

The
SHORT WAVE
Magazine

4/6
22½p

VOL. XXIX

MARCH, 1971

NUMBER 1

17 ½
22 ½
4
44 0



WORLD WIDE COMMUNICATION

KW ATLANTA MARK II

for a new
low price of
£198 with AC
power supply
quality and
reliability
maintained



- Extremely good audio (crystal filters fitted)
- 500 watt PEP SSB Transceiver
- Operation on all amateur bands from 10 to 80 metres
- Plug-in VFO Unit available separately

Carriage Extra

KW 2000B

The only transceiver
with Top band

plus

Contest winner "CQ Top"
Band section winner -
VE3BS - used a KW2000B.

10-80 metre band



SSB TRANSCEIVER

180 watts PEP 10-160 metres, complete
with AC PSU, VOX P.T.T., I.R.T/I.T.T.
£220 carriage extra

- Two speed VFO drive
- Improved VFO Read-out
- New, precise metering
- Attractive panel layout

Coming soon — the KW 202 receiver with matching
KW204 transmitter, KW105 Antenna tuning system.

NEW KW PRODUCTS

KW 101 - standing-wave-ratio indicator
KW 103 SWR indicator / power meter
(0-100 & 1000 watts)
KW Trap Dipole fitted with 75 ohm heavy
duty twin feeder.



K. W. ELECTRONICS LIMITED

1 HEATH STREET, DARTFORD, KENT

TELEPHONE: DARTFORD 25574.

CABLES: KAYDUBLEW DARTFORD

EASY TERMS ON EQUIPMENT AVAILABLE OVER 12, 18 OR 24 MONTHS

R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

HAMMARLUND HQ-170	£125.00 (£1-50)
R.C.A. AR88D	£45.00 (£2-00)
R.C.A. AR88L	£50.00 (£2-00)
MARONI CR100	£31.00 (£2-00)
TRIO 9R-50-DE	£37.00 (£1-00)
HEATHKIT DX-40 + VFO	£40.00 (£2-00)
KW VESPA Mk. 2 + A.C. p.s.u.	£95.00 (£1-50)
REDIFON R50M + p.s.u.	£90.00 (£3-00)
NATIONAL HRO-500	£450.00 (£2-00)
CODAR CR70A	£18.00 (75p)
KW-201	£90.00 (£1-50)
KW2000A + A.C. p.s.u.	£185.00 (£2-00)
HALLICRAFTERS SX-100	£100.00 (£1-50)
HEATHKIT RA-1	£35.00 (£1-25)
HEATHKIT RG-1	£33.00 (£1-25)
EDDYSTONE 770U/II	£125.00 (£2-00)
EDDYSTONE 940	£125.00 (£1-50)

WE CAN ALSO SUPPLY ANY MAKE OF NEW EQUIPMENT—and have pleasure in giving a few examples which are normally in stock—

ANGLIA, 2 metre converters (state I.F. required), £15-00 (30p).
 AVOMETERS, Model 7, Mk. 2, £37-00; Model 8, Mk. 4, £40-90; Model 9, Mk. 4, £40-90; Model 40, Mk. 2, £37-60; Multiminor, Mk. 4, £13-80;
 Standard leather carrying case (Models 7, 8, 9, 40), £6-50; Every-Ready ditto, £7-40; Multiminor leather case, £3-30; 10KV D.C. Multiplier for Model 8 or 9, £6-10; 30KV D.C. ditto, £9-90; Pair of Long Reach Safety Clips, £1-50; Model EA113 Electronic Avo, £62-00. All above post free in U.K. Trade and Educational enquiries invited.

S. G. BROWN'S HEADPHONES, Type "P" 120 ohms, 2,000 ohms, 4,000 ohms, £4-95 (25p); Rubber earpads for same, 45p per pair. Type 3C/1100 Noise excluding (with superb fitting), high quality, electro-dynamic, £7-55 (25p). Standard Jack Plugs, 22p (4p).

EDDYSTONE EQUIPMENT, Receivers, 8307, £340-00; EA12, £205-00; EC10/2, £74-50; EC10/1, £44-50; EB35/2, £78-00 + £1-45p.t.; EB35/2 Stereo, £85-50 + £23-00 p.t.; 924 A.C. mains p.s.u., £7-75 (50p); Doublet Aerial, 731/1, £5-28 (50p); Plinth Speaker, 906, £4-67 (50p); General Purpose Speaker, 935, £3-71 (40p); Edometer, 902 Mk. 2, £29-50 (30p); Telescopic Aerial, LP.3126, £2-50 (25p); Diecast Boxes, from 45p (10p). Brochure on request.

CODAR EQUIPMENT, ATS, £19-50 (35p); 250/S, £11-00 (65p); CR70A, £23-50 (45p); T28, £17-50 (25p); PR30, £7-50 (25p); PR30X, £9-50 (25p); 12M/S, £11-50 (40p); 12/RC, £2-50 (15p); RQ10X, £9-00 (35p). Leaflets on request.

PARTRIDGE "JOYSTICKS," Lightweight, £6-75 (40p); De-Luxe, £6-55 (40p); Standard, £5-50 (40p); Junior, £4-20 (40p). "JOYMATCH" LO-2, £7-95 (25p); 4RF, £7-10 (25p); SM, £5-50 (25p); 3A, £4-20 (25p). Literature on request.

SHURE MICROPHONES, 44AT, £14-00 (40p); 44A, £12-00 (40p); 401A, £4-25 (30p); 201, £5-10 (30p). Full details on request.

Our latest list of over 50 receivers, and many other interesting items sent free upon receipt of your s.a.e. CARRIAGE for England, Scotland and Wales shown in brackets. TERMS: C.W.O., Approved Monthly Accounts, Hire Purchase and Part Exchange. Special facilities for export. Enquiries invited.

- At R.T. & I.
- ★ We have full H.P. facilities
- ★ Part exchanges are a pleasure
- ★ We purchase for cash
- ★ We offer a first-class overhaul service for your electronic equipment, whether you are an amateur or professional user
- ★ We have EASY Parking facilities
- ★ We welcome your enquiries for specific items which, although not advertised, may very well be in stock.

TRIO EQUIPMENT, Transceiver, TS-510 + PS-510 a.c. p.s.u., £180-00 (£2-00); VFO-5D for above, £32-00 (50p); Receivers, JR-599, £185-00 (£1-00); JR-310, £77-50 (£1-00); JR-500-SE, £65-00 (£1-00); 9R-59-DS, £42-50 (50p); SP-5D Loudspeaker, £4-37 (40p); Headphones, HS-4, £5-97 (20p). Leaflets available.

OFFICIALLY APPOINTED K.W. AGENTS

KW EQUIPMENT, KW2000B + A.C. p.s.u., £220-00 (£2-00); D.C. p.s.u. for KW2000B, £44-00 (50p); KW2000B only, £180-00 (£1-50); KW ATLANTA + A.C. p.s.u., £198-00 (£2-00); Remote V.F.O. for Atlanta, £32-00 (50p); VOX unit for Atlanta, £7-50 (25p); Remote V.F.O. for 2000B, £35-00 (50p); KW1000 Linear amplifier, £125-00 (£1-50); KW201 Receiver-crystal cal., £111-00 (£1-50); KW VESPA, Mk. 2 + A.C. p.s.u., £135-00 (£2-00); KW202 Receiver, £125-00 (£1-50); KW204 Transmitter, £135-00 (£2-00); KW105 combined E-Z Match, VSWR indicator, dummy load, and ant. switch (4 outlets), £28-00 (50p); KW103, VSWR and power meter, 52 ohms, £12-50 (45p); KW101, VSWR meter, 52 or 75 ohms, £9-25 (30p); also E-Z match, dummy load, trap dipoles, etc., etc. Details on request.

R. T. & I. ELECTRONICS LTD.

Ashville Old Hall, Ashville Road, London, E.11 Tel: 01-539 4986

AMATEUR ELECTRONICS G3FIK

TRIO COMMUNICATIONS EQUIPMENT FROM STOCK
 YAESU MUSEN COMMUNICATIONS EQUIPMENT FROM STOCK
 KW COMMUNICATIONS EQUIPMENT FROM STOCK

We are now carrying extensive stocks of all items in the above manufacturers' range of products and our object is to give our customers a wide choice of equipment, readily available and with excellent demonstration facilities for the caller on any individual item. Attractive credit facilities are available on all sales and part-exchanges are welcomed.

Owing to present postal difficulties we are repeating last month's advertisement with the addition of one or two items recently to hand.
 RCA 8516L. Receiver in most excellent condition ... £145.
 HAMMARLUND HQ 180 AX receiver absolutely mint, £145
 EDDYSTONE S640. Receiver. mint ... £30

NATIONAL NCX-3. This transceiver has a deservedly high reputation and the one on offer is in exceptional condition throughout ...	110	0	0	MINIMITTER TOP 2-7 TRANSMITTER. 160, 80 and 40. Mint ...	21	0	0
TRIO TS-500. In unmarked original condition and with three months' guarantee ...	132	10	0	LAFAYETTE KT-340 RECEIVER. Very nice condition ...	25	0	0
TRIO TS-500. As above and complete with extra VFO-5. Also covered by three months' warranty ...	145	0	0	REDIFON GR-410 SSB TRANSCEIVER. Choice of four xtal controlled channels between 2 and 20 megacycles. Could be easily converted to VFO control. Uses three 6146B's in the final and complete with 24v. D.C. p.s.u. Excellent manual with rig and all cables and control box ...	45	0	0
TRIO TS-510. Brand new but with slight external markings only. With full twelve months' guarantee ...	165	0	0	OSKER SWR and POWER METER. Just in. These are de-luxe dual meter bridges giving direct power readings up to 2KW on the HF bands and up to 200 watts on two metres. Of most beautiful construction and each unit with individual calibration chart ...	17	10	0
KW 2000A. An excellent specimen with three months cover All of the above, of course, are complete with matching PSU's and prices include all carriage charges within the U.K.	167	10	0	MIDLAND LIGHTWEIGHT PHONES. Modern padded construction wired for stereo use but very simply adapted for communication purposes ...	3	10	0
SOMMERKAMP FL200B TRANSMITTER. Very clean throughout ...	85	0	0	ECHO DUAL IMPEDANCE HEADPHONES. (8 ohm and 4k) lightweight and padded ...	5	12	6
SOMMERKAMP FRI00B RECEIVER. Exactly as above ...	75	0	0	TRIO LIGHTWEIGHT COMMUNICATION PHONES S.G. BROWN TYPE F HIGH IMPEDANCE PHONES	6	2	6
COLLINS 75A-1 RECEIVER. Carefully modified to 75-A4 specification ...	165	0	0	MEDCO FILTERS FL50A. 50 ohm, Belling Lee connectors FL50B. 50 ohm, UHF connectors (PL-259) ...	4	12	6
EDDYSTONE EA12 RECEIVER. Immaculate, complete with Speaker/plinth ...	155	0	0	FL75A. 75 ohm. Belling Lee connectors	5	2	6
EDDYSTONE EA12 RECEIVER. As above, less plinth ...	152	0	0	MEDCO HIGH PASS FILTERS. The answer to the individual TVI problem ...	1	10	0
EDDYSTONE 940 RECEIVER. Very fine condition ...	110	0	0	HANGEAR PMII EQUIPMENT. All items in stock including their excellent model PMII Presselector. Rejuvenate your RX for only ...	7	19	6
EDDYSTONE 750 RECEIVER. First class all round ...	40	0	0	JOYSTICK EQUIPMENT. All new models now available from stock.			
EDDYSTONE S640 RECEIVER. An excellent buy at ...	27	0	0	G-WHIP MOBILE ANTENNAE. All models available ex stock.			
EDDYSTONE 840C RECEIVER. Again, in very nice condition ...	46	0	0				
KW VANGUARD TRANSMITTERS. Several in stock, all FB	39	0	0				
HAMMARLUND HQ-170 RECEIVER. Good condition and performance ...	85	0	0				
HAMMARLUND SP-600 RECEIVER. Rack mounting ...	90	0	0				
HALLICRAFTERS-108 RECEIVER, with excellent amateur band spread, ...	40	0	0				

Personal delivery service available if Postal Strike continues.
 An S.A.E. (as large as possible please) will bring you full details of any equipment or accessory advertised.
 1/6 in stamps will bring you our illustrated Yaesu Musen catalogue.
 DON'T FORGET! All prices shown include carriage which is deductible on any goods collected.

Amateur Electronics, Electron House, 518-520 Alum Rock Road, Birmingham 8
 Telephones: 021-327 1497 021-327 6313

Technical Books and Manuals

(ENGLISH AND AMERICAN)

AERIAL INFORMATION

ABC of Antennas	88p
Aerial Handbook	85p
Amateur Radio Antennas (Hooton)	£1.85
Antenna Handbook, Volume 1	£1.75
Antenna Round-Up, Volume 1	£1.45
Antenna Round-Up, Volume 2	£1.75
Antenna Handbook, 12th Edition	£1.38
Beam Antenna Handbook	£2.08
Ham Antenna Construction Projects	£1.45
Quad Antennae	£1.78
S9 Signals	85p

BOOKS FOR THE BEGINNER

Amateur Radio (Rayer)	£1.35
Basic Mathematics for Radio and Electronics	£1.50
Beginners Guide to Radio (7th Edit.)	£1.10
Beginners Guide to Electronics	83p
Beginners Guide to Colour TV	80p
Better Short Wave Reception	£1.78
Course in Radio Fundamentals	60p
Dictionary of Electronics	45p
Foundations of Wireless (N.E.)	£1.95
Guide to Amateur Radio (N.E.)	47p
How to Become a Radio Amateur	57p
Morse Code for the Radio Amateur	14p
Learning the RT Code	25p
Novice Handbook, Tx & Rx	£1.80
Radio, by D. Gibson	70p
Radio Amateur Examination Manual	31p
Short Wave Listening	83p
Short Wave Listener's Guide	O/P
Simple Short Wave Receivers (Data)	87p
Understanding Amateur Radio	£1.35

GENERAL

Easibinder	88p
Eliminating Engine Interference	87p
Guide to Broadcasting Stations (16th Edit.)	58p
How to Listen to the World 1970	O/P
Introduction to Valves	49p
Radio Experiments (Rayer)	88p
RCA Power Circuits	£1.55
RCA Receiving Tubes Manual	£1.55
RCA Transistor Manual (N.E.)	£1.55
RCA Transmitting Tubes	85p
Radio Astronomy for Amateurs	O/P
Shop & Shack Shortcuts	£1.75
Television Explained Vol. I	£1.35
Television Explained Vol. II	£1.35
World Radio & TV Handbook 1971 Edition	£2.25

HANDBOOKS AND MANUALS

Amateur Radio DX Handbook	£2.15
Electronic Circuit Handbook, Vol. 1	£1.40
Electronic Circuit Handbook, Vol. 2	£1.40
Mobile Handbook, CQ	£1.38
Mobile Manual, ARRL	£1.38
New RTTY Handbook	£1.78
New Sideband Handbook, CQ	£1.43
Novice Handbook Tx & Rx	£1.78
1970 ARRL Handbook (paper edition only)	O/P
Radio Communication Handbook (RSGB)	£3.50
Radio Handbook, W.I. Orr (17th)	£4.45
Radio Handbook, W.I. Orr (18th)	O/P
Rtty A-Z (CQ Tech. Series)	£2.23
Surplus Conversion Handbook	£1.35
Transistor Substitution Handbook	98p

USEFUL REFERENCE BOOKS

Amateur Radio SSB Guide	£1.57
Amateur Radio Techniques (N/E)	£1.13
Amateur Radio Construction Projects	£1.10
Amateur Radio Circuit Book	70p
Elements of Radio Engineering	83p
Guide to Amateur Radio (N.E.)	47p
Engineers' Pocket Book	80p
'G' Call Book 1971	52p
Hams' Interpreter	55p
Hints & Kinks, Vol. 8 (ARRL)	60p
Radio Amateur Examination Manual	31p
Operating an Amateur Radio Station	16p
Radio Amateur Operator's Handbook	33p
Radio Data (8th Edition)	75p
Radio Data Reference Book	60p
Radio, Valve and Transistor Data (Iliffe) 9th Edition	87p
Radio Engineer's Pocket Book	64p
Service Valve & Semiconductors Equivalents	29p
Single Sideband for the Radio Amateur (ARRL) 4th Edition	£1.35
Single Sideband for the Radio Amateur (ARRL) 5th Edition	£1.65
Surplus Schematics (CQ)	£1.20
Transistor Pocket Book	£1.55
Q & A on Audio	52p
Q & A on Electronics	52p
Q & A on Transistors (3rd Edit.)	57p

VHF PUBLICATIONS

VHF Handbook, Wm. I. Orr	£1.77
VHF Manual (ARRL)	£1.35
VHF/UHF Manual (RSGB)	£1.12

The above prices include increased postage rates and packing.

Delivery is from stock.

(O/P = temporarily out of print)

Available from

SHORT WAVE MAGAZINE

Publications Dept., 55 Victoria St., London S.W.1

01-222 5341

(Counter Service. 9.30-5.15. Mon. to Fri.)

(Nearest Station: St. James's Park)

(GIRO A/C. No. 547 6151)

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

TRIO'S 9R-59DS FOR SELECTIVE SUPERIORITY

The thrills of amateur short wave communication can be a joy forever. With TRIO's 9R-59DS communications receiver you can be assured of repeated adventure. TRIO's modern engineering techniques are especially apparent in its mechanical filter which achieves amazingly superior selectivity. For the thrill of a lifetime tune in with TRIO's 9R-59DS.

Specifications:

• Frequency Ranges: Band A 550-1600KHz, B 1.6-4.8MHz, C 4.8-14.5MHz, D 10.5-30MHz. • Sensitivity: $2\mu\text{V}$ for 10dB S/N Ratio (at 10MHz) • Selectivity $\pm 5\text{KHz}$ at -50dB • Power Consumption: 45 watts • Audio Power Output: 1.5 watts • Tube & Diode Complement: 6BA6 \times 3, 6BE6 \times 2, 6AQ8 \times 2, 6AQ5, SW-055 \times 2, SW-05 \times 2, IN60 \times 2. • Dimensions: Width 15", Height 7", Depth 10".



Model JR-310
SSB COMMUNICATIONS RECEIVER
• Frequency Range: 3.5-29.7MHz (7 Bands)
• Sensitivity: $1\mu\text{V}$ (at 10dB S/W)



TRIO KENWOOD ELECTRONICS S.A.
160 Ave., Brugmann, 1060 Bruxelles, Belgium

Sole Agent for the U.K.

B.H. MORRIS & CO., (RADIO) LTD. 84/88, Nelson Street, Tower Hamlets, London E. 1. Phone: 01-790 4824



“LISTEN TO THE WORLD WITH EDDYSTONE”

Your local Eddystone dealer is :

CHESHIRE

The Transistor Centre
(Wilmslow) Ltd.
Green Lane
Wilmslow 24766

CORNWALL

S.S.B. Products
(Norman Birkett (G3EKK))
7 Little Castle Street
Truro
Feock 575

DERBYSHIRE

J. & A. Tweedy (Electronic
Supplies) Ltd
64 Lordsmill Street
Chesterfield
Chesterfield 4982

DEVON

Graham Newbery
(Reg Ward G2 BSW) Axminster
Axminster 3163

ESSEX

F. E. Smith
184 Moulsham Street
Chelmsford
Chelmsford 54594

Unique Radio Ltd
6 The Facade, High Road
Goodmayes, Ilford
01-590 8277

HAMPSHIRE

Southern Marine Radio
(Southampton) Ltd
Solent House, Town Quay
Town Quay 22721

Wireless Supplies Unlimited
264-266 Old Christchurch Road
Bournemouth
Bournemouth 24567

IRELAND

John F. MacMahon
10, Church Street, Enniskillen,
Co. Fermanagh, N. Ireland
Enniskillen 2955

ISLE OF WIGHT

Sherratt & Son
81-82-83 High Street, Newport
Newport 3358-9

KENT

G. T. & R. Wilson
12-14-16 Queen Street
Gravesend
Gravesend 63527/8

Percy Powell Radio Ltd.
54 High Street
Tunbridge Wells
Tunbridge Wells 26534

LANCASHIRE

Stephen-James Ltd
70 Priory Road, Anfield
Liverpool L4 2RZ
051-263 7829

N.W. Electronics
52 Great Ancoats Street
Manchester M4 5AB
061-236 6276

Croftfilm Ltd
46 Friargate
Preston PRI-2AT
Preston 55244

LEICESTERSHIRE

A. K. Davey Ltd
New Street, Hinckley
Hinckley 2173 and 4288

LONDON

Imhofs (Retail) Ltd
112-116 New Oxford Street
W.C.1
01-636 7878

R. T. & I. Electronics Ltd
Ashville Old Hall
Ashville Road
Leytonstone, E.11
01-539 4986

Radio Shack Ltd
182 Broadhurst Gardens
London, N.W.6
01-624 7174

MIDDLESEX

Gurney's Radio Ltd
91 The Broadway, Southall
01-574 2115

NORFOLK

The Record Shop
157 King Street
Great Yarmouth

NORTHUMBERLAND

Aitken Bros. & Company
35 High Bridge
Newcastle upon Tyne NE1 1EW
Newcastle upon Tyne 26729

SCOTLAND

L. Hardie
542 George Street
Aberdeen
Aberdeen 20113

SUSSEX

Cosh and Hammond
29 Beach Road, Littlehampton
Littlehampton 4477 or 4478

WALES

Holt High Fidelity
Picton Arcade, Swansea
Swansea 53254

Holt High Fidelity
8 Portland Street, Swansea
Swansea 41032

WARWICKSHIRE

Chas. H. Young Ltd
170/172 Corporation Street
Birmingham 4
021-236 1635

YORKSHIRE

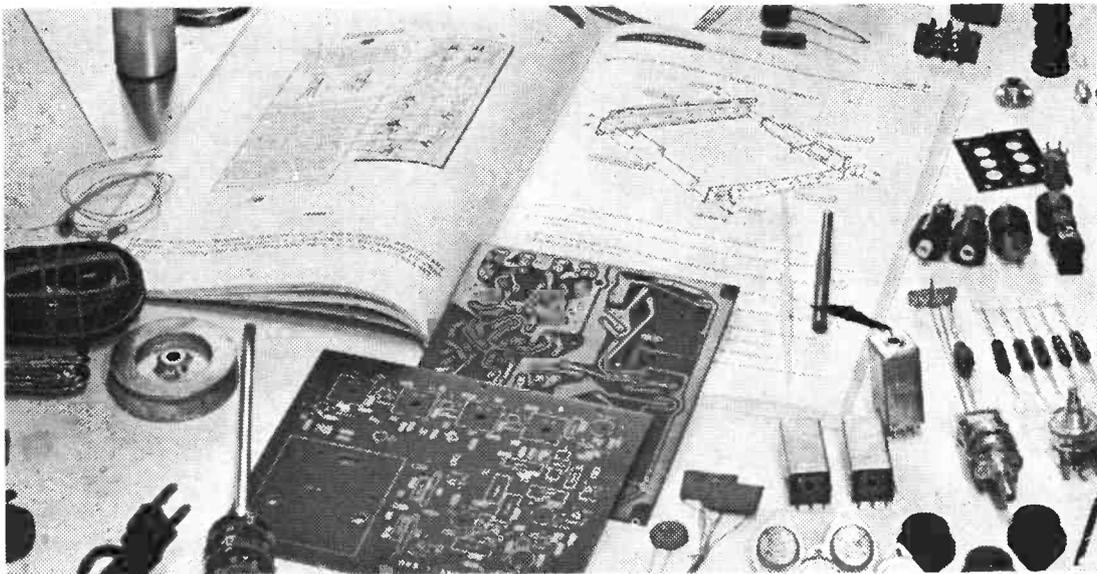
Philip Cann Ltd
Chapel Walk, Fargate
Sheffield S1 1GJ
Sheffield 29225/6

Short Wave (Hull)
24a Newland Avenue
Hull, HU5 3AF
Hull 408953

R. A. Coates
5 Bridge Street, Whitby
Whitby 2622

Point to note by Advertisers in "Short Wave Magazine"—as well as covering the U.K. radio amateur interest, we supply bookstalls all over the country, also schools, libraries and the radio-electronics Industry.

Today a Heathkit



Tomorrow the World!



PLEASE SEND ME FREE 1971 CATALOGUE

*Block
Capitals
please*

Name

Address

Post Code



A Schlumberger Company

HEATH (Gloucester) LTD., GLOUCESTER, GL2 6EE

FOULSHAM-SAMS BOOKS FROM STOCK

ABC'S OF ANTENNAS

Electronics technicians, amateur-radio enthusiasts, broadcast station operators and engineers, students—all who are involved in one way or another with theoretical and practical antenna problems—need a good, basic working knowledge of antennas. Most books on antennas resort to higher mathematics and difficult analytical discussions. In this book, however, the author has prepared a valuable reference text which is concisely written and easy to understand. Only simple mathematics is employed. The book covers a myriad of facts related to antennas and radiowave behaviour.

The introductory chapters cover the fundamentals of radio-wave propagation and basic antenna characteristics. The remainder of the book is then devoted to a discussion of the various types of antennas and their uses. Antennas for radio, television and two-way communications are included. Business radio, amateur, both mobile and fixed-station operation, are covered. The final chapter should be particularly appealing to those interested in microwave uses and radio-navigational systems. A perusal of this book will provide any student with an excellent foundation for more advanced study in antenna design.

87p

HAM ANTENNA CONSTRUCTION PROJECTS

For the many amateur radio operators who like to construct their own antenna gear, and for those interested in getting into the fascinating field of Amateur Radio, here is a practical guide to building and operating many types of ham antennas.

Although the antennae described in this book cost little to construct, many will out-perform some of the best-designed, ready-made designs on the market. By using parts you already have on hand (wire, 2 x 4's, insulators, etc.), you can build radiators that will allow you to DX places like Singapore, Moscow, Berlin, and the North Pole.

Besides full details on many useful and interesting types of aeriels, Ham Antenna Construction Projects includes complete information on long-lasting construction methods, as well as how to position your antenna to achieve maximum distance with a given radiation pattern. In addition, much easy-to-understand technical information on tuning antennas and the use of test equipment is presented.

£1-45

ABC'S OF SHORT-WAVE LISTENING

Have you ever listened to a radio and thought how enjoyable it would be to hear broadcasts from faraway places, such as Toronto, Berlin, and Tokyo, as well as signals from ships at sea and satellites in space. All these broadcasts can be at your fingertips, offering a fascinating hobby.

ABC's of Short-Wave Listening a non-technical guide, will help you get started, or give you added pointers if you are now engaged in this hobby. The mysteries of radio waves are revealed in a manner that anyone can understand, providing priceless knowledge about the ever-expanding world of short-wave radio.

Even though you may not have a basic knowledge of radio principles, author Len Buckwalter introduces you to the subject by first explaining just what short-wave listening is, what makes a radio wave and a "meter," and just how these short waves travel in the earth's atmosphere and space.

Using a unique collection of photographs, drawings, charts, and authoritative text, this book tells how the short-wave receiver works; what the various controls are for; and what to look for when selecting equipment. In addition, antennas are presented and explained so that you can better receive those elusive foreign stations on your set.

Finally, this book lets you in on the secrets of how best to set up and operate your listening station; how to track and "hold" DX (distant stations); and how to locate and listen to the space satellites and manned space vehicles.

£1-00

ABC'S OF RADIO & TV BROADCASTING

This is a book for those who want to know what goes on at the transmitting end in radio and television broadcasting. It explains how the radio and television signals are formed, built up, and transmitted. In addition to the discussion of basic transmitter circuits, information is provided concerning metering and monitoring circuits and procedures.

ABC's of Radio & TV Broadcasting is a basic survey of transmitter equipment and operation. The first chapter deals with the principles of electromagnetic radiation. Then two chapters cover audio and video modulating signals. The next two chapters treat the origin and amplification of the transmitter carrier signal. Two following chapters discuss modulation, both amplitude and frequency types. The remaining chapters deal with power supplies, transmission lines, standard broadcasting antennas, FM and television antennas, and remote transmitter operation.

The author has avoided a detailed mathematical treatment, keeping the text basic and the essentials in view. Review questions are included at the end of each of the twelve chapters. The answers are given in the back of the book.

£1-13

SWL ANTENNA CONSTRUCTION PROJECTS

Anyone who enjoys listening to short-wave broadcasts from all over the world will naturally be interested in improving his reception. Constructing a suitable antenna is an excellent way of doing this, and it may be done at little expense. This book supplies all the information you need to construct 35 different short-wave aeriels.

Two chapters cover the basic principles of antennae and the knowledge necessary for construction of the projects which are given in the following pages. The antenna projects themselves are divided into six classes. First are the dipole aeriels such as segmented and inverted types. Following them are the vertical antennae, including array and beam types. Then horizontal beam systems (Yagis) are considered. Various low- and high-band and multiband triangle antennae are also discussed. The next section deals with long-wire antennae, such as vee beams and rhombics, for those SWL'ers with a sizeable plot of land available. For SWL'ers without land, indoor antennae, which are included in the final section, may be a solution. Three useful appendices are provided at the end of the book.

This book will help you to find an antenna especially adapted to your needs and accommodations—one which will permit you to realise better the potentialities of your receiver. With such a system, you will receive more stations more consistently.

£1-38

PRACTICAL HAM RADIO PROJECTS

"All the equipment here is homebrew, OM." There is great self satisfaction in being able to give a detailed description of a piece of gear you have built yourself. This feeling of accomplishment is not the same with a house full of commercial gear.

Practical Ham Radio Projects is a book of value to everyone who enjoys building some of his own gear. Each chapter contains complete data for constructing a unique, useful piece of equipment, including chassis layout diagrams, subassemblies, tuning procedures, and operating instructions. Every project is supplemented by schematic and pictorial drawings plus complete parts lists.

All of the units are original designs—none are commercially available at any price.

The projects described in this book include: all-band 500-watt linear amplifier . 2-metre SSB mixer and linear amplifier . all-band 500-watt antenna tuner . electronic automatic keyer . deluxe 6-metre mobile transmitter . universal transistor mobile modulator and power supply . transistor 2-metre superhet receiver . VFO for 6, 2, and 1.25 metres . transistor dip oscillator . 2-metre transceiver for mobile or fixed station . transistor 6-metre handle-talkie . monitor scope for SSB and AM. Just about all that is needed for a complete amateur station!

£1-13

THE ABOVE PRICES INCLUDE INCREASED POSTAGE RATES AND PACKING.

DELIVERY IS FROM STOCK.

Available from

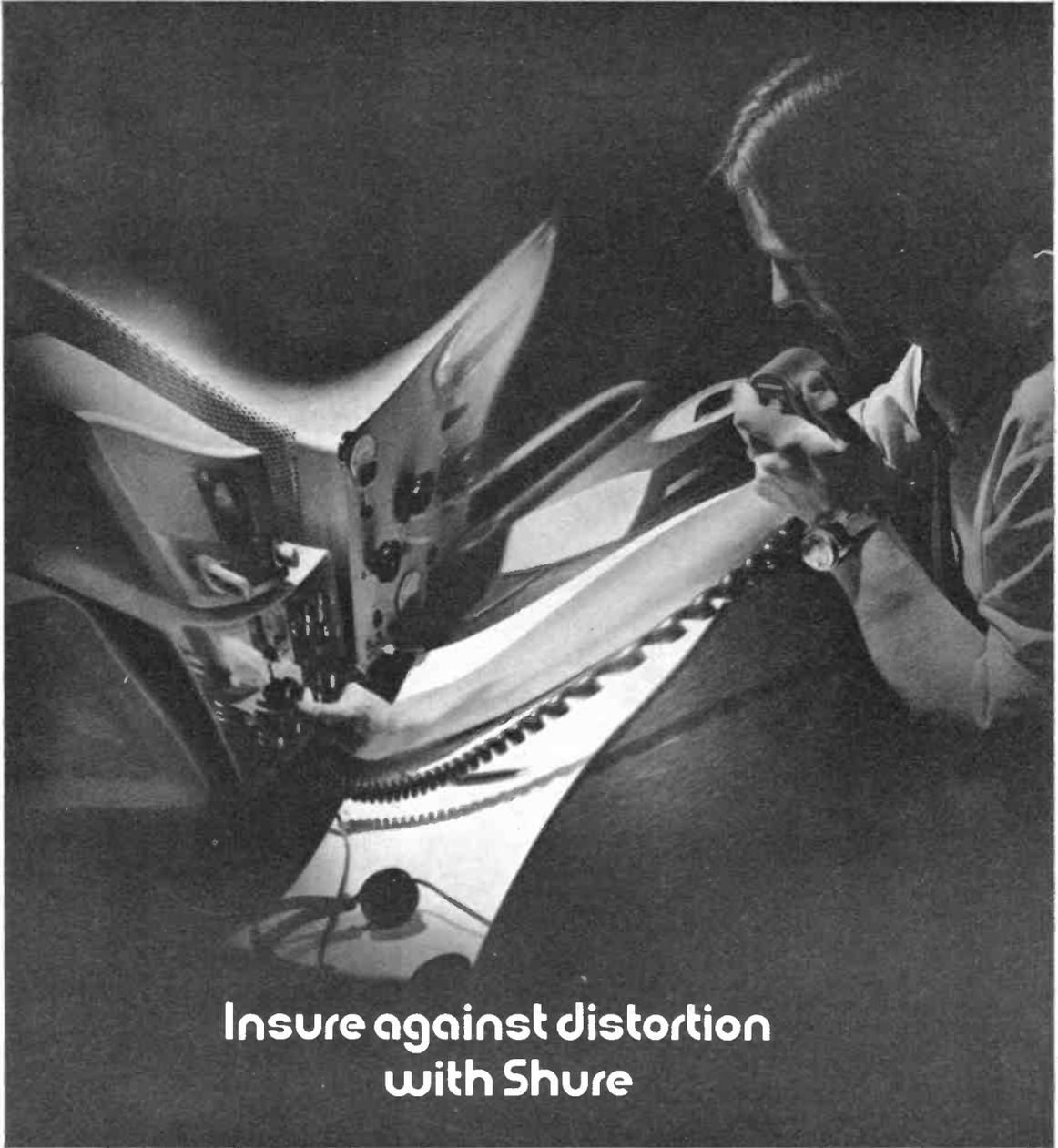
SHORT WAVE MAGAZINE

Publications Dept., 55 Victoria Street, London, S.W.1 . 01-222 5341

(Counter Service, 9.30-5.15, Mon. to Fri.)

(Nearest Station: St. James's Park)

(GIRO A/c. No. 547 6151)



Insure against distortion with Shure

Shure Model 444—
controlled magnetic
microphone specially
designed for radio
communications applications
with special response
characteristic giving optimum
speech intelligibility.



Please send me full information on **SWM2**
Shure Communications Microphones.

Name

Address

Tel:



Shure Electronics Ltd.
84 Blackfriars Rd., London SE1. Tel: 01-928 3424

LOWE ELECTRONICS

WELLINGTON STREET, MATLOCK, DERBYSHIRE

Matlock 2817 (2430 evenings) BILL G3UBO, ALAN G3MME

AGENTS

(EVENINGS AND WEEKENDS ONLY)

John G3JYG

16 Harvard Road, Ringmer, Lewes, Sussex.
Ringmer 8071

Sim GM3SAN

19 Ellismuir Road, Baillieston, Nr. Glasgow.
041-771 0364



YAESU F-LINE

This well known and deservedly popular equipment is now available at reduced prices.

FR-400 receiver—varies in price from £120 for the basic model with no frills to £160 for every possible optional extra.

FL-400—250w. p.e.p. transmitter, £140.

FL-2000B linear—1200w. to a pair of 572B/T160L, £130.

FT-101—the new 260w. p.e.p. mobile/fixed transceiver replacing the FT-150. Only 3 valves—12BY7A driver and a pair of 6JS6A's. 10 FET's, 3 IC's, 31 Si transistors and 38 Si diodes. Both 12v. d.c. and 234v. a.c. p.s.u.'s built-in. Optional CW filter, £218.

FT-200—260w. p.e.p. less p.s.u., £132.

FT-400 and FT-560—560w. p.e.p. built-in p.s.u., £195. External VFO's and speakers for all models.

In addition to the range of Yaesu equipment, we would mention the Inoue range, the FE equipment and our range of POST FREE accessories, etc. including SWR meters (£6.80), Yaesu YD844 table mike (£10), Teisco DM-501 (£3), low impedance padded headsets

(£2.40), 12 hour digital clocks (£5.70), EK-9X electronic keyers (£8), plain keys (£1), etc., etc., to say nothing of a slew of small bits and pieces, such as crystal and mechanical filters.

In the second-hand line, too, we don't do too badly and have a pretty good selection of excellent, fully tested and serviced equipment at very reasonable prices. It is well worth your while getting our lists—all it costs you is a large s.a.e. Schools, Colleges, etc. Can't afford to lash out capital on gear? What about leasing? Have a chat to us about it—our rates are very economic. Inoue IC-2F. They're going mad over these in the States. Inevitably, the same will happen here and I can't hold this price much longer. I don't want to be pushing or give you the hard sell, but if you're smart, you'll get yours now while the price is still rock bottom, £80.

Servicing: We do it, we do it well, we do it speedily and we do it at reasonable cost.

Hours: Tuesday to Saturday, 9-5.30
(closed for lunch 1-2 and all day Monday).

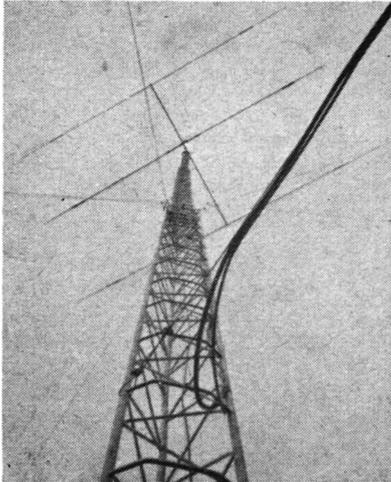
73 de Alan and Bill



WESTERN ELECTRONICS (U.K.) LTD.

- ★ Your 'one stop' single source for masts, towers, rotators, antennas and equipment.
- ★ Largest stock range in the U.K.
- ★ Money saving packaged deals.

79' TELETOWER

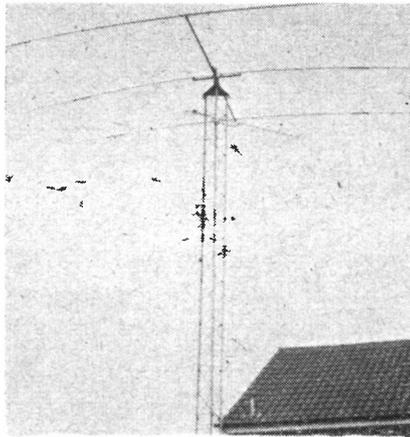


TELETOWERS

The finest value in guyed galvanised steel towers which telescope down to 25'.

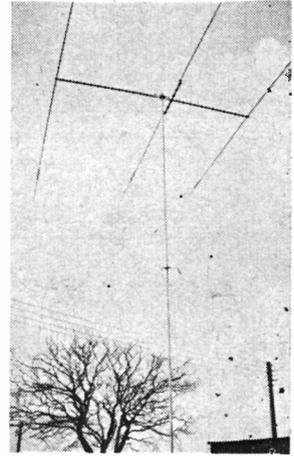
Price (carriage paid):
 42', £72.00 57', £93.00
 79', £112.00 101', £148.00

30' HAMTOWER



A self-supporting galvanised steel tower for HF band beams. Each 10' side weighs only 22 lbs., so the tower can be erected single-handed.
 Price: £47.00 carriage paid.

TELOMAST with TA33



The best in telescopic rotatable masts. can be erected single-handed in minutes and extends vertically upwards.

Prices (carriage paid):

	Mast only	Mast and Rigging kit
30'	£14.40	£19.95
40'	£16.50	£25.50
50'	£19.50	£31.50

VERSATOWERS

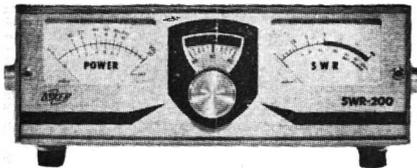
Immediate delivery from our stock! Self-supporting tilt-over towers for 40', 60' and 85'.
 P40', £121.75, P60', £146.50, T85', £275.00.

DO YOU KNOW YOUR POWER OUTPUT?

(No! You're not the only one!)

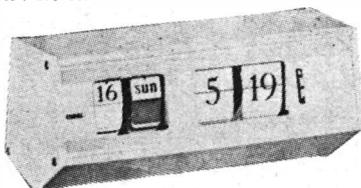
Then you need the **OSKER POWER METER**

Features: Switchable for 52 or 75 ohm systems. Each instrument is individually calibrated. Four ranges: 0-2, 0-20, 0-200 and 0-2 kw., 3-200 MHz. Excellent styling.
 Price: £18.50.



The finest digital clock available
The CASLON 601

Features: 24hr. 220v. a.c. 50c. Built-in diffused light. Noiseless operation. Superb styling. Easy-to-read digital face indicates date, day of the week, hour and minute. 5 second intervals marked on rotating wheel. Different colour for each day of the week.
 Price: £18.50.



CATALOGUE
 Send 10p for our TOWER/MAST catalogue or s.a.e. for details of other items.

H.P. available

Our London Agent is Roger Wilkins on 01-845 6290 after 6 p.m.

Hours of Business:
 9 a.m.-5.30 p.m.
 Monday - Friday
 Saturday by appointment.



FL2000B

Yaesu/Sommerkamp



- | | | | |
|-----------------------|---------|---------|------------------------------|
| FT101/277 | £218.00 | FR500S | Receiver plus extras £145.00 |
| FT200/250 Transceiver | £132.00 | FL2000B | Linear, 1200w. £130.00 |
| FP200/250 A.C. supply | £36.00 | YD844 | Table Microphone £11.00 |
| DC200 D.C. supply | £45.00 | YD846 | Hand Microphone £5.00 |
| SP400 Speaker | £10.00 | | |
| FF500X LP Filter | £6.20 | | |
| FL400/500 Transmitter | £130.00 | | |
| FR400 Receiver | £120.00 | | |

OSBOURNE RD., TOTTON, SO4 4DN, ENGLAND.
 TEL. TOTTON 4930 or 2785
 CABLES 'AERIAL', SOUTHAMPTON.



Latest Catalogue

Our latest edition giving full details of a comprehensive range of HI-FI EQUIPMENT COMPONENTS, TEST EQUIPMENT and COMMUNICATIONS EQUIPMENT. FREE DISCOUNT COUPONS VALUE 50p. 248 pages, fully illustrated and detailing thousands of items at bargain prices.
SEND NOW! ONLY 37p P & P 10p.

TRIO TS 510 AMATEUR TRANSCEIVER with speaker and mains P.S.U., £180
TRIO JR310 AMATEUR BAND 10-80 Metre Receiver, £77.50.

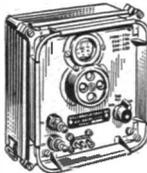
ADMIRALTY 62B RECEIVERS



High quality 10 valve receiver manufactured by Murphy. Five bands 150-300 Kc/s, 560 Kc/s, 1-5 Mc/s., 3-9-30.5 Mc/s. Incorporates 2 R.F. and 3 I.F. stages, band-pass filter, noise limiter, crystal controlled B.F.O. calibrator, I.F. output, etc. Built-in speaker, output for phones. Operation 150/230 volt A.C. Size 19 1/2" x 13 1/2" x 16". Weight 114 lbs. Offered in good working condition, £22.50, Carr. £1.50. With circuit diagram. Also available B41 L.F. version of above. 15 Kc/s.-700 Kc/s. £17.50, Carr. £1.50.

DUMMY LOAD RESISTORS
Carbon 30Ω 35w., 27p. P.P. 7p.

CRYSTAL CALIBRATOR No. 10



Small portable crystal controlled wavemeter. Size 7" x 7 1/2" x 4". Frequency range 500 Kc/s.-10 Mc/s. (up to 30 Mc/s. on harmonics). Calibrated dial. Power requirements 300v. D.C. 15mA and 12v. D.C. 0-3A. Excellent condition, £4.47 1/2. Carr. 37p.

MULTI-METERS

Model TE-300. 30,000 O.P.V. Mirror scale, overload protection 0.1/6/3/15/60/300/1,200v. D.C. 0.1/6/30/120/600/1,200v. A.C. 0.1/30uA/6mA/60mA/300mA/600mA. 0.1KΩ/80K/800K/8 meg. ohm-20 to +63 dB., £5.97 1/2, P.P. 15p.

Model TE-90. 50,000 O.P.V. Mirror scale, overload protection. 0.1/3/12/60/300/600/1,200v. D.C. 0.1/6/30/120/300/1,200v. D.C. 0.1/6/60/600 mA. D.C. 16K/160K/1.6/16 MEGΩ. -20 to +63 dB., £7.50, P.P. 15p.

TMK Model TW20CB. Features resettable overload button. Sensitivity: 20KΩ/volt D.C. 5KΩ/volt A.C. D.C. Volts: 0-0.5, 2.5, 10, 50, 250, 1,000v. A.C. Volts: 0-2.5, 10, 50, 250, 1,000v. D.C. Currents: 0-0.05, 0.5, 5, 50, 500mA. 10 amp. Resistance: 0-5K, 50K, 0-500K, 5 MEGΩ. Decibels: -20 to +52 dB., £11.50, P.P. 17p.

UR-1A SOLID STATE COMMUNICATION RECEIVER



4 bands covering 550 Kc/s.-30 Mc/s. continuous. Special features are use of FET transistors, 5 Meter, built-in speaker, variable BFO for SSB reception, noise limiter, band-spread control, sensitivity control. Output for low impedance headphones. Operation 220-240v. A.C. or 12v. D.C. Size 12 1/2" x 4 1/2" x 7". Excellent value. Only £24.00. Carr. 37p.

CLASS D WAVEMETERS

A crystal controlled heterodyne frequency meter covering 17-8 Mc/s. Operation on 6 volts D.C. Ideal for amateur use. Available in good used condition, £5.97 1/2, Carr. 37p or brand new, £7.97 1/2, Carr. 37p.

TE15 TRANSISTORISED GRID DIP METERS

Six ranges, 440 Kc/s.-280 Mc/s. Operates on 9v. battery. Full instructions, £12.50. P.P. 17p.



HANSEN SWR-3 BRIDGE

Impedance 52 ohms. Also operates as field strength indicator, complete with telescopic aerial, £3.47 1/2 each, P.P. 17p. PL259 plugs to suit 37p each.

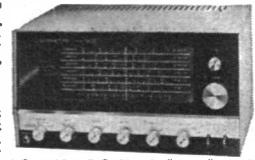
CODAR EQUIPMENT

CR.70 Receiver ... £22.50
CR.45 Receiver ... £14.50
CR.45 Kit from ... £11.50
PR.30 Preselector ... £7.50
PR.30X (Built in P.S.U.) ... £9.50
RQ.10 Q Multiplier ... £7.25
RQ.10X (Built in P.S.U.) ... £8.87 1/2
AT.5 MK.II Transmitter ... £19.50
T.28 Receiver ... £17.50
I2/M5 Mobile P.S.U. ... £11.50
I2/R Control Unit ... £2.50
AT5 Mains P.S.U. ... £11.00
Mini Clipper Kit ... £2.95



FULL RANGE OF OTHER SIZES IN STOCK. SEND S.A.E. FOR LEAFLET.

LAFAYETTE HA.800 SOLID STATE AMATEUR COMMUNICATION RECEIVER SIX BANDS 3.5-4, 7-7.3, 14-14.35, 21-45, 28-29.7, 50-54 Mc/s.



Dual conversion on all bands. 2 x 455 Kc/s. mechanical filters. Product detector Variable B.F.O. 100 Kc/s. crystal calibrator. "S" meter Huge slide rule dial. Operation 230v. AC or 12v. DC. Size 15" x 9 1/2" x 8 1/2". Complete with instruction manual, £50.50. Carr. paid (100 Kc/s. Crystal £1.97 1/2 extra).

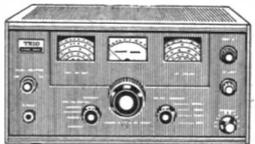
UNR-30. 4 BAND COMMUNICATION RECEIVER



Covering 550 Kc/s.-30 Mc/s. Incorporates variable FOB for CW/SSB reception. Built-in speaker and phone jack. Metal cabinet. Operation 220/240v. A.C. supplied brand new, guaranteed with instructions, £15.75. Carr. 37p.

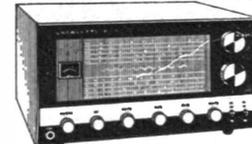
TRIO 9R-59DE

4 band covering 550 Kc/s. to 30 Mc/s. continuous and electrical bandwidth on 10, 15, 20, 40, and 80 metres. 8 valve plus 7 diode circuit. 4/8 ohm output and phone jack. SSB-CW - ANL. Variable BFO. 5 meter. Sep. bandspread dial. IF frequency 455 Kc/s. audio output 1-Sw. Variable RF and AF gain controls 115/250v. A.C. Size: 7" x 13" x 10" with instruction manual, £42.00, Carr. paid.



TRIO COMMUNICATION TYPE HEADPHONES. 'Normally £5.97 1/2, our price £3.75 if purchased with receiver.

NEW LAFAYETTE SOLID STATE HA600 RECEIVER



5 Band AM/CW/SSB amateur and short wave 50 Kc/s.-400 Kc/s. and 550 Kc/s.-30 Mc/s. F.E.T. front end. 2 Mechanical filters. Variable Dial. Product detector. Variable BFO. Noise limiter, 5 Meter. 24 1/2" Bandspread. 230v. A.C./12v. D.C. Neg. earth operation. RF gain control. Size: 15" x 9 1/2" x 8 1/2". Wt. 18 lbs. Expectational value, £45. Carr. 50p.

TRIO JR-500SE AMATEUR RECEIVER



7 separate ranges between 3.5 and 29.7 Mc/s. 7 valves, 2 transistors and 5 diodes plus 8 crystals: output 8 and 500 ohm and 5000 ohm phone jack. Crystal controlled oscillator. Variable BFO. VFO. AVC. ANL. 5 meter. SSB-CW. Stand-by switch special double gear dial drive socket for connection to a transmitter. 115/250v. A.C. Mains. Size: 7" x 13" x 10" with instruction manual and service data, £65.00, Carriage paid. Package deal: JR500SE with SP5D speaker and H54 headphones, £69.50.

EDDYSTONE VHF RECEIVERS

Model 770R, 19-165 Mc/s. Excellent condition, £150.00.

HAMGEAR PRESELECTORS

Mains operated 7.5-30 Mc/s., £7.50. P.P. 20p.

B.C.221 FREQUENCY METERS

Latest release 125 kHz-20 MHz. Excellent condition. Fully tested and checked and complete with calibrator charts, £27.50 each. Carr. 50p.

AR88 MAINS TRANSFORMERS

Brand new, boxed, £2.97 1/2, P.P. 25p.

JOYSTICK AERIALS

Full range of Aerials and Tuners in stock.

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 1/2/3/2in. square fronts.

50uA	£2.00	1 amp	£1.37 1/2	150v DC	£1.37 1/2
50.0-50uA	£1.87 1/2	2 amp	£1.37 1/2	300v DC	£1.37 1/2
100uA	£1.87 1/2	5 amp	£1.37 1/2	500v DC	£1.37 1/2
100.0-100uA	£1.75	20mA	£1.37 1/2	750v DC	£1.37 1/2
200uA	£1.75	50mA	£1.37 1/2	15v AC	£1.37 1/2
500uA	£1.75	100mA	£1.37 1/2	50v AC	£1.37 1/2
500.0-500uA	£1.75	150mA	£1.37 1/2	150v AC	£1.37 1/2
	£1.37 1/2	200mA	£1.37 1/2	300v AC	£1.37 1/2
	£1.37 1/2	300mA	£1.37 1/2	500v AC	£1.37 1/2
1mA	£1.37 1/2	500mA	£1.37 1/2	5 meter 1 mA	
1.0-1mA	£1.37 1/2	3v DC	£1.37 1/2		£1.60
2mA	£1.37 1/2	10v DC	£1.37 1/2		VU meter £2.10
5mA	£1.37 1/2	20v DC	£1.37 1/2		
10mA	£1.37 1/2	100v DC	£1.37 1/2		
750mA	£1.37 1/2				

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

27 TOTTENHAM CT. RD. LONDON, W.1 Tel: 01-636 3715
3 LISLE STREET, LONDON, W.C.2 Tel: 01-437 8204
34 LISLE STREET, LONDON, W.C.2 Tel: 01-437 9155
311 EDGWARE ROAD, LONDON, W.2 Tel: 01-262 0387
OPEN 9-6 MONDAY TO SATURDAY (EDGWARE ROAD 1/2 DAY THURSDAY)

All Mail Orders to -
147, Church Street,
London, W.2
Tel: 01-262 6562
(Trade supplied)

INDEX TO
ADVERTISERS

	PAGE
Amateur Electronics (G3FIK)	1
Belding & Bennett (Morse)	64
J. Birkett	60
Derwent Radio	59
Echelford Communications	60
Eddystone Agents... ..	4
Eley Electronics	64
G. R. Grigg	61
G.W.M. Radio	62
Hamgear Electronics	62
Heath (Gloucester) Ltd. ...	5
Home Radio, Ltd. <i>inside back cover</i>	
Imhofs	61
K.W. Electronics <i>inside front cover</i>	
Lowe Electronics	8
May (Leicester) Ltd.	64
Mosley	12
N.A.T.C.S.... ..	59
Newbery, Graham	60
N.W. Electrics	55
Partridge Electronics <i>inside back cover</i>	
Quayslade Electronics	59
Radio Shack	12
R. T. & I. Electronics, Ltd.	1
Senator Crystals	57
Shure Microphones	7
Small Advertisements	62-64
Smith, G. W. (Radio)	10
Solid State Modules	63
Spacemark, Ltd.	60
Stephens-James, Ltd.	57
Strumech	61
S.W.M. Publications <i>back cover,</i> <i>inside back cover, 2, 6,</i> <i>55, 56, 58, 61, 64</i>	
Taurus Electrical Services...	60
Telecomms (G3SED)	63
The Amateur Radio Shop	61
Trio Electronics	3
J. & A. Tweedy, Ltd.	57
Western Electronics	9
Yukan	57

SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXIX

MARCH, 1971

No. 329

CONTENTS

	<i>Page</i>
Editorial—Frustration	13
Satellite Reception Made Easy, Part II , by J. M. Osborne, M.A., G3HMO	14
Drake 2-B Receiver on Top Band , by R. L. Glaisher, G6LX	20
Automatic Dot-Dash Sender , by G. V. Farrance, G3KPT	22
A 70-Centimetre Tripler (PSU)	25
SSB Not So New , by A. Wickham, G3IAZ	26
Centre-Loaded Whip for Top Band , by A. C. West, G3RBF	28
Communication and DX News , by E. P. Essery, G3KFE	30
VHF Bands , by A. H. Dormer, G3DAH	35
“SWL”—Listener Feature	41
HPX Rules	46
The Month with The Clubs—From Reports	47
New QTH's	54

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

Advertising: Maria Greenwood

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

Annual Subscription: Home: 50s. (55s. first class) post paid
Overseas: 50s. (\$7.00 U.S.), post free surface mail

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 with details on a separate sheet. 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.

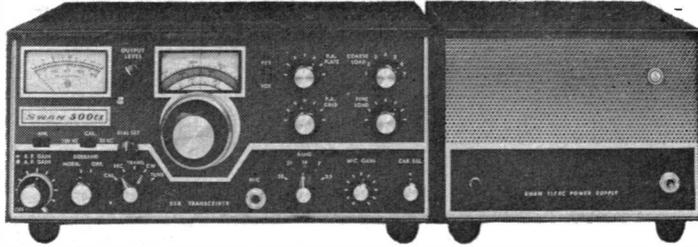
© Short Wave Magazine Ltd.

Radio Shack Ltd ★

London's Amateur Radio
Stockist

Just around the corner from West Hampstead Underground Station

**INTRODUCING THE DE-LUXE 500-CX. AND 500-CX. SS-16
5 BAND TRANSCEIVER-550 WATTS P.E.P. HOME STATION, PORTABLE,
MOBILE**



All the outstanding features of the famous 500C, plus the following improvements:

New Automatic Gain Control circuit. Faster attack, controlled decay, results in superior receiver control with no "pumping".

Amplified Automatic Level Control makes mic gain adjustment less critical, reduces tendency to over-modulate.

New crystal calibrator provides both 25KHz and 100KHz markers. Carrier suppression exceeding 60dB.

Improved Product Detector Circuit. Increased A.F. gain with less distortion.

Narrow Band CW Filter Accessory for installation in 230-XC matching power supply. Model AF-800.

550 Watts p.e.p. input.

	£	s.	d.
500-CX De Luxe	313	10	0
50-CX. SS-16 De Luxe	355	0	0
230-CX AC P.S.U.	65	0	0

RADIO SHACK LTD.

182 BROADHURST GARDENS,
LONDON, NW6 3AY

Just around the corner from West Hampstead Underground Station
Telephone: 01-624 7174 Cables: Radio Shack, London, N.W.6.
Giro Account No.: 588 7151

WE ARE THE ANTENNA PEOPLE



SOME OF OUR ANTENNAS

VERTICALS: Atlas. 10, 15, 20 and 40 metres.

V-3 Jr. 10, 15 and 20 metres.

VTD Jr. 10, 15 and 20 metres.

TW-3X. El Toro 20, 40 and 80 metres.

TA-31 Jr. 10, 15 and 20 metres. Also Horizontal.

HORIZONTALS: TA-33 Jr. TA-32 Jr. 10, 15 and 20 metre beams.

Mustang. 10, 15 and 20 metre beam.

Elan. 2 band 3 elements 10 and 15 metres.

A-203-C. 20 metre monoband beam.

A-315. 15 metre monoband beam.

A-310. 10 metre monoband beam.

TD-3 Jr. 10, 15 and 20 metres. Trapped dipole.

Short Wave Listeners' Antennas: SWL-7 Broadcast Short Wave Bands.

RD-5 Ham Bands. 10, 15, 20, 40 and 80 metres.

Accessories: D-4BCA. Base loading coil for 80 metres with Atlas.

Polythene, cord and rope.

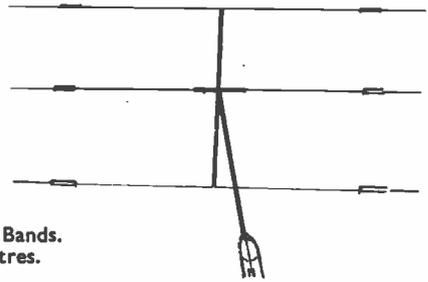
Rotators.

Coax cable and twin feeder.

Towers. Insulators etc. . .



V-3 Jr.



MUSTANG

Send for complete Catalogue/Handbook, containing full details of Antennas and other technical information.
25 pages 15p. Refundable upon purchase of Antenna.

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

The SHORT WAVE Magazine

E D I T O R I A L

Frustration *The comment in this space last month outlined the difficulties we were in with the February issue. Though full retail distribution was eventually achieved, we could not of course send out any post copies—this naturally we regret deeply but we know that direct subscribers, individually (of whom there are several 1000's) will understand the situation. At the moment of writing, their copies still await despatch.*

The difficulties of production have been no less severe with the issue now in your hands—but the fact that you have it will at least prove that we got it out on time and have been able to ensure a measure of retail distribution.

But we have had no mail intake (since January 18) for this issue, which means that the news-feature articles are not as comprehensive as usual, nor does the Reader Small Advertisement section carry anything like its usual volume of notices.

We can only hope that by the time the April issue of SHORT WAVE MAGAZINE is due for publication, on March 26, the postal system will again be functioning as a Public Service (which we keep being told it is). Though even then it will be with charges heavily increased. Readers interested in our regular Book advertising—in which context we find a healthy uplift in turn-over, proving that we are meeting a real demand—will note the effect of postage. All our current prices have been decimalised and take in the new postage rates that came into force on February 15. We would wish particularly to stress that any apparent increase between last month's price lists and those shown in this issue is due entirely to the new postage loading.

We are sure most readers will appreciate that our advertisers are also in considerable difficulties. They have had no inflow of mail and are unable to make any despatches. As far as cash transactions are concerned they have, like us, to rely on caller business till things get back to normal.

* * * *

Twenty-Five Years On *It may seem a little beside the point at the present juncture, but perhaps it is worth recording that exactly 25 years ago the writer of this piece launched the first post-war issue of SHORT WAVE MAGAZINE, in March 1946—and he has been producing it regularly and on time each month ever since. Looking back on it, the birth-pangs associated with the March 1946 issue seem to have been no worse than those suffered for March 1971! Time marches on—and our grateful thanks are due to all those readers who have kept with us through the years. It is they who have helped to maintain the Magazine as a positive factor in the field, world wide, of what we know as Amateur Radio.*

*Austin Smith,
G6FO.*

SATELLITE RECEPTION MADE EASY

BASIC UNDERSTANDING ABOUT SATELLITE ORBITING—FIXING PASS TIME AND DIRECTION— CURRENT SATELLITE DATA

Part II

J. M. OSBORNE, M.A. (G3HMO)

The first part of this practical article on the reception and identification of active Satellites sending usable information appeared in our February issue. It should be read for continuity.—Editor.

IN the first part of this article (February, 1971, SHORT WAVE MAGAZINE) it was suggested that by listening on the right frequency for two hours around midday one could hear a weather satellite for 15 minutes. This is a hit-or-miss procedure, but once a signal is acquired the future course of the satellite can be predicted with the same certainty that night follows day and winter follows summer—the same facts and laws are involved. This part of the article will explain how this is so and how to predict the day-to-day motion of a satellite. To keep it simple I shall confine myself to a consideration of circular orbits near to the earth. (Elliptical orbits and those involving the moon's gravitational field as well as the earth's are obviously more complex and so outside our scope for the time being.) In fact, to keep it simple, I shall ignore all but the vital facts, e.g., the rotation of the earth itself during the satellite transit. In this way one can "see the wood" and build up a satisfying and workable comprehension of satellite motion. This could lay the foundation for further work, such as participation in the utilisation of *Oscar* satellites.

Orbits—Basic Facts

As was made clear by Newton, once in orbit the satellite will continue to circle in the same plane indefinitely. It needs no rocket propulsion provided that it is beyond the earth's retarding atmosphere, say over 100 miles up. We all know that what goes up must come down; however, in the case of the satellite the horizontal velocity is so high that it is, as it were, always falling over the horizon. The cumulative effect of air resistance on a satellite in a *low* orbit is to reduce the horizontal velocity so that eventually it does not quite make the horizon and so re-enters the atmosphere and burns up. During this time the orbit gets smaller and so the time to go round gets less, even though the velocity is reducing. However, the satellites which we are interested in are 1000 Km. up or more and will last out our life-time—though their electronics will be switched off when they have finished their useful working life.

A satellite can be launched into an orbit of one of three categories—polar, inclined and equatorial. If launched towards the North, it will pass over each pole successively and cross the equator and all points below it, travelling South to North or North to South. If it is launched into an East-West orbit over the equator, it will continue to circle the equatorial belt, never leaving it. If, as is the more usual case, the orbit is inclined to the North-South axis of the Earth, it will never reach the poles. The diagrams in Fig. 1 will help one visualise these categories.

The Inclined Orbit

A typical weather satellite will have an orbit inclined about 10° West of North. This is illustrated in Fig. 2 (A). By looking exactly edge-on to the orbit as in Fig. 2 (B), it is clear that the satellite crosses the equator going 10° West of North, i.e., making an angle of 80° with the equator. It is also clear from the same diagram that the most northerly point reached is a latitude of 80° N. By looking at Fig. 2 (A) again one can see that the direction of the satellite relative to the earth below is changing continuously. Having crossed the equator going 10° W. of N., by the time it reaches 80° N. it is travelling from East to West. Now looking from the other side in Fig. 2 (C), we see the satellite coming over the top 80° N., and travelling East to West, being the same point as the top in Fig. 2 (A). It crosses the equator going 10° W. of S., and subsequently goes under at 80° S., travelling again E. to W. at this point. An example of such a single orbit on a Mercator projection is shown in Fig. 3.

To track a satellite from a point on the Earth's surface we need to know when the satellite is over our horizon and during this time whereabouts in the sky it is. We now have to bring in the rotation of the earth, one revolution in 24 hours (no apologies for the obvious; I hope that it will all be as obvious by the end!). Not that this rotation concerns the satellite but it does concern us as to whether or not we are passing through the plane of the orbit. We also need to know the satellite's period, i.e., how long it takes to circle the earth once.

Consider an imaginary satellite at such a height that it takes exactly two hours to go round. Next, imagine that it is exactly overhead our ground station at some convenient time, say 12 noon. By 2 p.m. it will again be overhead the same latitude but the Earth itself having rotated 30° in 2 hours (360° in 24 hours), we shall now be 30° East of the satellite. The satellite will be (like the sun) 30° W. Working backwards, we can say that the satellite would have been 30° E. at 10 a.m. Making exactly 12 orbits each day, it would repeat exactly the same pattern each day.

In practice a typical weather satellite will be orbiting at a height of 1400 Km (600 nautical miles) over the Earth's surface and will take 108 minutes to complete an orbit. (The same Law of Gravity determines the Moon's period of a month from its height of 250,000 miles.) In 108 min. the Earth rotates 27° (that is 360° in 24 hours, or 1° in 4 min.).

Now consider London, Lat. 52° N. Long. 0° . At some time, say 10 a.m., London could be in Posn. 1 in

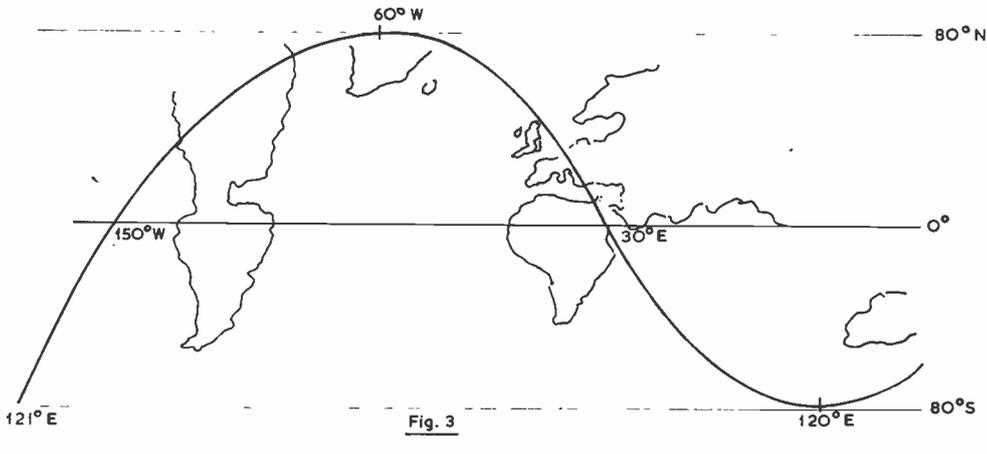
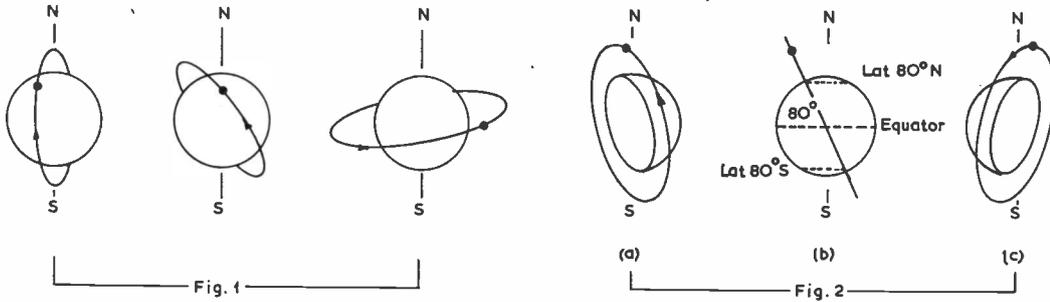


Fig. 1. Illustrating polar, inclined and equatorial orbits. Fig. 2(A). A section through the inclined orbit diagram of Fig. 1, to help visualise the plane of the orbit. Fig. 2(B). An edge-on view of the orbit, like the edge-on view of Saturn's rings. This explains why the equator-crossing angle also determines the maximum latitude reached in a particular orbit. Fig. 2(C). If Fig. 2(A) is a view of the sunny side of the Earth, then this is the corresponding view of the orbit on the night-time side. Fig. 3. An outline map on Mercator's projection showing the same orbit as in Fig. 2.

Q 480

Fig. 4 and at this time the satellite might be crossing the Lat. 52° line, some 35° to our East, *i.e.*, the satellite's sub-point on the Earth's surface would be 52° N. 35° E. Then, 108 min. later, that is 11.48 a.m., we shall have rotated 27° and be in Posn. 2 in Fig. 4. The satellite will have been round the earth once in this time and so it will again be crossing latitude 52° but it will now be only 8° E., *i.e.*, its sub-point will be 52° N. 8° E. (See Fig. 4, overleaf).

Hence, if we aim our aerial East at the right elevation we should "acquire" the satellite signal. Over a known point in Europe at a height of 600 miles, it is a simple problem of triangulation to determine the elevation. With a typical Yagi of beam width some 30° it is, however, unnecessary to do the calculation. If the aerial is elevated between 40° and 80° in a vaguely easterly direction, the satellite will be effectively in the beam. Next time round, 1.36 p.m., we shall be in Posn. 3 in Fig. 4. The satellite's sub-point will be 52° N. 19° W. (It will be 27° to the West of its previous position of 8° E.) An aerial aimed in a westerly direction at around 10° to 40° elevation

should again acquire the satellite.

It is not difficult now to visualise that at about 11.40 a.m. the satellite would rise in the South-West and having passed over Europe (to our East at 11.48 a.m.) would set in the North around noon. It will then reappear on our southern horizon about 1.30 p.m. (to our West at 1.36 p.m.) and set in the North-West around 1.45 p.m. Next time round it will not rise over our horizon and so will not be visible. ("Visible" in this context means, of course, radio-wise or in line-of-sight—satellites are not visible to the naked eye except those which are large and close and then only under favourable conditions of illumination, such as when the observer is in the dark and the satellite in sunlight.)

During the hours of darkness we shall again pass through the plane of the orbit. The satellite may be transmitting infra-red pictures of the Earth as it passes us, travelling now from North to South. But the next time it appears in daylight coming from S. to N. will be 12 orbits after 1.30 p.m.—that is 12 x 108 min., which is 21.36 hours later, or 11.06 a.m. the next morning. At 11.12 a.m. it will be crossing Lat 52° N.

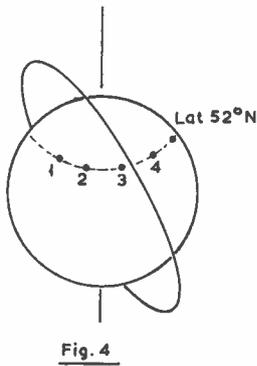


Fig. 4

Q 481

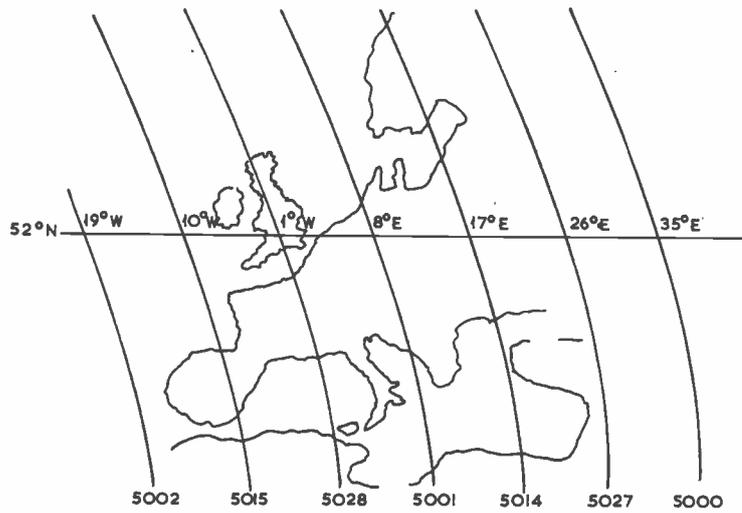
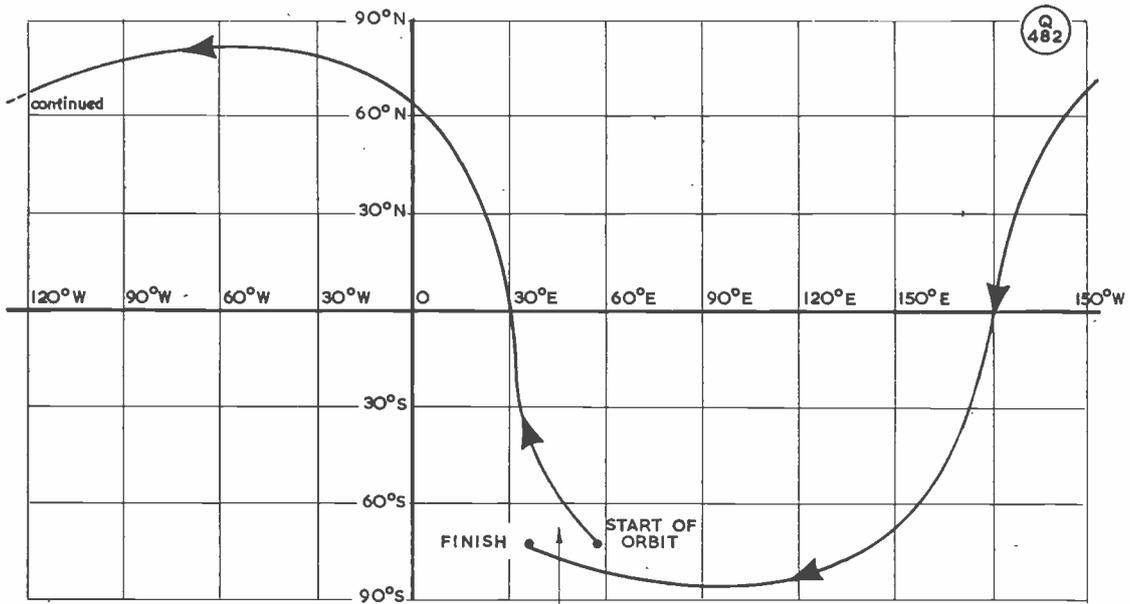


Fig. 5

Fig. 4. The plane of the satellite remains fixed in space, while a point on the surface of the rotating Earth will move successively through the positions indicated in the time the satellite takes to make one orbit. Fig. 5. Outline map of Europe showing the satellite tracks given in Table I, opposite.



DETAIL FOR FIG. 3— WORLD ORBIT

Note: 27° lost per orbit due to earth's rotation

Orbit detail for Fig. 3 — see text.



The synchronous satellite ATS-3 goes QRT after sending a series of weather facsimile—known as WEFAX—pictures. This is the reproduction of an actual sign-off signal as received by G3HMO in London. ATS-3 is fixed in space (with respect to Earth) some 22,000 miles out over the mouth of Amazon. It is easily received in the U.K.

Table I

IMAGINARY DATE	ORBIT NUMBER AFTER LAUNCH	TIME OF CROSSING LAT. 52°	LONG. AT THIS TIME
16/7/71	5000	10:00	35°E.
	5001	11:48	8°E.
	5002	13:36	19°W.
17/7/71	5014	11:12	17°E.
	5015	13:00	10°W.
18/7/71	5027	10:36	26°E.
	5028	12:24	1°W.*
	5029	14:12	28°W.

*This Orbit No. 5028 would pass overhead in the U.K. Times are GMT.

During this time the Earth will have rotated $12 \times 27^\circ$, that is 324° , from its previous position. The satellite's sub-point will now be 324° beyond its previous position of 190° W. This brings it to 343° W. or 17° E.

The data can be tabulated and extended for successive days, as shown in Table I, above.

From Table I a pattern emerges. Each day this imaginary satellite will be easily observable (radio-wise) once or twice between 11 a.m. and 1 p.m. If it appears around 11 a.m. it will be to the East and will appear again and pass to the West around 1 p.m. If it appears around noon it will pass overhead. If the tracks and times are shown on a Mercator projection, this pattern becomes quite clear. Fig. 5 shows the contents of Table I plotted in this way—see over.

Once one has acquired a satellite and supposing one knows its period (by timing successive orbits if no other way of getting the information is available), one can predict its position at any time in the future. In fact cumulative errors would limit the usefulness of doing this to a week or so unless one had very precise information to work from or unless one was continuously up-dating the information with frequent observations of the satellite. Further extended calculations of this sort, while basically simple, are extremely tedious without the aid of a desk calculator. In practice, of course, the whole process is given to a computer which can be programmed to print out the aerial azimuth and elevation at two minute intervals for every visible orbit for any given satellite.

There is another way of extending one's predictions which comes about in this way. In Fig. 5 no two tracks correspond but since they are all parallel sooner or later one orbit will be identical in both space and time of day to a previous orbit. In our very first simple example this was once a day. In practice it could be months, but to within a few minutes the weather satellites repeat every week or so. *Nimbus 4* has an exact 7-day cycle, by chance as far as I know, which means that if you observe it on one Sunday it will be in transit on successive Sundays at exactly the same time. Likewise Monday's transits will recur the following Monday, and so on. *Ito 1* has a 2-day cycle less $2\frac{1}{2}$ minutes. If you observe it this Sunday lunch-time it will be doing almost exactly the same orbit on Tuesday, but $2\frac{1}{2}$ minutes earlier. Table II gives this and other relevant information on four satellites. The information is believed to be correct but of course NASA could change the status at any time as would be announced in a daily bulletin. Not that the orbit could be changed, of course, but cameras can be switched, the mode might be changed from APT to infra-red picture or the satellite switched off to avoid interference with other activities.

Although I have omitted all but essential facts, I will mention one special feature of the weather satellite orbits without which the foregoing treatment would only apply for a very limited time. Owing to the flattening of the Earth's poles, the plane of the orbit does not stay exactly fixed in space but processes slowly. By cunning choice of the inclination this can be chosen to be about 1° each day or 365° per annum. In this case the orbit will remain fixed with respect to the sun and this is why these orbits discussed here result in transits about the same time each day *throughout the year*. This sun synchronous orbit is of obvious advantage to the Met. men.

Footnote, *Nimbus 4* is currently not sending APT (Dec., 1970) but can be heard as on its CW tracking beacon 136.5 MHz.

The Equatorial Orbit

Finally, I must mention one other special case. This is the equatorial orbit at a distance from the Earth greater than the weather satellites and less than the Moon. At a height of 22,000 miles the period becomes exactly 24 hours. As the satellite and the Earth

Table II
Current Active Weather Satellites

NAME	FREQUENCY	PERIOD	DAILY TIME	HEIGHT	TRANSIT
<i>Nimbus 4</i>	136.95	107.4 mins.	1100	1,180 Km.	S to N
<i>Itos 1</i>	137.50	115.1 mins.	1420	1,500 Km.	S to N
<i>Itos 2</i>	137.62	115.0 mins.	1310	1,480 Km.	N to S
<i>Essa 8</i>	137.62	114.7 mins.	1045	1,450 Km.	N to S
<i>ATS 3</i>	135.60	(In synchronous orbit—see text)			

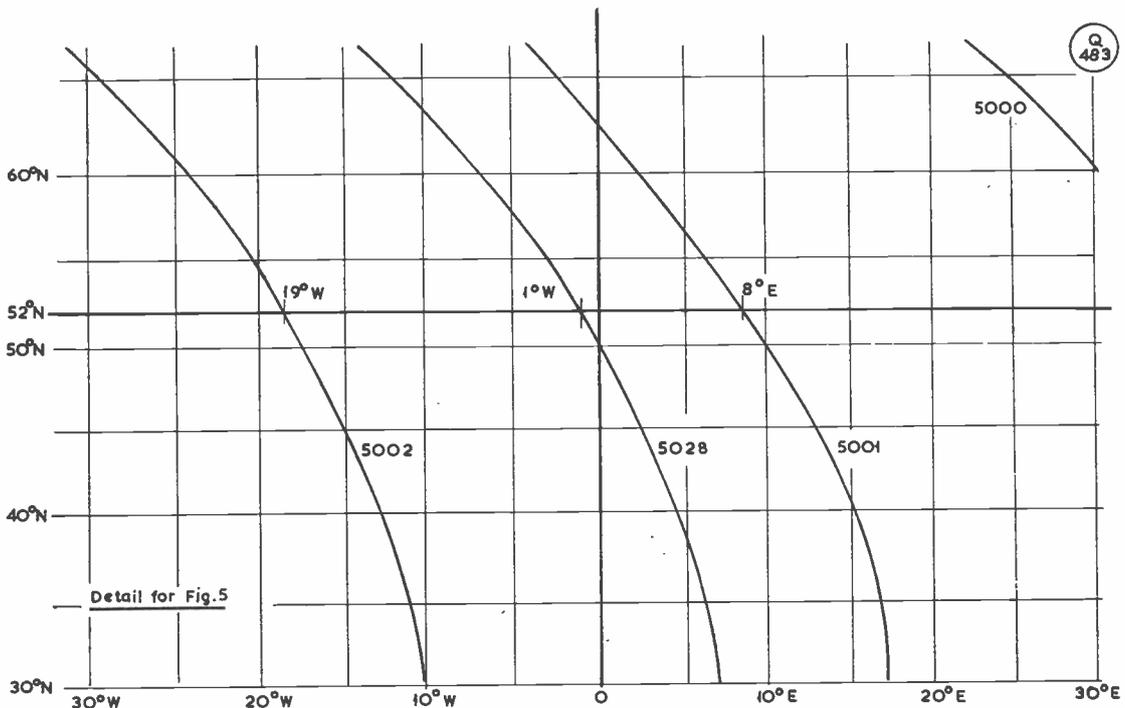
Repeating Intervals

- Nimbus 4* Seven days exactly
Itos 1 Six days less 7 minutes
Itos 2 Repeats alternate days less 7 minutes
Essa 8 Nine days plus 1½ minutes.

NOTES: Frequencies are in MHz, *Itos 2* and *Essa 8* being on the same frequency. *Daily Time* is the time of passing through the plane of the satellite's orbit. This is the time when the satellite could pass overhead. If it passes earlier, it will be to the East, if later to the West. GMT need not be specified, because the information given (in GMT here) applies to local time throughout the world. Thus, local variations in time must be corrected for, e.g., add one hour for BST in the U.K. The *Transit* heading above gives the direction of the day-time pass.

rotate together, the satellite remains above the same point on the Earth's surface. It can be seen and can see most of a hemisphere and aerials do not have to track. Among the various synchronous satellites, as they are called, is an experimental one, *ATS 3*, on 135.6 MHz, and at present parked over South America (on the equator, of course). At the time of writing, December 1970, its bearing was 235° at an elevation of 15°. Among other experiments, it is used for broadcasting weather pictures but its schedule is not announced much in advance as far as is known. Recently, it has been on the air most days from 0100 to 0150 GMT. It can be received with the simple gear described in Part 1 of this article. The satellite can be manoeuvred by commanding a propulsion system and from time to time it might be more favourably placed.

This description of satellite orbits is intended only



Detail for Fig. 5 — see text.

Satellite ATS-3 on 135.60 MHz in synchronous orbit at a distance of 22,000 miles coming through at good speaker strength during this portable test at a good site on the South Devon coast (it is just as easily received in the heart of London). Unlike the much nearer Wx satellites (see Table II, opposite) the plane of polarisation from this "fixed" satellite does not appear to change during transmission. ATS-3 sends weather pictures taken by its own cameras, these being processed in the U.S.A. for sending up again on a separate channel for re-transmission for general reception.



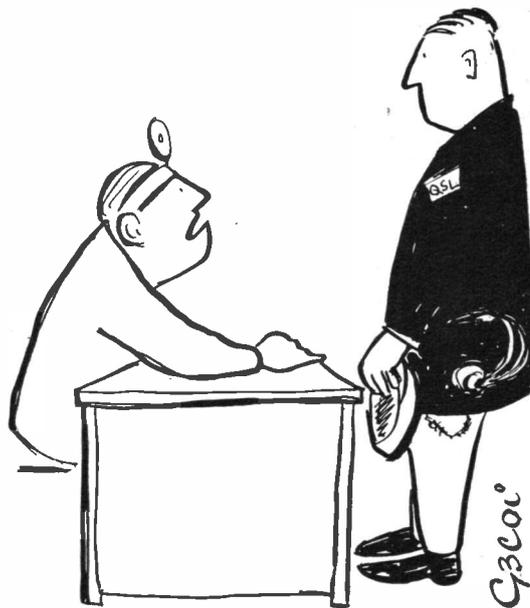
as an introduction for those who might like to receive transmissions from space. It is not exhaustive nor is it precise. It is intended as a common-sense introduction which will enable amateurs just starting in this fascinating field to realise what is going on when they track satellites and to use rule-of-thumb methods

quite accurate enough for directing simple beams, the point being that they can get strong signals using quite simple gear. The interpretation of these signals and the use to which they can be put will be discussed in another article. (Photographs by D. Rogers and A. Jones, Westminster School Science Dept.)

"SINGLE SIDEBAND FOR THE RADIO AMATEUR"

The 5th Edn. of this useful ARRL publication has been extensively revised to include theory and practice up-to-date. With more than 60% new material, much emphasis has been placed on the applications of solid-state thinking in SSB equipment. Among the 30 or so practical constructional projects are easy-to-build station accessories; receivers both simple and sophisticated; phasing-type and crystal-filter SSB exciters; complete Sideband transceivers and transverters; also no less than five high-power linear-amplifier designs. Of particular interest is a solid-state transceiver for the 10-80m. bands and a communications Rx using the phase-lock technique to achieve high frequency stability. Also discussed are the design and construction of crystal filters, speech processing circuits and RF power meters.

Though all this is, of course, in the American context and idiom, the content is just as applicable and interesting from the point of view of radio amateurs and professionals in the U.K. This new edition of *Single Sideband for the Radio Amateur* is of 256 pages, well illustrated, and costs £1.65 (33s.) post free from our Publications Dept. at Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.



"... Your condition suggests to me that you ought to take up some sort of hobby ..."

DRAKE 2-B RECEIVER ON TOP BAND

NOTES ON A SIMPLE MODIFICATION

R. L. GLAISHER (G6LX)

THE Drake 2-B was first introduced in 1959 and although it has been superseded by later models, in the writer's view it is still one of the best of the post-war amateur receivers for SSB and CW use. In addition to coverage of the 3.5 to 28 MHz amateur bands, it has a built-in facility which permits, with the use of extra crystals, reception on *five extra bands* each 600 kHz wide anywhere in the range 3 to 32 MHz. It is this facility which can be used to extend the coverage to include the 160-metre band.

As will be seen by reference to the block diagram (Fig. 1), the receiver is a multiple-conversion superhet having a basic tuning range of 3.5 to 4.1 MHz. A crystal oscillator and mixer stage is switched into circuit for the amateur bands 7 to 28 MHz and for the five extra bands in the spectrum above 4.1 MHz. The grid and anode circuits of the RF stage are tuned independently of the main frequency control by the use of a separate preselector control comprising L/C circuits which resonate at $7 \text{ MHz} \pm 2 \text{ MHz}$. Coverage of the other bands and frequencies is obtained by the switching of capacitive or inductive shunts across the preselector coils to raise or lower their inductance.

To receive 160 metres, triple-conversion is used, as on the 7 to 28 MHz bands. As the preselector circuits will only tune down to 3.3 MHz, it is necessary to add capacity so that they will resonate at 1.9 MHz at mid-scale of the preselector tuning. This can be done by using the extra Band "A" switch position to bring in capacitive shunts, which in conjunction with a suitable crystal fitted in the "A" socket, will provide the coverage required. By using Band "A", the modification has no effect on the performance or the operation of the receiver on the other bands, as the shunts are only in circuit on

160 metres.

A total padding capacity of about 1500 μF is required across each section of the preselector tuned circuits. This capacity is made up from a 0.001 μF silver-mica condenser in parallel with a 700 μF compression-type mica trimmer. At first sight it might be thought that the addition of such a large capacity in shunt with the condensers already in circuit would have detrimental effects on the Q of the tuned circuits in the RF stage. In practice this was not found to be a problem as the preselector can be tuned over the frequency range required and more than sufficient gain is available from the RF stage to blanket the noise from the succeeding mixer stages.

Crystal Frequency

To convert the 1.8 to 2.0 MHz signal frequency to fall within the range of the tunable IF (3.5 to 4.1 MHz), the crystal oscillator has to operate between 1.7 and 2.1 MHz for product mixing, or between 5.5 to 5.9 MHz for difference mixing. At G6LX, a crystal frequency of 5.5 MHz is used to obtain a coverage of 1.8 to 2.0 MHz with the receiver tuned 3.7 to 3.5 MHz. Product mixing is not recommended, as apart from the problem of the oscillator being in the band in the 1.8 to 2.0 MHz segment, there are difficulties with strong second-channel signals and in-band birdies. Using difference mixing, there are no obvious spurious or second channel signals within the 1.8 to 2.0 MHz band. It is suggested that a crystal having an exact multiple of 100 KHz be used as this will provide a direct frequency read-out on the main tuning scale.

The Preselector Modification

It is first necessary to identify the two switch wafers that are associated with the preselector input and output circuits and the connections to the wafers that correspond to switch positions "A" and "80". These wafers are the first two looking from the front panel and as wired have a linking lead between the connections for "A" and "80". (See Fig. 2A). The modification consists of removing these leads and wiring in the padding condensers (C1A, CT1A, C2A and CT2A) as shown in Fig. 2B. While there is

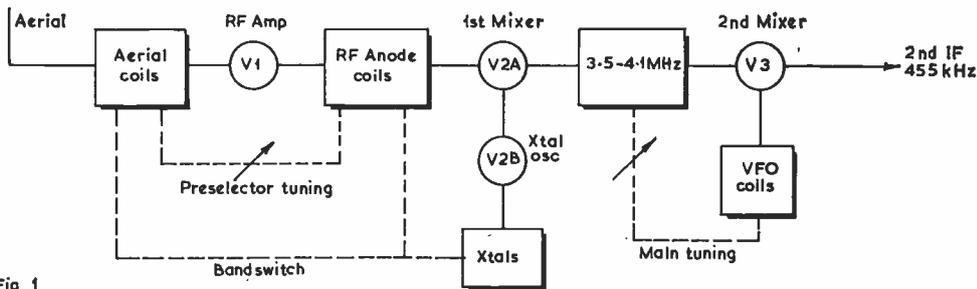


Fig. 1

Fig. 1. Block diagram of the Drake 2-B Receiver, showing RF and Mixer arrangements — see text.

R
574

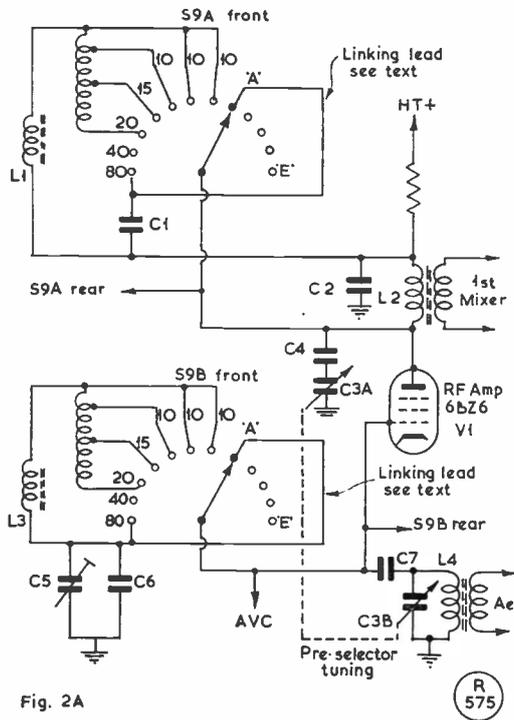


Fig. 2A

Fig. 2A. Part of the RF stage circuit of the Drake 2-B, before modification. Component values are as original—see handbook.

sufficient room to mount the extra components on short brackets attached to the chassis, this was not found to be necessary and the condensers and trimmers are wired directly between the switch contacts and the 80-metre shunts using short lengths of 18g. tinned copper wire. If brackets are used, it should be remembered that most types of compression trimmers are constructed so that one side is at earth potential and insulated spacers will be required between the trimmers and the mounting brackets.

Alignment

Once the preselector modifications have been completed and a crystal of the correct frequency inserted into crystal socket "A", the only thing that remains is to adjust the trimmers CT1A and CT2A in order to resonate the preselector tuned circuits to 160 metres. This is a very simple adjustment which can be done without the use of a signal generator or other test equipment. The receiver bandswitch is set to 160 metres (Band "A") and the preselector control to mid-scale. The main tuning control is set to the frequency that corresponds to 1.9 MHz and the trimmers CT1A and CT2A carefully adjusted for maximum received noise without an aerial connected. If the receiver is fitted with the optional 100 KHz calibrator, this can be switched on and the trimmers adjusted for maximum S-meter reading. Correct adjustment of the trimmers can be checked by retuning to 1.8 MHz and the preselector control

adjusted for a noise peak (or maximum S-meter reading on the calibrator signal). This peak should occur with the preselector at near maximum capacity, (pre-selector dial near 3.5). A similar check at 2.0 MHz should provide a preselector peak at near minimum capacity (28 MHz on the dial). Provided that the trimmers have been correctly set, tracking over the band will be satisfactory and the aerial can be connected. If it is found that the preselector will not peak at the band-edges, or if there is an obvious difference in sensitivity over the band, this is a sure indication that the trimmers were not set correctly at 1.9 MHz and further adjustment is required.

Performance

A number of Drake 2-B receivers have been similarly modified for 160 metres, using the arrangement described. In every case the sensitivity throughout the band has compared favourably with that attainable on 80 metres. The G6LX receiver has been used extensively for Top Band DX working and by the Croydon NFD Group, with excellent results.

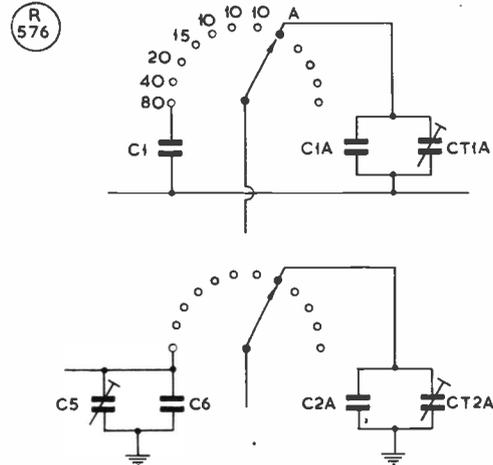


Fig. 2B

Fig. 2B. The preselector modifications for Top Band in the Drake 2-B. C1A, C2A, are .001 μF silver mica. CT1A, CT2A, 700 μμF compression-type trimmers—see text.

ENTRIES—MAY R.A.E.

Candidates intending to sit the next (May '71) Radio Amateur's Examination should have had their entries in by now. However, it is reasonable to assume that because of the failure of communication due to the postal stoppage there will be some extension of the time allowed. In any event, course instructors should know about this and will be able to guide their candidates accordingly. For those not in with a course but entering as individuals, enquire at the local office of the Education Authority (quoting "Subject No. 55, Radio Amateur's Examination, City and Guilds"). In case of difficulty, the address of the City & Guilds of London Institute is 76 Portland Place, London, W.1, and the telephone number 01-580-3050 (and be sure to quote "Subject No. 55" in the course of any enquiries).

AUTOMATIC DOT-DASH SENDER

THE KPT KEYER,
USING I.C. UNITS—TONE
GENERATOR AND SELECTOR
CIRCUITRY—WIDE SPEED RANGE

G. V. FARRANCE (G3KPT)

THE keyer described here can be constructed at a cost less than £5, yet will be found to have all the facilities of more sophisticated devices, e.g., self-completing characters, lock-out and speed control from about 8-50 w.p.m.

As shown in the photograph, the prototype was constructed on a piece of Veroboard $4\frac{1}{2} \times 2$ in. on a 0.1 in. matrix, and bases were employed for the two integrated circuits.

The IC's are numbered as shown in the circuit diagram, Fig. 1, looking from above—that is, with the pins downwards; note the small indentation at the one end which denotes the start of numbering.

The writer uses this keyer on small transistor rigs, with which no contact protection is required. However, as reed relays are notorious for "bounce" it would require protection in most applications.

Description

A pulse generator (CLOCK) is started by operation of the key to either the "dot" or "dash" position, at

the same time the flip-flops are opened to receive the pulses.

Pulses from the generator actuate the flip-flops and their outputs in turn feed a NOR gate and then a driver transistor which operates the reed relay. When dashes are called by the key the output of the "dash" flip-flop is added to the output of the "dot" flip-flop in the NOR gate, holding the relay in for the length of a dash. When dots are called by the key, the "dash" flip-flop is held inoperative.

Pulse Generator

At switch-on (with the key in the neutral position) Tr1 is "off" as its emitter is at 0v. (the $1 \mu\text{F}$ capacitor is virtually short circuit at switch-on), and its base is at approximately +2.5v. due to the two 100-ohm resistors. If Tr1 is "off", then there is no base current available for Tr2, so this is also "off"—also the Tr2 base is held at 0v. by reason of Tr3 being "on" because its base is held at +5v. via the 47K and 1K resistors.

Immediately after switch-on, the $1 \mu\text{F}$ capacitor charges up to a voltage where Tr1 begins to conduct (about 3.1v.) but as Tr3 is hard "on", no further action takes place and Tr1 remains in a state where the current flowing through it is balanced by that through in the 27K resistor and the 250K variable. When the key is moved to either the "dot" or "dash" position, Tr3 is turned "off", as its base is then connected to 0v. via the 47K resistor and the key. This allows current to flow into Tr2 base and it starts conducting, causing the voltage at the junction of the 100-ohm resistors to become less positive, allowing Tr1 to turn on harder, letting more current flow into the base of Tr2, which turns on harder, creating an avalanche effect until Tr1

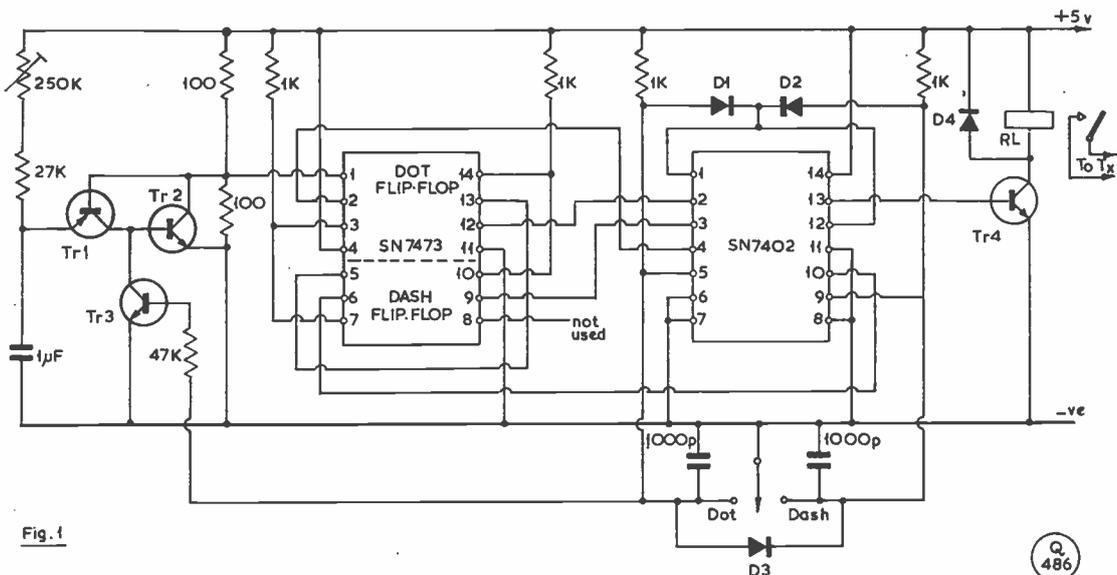


Fig. 1

Fig. 1. In this circuit, Tr1 can be BCY-70 or BCY-71; Tr2, Tr3, Tr4 are BC-107; D1, D2, D3 could be OA91; D4, BAX-16 or any silicon diode; and RL is a 6v. reed relay—see text. The integrated circuit units are SN7473N, or similar.

Q
486

The Keyer unit complete, as designed and constructed by G3KPT. The potentiometer is for speed control. Assembly is on a piece of 0.1in. "Veroboard".

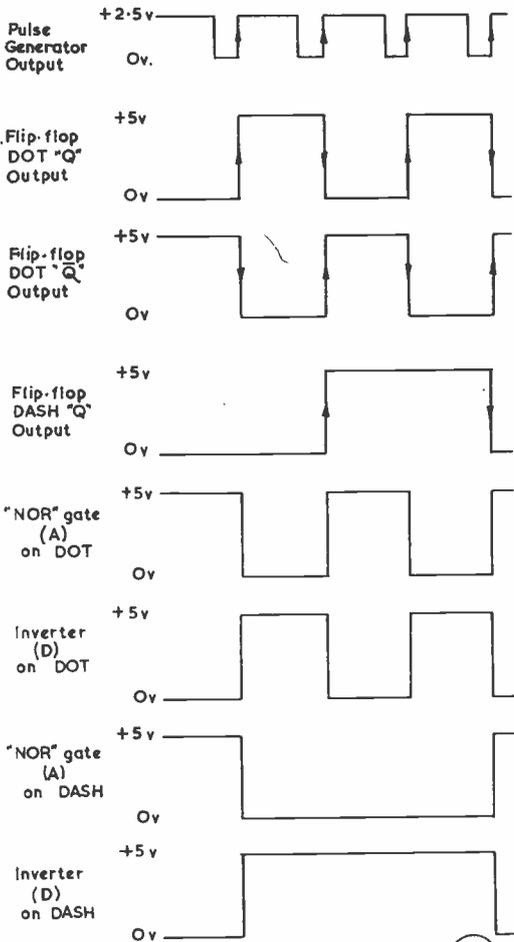
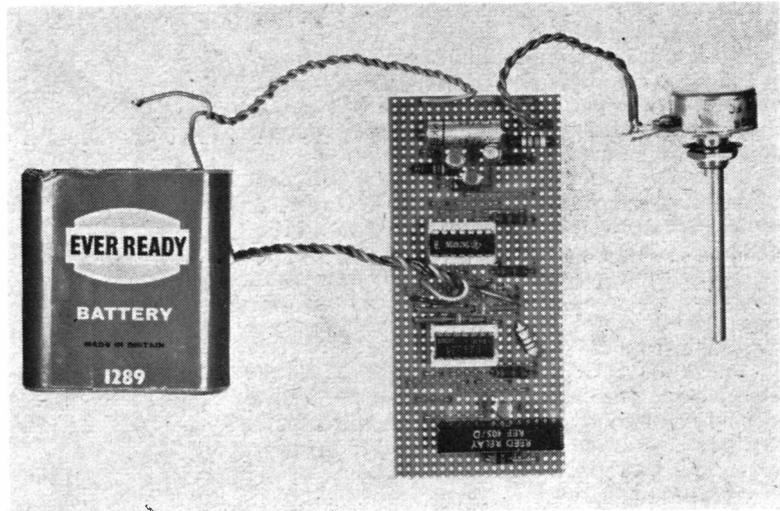


Fig 2



and Tr2 are both hard on; this rapidly discharges the capacitor and provides the negative edge of the output pulse.

When the capacitor has discharged, Tr1 turns off, stopping the base current into Tr2, which also turns off, to give the positive edge of the output pulse the condition required to feed the flip-flop.

"Dot" and "Dash" Flip-Flops, SN7473N

The J and K inputs are not required in this system, so they are held at +5v. by 1K resistors.

With the key in the neutral position, a logic 0 is applied via an inverter to the "clear" inputs, which holds the Q outputs to a logic 0 and the Q output to a logic 1 irrespective of the state of the CLOCK input. When the key is moved to the "dot" position, a logic 1 is applied to the "clear" input of the "dot" flip-flop, allowing pulses to enter the CLOCK input.

The logic 1 is held on the "clear" input until the output pulse is complete, irrespective of the key position (see description of NOR gates). If the key is moved to the "dash" position, a logic 1 is applied to the "clear" inputs of both the "dot" and "dash" flip-flops. The output pulse from the Q of the "dot" flip-flop is fed to the CLOCK input of the "dash" flip-flop where its time is doubled (the frequency dividing action of a flip-flop).

The Q output pulses of both the "dot" and "dash" flip-flops are added together in a NOR gate to produce a dash, the time period of which is thrice that of a "dot". Again the "clear" inputs are held at logic 1 until the completion of the pulse.

NOR Gates

The SN7402N is a set of four. In this system two input NOR gates, and two gates (B and C) are connected as inverters for the "clear" signals to the flip-flops—one, (A), as a true NOR gate for adding the

Fig. 2. The logic units are connected as shown here—see text

pulses, and the fourth, again as an inverter driving the relay transistor Tr4.

When the key is in the neutral position, a logic 1 is applied to the inputs of the two inverters (B and C), whilst their other two inputs are grounded. This causes the outputs to sit at a logic 0 level, which is applied to the "clear" inputs of the flip-flops.

If the key is moved to either the "dot" or "dash" positions, the inputs to the inverters B and C are grounded, causing the outputs to change to a logic 1 and hence remove the "clear" signal from the flip-flops.

The Q outputs from the flip-flops are connected to the two inputs of a NOR gate A, the output of which is connected to two diodes and an input of the remaining inverter D.

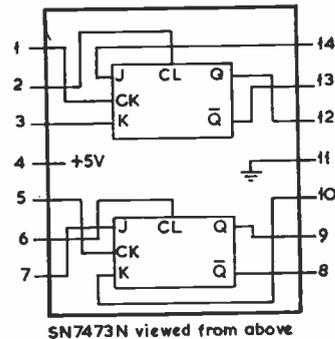
When the key is in the neutral position, the flip-flop Q outputs are at logic 0 which causes the NOR gate output to be at a logic 1 and hence the output of the inverter D is at a 0 (because its other input is at ground); this in turn switches off Tr4 and the relay is de-energised.

When one of the Q outputs changes to a logic 1, the output of the NOR gate A changes to a logic 0, which holds the key contact selected at an 0 via D1 and D2, until the output of the flip-flop returns to an 0. The output 0 of the NOR gate A causes the output of the inverter D to change to a logic 1, turning on Tr4 and energising the relay.

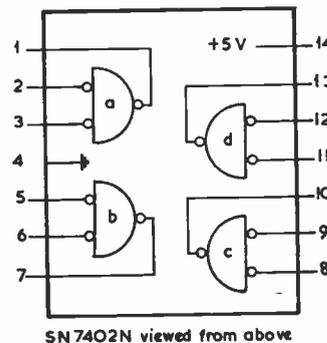
The NOR gate A adds the pulses from the "dot" and "dash" flip-flops together, by virtue of the fact that the "dash" pulse is presented at the end of the "dot" pulse, so that one long pulse appears at the output of the gate.

Diode D3 ensures that when the key is at the "dash" position, both inverters are operated to give the "clear" inputs logic 1 levels on both flip-flops, and also start the pulse generator.

Diode D4 protects Tr4 from transient spikes produced by the inductance of the reed relay coil. The



SN7473N viewed from above



SN7402N viewed from above

Fig. 3

Q
488

Fig. 3. For the KPT Keyer, the "J" and "K" inputs are not required and are biased off—see text.

two .001 μ F capacitors are included to prevent any RF present on the keying leads from entering the electronics.

MAY BE AN IDEA

At intervals over the years, it has occurred to us that it might be mutually interesting to those concerned if, from time to time, we published lists of licensed radio amateurs engaged in the same calling or profession, e.g., doctors, lawyers, chemists, engineers qualified in the various disciplines (mechanical, electrical, mining, civil and such), estate agents, and so on. This idea has been revived by a letter from M. Gaunt, M.P.S. (G3WGW), who is anxious to form a "Radio Club of Pharmacists" (in this case, to include SWL's); he is Group Pharmacist of the Leeds (Group B) Hospital Management Committee, and his QTH is Killingbeck Hospital, York Road, Leeds, LS14-6UQ, Yorkshire. (Those interested please write him direct.)

In the meantime, as a first step, we would like to hear—if they are interested—from those holding call signs who are qualified in medicine, surgery or their various specialist branches. These would be for publication in the *Magazine*, but giving only name,

qualifications, callsign and location, e.g., Dr. J. L. Swanston, T.D., M.D. Edin., D.P.H., GM3ZVF (Kirkcaldy).

If this idea develops it might enable some interesting personal contacts to be made among like-minded people with the same radio amateur and professional interests. Just a note to "Medical List," c/o Editor, SHORT WAVE MAGAZINE, BUCKINGHAM, England, will do. If the idea is thought worth while and it catches on, we will run similar listings.

NEW RSGB PRESIDENT INSTALLED

In the course of a pleasant social occasion in London on January 15, F. C. Ward, G2CVV—well known as an active worker in the cause of Amateur Radio, with much credit particularly in the Derby area—was installed as this year's President of the Radio Society of Great Britain, in succession to Dr. J. A. Saxton. G2CVV was supported by a large gathering which included many distinguished OT's and several past-presidents of the Society.

A 70-CENTIMETRE TRIPLER
THE POWER PACK

In the February issue of SHORT WAVE MAGAZINE we ran the article, by G3DAH, on a Power Tripler for the Seventycent Band. Here is the Power Supply Unit for energising the Tripler, to give all the necessary outputs. The circuit shown here is Fig.4 in the original sequence, which should be read for continuity.

This Power Pack is complete in itself and will give all the supplies required for the Tripler Unit as described. Though existing PSU's capable of the necessary outputs could, of course, be used, it is always desirable to ensure that transformers T1 and T2 are separate items.

Table of Values

Fig. 4. Suitable PSU for the Tripler

- C1, C2 = 16 μ F 500v.
- C3, C4 = 100 μ F 450v.
- C5 = 39 μ F 450v.
- R1 = 39K, 1w.
- R2, R3 = 39 ohms
- R4 = 21 ohms
- R5, R6 = 25K, 10w.
- R7 = 1.5K, 5w.
- R8 = 4.3K, 5w.
- R9 = 47K, 2w.
- R10, R11 = 47K, 2w.
- T1 = Sec. 230v. 25 mA, 6.3v. at 1 amp, 6.0v. at 3 amps.
- T2 = Sec. 350-0-350v. 300 mA
- SW1, SW2 = 2-pole mains switches
- F1 = 2 amp cartridge
- F2 = 50 mA cartridge
- V1 = VR75
- V2, V3 = VR150
- DCR = 8 x BY100 with .01/1000v. disc capacitor and 100K $\frac{1}{2}$ w. resistor in parallel with each diode
- D1 = BY100
- Blower = Airflow Development Type 26BTM (Lancaster Road, High Wycombe, Bucks.)

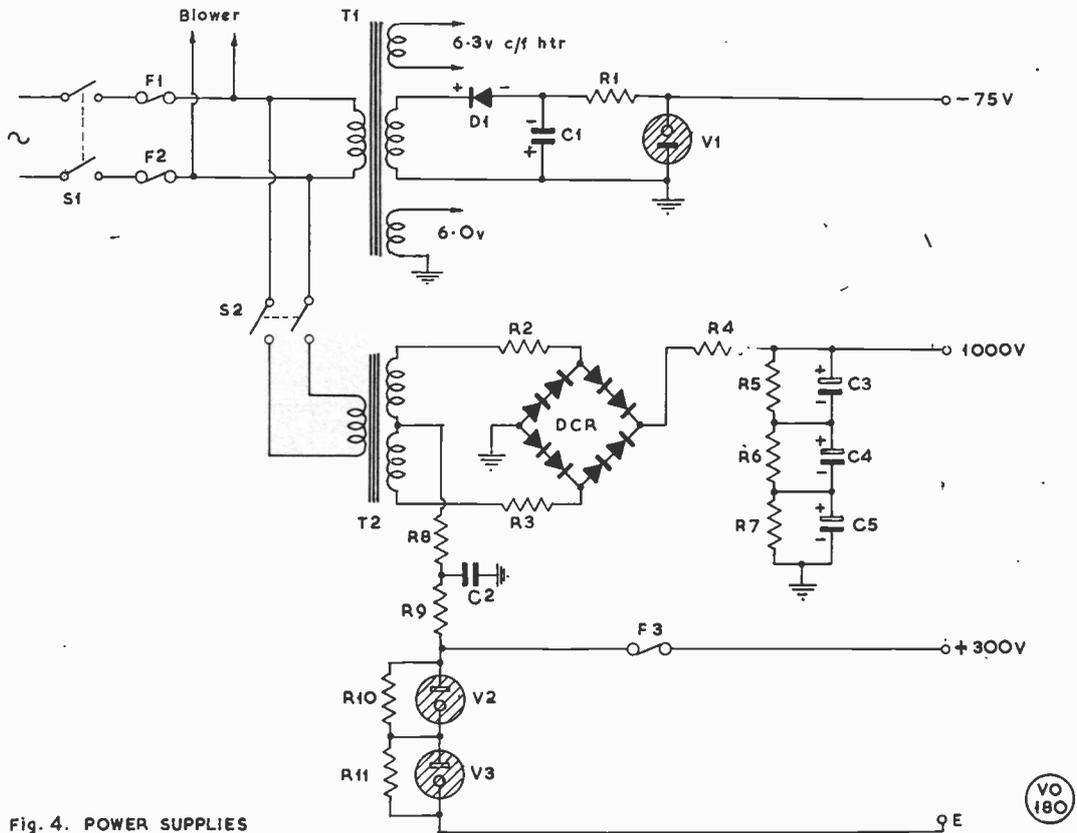


Fig. 4. POWER SUPPLIES

Fig. 4. Suitable Power Supply Unit for the 70-Centimetre Tripler.

To become a Direct Subscriber costs 50s. post free for a year of twelve issues (or 55s. for "first-class posting" in the U.K.) starting any month.

SSB NOT SO NEW

BIT OF NOSTALGIA—
TECHNICAL FACTS OF YEARS
AGO

A. WICKHAM (G3IAZ)

A great many readers—indeed, probably the majority—do not realise that as a system of radio-telephony transmission Sideband working was in commercial use many years ago. This interesting article brings out some of the facts, using the terminology of the time.—Editor.

IN listening on various amateur phone bands, particularly 80m., the writer has been surprised to hear many amateurs refer to the SSB mode as "new". They appear to think of SSB as a fairly recent development, and do not know that the Post Office used to transmit, circa 1925, ordinary telephone calls to the U.S.A. and Canada from their long-wave station GBR at Rugby using SSB.

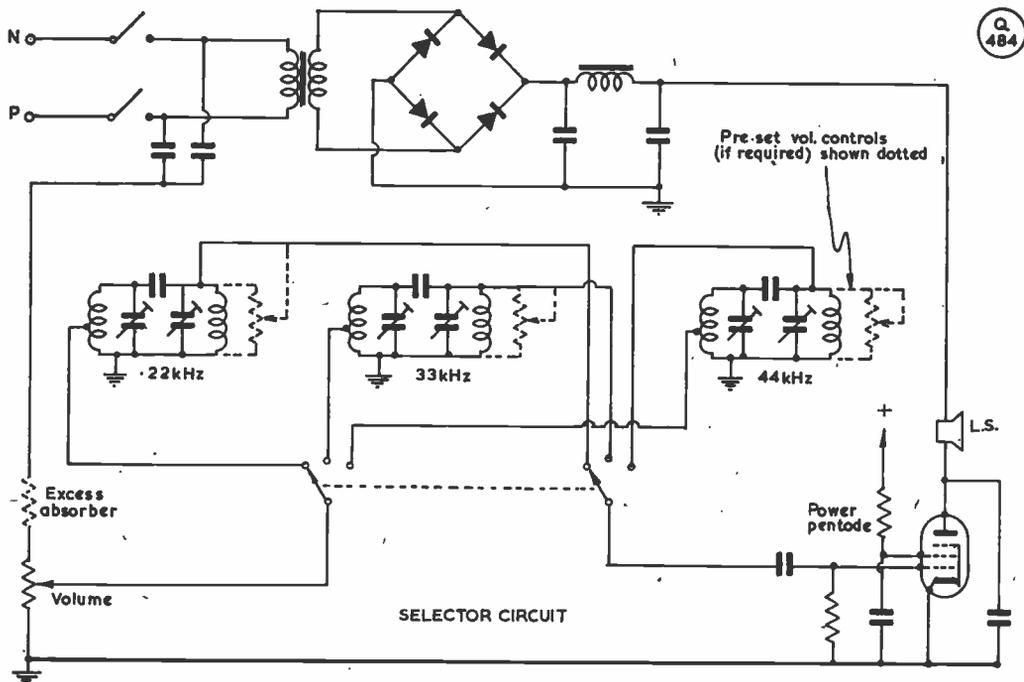
Some years before the last War, about 1936, your correspondent served as assistant to Capt. P. P. Eckersley (one time Chief Engineer of the British Broadcasting Company) on some experimental work

he was conducting in Liverpool. At that period, before Hitler's War and prior to general TV coverage, it was popular to receive sound broadcast programmes via "rediffusion". This was a method whereby three or more programmes were wired, telephone style, into houses from a central receiving station. The house unit was just a loud speaker in a box with a selector switch and volume control.

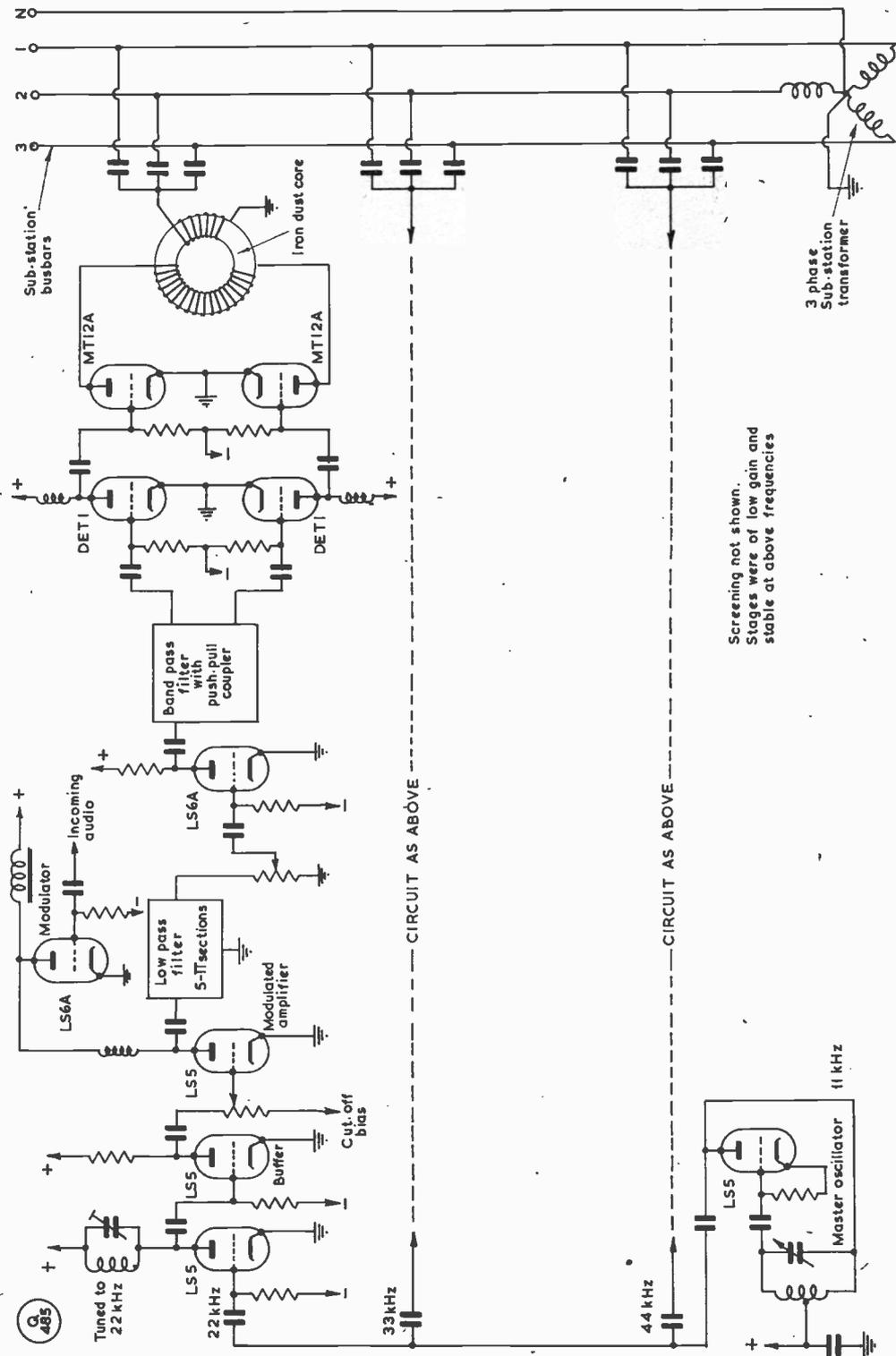
Eckersley wanted to improve on this. He wanted to transmit these programmes, using modulated HF, into the homes of the people, using as *media* something that existed equally in all homes—the electric light mains. By this means Eckersley hoped to avoid some of the drawbacks of the existing system—such as outside wiring, way-leave troubles and attenuation—and to gain a more flexible arrangement with the hirer's unit compensating somewhat for line loss.

Basic Considerations

Three transmitters were made for operation on 23, 33 and 44 kilocycles. They were driven from the harmonics of a common oscillator running at 11 kilocycles. By using a common oscillator there was no question of heterodyning between carriers. Circuitry was approximately as shown. In the accompanying diagrams, only one station is shown in full—the others were basically the same. SSB was used to allow the transmitters to be packed close together and operated low in frequency. It was found that attenuation became more rapid for the higher frequencies. By means of the filters used, all of one sideband was cut (upper sideband), and approximately



Receiver unit for "Wired Wireless," as used pre-1939.



Screening not shown.
Stages were of low gain and stable at above frequencies

The Lower Sideband wired wireless system proposed by Eckerstey, circa 1936.

half of the carrier, this operation being not difficult at low frequencies. Low-pass and band-pass filters were used and adjusted to give an even response up to 6,000 cycles. By retaining some of the carrier it was not necessary to use a local oscillator in the receiving unit. Power out was approximately 600 watts per transmitter.

The Filter System

The design and construction of the low-pass and band-pass filters was very carefully planned. The values of L, C and R were large in a power-rating sense and as the sections needed to have no coupling, the filters were fairly large. The value of R was first determined at an ohmic value into which the preceding valve could work. Inductances we made ourselves, of values to suit impedances and frequency, and these were tuned against a standard capacity and trimmed according to readings using a variable oscillator, wavemeter and a valve voltmeter. Capacities, metal box type, were ordered specially. Then the whole filter was assembled on the bench and checked for cut-off, measuring volts-in against volts-out on a VTV using the spectrum as required from the oscillator to suit the transmitter. Usually, the filters worked out fairly close to requirements and only small adjustments to L, C and R were necessary.

Transmission

Mains impedance at the sub-station was measured as approximately one ohm. The HF voltage gradient went down fairly rapidly as it left the sub-station on

the mains but tended to level out, rather similarly to free-space radio waves. Voltage pattern was complex due to the unsymmetrical shape of a supply network, but it was always adequate to drive the receivers, even with a further mains network paralleled in for experimental purposes. The greatest distance used was approximately half-a-mile (end of network).

The receivers, or "selectors" as we called them, had one stage of detector/amplification. A power pentode only was used and it operated the loud speaker direct. One of three programmes was selected by a three-way switch. A volume control regulated sound level to suit the listener, but a fixed potential divider was used on each of the three channels to absorb excess volts.

Results

Two broadcast receivers of the hi-fi type plus one hi-fi recording of music were used as programme sources. The quality of the received music on the mains network was superb. Many demonstrations were arranged and each was 100% successful.

But the system was not adopted commercially because—to use Eckersley's own expression—"of vested interests in opposition"!

Yes, for the writer at least, SSB is no "new" conception. It is more a matter of nostalgia! SSB is nearly as old as AM and, up to the present, has been shown to have comparatively narrow applications. Possibly one of the present criticisms of SSB in the Amateur Radio context is its poor tonal spectrum.

CENTRE-LOADED WHIP FOR TOP BAND

RESONATING AT ONE-THIRD
WAVELENGTH—FOR /P, /M
OR FIXED-STATION OPERATION

A. C. WEST (G3RBF)

HAVING read SHORT WAVE MAGAZINE, and other periodicals, the writer has noticed all /P and /M aeriels seem to be of the quarter-wave configuration and a large percentage of these are base loaded. As maximum radiation occurs at the high-current portion of any antenna the $\frac{1}{4}$ -wave loaded whip would not be the best of radiators. With this in mind the $\frac{1}{3}$ -wave whip was evolved—see Fig. 1. Initially, a $\frac{1}{2}$ -wave whip was tried, but results were poor. This was found to be due mainly to the high radiation resistance. After extensive tests this $\frac{1}{3}$ -wave centre-loaded whip appeared to be the best compromise consistent with maximum radiation. It can be seen from Fig. 2 that a better Q can be obtained using a *pi*-tank without an ATU. In fact, the aerial will load up over the whole of the 160-metre band without any alterations to the whip.

The coil on the whip section is of 155 turns of 18g.

enamelled copper wire wound on a 10 $\frac{1}{2}$ in. length of p.v.c. gutter pipe of 2 $\frac{1}{2}$ in. o.d. This allows 1 $\frac{1}{2}$ in. or so at each end to secure the whip. For the initial whip an *ex*-BBC type TV antenna was cannibalised. Although the finished aerial is a foot or so longer the extra was

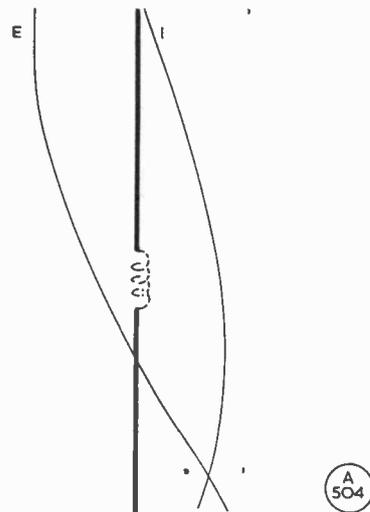


Fig. 1

Fig. 1. Voltage (E) and current (I) distribution on a one-third w/l centre-loaded aerial. For the whip construction discussed in the article, the total length for Top Band is less than 10ft.

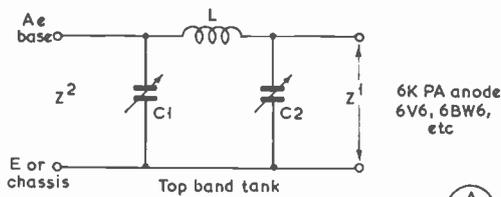


Fig. 2

Fig. 2. The $\frac{1}{4}$ rd.-wave aerial can be fed by direct connection to the conventional pi-tank circuit for Top Band, for which L, C1, C2 here have usual values.

added only to increase height and appeared to affect the frequency only slightly. The large diameter tube of the whip, $\frac{5}{16}$ in., enables a very high Q to be obtained because fewer turns are required to resonate, also lowering the value of R; as $Q = \frac{2\pi FL}{R}$ this becomes obvious.

It should be noted that any change in length or o.d. of the top section of whip will greatly affect resonance, therefore constructors should not deviate from physical dimensions. Tuning up is critical. The simplest method is to solder a 2.5 volt torch bulb to a link of wire, slip

it over the coil on the whip, located towards the bottom. This greatly assists tuning up—in fact, it is almost impossible without the link to know if you are resonating on 80 or 160 metres. The bulb will light when the system is tuned correctly. Maximum current should be indicated about one-third the way up the coil, shown by brilliance of the bulb. Current and voltage distribution on the system is as diagram Fig. 1.

Some Points

Mechanical construction is quite simple requiring only a few tools. First join the two halves of the whip with a piece of insulated rod, e.g., Tufnol, nylon or wood dowel, as in Fig. 3. leaving a space for insulation between sections. Mark off ends of the coil former at 90° and drill for 4BA clearance—the drawings in Fig. 3 make the details clear for anyone of a constructional turn of mind. Solder tags should be fitted on the 4BA rod to make the coil connections.

Running 8 watts /P, R5 and S8-9 reports have been given up to 20 miles radius, the longest distance worked being about 40 miles with a mobile station.

While this aerial has been used and discussed from the /P and /M points of view, in fact it has a high potential for the town or flat-dweller having no outside space for a conventional Top Band aerial. At least, it can be relied upon to give good 160m. contact over local distances.

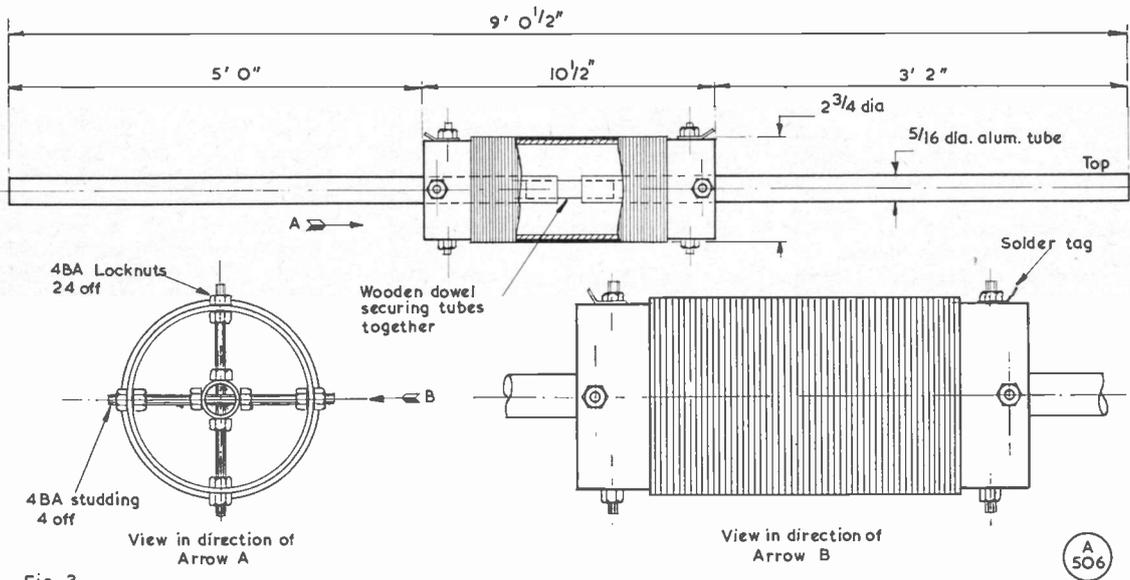


Fig. 3

Fig. 3. Careful study of these drawings will make the constructional details clear. A Top Band radiator of this kind can be used effectively either /P or /M and also as an indoor system for 160 metres.

Always mention "Short Wave Magazine" when writing to Advertisers — it helps you, helps them and helps us.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

IT'S a queer world we live in; last time out there was so much to say that the Editorial axe had to be swung vigorously; this month there seems to be a 100 dB Jackson-type attenuator between your poor old conductor and his news.

However, at the time of writing things appear to have been rather as one would have expected at this time of the year—like the curate's egg. By the time this comes to be read, hopefully, we shall be seeing the first signs of the upswing in conditions, inside and outside the shack, for which we have all been waiting.

Top Band

Most times when your scribe checked it there was little or nothing doing; albeit on one session recently, having worked G3KDV, he was surprised to be called by regular correspondent, G3YDX (Newquay), who doubtless had some titbit of news to impart—just when G3KFE had to QRT immediately.

The Trans-Atlantic doings on the morning of January 31 seem to have been a little odd, with "one-way skip" somewhat in evidence; most of the regulars on the other side were on, but few QSO's were made and the Europeans did not seem to be getting over at all well.

The Grafton Top Band Contest, an event which has been going on for some years now, is being run again this year, the dates being as follows: AM section, *March 20*; CW on *March 27*; and SSB, *April 3*. Times, in each case, 2130-0001z. One point per contact and one contact only with a given station in each section of the Contest. The Phone call to use is "CQ Grafton SSB (or AM) Contest," and on CW, "CQ GRS." The contest exchange will be RS(T) plus a serial number starting anywhere

between 001 and 100, and going on up serially. Logs are required from entrants for both CW and one or the other of the Phone legs (but not both), to be despatched to arrive before April 14, to G3KEB, 23 Richmond House, East Street, London, S.E.17. G3KEB can also supply log sheets in return for an s.a.e., if the mails are back to normal in time. As ever, Grafton are encouraging versatility with their contest, and there will be certificates to the winners and runners-up overall, plus parchments for the leaders in each section.

Last time out we mentioned the sort of stuff G3ORP (Maidstone) had been hearing; and this month, we can look at the aerials he is using. Aerial (A) is a 132-footer, 48 feet high, end-fed with coax, on which the VSWR is 1.5:1. Aerial (B) is 152ft. long, 48 feet high, end-fed with 50-ohm coax, again through a series capacitor to bring the VSWR down to near unity. Aerial (C) is a sort of inverted-U arrangement, fed at one end. This leaves the coax feeder and goes up vertically for 48 feet, out for 150 feet, and down vertically from 35 feet to a ground termination. About two-thirds of the way along the top span a closed stub is inserted, with its end hanging down, the length being to make it up to a half-wave in total length, from the coax to the ground connection, the outer of the coax also being earthed at the feedpoint. This is a "travelling," as against "standing-wave," aerial, which fires broadside to the loop, with a null at the ends, which is only about 5 dB down. Although the array is aimed towards W8/VE, and is quite good across the Pond, also into to GI and GM, it is well down at the 100-150 mile ranges. But VK6NK has been heard on it at RST-329 for a few moments: The earthing system to go with it may be thought elementary when

compared with those of some of the Big Boys—but it comprises fourteen 8ft. earth-spikes spread around the garden, plus four quarter-wave counter-poles spread around the neighbours' gardens! Even with this, it is not possible to work across the Atlantic on a half-wave aerial, whether end- or centre-fed, and it can only be done with a mighty struggle when a 180-foot end-fed is used against it. G3ORP goes on to say that he spent about a year at week-ends trying to work across the Atlantic. He failed to get any replies until he settled into the construction of a good earth system. An interesting point he makes is that it is best to use several wires in parallel for the high-current portions of the aerial, to reduce the I²R losses and increase bandwidth. Another thing he says is about hearing so many of the new boys—and some who *should* know better—bleating about the "high power" allegedly being used by others on Top Band: Some transmitters he has checked with a watt-meter are giving a bare, three watts RF out for ten watts input—so much for cotton-reels as PA tank coils! And a comment by G3ORR which will find an echo in many hearts is the suggestion that the VFO should control the Tx frequency—not the PA tuning!

A note which missed us last time came from G2DF (Warrington) who says he needs Guernsey for his 98th and last county and would like a CW sked with a genuine Guernsey GC to make up his set—a task which has remained uncompleted for several years. Offers please, direct to G2DF, QTHR.

Talking about GC skeds, Jersey is one which has always found ways of eluding your conductor's grasp, even though the others have been done several times over; likewise Scilly awaits the magic tick on the G3KFE list.

Contests and Awards

By now, most amateurs in the U.K. will be aware of the WAB Award, and what it is all about. Basically, the country is divided into the squares of the National Grid—which means that, at a pinch, if someone asks your WAB area you can look it up from the current *AA Handbook*—for instance, Bishops Stortford is in area TL42. To obtain the WAB Awards, you have to make QSO's with a given number of the WAB areas, such as the one just mentioned. The Cannock Chase Club also sponsor WAB contests—HF Phone, HF CW, LF Phone, LF CW and VHF Phone. All are twelve-hour affairs, from 0900z to 2100z. The dates are: March 14, March 28, April 4, April 11 and June 20 respectively. And there can also be an overseas interest in this.

It should be noted that all the very considerable amount of work involved in HAB/WAB is voluntary, and proceeds and support go to R.A.I.B.C., which means you enjoy chasing a sheepskin which will indicate you have done something to help others. The second edition of the *WAB Book*, at 62½p (12s. 6d.), wherein all is explained, became available from end-February. All your conductor need add is that he knows at least one holder of the book who finds it a godsend in locating places on the map of England and a valuable adjunct to his motoring library. Apply, of course, direct to G3ABG, *QTHR*.

On a different plane, we have a couple of interesting Brazilian Awards. The first one is known as EP-AA, and is for working 60 countries bordering the Atlantic Ocean, after March 31, 1967, one of which must be with a Brazilian Island—a PYØ. Details, including a current list of the countries available, from EP-AA Manager, *Electronica Popular*, Caixa Postal 1131, Rio de Janeiro, with one IRC. This is also the address to apply for the award—when you have got the countries in!

Possibly a mite easier is the WAPY, which requires you to work each of the call-areas PY1 to PY9 from the same location,

and to get the cards in. The certified list of the cards then go to *Antenna Magazine*, P.O. Box 1131, ZC-00, Rio de Janeiro, Brazil. This one is free, but it is suggested by the organisers that you enclose "an adequacy of IRC's to cover return postage for the cards and the certificate by registered mail."

Here and There

Sharp-eyed readers may have noticed last month that reference to the old FL8 audio filter as a useful adjunct when using a transceiver for CW, since few if any transceivers are really adequate for serious CW working. During

the past month, your conductor has been trying an integrated-circuit *Op-Amp* Type 741, arranged to give something of a peaking "selectoject" effect, tunable across the audio passband, which can be plugged in rather on the lines of the FL8—however, at the time of writing, it shows a distressing tendency to want to "hoot" if used in a circuit that can be switched in or out when searching the band. Now that IC *Op-Amps* are becoming reasonably cheap, this approach to the problem of getting some extra rejection of the QRM seems to be sensible economics as well as small enough to sit in a corner

SIX-BAND DX TABLE

(All-Time Post War)

Station	Countries	28 MHz	21 MHz	14 MHz	7 MHz	3.5 MHz	1.8 MHz
G2DC	338	181	311	329	169	116	20
W6AM	349	149	161	349	145	119	7
G3KMA	262	208	202	192	142	61	11
G3IGW	212	129	153	169	136	107	47
G3DO	339	213	250	332	90	83	9
G3PQF	175	119	53	107	85	56	13
9H1BL	202	117	129	143	74	57	8
G3XBY	167	110	124	107	74	57	8
G3XAP	109	44	56	47	74	31	13
G3LZQ	265	140	156	215	72	38	8
G3WTV	196	125	124	157	70	74	—
G3VPS	147	58	54	122	61	40	14
G3RJB	177	80	58	164	60	37	8
G4RS	187	84	118	128	59	42	13
G3YDX	131	69	77	47	54	39	9
G3WPO	105	36	24	66	49	31	24
G3NOF	320	204	231	310	38	64	4
G3ZEM	88	—	—	86	28	31	13
G3IDG	131	77	97	55	27	18	12
G3DCS	126	15	80	66	19	20	6
G3ZCC	41	13	8	21	18	24	16
G3VLX	60	7	14	31	8	28	19

Note: Placings this month are based on the "7 MHz" Column. Claims must be made at least every three months to retain a place.

of the bench, or even hang in the phone lead.

Still on the subject of useful gadgets, it is surprising to this slave how many operators who use 'phones and wear glasses are still prepared to put up with the discomfort and pressure of ordinary "cans" on the lobes of ears behind which are the side-arms of spectacles. G3KFE has for long been using a pair of the stethoscope-type with a deaf-aid ear-piece as the transducer, and found them perfect—except that when it was desired to listen on another receiver the phones had to be unplugged and plugged-in to the other receiver if one did not want to use speaker. What seemed to be needed was a pair of *stereo* stethoscope-type phones, and it has only recently been discovered that such are indeed available. Then, all that is required is to make up a suitable "tail" for these, so that the *Eddystone* 888 happily fills one ear while the *KW-77* deals with t'other, all at the flip of a circuit-switch connecting either receiver to the aerial and no changing-of-plugs—not to mention no more headaches or sore ear-lobes!

On a slightly different wavelength, a letter from G3UBL which unfortunately missed the bus last time out, will be of interest to connoisseurs of special-activity stations. On February 6, at R.A.F. Innsworth, GB3RAF was set up to work the HF bands at a fête held in aid of Royal Air Force Association charities, as one of the many attractive items, to include a *Heathkit* show covering the Amateur Radio interest.

Eighty Metres

Because of the amount of news last time round, this band had to be "axed" from the piece—a pity, since it was the fullest clip we have had on this allocation since this commentator took on the task of producing CDXN each month.

But what a band! Apart from the top 10 kHz set apart by band-planning as the "agreed DX Phone Channel," there is another good 290 kHz of (shared) space. However, at what the technical types who use in-words would call "the

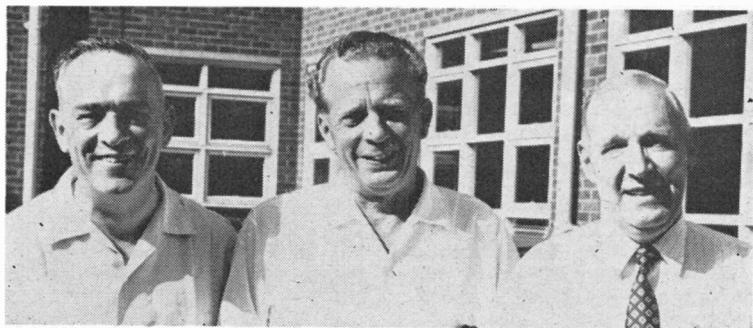
interface" between the DX channel and the rest of the band there is an incredible amount of assorted clatter, varying from genuine QRM to farmyard noises; CQ calls on tape; the sound of music; and a "thing" described by GW3ZKY (Llanelli) as "The Red Dragon leaving Paddington Station, under steam." This description so arrested your conductor's attention that he took the trouble to have a listen for himself. What he heard was a noise which, if GW3ZKY's description were applied to it, would make any fan of the old G.W.R. foam at the mouth. If one adds to that epithets banded about such as "our pig-farmer friend," then it is clear the whole situation has got right out of hand in Amateur Radio terms. What makes it worse is that most of the accusations made by *both sides* have a mite of truth in them. And that, gentle reader, is where it gets nasty. If people who complain that they "can't get in to the net" were to time their calls more sensibly, and put themselves on the right frequency, then they *would* get in. If then, these people who failed through their own bad operating tactics to break in would refrain from venting their spleen in ill-mannered ways then there would be no cause for the Net people to get angry and name the offenders. And if the people who don't believe in DX-net operation as a way of finding DX would just ask the Net politely to give them a moment of clear channel to call the DX on their own, they would have no cause

to complain when they are named as ill-mannered for QRM'ing a net station making his call in correct order. The only real accusation that bears looking at is that some Phones on both sides of the dividing-line are over-driven and splatter—just as happens on any other DX band when people get over-eager.

Doesn't it seem that the time has come for all the operators concerned—and that means *all*, on both sides of the argument—to take a long cold look at the situation that has developed, and resolve, (a) to keep their tempers, and (b) to conform both to the terms of their licence *and* to the band-plan. Because, if they don't, the time will surely come when the U.K. authorities will do what has been done in some other cases and simply suspend some licences. If that happens, then whoever it happens to could be not the worst offender—because no one person is really to blame, but all are in the wrong, one way or another.

To turn to more substantial matters: The winter weather must have rather cooled the enthusiasm of many chaps for early-morning DX, opines G2DC (Ringwood), especially as conditions were somewhat below par. Nevertheless, the G2DC CW note found its way into receivers at JA0SX, ZL3FZ, ZL4WE, W1-5, and W8-0.

G3NOF (Yeovil) does not often mention 80m. but he has been listening around the Sideband end mornings and evenings. He has had a buzz that EU's have been working W6 and Asians in *mid-afternoon!* His own gotaways on



Three well-known voices to be heard on Sideband—left to right, G3UWD, G3QS and G3IUF. This was taken at the Peterborough Mobile Rally in September last.

SSB included MP4TDT, TI2CF, VP2MM, VS6DO and 9K2AL. To balance the log, Don managed to raise CN8BG, EA8GZ, FP8AP, GC3HHZ, HC1RF, KP4CL, OY2R, VP2MRK, ZB2A, 6W8DY and a crop of W's.

An interesting and slightly out-of-the-ordinary one is mentioned by G3YMH (Staines), this QSO being with JA1JQX/MM, worked at 0215z when the /MM was near Malta.

G3ZDY (Fareham), as related last month, acquired a "DAF-type Tx," which refused to play on Top Band because of a missing conversion crystal—mmm, could account for the trouble! — so decided to try the only other band on which the receiver *would* play. At the time of his letter, a couple of weeks had been so employed, with 37 countries booked in on 80m., including such as VS6DO, DU1FH, 3V8AB, MP4BIJ, ZL3GS, VP2A, VP2V, also W's.

G2HKU (Sheppey) has had more than his fair share of power-cuts, in that he stayed QRT when he had power only because the local hospital is on the same feeder. However, once that problem was resolved, Ted looked over 80m. and found EA8GZ (a YL from Tenerife), ELØK/5A1, ELØK/MM off Libya, G6ZY/CN/M and VO1GE.

After some equipment troubles had been cleared up, G3OJV (Hockley, Essex) worked on CW VO1AW, also GC3HHZ, 4U1ITU and 8P6DO on SSB.

Gales and aerials tend to be incompatible, says G3DCS (Ipswich), whose aerial came down, resulting in a hurried lash-up of a Joystick on a pole, supported against the house to get it up to thirty feet. This did not impress the locals who found him low in QRK, so another J/S on the end of a 60ft. horizontal wire was used to deal with them. The former aerial (associated window-frame) dealt adequately with YU, UB5, OH, OK, GM and LA on CW, plus SSB with PA, ON, DJ, SM and GW.

To be a *real* 3.5 MHz type, you need to be the original sleepless wonder; G3YCU (Woking) is just that. He has a Vespa Mk. II and an HA-350 receiver, hooked



G3ZHP is owned and operated by David Marsden, 5 Smithy Lane, Skelmanthorpe, Huddersfield, Yorkshire, who came on the air in April 1970, after having served a long apprenticeship as an SWL. At present, activity is mainly on the LF bands, AM/CW, running A.T.5 and LG.50 as Tx's, with an AR88D as main receiver. His aerial is 125ft. of wire, carefully matched through an ATU, with a good earthing system. Though using commercial equipment, G3ZHP is an enthusiastic constructor, much "bread-board" experimenting being done. David belongs to the Spen Valley Amateur Radio Society and acknowledges the great help he had from members in getting going.

to a trap dipole. Steve finds it needs persistence almost to the point of liddishness to break-in on *that* DX Net, what with the QRM and stuff. But life is a little easier once one gets into the small hours, or first thing in the morning, so far as SSB phone is concerned. CW is a little easier all-round, and using the two modes, eighteen months of sporadic operation have given ninety countries on the band. The present list shows such as EP2TW, ZB2A, VS6DO, 7X2OM, TA2BK/1, VO1BV, CO2FA and OX3WX, all on SSB, while CW knocked off WA2JNO and K4SHB. To round off nicely, as he was writing he broke off (at 0400) to pick off VE8RA.

Forty Metres

Your conductor only listened on this band at odd times in the evenings, but at this sort of time the band has seemed, by and large, to be pretty fair. Obviously, it is always well plastered with EU, but a few layers down can be found VK, ZL, W's, various Caribbean spots, 4X4, ZS, 7Q7, and so on. Mostly concentrated, at the time your slave was there, on the DX channel at the CW end, but almost certainly available for the SSB phone fraternity later on if they go over the 40m.

band carefully.

The HF Bands

One report which missed out last time was that of G3MBL, who applies his 25 watts of AM phone to a two-element beam on *Fifteen*, and has been using this sort of set-up for years, to your conductor's knowledge. Alan reports an AM both-ways QSO with TJ1AR, at 0740z. How things have changed, when an AM-to-AM QSO has to be given special mention—if we didn't, *everyone* would automatically assume it to have been SSB-SSB! And yet, it seems only yesterday that our old friend and colleague Tommy, G6QB, was discussing in this very column the possibility, then just becoming envisaged by the advanced types, of an all-SSB DXCC!

Twenty has by and large been what one would expect at this time of year, albeit one would think, without evidence from the lost mail of other opinions, that at times when the majority of us are trying to avoid working TV sets, the band has been a bit scratchy if not actually flat in the DX sense.

Naturally enough, if *Twenty* was flatter than expected at evening operating times, *Fifteen* and *Ten* have been distinctly erratic.

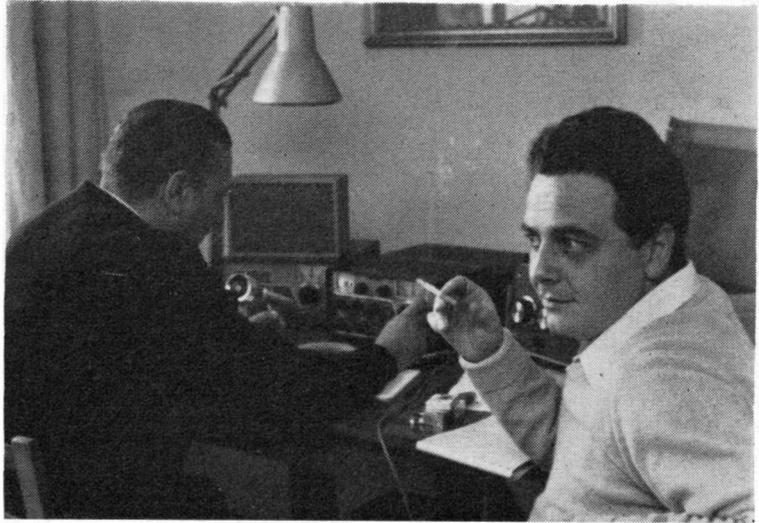
But both were, on occasion, giving good signals, both SSB and CW, from all over the world during the evenings, even if dead on other occasions.

By the time this comes to be read, your shack will be a little warmer when you go into it, and daylight a little longer at both ends of the working day—so with luck it should be possible to have a few minutes after the DX bands open and before going off to work, as a promise for the real spring-time conditions ahead.

Many people are on the lookout for Laccadive Is. operation. It is understood that VU2KV, VU2D1 and VU2RM have been there; they were to have been on for about 12 days. They had three lots of gear and aerials and mainly the operation would have been over the HF bands, with QSY to 80/40 if conditions warranted it. For this operation, QSL's direct to VU2KV, P.O. Box 3031, New Delhi, enclosing five IRC's; all cards in response were to be sent out from VU by direct air mail.

Some doubt arises over a station on Twenty, signing "XV5HH;" could be all right although the operator, name of Howard, says he is *ex-CP1GN*, and asks for QSL's *via W9JT*—who says he's never heard of him!

If you hear 5X5SS, it could be G3SS/5Z4SS in disguise, mainly CW on most bands—hard luck the SSB chaps, as Ernie took his Sideband box back to U.K. with



If you heard or worked IIIAJ/IIIKDB, Ischia, some months ago, here is the station, which was put on by IIAJ and IKDB (right), two of Italy's leading DX operators. In the DXCC context, the 'KDB score is 330.

him last year.

A word in the ear of those who would like a QSO with rare location Bajo Nuevo—K5QHS, who was on from KS4 recently, has said he is prepared to go to Bajo Nuevo this summer some time if enough folk indicate that a demand exists.

Talking about demand, many who are looking for a QSL from UAVH/JT1 have been chasing W3HNK about it—he says thanks for all the letters but about 10-12 weeks should be allowed for him to reply before assuming that your QSL went astray in the post.

(Shows that this QSL business is more difficult than it seems!).

Sign Off

And that, good people, is about the lot for this time—somewhat attenuated but with no mail-intake your slave has done his best.

Deadline for next time, if the mails are with us, is **March 8**. A bit further ahead we can see **April 8** for May; **May 10** for June, and **June 7** for July's issues. The address, as ever is CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM, England. Keep doing your best—as we are!

MOBILE RALLY SEASON

It will not be long before this will be on us again—in fact, the following dates have already been booked:

April 18: North Midlands Mobile Rally, at Drayton Manor Park, Nr. Tamworth, Staffs. (*as last year*).

May 2: Booked for the Tulip-Time Rally, near Spalding, Lincs., as last year, organised by the Spalding & District Amateur Radio Society.

May 30: Maidstone YMCA Amateur Radio Society Rally, at Maidstone (*as last year*).

June 27: Echelford Amateur Radio Society, in collaboration with Hanworth Carnival Committee, will be organising a Mobile Rally for the London area at Hanworth Airpark.

We shall be glad to hear of any other bookings as early as possible, for notification in this space.

Address to: "Mobile Scene," SHORT WAVE MAGAZINE, BUCKINGHAM—and please keep the notice quite separate from any other correspondence.

WE MUST APOLOGISE

For the paucity of Reader Small Advertising in this issue—the reason being, of course, that we have had no mail-intake since January 18, this frustrating and exasperating state of affairs having continued up to the time of going to press. Because there must be a considerable number of Small Advs., intended for this issue and yet to reach us, in the postal pipe-line, readers wishing to get into the April issue (and we cannot at the moment guarantee any appearances) should send their notices in as soon as possible, with remittance (2½p per word, minimum 50p), addressed to: Small Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

PROPAGATION on all the VHF bands has been nothing to get excited about this month. Two metres has probably been better than the other frequencies, both from the point of view of activity and DX, but even there, EU/DX has been scarce, and what there was of it came mainly from France. One might have expected something a little better since the "Checkpoint Charlie" German beacon on 143.968 MHz has been heard on many occasions, although calls to the East have failed to bring any substantial results. The Durham and Cornwall beacons have been well below normal here in the South-East, and even when they have been receivable at reasonable strength, the transmissions have been marred by very heavy QSB. On 70 cm, the Sutton Coldfield beacon has been very variable, and reception of the London beacon on 145.45 MHz has been poor for many weeks past. A slight lift on 70 cm was apparent on January 31 and February 1st, but there was little activity to match it.

High solar noise has been recorded on several occasions since the start of the year, but no four- or two-metre auroral propagation has been observed, although the SM's were reporting *Ar* on January 24/25.

January 24 was the date for the 144 MHz CW contest, but even using this mode of transmission, the DX was very difficult to wrinkle out under the combined effects of the generally poor propagation conditions and the accompanying QSB. Best DX from Herne Bay was with G2AMV in

VHF BANDS

A. H. DORMER, G3DAH

Birkenhead, GW2UCB/P near Llangollen and G2SU/A in Halifax. GW3MFY and GW3FSP were both active, but with very variable signal strengths. The Continentals largely seem to have ignored the event, as the only one heard operating consistently throughout the whole of the contest was PA0CSL. Although one should recall that one cannot please all the people all the time, the Contests Committee have come under some criticism for their timing of the event, on the grounds that it ran well into the popular Sunday afternoon TV programmes, and therefore, necessitated some curtailment of activity by operators unfortunate enough to suffer from TVI. The most popular time still seems to be

from midnight to midday, and this has the advantage that one can expect to get a bit of a lift in VHF propagation after midnight, and again at the dawn period, which all adds to the general enjoyment of the event. Activity seemed lower than during the corresponding contest last year, and few scores over the 50 mark were heard. Of course, as pointed out last month, until the distances are also known, a numerical score means little.

DX-Peditions

Although details have yet to be finalised, several major DX-Peditions are planned for the coming season. The Verulam Club propose to visit *all* Welsh Counties with both two-metre and four-metre equipment. The ploy is to work Two from, say, 7-11 p.m., and Four after that, when TV goes off the air. Good idea!

G3BA/G3BHT will be in Luxembourg for the IARU Region 1 and VHF/NFD events in September. They will have two-metre gear with them and, possibly, also Four. They propose to remain in LX for the day after the contests in order to give those operators who have been out portable a chance to get an LX QSO from their home QTH.

Members of the Farnborough & District Amateur Radio Society plan to visit the Channel Islands with the Club call G8DIZ. They intend to take in Alderney and Sark (which have been done before, of course) and also *Herm*, which will score as a separate county as far as our Annual VHF Tables are concerned. Dates for GC8DIZ are probably the second

THE VHF/UHF BAND PLAN

Abridged Version

Four Metres		145.0 mc	Mobile calling channel.	432.9 to 433.1 mc	Zone 6.
70.025 to 70.1 mc	CW only.	145.3	RTTY North and International.	433.1 to 433.3 mc	Zone 7.
70.1 to 70.7 mc	All modes.			433.3 to 433.45 mc	Zone 8.
70.675 to 70.7 mc	Beacons.	144.6 mc	RTTY South.	433.45 to 433.5 mc	Beacons.
70.26 mc	Mobile calling frequency.	145.41	SSB calling channel.	433.3 mc	RTTY International and UK North.
70.56 mc	RTTY.			432.6 mc	RTTY UK South.
	* * *			432.15 mc	SSB calling channel.
Two Metres		70 Centimetres			
144.0 to 144.15 mc	CW only.	432.0 to 432.1 mc	CW only.		
144.15 to 144.5 mc	SW Zone A.	432.1 to 432.2 mc	Zone 1.		
144.5 to 145.1 mc	SE Zone B.	432.2 to 432.3 mc	Zone 2.		
145.1 to 145.5 mc	Midlands Zone C.	432.3 to 432.5 mc	Zone 3.		
145.5 to 145.95 mc	North Zone D.	432.5 to 432.7 mc	Zone 4.		
		432.7 to 432.0 mc	Zone 5.		
				23 Centimetres	
				1296 to 1296.15 mc	CW only.
				1296.15 to 1297.95 mc	All modes.
				1297.95 to 1298 mc	Beacons.

and third weeks of July, subject to variation. Because there is little point in undertaking these trips unless one is sure of an audience at a range of 100 miles at least, the Farnborough Club rig will run fairly high power and the antenna is likely to be 4 x 10 elements in a box formation. An interesting side-light is that there may be a special certificate awarded for contacts made during this outing.

While not a major expedition—such as their previous trips to EI, GI and GM—G3BA and G3BHT intend to visit a new county every Wednesday evening during the summer months, with *four-metre* gear. This will be much appreciated by many 70 MHz operators looking for contact from the rarer spots, and there are plenty of them with no four-metre representation!

Paul Widger, GM8AGU, who will be remembered for his portable doings last year, is planning another such foray, probably in May or June, in company with GM3JFG. Sites in Scottish counties which have been eschewed by previous expeditions, either on account of their inaccessibility or remoteness, will be visited, and as the intention is to have a pair of 4CX250B's (*sic*) on Two, there should be a very good chance of making some unusual and very welcome DX contacts. Itinerary will follow when plans are finalised. Watch this space! As Paul's QTH does not appear in the latest *Call Book*, get in touch with him at 87, Findhorn Caravan Site, Forres, Morayshire.

G8BQX will be operating as GM8BQX/P from just after the March 144 MHz contest, until Easter. He does not yet know which counties he will be visiting, but he will have 20 watts or so every evening on a frequency up in the Scottish Zone, and will be looking for both GM and G contacts.

Group and Club

The South East UHF/VHF Group had a very successful meeting at Wye College, University of London, in January when the speaker, Des Desborough, G3NNG, discussed VHF receiver design. The next meeting is on March 5 at 7.30 p.m. in the Electronics Building of the University of Kent, Canterbury, when the speaker will be Dr. E. A. Parker, M.A., Ph.D., F.R.A.S., whose subject will be Radio Astronomy. All amateurs in the area are welcome to attend, and details of this, and subsequent, meetings may be obtained from the hon. secretary, G3DAH, *QTHR*.

The South Bucks VHF Club next meets on March 2 for a talk on test equipment. Venue is as usual Bassetbury Manor, High Wycombe, and further details may be obtained from R. Idiens, 77 Amersham Road, High Wycombe, Bucks.

VHFCC Awards

Pressure on space last month precluded the inclusion of station details of the new members of the VHF Century Club, but this can now be remedied.

From Attleborough in Norfolk, Roy Reed, G3ZIG, gains Award No. 86 for two metres. First licensed in April of last year, he was on the air within one week. The outfit consists of a modified Pye base station Tx with a QQV03-20A in the PA, modulated by a pair of 6V6's and running 25 watts input. The converter is home-built (6CW4 pre-amp and RF stages), followed by a pair of 12AT7's; the IF of 20-22 MHz is fed into an AR88. The antenna is an 8-ele Yagi at 28ft., and the QTH is 175ft. a.s.l. Roy says that he had to make over 300 contacts before he got the 100 QSL cards for his claim! Future plans are to run a Sommerkamp FL-200B, to

serve as the prime mover for a transverter on the lines of the G3DAH design described in the July/August 1968 issues of *SHORT WAVE MAGAZINE*, and to start up on four metres. To this latter end, Roy has already acquired another Pye base station with a QQV06-40A in the PA and has built the converter on the same lines as the two-metre job already described.

First licensed in May 1968, as GC8BNV, Jim Martin of Guernsey obtained his full ticket in April 1969 and became GC3YIZ. The two-metre Tx is fairly conventional with the Robert Dollar overtone oscillator and switched xtals through to an output stage with a QQV03-10 running at 15 watts input. The antenna is a *J-Beam* 8/8 slot-fed Yagi at 35ft. Reception is with a transistor pre-amp and valve converter feeding 4-6 MHz into the *Eddystone* 840C. The QTH is at sea-level and about half-mile inland from the north-western coast of Guernsey, and Jim puts out a very good signal from there, as your scribe can bear personal witness. To date he has worked seven countries and gains Award No. 87 to confirm his membership of the VHF Century Club.

Pat Screeney, G8BJS, is awarded Certificate No. 88 for his two-metre work from Shefford, Beds. It has taken him quite a time to get the necessary cards for the Award, as he is 'only QRV for about one hour in the evenings, and much of that time is spent in listening only. Most of Pat's contacts were made with the *Printaset* Tx and Rx, and these were found to give a good performance. He now runs a *Heathkit* HW17A, VFO controlled. The antenna was an 8-ele beam at 25ft., but this has now been replaced by a 6/6 slot. The main interest at G8BJS is portable operation—it is "his Thing," he says, and, fortunately, the family

To keep in touch with the world of Amateur Radio, read "Short Wave Magazine" regularly.

"Short Wave Magazine" circulates in 75 countries outside the U.K.

shares his enthusiasm, so that forays into the remoter VHF/DX sites are enjoyed by all.

A hearty welcome to the second Scots member of the VHF Century Club, who is Frank Hall, GM8BZX (Forfar, Angus). He gains Award No. 89 for operation on two metres. It was a bit of a battle to get the requisite cards in, not only because activity in and around Angus cannot be as high as in other, more densely populated parts of the British Isles, but also because of the difficulty of extracting them, sometimes from very well-known operators! All the Continental, and most of the best GDX, was worked during the openings on Two in October 1969 and June 1970. Frank passed his R.A.E. as long ago as 1955, but did not take out his licence until September 1968. He has been constructing amateur gear of one sort or another since 1945, when he came out of the R.A.F. His main interest is in VHF, and as yet he has no plans for joining the rat-race on the HF bands! The gear in use is much the same as that assembled to come on the air initially, a Pye 3302 Tx running 30 watts to a QQV06-40A, modulated by a pair of 6V6's. The converter line-up is a two-stage AFZ12 pre-amp followed by A2521 and EC91 RF stages, EC91 mixer and EC91 cathode follower, producing an IF of 5-7 MHz into an HRO receiver. A number of antennae have been in use, including a 6/6 slot and 5, 6, 8 and 10 ele Yagis, all home-built. Until recently, these devices were located on top of a 28ft. pole which was rotated by hand, but this has now been replaced by a motor-driven pole on top of a 28ft. timber-built lattice mast. Under construction is a 14-ele Yagi for two metres and a corner reflector for 70 cm. Those who attended the Dundee VHF Convention last year may have heard Frank's callsign if they came along /M, as he provided the two-metre talk-in station.

Two Metre Award No. 90 finds its way to Ongar in Essex—Steve Moor, G8DJQ, who has obviously not let much grass grow under his feet in getting the 100 cards necessary to support the claim. First licensed in February 1970, he has



G8BRT, Bob Cliffe, 16 Moorbank Drive, Sheffield, S10-5TH, Yorkshire, actually qualified for a full permit (R.A.E. and Morse) as long ago as 1952. But he did not put in for a ticket until 1968 and since then has been running a Pye base-station Tx to 30w. into a 5-ele beam, using on the Rx side a Mosfet dual-gate converter with an Eddystone EC-10.

worked upwards of 300 stations in under a year, which isn't bad going by any standards. The QSL return rate of, presumably, 33 per cent isn't too hot, though! The original Tx ran 7 watts of AM with a QQV02-6, but this was subsequently replaced by a QQV03-20A running 30 watts of NBFM. The receiving set-up consists of a converter to the G3HBW design, dual gate Mosfet model, and a transistorised tunable IF strip. The antenna is an 8-ele *J-Beam* in the loft (what should we all do without those Northampton boys?). The QTH at 225ft. a.s.l. has a good take-off in all directions.

Crayford in Kent is the QTH of Peter Hudson, G8BHD, and he gains Award No. 91 for two-metre operation. The equipment he uses is a modified Pye "Cambridge" with transistor modulator and QQV03-10 PA giving 10 to 15 watts output, depending upon the condition of the battery! A dual-gate Mosfet converter feeds an HA-600 receiver, and is coupled to the 10-ele Skybeam at 35ft. The QTH is just under 100ft. a.s.l., with quite a good take-off in all directions.

Finally, Certificate No. 92 goes to Barry Cator, G8DII, of Thet-

ford in Norfolk. Having taken the R.A.E. as long ago as 1963, other pressures upon his time prevented Barry from applying for his licence until 1970, and it was not till March of that year that he came on the air for the first time. Initially, the two-metre rig consisted of a QQV03-10 PA and OC28 modulators, but this was subsequently changed, and for most of the contacts for which the VHFCC Award is claimed, the transmitter has been a modified Pye base station with about 25 watts input to a QQV06-40. Local TVI reared its ugly head while AM was being used, and so the Tx was later converted for NBFM, with considerable success in the elimination of this menace. The Rx is now an Eddystone EC-10 with a dual gate Mosfet converter, and the antenna, until recently a 14-ele Parabeam, is now a 3-ele Quad which seems to function very well indeed — so much so that a four-ele version is now under construction. The site, near Watton, is 150ft. a.s.l. with a good take-off in all directions.

Congratulations to all these new members of the VHF Century Club!

[over

Ba(n)d Practice

Although references have been made, here and elsewhere, to a general code for operating practices on the VHF bands, one still hears from time to time the most extraordinary new procedures being used which either contravene the terms of the licence, or show a certain lack of consideration for other users of the band. Now, while innovation may be a very good thing when correctly applied, a general standard of usage has been evolved over many years, and only in rare circumstances is deviation from this standard advantageous to all concerned. However inadequate, or even long-winded, some practices may seem, it must be assumed, since they have withstood the test of thousands of hours of operating time and have been shown, without any reasonable doubt, to lead to worthwhile and pleasant exchanges, that they are probably about right.

While wishing to avoid the suggestion that what follows is in any way a session of instruction to maternal grandparent in the art of egg-sucking, the plea is advanced to avoid a perpetuation of nonsenses such as those listed below.

(a) A long CQ call followed by one callsign and "listening on this frequency." Give a chap a chance to QSY and touch up the output by stating the tuning intentions early on in the call.

(b) If not listed in the *Call Book*, it is useful to state the location when calling CQ.

(c) Do use phonetics for the callsign and speak slowly and distinctly. Many a QSO is lost, indeed many a QSO is not even started, because of uncertainty of the identity of the distant station. It should always be remembered that it is the *minority* of people who have really clear enunciation—and, in a callsign, even they have to differentiate between "s" and "f," "b" and "v," "d" and "t," or "i" and "y"—to say nothing of dialect variations!

(d) Although, by the terms of the licence, one is only required to announce *one's own* callsign at regular intervals, it does help considerably if the callsign of the

other station is mentioned from time to time throughout the QSO. This gives other operators, who may wish to make a contact, a better chance of doing so. If the distant station is good DX, it is also helpful to quote the frequency on which he is operating.

(e) Two operators were heard the other day who, although on AM and not working break-in, terminated each long over with the single word "Go" without any mention of their respective calls. While this practice is perhaps permissible during fast exchanges in a contest when working Vox (it corresponds to the \overline{BK} sign in CW) it is a licence contravention when used to replace the correct sign-over procedure at the end of a lengthy over. On the supposition that "Go" in this context was being used to save time and give the impression of slick operating, one is tempted to recall the comment of Confucius who, when told by a pupil that he had walked a mile in one minute less time than he usually took, asked "And what will you do with the minute?" Take time and do it correctly.

(f) Much friction can be avoided if, before transmitting, the frequency it is proposed to use is checked. If using a VFO, be even more readily prepared to QSY to avoid QRM with a fixed-frequency operator.

(g) Finally, if the band is open for DX, or if activity is high—for example, on a Sunday morning—please do *not* conduct lengthy tests using an open aerial, even if you are the only person involved in the test. More important still, do not ask a busy station operator to participate in such tests when, however helpful you may know him to be, it must be quite obvious that he is otherwise engaged.

To confirm that this is not just an academic exercise, all the malpractices listed in the foregoing were observed on two metres during the last two weeks of January this year.

Linear Amplifiers

More and more chaps these days seem to be thinking in terms of big linear amplifiers, on two metres in particular, and the fol-

lowing general notes may be of interest as they refer to an aspect which is not often covered in technical articles dealing with the construction and adjustment of such amplifiers—namely, balancing.

In push-pull RF amplifiers, lack of balance of the anode circuit, or the anode dissipation, is usually due to lack of symmetry on the RF side. Normally, unless well-worn, surplus-market valves are pressed into service, it is fairly safe to assume that any lack of balance is *not* associated with the construction or characteristics of the valve itself. Of course, this can easily be checked by interchanging the valves in their respective sockets, provided that the DC voltage supplies are common to both valves. If the unbalance remains associated with the socket, then the circuit must be at fault and will require adjustment or redesign.

Assuming that the anode circuit is electrically and mechanically symmetrical, and that both valves are serviceable, the lack of balance can usually be traced to the application of unequal RF voltages to the two grids. Quite often, however, the grid circuits are deliberately unbalanced in order to achieve balance on the anode sides and this, within small limits, is permissible. The adjustment should be made to give equal DC flow in the two anode feeds. It is sometimes claimed that anode current balance is a more important criterion than equality of screen grid currents, as valves tend to be more uniform in their anode characteristics, but screen current is a more sensitive indicator, and is, therefore, frequently to be preferred.

Once the valves have been DC-balanced, the anode circuit should be adjusted under operating conditions to give equal screen currents. Interchanging the two valves will sometimes assist this process.

Some authorities claim that equal DC grid currents can give an indication of power amplifier balance, and indeed it is probable, after the foregoing adjustments have been made, that the DC grid currents will be found to be equal—but this is not a method to be recommended as, in itself, bal-

anced grid currents are not a safe indication of balanced grid excitation.

One cannot help wondering how many constructors have ever measured the anode currents in each section of a QQV06-40A, for example. Come to that, how many have, or can, measure the grid currents separately, and have used variation of them to balance the output? This may be common practice with the 4CX250B RF amplifier, but is often overlooked when using smaller output valves, although the principle of anode circuit balancing is equally important and applicable to both cases.

News Items

Further to the reference last month to GM3ZBE, who is regularly beaming to the South looking for G contacts on either CW or SSB, Alec says that it is of little use tuning for GM's *outside* the band 145.7 to 145.9 MHz, unless there is a very strong indication of good propagation conditions, when operators do tend to search down the band a bit. The bulk of the GM activity is centred around 145.8 MHz and this applies equally to reception and transmission. However, for the purpose of the 2300z daily skeds with G3DAH, he will be on CW on 145.5 MHz with a QSY to the SSB channel if conditions warrant it.

* * *

All logs for the 432 MHz Marathon organised by G8APZ and G8AWS have now been received and a preliminary analysis shows the leader to be G3NEO (Sheffield), followed by G3UBX (Wolverhampton) and G8AUE (Pentrick, Derbyshire). A total of 37 logs came in, of which three were for A/TV. Some 200 call-signs are listed as active during the period of the contest, and the organisers are to be congratulated on the success of their efforts to stimulate activity on the 70 cm band. A complete summary of the results, with appropriate comments, will appear in SHORT WAVE MAGAZINE in due course.



G8DDX, Anthony Daniels-Galey, 93 Leadwell Lane, Rothwell, Leeds, Yorkshire, passed R.A.E. in 1962 but did not take out his licence until October, 1969. His gear consists of a Garex QQV03-20A Tx, with either a valve or transistor modulator, and a nuvistor converter into an Eddystone 840A. His beam is a 4/4 on a Heathkit 30ft. tower. Some 70 cm. gear is also available, and a general-coverage receiver, all home built.

Forthcoming contests are the last of the 432 MHz Cumulatives on February 10, February 23 and March 1st, and the 70 MHz fixed station event on February 7.

Integrated Circuits

The *Plessey Company* have come out with some new integrated circuits which, in certain applications, are of interest to amateurs. In particular the SL630 and the SL620 look promising. The SL630 is a microphone amplifier which has a voltage gain of 100 times and will accept balanced or unbalanced inputs of the order of 1 μ V RMS, which makes it suitable for use with most of the popular microphones. The frequency response of the unit is controlled by an external capacitor, cut-off frequency, which is quite sharp, being typically 4 kHz for a capacitor of .025 μ F. That, however, is not the end of the story. Gain may be controlled either manually or, in conjunction with the SL620C, automatically. This latter unit has been designed specifically for use as an AGC generator with either SSB receivers or with the SL630 amplifier, and in the latter case, will provide effective gain control with a low frequency cut-off of 200 Hz.

This makes it ideal for use as a speech compressor for either SSB or NBFM, since the output can be held substantially constant for a range of input variation of up to 35 dB, and the frequency response is suitably tailored. Prices quoted for singles were £1.81 for the SL620 and £1.15 for the SL630.

Mullards have recently introduced the TBA281 for use in stabilised power supplies where high performance and small weight are important. It can be used with circuits that give outputs from 2v. to 37v. with a maximum current of 150 mA. The TBA281 contains a temperature-compensated reference amplifier, a power series feed transistor and a current limiter, the whole lot being in a ten-lead encapsulation. Typically, a change of three volts in the input voltage produces a change of only 0.01% in the output, and a current change from 1 to 50 mA causes the output to fall by not more than 0.2%.

From *Motorola* comes the MC1596G, and the lower priced MC1496G — its performance at the higher frequencies is not quite up to the standard of the MC1596G. This IC is officially a balanced modulator, but by suit-

able external circuitry may be used as a balanced mixer or as a doubler at VHF on frequencies up to 300 MHz. With a 28 MHz input signal, the conversion gain is 13 dB and the sensitivity is 7.5 μ V for a 10 dB signal/noise ratio. At 220 MHz, the gain drops to 9 dB and the sensitivity to 14 μ V. To use this device as a doubler it is only necessary to feed the same frequency to both inputs. The output will then consist of a single frequency equal to the sum of the two input frequencies—instant doubling! No tuned circuits are required for this process which can be applied to input frequencies up to 200 MHz, at which level spurious products are down by 20 dB. Price quoted recently was under £3, which does not compare too unreasonably with other balanced mixers using

either transistors or valves and associated components.

The Tabular Matter

Naturally, because of the postal hiatus no claims have been received for the new Three-Band Annual VHF Table, which reopened w.e.f. January 1st, 1971, to run for the rest of the year till the end of December. Those interested are asked to get new claims in just as soon as possible, so that another Table can be started at the first opportunity.

In the coming year, we are hoping for increased support for the Tabular Matter—for nearly 25 years a regular feature of "VHF Bands"—particularly by operators newly-licensed or just starting on VHF. To enter the various columns (see layout p.725,

February)—all you have to do is to list your counties/countries worked, by bands, and then add to your totals from time to time as they accrue.

Deadline

Though we can give the deadline for the next issue as **March 6**, it is not at all certain at the moment of writing what the postal position might be at the time you read this. So, in the hope that by then at least some sort of normality will have been restored, we give also the closing date of **April 10** for the May issue of "VHF Bands." The address for all your news, views, comments, ideas, suggestions and criticisms is: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. 73 de G3DAH.

"FOUNDATIONS OF WIRELESS"

This is a book in our current list which should not be overlooked—its scope is considerably wider than the title suggests. Though covering the field from the basics of valve theory and transistory through to transmission and reception to TV, radar and computery, no previous technical knowledge is assumed and mathematics are used only where essential. The author, Marcus Scroggie, B.Sc., C.Eng., F.I.E.E., is well known as a writer on radio and electricity and his *Foundations of Wireless*, (a standard text for many years) has been kept up-to-date; this new version is the 8th edition, and altogether it has sold over the years something like 250,000 copies—sufficient proof of its technical excellence, wide appeal and practical value among students, undergraduates and those just having an interest in radio and electronics. The price of *Foundations of Wireless*, fully illustrated and running to more than 500 pages, is 39s. (£1.95) post free, available from stock of: Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

NOTES AND COMMENTS ON RECENT ARTICLES

The following comments have been offered by the contributors concerned following the appearance of their articles, or in response to observations made on them by readers:

"*Getting on VFO for VHF/UHF*," October 1970, by G2JF. While the author agrees with G8DIK (Bradford) that pitfalls can be encountered in the mixer-master type of drive oscillator—and known since the days of Goyder-lock—his article did stress that extreme care must be taken in the selection of mixing and generating frequencies. In one sense, this

article is "not for beginners" or the inexperienced, who could find themselves in difficulties. On the other hand, it is of practical interest to add that G2JF himself—who is licensed for powers on VHF up to 1 kW for special propagation-investigation purposes—is on occasion monitored by the Post Office and that, even with inputs of this magnitude on two metres, the problem of spuri has not emerged as the "potential hazard" suggested by G8DIK.

"*Using The Joystick*," November 1970, by G3DCS. The author would wish to make it clear that on the 20m. band some 25 countries were worked, with AX, HK, PY, PZ and UAØ amongst the best DX—also that the paragraph on p.527 commencing "Received signal strengths varied from S9 for JA . . ." should be read to mean that these were reports given on the G3DCS signal.

"*Report on the JR-310*," January 1971, by G3DNF. In the circuit Fig. 4 on p.657, C5 should be shown as also coupling the collectors of Tr1, Tr2, as well as being connected to C7, C9, i.e., the C7, C9 side of C5 should join to the junction of R5 and Tr2 collector.

"*VXO Transmitter for Two Metres*," January 1971, by G3NBU. In the Table of Values, p.677, "C25, C26" should read C24, C25. Regarding the crystals to use, it might also be mentioned that FT-243 types will "pull" (in the frequency sense) much less than the HC-6U because of the high holder capacity, i.e., HC-6U's would give increased coverage with fewer xtals.

"*A 70-Centimetre Tripler*," February 1971, by G3DAH. On p.739, right-hand col., the note about drive-derived bias should read "(13mA through 5.6K)," and in the Table of Values on p.739, the value of R1 ought to have appeared as "1000 ohms, 1 watt."



SHORT WAVE LISTENER FEATURE

MEANING OF SPECIFICATION—READERS COMMENTS AND QUERIES—LEARNING MORSE OFF RECORDED TAPE—GENERAL NEWS AND CHAT—HPX RULES AND THE TABLES

By Justin Cooper

THIS is being prepared at a time when there is more practicality in pigeon-post than the normal kind. However, J.C. seems to have got most of his mail in safely before the postal stoppage.

Quite a thought-provoking article appeared in a recent issue of *Tekscope*, the Tektronix house magazine, in which was considered just what exactly is meant by, and involved in, a "specification." Without going into the details as applied to the oscilloscope (which is the firm's particular interest) we can draw some useful lessons from this discussion. For instance, we might say that an oscilloscope Y-amplifier has an accuracy of 3%; we might also in another sentence say that the bandwidth to the 3 dB point is 10 MHz. Does that mean we can measure the amplitude of a pure sine-wave of 10 MHz with an accuracy of 3%? Not on your life, as a moment of reflection will make obvious. Similarly, in our own field, we might read that a receiver is blessed with a sensitivity of 0.5 μ V. What does this statement in fact mean to, for instance, Joe Blow on SSB, or Bill Bloggs listening to AM, or Joe Sope who is interested only in CW. If all these three chaps were the happy possessors of a signal-generator whose inherent leakage is low enough for them to make meaningful measurements—and only if—they could all make dependable assessments of the sensitivity of the receiver in their own particular mode of operation, and then argue interminably as to who has made the right measurement and got the correct answer!

Let us look at the differences. The CW chap might well find he can put in a signal of the specified level, and get a response that can be seen and measured, of 0.1 μ V. An SSB man would be able to say that if he put in a two-tone signal of 0.5 μ V he can get a signal-plus-noise to noise-ratio of so many dB. The AM chap sets his modulation level to 40% and to get a similar S + N/N ratio requires to inject as much as a couple of microvolts. Along comes your old J.C., wagging his white beard, and throws them all to the ground by just asking whether the specified signal amplitude was in microvolts PD or microvolts EMF. What he would be asking is, in effect, does the quoted figure mean the signal developed by the generator, or the proportion of that signal which actually appears across the input terminals of the receiver, the latter being, because of Ohm's Law, less than the former? In other words,

the statement is meaningless until it is put into terms which remove all possibilities of ambiguity in the mind of an owner trying to test his receiver.

And The Test Gear?

All this still assumes that the test gear used to make the measurement is perfect—and, of course, in practice it never is, so a further statement has to be added, defining the essential features of the test-gear. Even *this* is not always enough. A case from the personal experience of the writer comes to mind, of defining the rise-time of a 'scope Y-amplifier where the bandwidth to the 3 dB point is 35 MHz. Now, clearly if the test square-wave is perfect, the rise-time can be specified in terms of so many nanoseconds. However, the square-wave has a rise-time of its own—given as so-many nanoseconds for the output from a specified generator. So the effective rise-time seen on the tube will have a longer time. As if that were not enough, no CRT is perfect, and if the gun assembly is allowed to be so-many degrees out of parallel as a manufacturing tolerance, then an allowance has to be made for this orthogonality, which means that in the end the risetime is specified as "better than twelve nanoseconds when the amplitude of the square-wave is so many volts on the so-and-so range."

Other Misleading Cases

Loose and meaningless statements are often used on the amateur bands. The classic, of course, is the receiver S-meter, but another firm favourite is the measurement of VSWR on an aerial feeder. In any normal coax cable system, it is a bit pointless to aim for a 1:1 Standing-Wave Ratio when the normal tolerances in characteristics of the cable are going to give bumps of up to 1:1.1 or more. It is even sillier to measure the VSWR at the bottom or receiver end of the feeder unless one can also specify the loss of the cable for the given length of feeder, and also obtain substantially the same answer when a few feet more or less cable are added to the system. And, lest some pedant may point out that even the connector used for this latter test could upset the results, it can be said that a *Belling Lee* TV type coax connector will certainly introduce a "bump of reflection" less than any *good* length of coax will have due to normal manufacturing tolerances, at

least up to 144 MHz.

From The Mail

This issue of "SWL" will see the last showing of the 1970 HPX Table and the new one, to appear next time, will start from January 1st, 1971. The Rules will be the same, and the A-T-P-W and CW sections will continue on their way unaltered.

H. Wright (Pontefract) has a thumping great rise in the CW listings to record, from 291 to 455, partly through more listening, and partly due to a comb-out of old log-books.

J. Fitzgerald (Gt. Missenden) continues with his brace of transistor portables used together to resolve the SSB stuff; John is of the opinion that the QRM on the 80m. DX Net is worse than ever, much of it coming from an EI station who persists in calling "CQ DX" on top of the Net or of calling DX out of turn on the Net frequency. However, an interesting one, which he believes to be quite genuine, was a DFØAFZ, operating on behalf of, and to raise funds for, some sort of West German amateur charity.

It is often a case of "like Father, like Son" and several such partnerships are known, usually as a result, in the first place, of Pop's interest rubbing off on Junior. This time the boot is on the other foot, as *G. Proud (Haverfordwest)* was nudged into it by

son *Stephen*, when the latter realised Dad was an ex-Navy "sparker"—RNARS Hon. Sec., please note! George gets on Stephen's HA-500 and CR-70A when he can sneak in, and this plus the aerial farm have resulted in a first entry to the CW list at 369. How nice to see another CW entry once in a while. Stephen concentrates on the Phones, and has 524 to offer up this time, his array of doubtfuls all managing to pass the test.

R. Friend (London, S.W.19.) runs a KW-201 to an indoor Joystick and ATU, which combination takes his second entry in the 1970 section from 244 up to 271. A different approach is mentioned by *M. Cuckoo (Herne Bay)*, who, possibly influenced by the proximity of our "VHF Bands" expert, G3DAH, has gone in for 144 MHz, with a converter running 28-30 MHz as the tunable IF, fed to a *Trio 9R-59DE* one way and a six-element beam at twenty feet in the other.

By the time this comes to be read, *C. J. Deacon (London, E.6.)* will, if all goes well, be the proud possessor of a G8/3 callsign, which is the best of all reasons for giving up SWL.

A long and newsy letter from *R. A. Treacher (Eltham)* indicates that Bob has been bumping up his Countries Heard score on Eighty of late, to the virtual exclusion of the other bands. Between mid-December and the date of his letter, this had resulted in the total for the band going up from 102 to 115 countries; and the cards for his reports are also coming in at a satisfying rate, to give an overall of 174 confirmed for 229 heard.

HPX LADDER

(All-Time post war)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
B. J. Gilbert (Tonbridge)	1226	L. W. Robinson	603
S. Foster (Lincoln)	1188	(Bury St. Edmunds)	
A. W. Nielson (Glasgow)	1071	P. L. King (Ryde, I.O.W.)	601
J. Singleton (Hull)	1063	G. W. Raven	
R. Nicholls (Narborough)	923	(London, S.E.13)	579
G. Dover (Nottingham)	832	G. Foster (Preston)	572
M. G. Toms (Ilford)	831	M. Williams (Sleaford)	567
G. S. Taylor (Rugeley)	828	E. Parker (Hove)	560
J. Fitzgerald (Gt. Missenden)	823	N. Askew (Coventry)	546
M. T. Hyder (Hythe)	795	P. N. Butterfield	
N. Henbrey (Northiam)	794	(Sharlston Common)	542
G. Braund (Taplow)	789	K. Kyezor (Perivale)	535
W. Moncrieff (Hampton)	772	P. Harris (Lincoln)	535
C. J. A. Morgan (Walsend)	757	Mrs. S. Singleton (Hull)	527
R. A. Treacher (Eltham)	746	S. Proud (Letterston)	524
R. Shilcock (Lye)	737	J. Lee (Nuneaton)	522
G. Aytton (Sunderland)	735	D. J. Browning	
M. Fisher (Bradford)	731	(Bishops Stortford)	515
R. Carter (Blackburn)	709	C. J. Deacon (East Ham)	509
J. P. Scragg (Stockport)	705	T. Rootsey (Ilford)	508
I. Brown (Newtownabbey)	700	B. Cushing (Kenley)	508
A. T. Cheesley		J. Dunnett (Luton)	504
(Kuala Lumpur)	687	A. Judge (Bishops Stortford)	504
T. W. Hyder (Southampton)	676		
K. Plumridge		CW ONLY	
(Southampton)	671	A. Glass (Plymouth)	667
M. J. Quintin		A. Vest (Durham)	656
(Wotton-under-Edge)	669	J. Dunnett (Luton)	619
D. Rodgers (Bolton)	664	H. Wright (Pontefract)	455
H. M. Graham (Harefield)	663	G. Foster (Leyland)	391
B. Hughes (Worcester)	653	G. Proud (Haverfordwest)	369
D. Robinson		G. Braund (Taplow)	304
(Birmingham, 26)	631	J. Halden	
H. Alford (Burnham-on-Sea)	626	(Newcastle, Staffs)	262
A. Cobb (Hull)	611	J. Lee (Nuneaton)	255

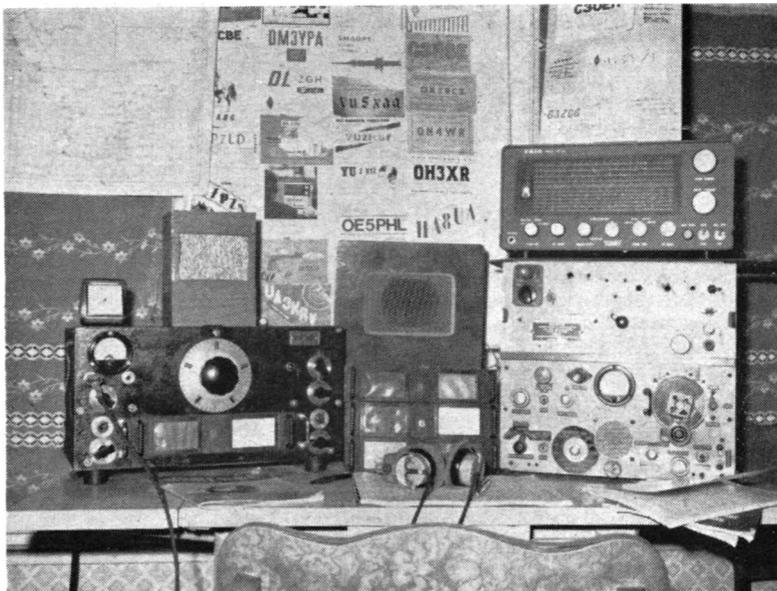
Starting score, 500 for Phone, 200 for CW. Listings include only recent claims. Rules for HPX are given on p.46. The DX Zone Map and latest Prefix List, 84p (16s. 9d.) post free from Publications Department, Short Wave Magazine Ltd., 55 Victoria Street, London S.W.1.

The Skill—and—Experience Factor

T. Rootsey (Ilford) takes issue with our correspondent of last time, D. A. Shepherd, who felt he was "up against it" with a poor location. Terry, in fact has an indoor Joystick tucked away out of sight behind the wardrobe so as not to offend the XYL's eye(!). To it he couples an *Eddystone EC-10* and a pair of phones. He felt that with this gear it would be an achievement even to reach the 200—but now he is sitting up at 508, he finds that to continue progressing he has to winkle out the signals which previously he would have either disregarded altogether or not tried to copy under the QRM. How right he is; as far as receiving goes, it is 90% operator, 5% gear and aerial, and 5% the location. Otherwise, how could one explain the regular success of, say GM3IAA, in working across to the States on Top Band, when his received signals are down by several S-points as compared with the Southerners? And he has a bent aerial in a notoriously bad location, and withal has to cope with the loss of response and sensitivity of his ears due to age? Of course it is his operating skill and know-how that overcomes all the other problems.

Another example comes in here, in the shape of *J. R. Brien (Bethnal Green)* who uses a couple of metres of curtain-wire as aerial for an *Eddystone 840C*. Incidentally, James would like to hear from anyone with ideas on improving SSB reception on the HF bands and adding S-meter facilities to his

Stephen Smith, 9 Sowrey Avenue, Rainham, RM13-7LX, Essex, has been an SWL for about two years and in that time has acquired the neat-looking installation shown here. The main Rx is the HRO-MX, at left, and he also has a Trio 9R-59 and a Canadian 52 Set (lower right). His aerials are a Joystick and a 95ft. end-on wire.



receiver—letters direct, please, to him at 12 Butler Estate, Digby Street, Bethnal Green, London, E.2.

I. Brown (*Newtownabbey, Co. Antrim*) is another who comments on the offsetting of skill and experience against difficulty as the score rises; his own now has reached 700, despite the trains. Irwin has gathered together materials for a mast of height between 60 and 70 feet and is at the moment awaiting the desired permission to put it up. Incidentally, among his prefixes appears an SZØ, this being a variation on the Greek theme, to cover a commemoration.

Now to A. Judge (*Bishops Stortford*), who has picked exactly the right time to transfer from the 1970 to the A-T-P-W list, into which his starting score of 504 has been entered. Listening has been mainly on the LF's, Eighty having yielded a pile of DX which would grace any log-book, and Top Band a hearing of ZB2A on CW. Naturally, reporting on this sort of reception will result in QSL cards, and these are now beginning to roll in, both from the Bureaux and direct.

G. S. Taylor (*Rugeley*) has changed his HE-30 for a Trio 9R-59DS, which he likes very much. However, although Graham has a young aerial-farm at his disposal he is somewhat "bugged" by his inability to hear the weaker ones on the LF bands under the interference generated by the TV set—interference which is more of a nuisance on 625 lines. Usually, this sort of thing is due to the TV line timebase—the same noise that makes mincemeat of the 200 kHz BBC channel. Often it will be found, on investigation, that this is as much as anything an earthing problem—there will be found that somewhere, the same bit of wire is carrying the earth currents of the TV and those of the receiver; and for "piece of wire" we could add "piece of water-pipe." The cure is to run a separate earth from the SW receiver,

which, if it has to use the water-pipe at all, should make its connection to the pipe between the existing mains earth and the point of entry of the pipe into real ground.

Talking of interference, H. M. Graham (*Harefield*) has two annoyances, one of which comes on in the day and the other in the evenings. The evening one makes frying noises and generates "birdies" all over the band, while the other one is a pest of an electric motor, which delights in reserving its best efforts for Sunday mornings. The result of the two months' effort since last time out seems to be a matter of three new prefixes; three new countries on Ten in spite of its winter doldrums; Twenty spasmodic but about the best of the bunch; and despite the noise on the LF's, and the QRM, a few new ones on Eighty and some WAB areas on Forty, albeit here the Continental QRM often wipes up the WAB Net—not really their fault, but rather one of the vagaries of 7 MHz propagation.

N. Crampton (*Romford*) seems to have been a listener to the 3.5 MHz DX Net for what time he could spare, and as a result netted a few new prefixes. Still on the tack of LF DX, it is interesting to note that despite all the hot-under-the-collar stuff and deliberate interference, it is most definitely the most popular activity to listen to as far as the SWL's go, with the WAB activity not far behind.

Up in *Stockport* sits Phil Scragg, who has been pretty inactive since the autumn, as he is in most seasons when the chess takes over. However, this time Phil has a new competitor as well in the shape of a central heating system which is kicking up a mighty amount of electrical noise, and which the installers seem a bit reluctant to tackle.

Now we have something of a record to comment on. Believe it or not, S. Foster (*Lincoln*) has not

one addition to make to his existing score, due to his other commitments with ISWL, CHC, Christmas puddings and more mundane things like working and sleeping. Stew, along with Heaven knows how many others, reckons that doubtful "OR1RAF" was almost surely a mis-copying of DA1RAF who has been very active indeed from Gatow in West Berlin.

On Learning Morse

Several times your J.C. has mentioned the value of a tape-recorder around the shack. *D. Rodgers (Harwood)* uses his as a way of learning CW. Starting a couple of months prior to his letter, Dennis could not read anything he heard on the receiver. He therefore set his recorder up on its highest speed, using a high-pitched beat note in the receiver, and recorded lots of QSO's—and doubtless QRM! — on tape, for playback at either half- or quarter-speed as practice material. Now, at the time of his letter, he was finding it easy comfortably to copy at 15's straight off the receiver, and the recorder is kept only as "insurance" against not being able to decipher one of the fast merchants. So far, Dennis is now up to 170 prefixes on CW and looking as though he will soon have an entry into the Ladder.

J. R. Cowan (Rochford) has lots of points and queries. However, his main one seems to be about the practice of direct QSL'ing and reporting, and the use of IRC's. Broadly speaking, J.C. prepers to avoid IRC's, and if QSL'ing direct sends an s.a.e. franked with the correct number of stamps for return postage; the snag is, of course, that you have to obtain them as mint stamps of the country where the QSL is going to be posted from to you. This means having contacts with a friendly stamp dealer. However, even this is not always "on," as for instance with a DX-pedition sending the cards out from their own country after they return. However, the situation is different from station-to-station, as the location and local factors change. W9WNV's *Amateur Radio DX Handbook* contains some pertinent information on this and other aspects of DX'ing and QSL'ing, and of course you should keep a close eye on the DX columns in the magazines you favour for up-to-date news. In addition, all the very latest stuff in the way of forthcoming DX events is obtained by subscribing to Geoff Watts *DX News-Sheet*. This lands on your mat on a Thursday with news that has broken as lately as the previous Tuesday morning, not to mention QSL addresses and details for all the major shows and most of the minor ones as they crop up. Write to Geoff at 62 Belmore Road, Norwich NOR 72T, or phone Norwich 33103 for the gen. on his *DX News-Sheet*.

A. W. Nielson (Glasgow) still keeps steadily plodding on in the A-T-P-W list, despite the continued lack of an aerial and a sick receiver, which has now all but given up the ghost as far as Twenty and Forty go, leaving only Ten and Fifteen, these in their turn being only of use when Arthur can be listening during the times they are open, meaning effectively weekends. Sounds a little as though this fault would be cleared by attacking the several wafers of the bandswitch S1 with switch cleaner such as

NEW HPX LADDER

(Starting January 1, 1970)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
D. Smith (Nuneaton)	485	A. Wood (Darwen)	322
R. Bence (Cardiff)	482	J. Law (Stonehaven)	320
J. Spearing (Orpington)	471	A. Pyne	
R. Pepper (Bradford)	469	(Budleigh Salterton)	318
M. Gawthorpe (Hull)	468	I. Simpson (Newcastle)	318
J. R. Cowan (Rochford)	460	K. Murphy (Manchester)	316
D. Foster (Llandaff)	452	A. Vest (Durham)	309
W. E. Swain (Bodmin)	427	M. Marsden (Ilford)	300
N. Crampton (Romford)	426	E. Shaw (Chester)	293
K. C. Webb (Slough)	409	J. Marchant (Sharnbrook)	289
G. Stuart (Edinburgh)	409	G. Dodwell (Yeovil)	284
M. Rivers (Whyteleafe)	402	R. Friend (London, S.W.19)	271
P. Corrigan (Tallaght)	401	M. W. Savegar	
W. R. Martin (Tewkesbury)	392	(Bexhill-on-Sea)	263
S. Rawlings (Twyford)	356	M. Cuckoo (Herne Bay)	256
P. Fry (Eastleigh)	359	E. Ransom (Redcar)	251
T. Thornton (Reading)	356	D. J. Lockwood	
P. Oliver (Mansfield)	356	(Sharlston Common)	245
A. Watson (Dartford)	334	D. Waters (Ruislip)	245
Miss L. Hyder		K. A. Hastie (Jedburgh)	229
(Southampton)	332	L. J. Turner (Newark)	225
D. J. Lee		A. D. C. Baker (Sanderstead)	218
(Heimel Hempstead)	323	P. Reeves (Burton-on-Trent)	204

Listings include only recent claims. Starting score 200. Rules for HPX as shown overleaf. This is the final appearance of this Table, repeated from last time (January) because of the postal delays. The next issue of "SWL" (May) will carry the first of the New Table entries, counting from January 1, 1971. Other rules will be unchanged.

Lectrolube, squirting it on to the appropriate parts by using the long nozzle which comes with the aerosol. Probably a squirt of the same down the 5-8 and 11 MHz crystal sockets and the cleaning of the crystal pins before plugging them back in would help too. No, J.C. does not boast a crystal ball—but he does also, like Arthur, have a KW-77 receiver in his shack!

J. Brackenridge (Maybole) takes your conductor to task for a slip-up in the HPX recording of Jim's score. Going on along his letter, one notices the cards through the Bureau are beginning to trickle in, notably from 4M1A and PJ1AA. On the equipment side, a change to the aerial is in hand.

An interesting letter from *N. Henbrey (Northiam)*, enclosing his new score indicates that he is more than somewhat observant in his reading, he having noted your old scribe's sticky paws "in another place" as they say in Parliament. Son *David* has is A-levels coming up soon; upon the results of this a lot depends, as he wants to go on for a degree course in Electronics, so naturally, SWL has to take very much of a back seat just now.

E. Shaw (Saltney) has also been a little inactive but for rather different reasons; Eric has a shack at the bottom of the garden which is being "done out" thoroughly so as to improve the heating and other details, to go along with the new *Trio JR-500* that graces the operating spot. He says he likes it, and understands why so many people buy all-commercial stations—but he just *likes* building—and a very fine thing too. On a different tack, Eric has been doing some careful comparisons as between the end-fed

quarter-wave and the trap vertical, on signal strengths at all distances, out of which the trapped beast comes out hands-down except on the locals, where the straight wire is much better; this is probably due to the high-angle radiation off the wire coming back down to ground at a very steep angle indeed.

All the way from *Hong Kong* comes a letter from *S. Edwards*, who is one of that mystic tribe of Servicemen known as a Foreman of Signals, claimed to be, along with a similar rate in the Artillery, the best job in the Army. However, J.C. has known many F.o.S. types, and they all have a sense of humour, in this case by way of a cutting from the *China Mail* showing a radio room full of water, an agitated officer at the door, and wearing a life-jacket, and a very angry R/O saying to the officer "We would have to go and sink—just as my request on the radio is coming up!"

Instead of his usual *I.o.W.* address, *P. King* writes in this month with a *nil* report from the Beach Hotel, Antigua, where he is listening-in with a T.28 on the LF bands as they sound in VP2A-land. Most of the European big signals have been heard on Eighty in the evenings, including G3UML and GM3VIU, plus of course lots of Central-American "locals" like 8P6, 6Y5, 9Y4, and so on. Oddly, the only VP2A heard is VP2AA, who is quite active.

J. Jarvis (Rickmansworth) is a bit of an addict of Top Band, mainly local rag-chews, but occasionally for the DX; and he is rather cross because of QRM from fish-phone stations which splash across his receiver. Jonathan claims this is due to the fish-fone drifting, but, sad to say, the blighters just don't drift at all; what is happening in all likelihood is either that he is listening to a contact on a frequency which belongs to a fish-signal from the other end of the country to the station having the QSO, or, more likely, just that he is running the receiver RF gain far too high and the interference is being generated in his own receiver, as a result.

What one hears and enters in the log is to some extent connected with what one is listening to. For example, J.C. might be listening for one of those VK's at the bottom end of Forty one evening. QRM is, as ever, pretty steep; and if one wants the VK enough, it is noticeable that other prefixes just do not register, even though they be DX or "new ones." This often means that one fails to log, say, an 8P6 who is right alongside the desired VK, even though one hears him and knows just what he is worth. A sort of mental "squelch circuit." The effect is commented on by *H. Alford (Burnham-on-Sea)* who finds that since his main pre-occupation is that of hearing Countries, he often fails to log Prefixes. Just have to change the method, OM!

His absence from the last piece is explained by *G. C. Stuart (Edinburgh)* by the fact that at the time of the deadline he was very busy on last-minute revision for the December R.A.E., which Gordon hopes he will pass; and so for his sake do we.

J. Halden (Newcastle, Staffs) enters with a CW-only list—good!—and mentions the matter of a ZA1B heard on 40m. early in November. As with most of them, this one was a phoney—perhaps he had not heard of OH2BH/ZA, and ZA2RPS, who between them added Albania to the scores of most of the DX stations in the world.

The real ZA2RPS fell in to the bag of *M. Gawthorpe (Hull)*, to the latter's great pleasure. Another one, about which Martin has a certain amount of doubt is the DA2AU—but by now most people will be aware that the DA calls are a variation on the theme of DL/DJ to cater for overseas Forces personnel stationed in Germany.

Back to the Eighty-metre DX Net; *N. Martin (Killiney, Co. Dublin)* was listening to them on December 7, and was struck by the size and cosmopolitan nature of the assembled gathering. About twenty stations were on at 0030z that night, with YU, 9H1, UW9, EA3, G, LA, SM, I1, OZ, UA9,

The rig at the QTH of Paul Goff, 25 Carey's Road, Pury End, Towcester, Northants., consisting of a modified 19 Set (upper left), a Pye 47C receiver and, at centre, a modified R.1475 with its PSU. He also has a home-built two-metre Rx—and, where he is, must find quite a lot of interesting listening on that band.



HPX RULES

- (1) The object is to hear and log as many *prefixes* as possible; a prefix can only count once for any list, whatever band it is heard on.
- (2) The /M and /MM suffixes create a new series; thus G3SWM, G3SWM/M and G3SWM/MM all count as prefixes, and, where it is known to be legal, /AM also.
- (3) Where a suffix determines *location*, the suffix shall be the deciding factor, thus W1ZZZ/W4 counts as W4. Where the suffix has no number attached, e.g. VE1AED/P/SU, VE2BUJ/P/SU they are arbitrarily counted as SU1 and SU2 respectively, and the same holds good for similar call signs.
- (4) When the prefix is changed both the old and the new may be counted; thus VQ4 and 5Z4 both count.
- (5) The object is to hear *prefixes*, not countries, thus there is no discrimination between, say, MP4B- and MP4AK- which count as one prefix.
- (6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate call signs will not be credited, nor may any MARS stations be claimed.
- (7) G2, G3, G4, etc., all score separately, as do GW2, GW3, GW4, etc., and in the same way K2, W2, WA2, WB2, WC2, WN2, all count separately even though they may be in the same street.
- (8) Send your HPX list, in alphabetical and numerical order, showing the total claimed score. With subsequent lists, it is sufficient to quote the last claimed score, with the new list of prefixes, and the new claimed total. Give your name and address on each sheet, to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, if possible to arrive before the SWL deadline for that particular month.
- (9) Failure to report for two consecutive listings, i.e. four months, will result in deletion from the Table, although there is no objection to a "Nil" report to hold your place.
- (10) **Starting Score 200.** Phone Table is mixed AM/SSB, with a separate CW Table. No mixed Phone/CW Table, nor will AM-only or SSB-only entries be accepted.
- (11) Lists will be based on those shown in the current *Short Wave Magazine* list of Countries and Prefixes, dated December 1970, and with the current edition of the *DX Zone Map*.

NOTE: The *DX Zone Map* costs 84p (16s. 9d.) and includes the latest Prefix List. The *Prefix List* alone, by countries, prefixes and zones, alphabetically both ways, costs 13p (2s. 7d.). Prices are post free. Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

CT1, GM, DL, OK and VE1 all represented, in some cases by more than one station.

P. Harris (*Lincoln*) has been at the SWL game for a long time, using a domestic radio set with a suitable "collection of transistorised gubbinses tacked on." Tacked on or stuck on, it makes no difference to the fact that SWL Harris is climbing steadily in the A-T-P-W Table.

This is not the case with D. J. Lee (*Hemel Hempstead*) who, having sweated it out to reach the magic 500 prefixes required for entry to the Big League, is somewhat mortified to have to send in a *nil* report until he can scratch up the last one or two.

With his list of prefixes J. Spearing of *Orpington* writes to say that he has been making quite a few changes around the place. An R.1155 and PSU have appeared in the shack, thanks to a Cray Valley Club junk sale. This one is fed from a vertical hanging down from the shack window; and alterations have also been made to the run of the long-wire.

A sad note which arrived just too late for our last piece, from A. Donald, advises that his friend *Dave Douglas* was killed in a road accident during the first week of December last. David was at one time well up at the head of the HPX Table before he dropped out. Alisdair tells us that at the time of his death David's records showed 214 countries confirmed, all band, not to mention 39 confirmed in six continents on Top Band and considerable VHF activity. He will be much missed in SWL circles.

A very long letter from M. Williams (*Sleaford*) discusses his approach to many things. Maurice is not intending to go in for R.A.E. this time on the strength of just a short period of instruction, but wants to consolidate it to the point where he feels in his own mind not only that he can in fact pass the exam, but also, one suspects, feel worthy of his call. One could wish many others could feel the same way, particularly among the younger elements.

One query appears in P. Corrigan's letter from *Tallaght, Co. Dublin*, taking the form of PI1HTG. No problem there, Peter, PI is and has been for years a variation on the PAØ theme.

Not so D. J. Lockwood (*Sharlston Common*) who has five of them on offer, out of which we have with regret to delete ZA1AB and GM7T (!) and allow ZA2RPS, UD5L, OG1GR, for a reasonable compromise leaving honour satisfied on both sides.

In the *Plumridge* family there are two SWL customers, and your old J.C. was aye mixing them up. However, we now know that the K. is Junior's initials, he and Dad having pooled their resources and treated themselves to a Trio JR-500SE, which will no doubt give much pleasure.

All four of J. Dunnetts (*Luton*) CW queries are "good" albeit there is no *series* covering the /MA suffix used by Maritime Mobiles when anchored. Oddly enough, the Phone queries are all, by the look of them, phoneys.

* * *

A first entry for the HPX comes from A. Mercer (*Wigan*) who runs a R1155N—the Top Band coverage one, mainly used on the LF bands. Alan has

started to learn Morse, and can now take callsigns up to about 14 w.p.m., but is a bit disappointed at not hearing any really good DX on CW after all he has been told.

Doctors, please note! *R. Carter (Blackburn)* has found a way of easing his bronchitis a little—he sits up and listens for new prefixes! As a result, the morning 0600z sessions on Eighty have been quite profitable and the score of prefixes benefits accordingly.

Another new entrant this time is *S. Rawlings (Reading)*, who has recently replaced his home-brew 3-valver by an AR88D, which is coupled to a 66ft. wire at 26 feet, coupled through an ATU. There are also means of listening to 144 MHz, at present by super-regen, but soon by an FET converter which is set at the moment in the building stage.

As always, there are some people who write in with just scores and no comments. Thus, for this time we have entries from *A. D. C. Baker (Sander-*

stead); *T. W. Hyder (Southampton)*; *G. Dodwell (Yeovil)*; *A. T. Cheesley (Kuala Lumpur)*; *K. Kyezor (Perivale)*; *M. Rivers (Whyteleafe)*; *M. Marsden (Ilford)*; *T. Thornton (Wargrave)*; *P. Fry (Chandlers Ford)*; *A. Glass (Plymouth)*; *E. W. Robinson (Bury St. Edmunds)*; *K. Murphy (Manchester)*; *M. J. Quintin (Wotton-under-Edge)*; *R. Shilvock (Lye)*; *D. Robinson (Sheldon, Birmingham)*; *J. G. Ayton (Sunderland)*; and *W. Moncrief (Hampton)*—all of which are acknowledged and taken in as applicable.

Deadline

So there is is. For next time, as already indicated, your entries for the 1970 Table will be struck out in favour of your entries for 1971, while the CW and A-T-P-W continue on their present paths—but all depends on the posts coming back to life; if so, then the deadline will be to arrive, as ever addressed to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, by **March 15**. Till then, keep pushing on. *73 de J.C.*

THE MONTH WITH THE CLUBS

By "*Club Secretary*"

(Deadline for April issue: March 5)

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

THIS month there is some element of difficulty about writing "Clubs," if only from the point of view that, although several groups managed to get their letters in, either before the postal disruption, or afterwards by hand delivery to Victoria Street—for which, many thanks—it is clear at the time of writing that this piece will have to be completed early anyway, and without the benefit of any incoming mail.

This being the case, we have, as far as possible, tried from our records to give as near to a true picture as may be of the Club scene for the coming month. We ask forbearance if, for any reason, we have missed out anywhere.

The Clubs

Straight down the list this month, as the situation at the time of writing does not permit a regional arrangement.

Bishops Stortford had an AGM in January and the new committee is busily fixing up a programme for the rest of 1971. The pattern is of a meeting on the third Monday of each month, at the British Legion Club at the top of Windhill; start at 2000 clock, but arrive a few minutes early if you prefer

for a preliminary ragchew downstairs in the bar.

If you operate /M, either as licensed amateur or SWL, in U.K. or elsewhere, then **A.R.M.S.** is the Club for you. Apart from their *Mobile News* each month, there are other activities to enter into, not to mention operating awards to try for. Well worth the subscription, in your scribe's view.

Up in the Border country centred on **Berwick-on-Tweed** is the group called the **Border Amateur Radio Society**. Recently they had an AGM, so we have no up-to-date information as to their proposed activities; but we can say that the venue is to be the Tweed View Hotel, Berwick-on-Tweed, on the first Sunday in the month, starting at 3.0 p.m.

Guildford have a meeting on March 12, no programme details specified, and another on March 26, when Mr. R. T. Greenwood will be telling them "How to Build a Frequency Counter." The Hq. is at the Model Engineering Club, Stoke Park, Guildford, the normal routine being the second and fourth Friday in each month.

County Control, Civil Defence Hq., Gaol Street, is the home for **Hereford** on Friday evenings. Sadly, we cannot tell you much about forthcoming events, because after the AGM, and at the same time this

is due to be read, the new committee will be busy organising it all.

Over to **Southgate**, where the place to search out is the Civil Defence Hut—easy enough, as it is opposite the Arnos Grove station of the Piccadilly Line. For the date, and the other details, contact G3XSV—address and phone number as Panel, p.49.

The total of members on the roll at **Surrey** is no less than 96, which bespeaks a strong and active group. Although the formal meetings are, we understand, to continue in Croydon, there is a move afoot for a new place in Wallington. This being the case, a line to G3FWR, as Panel, would be a good insurance against the risk of arriving at the wrong place. The normal date would be the third Tuesday at the Swan and Sugarloaf, Brighton Road, South Croydon, for a Junk Sale.

Having given up their own place at **Perdiswell** for various reasons, the **Worcester** lads will be getting together at the Crown Hotel, Broad Street, on March 20—the third Saturday in each month will be the routine from now on. Incidentally, this group have a vacancy for a psychiatrist on the proposed NFD staff!

Flint is a relatively remote part of the world in the Amateur Radio context, but there is a strong and active Club; judging by the *Newsletter* they have a happy slant on life. To find out, go to the Hawarden Castle in Church Street on Friday evenings, where the “informals” or on-the-air evenings alternate with the more formal lecture/demonstration/filmshow type of entertainment.

Crawley is one of the Clubs that believe in success and its relationship with publicity, so much so that they appoint a member specifically charged with looking after this aspect. G3TR writes in to say that on March 24, at Trinity Congregational Church Hall, there is to be a Film Show and a Constructional Contest.

If you have served in the Navy you should make a point of joining the **Royal Navy** society; apart from their nets on Eighty—3720 kHz SSB 1900 clock, and 3520 kHz CW 0900 clock, Wednesday evening and Sunday morning respectively—they have the much-appreciated QRQ Run for anyone wanting to bring up their Morse speed and prove by the certificate that they can do it. This exercise also is on 3520 kHz, starting at 1900 GMT on the first Tuesday in each month. As well as all this, there is what is currently one of the best *Newsletters* to reach this desk each month.

Now **Crystal Palace**, where we are advised the meeting date for March is the 20th; this is one club where the outgoing committee organise the meeting after the AGM, which saves the incoming lads much worry; on this particular Saturday evening at Emmanuel Church Hall, Barry Road, London, S.E.22., there are no less than four speakers lined up to talk about Electronic Components and Materials, namely G30OU, G3FZL, G3IIR and G3XFT.

The hon. secretary of **Acton, Brentford and Chiswick** goes to great pains each month to make sure he gets his mention in this piece; this time a letter delivered by hand advises that they are, as ever, at

the Trades and Social Club, 66 High Road, Chiswick, London, W.4., where G3OJX will be the speaker, and his subject a practical one, namely his experiences with Integrated Circuits.

* * *

No matter what happens the weekly doings of the **Shefford** gang continue. March 4 is down for a talk on Atmospheric Phenomena by G8CTB, while on the 11th, Mr. J. Robinson teaches First Aid—a topic so often left right out of Club syllabi and yet so important. An intriguing title comes up for March 18—trust G2DPQ to think of a new twist!—“The Relationships between Music, Radio and Morse.” Finally, there is G8DUY on March 25, to talk about the Eastern Gas Board Microwave system. All the home meetings are in the Parish Hall, Ampt-hill Road, Shefford.

The ever-popular junk sale features in the March programme for **Kingston-on-Thames** club. Look for them on March 10, at the Penguin Lounge, 37 Brighton Road, Surbiton.

With the **North Kent** March programme we are on the horns of a dilemma, insofar as it looks as though the *Newsletter* typist allowed a finger to stray. We believe that March 11, not the 22nd, is the correct date for the Vero Electronics lecture, and March 25 for the Open Evening—but in the circumstances it is suggested that you get in touch with G3WRP, at the address in the Panel.

Dorking have their Hq. at the Wheatsheaf, and the dates look to be March 9 and March 23; but unfortunately our information at the moment does not extend as far as the details for these meetings.

A similar situation applies for **Dartford Heath D/F** Club, albeit we know that on March 5 they propose to have an Evening Hunt; and on March 13 they are having a dinner-and-dance at Greenaways Hotel, Wrotham. As we are not up-to-date with all the details, it is advised that you ring G3XVC, as Panel.

If ever you were in the Forces years ago, and served around the Medway Towns area, then you will know the **Medway** Hq.—although it is now known as the Aurora Hotel, Gillingham, in those days it was better-known as the Medway NAAFI Club. Any Friday evening you can turn up there, unless the lads have a trip planned to some local place of interest. Normally, they have something in the way of a talk, demonstration, film show or what-have-you.

As far as the **George Kent** Company Club is concerned, we know it is in being, and that a programme is being run, but for the details we must refer you to the hon. Secretary, address as Panel.

The Ashford area of Middlesex is covered by the **Echelford** Club, who have their Hq. at The Hall, St. Martins Court, Kingston Crescent, Ashford. Here they assemble on March 8 for a Construction Night (for which you are asked to bring along your home-built equipment for the others to see and draw ideas from) and in addition there is a special prize of a fiver going for the best home-constructed *and working* version of the G3SAZ Valve Tester, as featured in

their *Newsletter* of late months. The second date is March 25, which it is most important for you to attend, as it is the evening of the AGM.

It should be noted by anyone thinking of going to the *Verulam* meeting that the starting time has been brought forward a little, to 7.30 for 7.45 p.m. sharp, in the Council Chamber of St. Albans Town Hall—March 24 it is, and the speaker G8BBO, on his pet topic of Printed Circuits. All that needs to be said about this one is that G8BBO has forgotten more about printed circuits than most of us will ever know, and he has a happy knack of being easy

to listen to into the bargain.

The *Colchester* group has another name which defines their Hq., namely, North-East Essex Technical College, which is in Sheepen Road, Colchester. Here they assemble regularly in Room 40; but we cannot at the time of writing give you any dates, so we must refer you to G3ZOS, *see* Panel.

Clackton have their corporate being in the Martello Tower, Marine Parade West, Clacton-on-Sea, where you can find them on the second and fourth Tuesday of each month; here again, while we know there is a firm programme set up, we do not

Names and Addresses of Club Secretaries reporting in this issue :

- ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
 A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.
 BANGOR: E. R. Sandys, G12FHN, 25 Moira Park, Bangor, Co. Down, Northern Ireland.
 BASINGSTOKE: P. Sterry, G3CBU, Ashley, Orchard Road, Salisbury Gardens, Basingstoke, Hants.
 BISHOPS STORTFORD: A. Stanley, G3WUR, 43 Havers Lane, Bishops Stortford, Herts.
 BORDER COUNTIES: C. H. Crook, G3YOG, 19 Hatters Lane Berwick-on-Tweed.
 BRACKNELL: L. J. Parry, G8AMK, 13 Cannon Hill, Easthampstead, Bracknell (23704), Berks.
 BRADFORD: H. F. F. Lobley, Stoneways, 37 Cullingworth Road, Cullingworth, Bradford, Yorks.
 BRISTOL: Rev. J. L. Marshall, G3RKH, 9 Colston Parade, Bristol (20587), BS1-6RA.
 BRISTOL (Shirehampton): E. J. Davis, G3SXY, 72 North View, Westbury Park, Bristol (33284), BS6-7PZ.
 BRITISH RAIL: R. Woods, 15 Grant Avenue, Slough, SL1-3NB, Bucks.
 B.A.R.T.G.: D. J. Goacher, G3LLZ, 51 Norman Road, Gorse Hill, Swindon (21740), Wilts.
 CANNOCK CHASE: B. Galliar, 67 Bentons Lane, Landywood, Walsall, Staffs., WS6-6EE.
 CHIPPENHAM: P. Strand, G3UTO, 8 Brookwell Close, Chippenham (3723), Wilts.
 CLACTON: T. A. Mills, G3YAL, 122A Chilburn Road, Burrs-ville Park, Clacton-on-Sea (22857), Essex.
 COLCHESTER: J. Morrison, G3ZOS, Weeley House, The Street, Weeley (216), Clacton-on-Sea, Essex.
 CORNISH: J. Farrar, G3UCQ, Elm Cottage, Ventonleague, Hayle, Cornwall.
 COVENTRY: C. Jaynes, 20 Belgrave Road, Coventry, CV2-5AY.
 CRAWLEY: G. Bowden, G3YVR, 51 Leighlands, Pound Hill (3253), Crawley, Sussex.
 CRAY VALLEY: P. F. Vella, G3WVP, 78 Hurst Road, Sidcup.
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23 (01-699 6940).
 DARTFORD HEATH D/F: Mrs. M. Worbey, G3XVC, 13 Havelock Road, Dartford (22889), Kent.
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3-7GE.
 DORKING: R. Greenwood, G3LBA, 8 Deacon Close, Downside, Cobham (2628), Surrey.
 ECHELFORD: R. Hewes, G3TDR, 24 Brightside Avenue, Laleham-on-Thames, Middx. (Staines 36513).
 EXETER: V. Tomkins, 56 Causey Lane, Pinhoe, Exeter (67447), EX1-3SH.
 EX-G: F. W. Fletcher, G2FUX, 53 St. Ives Park, Ringwood, Hants.
 FLINT: P. M. Salomon, GW3XQO, 15 Alyndale, Hope, Wrexham, Denbighshire.
 GEORGE KENT LTD.: J. Allen, G3DOT, 77 Rosslyn Crescent, Luton, Beds., LU3-2AT.
 GUILDFORD: R. L. F. Ramsay, G3ARM, 32 Sidney Road, Guildford (62325), Surrey.
 HAVERFORDWEST: A. Thomas, GW3YBB, 7 St. Martins Park, Haverfordwest (2181), Pems.
 HEREFORD: S. Jesson, 181 Kings Acre Road, Hereford (3237).
 HULL: Mrs. Mary Longson, 4 Chester Road, Wold Road, Hull.
 KINGSTON: R. S. Babbs, G3GVU, 28 Grove Lane, Kingston-on-Thames (2801), Middx.
 LEICESTER: T. H. Adcock, 38 Wykes Road, Newparks, Leicester (873711).
 LINCOLN: G. O'Connor, 61 Steep Hill, Lincoln (24113).
 LOTHIAN: D. E. Ferguson, GM3YMX, 1 Braidburn Crescent, Edinburgh, EH10-6EL (031-447 2858).
 MAIDSTONE: A. S. Walter, G3WXL, 31 Lansdowne Avenue, Maidstone, Kent.
 MANSFIELD: F. N. F. Bewley, G8HX, 116 Westfield Lane, Mansfield (25208), Notts.
 MEDWAY: D. Ferrigan, 191 Gillingham Road, Gillingham (54203), Kent.
 MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray (3369), Leics., LE13-1TZ.
 MID-CHESHIRE: A. Greenwood, G3SIQ, 83 Ash Road, Cuddington, Northwich, Cheshire.
 MID-HERTS: H. R. Thornton, G3PKV, 43 Fordwich Road, Welwyn Garden City (23163), Herts.
 MIDLAND: N. Gutteridge, G8BHE, 14 Metchley Drive, Harborne, Birmingham, 17 (021-622 2323).
 MINEHEAD: H. G. Cane, G8BGG, Jubilee Terrace, Timberscombe (266), Minehead, Somerset.
 NORTH BUCKS: F. Frisby, G3ZNY, 11 Kingston Avenue, Stony Stratford (2382), Bucks.
 NORTH KENT: A. Beaton, G3WRP, 373 Bellegrave Road, Wellington, Kent.
 NORTH LEEDS: P. B. Furringer, G3MZF, 3 Ruthven View, Leeds, LS8-RQ, Yorkshire.
 NUNEATON: D. W. Smith, 2 Niton Road, Weddington, Nuneaton, Warks.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye (351), Peterborough.
 PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey, CR4-6DB.
 RACAL: N. P. Henry, Racal Amateur Radio Club. (Bracknell 3244, extn. 233).
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
 READING: P. Bendall, G3NBU, 89 Hexham Road, Reading.
 REDDITCH: R. J. Mutton, G3EVT, Summerhayes, Mill Lane, Oversley Green, Alcester (2041), Warks.
 ROYAL NAVY: C/Rs M. Matthews, G3JFF, *H.M.S. Mercury*, Leydene, Petersfield, Hants.
 SALTASH: J. A. Ennis, G3XWA, 19 Coombe Road, Saltash, Cornwall, PL12-4ER.
 SHEFFORD: A. Sullivan, G2DGF, 12 Glebe Road, Letchworth, Herts.
 SOLIHULL: J. Burnie, G8BYM, 12 Buryfield Road, Solihull (021-705 4565), Warks.
 SOUTHGATE: A. Hydes, G3XSV, 6 Glenbrook North, Enfield (01-363 8747).
 SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire, M33-3GW.
 SURREY: S. A. Morley, 22 Old Farleigh Road, Selsdon, South Croydon, CR2-8PB (01-657 3258).
 TORBAY: Mrs. G. Western, G3NQD, 110 Truro Avenue, Hele, Torquay.
 UNIVERSITY OF MANCHESTER (Institute of Science and Technology): P. Wilby, G3YRU, Students Radio Soc., Box 88, Sackville Street, Manchester, M60-1QD.
 VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford, Herts, WD2-5JQ.
 WAKEFIELD: M. E. Garner, G3XVU, 13 Kingslade Avenue, Drighlington, Bradford, Yorkshire.
 WESSEX: G. A. Moore, G8BBN, 15 Stanfield Road, Winton, Bournemouth, Hants., BH2-2NL.
 WEST OF SCOTLAND: K. McDermott, GM3SSB, 22 Fettercairn Avenue, Glasgow, W.5.
 WIRRAL: A. Fisher, G3WSD, 34 Glenmore Road, Oxtou, Birkenhead, Cheshire (652-5078).
 WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton, WV3-7LX, Staffs.
 WORCESTER: G. Spink, G3WUI, 1 Belvoir Bank, North Malvern, Worcs. (Malvern 3088).

at the moment know any details.

As far as the **North Bucks** crowd is concerned, it looks as though they get together twice each month, albeit we have no more details; thus again we have to advise you to contact the hon. secretary, G3ZNY, name and address as Panel, p.49.

Mid-Herts have a booking on the second Thursday of March at Welwyn Civic Centre, and indeed this is the form for every month. February's must have been of great interest to the still considerable contingent of home-builders of equipment, as G8BGM was going to talk about Linear Integrated Circuits.

If you are in or near **Purley**, the place to look out for is the Railwaymen's Hall, 58 Whytecliffe Road; on March 5 it is the small hall for a Natter Nite, and on the 19th the large hall (definitely!) for the first part of the annual Spring Junk Sale.

* * *

Every Friday the **Maidstone** chaps foregather at the "Y" Sportscentre in Melrose Close, where the main occupation at the time of writing was wood-working and the fitting up of their *second* Club shack! However, on March 5, the lecture evening will be by G3WWI, who is to answer the question "What is Hi-Fi?" to the satisfaction of those present. Another important date is March 19, as this is when they will consider the 1971 Maidstone Mobile Rally—an important matter indeed.

Chippenham next, where the lads have every Tuesday evening at the Boys High School, Hardenhuish Lane. Here again we have with regret to say that our news of this month's activities is not in at the time of writing—however, no doubt G3UTO will be delighted to give details if you contact him at the address in the Panel.

Reading seem to have dates booked on March 2 and 16, but we have no information as to what is organised. For the very latest details on the programme and directions as to how to find the Hq., again we have to refer you to the hon. sec., G3NBU, as at the address Panel, p.49.

From where we sit it looks as if the **Cornish** main meeting at the SWEB Clubroom, Pool, Camborne will be on the first Thursday in March, albeit we cannot give much information about it. In addition there is a Newquay group which meets at Treviglas School. Again, it is a matter of getting in touch with the Secretary, in this case G3UCQ.

At **Saltash** the AGM disclosed a very satisfactory state of affairs, with a healthy club, a regular input of new members, and the revival after an interval of the *Tamar Pegasus*, their newsletter. This crowd still meet at the Burraton Toc H Hall, Waraton Road, where they are booked in on the first and third Friday in each month.

The **Minehead** lads have been gathering now for a little more than a year; but of course they, in common with most Clubs, would always welcome some new faces at meetings. These are held every Tuesday at the Old Police Station, Jubilee Terrace, Timberscombe.

Another Tuesday booking is for **Haverfordwest**,

at the Rosemary Lane Hq., where the local chaps are enjoying themselves each week after a long period "in the wilderness" as far as meeting places go.

The **Bristol (Shirehampton)** crowd are in conclave every Friday evening, unless there is some local clash, at Twyford House, Shirehampton, 7.20 to 9.30, with an equipped station, Morse tuition and R.A.E. instruction, also organised lectures.

Not far away is the older **Bristol Club**, with Hq. at 41 Dulcie Road, Barton Hill, where they assemble on Tuesdays and Thursdays. For details about the current programme we refer you to the hon. sec., address as Panel.

* * *

One of the few GI Clubs to report to this piece is at **Bangor, Co. Down**. From where we sit it rather looks as though the scheme of things is a monthly get-together on the first Friday each month, at the Silverstream Hall, Belfast Road; but for details try G12FHN, *QTHR*.

Now to **Exeter**, where we seem to have made a bit of a boob last time; they have their main meeting on the first Tuesday in each month; the second is a General Night; the third for R.A.E. and Morse tuition; and the fourth is a constructional night—all this according to their new hon. secretary. The venue is the Community Centre, 17 St. Davids Hill, where new members or visitors are assured of a cordial welcome.

The **Wessex** crowd still assemble at the Cricketers' Arms Hotel, Windham Road, Bournemouth — even though G8BBN, the secretary, broke his arm on the way in! However, he must be on the mend to be treating the matter so light-heartedly. The arrangement is that there is a meeting on the first Friday, and then another on the Monday 17 days later—this to give more people a chance to show up (at least occasionally) than the usual, arrangement of meeting on the same evening.

Over at **Basingstoke** the chaps have Saturdays—the first and third—at Chineham House, Shakespeare Road, Popley, the first being informal for Morse and Construction, while the latter is the formal lecture evening.

March 27 at **Torbay** is down for a lecture on Frequency Measurement; the place to look for is the Hq. in Bath Lane, rear of 94 Belgrave Road.

While it is true to say that the first Friday in each month is the one the **Mansfield** chaps reserve, it is even more important that they do so this time, as March 1 is down for that all-important Annual General Meeting, when all the new ideas and programmes come to the surface. Start at 7.45 sharp, at the New Inn, Westgate, Mansfield.

The recent move to new Hq. is an improvement for the **North Leeds** chaps—but they are still under the same landlord, who does not permit them to advertise their venue! So all we can say is that meetings are on Tuesday evenings. Get in touch with the hon. secretary—see Panel—and he will let you into the secrets!

Wirral have moved back to their old place at

Harding House, Park Road West, Birkenhead, and in so doing have been rewarded by a marked upswing in the attendance level. The form is that they foregather there on the first and third Wednesdays in each month at 1945 clock.

South Manchester next, where the meetings are split two ways; the main group meetings are on Friday evenings at the Conservative Divisional Offices, 449 Palatine Road, Northenden, and there is also a VHF section which assembles in the Club shack in Shady Lane, Baguley.

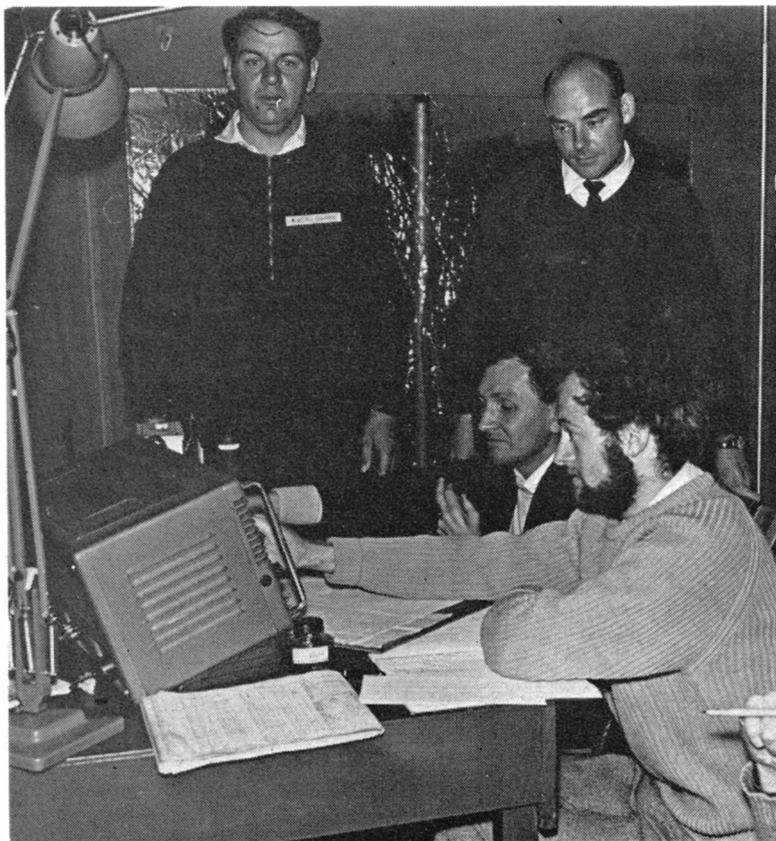
Mid-Cheshire is a title covering the group centred on Winsford Verdin Comprehensive School, Grange Lane, High Street, Winsford. Here the lads can be found on Wednesday evenings, with quite a crowded evening's activity, starting at 7 p.m. for the SWL's and the Morse class, followed by a 30-min. session with the Club station on the air; at 8.0 p.m. the business session proper follows, consisting of a lecture, film show or whatever.

We have no knowledge of the March programme at **Hull**, although we can say that they can be found at 592 Hessle Road, every Friday evening, and would add that from past experience there is "something cookin'" pretty well every time they gather.

An active Club operating in an area often results in an upsurge of new activity and new licences. This seems to be the case at **Peterborough**, where secretary G3KPO reports he has the biggest number of takers ever for his R.A.E. class—more than 20 were keen enough to book in. Last month they had a junk sale at their place in the Rose and Crown, opposite the City Police Station, on February 5, so it would seem likely their March date is also the 5th. However, to clear up any doubt, try G3KPO, as Panel, for the latest information.

For **Bradford** it looks like March 2 and March 16, and for both dates one would expect them to be at their Hq., 10 Southbrook Terrace, Bradford, 7. For details as to what is going on, contact the hon. secretary—see Panel, p.49.

Lincoln's home base is at No. 2 Guardroom, Sobraon Barracks, Breedon Drive, off Burton Road, and they are in residence, as it were, on Tuesday evenings. This is a Club that always makes a point of saying in their report that they really do welcome visitors.



Members of the Lincoln Short Wave Club, who can sign G3IXH in their own right. In this picture are G8CRI, G3TJO (on microphone), G3UHS and G8BWK (tuning the Rx). The hand-with-pencil at lower right belongs to G8BSS.

West of Scotland seem to be growing at a great pace, with over *sixty* members on the books at the latest count. They have their Hq. at the Royal Signals building, 21 Jardine Street, Glasgow N.W., where there is ample parking for the motorised types and, in addition, is conveniently placed for public transport both by 'bus and train.

One notes with some amusement that the **University of Manchester** Institute of Science and Technology postal address is Box 88, Sackville Street, Manchester. This group is exceptionally well endowed in the matter of facilities for Amateur Radio, with a shack on the upper floor of a 12-storey building, on top of which they have a full-size 160m. aerial. Indeed, so well do they get out that last Autumn they were surprised and delighted to receive an airmail report from VK-land on their Top Band signals—nice going, and our congratulations.

Lothians, regular reporters to this piece, have, as it were, become embroiled in the postal hold-up—but no doubt GM3YMX would be pleased to rectify this—see Panel. All that we can say is that they

are based on Edinburgh, and would appear to have March 11 and 25 set aside for their regular gathering.

* * *

Derby must have "had a feeling," because they wrote in advance of sending in the printed programme—which saved the day nicely. March 3 is a Surplus Sale by auction, and on the 10th there is to be a discussion about D/F activities prior to the start of the season. March 17 is the all-important AGM, while on March 24 there is to be a demonstration of electronic gadgets. Friday, March 26, should draw the crowd, as G3HAN is to talk to the VHF/UHF *wallahs* about phase-locked oscillators. Monday, March 29, sees them starting the all-important Diamond Jubilee Exhibition work; March 31 is set aside to deal with any last-minute snags on this front, and on Saturday, April 3, at the Museum and Art Gallery comes the opening of the Exhibition by the Lord Mayor of Derby, Miss M. E. Grimwood Taylor, who by coincidence is the daughter of a founder member of the original Derby Wireless Club, S. Grimwood Taylor. The meetings referred to earlier, are all held at Hq., 119 Green Lane, Derby.

Leicester is a booming Club with all the advantages of a very good Hq. For details, we must refer you to the hon. secretary—see Panel—who just had time to write in to say he had been elected and was busy on the programme for the coming year.

At **Nuneaton** it has been decided to hold their regular get-togethers on the first Friday in the month, at Caldecote Grange, with any extra sessions as the programme may demand. The secretary can give you details.

Wolverhampton have a pretty crowded programme as a rule, based on their Hq. at Neachells Cottage, Stockwell End, Tettenhall, the normal meeting evening being Monday. They also run a Club net on 145.35 MHz, Sunday mornings at 1130 clock.

Luckily the December issue of the admirable **Midland Newsletter** carried a note of their dates for the next three months. This being the case we can say that you will find them at the Birmingham and Midland Institute (which has been their home for years) on March 16. The Institute, as any "Brummie" can tell you, is now located in Margaret Street, Birmingham 3.

Melton Mowbray have the third Friday each month, but sad to say we have no information on the assembly-point, although it is believed to be at the St. John Ambulance Hall—so here again, it is a matter of getting in touch with G3NVK, as in Panel.

Cannock Chase advise that they will be only too pleased to welcome visitors to their get-togethers. They have a firm date with G3EEZ on March 4, for a talk on VHF/UHF, kicking-off at 2030 sharp. For details of this, and any other Cannock meetings, contact the Secretary.

Again we have to advise you to contact the hon. sec., as shown in the Panel, for details of the **Coventry** doings on Friday evenings. The usual arrangement is that every other week the Club has

a Night-on-the-Air with their KW-2000, and in the intermediate weeks there is something else organised for the edification of those who attend.

What used to be known as the East Worcestershire club has changed its name to the **Redditch** and District. They assemble at the Old People's Centre, Park Road, every second and fourth Thursday in the month.

British Amateur Radio Teleprinter Group—better known around the world as **BARTG**—is the obvious one to join if you have any interest or know-how in the radio teleprinter or FAX line. The FAX side of the activity—copying the weather-satellite pictures is a favourite—seems to be growing, and in the current *Newsletter* G2UK recounts the results of his recent request for help from people who know about his Creed Desk-Fax machine and its modification for use on the air.

Our last two should need no introduction. The **Ex-G Club** is just what its title suggests—a group of chaps and girls out from the U.K. and scattered all over the world, keeping in touch with each other and with home by Amateur Radio. Their *Bulletin* comes out quarterly, and there are net meetings each Sunday around 14347 kHz at 1900z, into which U.K. stations are specially invited.

RAIBC also serves a special interest. The members are all invalid or blind and interested in Amateur Radio as SWL or licensed amateur. The supporters make up the other half of the membership of this worthy organisation—and there is always room for more of them. The current issue of their *Radial* has a comic piece about licensed amateurs and their activities on the air in the way of rubber-stamp



"... Pakistani boy naturalised Scotchman here_QTH Knotty Ash, thank you ..."

Not, as you might suppose, a station on for the recent J-O-T-A event, but an operation mounted by the West Yorkshire Scout Group, signing GB3GYS, for the occasion of the Great Yorkshire Show. Left to right are G3WAH, G8AUL, G8CDG, G3SOP and G3JWN.



QSO's; there is also, besides all the interesting chat about members and supporters, another part of an interesting article on the history of the ballpoint pen, and another light-heartedly discussing therapists and the things they make you do when they get you into their clutches—members of R.A.I.B.C. should know!

Club for Bracknell

We are asked to announce that it is proposed to form another Club for the Bracknell, Berks., area—the existing Racal Club is, of course, a “Company group” and as such has a large membership within the firm, and doing very good work in the Amateur Radio context. It is assumed, however, that the new Club will be on different lines and those interested should write to E. J. Parry, G8AMK, as Panel p.49.

Club Reports Phoned In

During the recent postal hold-up, a number of Club Secretaries phoned in their reports for this space—we were very glad to receive those that were in time to be taken in, and we trust that there are no serious transcription errors.

Wakefield get together at the Youth Centre, Zetland Street, on alternate Tuesdays at 7.30 p.m. Next engagements for them are: March 9, slide show including shots of Apollo-12; March 23, on the air under the Club call G3WRS; April 6, film show; and April 20, on again with G3WRS.

Membership in the U.K. of British Rail Amateur Radio Society now totals 30 transmitters and 16 SWL's. The Club is open to anyone in or employed by British Rail and its ancillary services, also to those interested in Amateur Radio who understand railways.

At Solihull they have an informal meeting in the Malt Shovel, in the High Street, on March 2, at 9.0 p.m. On March 16, 7.30 p.m., they will discuss the interesting topic of “How I Became a Radio Amateur,” at the Manor House, High Street, (next door, as we understand, to the other place).

Racal Radio Club (Bracknell) is fortunate in having available equipment and components surplus to the firm's development and production; it is being

offered to local amateurs, at nominal prices. To this end, a sale is to be held on March 13 at the Scout Hq., Meadow Way, Bracknell, Berks., and will include scopes, numerous good components and parts, tables, cabinets and other metal work, much of it new and unused. G3RAC will be on the air during the sale, and there will be a cafeteria service. The sale-room will be open from 9.30 a.m. till 5.0 p.m. (or until sold out) and a small entry fee of 5p (1s.) will go to the Scout fund.

The Cray Valley chaps have a good programme for March-April. Meetings are on Thursdays at the Congregational Church Hall, Court Road, Eltham, opening at 8.0 p.m. On March 4, they have a talk by G3UVZ on a subject of growing interest, RTTY; the 18th is to be a Surplus Sale; April 1st is the AGM—and don't think this means you can “leave it to Joe”; it is the one occasion when your president, chairman and committee really need a full attendance, so that all matters of Club interest can be discussed, argued out and agreed upon. That is what AGM's are intended for—whether it's a radio society or a ladies' badminton club.

Deadline

We can only hope that by the time this appears things will have become more normal as regards the post. At the moment of writing the situation is still unsure—but nevertheless we will give you March 5 as the deadline for the April issue, addressed as usual to: “Club Secretary,” SHORT WAVE MAGAZINE, BUCKINGHAM.

Closing dates for the months following will be Fridays, April 9 (for May) and May 7 (June).

DANAVOX HEADSETS

It seems that, somewhere along the line, an error occurred in the pricing of the excellent Danavox products advertised in our January '71 issue. Only part of the printing run was affected, so these prices—which should have been as shown on p.759 of our February issue—may well have been given correctly in your copy.

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.

DA2XX, J. Cooper (*G3DPS*, *ex-D2IZ* / *GM3DPS* / *ZC4XX* / *VS5JC* / *9M6JO* / *9M8JC* / *9M2XX* / *9M2SR*), 28 (BR) Signal Regiment (Northag), B.F.P.O.35.

EI9CD, J. W. Welch, Tivoli, Dublin Road, Dundalk, Co. Louth. (*Tel. Dundalk 4836.*)

G2PJ, Loughborough Technical College, Radmoor Road, Loughborough, Leics. (*re-issue.*)

G3ZIH, D. Elliott, 12 Radford Drive, Braunstone, Leics.

G13ZMZ, Amateur Radio Club, Kilkeel High School, Harbour Road, Kilkeel, Co. Down.

G3ZOI, D. J. Deane, 6 Beechmont Avenue, Virginia Water, Surrey.

G3ZQC, J. Smith, 161 Sandy Lane, Fair Oak, Eastleigh, Hants., SO5-7GF.

G3ZSS, P. W. Bacon (*ex-G8DAD*), Easter Hill, Christchurch Lane, Lichfield, Staffs., WS13-8AL.

G3ZUA, R. E. Lawson, 163 Cole Green Lane, Welwyn Garden City, Herts. (*Tel. Welwyn Garden City 27337.*)

G3ZUN, D. R. Sharpe, B.Sc. (Hons.), 293 Milton Road, Southsea, Hants.

G3ZUS, N. T. Ewer, 67 St. Davids Road, Thornbury, Bristol, BS12-1AJ. (*Tel. Thornbury 3693.*)

GM3ZVB, R. Dalgliesh, 5 Craighlockhart Park, Edinburgh, EH14.

GM3ZVL, R. Manners, 165 Mayfield Road, Edinburgh, EH9-3AY.

G3ZVX, M. K. James, 33 Fairfield Road, Uxbridge, Middlesex.

GM3ZWO, P. Slawek, 7 Polwarth Grove, Edinburgh, EH11-1LZ.

G3ZWS, M. C. J. Horley, 49 Lambs Farm Road, Horsham, Sussex.

GM3ZXG, J. Higgins, 31 Woodstock Road, Greenock, Renfrewshire.

G6AGC/T, L. J. O'loughlin (*G8AXC*), 49 Station Road, Snainton, Scarborough, Yorkshire. (*Tel. Snainton 252.*)

G8EAM, H. J. S. Newton, 9 Periton Lane, Minehead, Somerset.

G8EBF, J. F. Richardson, 19 Coleman Avenue, Wednesfield, Wolverhampton, Staffs.

G8ECT, H. E. Thornton, 26 Stagbury Avenue, Coulsdon, Surrey, CR3-3PD.

GM8EFL, S. Liddell, 5 Essenside Avenue, Glasgow, W.5.

G8EFO, M. Senior, 3 Wickhurst Lane, Broadbridge Heath, Horsham, Sussex. (*Tel. 0403 60234.*)

G8EKV, B. A. Strutt, 98 Fairview Road, Penn, Wolverhampton, Staffs.

G8ELI, R. T. Russell, 59 Campbell Road, Gravesend, Kent. (*Tel. Gravesend 3428.*)

G8EMN, R. B. P. Carpenter, 3 Grassmount, Taymount Rise, Forest Hill, London, S.E.23.

G8ENC, T. W. Cannell, 137 Kings Road, Old Trafford, Manchester, M16-9NU. (*Tel. 061-881 2228.*)

G8ENL, G. Monks, 83 Scotland Way, Horsforth, Nr. Leeds, Yorkshire. (*Tel. Horsforth 6735.*)

CHANGE OF ADDRESS

G2DX, W. K. Alford, Green's Farmhouse, Cherry Orchard, Shaftesbury, Dorset.

G3AXN, G. Collop, 3 Sassoon Way, Maldon, Essex.

G3CTZ, A. Jones, C.Eng. M.I.E.E., 17 Oaklea Way, Woodland Grove, Old Tupton, Chesterfield, Derbyshire. (*Tel. Clay Cross 2288.*)

G3NAE, C. K. Richardson, 84 Moot Gardens, Downton, Salisbury, Wilts.

G3NOH, G. D. Eddowes, 16 Belmont Road, Bushey, Herts.

G3PAQ, J. D. Davis, 21 Rosenau Crescent, London, S.W.11. (*Tel. 01-223 2675.*)

G3PGA, G. Dorling, 12 Sherwood Gardens, Dumpton Park, Ramsgate, Kent.

G3PRK, A. Yilmaz, 31 Nursery Road, Southgate, London, N.14.

GM3RAO, P. S. Hayes, 159 Beech-

wood Drive, Jordanhill, Glasgow, W.1.

G3REL, B. Woodfield, 51 Oakfield Road, Hawley, Camberley, Surrey.

G3SGT, A. P. Teale, 11 Burns Avenue, Mount Pleasant, Southall, Middlesex.

G3SKW, D. J. Morgan, 20 Westfield Avenue, Crawcrook, Ryton, Co. Durham.

G3WMT, R. M. Dowling, 9 Levett Close, Isle of Grain, Rochester, Kent.

G13XDD, S. C. Crampton, 16 Alexandra Avenue, Whitehead, Co. Antrim.

GW3XJA, D. J. Williams, 5 Coed-Eithin Terrace, Blaenavon, Mon. NP4-9LQ, South Wales.

G3XKN, J. P. Hind, 44 Langdale Road, Dunstable, Beds.

GW3YFD, W. T. Hewitt, 28 Park Avenue, Flint, Flintshire.

G3YLL, R. F. Brooks, 15 Nettleton Avenue, Tangmere, Chichester, Sussex.

G3YRU, P. R. Wilby, Roundmead, Crabtree Drive, Chelmsley Wood, Birmingham, 37. (*Tel. 021-770 3599.*)

G3ZBS, J. S. McCall, 18 Montrose Road, Rokeby Estate, Rugby, Warks.

G4FN, C. T. Wakeman, 31 Highfield Gardens, Grays, Essex.

G6TZ, P. Bottomley, 58 Delius Street, Coventry, CV4-9NE, Warwickshire.

G8AEL, D. W. T. Button, 1 Halsey Road, Kempston, Beds.

G8BEB, P. B. Jackson, Top Flat, 25 Hurst Road, Eastbourne, Sussex.

G8BWF, M. J. Valentine, 133 Merrill Road, Thurnscoe, Rotherham, Yorkshire.

G8CCO, B. Houghton, 165 Hillside Road, Hastings, Sussex.

AMENDMENT

G3ZCC, M. M. Davidsohn, 101 New Road, Chingford, London, E4-9EX. (*Tel. 01-529 2255.*)

CALL BOOKS

- INTERNATIONAL:
RADIO AMATEUR CALL BOOK**
(Winter Edition)
"DX Listings" £2.94
"U.S. Listings" £3.80
The two together, covering the
World £6.45
"G's" only 52p

MAPS

- AMATEUR RADIO MAP OF WORLD**
Mercator Projection — Much DX
Information — in colour. Second
Edition 60p
- DX ZONE MAP (GREAT CIRCLE)**
In colour with Country/Prefix
Supplement Revised to February,
1970 85p
Black and White only 30p
(plus 2s. 0d. with Country/Prefix
Supplement)
- RADIO AMATEUR MAP OF THE
U.S.A. AND NORTH AMERICA**
State boundaries and prefixes, size
24" by 30", paper 60p
- RADIO AMATEUR'S WORLD
ATLAS**
In booklet form, Mercator projec-
tion, for desk use. Gives Zones
and Prefixes 85p

LOG BOOKS

- Standard Log (New Glossy Cover)** 53p
Log and VHF Contest Log 40p
Receiving Station Log 38p

(The above prices include increased postage rates and packing).

Delivery is from stock.

MORSE COURSES

- G3HSC Rhythm Method of Morse Tuition**
- Complete Course with three 3
speed L.P. records with books £4.50
- Beginner's Course with two 3
speed L.P. records with book £3.30
- Single 12" L.P. Beginner's with
book £2.75
- Single, 12" L.P. Advanced with
book £2.75
- Three speed simulated GPO test.
7" d.s. E.P. record 85p
- Ex.Gov. Heavy Duty Morse Keys 75p

Prices include postage, packing and insurance

Available from

SHORT WAVE MAGAZINE

Publications Dept., 55 Victoria Street,
London, S.W.1 01-222 5341

(Counter Service, 9.30-5.15, Mon. to Fri.)

(Nearest Station: St. James's Park)

(GIRO A/C No. 547 6151)

N. W. ELECTRICS

52 GT. ANCOATS STREET

MANCHESTER 4

061-236 6276

G3MAX

**EDDYSTONE AND TRIO RECEIVERS.
DIECAST BOXES. JACKSON CAPACITORS
AND DRIVES. DENCO COILS. "RADIO-
SPARES" TRANSFORMERS AND COM-
PONENTS. 'Q' MAX CUTTERS.**

BROWN BROS. twin lever paddle, £7 10s., post paid.

132ft. COPPER AERIAL WIRE. 7 strand 26 swg, fitted with
4 sets Bakelite chain insulators. 10ft. insulated lead in wire,
supplied on 8in. cable drum, 17/6, post 6/-.

VIBRATOR AND DYNAMO PSU. 250 volt 75mA, Vib. pack
400 volt 140mA dynamo. 12 volt input. For Pye C12 Tx/Rx,
25/-, carr. 15/- BRAND NEW.

GPO COUNTER. 24 volt, 500 ohm coil, 4in. long by 1in. square,
4 digit, 9/6, 2/- post.

GPO TELEPHONE SET. 20 ohm, single earphone, 300 ohm
microphone unit. Useful for mobile, 15/-, 2/6 post. BRAND
NEW BOXED.

R209 Mk. II PORTABLE/MOBILE RECEIVER. 1 to 20 Mcs.
12 volt DC operation, AM/CW/FM. Internal speaker. Ideal for
caravan or small boat enthusiast. Checked and tested before
despatch, £15, carr. 10/-.

ALUMINIUM CHASSIS WITH BASE PLATE. 17in. by 9½in.
by 2in. 32 valveholders B9A 100 0-01 disc ceramics. Erie. 500v.,
100 resistors, 75 standoff insulators, 10/-, post 6/-.

POLYPROPYLENE ROPE. 500lb. strain. 100 yd. reel, £1,
post 2/6.

CONVERTER CHASSIS. New spares for transistorised UHF
tuner. Contains 4 gang min. var. cap. 4 tube trimmers. in
screened sections, 5/-, post 2/6.

1970 ARRL HANDBOOK 55/- P.Paid.

Some items left from previous adverts.

Stamped addressed envelope for any inquiries.

Business hours: 9 a.m.-6 p.m., Tuesday-Saturday.

CLOSED ALL DAY MONDAY

FOULSHAM-SAMS BOOKS FOR YOUR LIST

ABC of Electronics (by Farl J. Waters)	£1·18
ABC's of Radio and TV Broadcasting	£1·13
ABC's of Short Wave Listening	£1·00
ABC of Transistors (3 copies only)	£1·08
Amateur Radio Mobile Handbook (W6NJV)	£1·33
ARRL. Calculator. Type A	00·90
ARRL. Calculator. Type B	00·70
Building Your Amateur Radio Novice Station (by W7OE)	£1·55
Electronic Transistor Circuits	£1·48
Easibinder (to keep your copies together)	00·88
FET Principles, Experiments and Projects	£2·13
Know Your Oscilloscope (by Paul C. Smith)	£1·29
Practical Ham Radio Projects (by W6NJV)	£1·13
Practical Transistor Theory	£1·08
Radio Circuits (Basic Electronic Series)	£1·38
110 Semi-Conductors Projects for the Home Constructor	£1·35
SWL Antenna Construction Projects	£1·38
Transistor Fundamentals: Basic Semi-Conductor and Circuit Principles Vol. 1	£1·90
Transistor Fundamentals: Basic Transistor Circuits Vol. 2	£1·90
Transistor Fundamentals: Electrical Equipment. Circuits Vol. 3	£1·90
Transistor Fundamentals: Student's Workbook	£1·90
Transistor Substitution Handbook	£1·00
Using 'Scopes in Transistor Circuits	£1·75

Many of these Titles are American in origin.

These prices include new rates of postage and packing. Delivery is from stock.

Available from

SHORT WAVE MAGAZINE

Publications Dept., 55 Victoria Street, London, S.W.1

01-222 5341/2

(Counter Service, 9.30-5.15, Mon. to Fri.)

(Nearest Station: St. James's Park)

(GIRO A/c. No. 547 6151)

THE SENATOR CRYSTAL BANK G3UGY

CRYSTALS FROM STOCK 01-769 1639

The SENATOR crystal bank currently holds approximately 50,000 brand-new, modern crystal units from 50 kHz through 132 MHz so, when 'phoning or writing in, don't be too surprised when we are able to tell you either that we have your frequency exactly or something very close to it IN STOCK—this way you don't need to buy imported crystals or the long wait that comes with them.

We sell BRAND NEW crystals of recent manufacture, so there's no comparison between them and so-called "brand-new" ex-forges 25 year olds which, if they oscillate at all, by now have possibly "wandered" a few kHz and may not overtone.

To ensure satisfaction, every crystal we sell is now tested on our high-frequency digital counters and test sets for frequency and drive.

Crystals for every amateur band always in stock. Here's our STOCK range of brand new HC6/U, 8 MHz for 2m.: 8'007, 8-018, 8-021, 8-032, 8-041, 8-043, 8-047, 8-048, 8-058, 8-061, 8-070, 8-081, 8-092, 8-100, 8-104, 8-107 (and in-between, but you'll have to ask us about them specially). AND THEY'RE STILL ONLY 20/- each plus 1/- p.p.

You can order with confidence from SENATOR CRYSTALS the people who don't just "sell" crystals, but know about them too.

As supplied to leading electronics manufacturers. Frequencies between 200 Hz to 200 MHz made TO ORDER but see our list first as the frequency you want may be in our low-price stock range.

S.A.E. for list—Mail Order—to :

Senator Crystals

Dept. S.W.
36 VALLEYFIELD ROAD, S.W.16

G3LRB

G3MCM

STEPHENS-JAMES LTD.

KW Atlanta. Transceiver	£198	Trio TS510. Transceiver	£180
KW2000B. Transceiver	£240	Trio 9R59DS. Receiver	£42.50
KW202. Receiver	£125	Trio JR310. Receiver	£77.50
KW204. Transmitter	£135	Trio JR599. Receiver	£185
KW1000. Linear	£135	Lafayette HA600	£42.50
KW E-Z Match	£13.25	Eddystone EC10MK2	£74.50
KW Balun	£1.75	Shure 201 Microphones	£6
KW Antenna Switch	£3.50	Shure 444 Microphones	£13
KW Low Pass Filter	£5.60	Trio SP5D Loudspeaker	£4.37½
KW VSWR/power meter	£12.50	Trio HS Headphones	£6
KW205. Matching unit	£28	Eddystone 898 Dial	£7.25
Yaesu. Musem FT200.		Yaesu FR400	£150
Transceiver	£180	Yaesu FL400	£130
Yaesu 101 Transceiver	£235		

Hy-Gain Antenna Range		G-Whip Mobile Antenna Range	
Verticals :		160/80m. Two bander	£9
12AVQ 10-15-20m.	£15.50	160m. "Ranger"	£7.50
14AVQ 10-15-20-40m.	£19.50	Tribander 10/15/20m.	£9.30
18AVQ 10-15-20-40-		Coils for 40, 80 or 160	£4
80m.	£35.50	Multimobile Basic 10/15/	
Beams :		20/40m.	£15.30
TH3MK3 Tribander	£69.50	Multimobile 80 or 160 coil	£4
TH3Jnr. Tribander	£49.50	Mobile base mounts	£1.47½

VHF Equipment		Antenna Rotators	
2m. 5 Element Beam	£2.50	£15.50, £25, £40, £70	
2m. 6 Element Beam	£2.70	Hansen SVR Bridges 50	
2m. 8 Element Beam	£3.12½	ohm	£4.12½
4m. 3 Element Beam	£3.50	TTC Double meter SVR	£7.25
9 Element 70 cm.	£3.12½	Bridge	£7.25
Mosfet 2m. Converters	£13.75	TTC Tunable RF meter	£4
Garex FET 2m. Con-		Dipole "T" pieces	12½p
verter	£11.92½	300 ohm twin feeder yd.	3½p
Garex 2m. Mobile Tx	£42.50	75 ohm twin feeder yd.	3½p
Echefford 2m. Tx A.C.		50 ohm co-axial cable yd.	1½p
p.s.u.	£42.50	50 ohm Dummy Load	£3.75
QQVQ-3-20A	£1.75	P1259 Plugs 30p. Sockets 25p	
QQVQ-3-10	75p		

Second-hand Equipment		Codar Equipment	
National NCX5 Trans-	£320	ATS 160/80m. Trans-	£19
ceiver		mitter	
Swan 500 with VFO	£235	T28 160/80m. Receiver	£17.50
Eddystone 888A	£65	PR30 Preselector	£9.50
Viceroy Mk. 2 with A.C.		"Q" Multiplier	£9
p.s.u.	£80		
AR88D with mains filter		Test Equipment	
and matching loud-		Tech 15 Transistor GDO	£12.50
speaker	£50	ASD100 Multimeter	£12.50
KW2000B with A.C. p.s.u.	£185	TMKPL96 Multimeter	£7
TW Top Band Com-		Medco High Pass Filter	£1.37½
municator	£30	Digital Clocks	£14 and £19
ATS with DC p.s.u. and			
Cont. unit	£25	All RSGB Publications In Stock.	
30JR310	£60		
Sommerkamp FL200 Tx	£95		
Inoue Tx & Rx	£145		

Complete range of Eddystone and Diecast Boxes. "Stella" Cabinets, etc. Send large s.a.e. for latest lists. H.P. and Credit terms arranged on all orders over £35. Carriage/postage extra all items. S.a.e. with enquiries please.

70 Priory Road, Anfield, Liverpool 4

Tel. 051-263 7829 Half-day Wednesday.

No parking problems except Saturday afternoons as we are close to the Liverpool and Everton Football grounds.

G2CTV

G3ZY

J. & A. TWEEDY (Electronic Supplies) Ltd.

SPECIALISING IN AMATEUR RADIO EQUIPMENT

Full range of KW equipment and accessories in stock.			
2000B with A.C. p.s.u.	£220	Matching VFO 4B	£35
Atlanta with A.C. p.s.u.	£198	Matching VFO 4A	£32
1000 linear amplifier	£125	Ezee Match	£13.10
101 SVR indicators	£9.5	103 SVR/power indicator	£12.10
Dummy loads	£5.15	LP filters	£5.10
Traps and T Insulators	£4.0	Trap dipole with balun	£15
Baluns 50/75Ω	£5.15	Trap dipole	£12.15

Eddystone EC10 Mk II	£74.10	Eddystone Die-cast boxes.	
Trio 9R59DS. General coverage	£42.10	Trio JR310. 80 to 10	£77.10
TSS10 with A.C. p.s.u.	£180	Trio JR599	£185

Lafayette HA800. Ham-		Unica. General coverage	
bands	£57.10	FET	£24

TAVASU AERIALS (CHESTERFIELD)

MOBILE			
100" Whip complete with		20 metre resonator	£2
50 ohm co-ax and base	£2 12 6	15 metre resonator	£2
160 metre resonator	£2 10 0	P. & P. 2/6 per item extra.	
80 metre resonator	£2 10 0	Mobile packaged deal. One of	
40 metre resonator	£2 5 0	each item £12 10s. plus 7/6	
Chrome-plated adaptor	6 0	postage and packing.	

VHF			
TAVASU 2 metre 3 element	£2 1 6		
TAVASU 2 metre 5 element	£2 9 6		
TAVASU 2 metre 6 element	£2 13 6		
TAVASU 2 metre 7 element	£2 17 6		
TAVASU 2 metre 8 element	£3 1 6		

Carriage on beams 6/- extra. Specials made to order

Several items of used equipment including 2 KW linear amplifiers. Type 600.

Postage on KW accessories, Baluns 2/6, Aerials 9/-, others 6/-.

OPEN TUESDAY TO SATURDAY 9 a.m. to 5.30 p.m.

H.P. Terms available Part exchanges

64 Lordsmill Street, Chesterfield, Derbyshire

Tel. Chesterfield 4982 or 68005 (evenings)

YUKAN 50 PROFESSIONAL THE
SELF-SPRAY YUKAN AEROSOL WAY—
air drying GREY HAMMER
Get these **NOW!** OR **BLACK WRINKLE**
OR (CRACKLE) finishes

Yukan Aerosol spraykit contains 463g. fine quality, durable easy instant spray. No stove baking required. Hammers available in grey and blue, 90p carr. pd. Modern Eggshell Black Wrinkle (Crackle) producing a 3D textured finish, 90p carr. pd., all at 85p per push-button self-spray can at our counter. Also durable, heat and water resistant Black Matt finish (335g, self-spray cans only) 75p carr. pd.

SPECIAL OFFER: One can plus optional transferable snap-on trigger handle (value 25p) for 96p carr. pd. Choice of 13 self-spray plain colours and primer (motor car quality) also available.

Please enclose cheque or crossed P.O. for total amount direct to:

DEPT: P/2 YUKAN, 307a EDGWARE ROAD, LONDON W21BN

We supply many Government Departments, Municipal Authorities, Institutes and Leading Industrial Organisations—We can supply you too. *Now British—even better*

Other Yukan Air Drying Aerosols, 453g. at 90p carr. pd. include:
Zinc Chromate
Clear Lacquer
Metallics: Grey, Blue.



"FOULSHAM-SAMS BOOKS"

TRANSISTOR FUNDAMENTALS Vol. 1

This book is a carefully planned programmed introduction to semi-conductors and the basic electrical circuits. It begins with a brief description of transistors and later devotes an entire chapter to an explanation of transistor principles. Sandwiched between these chapters are explanations of voltage, current, and resistance; and the all-important Ohm's Law and Kirchhoff's laws. The book also looks at the more complicated nature of inductance, capacitance, and resistance in AC circuits.

£1-90

TRANSISTOR FUNDAMENTALS Vol. 2

This volume describes transistors and how they are used in semi-conductor circuits. Simple circuits illustrate the basic principles involved, and the more complicated circuits found in amplifiers and oscillators help to show how the basic operations are applied. Later, some recent semi-conductor developments are discussed. Detailed descriptions of four new transistor devices are given and how they are being used.

£1-90

TRANSISTOR FUNDAMENTALS Vol. 3

This book covers circuits used in audio, radio, and television equipment. The reader is given a basic explanation of block and schematic diagrams, and operating principles of input and output devices, such as microphones and speakers. Numerous "X-ray" illustrations highlight the descriptions of these devices. Also discussed are the uses of the oscilloscope, radio-frequency and audio generators, and the vacuum-tube voltmeter. Throughout the book the reader will learn to recognise trouble symptoms and to use logical troubleshooting methods to narrow down troubles to specific circuits or stages in the unit under test.

£1-90

AMATEUR RADIO MOBILE HANDBOOK

Amateur Radio is a rewarding and enjoyable hobby, and for many hams the greatest thrill comes from mobile-operating activities. The amateur who goes in for mobile operation will find plenty of room for exercising initiative and developing original ideas in equipment.

Amateur Radio Mobile Handbook is for every amateur, whether he wants to "roll his own" or merely desires information about available commercially built equipment. Each chapter covers some facet of mobile operation and installation, including converters and receivers, transmitters, modulators, transceivers, transmitter-receivers, microphones, antennae, power supplies and control circuits, and the suppression of ignition noise.

Commercially available equipment is described in detail, and construction information on all necessary pieces of gear to make a complete installation are included—even up to and including a home-built microphone.

The author's popular style and the extensive use of detailed photographs and schematics make *Amateur Radio Mobile Handbook* a must for all amateurs.

£1-33

RADIO CIRCUITS Thomas M. Adams

All radio receivers, no matter how complex, stem from a few fundamental designs. Thus, to understand how a receiver operates, a working knowledge of the individual circuits within the receiver is necessary. The biggest stumbling block to gaining this knowledge, however, is not being able to see the actions which take place during circuit operation.

Realising the need for improved methods of teaching theory, Captain Adams developed a unique visual presentation of circuit actions. His approach consists first of clearly and unmistakably identifying each electron current and its movements through the use of multiple-colour illustrations. Then, using non-mathematical and logical explanations, he discusses these movements and explains their significance in the overall circuit operation.

This volume explains the actions of various circuits used in typical radio receivers. Voltage analysis and signal substitution methods for servicing typical tube and transistor receivers are included. The four previous volumes—*Oscillator Circuits*, *Amplifier Circuits*, *Detector and Rectifier Circuits*, and *Transistor Circuits*—contain similar discussions of the fundamental circuits used in all types of electronic equipment. This series is recommended to all individuals and educational institutions as a fundamental text on electronic-circuit actions.

£1-38

ELECTRONIC TRANSISTOR CIRCUITS

Thomas A. Adams

All electronic circuits, no matter how complex, stem from just a few fundamental designs. Thus, to understand how any circuit operates, it is necessary to have a working knowledge of the basic principles. The biggest stumbling block to gaining this knowledge however, is not being able to see the actions that take place during circuit operation.

Captain Adams, realising the need for improved methods of teaching electronic circuit theory, developed a dynamic and unique system for diagramming circuit actions. His approach consists first of clearly and unmistakably identifying every electron current and its movements with the use of multiple-colour illustrations.

Then, using non-mathematical and logical explanations, he discusses these movements and explains their significance in overall circuit operation. Questions are included to reinforce your understanding as you progress through the text.

This volume goes into great detail in explaining how various types of transistor circuits work. Other published volumes in the series include: *Detector and Rectifier Circuits*, *Oscillator Circuits*, *Amplifier Circuits*, *Radio Circuits*, *TV Sync and Deflection Circuits* and *TV Video and Sound Circuits*. The *Electronic Circuit Action Series* is recommended as a fundamental text, as well as a refresher or reference source for both individual and classroom use.

£1-48

The Books described here are American in origin and are the latest editions.

The above prices include increased postage rates & packing.

Delivery is from stock.

Available from

SHORT WAVE MAGAZINE

Publications Dept., 55 Victoria St., London S.W.1

01-222 5341

(Counter Service, 9.30-5.15, Mon. to Fri.)

(Nearest Station: St. James's Park)

(GIRO A/C. No. 547 6151)

SCA 63982 DERWENT RADIO SCA 65996
SHOWROOM, 5 COLUMBUS RAVINE, SCARBOROUGH

KW Atlanta and AC p.s.u. £198	Codar 12/RC ... £2 10
KW Atlanta VFO £32	Codar PR 30 ... £7 10
KW 2000B with AC p.s.u. £220	Codar PR 30X ... £9 10
KW 2000B DC p.s.u. £44	Codar CR70A ... £22
KW E-Z match ... £13 10	Lafayette HA600 ... £45
KW s.w.r. bridge ... £8 10	Lafayette HA800 ... £37
Wightraps, pair ... £2 10	Thrust bearing ... £3 19
Wightraps hi power ... £3 10	Joystick standard ... £5 10
Hallicrafters SX 133 ... £145	Joystick de-luxe ... £6 10
Juliette AM/FM/Aircraft £39	Joystick SM tuner ... £5 10
Yaesu FT200 ... £190	Joystick 3A tuner ... £4 4
Trio JR599 ... £170	Joystick 4RF tuner ... £2 2
Trio 9R59DS. New model £42	Jackson 4103 dial ... £4 4
Trio JR500Sa ... £65	Jackson 25 pfd variable 40/-
Trio JR310 ... £77	Eagle RF45 tuning meter ... 80/-
Trio TSS10 transceiver ... £180	TTC 5 band RF meter ... 84/-
Trio SP5D speaker ... £4	TTC s.w.r. bridge ... £7 4
Trio HS 4 Headset ... £5 10	TTC s.w.r. bridge ... 6/-
G Whip 160/80 ... £9	Amphenol PL 250 ptfc ... 5/-
G Whip Tri bander ... £9	Amphenol SO 239 ... 1/-
G Whip Multimobile ... £15 10	Amphenol reducers ... 6/-
G Whip basement ... £1 10	Amphenol SO239A ptfc ... 52/-
Garax 2m converter. 12v. £10 7	RCA 6LQ6 ... 52/-
IF 28/30 MHz ... £3 15	RCA 6146B ... 19/-
Garax xtal checker ... £24	RCA 6GK6 ... 17/-
Unica UR-IA rx ... £6 17	RCA MOSFET 3N140 ... 30/-
Halsen mobile whip ... £3 17	RCA MOSFET 3N141 ... 7/-
Halsen extra coils ... 32/-	6146 ... 30/-
Antex 15w. solder iron ... 49/-	OC 28 ... 7/-
Antex soldering kit ... 32/-	50 misc. xtals ... 30/-
PTT xtal mic. ... 27/-	50 misc. transistors ... 5/6
Xtal mics. from ... 55/-	50 misc. diodes ... 2/6
2 way intercom ... £4 10	HC6U xtal sockets ... 6/-
Medco i.p. filter 50/BL ... 55/-	Rendar knobs. Set of 4 ... 6/-
Padded headset low Z ... 5/-	Guide to Broadcast stns. ... 22/-
250 ohm carbon pot ... 63/-	"J" Beam 2m. halo ... 1/-
RSGB Handbook ... 9/-	Shure 201 ... £12
RSGB Logbook ... 9/-	Copperclad board ... £12
RSGB Callbook ... 28/-	Shure 414A ... £12
All RSGB Publications in stock. £74	Shure 444 ... £12
Xtals 38.666 MHz ... £74	Acos Mic 45 ... 22/-
Eddystone EC10 II ... £7	Magazine binders ... 14/6
EC10 mains psu ... £27	Egg type insulators ... 6d.
Eddystone Edometer ... £27	All RCA publications in stock:
Eddystone 898 dial ... £7 5	Tx valve manual ... 18/-
Eddystone plinth spkr. ... £4 10	Rx valve manual ... 22/6
Diecast boxes 8/-, 9/4, 13/-, 21/-	Transistor manual ... 25/-
Codar AT-5 tx ... £18 10	Transistor servicing ... 34/-
Codar T-28 rx ... £17 10	Hobby ccts manual ... 20/-
Codar 250/S mains psu ... £11	S.C.R. manual ... 13/6
Codar 12/MS mobile psu £11 10	Power transistors ... 20/-
	I.C. applications ... 25/-

Wanted: We are always pleased to hear about your trade-in equipment and are looking for good condition KW, Eddystone, and TW items in particular. We can offer cash, radio equipment or new photographic equipment in part exchange.

PACKAGE DEALS. WE CAN BEAT ANY ADVERTISED OFFERS. GIVE US A RING

H.P. on any items over £35 in value. One third deposit and up to two years to pay. Payments may be by Post Office Giro. You may also place your orders by Giro. Our account number 64 041 0006.

Second-hand equipment in stock

Heath DX40 ... £20	Eddystone 840A ... £35
Boottmount rangers ... £5	Hallicrafters S214 ... £35
Minimutter Mercury ... £30	KW Viceroy III ... £90
Trio VFO for TS 500 ... £16	Lafayette HA600 ... £35
Paros 80-20M ... £90	TSS10 as new ... £140
Trio 9R59De ... £35	Star SR550 ... £30
Codar AT 5 ... £13	HRC/p.s.u./coils ... £25
Pye base receiver low ... £5	Eagle tx 80 ... £25
KW 77 ... £65	Trio JR 310 mint ... £65
Hallicrafters SX 111 ... £70	Pye base receiver hi band ... £5
Trio JR500Se ... £55	BC348 receiver ... £12
Hallicrafters SX 110 ... £60	Codar CR 70A ... £17
Codar T28 ... £12	19 set ... £4
"J" Beam 10M yagi ... £14	R107 rough ... £2
KW 2000A and p.s.u. ... £175	

Please add extra for carriage. S.A.E. for lists

28 Hillcrest Avenue, Scarborough, Yorks.

QLE Arrays.

4-metre, 3-element ...	£3 0 0
4-metre, 4-element ...	£4 0 0
2-metre, 5-element ...	£2 10 0
2-metre, 6-element ...	£2 14 0
2-metre, 8-element ...	£3 2 0
70-centimetre, 9-element ...	£2 10 0

all plus 7/- carr. State type of clamp, i.e. 1"-1" or 1"-2".
Folded dipoles for 1/2 or 1" boom
2-metres ... 14/- plus 3/- p.p.
4-metres ... 30/- plus 4/- p.p.
70-centimetres (1/2 or 15mm. sq. boom) ... 12/- plus 2/- p.p.
Also many types of fittings and antenna rotators available.
H.P. terms on all aerial equipment.
S.A.E. for List

We are open for personal callers all day Saturday.
Trade enquiries welcome.
"RADIO QUAYSLADE"
REAR 286 NORMANTON ROAD, DERBY.
Tel.: 47728

If you're a telecommunications man and match up to the qualifications below cut yourself into a slice of Britain's future



Become a

Radio Technician

in the fast-growing world of Air Traffic Control

Please send me an application form and details of how I can join the fascinating world of Air Traffic Control Telecommunications

Name

Address

WMT/E3

Not applicable to residents outside the United Kingdom

To: A J Edwards, C Eng, MIEE,
The Adelphi, Room 705, John Adam Street,
London WC2N 6BB.
marking your envelope 'Recruitment'

Sending this coupon could be your first step to a job that's growing in importance every year.

The National Air Traffic Control Service needs Radio Technicians to install and maintain the vital electronic aids that help control Britain's ever-increasing air traffic.

This is the kind of work that requires not only highly specialised technical skills but also a well developed sense of responsibility, and candidates must be prepared to undergo a rigorous selection process. Those who succeed are assured a steadily developing career of unusual interest and challenge. Starting salary varies from £1044 (at 19) to £1373 (at 25 or over); scale maximum £1590 (higher rates at Heathrow). There is a good annual leave allowance and a non-contributory pension for established staff.

You must be 19 or over, with at least one year's practical experience in telecommunications, ('ONC' or 'C and G' qualifications preferred).

NATCS

National Air Traffic Control Service

SPRAUGE 2N 3321. 900 Mc/s. PNP unmarked Transistors, 7½p (1/6) each, 7 for 30p (6/-), 40p (8/-) per doz.

BRANDED RADAR. Wideband Amplifiers. 10-60 Mc/s. with circuit details. Price 20p (4/-) each.

SURPLUS unmarked operational Amplifiers, 15p (3/-) each, £1.50 (30/-) per doz.

MULLARD Transistors, BF 197 or BF 196 at 25p (5/-) each.

AC128-AC127 matched pairs, 30p (6/-) per pair

MULLARD Diodes BA 144 at 10p (2/-), BA 154 at 10p (2/-), OA 91 at 5p (1/-).

MULLARD Variable Capacitance Diodes at 22½p each (4/6).

BY 12B Silicon Diodes, 1000PIV 750mA, 15p (3/-) each, £1.50 (30/-) per doz.

PLESSEY MADT SA52 PNP Transistors 10p (2/-) each, 90p (18/-) per doz. Sub-miniature 10-40p Ceramic Trimmers, 2½p (6d.) each, 25p (5/-) per doz.

Sub-miniature Tuning Condensers 6p at 10p (2/-) each.

1N4000 Series Plastic 1 amp Diodes, untested, 20p (4/-) per doz., 25 for 32½p (6/6).

MATCHED QUADS. Four NPN 400 Mc/s. Transistors, untested in flat pack, 10p (2/-) each, 3 for 25p (5/-), 12 for 90p (18/-).

50 assorted P Channel F.E.T.'s for £1.12½ (£1 2s. 6d.).

SCR's (Thyristors) 400 PIV 5 amp at 42½p (8/6), 400 PIV 7 amp at 45p (9/-), 400 PIV 10 amp at 50p (10/-).

TRIACS. 400 PIV 1 amp at 32½p (6/6), 400 PIV 5 amp (Press Fit) at 32½p (6/6), 400 PIV 10 amp on Heat Sink at 90p (18/-).

1 Waste Audio Amplifiers TOS Can with circuit at 37½p (7/6).

250 mW Mike or Phone Pre-Amps untested with circuit, 3 for 60p (12/-)

Wide Band RF-IF Amplifiers with Detector and Video Output, untested with circuit, 10p (2/-) each 3 for 25p (5/-), 6 for 40p (8/-), 12 for 60p (12/-).

MOS LOGIC DEVICES UNTESTED

8 Bit MOS Shift Register, 3 for 60p (12/-).

24 Bit MOS Shift Register, 3 for 60p (12/-).

Quad 10 Bit MOS Shift Register, 3 for 60p (12/-).

Quad Adder, 3 for 60p (12/-).

2-6-way Ring Counter, 3 for 60p (12/-).

6 Bit Ripple Thro Counter, 3 for 60p (12/-).

Dual 3 input NAND Gate, 10p (2/-) each, 90p (18/-) per doz.

2 x 3 Input Mandoran (Multiple And-Or Amplify Not), 10p (2/-) each, 90p (18/-) per doz.

Dual 3 input Nor-Gate, 10p (2/-) each, 90p (18/-) per doz.

Single 6 input Or-Nor Gate, 10p (2/-) each, 90p (18/-) per doz.

Universal Counter-Register Bistable Element, 12½p (2/6) each, £1.20 (24/-) per doz.

Sub-miniature Cadmium Sulphide Cells, type RPY58. Price 32½p (6/6) with suggested circuit and characteristics.

GUNN DIODES covering the X Band at £1.50 (30/-) each.

X Band Detector Diodes similar to SIM 2 at 12½p (2/6).

J. BIRKETT
Radio Component Suppliers,
25 THE STRAIT, LINCOLN
Telephone 20767

TAURUS ELECTRICAL SERVICES

THIS MONTH'S BARGAINS

AIRMEC SIG. GENS. AM/FM CT212. 85 kc/s.-32 megs. in 7 switched bands. Mains or 12v. D.C. supply with probes and leads, etc., £29 10s. delivered.

NEW AMERICAN 6AC7 VALVES, £1 a dozen, post paid.

COMMAND "Q" 5'sers. In good condition, £5 delivered.

COMMAND MODULATOR UNITS with space for transmitter, £3 delivered.

MAINS MOTORS with gears, final speed 2½ r.p.m., 10/- post paid.

S.A.E. FOR TELEPRINTER BARGAIN LIST

12ft. TANK AERIALS, 3 section. Price 10/- plus carriage 9/- BRS, any quantity.

NEW G.P.O. TYPE RELAYS. Selection of 3, new, boxed, £1, post paid.

CREED 7B TELEPRINTERS, good condition. Tested before despatch, £25 delivered. Other Teleprinters in stock from £10.

MARGIN DISTORTION TEST SETS in new condition. Complete with handbook, £7 10s. delivered.

G3TED & G3LHB

26/28 NOTTINGHAM ROAD, LOUGHBOROUGH, LEICS.

Telephone 5131

New Branch now open at

88 ARKWRIGHT STREET, NOTTINGHAM

GRAHAM NEWBERY

(Reg Ward G2BSW)

EDDYSTONE RECEIVERS

EC10, Mk. II	£74 10 0
EA12	£205 0 0
830/7	£340 0 0

and all accessories—phones, speakers, etc.

KW EQUIPMENT—In Stock at New Reduced prices

KW ATLANTA with p.s.u.	£198 0 0
Remote VFO	£32 0 0
KW 2000B with p.s.u.	£220 0 0
Remote VFO	£35 0 0
KW 201 Receiver	£111 0 0
KW 1000 LINEAR	£135 0 0
KW 204 TRANSMITTER	£135 0 0

and all ancillary equipment—E.Z. match, SWR meter, etc.

YAESU MUSEN

FT 200 240 watts PEP with p.s.u.	£180 0 0
---	----------

SHURE MICROPHONES

MODEL 444	£12 15 0
MODEL 201	£5 12 6
MODEL 202	£6 0 0

R.C.A. VALVES 6146B, 6LQ6, ETC. — MOST TYPES IN STOCK FOR KW EQUIPMENT.

WE STOCK R.S.G.B. PUBLICATIONS,
LOG BOOKS, ETC

H.P. AND CREDIT SALE TERMS AVAILABLE. S.A.E. FOR LISTS.

AXMINSTER - DEVON
Telephone 3163

GOOD CW STARTS HERE

JUNKER PRECISION HAND KEY. Superb German straight Key made for professionals afloat and ashore. Free-standing—needs no fixing to desk. Hinged grey dust cover. Front and back contacts with click-stop gap adjustment, key-click filter, £8 15s. (£8-75)

BAUER KEYING LEVER AND PADDLE UNIT—for your own El-Bug. Compact enough to build in. Gaps/tensions adjustable, 37/6. (£1-87)

SAMSON ETM-2 KEYSER, £21 (£22 4s. (£22-20) with mercury batts.)

PRINTSET ET5 KEYSER BASI-KIT, £6 0s. 3d. (£6-01)

All items post paid. 14 page Catalogue SP5 describes these and other RTTY, VHF, SSB kits and units.

SPACEMARK LTD.

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

ECHELFORD COMMUNICATIONS

32, FELTHAM HILL ROAD, ASHFORD, MIDDLESEX
Ashford (MX) 55265 (up to 9.30 p.m. any evening) 043 63 63

New **EAGLE** Electrolytic Capacitors, 16 µF 4-50v. and 32 µF 4-50v. only 8p, postage and packing 3p (each); 12 for 85p (by post £1.00).

½W Carbon Resistors 10%, 87½p per 100 (by post £1.00).

Your assorted values **TAYASU** Mobile Whip and coil complete set for 160m. or 80m., £5-60 post paid.

Another 160m. or 80m. loading coils, £2-60 post paid.

S.A.E. for list on sheet aluminium, second-hand items, valves, etc.

Closed all day Wednesday.

A. G. WHEELER, G3RHF

"CALLBOOK"

"WINTER" EDITION

Please order early to ensure your copy.

Known the world over as the CALLBOOK, this comprehensive reference lists about 300,000 licensed radio amateurs in the United States Directory and 160,000 or more in the rest of the world (contained in the "DX Section"). The entries grow with every issue! In the U.S. Section, licence classifications are now shown. Each issue is an entirely new book with revised listings of new licences, names and addresses. The CALLBOOK also includes much incidental DX information. Every amateur operator and SVWL needs the latest CALLBOOK to get the most out of Amateur Radio.

The CALLBOOK has a new look—the directory pages are now easier to read—upper and lower case print, a much desired improvement and one we are all accustomed to reading.

DX Listings £2.94 **US Listings £3.80**

The two together, covering the World, £6.45

The above prices include increased postal rates and packing.

Available only from
Publications Dept.,
SHORT WAVE MAGAZINE
55 Victoria Street, London, S.W.1
01-222 5341

The Amateur Radio Shop

(G4MH)

13 CHAPEL HILL, HUDDERSFIELD
(Telephone : 20774)

Agents for: CODAR, K.W., JOYSTICK, etc.

Full range of Trio equipment in stock.
TS510, JR310, JR599, 9R59DS, Filters, Loudspeakers,
Earphones, etc.

SECOND-HAND

Swan 500 with p.s.u., mint condition, £195, Drake 2C
all crystals fitted £85, Sommerkamp FR100B £85,
KW201 (2) with calibrators and Q multiplier £85.
SX111 £70, S108 £35, HRO(2) from £18, CR100(2)
from £14, K.W. Tx Vanguard £25 and many other items.

2 METRE EQUIPMENT

4MH Tx £10. SSM Converters £13 15s.
Beams, halos, crystals and Pye equipment.
S.A.E. or phone for further details. Delivery service if
required.

LATE FLASH !

The new TX599 shortly available 1.8 MHz—144 MHz.
Price to be announced!

2 METRE CONVERTERS

A.F.239 R.F. Stage. 2N5245 F.E.T. Mixer Xtal controlled
Multiplier Chain. Size 4" x 3" x 1½". I.F.'s: 4-6, 18-20, 24-26,
28-30 Mc/s. £10 each. Also available less Case & Coax
Sockets at £8-10-0.

G. R. GRIGG, G3PRX
72 ELMSTONE ROAD, RAINHAM, KENT.



hamstrung?

No need to be strung up with guys!
our telescopic, tilt-over towers
are unguyed.
Post and wall mounted models,
in heights of
25, 40, 60 and 85 feet.
Send for details:
Strumech Engineering Co. Ltd.
Coppice Side, Brownhills,
Walsall, Staffs.

STRUMECH
VERSATOWER
SYSTEM

Listen to the world with Eddystone



When you own an Eddystone communications receiver, you have the broadcasting world at your finger tips—wherever you happen to be—on land or at sea. The reputation these sets have attained is proof of their excellence and reliability and at Imhofs, there is a special Eddystone department, where you can see, hear and compare all models listed here. Same day despatch to any part of the world; free delivery in the U.K.; plus after sales service for which Imhofs and Eddystone are world famous.

EDDYSTONE EB35 Mark II broadcast receiver AM/FM transistorised. A high performance all-band receiver, can also be used as a "Hi-Fi" tuner. Powered by 6 SP2 torch cells, or, with Type 924 power supply unit, from AC mains. £78 0s. 0d. (plus £21 9s. 0d purchase tax.) Total £99 9s. 0d.

EDDYSTONE EC10 Mark II transistorised communications receiver. A de-luxe version of this famous design now incorporating "S" meter and limited fine tuner. £74 10s. 0d.

EDDYSTONE 830/7 wide range communications receiver. A high grade HF/MF receiver covering 300kHz—30MHz in 9 ranges with crystal control facilities. Many satisfied users acclaim it as "the best ever". £340 0s. 0d.

There is an Eddystone Communications receiver for any frequency between 10kHz and 870MHz full details from Imhofs or your local Eddystone agent.

IMHOFS

MAIN EDDYSTONE
DISTRIBUTORS



Dept.: 11/3

112-116 New Oxford Street, London, WC1A 1HJ Tel. 01-636 7878
R36E

HAMGEAR ELECTRONICS

1971 PRICES

P.M. II This is a preselector covering 1.8 to 32 Mc/s. completely with a gain of up to 25 dBs. With a built-in antenna coupler this will improve almost any communication receiver/antenna combination. Prices at **£7 16s.** Complete with internal mains power pack. This model is also available with a built-in xtal 1 Mc. Calibrator. Priced at **£10 5s.**

P.M. III If you have a receiver which does not cover 160 metres and you would like to take advantage of this band over the winter season, we offer a 160 metre converter, I.F. of 7 Mc/s. using three F.E.T. transistors. Again with a built-in antenna coupler. The price is **£9.**

P.M. IV There is also a 1 Mc. crystal calibrator to enable you to set your receiver up to the nearest megacycle point, invaluable with receivers having a bandset control. This also has internal modulation for easy recognition of the marker points, priced at **£4 10s.**

All these models in modern cases with engraved panels.

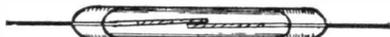
Send for fullest details to
29 CARLYLE ROAD, NORWICH

G. W. M. RADIO LTD.

FAST SWITCHING. Logic Diodes BAY38 (CV8617)k £2.00 per 100, £12.50 per 1000 post paid.

REED RELAYS. Many types available, mostly 4 reed type with coils for 2.3 volts (190 ohms) to 23 volts (9000 ohms). Please send for list.

Dry Reed Inserts as used in the above relays



Overall length 1.85" (body length 1.1"). Diameter 0.14" to switch up to 500 mA at up to 250v. D.C. Gold clad contacts. 63p per doz.; £3.75 per 100; £27.50 per 1,000. £250.00 per 10,000. All carriage paid.

WHIP AERIALS. 14ft. open, 2ft. closed, 88p, post paid.

RECEIVERS. R1392. 100 to 150 mc/s. crystal controlled but may easily be converted to tunable, £7.50, carriage 75p.

WALTHAM pocket watches, unissued, £3.50, registered post paid.

SINGLE GANG 500 pf VARIABLES, new and boxed, 30p, post paid.

MAINS TRANSFORMERS. Unused. Woden fully shrouded type 8T 200/250v. to 540-440-0-440-540v. 75ma, 0-4-5-6-3v. 3a. Type 11 200/250v. to 440-340-0-340-440v. 75ma, 0-4-5-6-3v. 2a, 0-4-6-3v. 3a. either type, £1.75 post paid. "C" core 110/250v. to 250v. 300ma, 6-3v. 10a, £2.50 post paid. "C" core auto, 5-10-15-120-230-250v. at 50va, 88p post paid. USED "C" core 200/250v. to 230-0-230v. 260ma, 3-3v. 0-6a, 6-3v. 6-0a. clean condition, £2.00 post paid.

CT44 ABSORPTION WATTMETER (TF956) 1 microwatt to 6 watts Audio, £6.25 post paid. B.40 speakers 600 ohm in Ali case, £1.50 post paid. Eddystone 2" fluted knobs 3146P, 25p each, 6 for £1.00 post paid either.

SOLATRON VARI-PACK, 0-500v. D.C. at 100 mA, 6-3v. 3 amps. A.C. For A.C. mains 200-250v. Compact hammer finish cabinet, good condition, £7.25, carriage paid. **CREED** power units 53947 GP6, 100-250v. A.C. input. Output 24-0-24v. D.C., £3.50, post paid.

AMPLIFIER units, contain three 12AX7 and two 5B/254M (known as the "miniature 807"), £2.88, post paid, in unused condition. **CRYSTAL** calibrators No. 10, excellent condition, £3.50, post paid. 12v. 4-pin vibrators, 28p each or three for 68p, post paid.

All Receivers and Test Equipment are in working order at time of despatch. Carriage charges quoted are for England and Wales only.

Telephone 34897

Terms: Cash with order Early closing Wednesday

40-42 PORTLAND ROAD, WORTHING, SUSSEX

SMALL ADVERTISEMENTS

("SITUATIONS" AND "TRADE")

5p (1s.) per word, minimum charge £1.00. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 50% for Bold Face (Heavy Type). Box Numbers 12½p (2s. 6d.) extra. No responsibility accepted for transcription errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

TRADE

NEAT Air Warming Cable—keeps condensation out of your equipment, placed under and around gear. Nineteen-foot length with 6ft. lead for 240v. mains, loading 40 watts, running cost about 4d. per week. Price 75p (15s.), post free.—Warwick, G3VCJ, 50a Queens Road, Buckhurst Hill, Essex.

RELAYS: From cooking to coax. Foolscape s.a.e. for lists, please.—Watsons, 7a Pier Street, Lee-on-the-Solent, Hants., PO13-9LD.

QSL Cards for Tx and SWL. Send s.a.e. for samples stating which type required.—Beaumont, G5YV, 8 Ashfield Avenue, Morley, Leeds. LS27-0QD.

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

TEST-DRIVE a Trio: Transceivers and receivers on demonstration. Licensed operators may try a transmitter by previous arrangement. (Bring your licence with you.)—Holdings, Photo-Audio Centre, 39-41 Mincing Lane, Blackburn, BB2-2AF, Lancs. (Tel. 59595/6. Closed all day Thursday.)

SEE The Trio TS-510 and other Amateur Equipment at the York Photo-Audio Centre, Fossgate, York, Tel. 56176, or evenings 25798. Cameras and Equipment in Part Exchange. H.P. terms available. Also Wanted: Good commercial equipment for cash or in exchange for Cameras and Projectors.

APRIL Issue: Appears March 26. Single-copy orders 5s. (25p) post free, to reach us by Wednesday, March 24, for posting on March 25.—Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

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

QSL CARDS designed by specialists. Send s.a.e. for samples and prices.—New Forest Printing Co. Ltd., 31 Palfrey Place, London, S.W.8.

GODSHILL, I.o.W.: Bed, breakfast, evening dinner. H. & C. all rooms; TV lounge. Also available 4-berth caravan.—Berden, G3RND, Bridgecourt Farmhouse, Godshill, Ventnor, Isle of Wight. (Tel. Godshill 606.)

READERS ADVERTISEMENTS

2½p (6d.) per word, minimum charge 50p (10s.), 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 12½p (2s. 6d.) extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

READERS

SALE: Heathkit RG-1 receiver, with speaker. Factory aligned. Offers around £22.—Clarke, 16 Trewint Close, Cedars Estate, Exhall, Coventry, CV7-9FG.

SELLING: Heathkit RA-1 receiver, with matching Q-multiplier; just been realigned and in very good condition; price £33. Also Pye "International" 11-waveband radio, good condition, £19. Buyers to inspect and collect.—Bartlett, 25 Westbourne Avenue, Emsworth (2900), Hants.

WANTED: For AR88D, genuine S-meter and/or trimming tools.—Ring Norden, 01-794 8980 after 7.0 p.m.

COMPLETE Fixed and Mobile Station For Sale, comprising Codar A.T.5 Tx and T.28 Rx; also 12 M/S mobile PSU; 250/S mains PSU; control unit, speaker and microphone. Price £35.—Amblin, G3LYN, QTHR, or ring Bath 22723.

FOR SALE: Teletype Equipment, as described in book "RTTY from A to Z", consisting of Composite 19, comprising Printer, Transmitter Distributor, Power Supply and Table, £15. Buyer collects.—Ring Sanders, Burntwood (Staffs.), 6364.

SELLING: Collins S-Line KWM-2, 516F-2, PM-2, MP-1, 312B-4, 30L-L and 312B-3, £485 the lot but might split. Also Hy-Gain TH.3 Mk II beam with Hy-Gain balun, £45. Heath Two'er, £10. ETM-2, £12.—Harrison, 47 Hargrave Road, Maidenhead (20399), Berks.

OFFERING: Labgear LG.300, with Variac-controlled PSU/Modulator. VFO unit comprising BC-221 and buffer amplifier, output 3.5 MHz, built into cabinet, for use with LG.300. Also R.C.A. AR88D receiver, Joystick with all-band ATU, and Cossor oscilloscope. Offers?—Martin, G6MC, 151 Park Road, Bingley, Yorkshire.

MANUAL Information available on following items: B2, BC-312, BC-342, CR-100, AR88, HR0, S.27, BRT-400, R.1155, T.1154, BC-221, ET-4332, Pye "Ranger", and Wilcox-Gay VFO. Please send s.a.e. stating specific requirements.—Swindon, G3ANK, QTHR.

FOR SALE: Countermeasures Rx Type AN-APR47, coverage 35 to 1000 MHz, with CV-253 tuner, 4 switched ranges and auto-sweep tuning, takes AM/FM/Pan/Vid, 30 MHz IF, with manual, price £65. Panadaptor, 30 MHz, with 6 MHz band-width, £20. AN-APR4, three tuning units 30 to 1000 MHz (one u/s), all auto-sweep OK, £25. PSU in 19-in. rack, outputs 240v. 50 mA, 260v. 120 mA, 250v. 100 mA and 6-13v. 15 amps., £8 10s. S-Band preselector with klystron cavity for 6BM6, £5. S-band 4ft. dish, with horn, £15.—Ring Riley, 643-3333, extn. 42, during office hours.

APRIL Issue, SHORT WAVE MAGAZINE will appear on Friday, March 26. Single copies at 5s. (25p) post free can be supplied to orders reaching us by Wednesday 24th, for despatch on Thursday 25th, the day before publication. Orders with remittance to: Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WE APOLOGISE to Readers who follow this section and Advertisers who wish to use this space that our Small Advertisements are so short this month. At the moment of writing, we have had no mail intake since January 18—which means that a large number of Small Advs. must be held up in the postal pipe-line. They will be published at the first opportunity. In the meantime, if you have a notice of your own in prospect, send it in, with remittance, as soon as you possibly can to ensure its earliest appearance. We are continuing to do our best to get back to normality!—Small Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

EXCHANGE My SX-28 for a CR-100, must be in good condition. Selling a CR-150 with manual, but less cabinet and PSU, £12. Also a small CW transmitter, 40-watt for 10 to 80 metres, £15. Buyer collects.—Ring Tew, 01-648 5895.

NEW ! 70 cms. IN 2 metres OUT

This 70 cm. converter should be available now. All the bits were ordered last year and with luck should be assembled as converters right now.

THE SENTINEL DUAL GATE MOSFET 2 METRE CONVERTER

- ★ Low noise figure 2 dB.
- ★ Excellent overload and cross modulation performance.
- ★ Compact—2½" x 3" x 1½" aluminium case.
- ★ VHF crystal and silicon planar injection stages.
- ★ Dual Gate MOSFET RF amplifier and mixer.
- ★ IF's stocked—4-6 MHz, 9-11 MHz, 14-16 MHz, 18-20 MHz, 23-25 MHz, 24-26 MHz, 28-30 MHz.
- ★ PRICE: £13-75.

4 METRE CONVERTERS

- ★ Specification as for the 2 metre units.
- ★ IF's at present: 25-25.7 MHz, 28-28.7 MHz, 4-4.7 MHz.
- ★ PRICE: £13-75.

THE SPITFIRE 2 METRE A.M. TRANSMITTER

- ★ A printed circuit module size 4" x 4", running 4-5 watts input, 2 watts RF output from a 12 volts supply. Contains audio wave shaping circuits and limiting circuits to ensure 100% modulation. Five silicon planar multiplier and driver transistors and two selected modulated P.A. overlay transistors. Crystal required 8 MHz or 24 MHz.

- ★ PRICE: £17.
- ★ Modulation transformer... primary impedance 3 ohms for matching to any standard audio amplifier.

THE SENTINEL LOW NOISE FET PRE AMPLIFIER

- ★ The FET's and components are selected for a noise figure of less than 1 dB.
- ★ Gain of 20 dB.
- ★ Boxed as the converter.
- ★ PRICE: £6-5.

All this equipment should be ex stock but you can always ring (nearly always) and make sure.

Our equipment is considered the best value for money, high performance at reasonable cost.

SOLID STATE MODULES

14 Dalton Green Lane,
Huddersfield, H.D5-9YE.
Tel. 25173

TELECOMMS G3SED

AMATEUR COMMUNICATIONS
ELECTRONIC COMPONENTS

SALES AND SERVICE

WE ARE TRIO AGENTS FOR THE SOUTH COAST

TRIO JR599. This latest model from Trio giving reception of AM, FM, CW and SSB covers Ham bands from 1.8 MHz to 30 MHz and 144 MHz to 1.46 MHz. Completely solid state throughout using IC's and FET's with 4 Mech. Filters for selectivity from 16 kHz to 400 C/s. bandwidth. Incorporates squelch control and 100 kHz or 25 kHz crystal calibrators. May be powered from 12v. D.C. or from A.C. mains. Definitely for the perfectionist only. Price £185.

TRIO JR310. Still the most popular SSB receiver on the market	£77 10 0
TRIO JR500. Ham band receiver, fitted with preselector	£69 10 0
TRIO 9R59DS. The latest general coverage receiver from TRIO	£42 10 0
TRIO SP-5D. Speaker to match above receivers	£4 7 6
TRIO HS4. Padded headphones designed for communications	£5 7 6
TRIO TS 310 and A.C. p.s.u. High quality transceiver SSB, CW, AM	£175 0 0

You are invited to test these receivers at our shop.

HP and PART EXCHANGE welcome on all TRIO equipment.

REGULATED POWER SUPPLIES, ex equipment. Mains input. Contains 1 transformer 435-0-435v. at 400mA, 6-3v. at 5-5a., 5v. at 6a., 1 choke 5H at 400mA., 9 valves, etc. Size: 18" x 10" x 6". Weight approx. 45 lbs. PRICE: £3 10s. plus 15s. post.

JUST IN ! ... 1,000's of cut-price components, resistors, capacitors, pots., etc. Send S.A.E. for this month's list.

Shop hours 10 a.m. to 7 p.m. Half day closing Thursday

Terms cash with order. Tel.: Portsmouth 60036 (STD 0705)

**73's From 73 TWYFORD AVENUE,
STAMSHAW, PORTSMOUTH, HANTS.**

SPECIAL XTAL OFFER FROM G3ACQ. 1.8 to 30 MHz amateur bands 3 for 22/-, 7 for 42/-, 18 for 100/- post paid. **LUCKY DIP XTALS.** 10 for 22/- post paid. **VHF XTALS.** 9 to 9-125, 12 to 12-166, 16 to 16-222, 35-05 to 35-350, 48 to 48-664 80 to 82 MHz all 12/6 each post paid. **TRIO TS510, JR500, JR310, 9R59DE. JR599 CUSTOM "S".** The new de luxe all band **160 to 2 METRES.** 10 fets, 1 IC, 30 transistors, 37 diodes, 4 zeners, 6 varicaps, AC mains or 12 volt. **4 FILTERS FITTED** for AM CW SSB and FM. 25/100 KHz calibrator fitted. RIT squelch FM discriminator. RF gain attenuator in 4,20DB steps £185. Joysticks S.S. Modules 2 metre converters. Tech GDO, S.W. Bridges.

S. MAY (LEICESTER) LTD.
12/14 CHURCHGATE, CITY CENTRE,
LEICESTER.
Tel. Leicester 58662

MEASURE WIND SPEED

Anemometer Heads consisting of rotating vanes which chop a built-in light beam/photo electric cell combination. The Signal is then fed to your ratemeter or counter (suitable circuit recent *Practical Electronics*), 30s. (£1-50) plus 5s. (25p) p. and p.

Colvira 10 turn W-W Helicots 100,000 ohms Linear \pm 0.5%, ex equipment, 5s. (25p) plus 1s. (5p) p. and p. Plastic 10 turn knobs for above 2s. 6d. (12½p) plus 6d. (2½p) p. and p.

U-Magnetic Clutch or brake 4" x 4" x 1½" sq. mounting flange, 28v. D.C.—10W., 30s. (£1-50) plus 5s. (25p) p. and p.

ELEY ELECTRONICS

112 GROBY ROAD, GLENFIELD, LEICESTER, LE3-8GL

"DX ZONE MAP"

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

With new revised Prefix List

Price 85p.

including postage and special packing in postal tube to avoid damage in transit.

Publications Dept.

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

RADIO COMMUNICATION HANDBOOK

New Fourth Edition of the
Original RSGB "Amateur Radio Handbook"

Price £3.15

(+ post and packing 35p.)

Available from stock

Order from

PUBLICATIONS DEPT.
SHORT WAVE MAGAZINE LTD.,
55 VICTORIA STREET, LONDON, S.W.1

WANTED Urgently, Heathkit SB-10 or SB-10U SSB Adaptor, must be in mint condition and complete with manual.—Giddings, G3XLB, 24 Park Avenue, Formby (71968), Lancs.

WANTED: Morse Keys (Tappers), civil and military types, for collection. Specimens such as the A.M. B1, Marconi, Admiralty and foreign types are required.—Shedd, 20 Heathgate, London, N.W.11.

SELLING: Heathkit DX-40U Tx and VF-1U VFO, with manuals and Ae, c/o relay, £25. Woden UM2 mod transformer, 50s. Buyers collect. **EXCHANGE:** Avo sig. gen. in mint condition, 2 to 500 MHz output, for good general-coverage Rx with bandspread.—Walwyk, 321 Parkside Avenue, Barnehurst, Nr. Bexleyheath, Kent.

FOR SALE: Trio 9R-59D receiver with matching speaker, one year guarantee, price £35 or near offer, buyer to collect after 6 p.m.—Burrows, 41 Balham Park Road, London, S.W.12.

G3KFE is moving into smaller room, and must compress, so is offering the following items, all in daily use and in good or immaculate condition; buyers to collect or delivery by arrangement. (1) KW Vespa Mk. II, 6LQ6 PA, ALC mod fitted, with AC/PSU, actual review sample, and immaculate, £90. (2) KW-500 Linear, 813 valve, very nice and clean, not to say potent, £50. (3) KW-77, this receiver is the apple of my eye, so only to a good home for £65. (4) M. & G. Transceiver, 100 watts p.e.p. on 160, 80 or 20 metres, work DX from home or car, as both AC and DC PSUs available, added calibrator and internal stabilisation for a first-class little rig which has worked all continents from the car on 14 MHz. Price £85 includes all the trimmings. (5) Top Band AM mobile rig, A complete station in one box, operates off twelve volts, all-transistor Rx, modulator, VFO, buffer, valve driver and PA, transistor power, and crystal mic. inputs, £10 for a good bargain. (6) Raw materials for a 2 x 813 Linear Amplifier or PA. Includes all transformers, 2.5 kV for anodes, all built up as to metalwork, but needs completion of wiring; price includes a 4ft. x 6in. enclosed rack-type cabinet, price £10, and at this it must definitely be buyer collects. (7) 1960 Standard Vanguard Vignale, with many more thousands of miles life left in it—reason for sale, I'm tired of trying to wear it out! Body free of rust, M.O.T. valid till next November. £55 or good offer! All these bargains available from—Essery, G3KFE, QTHR, or ring Bishops Stortford 2501.

FOR SALE: Rediffusion Transmitter G.34 1.46 MHz in Racks. Complete with Power Pack, Modulator, Handbook and Circuit Diagrams.—Offers please. Office 01-546 9441. Evenings Staines 54087.

MORSE MADE !!! EASY

FACT NOT FICTION. If you start RIGHT you will be reading amateur and commercial Morse within a month. (Normal progress to be expected.)

Using scientifically prepared 3-speed records you automatically learn to recognise the code RHYTHM without translating. You can't help it, it's as easy as learning a tune. 18-W.P.M. in 4 weeks guaranteed.

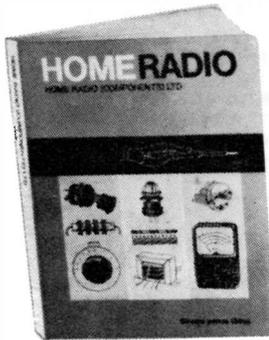
For details and course C.O.D. ring s.t.d. 01-660 2896 or 01-660 3235 send 4p. stamp for explanatory booklet to:
G3HSC/Box 14, 45 GREEN LANE, PURLEY, SURREY.

It costs

ONLY 63p
post paid



for today's **MOST USEFUL COMPONENTS CATALOGUE**



Many radio and electronic enthusiasts say that our catalogue is "priceless"! Be that as it may, we charge you only 63 pence. What is more the catalogue contains 6 vouchers, each worth five pence when used as indicated. And for good measure, we throw in a useful Bookmark giving electronic abbreviations and a 30-page Price Supplement. *Why are you waiting?*

By the way, if it suits you to call at our shop you save yourself another 20 pence—the post and packing costs.

POST THIS COUPON

with your cheque or P.O. for 63p



Please use block capitals

Name

Address



HOME RADIO (Components) LTD.,
Dept. SW, 234-240 London Rd., Mitcham, CR4 3HD

The price of 63p applies only to catalogues purchased by customers in the U.K. and to BFPO addresses.

WORLD RADIO/TV HANDBOOK 1971

(From Stock)

The World's only complete reference guide to International Radio & Television Broadcasting Stations. It includes: Frequencies, time schedules, announcements, personnel, slogans, interval signals and much more.

Lists all International short-wave stations, including frequencies, for each country; foreign broadcasts, long and medium wave stations (AM broadcast Band), TV stations and domestic programmes. Long recognised as the established authority by broadcasters and listeners. It is the only publication that enables you to identify BC stations quickly and easily. Enables you to fill more pages in your log book on the SW BC bands and helps you add more BC-station QSL cards to your collection.

£2.25

(The above prices include increased postal rates and packing).

from:

SHORT WAVE MAGAZINE
55 Victoria Street, London, S.W.1

THIS IS NOT AN ORDINARY ANTENNA!

Read what the experts say about the **JOYSTICK VFA**
REGD.

W7OE (retired U.S. Government Electronics Engr.) on 40m. Band:

"JOYSTICK 5ft. below ground, same as dipole. Elevated 15ft., 1-S point UP on dipole!"

G3DCS (C. Engr., F.I.E.R.E., Chartered Engr.):

"achieved DX using JOYSTICK VFA in only 95 operating days" (subject of course to QSL confirmation).

CQ Magazine:

"will operate as well as the 3-ele Beam with which we compared it."

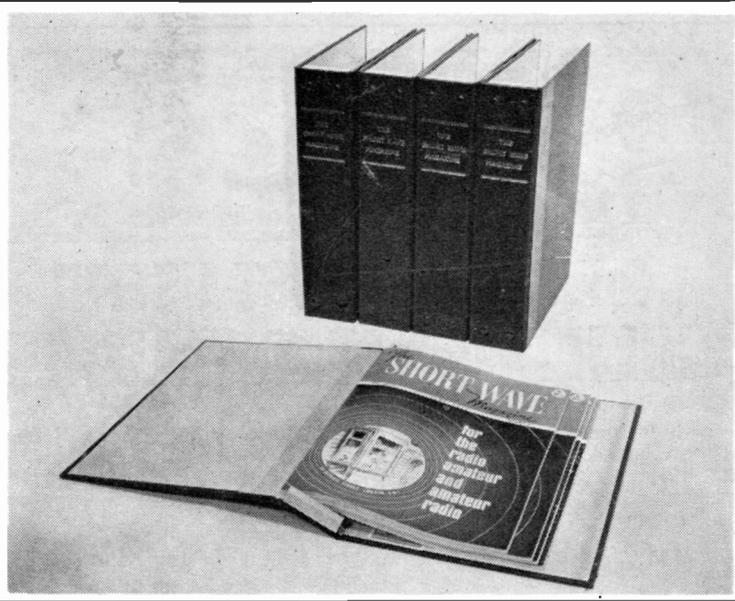
W2EQS, on 160 JOYSTICK VFA 5ft. below ground, only 1-S point down on his famous, "ATLANTIC SPANNER."

PARTRIDGE ELECTRONICS LTD.
BROADSTAIRS, KENT.

G3CED

G3VFA

Telephone : 0843-62535



CREATE YOUR OWN REFERENCE LIBRARY

The "EASIBINDER" is designed to bind 12 copies of the Magazine as you receive them month by month, eventually providing a handsomely bound volume for the bookshelf.

No need to wait until twelve copies are assembled. As each copy is received, it is quickly and simply inserted into the binder. Whether partially or completely filled, the binder is equally effective, giving the appearance of a book, with each page opening flat.

Strongly made with stiff covers and attractively bound in maroon Leathercloth and Milskin, the binders have only the title gold blocked on the spine.

Price 88p post free.

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

Advertising in "Short Wave Magazine" guarantees the largest and most effective coverage of the U.K. radio amateur interest

Short Wave Listening

PHILIPS PAPERBACK by Vastenhoud.
107 pages. Numerous text diagrams.
Price 83p inclusive of p & p.

This book is intended as a guide for the benefit of the increasingly large numbers of regular listeners to short wave transmitting stations and also for radio amateurs who are interested in short wave listening. The first group includes many emigrants who in their new country are anxious not to lose touch with their homeland, and those who are intending to emigrate and will thus in future have to do much of their listening on short waves. The second group is of those enthusiasts who regard short wave radio as an indispensable medium for the exchange of information internationally in the broadcast sense and employ it in order to widen their knowledge of other countries. The book, which deals with the possibilities and problems of short-wave reception on the level of popular science will enable the reader to discover a whole new world of his own.

CONTENTS

- | | |
|---|---|
| Short Waves | Do Any Regulations Exist |
| The Principles of Short-Wave Transmission | Governing the use of Frequencies in the Short-Wave Bands? |
| Practical Short Wave Transmitting | DX-ing in Practice |
| Short Wave Prediction | DX-ing With a Tape Recorder |
| Sources of Interference | DX-ing Using a Frequency Meter |
| The Aerial | Some Commonly Used DX Terms in Three Languages |
| The Correct Choice of Receiver | Transmission of Time Signals at Standard Frequencies |
| Communications Receivers | Some of the More Important DX Clubs |

GUIDE TO BROADCASTING STATIONS

16th Edition
Miffe & Son Ltd. 164 pages. 58p (inclusive of p & p.)

CONTENTS
Long- and Medium-Wave European Stations : Some L.W. and M.W. Stations outside Europe : Short-Wave Stations of the World. Stations outside Europe: Short-Wave Stations of the World : Map of Broadcasting Regions : European Standard Frequency Transmitters : Short Wave Broadcasting Bands : Wavelength and Frequency Conversion : European Television Stations : European VHF Sound Broadcasting Stations : Internationally Allocated Call Signs.

Available from stock:
**PUBLICATIONS DEPT.
SHORT WAVE MAGAZINE
55 VICTORIA STREET LONDON, S.W.1**

ANNOUNCEMENT:

RADIO HANDBOOK (18th Edition)
by William I. Orr **W6SAI** @
£5 . 11 . 0 now completely sold out.

We can however supply from stock copies of the earlier **17th Edition** at the reduced price of
£4.50

The above prices include increased postal rates and packing.

Publications Dept.

**SHORT WAVE MAGAZINE
55 Victoria Street,
London, S.W.1.**

Telephone: 01-222 5341

National Giro a/c 547 6151