE: B. Negri, G3LXN, 17 Voltaire Road, London, S.W.4.  
 SOUTH SHIELDS: D. Forster, G3KZZ, 41 Marlborough Street, South Shields.  
 SPEN VALLEY: N. Pride, 100 Raikes Lane, Birstall, Leeds.  
 SURREY (CROYDON): R. Morrison, G3KGA, 33 Sefton Road, Addiscombe, Croydon.  
 SWINDON: D. J. Goacher, G3LLZ, 51 Norman Road, Swindon.  
 TORBAY: Mrs. G. Western, G3NQD, 118 Salisbury Avenue, Barton, Torquay.  
 VERULAM: G. Slaughter, G3PAO, 5 Leggatts Wood Avenue, Watford.  
 WAKEFIELD: E. Price, G3TQV, 23 Elmwood Grove, Horbury, Wakefield.  
 WELWYN GARDEN CITY: J. Hum, G5UM, Wyldes, Burnham Green Lane, Bulls Green, Knebworth.  
 WEST KENT: R. Trevitt, G3SSE, 28 Delves Avenue, Tunbridge Wells.  
 WESTON-SUPER-MARE: A. E. Seymour, G3GNS, Manor Farm, Hillend, Banwell, Weston-super-Mare.  
 WIRRAL: A. Seed, G3FOO, 31 Withert Avenue, Bebington, Wirral.  
 WORCESTER: B. A. Jones, 12 Woodside Road, Larkhill, Worcester.  
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.  
 YORK: J. A. Rainbow, 14 Temple Road, Bishopthorpe, York.

#### Overseas

AERONAUTICAL CENTER, OKLAHOMA: Post Station 18, Oklahoma City, Okla., U.S.A.  
 EX-G RADIO CLUB: N. F. Thompson, W8YHO, 1368 Roslyn Avenue, Akron 20, Ohio, U.S.A.

The South Yorkshire Amateur Radio Society held their annual dinner on January 21, at the Rockingham Hotel, Doncaster. The event was well supported by members, YL's and XYL's.



4th and 18th), a Junk Sale on the 11th and a Film Show on the 25th. All meetings are on Fridays, 8 p.m. in the Science Lab., Roxeth Manor School, Eastcote Lane, South Harrow.

**Paddington** held their AGM on January 19 and elected Mr. D. S. Jewiss president, G3NOZ chairman, G3JDP vice-chairman and A. E. Copperwaite hon. secretary (see panel). On March 16 there will be a talk by G3MHQ on Crystal-Grinding for Crystal Filters, and the Club net continues every Friday, 11 p.m. on 14.2 mc. Meetings are held every Wednesday, 8 p.m. at the Beauchamp Lodge Settlement, Warwick Crescent, London, W.2.

**Coventry** have now acquired a permanent club-room at the Civil Defence Headquarters, Drapers Fields (off Foleshill Road), where they will gather every Friday at 7.30 p.m. New members and old friends welcomed, and they hope to provide an interesting programme.

**Crawley** will be meeting for G6QB's "Mixed Bag" on March 23. On Friday, March 18, they will hold their Sixth Annual Dinner, with G2BVN as guest. **Yeovil** heard a tape on *Musique Concrete* (by G2BCX) on February 2, and saw a Mullard film the following week. Latest additions to Club equipment are a BC-221 and a Taylor valve tester. Members'

home-built apparatus has been on show, including G8AFA's QRO Tx for 432 mc, and a 60-watt 12/300 volt transistor inverter by G3TTC.

**Northern Heights** have had a talk on The Layout of an Amateur Station (G3FDC), and a Junk Sale (the proceeds of which went to the Club Tx fund, which is growing nicely). Future talks: "On Safari among the Kilowatts," by David Howell, on March 16; NFD Arrangements on March 30; and the AGM will be on April 13.

**Reigate** held their AGM and re-elected most of their officials. Their membership is now 46, including 30 callsigns, and they have gained a fine reputation for contest work during the past year. Next meeting, on March 17, will be a Film Show, to which YL/XYL's are invited, at the George and Dragon, Redhill.

**Saltash** will meet on March 11 for a talk by the local "legendary character, G9BO," and a general matter. March 25 is their Film Night, and their Mobile Rally is fixed for May 30. The recent Constructors' Competition was won by SWL Jack Martin with his receiver.

**Greenford** continue to gather at the Community Centre, Oldfield Lane, and their March meetings are on the 11th (Junk Sale) and 25th (Mobile Evening



Table at the recent dinner of the Worcester & District Amateur Radio Club, for which the total attendance was 28 members and friends.

on One-Sixty and Four). **Maidenhead** have March 15 booked for a talk and demonstration of VHF working, by G3MEV; it is hoped that some two-metre contacts will be made during the meeting. The Club reports good progress, increasing membership, and a welcome for any newcomers, whether licensed, SWL or "just interested," at their meetings on the third Tuesday in the Hall, East Berks. College, Boyn Hill Avenue, Maidenhead.

**Welwyn Garden City** report some interesting sessions, one of which dealt with the Development Corporation's edict concerning "TV and other Aerials" on housetops (!). Their annual Constructors' Competition will be judged by G6LL and Mr. A. H. Beattie at the March meeting.

**South London Mobile Club**, at Clapham Manor Baths, will be holding a Junk Sale on March 12, and a talk on 70 cm. operation on the 26th. The AGM will be held on April 23. All timed 8.0 p.m. **South Shields** meet in the Trinity House Social Centre, Laygate, on Friday evenings and occasional (advertised) Thursdays. On March 3 their Constructional Competition was to be judged by G3BIK and G3SFL. Among the entries were a communications receiver, a transmitter, a transceiver, a two-metre converter and a pre-amp.—which just shows what a Club can do.

**Wirral**, having had a D/F Lecture on March 2, will hear a talk on Communications Receivers on the 16th, and G2FOS's discussion on Transistory (Part III) on April 6.

Up in **Ainsdale**, they have their annual "Hot-Pot Night" (and what an occasion that can be!) on the evening that this appears, when plans will be discussed for the year's activities—to include /P gear for the HF bands. They are already fully transistorised on VHF.

Down in Wales, the **Cardiff Radio Contest Club** will foregather at the Griffin, Lisvane, on March 7 at 8.0 p.m., when all locally will be welcome. They have plans for a /P expedition, come the summer.

From **Edgware** it is reported that their Club Net on 1875 Khz (the hon. secretary remarks that he read p.734 of our February issue!) at 2100z is proving useful for local amateur publicity and recruitment. Next meeting is on March 14, when

G3SJE will give the first of two demonstrations on The Oscilloscope.

One of the most active London Clubs is **Grafton**, with meetings arranged for March 11 (SWL Corner, by G3KRH); March 18 (Introduction to Amateur TV, by G6ABA/T); and March 25 (Easter Junk Sale). Visitors are most welcome, the evening programme starts at 8.30 p.m., and the place to find them is Room 35, Montem School, Hornsey Road, N.7.

**Huddersfield** have now got themselves two rooms at the YMCA, St. Peter's Street; one will be used for regular fortnightly meetings and it is intended that the other shall be equipped as a workshop with Tx gear for use any night of the week.

### CLUB PUBLICATIONS

We acknowledge, with thanks, the receipt of the following Club Publications. (*Latest receipts only are mentioned*):

**Coventry (CARS Newsletter)**; **AERE, Harwell (QAV, January)**; **ARMS (Mobile News, January)**; **Cornish (Cornish Link, February)**; **Cray Valley (QUA, February)**; **North Kent (Newsletter, No. 96)**; **Norfolk (NARC Challenge, Christmas)**; **Purley (Splatter, January and February)**; **RAIBC (Radial, January)**; **Surrey (SRCC Monthly News, February)**; **Swindon (Wiltshire Hams, January-February)**; **Worcester (Newsletter, February)**; **Radio Club of Scotland (GM Magazine, January)**; **Saltash (Tamar Pegasus, February)**; **Reigate (Feedback, January)**; **Echelford (Newsletter, January)**; **Wirral (Newsletter, January)**; **Aeronautical Center, Oklahoma (Collector and Emitter, January)**; **Ex-G Radio Club (Bulletin, Vol. 5, No. 6)**; **Southampton Group (QUA, February)**; and **Verulam (News Sheet, February)**.

\* \* \* \*

### GETTING THROUGH THE R.A.E.

A very useful practical article for those taking the next Radio Amateurs' Examination, in May, appeared in the April, 1965, issue of **SHORT WAVE MAGAZINE**. We would recommend all aspirants to read and re-read this contribution, because it gives the sort of advice and information that serious candidates would find both helpful and encouraging.

## STEPHENS-JAMES LTD.

Appointed Northern Agents for KW Electronics

**FULL KW RANGE NOW IN STOCK**

We can supply **NATIONAL, EDDYSTONE, EAGLE and LAFAYETTE**

**CODAR and "JOYSTICK" Stockists**

NCX3 and Psu., £110. Eddystone 940, £80; 840c, £45; 840a, £25. CR45 £8. TW Topmobile, £14. AR88D £40, AR88D, £35.

HP terms arranged. Part exchanges. SAE enquiries

**70 PRIORITY ROAD, LIVERPOOL 4**

Tel.: ANfield 3141 and 7829

## AMATEUR ELECTRONICS COMMUNICATIONS EQUIPMENT

	£	s.	d.
EDDYSTONE 840C. Mint condition ... ..	40	0	0
KW16 MOBILE RECEIVER. All bands, in good condition ...	20	0	0
HALLICRAFTERS 538. 550 Kcs.-30 Megs. Bandspread. Excellent condition ... ..	16	0	0
BC312 RECEIVER. In good working condition complete with power pack and speaker ... ..	16	10	0
HE40 SHORT WAVE RECEIVER. In excellent condition ...	12	10	0
COMMAND TX. 4-5.5 Megs. Excellent condition and complete with valves and setal ... ..	5	10	0
COMMAND RX. 6-9 Megs. Good condition ... ..	4	10	0
TELEPRINTER ADAPTORS. FS No. CI. R.C.A. 230 volt input 455 Kc I.F., 3 channel input ... ..	15	0	0
R209 RECEIVER. 1-20 Megs. 6 volt input. Brand new ...	15	0	0

Communication equipment purchased. S.A.E. all enquiries please.

**WANTED—AR88 TYPE RECEIVERS.** Top prices paid

240 LICHFIELD ROAD, ASTON, BIRMINGHAM 6. Tel.: East 1947

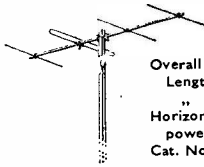


# AMATEUR RADIO ARRAYS

## TYPICAL FOUR METRE ARRAYS

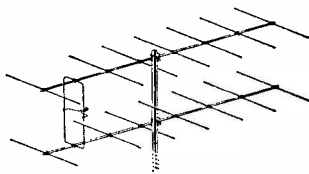
## PRICE LIST JANUARY 1966

### BASIC 4 ELEMENT YAGI



Overall Dimensions :  
 Length 44" Width 41"  
 " 112 cm. " 104 cm.  
 Horizontal Beamwidth between half  
 power points 55°  
 Cat. No. 2/4Y.

### EIGHT OVER EIGHT



Overall Dimensions :  
 Length 102" Width 40" Height 46"  
 " 260 cm. " 102 cm. " 116 cm.  
 Horizontal Beamwidth between half power points 40°  
 Cat. No. 2/16.

### PLUS UNITS

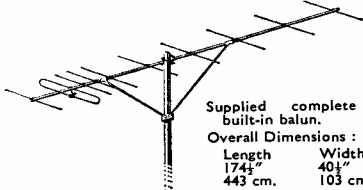
Plus 2 unit — adds 2 elements to any crossboom.  
 Cat. No. 2+2.

Plus 4 unit — adds 4 elements to any crossboom.  
 Cat. No. 2+4.

**Examples :** To convert 4 Element Yagi into 6 Element Yagi add plus 2 unit.  
 To convert 4 over 4 into 8 over 8 add two plus 4 units.

**N.B.:** The Skybeam 10 Element Yag cannot be extended.

### SKYBEAM 10 ELEMENT YAGI

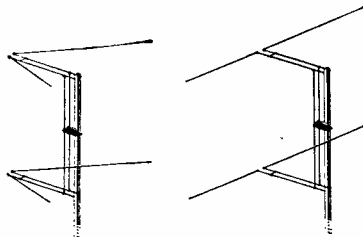


Supplied complete with  
 built-in balun.  
 Overall Dimensions :  
 Length 174 1/2" Width 40 1/2"  
 443 cm. 103 cm.

Horizontal Beamwidth between half power points 33°.  
 Cat. No. 2/10Y.

Most clamps illustrated suitable for 1"—2" diameter masts.

### OMNI-V



Omnidirectional

Bidirectional

Can be used as an omnidirectional or a bidirectional aerial.  
 Incorporates coaxial balun.

Supplied complete with 6' x 1 1/2" o.d. mast.  
 Length of dipoles 37". Spacing between stacks 42"  
 94 cm. " " " 107 cm.

Cat. No. 2/0V.

Type	Band	dB gain over a dipole	Cat. No.	Price
All aerials available with 75 or 300 ohm feed				
3 El. Yagi	4 metre	5.7	4/3Y	52/-
4 El. Yagi	4 metre	7.0	4/4Y	68/-
4 El. Yagi	2 metre	7.0	2/4Y	30/-
6 El. Yagi	2 metre	8.7	2/6Y	42/6
8 El. Yagi	2 metre	10.0	2/8Y	55/-
10 El. Skybeam	2 metre	13.2	2/10Y	126/-
Double 2 Slotbeam	2 metre	6.7	2/4	45/-
Double 4 Slotbeam	2 metre	10.0	2/8	70/-
Double 6 Slotbeam	2 metre	11.7	2/12	95/-
Double 8 Slotbeam	2 metre	12.6	2/16	120/-
Plus 2 Unit	2 metre	+1.7	2+2	12/6
Plus 4 Unit	2 metre	+3.0	2+4	25/-
Omni V	2 metre		2/0V	75/-
Halo Head only	2 metre		2/HO	15/-
Halo with mast	2 metre		2/HM	19/6
X10 Moonbounce	2 metre	13.2	2/10XY	168/-
Double 4 Slotbeam	70 cm.	10.0	70/8	46/-
Double 6 Slotbeam	70 cm.	11.7	70/12	63/-
Double 8 Slotbeam	70 cm.	12.6	70/16	76/-
10 El. Skybeam	70 cm.	13.2	70/10Y	63/-
14 El. Skybeam	70 cm.	16.0	70/14Y	90/-
24 El. Skybeam	70 cm.	17.5	70/24Y	161/-
X14 Moonbounce	70 cm.	16.0	70/14XY	153/6

	Band	Cat. No.	Price
75 ohm Balun	6 metre	6/75B	45/-
Balance/unbalance transformer with coaxial socket	4 metre	4/75B	39/-
	2 metre	2/75B	31/-
	70 cm.	70/75B	25/6
75 ohm TW2	6 metre	6/TW2	71/-
Balun with 75 ohm screened twin	4 metre	4/TW2	59/-
Phasing and matching harness to stack two balanced feed aerials	2 metre	2/TW2	57/-
	70 cm.	70/TW2	42/-
75 ohm C02	6 metre	6/75C02	30/-
Coaxial matching and phasing harness to stack coaxial feed aerials	4 metre	4/75C02	29/-
	2 metre	2/75C02	28/-
	70 cm.	70/75C02	18/-

**Note :** Type C02 with two type TW2 Will match and phase 4 aerials.  
 Three type C02 and 4 type TW2 Will type C02 and 4 type TW2 Will match and phase 8 aerials

300 ohm PH2	6 metre	6/PH2	20/-
Q Bars only to match two 300 ohm aerials	4 metre	4/PH2	15/-
	2 metre	2/PH2	9/6
	70 cm.	70/PH2	6/-
300 ohm PM4	6 metre	6/PM4	54/-
Phasing and matching harness to stack four 300 ohm aerials	4 metre	4/PM4	53/-
	2 metre	2/PM4	52/-
<b>Note :</b> Type PH2 with 2 type PM4 will match and phase 8 aerials	70 cm.	70/PM4	32/-

### MASTS AND ACCESSORIES

10ft. x 2in. 14 s.w.g. aluminium alloy			44/-
12ft. x 2in. 14 s.w.g. aluminium alloy			56/-
14ft. x 2in. 14 s.w.g. aluminium alloy			66/-
9ft. x 1 1/2in. 18 s.w.g. galvanised steel			17/6
10ft. x 1 1/2in. 18 s.w.g. galvanised steel			18/6
10ft. x 2in. 18 s.w.g. galvanised steel			28/-
12ft. x 2in. 18 s.w.g. galvanised steel			31/-
15ft. x 2in. 18 s.w.g. galvanised steel			41/-
6in. galvanised jointing sleeve for 2in. masts	JBL10		6/-
15in. galvanised jointing sleeve for 2in. masts	JBL59		13/-
3 hook guy wire clamp	JBL58		6/-
Universal mast clamp to 1in. tube	JB53		4/-
Universal mast clamp to 1 1/2in. tube	JBL63		5/6
Universal mast clamp to 1 1/2in. tube heavy duty	JBL73		10/-
1in. mast clamp to 1in. tube	JLB55		3/-
Stand off wall brackets 6in.	JBL6		8/-
Stand off wall brackets 18in.	JBL 7		33/-
Stand off wall brackets 24in.	JBL 7a		36/-
Stand off wall brackets 24in. heavy duty	JBL 8		56/-
Chimney lashing double (2 wires)	JBL 4		27/6
Chimney lashing single (1 wire)	JBL 3		20/6
1 1/2in. 18 s.w.g. aluminium alloy tube		ft.	2/-
1in. 18 s.w.g. aluminium alloy tube		ft.	1/6
Semi-air spaced coaxial cable		yd.	1/3

TERMS: C.W.O. All prices include free delivery in U.K.

ILLUSTRATED TECHNICAL DATA HANDBOOK Now available Post free 2/6

# J-BEAM ENGINEERING LTD.

ROTHERSTHORPE CRESCENT, NORTHAMPTON



## MORE TITLES AVAILABLE FROM STOCK

<b>AMATEUR RADIO ANTENNA HANDBOOK.</b> 157 pages (by H. D. Hooton, W6YTH)	24/-
<b>AMATEUR RADIO</b> (by F. G. Rayer, G3OGR)	31/6
<b>BEGINNER'S GUIDE TO RADIO</b> (Newnes)	9/-
<b>BEGINNER'S GUIDE TO COLOUR TELEVISION</b> (Newnes)	15/8
<b>BEGINNER'S GUIDE TO ELECTRONICS</b>	15/6
<b>DICTIONARY OF ELECTRONICS</b> (Penguin Books)	8/-
<b>ELECTRICAL HOBBIES</b> (Collins)	5/6
<b>ELEMENTS OF RADIO ENGINEERING</b> (Cleaver-Hume)	15/10
<b>HAM ANTENNA CONSTRUCTION PROJECTS.</b> 157 pages (Sams)	24/-
<b>HANDBOOK OF HAM RADIO CIRCUITS</b> (by W9CGA)	24/-
<b>INTRODUCTION TO VALVES</b> (Iliffe's)	9/4
<b>RADIO ASTRONOMY FOR AMATEURS.</b> 220 pages (by Frank Hyde)	26/6
<b>REMOTE CONTROL BY RADIO</b> (Philips)	10/9
<b>RADIO &amp; ELECTRONIC HOBBIES</b> (by F. C. Judd, G2BCX)	22/-
<b>SHOP &amp; SHACK SHORTCUTS</b> (by W6TNS)	32/-
<b>SHORT WAVE AMATEUR RADIO</b> (by PA0HH, Philips Technical Library)	22/-
<b>TECHNICAL TOPICS FOR THE RADIO AMATEUR</b> (R.S.G.B.)	10/8

**SHORT WAVE MAGAZINE**  
55 VICTORIA STREET : LONDON, S.W.1  
PUBLICATIONS DEPARTMENT

## 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.

### SITUATION OFFERED

**CRAFTSMAN** Required for installation and maintenance work on the Communication System of the Midlands Electricity Board. Experience of VHF/UHF transmitters and receivers essential; knowledge of telephone systems an advantage. Salary for successful candidate £835 p.a., plus 10s. 6d. per week productivity bonus. Additional service increments of £20 p.a. payable after 2-3 years' satisfactory service. Also holiday and sick pay schemes, and optional superannuation arrangement. N.J.I.C. conditions.—Apply by letter to: Mr. E. C. Watson, Area Manager, Midlands Electricity Board, Spring Gardens, Ditherington, Shrewsbury, Shropshire.

### TRADE

**SILICON PLANAR** Transistors: 2N3711, Hfe 180 to 660, 7s. 2N3663, Ft 1200 mc, 17s. 2N3403, 900 mW, Hfe 180 to 540, 8s. 6d.—Electrovalue, 6 Mansfield Place, Ascot, Berkshire.

**RIDDYS.** New Valves: 6J5G, 6J5GT, 2s. 6d. Meters, 350 mA, 2in., 7s. 6d. Dash lamp assemblies, 2s. 6d. Interior lamps, 2s. 6d. Meter rectifiers, 2s. 6d. 10K w/wound resistors, 1s. 6d. Rotary switches, 3-way 4-position, 1s. Electrolytic condensers 200 mF, 200v. DC, 2s. 6d. G.P.O. double-jack plugs, 2s. 6d. Airspeed indicators, 700 m.p.h., 7s. 6d. Altimeters, to 20,000 feet, 10s. Add 6d. postage on all orders.—Riddys Surplus Stores, 3 Walsgrave Road, Gosford Green, Coventry (28914), Warwickshire.

**AMATEURS:** Your QSL cards at reasonable prices, 20s. per 100.—ACE, Dept. Q., 330 Wetmore Road, Burton-on-Trent, Staffs.

**NATIONAL HRO** Senior Receivers, Model 5T. In excellent tested condition. Receiver only £18 10s. Set of four coils, £6. PSU £2 15s. Carriage 30s. on Rx and 10s. on PSU.—Thompson, Eiling Lodge, Codicote, Hitchin, Herts.

**GOING MOBILE?** Then you need the Halson Mobile Aerial, our all-band Antenna system. Price £6 10s. for one band, additional coils (bands) £3 10s. each. Add 3s. postage.—Halson Radio Services, 2 Sefton Street, Blackpool (20441), Lancs.

**MORSE INSTRUCTION TAPES:** Eight 25-minute lessons at 3jin. per sec., 50s. **MORSE PRACTICE TAPES:** Eight 25-minute lessons, including simulated tests, 50s.—Holmes, 69 Crosby Avenue, Scunthorpe, Lincs.

**APN-4** Loran Receivers, new and boxed, £2 (carr. 15s.). Marconi loudspeakers, 2-ohm, 5in., metal cased, 10s. (post 3s. 6d.). A/S 576 Valve-Voltmeters, £5 19s. 6d. (post 17s. 6d.). Design 17 RF power meters, 40-watt, unboxed, 27s. 6d. (post 7s. 6d.). Type 1019 sealed relays, new, 3s. (post 1s. 3d.); 4673 G.P.O. type ditto. GLT No. 3 4-metre wavemeter, £3 (carr. 12s. 6d.). E.S. reflector bulbs, 240v. 300-watt, six for £3, post free. TS-45/APM3 X-band signal generators, £6 (carr. 15s.). TS-13/AP, £3 (carr. 40s.). Type 62E UHF Receiver chassis (no valves), £2 (carr. 12s. 6d.). **MAIL ORDER ONLY.**—Worthing Radio, 7 Coronation Buildings, Brougham Road, Worthing, Sussex.

**SWL's!** Make Your Receiver Come to Life! Send s.a.e. for details of new style preselector with built-in antenna coupler. Tunes your aerial and boosts signals 25 dB at the same time. Coverage 1.8 to 32 mc inclusive; self-powered. Price £6 18s.—Hamgear Electronics, 29 Carlyle Road, Norwich.

SMALL ADVERTISEMENTS, TRADE—*continued*

**FOR SALE:** Eddystone 680X, first-class condition and working order, price £62.—Cosh & Hammond, 29 Beach Road, Littlehampton (877), Sussex.

**READERS' ADVERTISEMENTS**

3d. per word, min. charge 5/-. payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

**FOR SALE:** Complete two-metre station: G. & D. CTX-2 transmitter, PSU and modulator, G. & D. Mk. IV converter, 6-over-6 slot beam, the lot only 6 months old, for £28. Pye 12v. transistor car radio, 4 months old, £9. Labgear wideband multiplier, 10-80m., £3. Labgear driver coil pack, 10-80m., £3. (Both these on brass chassis with valve holders and partly wired.) Frequency Meter TS-69/AP 341 to 1000 mc, with 4½ in. 200 microamp. meter, as brand new, in carrying case, £15. VLF frequency meter, 36 to 63 cycles, vibrating reed type, in oak case, £6. Top Band/80-metre Tx, with PSU, £7. Test Oscillator BC-376H, with mains PSU, needs checking, £2 10s.—G3SBH, QTHR. Ring Dursley (Glos.) 2907 after 6.0 p.m.

**SELLING:** Receivers, in perfect condition: AR88D, with improved RF stage and BFO, S-meter, extension speaker, headphones and manual, £45; Eddystone S.840A, with headphones and manual, £30; HE-80, includes two-metre coverage, little used, with manual, £35; PR-30X preselector, self-powered, as new, £5.—G3RCX, 3/117 Leigham Court Road, Streatham (5746), London, S.W.16.

**WANTED:** In good condition, Heathkit RA-1 or Eddystone S.640.—Box No. 4238, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE or EXCHANGE:** My home-brew Tx with heavy-duty PSU, built round Geloso VFO, price £12 o.n.o.? or EXCHANGE together with my HRO Rx with bandspread coils, for Eddystone Rx.—F. D. Nurse, G3RBI, 10 Wenwell Close, Aston Clinton, Bucks.

**SPY** Radio Type MCR-1, complete with AC/DC PSU, matched headphones, plug-in coils covering medium-wave and 3.5 to 14 mc. Sell £12, or consider EXCHANGE good Top Band mobile gear.—Box No. 4239, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

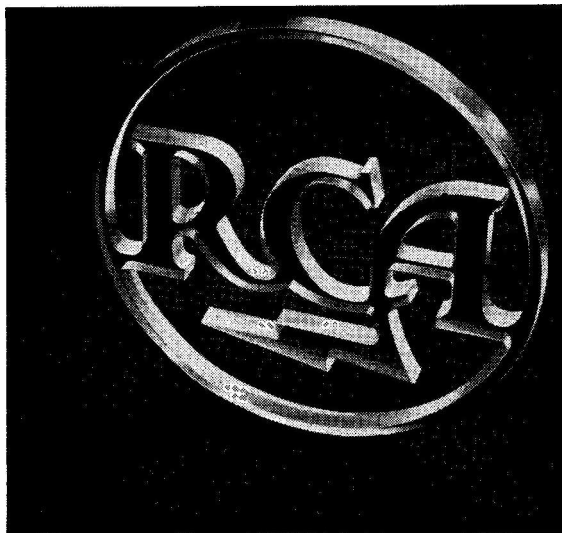
**WHAT IS ACSE 2A10**

**EXCHANGE:** B.S.R. Civic Tape Recorder deck, cost £18 a year ago, for CR-100 or similar. Consider sale for £12. Prefer buyer collects.—Macklin, 5 Sheridan Close, Stanmore, Winchester, Hants.

**SALE:** Class-D Wavemeter, mains, £2. B2 Tx/Rx, with 160m. coverage and including PSU, £8 10s. (Crystals available). Prefer buyer examines and collects, otherwise carriage extra.—GW3LCQ, 12 Penrhos Avenue, Llandudno Junction, Caernarvonshire, North Wales.

**SELLING:** BC-348R, with internal mains PSU and RF-24 Unit, in nice condition and working well, £13 o.n.o.? **WANTED:** Manual, circuit or any details for CR-100.—Oddy, 2 Carter Avenue, Whitkirk, Leeds, 15, Yorkshire.

**OFFERING:** Copies "Short Wave Magazine," Vol. XXI Nos. 2, 5, 6, 8, 9, 10, 11, 12; Vol. XXII Nos. 4, 5, 6, 7, 9, 11 and 12, at 1s. each. Speaker, 8in. in cabinet, 12s. carr. paid.—M/Sig. Livermore, Sgts. Mess, R.A.F. Stradishall, Newmarket, Suffolk.



RCA Great Britain is a subsidiary of the Radio Corporation of America. The Company's activities cover a wide field of design, development, manufacture and service of electrical and electronic equipment. It is specially noted for its work on the design and manufacture of equipments for recording and re-recording sound, for sound reinforcement systems and for the full range of products required to equip film and television studios and for cinemas and theatres. Associated with these activities is the manufacture of language laboratories. The Company's activities include the development of colour receivers and test equipment for the requirements of the various standards and systems now in existence.

The Company's capability for service ranges from major projects such as the operation and maintenance of the Ballistic Missile Early Warning System at Fylingdales down to the less complex work of cinema service. Service centres in the United Kingdom and Eire provide full geographical cover and the Company is prepared to provide service to those requiring support of any form of electrical or electronic equipment. A large force of mobile engineers is in constant operation overseas installing and maintaining various forms of communication installations.

As sole distributor in the United Kingdom of RCA products the Company is able to supply advanced types of semiconductors, integrated circuits, valves, tubes and capital electronic equipment including video tape recorders, colour and monochrome cameras, broadcast and television transmitters, mobile television units and any other item from the catalogue of the Parent Company.

*All enquiries for products or service should be addressed to RCA Great Britain Limited, Lincoln Way, Windmill Road, Sunbury-on-Thames, Middlesex.*



**The Most Trusted Name in Electronics**

**RCA GREAT BRITAIN LIMITED**, Sales Division,

Lincoln Way, Windmill Road, Sunbury-on-Thames

Telephone: Sunbury 5511

ASSOCIATE COMPANY OF RADIO CORPORATION OF AMERICA.

## G. W. M. RADIO LTD.

### RECEIVERS

**CANADIAN MARCONI 52.** 1.75 to 16 mc/s. New condition, £10/10/- or with ZE12 power unit for 115/230 volts A.C. and connecting cable, £13/10/-, both carriage paid. Reprinted handbook with circuits, 5/- extra. Without steel outer case, 10/- less.

**TRANSCIVER SCR522.** Receiver and Transmitter units in rack with all valves, £3, carriage paid.

**LOW FREQUENCY ADAPTORS** for R206 Receiver, 50 to 600 kc/s. 230 volts A.C. power unit, £3/10/-, carriage paid.

**OSCILLOSCOPES.** Hartley Electromotives type 13a. Good working order, £20, carriage £1, three only.

**SIGNAL GENERATORS.** Marconi TF390, 10 to 150 mc/s. or TF517, 150 to 300 mc/s., £4/10/-, carriage paid either type.

**METERS.** 500 microamp 2" round, 8/6, post 1/6. Tested.

**HEAD AND MIKE** sets for 19 or 22 set, 10/- or superior Chamois padded type, 15/-, both post paid.

**230 VOLTS A.C. POWER UNITS FOR H.R.O. RECEIVER,** 45/-, post 5/-. Speakers, 10" 3 ohm in wood case (slightly soiled) with 600 ohm line transformer, 25/-, carriage paid. 10 watt modulation Transformers suit pair 6V6 5000 ohms to 2500 ohms, 12/6, post paid. Ceramic insulated 3 gang Variables, 56 x 56 x 35 PF. 3/6, post 1/6.

**TRANSMITTER OUTPUT TESTERS** type 57. Ranges 0-15, 150 and 1500 watts. Made for Pulse Modulated Transmissions 150 to 250 Mc/s. 4" scale 0-1 Ma. meter. Power supply for 230 volts A.C. or 12 volts D.C. Complete with 50 ohm R.F. head, handbook with circuit, and connecting leads packed in transit case, £2/10/-, carriage paid.

**WHIP AERIALS.** Eight 4ft. sections and heavy base. Will make up to 24ft. max. 35/-, carriage paid.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges quoted are for England and Wales only. Telephone Worthing 9097.

Terms: Cash with order. Early closing Wednesday.

**40-42 PORTLAND RD., WORTHING, SUSSEX**

The foremost name in  
microphones and sound accessories

## LUSTRAPHONE

The many Public Authority and Service users of Lustraphone equipment appreciate the quality and reliability resulting from our extensive experience as specialists in the design and manufacture of microphones and associated equipment.

Microphones for all purposes incorporating the newest techniques . portable P/A systems for indoor and outdoor use . noise cancelling intercom systems . audio equipment accessories and components.

LUSTRAPHONE LTD.

St. George's Works, Regents Park Road, London, N.W.1  
PR1mrose 8844

Set of 6 N.P.N. 300 mc/s. 1w. S.T.C. SILICON PLANAR TRANSISTORS, 20/- set.

Set of 4 SUN SOLAR CELLS plus 24 page book of experiments, 11/- set.

ZENER DIODES : ½w. 3/6, 1.5w. 5/-, 7w. 6/-, 4.7v. to 30v.

AF114, AF115, AF116, AF117, OC170, OC171, 4/- each.

ACY22, BY100, AFZ11, T1166, GET7, GET8, GET9, 5/- each.

Plus many others, send 6d. stamp for Lists :-

**D. CURSONS**

78 BROAD STREET, CANTERBURY, KENT

SMALL ADVERTISEMENTS, READERS—continued

**WANTED:** AR88D, reasonable price and condition.  
**SALE:** AR88 IF selectivity switches, brand new, 15s. each, post 2s. 9d.—G3FWD, 126 Renton Road, Oxley, Wolverhampton, Staffs. (Tel. Fordhouses 2404.)

**SALE:** Transceiver HW12 with AC/PSU. Collins, KWM-1, noise blanker, DX adaptor, power supply, novice adaptor. Offers?—Mortimer, 51 Townhead Road, Dore, Sheffield, Yorkshire.

**FOR SALE:** Eddystone 840C Receiver, 480 kc to 30 mc, with data sheet, in immaculate condition, £30 o.n.o.?—Box No. 4241, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** K.W. Vanguard, 1958 model, covers 160m., £30. Eddystone 888A, 1962, with speaker and S-meter, £65. Both in immaculate condition.—Jackson, 12 Oak Tree Close, Burpham, Guildford, Surrey. (Tel. OGU3-5236.)

**SALE:** Eddystone 888A, just overhauled by makers, £65. Heathkit DX-100U, with 160m. coverage, SSB adaptor, sequential keying and manual, £65. Variac 230v., 0-270v., £4. Class-D Wavemeter, needs small repair, AC mains, in transit case, with handbook, 30s. Ceramic 5-plug ceramic coil formers, sockets, 5s. All plus carriage or collect Bedford.—Box No. 4240, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** Labgear Wideband Multiplier E.5026.—A. Holloway, 2 Burlington Drive, Davenport, Stockport, Cheshire. (Tel. STE 3684, after 7.0 p.m.)

**SELLING:** Marconi HR-110 Communication Receiver, with PSU, coverage 500 kc to 30 mc, 16 miniature valves, two half-lattice xtal filters, double conversion, 500 kc calibration, with manual, £30. CT-84 portable Oscilloscope, runs off 6.3v. AC or 24v. DC, £11. Type 4EP1 'scope tube, with shield, £5. TE-149 Wavemeter, £5. CN-348 VHF Transceiver, £4. Wavemeter GR.758A, new, £3. MN-26Y, with PSU, £5. Nombrex Signal Generator, £7. R.209 front end, £2. R.209 IF sections, £2. Buyer collects, all items (London).—Ring Smith, SYDenham 3217.

**SALE:** Correspondence Course for R.A.E., brand new, unused, cost £12 10s., take £7.—Dutfield, Overton Grange, Ludlow (2810), Shropshire.

**WANTED:** Labgear LG.300, and 14 mc HRO BS coil.  
**SALE:** J.36 bug, chrome, £5. LG.50, as new, £26. Commercial 3in. 'Scope, £8. Olympic 150-watt Z-match, £4. TU5B 80/40m. VFO, rock steady T9x, £2. Geloso 50-watt pi-tank and RF choke, £1. Mains transformers, 300v. 150 mA, 6.3v., 5v. drop-through type, 10s.; 400v. 200 mA, 15s.; 6v. 8 amp., 10s. Two speakers, 2s. 6d. All carriage extra.—Smith, G3RB, 15 Malcolm Court, West Monkseaton, Whitley Bay, Northumberland.

**AMATEUR OFF SICK** for 2½ years needs cash. What offers for BC-221 with original charts; two (American) 50ft. masts, 2½in. dural in 5ft. sections; 19 Set crystal calibrator; 1131A Tx, driver and PA stripped, otherwise complete; Variacs, one 3½ amp. and one 8 amp.—D. Pratt, G3MHS, 13 Rock Street, Upper Gornal, Dudley, Worcs.

**FOR SALE:** Oscilloscope, stabilised 2½in., with sine-wave-square-wave generator and PSU, in Eddystone cabinet, with handbook, £4 10s. Valve-voltmeter, with 200 microamp. 4½in. meter, mains, in aluminium case, with test leads, £3 10s. VHF frequency meter, 20 to 40 mc with harmonic amplifier, audio amplifier and 5 mc crystal calibrator, with special slow-motion dial and calibration chart, in cabinet, £2 10s. HF frequency meter, 3.5 to 3.8 mc with 100 kc calibrator, slow-motion dial, in cabinet, £2 10s. All these items home-built to professional standard and appearance. Converter for BBC/ITA, with built-in PSU, 20s. Absorption wave-meter BC-906D, 145 to 230 mc, with 500 microamp. meter, 30s. Front ends for receivers Type 76, 150 kc to 510 kc; Type 78, 2.4 to 13 mc and 100 kc xtal, IF 560 kc, with metered PSU, the lot £4 10s. Prefer collection, no packing available. Gone VHF.—G6AAR/T, QTHR.

## SMALL ADVERTISEMENTS, READERS—continued

**WANTED:** To buy, borrow or hire, Servicing Manu:is for Canadian Marconi Wireless Set No. 52; Hallicrafters S.27 Rx; R.1155 Receiver.—Sarginson, 1 Hallgarth View, Durham City.

**WANTED:** For R.1155 Rx, IF transformers or IF coils; or incomplete R.1155 containing these items.—S. Gaunt, G3PXJ, 43 Appian Close, Kings Heath, Birmingham 14.

**SALE:** Teletype 14 Teleprinter, commercially reconditioned, complete with 45 and 50 baud forks, £18. Bendix TA-12B transmitter, £3.—Mills, G3KUT, 6 Bowness Road, Catford, London, S.E.6.

**EXCHANGE:** A 24v. 15-watt transistor Public Address amplifier, with built in 4-way mixer, Reslo ribbon microphone, two 15in. re-entrant speakers, two 30in. exponential horn speakers, for HRO-MX or HRO-5, or sell amplifier at £18.—Fish, 358 Peppard Road, Reading (72015), Berks.

**SALE:** Labgear LG.300 transmitter, with matching PSU and modulator, in mint condition, price £49 o.n.o.? Can be seen and tested at this QTH.—G4IK, Woodlands, Leigh, Chard, Somerset. (Tel. Winsham 295.)

**SELLING:** Four heavy-duty super grade mains transformers, cheap. Details.—F. W. Hardstone, 43 Shrubbery Road, Streatham (8237), London, S.W.16. (Ring after 6.0 p.m.)

**OFFERING:** Minimitter Equipment, Exciter, PA, Q-Multiplier and LP Filter, Power transformers, HT and heater, all types; power supplies, valves, crystals, meters, Class-D Wavemeter, No. 10 Crystal Calibrator, P-E cells; and much other gear. Exchange some items, others must be sold.—J. Brown, Marlborough Farm, Falmouth, Cornwall.

**WANTED:** Circuit diagram Tiger TR-200 Tx. Also Tiger Z-match, or suitable ATU to match TR-200 to 5RV-type aerial.—G3OET, QTHR or ring Chelmsford 4967 home, 3656 business.

---

**WHAT IS ACSE 2A10**


---

**SALE:** K.W. Victor, 150-watt Tx, £45. Minimitter MR44/II receiver, £35. AR88LF, needs alignment, £20.—G3A0B, Strathleven, Toome Road, Ballymena, Co. Antrim, Northern Ireland.

**FOR SALE:** Lafayette Communication Receiver Kit, KT-320, complete. Offers?—Box No. 4242, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SELLING:** Gelloso VFO 4/102V, £5. Green & Davis two-metre converter, 4 to 6 mc IF, £5. Woden UM1 mod. xformer, 30s. AR88LF general coverage Rx, £30. Hallicrafters S.27, offers? Codar PR-30 Pre-selector, with PSU, £5. All in working order and offers considered.—G3TXA, 23 Ashridge Gardens, Palmers Green, London, N.13. (Tel. PAL 4592.)

**WANTED:** Super-Pro, BC-779 Rx, with manual. **SALE:** HRO dial, new, boxed and with fitting instructions, 35s. HQ-140X manual, 25s.—Box No. 4243, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** Radio Set Type 122 (miniature combined transmitter-receiver, ex-S.A.S.). Will pay up to £20 for model in good condition.—M. Gee, 11 Whitehorse Lane, Stepney, London, E.1.

**SALE:** Two-metre converter, £5. Two-metre pre-amp, with PSU, £3. Dependapac transistor PSU, £10. T.W. Fourmobile, £20. Minimitter 10-80m. converter, £6. Command Rx, 6 to 9 mc, £3. Also valves and meters (send s.a.e.).—Kidder, G3NZO, 44 Ingestone Road, Woodford Green, Essex.

**FOR SALE:** Postal Course for R.A.E., £6. Also Sony 8-transistor portable radio, 530 kc to 22 mc, as new, with tuning indicator and service data, £12.—Box No. 4246, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

## J. B. LOWE 115 Cavendish Road, J.B. Matlock, Derbyshire

**SPECIALS**

Wide spaced variables. Split stator about 175/175 pF .03 gap. Brand new surplus 12/6, post free.

1000 mF 12v. miniature capacitors brand new and not surplus, 1/3. Ceramics, etc. from 3d.

All kinds of lovely war surplus junk at low prices. Send me a s.a.e. and I'll send you a list of stuff.

**NEW STUFF IN STOCK****National**

NCX3 demonstrator c/w p.s.u., £150.

NCX5 Mk. 2, £235/10/1. A.C. p.s.u. £48/9/11. D.C. p.s.u. £57/1/7.

NC190, £97/4/2.

NC303 Demonstrator, £170.

HRO500, £705.

The NC303 is a dream Rx. A Hambander of the very highest quality and performance covering 160-10 and calibrated 6 and 2m. for converters. The HRO500 is a cut above the average transistor radio. I can't possibly describe it—I just look at it open-mouthed, green-eyed, and drool.

**Lafayette**

HA-350, 75 gns. HA-230, 33 gns. KT-340, 25 gns.

The HA-350 has become very popular—quite rightly so. Best value-for-money hambander on the market. The HA-230 although not particularly inspiring, I don't think you'll get any better at the price. The KT-340 (kit version of the HA-230) at 25 gns. must be classed as a best buy. O.K., so it drifts a bit—I'll sell you a voltage regulator for 6/-—1 And if you're really keen, gently insert a Lafayette Mechanical Filter (at £9/19/6 ex stock) just next to the mixer!

**OTHER NEW STUFF**

KW2000, £173. A.C. p.s.u., £32. Only 90 watts p.e.p. but a sweet little rig.

Swan 350 with A.C. p.s.u., £250. Bit more money, few more watts.

Carrying the National, KW and Swan in stock gives you the opportunity to see 'em all at one time, so if you are in the market for a transceiver why not call in one evening or week-end and look 'em over. Even if I don't sell you one we can always shoot the bull about DX and stuff. I personally like the NCX5 best, but by and large you get just about what you pay for.

Codar ATS, £16/10/-, A.C. p.s.u., £8. D.C. p.s.u., £11/5/-, a little gem, I like it.

Codar PR30X, £7/4/-. A preselector to give that old Rx some poop.

Electroniques: Coilpax valve hambander, £12/12/-. Just the thing for that really top notch Rx you're going to build one of these days (show Art Collins a thing or two, eh, laddie?). Having taken the plunge I will pester you to buy my Electroniques 85 kc/s. I.F.'s, HSO 1-6, HSO 350 and HSO 85 all at 12/6 each. By this time you're hooked, an addict! They come to my door at all hours begging for a "fix"—unshaven, trembling, the soldering iron dangling from nerveless fingers, bleary-eyed. "Bill," they croak furtively, "Can you fix me up with another 1-0 base—please, Bill, I gotta have it—" Holy Smoke, I get carried away a bit don't I. Probably a Freudian urge for self-expression—psychotic Bill, the nut on the hill!

Collins 7553B demonstrator, £275. Won't pick up the Light programme but otherwise is as Collins should be.

**SECOND-HAND**

Eddystone 840A. Mint. Magnificent dial and beautiful cabinet enclosing practically nothing, £25.

Scar SR550 Double conversion hambander 160-6m. as new. Not bad, not good, £50.

Eagle RX80. Again mint. Not a very good Rx, £35.

Lafayette HE80 mint. About as good or bad as the RX80 (about the same price too!), £35.

Eddystone EC10 virtually new. Much better than the Collins 'cos it gets the Light programme. Similar to the HRO500 (they both use transistors!). If I carry on like this maybe I'll get a buyer at £38 or v.n.o.

BC348. A good old clunker in excellent shape, £15.

**EQUIPMENT**

Heathkit V7A valve voltmeter kit. New £12.

52 Set power supplies 12v., 110v. and 250v., £2/10/-, carriage paid.

Power cables to connect the above to the 52 set, 7/6, post free.

Money refunded if not satisfactory (mind you, I usually reply "Dear Sir, your money is perfectly satisfactory, Yours faithfully."). Oh boy! it always amazes me that I ever sell anything!

In addition to the new equipment which I keep in stock, I have a constant stream of trade-ins so that in general I have as fine a collection of venerable old clunkers as you are likely to meet. If you are in the market for a Rx or Tx why not just drop me a line—s.a.e. will get you the latest stock amongst which you may well find what you are looking for at the right price.

TRADES: I honestly do my best to give you the best allowance in the business—if you don't believe me, a s.a.e. may convince you. To those prepared to contribute to the Credit Company Director's Next Rolls Royce, I can arrange H.P.

POSTAGE: I just give up—send plenty and I will refund the balance.

CRYSTALS		TRANSISTORS	
100 Kc/s. R.C.A. ...	15/-	Brand New 1st Grade	
500 Kc/s. 10X. ...	15/-	<b>MULLARD</b>	
100 + 1000 Kc/s. ...	22/6	AC107	12/6
1000 Kc/s. HC/6U ...	25/-	AF114	8/-
27.255 Kc/s. HC/6U ...	15/-	AF115	7/6
Over 600 types available from 100 Kc/s./50 meg.		AF116	7/-
Send 1/- for Lists		AF117	6/-
		AF118	17/6
		ADT140	15/-
		OC44	6/-
		OC45	4/-
		OC71*	4/-
		OC72*	6/6
		2N711A	15/-
		OC22*	15/-
		OC25*	12/-
		OC26*	7/6
		OC28*	17/6
		OC29*	17/6
		OC75*	6/-
		OC76*	4/-
		OC81*	6/6
		OC82*	8/-
		GET114*	5/-
		GET115	9/6
		GET116*	15/-
		OC83*	5/-
		OC84*	7/6
		OC170	7/6
		UC171	8/6
		AF139	19/6
		OC35*	15/-
		OC36*	15/-
		OC205	19/6
		AD140*	19/6
		AF186	27/6
		*Matched Pairs available Send for New List	

**HENRY'S RADIO Ltd.** PAD 1008/9  
303 Edgware Rd., London W.2 Mon.-Sat. 9-6 p.m. Thurs. 9-1 p.m.

**AERIAL MATCHING TUNING UNITS**  
These well-made tuning units, made for the American 19. Tx-Rx are housed in a metal case, green or brown, using a large precision calibrated scale, are an essential piece of equipment for the serious Tx or Rx operator. This unit will match an untuned wire or whip aerial to almost any short wave receiver or transmitter, exceptionally good for mobile Top Band use. This American version being well noted as far superior to any other. **GUARANTEED BRAND NEW, only 20/-, post 7/6.** Instructions supplied.

**JOHN'S RADIO**  
OLD CO.-OP., WHITEHALL RD., DRINGLINGTON, BRADFORD

**HALSON MOBILE ANTENNA**  
All-band System, £6 10s. with one coil  
Extra coils, £3 10s. each

**NEW! MOBILE DYNAMIC HEADSET**  
with boom mic., £4 10s.

**HALSON RADIO SERVICES**  
DOVER ROAD WORKS and 2 SEFTON STREET,  
BLACKPOOL (Tel. 20441)

**YUKAN SELF-SPRAY** SO PROFESSIONAL  
... THE YUKAN AEROSOL WAY!  
GET THIS AIR DRYING Hammer Finish

YUKAN Aerosol spraykit contains 16 ozs. fine quality durable easy instant spray. No stove baking required. Available in grey, blue, gold, bronze at 14/11 at our counter or 15/11, carr. paid, per push-button self-spray can. **SPECIAL OFFER:** 1 can plus optional transferable snap-on trigger handle (value 5/-) for 18/11, carr. paid.

Choice of 13 self-spray plain colours and primer (Motor car quality) also available.

Please enclose cheque or P.O. for total amount to:  
**YUKAN Dept. SWM/3**  
307a Edgware Rd., London, W.2

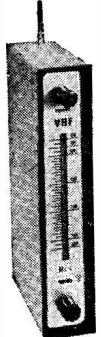
Open all day Saturday  
Closed Thursday afternoons

**TELECOM MK. II**  
Pocket size. V.H.F. 118-136 Mc/s

**AIRCRAFT-BAND TRANSISTOR RECEIVER**  
complete with telescopic aerial, loud-speaker and battery

£26.0.0  
carr. paid in U.K.

**BRITEC LIMITED**  
17 Charing Cross Road,  
London, WC2. Whitehall 3070



SMALL ADVERTISEMENTS, READERS—continued

**SALE:** TW2 two-metre station, Tx, converter, PSU, coax relay; also Labgear Topbander.—J. Brown, G3LPB, Marlborough Farm, Falmouth, Cornwall.

**SELLING:** Transmitter TCS-12, modified as "Short Wave Magazine," £6. Bendix MN-26C Rx, mains PSU, 150 to 1500 kc, IF 112 kc, used as Q5'er, £5. TN18/APN4 tuning unit, 300 to 1000 mc, IF 30 mc, £5. Range Calibrator 4807, with 23 valves including tunable klystron, mains, rack mounting, with 3-cm. horn, new, £6 10s. All carriage paid.—D. Spence, Dept. of Physics, The University, Newcastle-upon-Tyne, 1.

**OFFERING:** National NCX-3 Transceiver with NCX-A PSU, in excellent condition throughout, superb performance, £130 (all letters answered).—Box No. 4244, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** Eddystone EC-10, also 12v./300v. PSU. **SALE:** HRO-MX, with 9 coils, two BS, and PSU, £14; BC-348R, external PSU, £12; both excellent condition.—G2VO, Underhill, Glanbyon Drive, Keighley, Yorkshire.

**SALE:** Class-D Wavemeter, £3 5s. American matching ATU, 20s. Both brand new. Postage extra. Offers?—Stephenson, 82 Morris Lane, Leeds, 5, Yorkshire.

**WANTED:** Very early copies of "QST." prior to 1931; "CQ." prior to April, 1948; pre-war "Short Wave Magazine" and "Radio"; and any copies of "73"—G5LY, 33 Downs Road, Langley, Bucks.

**OFFERING:** An HRO, with PR-30 preselector, complete set of nine coils plus 40m. bandsread, PSU, speaker and spare valves, in excellent condition, £18 o.n.o.?—G. Hart, Lyon House, Bruton, Somerset.

**WANTED:** 80/160m. crystals, 10X type preferred. Frequencies and price to.—Box No. 4247, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** KW-76 receiver, 10-160m., with mains PSU, S-meter, Eddystone speaker, and Heathkit Q-multiplier, in mint condition. The lot for £27.—Yeo, 8 Bothwell Street, Edinburgh, 7.

**SELLING:** K.W. Vanguard, 10-80m.; simple 160m. modification kit available; unmarked as new. Price £35, no offers.—G3OLY, 6 Wheathill, Letchworth, Herts.

**SALE:** Receivers S.36, 27 to 146 mc, £16. BC-342, £11; R.107, £10. All in excellent condition. Taylor 45C Valve Tester; two Evershed Ohmmeters; CT53; Hunt signal generator; and other gear (s.a.e. details). Offers? **WANTED:** Marine radiotelephone.—Box No. 4248, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**LICENSED Amateur requires AR88 and Panda Cub, or similar types Rx/Tx. Faulty gear considered if repairable. Can collect 50 miles Lancashire.—Box No. 4245, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

**SALE:** Heathkit RA-1 receiver, little used, £30 o.n.o.?—N. Gaunt, 90 Nursery Gardens, Staines (51278), Middlesex.

**EXCHANGE:** Eddystone S.740 receiver, 600 kc to 30 mc, in good condition FOR a VHF Rx, such as S.27, S.36 or similar. Consider faulty specimen.—Chatterton, 88 Maple Road, Priory Estate, Dudley, Wores.

**FOR SALE:** An AR88LF, in good condition, £30 o.n.o.?—Clarke, 119 Brodie Avenue, Liverpool, 18. (Tel. Allerton 3123.)

**WANTED:** Tuning unit for Hallicrafters S.27, or u/s S.27 complete.—Senior, 1 Bedale Close, Coalville (2088), Leicester.

**SALE:** AR88D receiver, with R.C.A. manual, £40 o.n.o.? Minimitter MR44, with manual, £30. Both mint condition.—GW3LSB, Holcombe, Vicarage Avenue, Llandudno, Caernarvonshire, North Wales.

**FOR SALE:** Eddystone 840C receiver, in good condition, 14 months old, £45 o.n.o.?—Morphew, 17 Upland Road, Ipswich (77242), Suffolk.

SMALL ADVERTISEMENTS, READERS—continued

**SALE:** AR88D receiver, in excellent condition, £35. (H.P. possible.) QY3-125's, £2 each.—Bonnett, 28 Dale Park Road, London, S.E.19. (Tel. LIVINGSTONE 6190.)

**SELLING:** Geloso VFO 4/102, unused, soiled, valves but no dial, £2. Swinging choke, 5/25 Hy at 250 mA, 25s. Shrouded 8 Hy 250 mA choke, 15s. Fully potted oil-filled xformers: 500-0-500v. 250 mA, £2; 400-0-400v. 180 mA, 5v., 3/6·3v., 25s.; 360-0-360v. 150 mA, 5v., 4/6·3v., 20s. All plus post/packing. **EXCHANGE:** BS40 HRO coil for BS80, National make only.—G3RFB, 10 Hornet Road, Thorney Island, Emsworth, Hants.

**FOR SALE:** Crystal Calibrator No. 10, with mains PSU; also SWR bridge. Both in stove-enamel cases. £13 o.n.o.? Carriage paid.—G13SOO, 79 Prehen Park, Londonderry, Northern Ireland.

**SALE:** B2 Transmitter, with extra frequency formers, £5. Pair torque transmitters, 48lb.-in., 230v. 50 c/s, size 1/4rd h.p. motors, £7. Wilcox-Gay master oscillator (VFO), with 2 1/2 in. PA formers, £4. Type 114 Tx/Rx complete, with handbook, lined up on 70 mc, ready to go, only needs xtal, £6. Brand new BC-453, Q5'er, £5. Cowl-gill motor, 30s. Set six Eddystone 1 1/2 in. 6-pin coils and one 2 1/2 in. Eddystone PA coil, 20s.—G3LIA, QTHR. (Tel. Hatfield 4149 after 6.0 p.m.)

**SALE:** Hallicrafters SX-140 receiver, coverage 6 to 30mc., xtal calibrator, S-meter, with handbook, mint condition, £25. National SW-54 receiver, 500 kc to 30 mc, £8. Three RF ammeters, 0·5, 0·1 and 0·3 amp., 6s. each.—Gorman, 7 St. Anthony Road, Cardiff, South Wales.

**FOR SALE:** Power Unit Type RA34, in crackle AC cabinet 18in. x 20in. x 19in., input 115/230v. AC, output 1200v. at 400 mA and 14v. 3 amps. DC, both fully variable and metered, also 14v. 12 amp. AC. Fully relay operated, incorporating thermal delays and four circuit breakers, and using 866 rectifiers. Push-button control, with indicator lights. Several spare valves, cables, etc. Weighs 48lbs. and must have cost £100 to build. Price £15, carriage extra.—G5FH, QTHR.

WHAT IS AC SE 2A10

**FOR SALE:** BC-342 Rx, with S-meter, for 250v. AC, £18 10s. Transmitter, 35-watt, Geloso VFO/807 PA, 10-80 metres, separate 160m. Tx, £20. ATU and moni-match, 20s. Chassis punch kit, 30s. Numerous valves, speakers, etc. Offers and enquiries.—G3OOW, 102 Highbury Road, King's Heath, Birmingham, 14. (Tel. Highbury 3280.)

**DISPOSAL:** Echophone EC1B communications receiver, 560 kc to 30 mc, with bandsread and internal speaker, noise limiter, for AM/CW, price £10 10s. **WANTED:** Signal Generator.—Garth, Stagbury Avenue, Chipstead, Surrey. (Tel. Downland 54130.)

**SELLING:** Phasing-type SSB Tx for 20 and 80 metres, 6146 PA, with Vox and PSU built in; matching four-band Linear, 2/TT21, incorporating PSU; £40 the pair. Also G2DAF-type Rx, coverage 10-160m., with S-meter, noise limiter, etc., in CR-150 cabinet; fine performer and looks good; price £40. TCS-12 Tx, £8. LM-14 Frequency Meter, £16.—Short, 13 Lumley Avenue, Skegness (1623), Lincs.

**WANTED:** Drake-2B, preferably with Q-multiplier, speaker, etc.—GM3BQA, 19 Edinburgh Road, Cockenzie, East Lothian, Scotland. (Tel. Port Siton 331.)

**WANTED:** "Short Wave Magazine" for August 1958; buy, borrow or hire. **SALE:** Postal Course for R.A.E. (cost £10), price £4; gram. deck, with mic. and pre-amp., £3.—Box No. 4259, Short Wave Magazine, Ltd., 55 Victoria Street, London. S.W.1.



**For quick, easy faultless soldering**

Ersin Multicore 5-core solder is easy to use and economical. It contains 5 cores of non-corrosive flux, cleaning instantly heavily oxidised surfaces. No extra flux is required. Ersin Multicore Savbit Alloy considerably reduces the wear of copper soldering iron bits.



**HANDY SOLDER DISPENSER**

12 ft. of 18 s.w.g. SAVBIT alloy in a continuous coil, used direct from free-standing dispenser. **2/6 each**



**LOW TEMPERATURE SOLDER**

Size 9 pack contains 24 ft. of 60/40 high tin quality 22 s.w.g. **2/6 each**  
Size 10 pack 212 ft. 15/- each.



**SAVBIT SIZE 1 CARTON**

Contains approx. 30ft. of 18 s.w.g. SAVBIT alloy. Also available in 14 and 16 s.w.g. **5/- each**



**BIB WIRE STRIPPER AND CUTTER**

Strips insulation, cuts wire cleanly. Adjusts to any size. **4/- each**

Available from all Electrical and Hardware shops. If unobtainable write to:

**MULTICORE SOLDERS LTD.**

Multicore Works, Hemel Hempstead, Herts. Hemel Hempstead 3636 M.4B

**imhofs for eddystone**

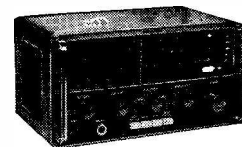


Imhofs are the main retail distributors for Eddystone communication receivers for the London area including The Pool of London. At Imhofs you can see, hear and compare all the most popular units in a new department entirely devoted to Eddystone equipment. You can order by post with complete confidence (U.K. delivery free) and all items can be sent abroad, tax free, under our "trouble-free" personal and direct export schemes.

Imhofs for individual attention, prompt supply and after sales service that is second to none.

see it now at Imhofs—

the new Eddystone EB35, transistorised receiver, covering VHF/FM, Long, Medium and Short waves. **NOW ONLY £59.7.6**



see also the Eddystone EC10 transistorised receiver for communications work, £48 come to Imhofs for other Eddystone receivers including EA12 £185 840C £66 940 £133

— also Eddystone die-cast instrument boxes and slow motion dials.



**Alfred Imhof Limited Museum 7878**

Dept. 11/3 112-116 New Oxford Street, London, W.C.1



## N. W. ELECTRICS G3MAX

**MARCONI R220 V.H.F. RECEIVER.** Single channel between 60-100 Mc/s., mains input, built-in loudspeaker. Ideal for modification to 4 metres. Supplied with circuit diagram but less Xtal and 5U4, £3/10/-, postage 7/6.

**KOKUSAI MECHANICAL FILTERS.** 455 Kc/s. Approximate bandwidths at 6 dB points 2.4 Kc/s. or 3.4 Kc/s., £9/5/-, post paid. Small type as used in the HA 350, £9/19/6, post paid.

Range of Aluminium Chassis 2½" high. S.A.E. for list.

72 and 300 ohm ribbon feeder, Flexible Conductors, 6d. yd., post 1/6 any length.

H.R.O. spares and power supplies in stock, S.A.E. for list.

Morse Keys, American Type J37, lead and jack plug, 5/-, p.p. 1/6.

Set of 4 valves for W1191 Wavemeter, 10/-, plus 2/6 p.p.

807 moulded valve holders, 6/- per doz., post paid.

0-002 and 0-01 µF metalmlite 1,000 volt, 6/- doz., post paid.

AF116 and 117 Mullard transistors, 4/- each, post paid.

Mullard BY100 800 P.I.V. .5A, 5/-, p.p. 6d.

Low resistance phones, 7/6. High resistance, 15/-, p.p. 2/-.

Noise Limiter Kit for TCS receiver, store soiled, 5/-, post paid.

AR88 Mains standby and AVC/N.L. switches, 4/- each, post paid.

**HALSON 3FIF MOBILE AERIALS.** £6/10/-.

### T.W. EQUIPMENT AVAILABLE

Range of **STANDARDS** and **H.F. XTALS** available  
**EDDYSTONE RECEIVERS AND COMPONENTS, CODAR, DENCO, REPANCO,** etc. We welcome all enquiries however small

Stamped addressed envelope please.

**52 GT. ANCOATS STREET  
MANCHESTER 4  
CENTRAL 6276**

## QUARTZ CRYSTAL UNITS

Hermetically sealed, Gold or Silver Electroded Crystals, post free at the following prices: each

Fundamental 3 Mc/s. to 15 Mc/s. at £1 5s. 0d.

Fundamental 15 Mc/s. to 20 Mc/s. at £1 10s. 0d.

Overtone 20 Mc/s. to 30 Mc/s. at £1 10s. 0d.

State holder type preferred — HC-6/U or FT243

## PROFESSIONALLY MADE FOR THE AMATEUR

Other frequencies available on request. Send cash with order stating your exact requirements.

These crystals are made to your order and are not Government surplus stock.

## CATHODEON CRYSTALS LTD. Linton, Cambridge

### SMALL ADVERTISEMENTS, READERS—continued

**WANTED:** Collins 75A type receiver, and DX-100U transmitter, or similar. **SALE:** AR88LF, £18; BC-348L, £10.—Beaumont, 8 Ashfield Avenue, Morley, Leeds, Yorkshire.

**SALE:** Hallicrafters HT-37 Tx, SSB/CW/AM, as new in original packing case, cost £215, price £115. Collins 75-A1 Rx, 3.1 kc mechanical filter, with auto-transformer, speaker and handbook, in FB condition, £110. Shure 444 mic. and base, £5. Woden mod. transformers: UM1, 20s.; UM2, £2; UM3, £3. SCR-522 mod. xformer, 15s. Class-D Wavemeter, 50s. Wattmeter, AF No. 1, laboratory instrument, £25 (write for details). DC voltmeter, 0-3500v., £2. "Short Wave Magazine," QST, "Bulletin," 1945-'65, 1s. each. Meters, valves, transformers, components, all cheap to clear.—GM3BQA, 19 Edinburgh Road, Cockenzie, East Lothian, Scotland. (Tel. Port Siton 331.)

**SALE:** New Q5'er, £5. Huge Hallicrafters power unit Type PE-110, with auto-transformer, £10. Taylor 47A Valve Tester, £10. Signal Generator, £4. TV Sig. Generator, £4.—Box No. 4249, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** Buy or borrow, manual for Receiver Type RAY-5, model PR7NA.—Smail, 2 Bright's Crescent, Edinburgh 9, Scotland.

**WANTED:** Grey 840A (£15 offered); 840C (£30 paid); 870A (£12 given); 940 (£60 offered).—Box No. 4250, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SELLING:** R.C.A. AR88D, with S-meter and manual, in excellent condition, price £40, carriage extra. R.A.E. postal course, with answers and Morse LP record, £10.—G3RCU, Japonica, Abbey Road, Sandbach, Cheshire.

**FOR SALE:** A 45ft. Tower, price £20. Buyer pays carriage.—Dutfield, Overton Grange, Ludlow, Shropshire.

**SELLING:** BC-348 Rx, with PSU, £15. Command Receivers: 500 kc to 1.5 mc, £4; 3.0 to 6.0 mc, and 6.0 to 9.0 mc, £2 10s. each. B.44 Mk. II, modified for 4 metres, £7. **WANTED:** Four-metre converter, IF 28 to 30 mc; receivers AR77 and 770R; CDR rotator.—Knight, G2FUU, Homefield, Upper Nazeing (2274), Essex.

**SALE:** Hallicrafters SX-24 Rx, completely rebuilt, with product detector, BFO, variable AGC, S-meter, amateur bandspread, ANL, coverage 540 kc to 44 mc, in FB condition, £12 o.n.o.?—Keeping, 11 Falcon Close, Langley Green, Crawley, Sussex.

**FOR SALE:** Racal RA-17L, 500 kc to 30 mc. R.C.A. AR-8516L, triple conversion, 80 kc to 30 mc, mint condition, £140. Collins R-278B, 220 to 400 mc. Transmitter T-216. Modulator/PSU MD-129A. Labgear LG.300. Hallicrafters S.27LA, 120 to 220 mc. CR-100, £18 10s. HRO, £18 10s. Two-metre converter, £5 10s. New AR88 spares: Dial, tools, gearbox, crystal, manual, etc. G.R. Sig. Generator, 7 mc to 330 mc, £12 10s.—Wright, 249 Sandy Lane, Hindley, Wigan (55948), Lancs.

**FOR SALE:** Codar CR-45 short-wave receiver, with all coils, plus speaker, £5.—Marriott, 21 Thorley Hill, Bishop's Stortford (4796), Herts.

**WANTED:** Eddystone 750 Rx, must be in good condition and reasonably priced; full details, please. **SALE:** New 30-watt modulation transformer, 30s.—Kellow, St. Dominic, Callington, Cornwall.

**WANTED:** VHF Receiver Type R.216, complete with PSU.—Whitty, Fourways, Morris Lane, Hallsall, Lancs.

**WANTED:** For historical record purposes: G.P.O. candlestick microphone; Ericsson headphones, 1939-'45 period; Admiralty B.34 receiver (Eddystone Type 358X). Working condition not important.—Box No. 4251, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**WANTED:** Receiver, either G2DAF, G3HTA, HRO, CR100 or similar.—G3UMV, 5 Highfield Crescent, Blackheath, Birmingham.

SMALL ADVERTISEMENTS, READERS—continued

**WANTED:** Woden UM1 mod. xformer. **SALE:** HRO bandspread coils, 10-20-40-80m., 15s. each. Also 50-100 kc and 100-200 HRO coilpacks at 10s. each. Round meters, 3in., 100 microamp., 15s. each. Xtals: 9025 kc, 1600 kc, on HC6/U base, 3s. 6d. each. Valves: U19, 5U4, 5s.; R17, 2s. 6d. Please add plenty for post/packing, will refund balance.—Taylor, G3NNW, 162A Birch Road, Rochdale, Lancs.

**SALE:** Mullard 5-10 RC amplifier, £14; ditto 3-3 RC amplifier, £10, or offers? Both brand new. Carriage paid.—Jones, 261 Richmond Road, Sheffield, 13, Yorkshire.

**MUST SELL:** Green & Davis Linear, in mint condition, not a scratch; overhauled not long ago by makers.—G3STL, 145 Benfleet Road, Hadleigh, Essex. (Tel. Southend-on-Sea 559246.)

**SALE:** Regulated PSU, 300v. 500 mA, complete with 7/EL34, 2/ECC83 and auxiliary 250v. Rx supply, with negative bias, less than 20 mV ripple, £15. Telescopic mast, in brass, 36ft., in excellent condition, £20. Absorption Wavemeter, 325 to 725 mc, with charts, £8. Complete HRO, but needs attention, £8. QY3-125, 20s. R.220 receiver, tunable over 4m., £2. 813, 25s. 12v./300v. 180 mA DC-DC converter, £6. Cedarwood shack, 9ft. x 6 ft., tiled floor, heat insulated, in excellent condition (cost £80), accept £40. Variac, 230v. 8 amp., needs rewind, £5. PSU, 1500v. 250 mA, less rectifiers, £4 10s. Offers considered on all items.—Box No. 4252, Short Wave Magazine, Ltd., 55 Victoria Street, London S.W.1.

**SELLING:** Panda PR-120V. Tx, in FB condition, complete with handbook, £28. Admiralty 5AH Tx. mod., AC/PSU, ATU, in good condition, with two handbooks, £10. Home-built Top Band Tx, FB reports (bulky), £5. All buyers collect.—G3UGE, QTHR. Tel. West Bromwich 0409.

**SALE:** G.E.C. BRT-400E receiver, in excellent condition, with handbook, price £40, carriage extra. Please write first.—Bassi, 13 Westbourne Crescent, Whitchurch, Cardiff, Glam., South Wales.

**WANTED:** Eddystone EC-10, in EXCHANGE for WAR88D with manual and voltage stabiliser (value £8 10s.).—15 Woodland Close, Sands, High Wycombe, Bucks.

**SALE:** Labgear LG.300 transmitter (new May 1963), with companion PSU and Modulator, in mint condition, £70. Buyer collects.—G3SZY, 8 Beechwood Road, Camp Hill Estate, Nuneaton, Warwickshire.

WHAT IS A CSE 2A10

**SALE:** Eddystone 840C, fitted Codar RQ-10X multiplier, PR-30 preselector, with muting, headphones and instructions, as new, £50. Delivery 100 miles.—G4PJ, QTHR. (Tel. Salcombe 2809.)

**DISPOSAL:** Heathkit RA-1, Rx, with xtal calibrator, almost new, £35. Home-built Geloso/807 30-watt CW Tx (no case), TVI-free, £14. Field strength meter, 50s. Home-built SWR meter, 10s. Dummy load, 10s. Testmeter, giving ohms and AC/DC volts, £3. G5RV aerial, £3. New "ARRL Handbook," 20s. T/R switch, 6/36, in box, 10s. Douglas LT xformer tapped 0-30v., 10s. Command Rx, 6-0 to 9-1 mc, less RF coils, 10s., with "Surplus Conversion Manual," 15s. Spares in Lots, real bargain, £3; s.a.e. with enquiries.—M. Cruttwell, 22 S.A.S., Bradbury Lines, Hereford.

**SALE:** Eddystone percentage-modulation meter, with five coils, £4 10s. SWR meter, 75-ohm, £4. Foster dynamic mic., £3. A.P.100386 TU and AP.66863 PSU, £10. Creed auto-Tx, current model 6S6M, £40.—Box No. 4261, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

G3ZY

G3ZY

**J. & A. TWEEDY (ELECTRONIC SUPPLIES) LTD.**

Appointed Dealers for  
**EDDYSTONE, KW, GREEN, CODAR, etc.**

**EDDYSTONE MODELS**

EB35, £59/7/6; EC 10, £48; 840C, £66; EA 12, £185; Edo-meter, £19/10/-; Dials, etc.

**GREEN E.C.E. LTD.**

CTX2, 14 gns.; CTX4, 14 gns.; CTR 70, £20; TMR-5, £35; rtk.V converters 4 mtrs., £10; 2 mtrs., £12; 70cm., £18.

**IMPORTED**

Starr SR550 d/shet ham bands, 58 gns.; Lafayette HA.350 xtal controlled, 75 gns.

**USED EQUIPMENT**

RXs: Eagle RX80, £30; Mosley CM1 with matching spkr, £55. TXs: "Sphinx," £55; KVV topbander, £18/10/-; Tiger Tigger with p.s.u., £20; DX35 with vfu vfo, £25; Olympic T/150 (as new), £65.

**VALVEHOLDERS**

(Postage 6d. extra)  
B7G pfe, 6d.; B7G with skirt, 7d.; B9A (McMurdo), 9d.; 10 ceramic, 6d.

H.P. TERMS AVAILABLE

**KW MODELS**

2000 ssb transceiver, £173; A.C. p.s.u., £32; D.C. p.s.u., £32; 2000A ssb transceiver, £195; A.C. p.s.u. £40; D.C. p.s.u., £40; 600 linear amplifier with p.s.u., £105; Vespa ssb/cw/am TX, £110; A.C. p.s.u., £25.

**CODAR**

PR30 preselector, £5/10/-; PR30X, £7/4/-; RQ10 Q mult., £6/15/-; RQ10X, £8/8/-; AT5 TX, £16/10/-; A.C. p.s.u., £8; D.C. p.s.u., £11/5/-; CR70A RX, £19/10/-; T28 RX 160/80 metre transistorised, £15/10/-.

**EX WD**

Class D wavemeters, 78/9 + 7/6 carr.; No. 10 calibrators, £4/4/- + 4/6 carr.

**TRANSISTORS (Post Free)**

OC26, 7/-; OC44, OC45, 2/6; OC71, OC72, 3/-; OC81, OC81D, OC82, OC82D, 2/3; AF114, 4/-; AF115, AF116, 3/6; EF117, 3/3; OC170, 3/-; OC171, 4/-; Matched sets 1 x OC81D + 2 x OC81, 1 x OC44 + 2 x OC45, 1 x OC82D + 2 x OC82 all at 9/- per set.

64 Lordsmill Street, Chesterfield, Derbyshire

Tel.: Chesterfield 5982 or Holmewood 506 (Evenings)

**HAMMERITE HAMMER PATTERN BRUSH PAINT**

The pattern is in the tin! All you do is brush it on

2 1/2 oz. tins 3/6	1/2 gallon 35/-*
1/2 pint 7/6	1 gallon 58/-*
1 pint 15/-	(*sent by road)

Colours: Blue, Silver or Metallic Black

CARRIAGE: Orders up to 5/-, 9d.; up to 10/-, 1/9; over 10/-, 2/9.  
RETURN OF POST SERVICE, Monday to Friday.

From your component shop or direct from manufacturers:

**FINNIGAN SPECIALITY PAINTS (SW)**

MICKLEY SQUARE, STOCKFIELD, NORTHUMBERLAND

Tel.: Stockfield 2280

THE **Radio Constructor**

The March issue, ON SALE NOW, features

**"DUAL-CONVERSION SUPERHET for 2 metres"**

by D. J. Bunn, G3OEQ

From your newsagent 2s. 3d. per copy  
or 2s. 9d. post paid from:

**DATA PUBLICATIONS LTD., 57 MAIDA VALE, LONDON, W.9.**

## SMALL ADVERTISEMENTS, READERS—continued

**SELLING:** Eddystone 888 Receiver, in good condition, price £45.—Currah, 26 Priory Road, Chelmsford, Essex. (Tel. Danbury 2329.)

**MUST Sell:** Lafayette HA-350 with xtal calibrator, five months old, offers around £65. Also a professionally built SB-10U, around £30. Both quite perfect and indistinguishable from new.—G3GHE, QTHR.

**FOR SALE:** Double-beam Oscilloscope Type 13A, by Hartley Electromotives, Ltd., 110/230v. AC, complete with probe and all necessary connections, £17 10s., buyer collects or carriage extra.—Gibb, 78 Halbeath Road, Dunfermline, Fife, Scotland.

**SELLING:** G2DAF Mk. II transmitter, with mechanical filter and 2/6146B's, completed but not fully tested, built to highest standards, in de-luxe cabinet with PSU, price £45. Also an HRO Senior, rebuilt to use mechanical filter, identical circuit to G2DAF Rx after 455 kc IF stage, with all bandspread coils and switchable Sidebands, etc., £30 o.n.o.—Jagger, 27 Penmaen Walk, Culverhouse Cross, Cardiff, Glam., South Wales. (Tel. Wenvoe 454.)

**WANTED:** G2DAF Rx, working condition or part constructed. Details to:—G3RQS, 15 Ellenborough Road, Bishop's Cleeve, Cheltenham, Glos.

**SALE:** Hallicrafters HT-40, 75 watt AM/CW Tx, coverage 10-80m., factory built, used few hours only, in immaculate condition, £25. Matching receiver SX-140, £25. The pair, £45. HRO-MX, with PSU and all bandspread coils (except 15m.), also broadcast coils, £20. Manuals included.—GM3AWW, 23 Poplar Avenue, Newton Mearns, Renfrewshire, Scotland. (Tel. 041 NEW 2370.)

**SALE:** Valves QQV03-10, all tested, 5s. each plus 6d. postage and packing per valve.—Box No. 4260, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**FOR SALE:** K.W. Vanguard, 10 to 160 metres, factory built, £48. Receiver R.1475, with spare plug-in units and circuit diagram, needs some attention, £8. Units RF-26, 15s.; RF-25 (no valves), 12s.—G3SVI, QTHR. (Tel. Brentwood 2119, 9 a.m. to 6 p.m.)

**SALE:** Pye PCR receiver, as new, needs external PSU, £8 o.n.o.? Send s.a.e. to:—Kinnesly-Taylor, School House, Durham School, Durham.

**OFFERING:** Geloso 4/103 two-metre VFO, complete and in unused condition, offers or EXCHANGE Small Top Band Tx, or W.H.Y.—Box No. 4254, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** Labgear LG.300 150-watt transmitter, in excellent condition, £35. Home-built 120-watt modulator to suit, on 19in. rack panel, using 2/6146 and UM3, with high level clipper and splatter filter, £17 10s. No PSU's for either but suitable transformer available to power both, if required. Also T.W. Top Band "Communicator" mobile Tx/Rx, complete with built-in transistor PSU and G3FIF whip, £40. **WANTED:** Good AR88D.—G3TCX, QTHR (Birmingham). Tel. EAS 1832 day, or STE 4906, evening.

**SALE or EXCHANGE:** Complete Mobile rig: AT5 Tx, 12v. transistor PSU, remote-control unit, Labgear 160m. converter, Minimitter whip, all leads, perfect, with data. Also CR-100 with S-meter; BC-224H with built-in AC/PSU; modified B.44, Mk. III; all in good order. G3HSC Morse LP recorder and 450ft. Morse tape. **WANTED:** Good amateur-band Receiver. All replies answered. Transport by arrangement.—G3UEV, 94 Heysham Road, Southport, Lancs.

**SELLING:** Lafayette HE-80, £34; will deliver 50 miles. Woden UM2 mod. transformer and matching PTM21, £5. New boxed 4X150A, £2. 4/TZ40, 3/GU50 and 3/3E29, offers?—G3DOV, 3 Walnut Grove, Dereham Road, Watton, Norfolk.

**WANTED:** Hallicrafters HT-32B transmitter; must be perfect. Top price will be paid.—Box No. 4256, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** Two double-beam oscilloscopes, nearly new condition, with manuals: Solartron CD.711-S2, £75; Cossor 2000, £60.—Tel. Maldon (Essex) 204.

**FOR SALE:** Eddystone 840A receiver, 480 kc to 30 mc, unmodified and in good condition, with circuit diagram, £31 or nearest offer. Buyer collects.—Ambler, 54 Vesey Close, Water Orton, Colleshill, Birmingham.

**SELLING:** Minimitter Mercury Transmitter, in excellent condition. Best offer over £35 secures.—Box No. 4255, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**SALE:** ZC1 Mk. I, 160-metre, with pi-output, modified for xtal mike, AC or battery operation, with AC/PSU, £5. 640 vibrator power pack, 6v., 20s. CR-100 manuals, 20s. HRO crystal filter complete, 20s. Rectifier unit fitted 2/GU50's, with two spares, 20s. "Bulletins," unbound, '57 to '64, offers? Carriage extra all items. —Lyll, Ewart, Wooler, Northumberland.

**WANTED:** Panda PR-120V, Heathkit DX-100U or any similar table-top transmitter in good condition. Prepared to collect any distance. Write giving full details and price required.—Box No. 4257, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

**FOR SALE:** Eddystone 840C receiver in mint condition, price £45. Will deliver 50 miles.—Fill, Candleford, Brook Close, Packington, Leicestershire.

**SELLING:** Hallicrafters HT-32A, with Shure microphone, price £140. Hallicrafters HT-41 Linear amplifier with spare valves, £150. Hammarlund HQ-170 Rx, Telechron timer fitted, price £95. For quick sale all three pieces, with spares, etc., £350.—Box No. 4258, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

## MORSE MADE EASY !!

The famous RHYTHM RECORDED COURSE cuts practice time down to an absolute minimum!  
One student, aged 20, took only 13 DAYS and another, aged 71, took 6 WEEKS to obtain a G.P.O. pass certificate. If you wish to read Morse easily and naturally, please enclose 8d. in stamps for full explanatory booklet to:

G3HSC, 45 Green Lane, Purley, Surrey

### MULLARD TRANSISTORS, BRAND NEW and GUARANTEED

AUY10.	100 Mc/s.	4-5W.	...	...	...	29/6
OC170.	120 Mc/s.	...	...	...	...	5/6
OC201.	3 Mc/s.	silicon	...	...	...	7/6
BY X22-600.	Silicon diode	PIV 600v. 1A.	...	...	...	6/6
OC41, OC42, OC45, OC71	...	...	...	...	...	3/-

Post Free.

S.A.E. Complete List.

### E.M.S.A.C. LTD.

Dept. S. 73 FRENCHGATE, RICHMOND, YORKSHIRE

The following equipment at reduced prices. All items have been completely brought up to the specification of their later counterparts in our Test Department.

2-off CTX-4 Mk. I (4m., 20w. CW TX)	...	...	£7
6-off CTX-2 Mk. I (2m., 20w. CW TX)	...	...	£7
5-off 2m. Converter Mk. IIIA. Any I.F. These Converters are the last of a small batch of the latest version Mk. III	...	...	£8
2-off CTR-70 Mk. I completely rebuilt 8w. 70 cm. Trip-Amp. Electrically identical to latest CTR-70 (new QQV02-6's)	...	...	£12
2-off 60w. D.C.-D.C. 300v./12v. Transistor Converters	...	...	£6.10.0

In the range of second-hand equipment available, is included a PGLA-1 500w. Sideband Linear. This has been brought up to LA-600 specification £85 (incl. new 7094).

Undamaged 2 metre J-Beam eight over eight, £5.

Consult us for coax, beams, mics, guy cord, mobile aerials, etc.

Special 2M1000. QQV07-50 p.a. (105w. output) 6146B modulators. Shure 201 mike, fully screened p.a. compartment, £125 complete. 70CM1000 with QQV07-50 p.a. (60-70 watts output), £75. If bought together, £175.

GREEN E.C.E. LTD., 79-91 BRAEMAR ROAD, N.15. STA 1387

# SWAN THE MOST RELIABLE AMATEUR TRANSCEIVER EVER MANUFACTURED. ASK THE AMATEUR WHO OWNS ONE

Sideband suppression :  
40 dB.

Carrier suppression :  
50 dB.

Lower sideband 80m.-  
40m.

Upper 20-15-10m. (oppo-  
site sideband kit avail-  
able).



Full range of accessories :

100 Kc. calibrator kit £9. 10

Opposite sideband kit £8. 15

Transistor V.O.X. ... £16. 0

Remote V.F.O. with 22  
adaptor for up to  
200 Kc. split fre-  
quency working ... £50. 0

Remote V.F.O. with 22  
adaptor for full  
band split frequency  
working ... £70. 0

Basic transceiver with A.C. supply/speaker, £250

● Big Signal well in excess of 400w. P.E.P. SSB, up to 320w. C.W., 125w. A.M.

Precision dual ratio tuning.

Full coverage of all bands 80-10 Mtrs.

Immediate delivery. Top allowances on modern  
trade-in equipment.

First class after sales service.

Latest brochures available from your supplier.

We have now appointed G. W. Smith & Co. as your  
Central-London Agents. Also J. B. Lowe, 115 Cavendish  
Road, Matlock, Derbyshire, for the Midlands.

**PETER SEYMOUR LTD**

410 BEVERLEY ROAD, HULL, YORKSHIRE

Tel. 41938 (43353 after 7.30)

## MAPS

### AMATEUR RADIO MAP OF WORLD

Mercator Projection — Much  
DX Information — In Colour.  
Second Edition, 8s. 6d.

### DX ZONE MAP

(New edition) 14s. 9d.

### RADIO AMATEUR MAP OF THE U.S.A.

State boundaries and prefixes,  
size 16in. by 36in., paper, 4s. 9d.

### RADIO AMATEUR'S WORLD ATLAS

In booklet form, Mercator  
projection, for desk use.  
Gives Zones and Prefixes, 10s. 9d.

## CALL BOOKS

"G's" only, 6s. 7d.

### SPRING EDITION (available end of March)

"DX Listings," 27s. "U.S. Listings," 45s.  
The two together, covering the World, 67/6

## LOG BOOKS

### A.R.R.L.

(Spiral bound), 8s. 6d.

### A.R.R.L.

(Minilog) 4in. by 6in., 5s. 6d.

### R.S.G.B.

(Replaces Webbs Type),  
7s. 3d.

## MORSE COURSES

G3HSC Rhythm Method of Morse Tuition

Complete Course with three 3 speed  
L.P. records + books ... 84/-

Beginner's Course with two 3 speed  
L.P. records + books ... 60/6

Single, Advanced (9-42) or Beginners  
(0-15 w.p.m.) + books ... 50/-

Three speed simulated GPO test. 7in.  
d.s. E.P. record ... 11/6

R.S.G.B. Morse Instruction Tape (900ft.) 35/-

R.S.G.B. Morse Practice Tape (450ft.) ... 20/-  
(both at 3 3/4 i.p.s., up to 14 w.p.m.)

Available from **SHORT WAVE MAGAZINE**

Publications Dept., 55 Victoria Street., London S.W.1 · Abbey 5341



# Better quality Equipment—at low cost

by BUILDING ANY HEATHKIT MODEL



**AMATEUR BANDS RECEIVER, Model RA-1.** Covers all amateur bands 10-160 metres. Half-lattice crystal filter at 1.6 Mc/s. I.F. Provision for fixed, portable or mobile uses. Switched USB and LSB for SSB. £39. 6. 6 Kit £52. 10. Assembled

OPTIONAL EXTRAS. Crystal Calibrator CL-1 £4. 12. 0 Kit. Loudspeaker Cabinet SG-4 £1. 9. 6. Loudspeaker £1. 4. 5 incl. P.T.

**AMATEUR TRANSMITTER, Model DX-40U.** From 80-10 m. Power input 75 W. CW., 60 W. peak, C.C. phone. Output 40 W. to aerial. £33. 19. 0 Kit £45. 8. 0 Assembled

**S.S.B. ADAPTOR, Model SB-10U.** For use with most A.M. transmitters. Less than 3 W. R.F. input power required for 10 W. output. Operation on 80, 40, 20, 15 and 10 m. on U.S.B., L.B.S. or D.S.B. £39. 5. 0 Kit £54. 18. 0 Assembled

**"MOHICAN" GENERAL COVERAGE RECEIVER, Model GC-1U.** In the forefront of design with 4 piezo-electric transistors, 10 transistors, variable tuned B.F.O. and Zener diode stabiliser. £37. 17. 6 Kit £45. 17. 6 Assembled

Suitable Battery Eliminator, Model UBE-1 £2. 17. 6 Kit

**REFLECTED POWER METER, Model HM-11U.** Indicates Antenna/Transmitter match. £8. 5. 0 Kit £10. 10. 0 Assembled

**HIGH-SENSITIVITY GENERAL COVERAGE RECEIVER, Model RG-1.** A high performance, low cost receiver for the discriminating short-wave listener. Frequency coverage from 600 Kc/s. to 1.5 Mc/s. and 1.7 Mc/s. to 32 Mc/s. Send for details. £39. 16. 0 Kit £53. 0. 0 Assembled



**AMATEUR TRANSMITTER, Model DX-100U.** Covers all amateur bands from 160-10 metres, 150 watts D.C. input. Own power supply. £79. 10. 0 Kit £104. 15. 0 Assembled

**Q MULTIPLIER KIT, Model QPM-1.** May be used with receivers having 450-470 Kc/s. I.F. Provides either additional selectivity or signal rejection. Self powered. Model QPM-16 for 1.6 Mc/s. I.F. Either model £8. 10. 0 Kit £12. 14. 0 Assembled

**GRID-DIP METER, Model GD-1U.** Continuous coverage 1.8 to 250 Mc/s. Self-contained. £10. 19. 6 Kit £13. 19. 6 Assembled

**VARIABLE FREQ. OSCILLATOR, Model VF-1U.** Calibrated 160-10m. fund. outputs on 160 and 40 m. Ideal for our DX-40U and similar TX. £10. 17. 6 Kit £15. 19. 6 Assembled

Please send for the **FREE** British Heathkit catalogue

## AMERICAN HEATHKIT SSB EQUIPMENT "The world's most advanced Amateur Equipment"

Prices quoted include duty, carriage and current import levy



Monitor Scope, HO-10E



Transceiver HW-12



Receiver SB-300E



Transmitter, SB-400E

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

Models HW-12 (80m.), HW-22 (40m.), HW-32 (20m.) £66. 0. 0 either Kit £4. 0. 0 Assembled

GH12. Push Talk Microphone

**3" MONITOR SCOPE, Model HO-10E.** A must for the SSB station. Gives at-a-glance, visual indication of your transmitted signal and the incoming signal, displaying envelope patterns. Built-in two-tone generator ensures a clean output signal. Power Req.: 115/230v. A.C. 50/60 c/s. £38. 10. 0 Kit

**"CANTENNA" TRANSMITTER DUMMY LOAD, Model HN-31.** Simplifies servicing and testing. £5. 15. 0

**NEW! 80-10m. TRANSCEIVER, Model SB-100.** Send for full details. £198. 0. 0 Kit

Suitable Power Supply, Model H.P.23. £24. 10. 0 Kit

**AMATEUR BANDS 80-10m. RECEIVER, Model SB-300E.** This de-luxe receiver offers unsurpassed value to the Radio Amateur. Of advanced concept, employing up-to-date design and construction techniques, its ultimate specification ensures unparalleled performance. Full specification and details on request. Weight 22lb. Power Req.: 115/230v. A.C. 50/60 c/s. 50 watt. Size: 17 $\frac{1}{2}$ " x 6 $\frac{1}{2}$ " x 13 $\frac{1}{2}$ ". £139. 0. 0 Kit (Less speaker)

**AMATEUR TRANSMITTER, Model SB-400E.** This transmitter is designed for "lock-in" facility with the SB-300E. A self-powered filter type Tx covering the "Amateur" bands, 80 to 10 m. with a P.E.P. of 180 watts. Weight 33lb. Power Req.: 115/230v. A.C. 50/60 c/s. Size: 14 $\frac{1}{2}$ " x 6 $\frac{1}{2}$ " x 13 $\frac{1}{2}$ ". £179. 0. 0 Kit

**LINEAR AMPLIFIER, Model SB-200.** Covers 80-10m. 1200 W. P.E.P. input SSB—1000 W. C.W. Solid state power supply. 120 or 240v. A.C. £112. 0. 0 Kit

**THE WORLD'S SMALLEST KILOWATT LINEAR.** The Heathkit, model HA-14. 80-10m. Provides 1000 W. P.E.P. input power. Size only 3 $\frac{1}{2}$ " x 12 $\frac{1}{2}$ " x 10 $\frac{1}{2}$ " deep. Weight 9lb. Power supply available. £56. 5. 0 Kit

To **DAYSTROM Ltd., Dept. SW-3 Gloucester, England**

Please send me

**FREE BRITISH HEATHKIT CATALOGUE** (Yes/No)

**AMATEUR RADIO BROCHURE** (Yes/No)

**American Heathkit Catalogue, 1/-** ... (Yes/No)

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

NAME .....

(Block Capitals)

ADDRESS .....

SW3

### WELCOME TO OUR LONDON HEATHKIT CENTRE

In response to the request of many customers, we have opened a showroom and retail stores at 237 Tottenham Court Road.

WHEN YOU ARE IN TOWN, WE HOPE THAT YOU WILL VISIT US THERE.

FREE brochure describing the range of BRITISH AND AMERICAN AMATEUR RADIO GEAR available on request.