

The
SHORT WAVE
Magazine

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NUMBER 3



WORLD WIDE COMMUNICATION



**OUR
AESU MUSEN MAIN DISTRIBUTOR**

WESTERN

"ALL RECEIVERS 'FALL OFF' AT 30MHz!"

THIS HAS BEEN THE GENERAL OPINION OF RECEIVER SENSITIVITY PERFORMANCE FOR YEARS AND STILL APPLIES TO SOME MODERN EQUIPMENT! HOWEVER,

It does not apply to Yaesu Equipment !

"You don't believe us? Then here are the facts !"

TAKE YOUR PICK! EITHER REFER TO THE R.S.G.B. REVIEW OR OUR TEST ON AN OFF-THE-SHELF

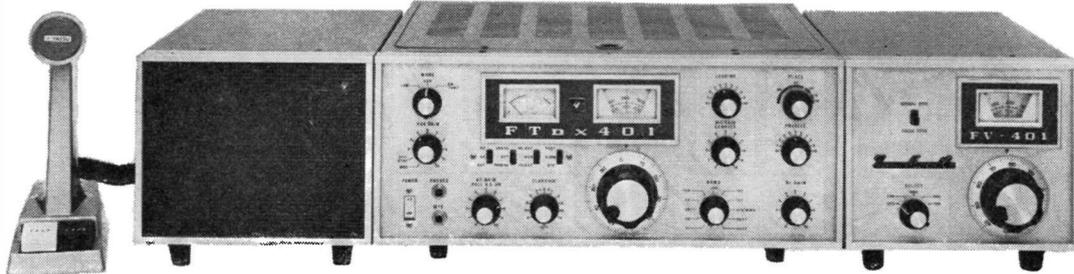
YAESU FT-401

YD-844

SP-400

FT-401

FV-401



RECEIVER MEASURED PERFORMANCE

In order to compare receiver performance figures one must determine the following :

1. 'Voltage': is it emf or pd across, say 50 ohm input ? There is a 6dB difference!
2. The signal + noise to noise ratio (S + N : N) in dB's.
3. The frequency at which the measurements have been made.
4. The bandwidth used.

Just in the same way as one can't compare apples with oranges, nor can one compare sensitivity figures unless the same standards are used. To use a narrower bandwidth would seem to give a receiver a better noise performance. Equipment used for tests: Marconi signal generator TF2002AS, Digital Synchroniser (Marconi) TF2170AF, Power Meter TF2500.

SENSITIVITY

Input Freq. MHz	S+N : N for 0.5µv emf dB	S+S : N for 1.0µv emf dB
3.6	16	22
7.1	19	25
14.2	19	25
21.2	19	25
28.7	20	26
29.7	20	26

AGC CHARACTERISTIC

Input emf 14.2MHz	AF output dB	Comparative figures with a £1,200 receiver ! dB
1 microvolt	0	0
3.2 microvolt	+6.5	+6.5
10 microvolt	+8.1	+8.1
32 microvolt	+8.6	+8.6
100 microvolt	+8.8	+8.8
320 microvolt	+8.8	+8.8
1 millivolt	+8.8	+8.8
3.2 millivolt	+8.9	+8.9
10 millivolt	+8.9	+8.9
32 millivolt	+9.0	+9.0
100 millivolt	+9.0	+9.0
320 millivolt	+9.0	+9.0
1 volt	+9.0	+9.0

INTERMODULATION. In-band 3.7MHz.
Measurements made with two Marconi Signal generators TF2002SA, two Digital Synchronisers, Marconi TF2170, Hewlett Packard 302A Wave analyser and resistive combining pad.

Input emf of each generator	2nd order 600MHz dB	3rd order 800MHz dB	3rd order 2600Hz dB
100 microvolts	-37	-24	-38
1 millivolt	-30	-20	-33
10 millivolt	-28	-17	-31
100 millivolt	-26	-16	-30

INTERMODULATION. Out of Band. Second Order.
Inputs at 6.7MHz and 7.5MHz Tuned to 14.2MHz

Input emf of each generator millivolts	Equivalent emf of IM products	dB relative to one input
3.2	Inaudible	Inaudible
10	Inaudible	Inaudible
32	Inaudible	Inaudible
100	0.25 V	-112 dB

DESENSITISATION

Wanted signal at 14.210MHz at 1.0µV				
QRM level emf	QRM Freq. MHz	Freq. spacing kHz	QRM Freq. MHz	QRM level emf
mV				mV
4.5	14.20	10	14.22	4.5
6.3	14.19	20	14.23	6.3
12	14.16	50	14.26	12
14	14.11	100	14.31	14
14	13.71	500	14.71	14

Measurements. Receiver tuned to 14.21MHz, RF Gain at max. Mode USB, 1.0V input. Interfering signal at given spacing from wanted signal. Level of QRM signal raised until S + N : N ratio is reduced by 3dB.

INTERMODULATION : Out of Band. Second Order.
Inputs at 21MHz and 6.8MHz Tuned to 14.2MHz

Input emf of each generator millivolts	Equivalent emf of IM product	dB relative to one input
3.2	Inaudible	Inaudible
10	Inaudible	Inaudible
32	0.18 V	-105 dB
100	0.5 V	-105 dB

INTERMODULATION : Out of Band. Third Order.
Inputs at 14.0 and 14.1MHz. Tuned to 14.2MHz

Input emf of each generator millivolts	Equivalent emf of IM product V	dB relative to one input dB
3.2	0.1V	=90
10	0.4V	=88
32	9.0V	=71
100	320.0V	=50

ELECTRONICS (UK) LTD

So when you hear people say that receivers "fall-off" at 30 MHz or that you sacrifice receiver performance if you buy a transceiver, don't forget to reply, "Not with Yaesu Musen you don't."
As regards transmitter performance we respectfully draw your attention to the power output figures at 30 MHz and 3.5 MHz. You'll notice they're the same! Now try your own equipment and see how it compares; on second thoughts don't bother as we don't want you to have any sleepless nights! Yes we have a very large stock of OSKER POWER METERS at the old pre-yen re-valuation price of **£18.5 + VAT** so get yours now.

YAESU PRICES—Carriage paid by Securicor

HF TRANSCEIVERS	PRICE	VAT	HF RECEIVERS	PRICE	VAT
FT-75, 50W p.e.p. 10-80m. 3 Ch. vxo ...	£99.00	£9.90	FR50, Double conversion 10-80m. ...	£65.00	£6.50
FP-75 AC PSU and Speaker for above ...	£22.50	£2.25	FR50 fitted WWV and xtal. Calibrator ...	£69.00	£6.90
DC-75 DC PSU, SPEAKER and MOBILE MOUNT ...	£22.50	£2.25	FR400DX, 160m. 80-10m. (28-29 MHz) ...	£135.00	£13.50
FT-200 240W p.e.p. 10-80m. ...	£145.00	£14.50	FR400SDX, 160-2m. 4 Mech. Filters, 28-30 MHz ...	£175.00	£17.50
FP-200 AC PSU and SPEAKER for FT-200 ...	£45.00	£4.50			
DC-200 DC PSU for FT-200 ...	£51.00	£5.10	MATCHING SPEAKERS		
FT-101 as above + 160m. NEW MODEL ...	£280.00	£28.00	SP101, SP400, SP401 ...	£11.00	£1.00
FT-401, 560W, p.e.p. 10-80m. ...	£265.00	£26.50			
FT-501, Digital Tcvr. ...	£335.00	£33.50	REMOTE VFO's		
			FV-101 for FT-101, FV-200 for FT-200 ...	£42.00	£4.20
VHF TRANSCEIVERS			FV-401 for FT-401 ...	£42.00	£4.20
FT-2FB 2m. 12 Channel, 10W. O/P FM. ...	£98.00	£9.80	FV-50 for FT-75 and FL50 ...	£28.00	£2.80
FT-2AC AC PSU and SPEAKER ...	£27.00	£2.70			
FP-2 ACB, AC PSU/Spkr. and Ni. cad batteries ...	£39.00	£3.90	FREQUENCY COUNTERS		
FT-2 AUTO, 2m. 8 Ch. Scanning ...	£157.00	£15.70	YC-355, 35 MHz, AC or 12v. DC ...	£97.00	£9.70
SIGMAISIZER 200 ...	£180.00	£18.00	YC-355D, 220 MHz, Built-in pre-scaler ...	£120.00	£12.00
HF TRANSMITTERS			LINEAR AMPLIFIERS		
FL 50, 50W, p.e.p. 10-80m. VXO control ...	£75.00	£7.50	FL-2100, 1200W p.e.p. 10-80m. (Matches FT-101) ...	£165.00	£16.50
FL 400 fitted VOX ...	£79.00	£7.90	FL-2000B, As above, Matches FL400 ...	£165.00	£16.50
FL 500, 240W, 10-80m. Transceivers with matching ...			FL-2500 2kW p.e.p. 160-10m. ...	£130.00	£13.00
FR400 receiver ...	£165.00	£16.50			

NOTE—ADD 10% VAT TO ALL ADVERTISED PRICES BELOW

NEW/USED EQUIPMENT : 3 months guarantee. Add £1 Securicor delivery.

Collins 7551, very good ...	£175.00	Heath HW32 + HP23 ...	£59.00	Lafayette HA500, 3.5-54 MHz ...	£30.00	Sommerkamp FL-500 Tx ...	£105.00
Codar Pre-selector ...	£5.00	Heath SB101 + HP23 ...	£150.00	National NCX5 ...	£170.00	Tristao, 105ft. Telescopic Tower ...	£225.00
Eddystone EC10 Mk. 2 ...	£60.00	Heath SB303 + CWF ...	£238.00	National NCX500 ...	£165.00	Trio 9R59DS ...	£39.00
Hallcrafters HT32B, 10-80m. Tx. ...	£80.00	New, No VAT ...	£199.00	Pyramid Linear ...	£37.00	Trio JR500SE ...	£35.50
Hallcrafters SX133, Mint ...	£90.00	KW Atlanta, New ...	£149.00	Racal MA79G Drive Unit, Mint ...	£485.00	Trio TS510, Mint ...	£140.00
Hammarlund HX50 Tx. ...	£79.00	KW Atlanta, Used ...	£149.00	Sommerkamp FT-100, 10-160m. ...	£150.00	Trio, Remote VFO ...	£20.00
Hammarlund HQ170A Rx. ...	£70.00	KW 2000A + AC PSU ...	£25.00	Sommerkamp FT-100, 10-160m. ...	£150.00	Yaesu FR50B, Mint ...	£35.00
Heath GR78 Rx. ...	£59.00	KW 2000B + AC PSU ...	£175.00	Sommerkamp FL 200B Tx. ...	£80.00	Yaesu FR400SDX, Mint ...	£149.00
Heath HM102 ...	£18.00	KW Viceroy 1 Tx. ...	£45.00	Sommerkamp FT-250, Tcvr. ...	£135.00	Yaesu FV400S, VFO ...	£30.00
Heath SB610 Monitorscope ...	£39.00	KW Vespa 2 Tx. ...	£90.00	Sommerkamp FT-500 Tcvr. ...	£160.00	Yaesu FT-101, Mint ...	£199.00
Heath HW12 and HP23 ...	£59.00	KW 600 Linear ...	£70.00			Yaesu DC-200, Unused ...	£40.00

ANTENNA ROTATORS

AR20 (p & p 40p) ...	£20.00	AR22R (p & p 65p) ...	£25.00	TR44 (p & p 75p) ...	£45.00	HY-GAIN, 400 (p & p £1) ...	£115.00
				HAM-M (p & p 80p) ...	£70.00		

BANTEX FIBREGLASS MOBILE ANTENNAS (Carr. 50p) including Base

70/1/2, 70 MHz, 1/2 wave ...	£3.00	BGA, 144 MHz, 1/2 wave ...	£6.15	Magnetic mount ...	£6.15	Note, Deduct 50p from price of aerial if base is not required.
144/1/2, 144 MHz, 1/2 wave ...	£2.75	B5, 144 MHz, 3/4 wave ...	£4.35	All aerials complete with base.		

G WHIPS (Carriage 50p, coils 20p)

Tribander 10, 15, 20m. ...	£9.45	LF160 160m. coil ...	£4.00	160 Ranger ...	£7.50	MM80 80m. coil ...	£4.00
LF40 40m. coil ...	£4.00	Whip for LF and MM coils ...	£1.00	Multimobile '71' 10, 15, 20m. 40m. coil ...	£12.50	MM160 160m. coil ...	£4.00
LF80, 80m. coil ...	£4.00	160/180m. Duobander ...	£9.00			Basemounts ...	£1.45

GEM-QUAD. The best FIBREGLASS 10-15-20m. QUAD

2 ele. ...	£74.50	3 ele. ...	£109.80	4 ele. ...	£144.00	Conversion kits ex-stock.
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HY-GAIN (Carriage paid)

Hy tower, 10-80m. (self-sup) ...	£110.00	LC800, 8mm. coil for 14AVQ ...	£7.75	TH3 Jnr., 10-20m. 3 ele. 600W. ...	£51.50	203BA, 20m. 3 ele. beam ...	£72.00
18V, 10-80m. vertical ...	£12.85	TH6DXX, 10-20m. 6 ele. beam ...	£97.00	Hy-Quad, 10-20m. 2 ele. ...	£74.50	153BA, 15m. 3 ele. beam ...	£36.50
12AVQ, 10-20m. vert. ...	£16.50	TH3MK3, 10-20m. 3 ele. 2 kW ...	£75.00	DB10-15 10-15m. 3 ele. ...	£57.50	103BA, 10m. 3 ele. beam ...	£28.50
14AVQ, 10-40m. vert. ...	£24.50			204BA, 20m. 4 ele. beam ...	£80.00	LA1 Lightning arrester ...	£14.50
18AVT, 10-80m. vert. ...	£35.50					LA2 Lightning arrester ...	£2.50

J BEAM. Full range in stock

MOSLEY (Carriage paid) (Ex-Stock) from us for fast delivery

Mustang 10-20m. 3 ele. 2kW ...	£45.00	TA33 Jnr., 10-20m. 3 ele. ...	£36.50	TA32 Jnr., 'E' or 2" mast ...	£26.50	TA31 Jnr. Rotary dipole ...	£17.00
TA33 Jnr. 'E' for 2" mast ...	£37.00	TA32 Jnr. 1-20m. 2 ele. ...	£29.00				

CATALOGUE — Communications equipment, antennas, towers, rotors, 20p.

Hours of Business : 9-5.30 p.m. Monday-Friday, 9-12.30 p.m. Saturday.

AGENTS : MIDLANDS—Andy Martin, G3UDR. Tel. 0608 61839. BUCKS.—Ian Partridge, G3PRR. Tel. Chesham 024-054143.

WESTERN ELECTRONICS (UK) LTD.
OSBORNE ROAD . TOTTON . SOUTHAMPTON SO4 4DN

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Cable : 'AERIAL' SOUTHAMPTON

LOWE ELECTRONICS

119 Cavendish Road, Matlock, Derbyshire, DE4 3HE

Tel: Matlock 2817 or 2430 9 a.m. - 9 p.m.

John: G3PCY

Bill: G3UBO

Alan: G3MME

MAIN DISTRIBUTOR FOR YAESU MUSEN EQUIPMENT

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

SERVICE AND SALES (evenings and weekends only): John G3JYG, 16 Harvard Road, Ringmer, Lewes, Sussex. Tel: Ringmer 812071. Sim GM3SAN, 19 Ellismuir Road, Baillieston, Nr. Glasgow. Tel. 041-771 0364. Alan GW3YSA, 35 Pen y Waun, Efail Isaf, Nr. Pontypridd, Glam. Tel. Newton Llantwit 3809. Peter Ward, G3XWX, 47 Radstock Avenue, Ward End, Birmingham B36 8HD.

SERVICE ONLY (evenings and weekends): Dave Dryden, G3BKQ, 205 Main Street, Thornton, Leics. Sim, John, Alan and Peter will be happy to demonstrate New Yaesu Gear by appointment. They also have a pretty good selection of second-hand trade-ins at the right price.

Price List

Please note that V.A.T. must be added to the prices below, but carriage is included.

YAESU MUSEN

Receivers

FRdx400 SDL £175.00 FR50B £65.00

FR50B Mods:

We can now modify this receiver for 160m. in place of the "AUX" switch position for WWV, and it is a modification we can thoroughly recommend.

We can also extend the 10m. band so that instead of covering 28 to 29.2 MHz it covers the full 28 to 30 MHz for converter use. Note however that the dial remains calibrated from 28 to 29.2. However, it doesn't take long to sort out where everything is.

Finally, for the man who wants everything, we can actually fit a 2m. converter which is switched from the front panel. This is the Weir Mosfet Converter which we think is excellent value for money.

PRICES OF OPTIONAL EXTRAS

100 kHz marker crystal	£2.50
1.5 to 2.0 MHz coverage for top band ...	£5.00
Extended (28-30 MHz) coverage of 10m. for converter use	£2.50
Both the top band and 10m. mods. done at the same time	£6.50
Installation of front panel switched 2m. converter to include extended coverage of 10m.	£20.00

If you require any of the above modifications carried out to your FR50B, please advise us and we will arrange Securicor collection and re-delivery for £4.00.

Transmitters

FLdx400 £165.00 FL50B £75.00

Transceivers

FT101	£280.00	FT200	£145.00
FP200	£45.00	FTdx401	£265.00
FT501	£290.00	FP501	£45.00
FT75	£115.00	FP75	£25.00
DC75	£25.00	FT2FB	£98.00

Sigmasizer	£180.00	FT2AUTO	£157.00
		(fitted 3 channels)	
		(fitted 5 channels)	

Linears

FL2100 ... £165.00 FL2000B ... £165.00

Accessories

Remote VFO's (FV101, FV401, FV200)	£42.00
Remote VFO's (FV50B, FV50C)	£28.00
Speakers (SPI01, SP401, SP400)	£11.00
Microphones YD844 (table)	£13.00
YD846 (hand)	£5.00
FT101 fans	£9.00
CW Filters	£16.00
FT101 AM Filters	£18.00
Tune-up device: Kit	£1.50
Assembled	£3.00

2m. Equipment

In addition to the popular Yaesu 2m. FM equipment, FT2FB fitted 3 channels at £98.00, FT2AUTO fitted 5 channels at £157 (extra channels £3.20 each) and the Sigmasizer (200 channels!) at £180, we stock the Liner 2 at £138. This rig is becoming extremely popular and has revolutionized 2m. SSB. It puts out a solid 10 watts of SSB, equally at home, mobile or fixed station, and covers the present SSB portion of 2m. 145.25 to 145.49 (fully tunable on both Rx and Tx). In the event of a change in the Band Plan, the Liner 2 can be made to cover any 240 kHz segment of 2m. by simply changing one crystal.

We also stock the range of Braun equipment which has a reputation for top performance and quality.

SE600 DIG. No compromise AM/FM/SSB/CW with digital readout. Probably the finest piece of 2m. equipment ever to appear on the market. £570.00.

SE280. Top quality 80 channel FM rig featuring a crystal synthesizer and separate Rx and Tx channels for repeater working. £220.00.

DGTC 22. 2m. Converter	£22.00
DGTC 1702. 70 cms. Converter	£40.00

Finally, we must mention the 2m. Converter we fit to the FR50B—this is the Weir Mosfet Converter and very attractively priced at £13.65.

Station Accessories**SWR Meters :**

Asahi twin meter	£8.00
Hanson single meter	£5.00
PL259 plugs to suit SWR meters	30p
Reducers	10p
Kuranishi Wattmeters	£35.00
Headphones, low impedance, padded	£3.00
Microphones	
Yaesu YD844 desk type	£13.00
YD846 hand type	£5.00
Katsumi EK9X Keyers	£9.00
CW practice oscillators	£2.20
Rotators	
AR22R	£25.00
TR44	£45.00
Ham-M	£75.00

Antennas

Big beams etc.—we can usually supply a top quality beam at a reasonable price—give us a yell.

Quads

The Polygon glass fibre quad, excellent value at **£35**

Verticals

Asahi Echo 8G 40, 20, 15, and 10m.	£20.00
Diamond DPI04 20, 15 and 10m.	£19.00
Diamond DPI03 80, 40m.	£25.00
Diamond DPI05 80, 40, 20, 15 and 10m.	£35.00

Note: ALL ITEMS UP TO NOW INCLUDE CARRIAGE BY SECURICOR OR POST BUT FROM NOW ON, CARRIAGE IS EXTRA—PLEASE ENCLOSE SUFFICIENT, WE'LL REFUND ANY EXCESS.

Antennas—Carriage extra, see below.

Mobile

G-Whips		
Tribander (20, 15 and 10m.)	...	£10.50
Multimobile (20, 15 and 10m.)	...	£12.50
160, 80 and 40m. loading coils ea.	...	£4.00
Top whip sections ... ..	...	£1.00
Base section ... ..	...	£1.45
Ranger 160m. ... ..	...	£8.00
Duobander 160 and 80m. ... ..	...	£9.00
Flexiwhips ... ..	...	£15.00
2m. Whips	The elegant Diamond $\frac{5}{8}$ vertical gutter mounting whip requires no holes in your car. Mounted in seconds	£10.00
"J" Beams	2/4y 4 element	£2.90
	2/6y 6 element	£3.50
	2/8y 8 element	£4.20
	2/10y 10 element	£9.00
	2/14P Parabeam	£14.30
	2/12 double 6 slot fed	£6.80
	2/16 double 8 slot fed	£8.40
	2/10XY crossed 10	£12.20
	Please specify 50 or 75 ohms	

Carriage—The above can be sent British Rail at 50p extra, or can be sent Securicor 24 hour service at £2.00 extra.

Cable—Postage Extra

UR43, 8p/m.; UR70, 10p/m.; UR67, 22p/m.
75 ohm twin feeder, 5p/m.; 300 ohm twin feeder, 5p/m.
4 core rotator cable for AR22R, 15p/m.
12 core rotator cable for TR44 and Ham M, 30p/m.

Baluns—Postage Extra

Popular HZP 1 : 1 £4.80 HZP 4 : 1 £4.80.
Rugged Kirk 5075B 1 : 1 2kW broad band, £7.50.
5075D LF 1 : 1 2kW specially optimised for 160, 80 and 40m. dipoles, £6.50.

Valves

For common valves like 6BA6's, 6BE6's, 6AU6, etc., we recommend you go to one of the large London dealers in valves—we simply cannot compete with their prices. Quite honestly if we want a common valve, we get it from RST or Z & I rather than go to our Wholesaler—it's cheaper. We recommend you do the same.

Where we can be of service to the Amateur is to stock some of the valves he can't get easily, particularly those used in Yaesu equipment as under :

6AH6, 6BZ6, 6CB6A, 6CL6, 6U8A, 6EW6, 6EH7, 6BM8, 12BY7A. All at **60p** each + VAT, post paid.
6GK6, **£1.20** + VAT, post paid.
PA Valves 6JM6A, **£1.50** each + VAT, post paid.
6JS6C, 6KD6, **£2.00** each + VAT, post paid.

These are supplied in matched pairs at no extra cost. Finally we must mention that we still have some 4CX250 valve bases in stock complete with chimneys. Brand new **£3.00** plus VAT, post paid.

Service

Ask anyone who has dealt with us—he is our best advertisement.

Second Hand Equipment

We always have the best selection in the best condition, fully checked, serviced and guaranteed. If it is not to your liking, you simply pick up the 'phone and tell us. We collect and you get your money back less the cost of carriage. This takes all the risk out of buying second hand. A SAE will get you our latest second hand list and a large envelope with a 6p stamp on will get you our complete catalogue which runs to over 50 pages, and includes circuit diagrams of all new gear.

Trade-Ins

We are always happy to trade in used equipment if it is something we can recommend to another customer. We don't mind if it's faulty because we service all the second hand gear before resale anyway.

Hire Purchase

We can arrange Hire Purchase terms on both new and second hand gear. The deposit is a mere 10% and repayment may be spread over 12, 18, 24 or 36 months. Your trade-in gear is perfectly acceptable as a deposit.

Agents

Don't forget that our Agents, Sim, in Glasgow, John in Sussex, Alan in S. Wales, and Peter in Birmingham can demonstrate and supply Yaesu gear, have second hand gear for sale, have a wide range of accessories and are available evenings and weekends to help you, advise you or just chat to you. Why not 'phone them if you have any problems?

In the case of Peter in Birmingham, he is operating full time from his home and although not yet on the 'phone is available pretty well any time. Five minutes from the Gravelly Hill interchange (Spaghetti Junction) puts him pretty close to you.

LOWE ELECTRONICS

119 CAVENDISH ROAD, MATLOCK, DERBYSHIRE, DE4 3HE

Tel. MATLOCK 2817/2430

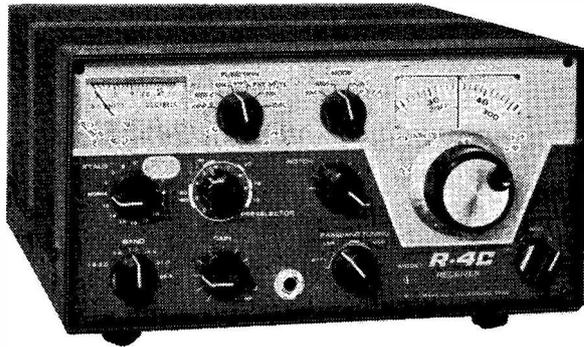
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Radio Shack Ltd ★

London's Amateur Radio Stockists

Just around the corner from West Hampstead Underground Station

Drake has made The Best better!



The New **DRAKE** **R-4C** Receiver

FEATURES

- Solid State Linear permeability-tuned VFO with 1 kHz dial divisions. Gear driven dual circular dials. High mechanical, electrical and temperature stability.
- Covers amateur bands with crystals furnished. Covers all of 8,040, 20 and 15 metres, and 28.5–29.0 MHz of 10 metres.
- Covers 160 metres with accessory crystal. In addition to the amateur bands, tunes any fifteen 500 kHz ranges between 1.5 and 30 MHz. 5.0–6.0 MHz not recommended. Can be used for MARS, WWV, CB Marine and Shortwave Broadcasts.
- Superior selectivity : 2.4 kHz 8-pole filter provided in SSB positions. 8.0 kHz, 6-pole selectivity for AM. Optional filters of .25, .5, 1.5 and 6.0 kHz bandwidths available.
- Smooth and precise passband tuning.
- Tunable notch filter attenuates carriers within passband.
- Transceive capability. May be used to transceive with the T-4X, T-4XB or T-4XC Transmitters. Illuminated dial shows which PTO is in use.
- USB, LSB, AM and CW on all bands.
- AGC with fast attack and two release times for SSB and AM, or fast release for break-in CW. AGC also may be switched off.
- New high efficiency accessory noise blanker that operates in all modes.
- Crystal lattice filter in first IF prevents cross-modulation and desensitisation due to strong adjacent channel signals.
- Excellent overload and intermodulation characteristics.
- 25 kHz calibrator permits working closer to band edges and segments.
- Scratch resistant epoxy paint finish.

DRAKE — SALES — SERVICE

SECURICOR ★ COURIER EXPRESS ★ B.R.S. ★ ACCESS ★ BARCLAYCARD ★ U.D.T.

RADIO SHACK LTD.

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Giro Account No.: 588 7151

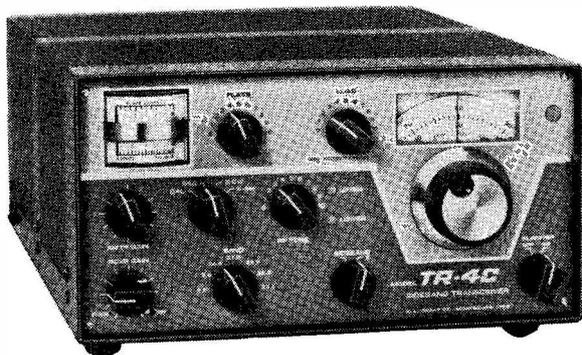
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The New **DRAKE** **TR-4C** Transceiver

The Drake TR-4C is a product of years of transceiver experience and design improvements. The resulting performance makes it one of the finest transceivers available. Its operating handiness is not only evident in circuit design, but also in packaging. Compact and lightweight, it is ideal for mobile use, portable excursions, and vacations. USB, LSB, CW or AM operation is at your finger tips with 300 watts P.E.P. of communications power.

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- **Complete Amateur Band Coverage**; 80 through 15 metre bands complete and 28.5-29.1 MHz of 10 metres. Rest of 10 metre band obtained with accessory crystals.
- **Separate Sideband Filters**; separate USB and LSB filters eliminate oscillator shifting and insure long term carrier vs filter alignment.
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- **CW Side Tone Oscillator** for monitoring your CW transmission.
- **Finish**; scratch resistant epoxy paint.
- **Crystal Calibrator** built-in.
- **VFO Indicator Light** eliminates confusion of which main tuning knob controls the frequency when using an RV-4C remote VFO.
- **Automatic CW Transmit Receive Switching** sometimes called "semi" break-in.
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456 in HC6/U ... £1-75	32-500 in HC18/U ... £1-60	
500 in HC6/U ... £1-75	34-000 in HC18/U ... £1-60	
	34-500 in HC18/U ... £1-60	
	35-000 in HC18/U ... £1-75	
	35-500 in HC18/U ... £1-75	
	38-666 in HC18/U* ... £1-35	
	40-000 in HC18/U ... £1-60	
	42-000 in HC18/U ... £1-60	
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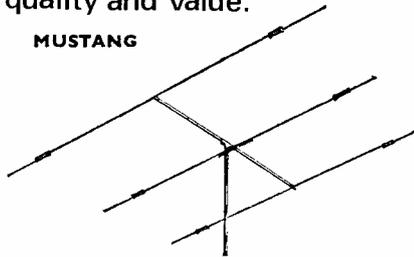
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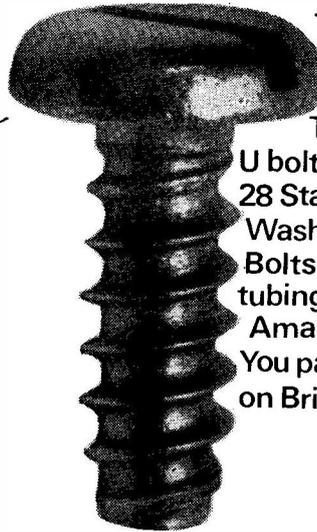
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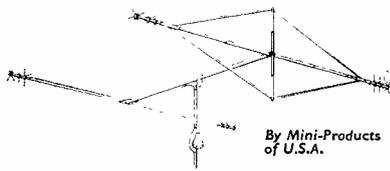
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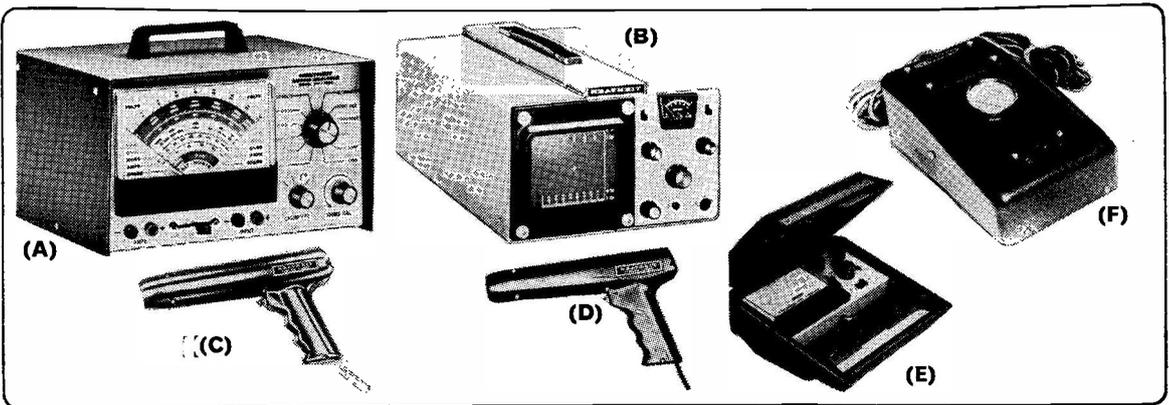
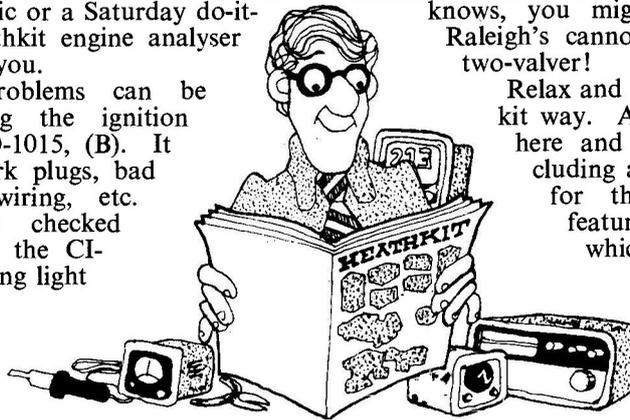
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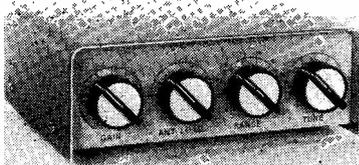
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SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXXI

MAY, 1973

No. 355

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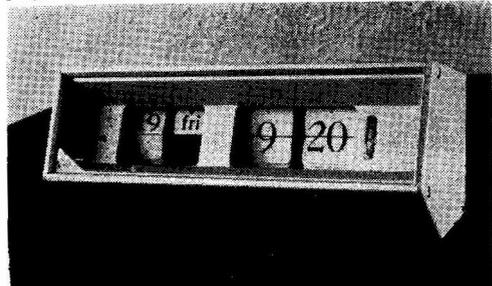
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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE *Magazine*

E D I T O R I A L

Praiseworthy!

On April 10, the BBC put out, on its "World Service" for listeners overseas, an altogether creditable half-hour programme on the theme of Amateur Radio.

In the Amateur Radio context, the programme proved to have been very well put together, with all aspects of current amateur activity covered—AM Phone, SSB, CW, SS/TV, VHF, mobile, Oscar VI working, the mystique of the QSL card and what it represents, the international aspect of Amateur Radio, RTTY operation, radio astronomy in the amateur field, also a brief description of the early amateur work on transistory, using home-made transistors powered by solar cells.

The speakers actually identified were G2BVN, G2DX, G3HMO, G5CS and G6DW—there were others, call signs not mentioned, including three enthusiastic VI Form boys from Harrow School, who had evidently done their home-work and between them knew a good deal about Amateur Radio as it is practised today.

Mercifully, from the producing side we were spared the usual idiot-talk about "hams" and fatuous comments on our jargon, nor was there any propaganda guff.

This half-hour BBC programme was in every way a most excellent treatment of the subject of Amateur Radio—it caught exactly the interest and feeling of the average intelligent radio amateur and where his interests lie over the very wide field of radio activity.

The production was of such quality that this is the sort of BBC programme that ought to go out on one of the Home Service channels, with a listing in the "Radio Times". As it is, it could have been heard by very few in the U.K. because it was transmitted on the Overseas Service at an awkward hour.

This is a pity. It is the first time in 25 years that we have been able to congratulate the BBC on their treatment of the Amateur Radio theme.

*Austin Forsyth
G6FO*

WORLD-WIDE COMMUNICATION

COMMUNICATION and DX NEWS

F. P. Essery, G3KFE

LAST month the piece was abbreviated by reason of the rail chaos; this time it is being put together at breakneck pace to beat the production hold caused by the Easter Holiday break—always a menace to those who have deadlines to meet. However, the meantime has been quite eventful, one way and another. Your conductor has had the pleasure of getting the rig fired up on, say, Twenty, after an evening meal, and *not* having the band go out while the rig was warming-up. Earlier this week, a trip to the New Forest was almost like being in high summer, albeit as this is being written snow lies thick on the apple-blossom buds. Eventful, indeed!

Interesting

Those who have seen the January issue of the American *QST* will have no doubt read the page of

IARU news therein. A letter from no less than 46 Russian signatories, endorsed by their national organisation, comes out in protest against the divisive tactics adopted by K6BX of the CHC, against IARU. It is of interest to notice that these 46 Russian operators are almost all well-known and respected DX amateurs, and that they were all members of CHC themselves. They realise that IARU exists for the benefit of radio amateurs of all countries, whatever K6BX and his organisation may think; and what is more they raised their protest in the only civilised way, by writing a letter for publication in the IARU page of *QST* (the ARRL magazine), and by withdrawing *en bloc* from CHC. Good for them! We might comment, that this could well serve as a lesson in the mechanics of protest for some of our long-haired youth of today in the West.

Perhaps we should add that as far as your conductor knows, nobody in the U.K. has done more than hear K6BX; the G's in general are far too sensible to regard CHC as other than a group of chaps interested in collecting certificates. (We withdrew support from K6BX and his concept of CHC about 12 years ago.—*Editor.*)

Top Band

Let us continue by looking first at One-Sixty. Just in time for this, we have a report covering the Trans-Equatorial summer tests. This year, stations in CP, LU, YV, ZS, 9J2, ZP, VP8, CX and PY are known to be intending to be active, and there is always the odd new one liable to pop up. The Tests this year will be timed for 0001-0030 GMT—Europeans and Asians to be on 1825-1830 kHz, the rest, including W/VE, on 1800-1807 kHz, saving only the ZS1MH station which is to use 1935 kHz. It is suggested that with the likelihood of Asians, for instance, appearing, U.K. operators should check their own frequencies plus-or-minus 2 kHz, as well as the LF end of the band. Procedure: Stations North of the Equator take the calling period for the first 2½ minutes, listen for the second 2½ minutes, *et seq*; stations South of the Equator go in reverse order, of course. As there are usually one or two very good nights, with signals a couple of S-points better than normal, it is more than ever important that an operator regarding himself as in the "tiddler category" should at least check the band every night during the month of June, and maybe even the first week of July, to be sure of hitting the good nights when they could have a chance of working some real DX.

ZS6ZE (Pretoria) who used to write in as G3LZQ, has come back to life; John found the Top Band listening a bit of a chore—as he puts it "DHJ 589 at times, but sustained listening is not on when noise can hit S9 plus 40 on the



G4AVT, Vincent Evans, of Beacon View, Parbold Hill, Wigan, Lancs. is one of those who first came to Amateur Radio in his middle 50's, never having had any professional connection with radio or electronics—he studied for the R.A.E. and Morse Test from the ground up, becoming licensed in January last year, on his second attempt at the Morse. Moreover, he worked largely on his own, from the books that we recommend for all beginners. These details are mentioned by G4AVT because he thinks they might encourage others of his sort of age to become licensed.

75A2 S-meter!" However, they are now in their autumn when conditions should improve, which means that both ZS1MH and ZS6ZE will be in there slogging on 1930-1935 kHz, monitoring 1805 and 1825-1830 kHz. John proposes Friday and Saturday evenings, 2000-2200z.

W4WFL/1 (Farmington, Conn.) adds some more to the known WAC holders on Top Band—the latest issues are to OL1AOH, W4BRB, K4BHG, WB4JFK and W4QCW. Incidentally, if you hear G5AYL belting away in the next few days, give him a shout—it'll be W4WFL on his European holiday.

G3DCS (Ipswich) in the course of a report covering all bands, has a succinct comment on 160 metres—*nil!* And, we might add, that goes for your conductor as well, saving that he managed a contact with G4BMO (Mouldsworth) after trying it previously on Forty with no joy—David's CW came through nice and steadily over the QRM and sounded as though with a few years of practice he'll be as good as any, even though his phone was just buried under the crud.

Eighty Metres

Since G2HLU (Reading) last wrote in he has abandoned his ideas about a beam, after considering how to get it up—and down!—in his restricted space. Instead, he has replaced the traps in his old W3DZZ inverted-Vee aerial by a brace of loading coils and used the rest of the savings from not having a beam by lashing out on a K.W. Vespa and E-Zee Match. It is, he remarks, very nice to go on CW and not have a "drifty" signal. He hasn't tried the Tx on SSB as yet. During the CW leg of the ARRL Contest, G2HLU found it easier to work W's on Eighty than on Forty, with strings of them booked in for no more than a QRZ? after each contact.

G3ZPW (Wombourne) does have a beam on Eighty. Mike worked lots of States and Caribbean stuff, including KP4AN, VP2EQ, HR1RF (who was booming in like a local). Off the *back* of the beam, he raised such as ZB2, OD5, YA1's, CN8's, 3A0FY/M and JY9GR. VP2EQ, FG7XL, FM7WN and HR1RF have all indicated that they intend to use 80m. more than they have done in the past. If we look at the

period between 2200 and 0200z, we find among many in the G3ZPW log, such calls as FG7XL, FM7WN, HK0BKX, HK3AVK, PJ2CW, PJ8GQN, PJ7LAR, PZ1CU, assorted VP2's, VP1JB, VP1BH, VP2ND, VP9's, KP4AN, KV4FC, KG4's, KZ5JF, 6Y5's, 8P6's, 8R1G, 9Y4AR, 3E1XIS, DL1DH/MM (in the Panama Canal), KP4ARW/HI8, WA2COJ/HH4, ZF1GC, YV's. PY's, and all W call areas saving W7—W6/s being heard between 0100 and 0200. Quite a collection for one log on Eighty!

An interesting story from G3YRR (Grimby) who relates how he gave a talk on Amateur Radio to a local Association. One chap was inspired to have a go, and is now G4BTL, a retired engineer who just got stuck into the swotting; he is nearing 70 years of age, and now is on Top Band and Eighty, at least till he solves his aerial problems. To G4BTL go congratulations, and the hope that others who have felt themselves too old to get a call will likewise be sensible enough to have a go—nothing venture, nothing gain!

Conditions, reckons G3RFG (Henlow) where rather interesting last month, with much QSB and QRN, but unexpected QSO's nonetheless. For Eighty, Stan used CW, as always, to connect with K3NPV, KV4HW, OY7BD, VE3UEM, W3EPR, W4MOX, W8JW and YV5CKR, on his multi-band, home-built vertical aerial.

This is perhaps the first time we have had a multi-band report covering mainly RTTY—G3DCS offers RTTY contacts with G's, F5XM, I5MPK, ON4CY, ON4WG, OK2BJT, DL8VX and OZ4FF. Enver uses 640 and 820 Hz tones for narrow shift, and 650/1500 Hz for the standard shift, frequencies which fall nicely into the pass-band of his Yaesu, the 650 Hz one coming bang in the centre of the "600 Hz" CW filter—it assists reception considerably, but does complicate transmission a wee bit.

Forty Metres

Weather conditions which failed to affect your scribe's 28g. "invisible aerial" managed to fell two of the four aerials at G3VLX (Chislehurst)



G2HR, Eric Johnson, 35A Woodland Road, North Chingford, London, E.4, was first licensed in 1929. His station description (as it was at that time) appeared in our "Other Man's Station" series during 1957. Sixteen years later he is still at it, though now with commercial gear of the K.W. marque. Having retired, G2HR is very much involved with his local group, the Silverthorn Radio Club (G3SRA) with which he has been actively associated for many years.

although, luckily, the TA-33 was not one of the casualties. Deryck, in addition to his TA33, has an inverted-Vee on 7 MHz, a trap dipole and a long-wire for Top Band—or, rather, did have! However, as far as Forty was concerned, VK3MR's rhombics were eclipsed by the contact with VK7GK, who has a Cubical Quad for 40 metres!

Forty CW yielded plenty of contacts to ZS6ZE, with G3KKP, G3KDB, G2HDU, DL1RK, DL8MM, DK4TP, I1DSR, OH2LA, SM6CTQ—but *not* G3KFE, despite repeated calls! On SSB one notices such as DJ2YA, G4ANT, HA4KYB and OZ5KF, so obviously John out there is getting through to Europe pretty consistently. On a different tack he relates the travellings of his log for the 1972 "CQ WW Phone Contest"—from ZS to U.K., then U.K. to JA and return, U.K. to ZS, and finally being posted off to the States! A total of nearly 40,000 miles, and 96 hours of concentrated paperwork to get the entry off in time, for a claimed score of 1.68 million points from 1869 QSO's in 30 hours of operating. No wonder John needed six weeks rest back home after that little lot!

G2NJ (Peterborough) has quite a packet of assorted news, much of it germane to Forty. G3ZXH, who has been worked by many as /MM, writes to say he has now obtained permission to use GM3ZXH/MM—he of course comes from Inverness. His late buddy, G3TZL/MM told G2NJ that he would be flying to Japan to join a brand-new ship. G3RSP/MM was heard back in February, in the English Channel and bound for Rotterdam. Another interesting call Nick has worked recently was GI3WWM/OE on CW, near Vienna, while G3MCA was running two watts CC, with a *one-tube regen receiver!* What's maybe more to the point, it was a good solid contact both ways. More contacts with ON4TA are noted, one of them lasting a full half-hour with no more than 700 milliwatts at ON4TA; André is very busy at the moment modifying his gear for Seventycems and two metres.

Four 40m. CW contacts are noted in W6AM's transcript of the log for the period under review, namely with CT1LN and KX6BB (both around 0700z) JD1AHC at 0849 and

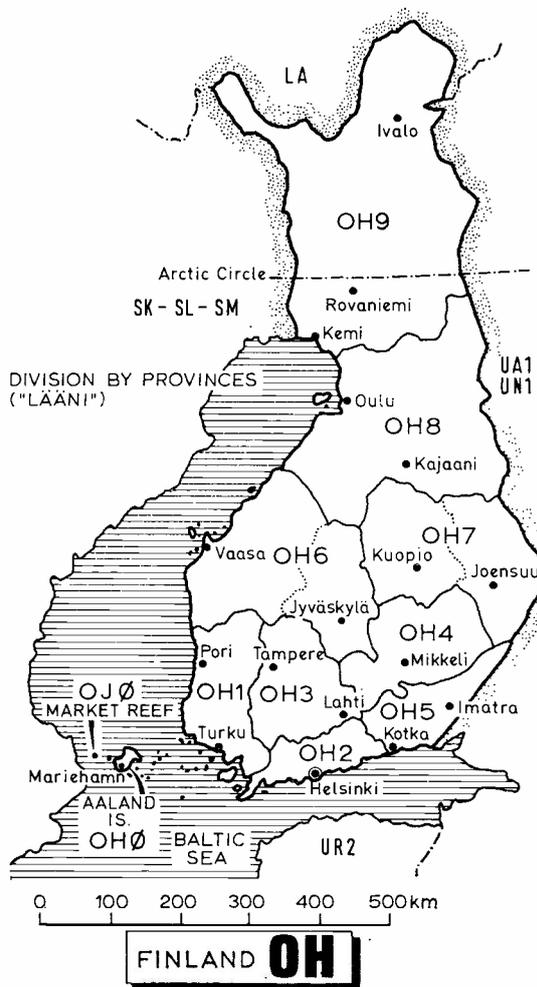
C21DR at 0900. As usual, the report Don got from those rhombics of his was 599—he hardly ever gets any other report, saving on Eighty, where the rhombics are probably not so gainy.

G2HLU found particular pleasure in some contacts he made, with ZL4BO, VK3MR and VK3XB for his first-ever QSO's with Oceania on that band.

On to G3RFG, who seems to have put in a fair amount of time on Forty, to work CW with KV4CI, PY1DUB, PY2FQP, PY2CJW, VE8DJ, VK3MR, VK7GK, WA3HPS/2, W9LVH, YV5DMM

and ZL1BHQ.

To bring his record a bit more up-to-date, G8HX (Mansfield) sends in one of his interesting "specials," Frank has taken down the 7 MHz dipole, and replaced it with a 136-foot wire, with the help of a certain amount of bending; it is cut for two half-waves on Forty, and works as well as the dipole—but by the fact of end-feeding it, Frank can now operate other bands as well if the mood takes him. On the station side, the SB-301 has replaced the AR-88, and is found to be very satisfactory, particularly since a 30 pF capacitor was floated



The provincial callsign areas for OH, Finland—from the "IARU Region I News", by G2BVN. Now you know where Market Reef and those blessed Aaland Islands are!

across the BFO crystal to bring the beat note down in frequency to 400 Hz. With all this, Frank doesn't mention much in the way of stations worked, apart from OD5EJ and 4W1AE, but doubtless more are booked in by now.

Ten Metres

Yes, despite dire predictions there is still the odd happening on the band. The CW of G3DCS was tried out on Ten, and managed a couple of East-West contacts with W4KFC and W4OZF. During five months of operating, ZS6ZE has managed a total of 1400 QSL's on Ten, working 280 different prefixes, in 86 countries. He adds: "It's a patchy band, but I do wish more people would come on and *use* it rather than just listen."

Another one who echoes these sentiments is G3USF (Keele) who found it an undistinguished month, yet with few blank days. Martin bends his conscience a bit, by having a set running on his office desk, but not *operating* in "firm's time!" Openings have occurred to West Africa, Eastern South America and the U.S., and there also have been Auroral goings-on, notably on April 1 when during the evening, between 1600 and 1815, most of Europe was there with the characteristic buzz-saw note and again between 2158 and 2356z—but, and here is the interesting propagation problem, in the middle of all the EU's, came W9DLZ at 2159z and W3BQP at 2240, both with weak but *non-auroral* signals. For G3USF, regulars on the 10-metre band are still CR6, ZS, 9J, 4X4, LU and PY, but in addition the following are noted—A4FD, A2CCY, A2CEW, CX6AM, CX8BZ, EP2MD, MP4TEE, ST2SA, VP2VAM, VP8KF, VQ9R, TT8AC, OD5CS, TJ1BB, 3B8CV, 4W1AF, 7Q7RM, 9L1MF and 9Y4EH.

G3VLX had one 10-metre contact, with 9J2RC. G3KFE managed to look at all the times when the band was *not* open!

Comments

G3UZ (Goring-by Sea) has a light-hearted description of what he describes as "local QRM," when his wife discovers he is no longer wielding the paint-brush but has crept off to work some DX! On a different tack, George wonders what would



JA4FWM, Akio Takahashi, is at 885 Kojima, Kurashiki, Okayama, in the southern part of Japan. He is a keen DX man and his layout is a good example of a modern Amateur Radio station. Outside, he has a 5-element beam for 20 metres.

happen if, say, a UA1 crept into a list of DX from the U.K. It all depends on what you mean by DX (frequency, power and time) and that, when all's said and done is an individual thing which varies with time. For a new chap who had never been on before UA1 may well represent DX—a couple of weeks later it is nothing to mention and three months later still it has fallen to the level of QRM to the same operator who first thought it DX! Your conductor tends to try and stabilise his own definition in terms of "anything not worked before, or worked but no card inwards" but for the purposes of CDXN, defines it as "anything about which the writer of the particular letter feels at all cock-a-hoop."

G6XJ, on his trip to New Zealand, struck the lucky dip when he discovered the R/O on board was G3UOF/ALØN, so between them they had fun on Fifteen until Arthur landed.

By way of W6AM comes a copy of the South Western Division *Bulletin*, with some interesting facts on licensing over there; looking at the list one notes a *downward* trend in the numbers of Novice, Technician, Conditional, and General licensees, with an upswing in the Advanced

and Extra classes, albeit not enough to cancel the overall picture of a fall in numbers.

Piracy next: G3HQU has a pest using his call on Eighty AM—the real one is only to be heard using SSB. Anyone involved with this AM pirate, kindly expose him.

G3ZZR is also being pirated—his shadow signs GM3ZZR/A or GM3ZZR/M, and cards have been received which indicates he has been active on Eighty and Twenty, giving location as Dundee, and names Allan, Archie, or Bob. Anyone who worked this one and sent a card obviously wasted his time; but if heard, please nail him for a pirate.

A letter from G3CNA says he has been asked by F3RW in Nimes to advise that cards to F3RW from U.K. should be sent *direct*, the address being Jean Bessone, 4 Rue Ecole-Vieille, Nimes, France.

Talking of QSL addresses, we have the odd one or two to offer. G3NOF first: He gives VQ9D, Box 191, Mahé; A6XF (was MP4TEE) via G3LQP; ZD9GC, to ZS6XO; and YJ8XX, to ZL1AMO. To this W4WFL/1 adds that VS5RL cards should go to his home call, WB5HJZ, QTHR. A new Persian station is on the air, EP2EJ, whose address for QSL's

is M. Sgt. Eber F Diehl, EP2EJ /W7AMM, Box R-136, Page, Communications Engineers, APO New York 09205.

G3UOF/MM writes from the Liberian registered cruise ship *Fairstar* (5MXH is her own callsign) at Fremantle, Australia, and mentions his passenger G6XJ, who landed OK at Wellington, New Zealand. Their contacts were all made using Mike's "at sea" call of ELØN/MM. G3VCH, says Mike, is one of the four R/O's on board *Northern Star* (GHZB) at present cruising between VK/ZL and the Pacific islands, but although he has an FT-101, he has no /MM licence; it is understood G3VCH is looking into the possibility of an HBØ maritime mobile ticket to get round this problem. As far as G3UOF is concerned, he arrives back in U.K. at about the time this is being written, for five days docking, and then is off again for ten weeks at 18 knots round the world via ZS / VK6 / VK5 / VK3 / VK2-ZL / FO8 / KZ5 / PJ / CT2 / CT1 / PA/G! Lucky chap!

BRIEF DX DATA

- 9M8OEA } If needing a card from
9M8SPD } either of these, re-apply to
C. E. Schaub, Regional
Relay Facility, PSC No. 2,
Box 19047, A.P.O. San
Francisco, California,
96274.
- TY1AAA Try 21265 or 21172 kHz;
has been heard around
1130 and 1545z.
- Zone 23 UAØYAE and UAØYT,
the former seems to stick to
CW but Vlad has been
worked 21031 kHz, 0915,
14199 SSB at 1355z.
- XF4 XF4FFC said conditions
were very poor and no
EU stations were worked.
However, they did work
another Revillagigedo
Island, this one in Alaska!
- 3B6CF 14232 kHz, and other
frequencies. Works to a
list taken the previous
day by A6XF, *ex-*
MP4TEE, on 14180 kHz
at 1300z. Agalega Is.
- 419, 4L3 4J9B was on from Lenin-
grad, 4L3Z from UF6-
land. QSL both *via* Box
88, Moscow.

Reporting the HF Bands

Reference that comment about VE1LG last time—we now have it that Fred is in fact 98 in September, is in good health, walking a mile a day or more for the exercise, and operating actively on 80 and 40 metres. Fred would like to hear from any oldster in the U.K. who would care to write—he obviously likes plenty to keep him occupied. He is *QTHR*.

Now Twenty

Let G3RFG kick off with his CW list: HS3AHL, JA2YC, K3ORS, VK2BET, VK2OO, VP9DR, W1VJ, W2ZT, WA3EFH, W4IJ, W7AUS, W8LY and WAØGVO/5.

As always, quite a lot of W6AM's DX is on Twenty, SSB giving him KA1DX (Marcus), ZVØWH, 4X25NJ, plus CW to 4X25NJ also.

Now ZS6ZE, who managed CW with KH6CA and C29ED, while SSB came up with A51PN, DU1JMG, no less than 66 JA's, JD1YAA (Marcus), KA1CQ (Iwojima), KA1DX, UDS, UG6, ZD7SD, 3B6CF and 4S7AB.

G3VLX complains his list is too long—never mind, we sort 'em out! Deryck's extra bit of power and the TA-33 have made quite a bit of difference to his average report, one notices. There were JX3P, OD5HM, 9Y4EA, 4J9B, HS4AGZ, VQ9R, 9H5D, VP9GO, EP2DO, HR3AC, VP2KH, VP2VI/MM and XE1AAK, all found on SSB.

G3UZ heard much DX popping up from the murk but failing to respond to his calls—'twas ever thus! However, the Swan 350 and dipole, plus key, accounted for UD6's, UL7's, UK7, UI8BL, UV9PS, UW9TK, UA9WU, UA9XAI, UA9FER, UW9TH, other UA9's, VO1JR, VK2MT, VP7BA, JH2FSC, OD5LX, PY2BAJ, FM7AD, KP4DPN, PY7ASV, YV5BPI, FY7AI, SVØWTT and UWØAY for the month under review (plus another crop of equal excellence for the previous month, which was caught in the mail chaos).

G3ZPF (Dudley) offers the cure

for G3KFE's gremlin of changing the low-pass filter. Possible, but we did more good by disentangling the 14-AVQ radials from the Top-Band end-fed after some kind soul had dropped a box of rubbish on the lower end of a halyard and *didn't* mention it. As to David's DX: He worked (all SSB), including W1, W2, W3, W4, W8, EA8IT, VU2AAA, UØ5OAK, 4L3Z, 4J9B, UA9BB, FL8OM, VK6DR, VS6GA (who is G8ATV in disguise), OHØNJ, VP9DL, UK9FFE, VE8ML, MP4TEE and, for comic relief, a "ZA4SMN" who wanted a QSL via I4SMN. Makes a change from "via the Albanian Bureau!"

Twenty for G3DCS was split between CW and RTTY. In the former mode, lots of W's were tackled, and on RTTY there were I6VGA, I5WT, HA25KDQ, IT9ZWS, W3DJZ and W4CQI, which sounds like a good start using radio-teleprinter.

G3NOF (Yeovil) returns to the scene after an absence caused by troubles in the aerial and linear-amplifier departments. The only band this time on which he feels able to comment is Twenty, for which his string of gotaways is as long as the list of worked-ones. The latter included A6XF, VQ9D, VS6GA, XW8EO, 9V1QG and some VK's.

Now Fifteen

Like Twenty, this band has felt the benefit of the Spring with longer "opening hours" enabling some of us to get in a bit of DX after tea-time

G3DCS kept his RTTY out of use on Fifteen, and stuck to the key, with which, in his limited time on the air, he managed a shoal of W's and PJ9JT.

G3ZPF was rather disappointed to find, having soldiered through his exams on the promise of DX to come, that when he did get back, everything was in the grip of an SID—but David offers W1, W2, W3, W4, W8, W9, HR3AC, EA8IS, 8R1UGF,

EP2RB, EP2SP, EF2GW, VQ9HCS, XX7IK and VP2MYA.

ZS6ZE has quite a list, including SSB with DU1AMA, EA8CN, EP's, 47 G's, 54 JA's, VP2MYA, VS6EN, YA1AH, ZD8RW, 4W1AF, 9M2IR, 9Y4T and KA1CQ.

For G3VLX, activity seems to have been about equally divided between 14 and 21 MHz, with the latter showing SSB contacts with VQ9W, ZF1JA, VS6CY, CN8BF, KP4BCL, HC1RJ, CQ6LF, VP2MYA, CP1JV, OD5BA, 5N2ESH, 5N2ABG, ZE1CE and CP5BP.

Quite the longest column in the G3RFG offering is devoted to Fifteen, Stan apparently having

quite deserted Ten of late. CW is the mode, and the result CX5CB, K2JKJ, LU1HAC, LU6EF, PY1BTC, PY2EWL, PY4AHH, PY7AES, PY7BFD, VE3EZH, VE3GGO, VE7CE, VK4YP and all W call areas save W5 and W6.

On the QRP front, G2NJ reports G3KPT's couple of watts as having rung the bell at UA9MEW, Omsk, and also working over the Pond to U.S.A. no less than ten times. G2NJ himself struck an odd one when he raised "SQ5Z," on CW, and was told the station was in connection with the reconstruction of the old Royal Castle in Warsaw.

A couple of new ones came the

way of G2HLU, in the form of EP2BQ and ZD8RR, the former sending his card through so fast that it arrived before Harold has sent off his'n!

Terminus

Reached once again, with assistance from all sources of news, to whom our thanks are due. For the next time the deadline is **May 8** latest, addressed as always, "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

Deadline dates for months following are *June 12*, *July 10* and *August 14*. Please post (in the U.K.) at least a couple of days ahead of time.

ISRAELI LICENSING AUTHORITY

Holders of U.K. amateur licences wishing to operate from Israel, 4X4/4Z4, whether on holiday or a working visit, can get full details of the requirements on application to: Ministry of Communications, Engineering Services, P.O. Box 29107, Tel-Aviv, Israel. We understand that licences are granted quite freely, subject to certain conditions.

CHINESE AMATEUR CALLSIGNS

From G2BVN's *Region I News* for April we get it that if and when amateur licences are in general issue to Chinese nationals, the form of the callsign will be B followed by a letter denoting a geographical area, then a single digit and after that an A, or A with one or two suffix letters, e.g., a Chinese amateur station in the Shanghai area could be signing BH2A, or if from Hankow BJ1AB, while a Sinkiang AT-station might come up as, say, BU3ABC. There are 17 prefix letters

allotted. So, when the bamboo curtain does go up (the chinks are already beginning to show) and amateur licences become freely available, the Chinese call book will be quite a thing. Though at the moment of writing we have no further positive information, callsigns heard or worked in the form shown here could well be genuine.

U.K. J-O-T-A REPORT

The final report on the last Jamboree-on-The-Air, the Scout international Amateur Radio event which took place during October 21-22, 1972, shows that about 300 U.K. stations took an active part, working between them nearly 500 overseas Scout stations in 64 countries—figures well up on the 1971 J-O-T-A. The total Scout participation in the U.K. (meaning operators and visitors to their stations) is estimated at 12,000-15,000 Scouts and Guides. Leslie Mitchell, G3BHK, the organiser for the British Isles, has circulated a most interesting and well-written report on the event.



Scene in the main hall during the White Rose Rally on April 1. The attendance and the trade support were such that the overflow of dealers had to go into separate rooms.

KNOWING ABOUT SS/TV

DISCUSSING THE FUNDAMENTALS AND EQUIPMENT REQUIRED

D. J. STANDEN (G4BSU)

ANYONE who has tuned across 20m. will have heard a strange warbling sound around 14.230 MHz. Many will have passed this off as RTTY, or some kind of QRM, but what has been heard is the transmission of pictures across the world, by amateurs equipped for slow scan television.

SS/TV is rapidly gaining in popularity on our HF bands, but not yet on VHF. The main increase in stations seems to be from Italy and the U.S., with very few G's to be heard being worked. Why there should be such little interest on the part of British amateurs and SWL's may be partly explained by the lack of much information on the subject, and the popular misconception that because it is "television" it must be complicated and very expensive—considering the high cost of commercial equipment for SS/TV (over £500) advertised in amateur magazines, this can easily be understood.

This article aims to show that SS/TV need be neither difficult nor expensive.

Principles

The basic principle of SS/TV is the conversion of black-to-white picture information into audio which, with its sync. pulses, are fed into the microphone socket of an SSB transmitter, resulting in Single Sideband Frequency Modulated Video, or F5j. A frequency of 1500 Hz represents black and 2300 Hz white, intermediate shades of grey being obtained by intermediate frequencies. Tones of 1200 Hz (ultra-black) are used to transmit the line and frame sync. pulses. See Fig. 1. The bandwidth occupied by a signal is 1.2-5 kHz.

Sweep rates are line $16\frac{1}{2} \pm 1$ Hz and frame between 6.79 and 8.68 secs., which results in a 128 ± 8 line frame. It will be seen that at approximately $7\frac{1}{2}$ secs. per picture, a long-persistence cathode ray tube is required, and that only static shots can be transmitted, for example slides of oneself, XYL, or QTH, also captions made up by *Letterset*, and drawings in Indian ink.

The Monitor

The monitor can be a specially constructed unit or an oscilloscope modified. Fig. 2 shows the monitor in block diagram. The limiter smooths out variations in the amplitude of the signal which is then passed to the discriminator, which is a simple audio filter consisting of three toroids and associated capacitors to separate the sync. pulses (1200 Hz) from video information (1500 Hz-2300 Hz); these are detected and amplified in a two-transistor circuit, and applied to the grid of the CRT.

The sync. pulses from the discriminator are passed to a sync. detector and separator, which sorts out the

line sync. pulse of 5 milliseconds from the frame pulse of 30 milliseconds, these then being applied to a trigger circuit and sawtooth generator and thence to the scan coils.

EHT is derived from a standard television line output transformer with associated oscillator and output valve. Line, frame, contrast and brightness controls are brought out to the front panel. (A simple but excellent monitor circuit is published in a booklet entitled *Slow Scan Television*, by G3RHI, and obtainable from BATC at 25p.).

The writer has built this equipment in the course of two evenings, and would consider it suitable for a beginner to complete. The circuits lend themselves well to be copied on to printed circuit board, and end connectors were used to enable the boards to be removed quickly for modifications.

Apart from a set of scan coils and a line output transformer, both salvaged from an old television receiver, all components were purchased new and the total cost of the monitor just reached £10. This cost could be reduced by going through the junk box or stripping an old TV Rx, as all the components are the more common of the preferred values, while the transistors, mainly BC109 and BC113's, can be obtained at about 10p each, and some cheap bulk unmarked manufacturer's surplus were also found to work. The tube, which must have a P7 phosphor (long-persistence) was £2 new; this was a 5in. tube, the 5FP7.

Anyone wishing to carry out an oscilloscope modification will find a circuit in the 1972 ARRL *Radio Amateur's Handbook*, which consists of 9 transistors. The main problem with this project is to find an equivalent electrostatic cathode ray tube with a P7 phosphor—such a tube could be more expensive than the total cost of the previously mentioned monitor.

Tape Recorder

Having built the monitor and received pictures it will soon be found useful to retain some off-the-air recordings of interesting video QSO's. All that is required is an audio tape recorder as we are dealing with audio frequencies. The faster tape speeds will result in better reproduction. The tape recorder in use at G4BSU is a cheap cassette type with professional tape of the extended frequency cobalt energized type (EFR90). Many of the recordings made are of very good quality, and apart from interest value, are of great use in making adjustments or modifications to the monitor in the absence of live signals. The tape recorder also becomes of use when we come to transmission. The audio frequencies from the camera modulator can be recorded, and a pre-recorded programme for transmission built up from various slides, captions and drawings.

Once the monitor is built then it is possible to enlist the help of an SS/TV station who has a camera unit, and who might put on tape a programme and CQ call, etc., which can be used live in SS/TV QSO until such time as a camera unit can be made.

The Camera

There are three methods of camera construction. The most expensive would be to use a slow-scan Vidicon tube; this is a special vidicon containing a shutter,

which exposes the scene briefly and so freezes all motion and then scans the latent image. Slow-scan vidicons have uses in satellites, and are both rare and very expensive to obtain.

Another system involves the use of fast-scan 625-line equipment, and involves altering the plane of the camera and fast-scan monitor scan coils, sampling for example every 5th line; circuits for sampling units are available, and references are given at the end of the article.

However, the simplest and cheapest system, costing less than £10, is the flying spot scanner. With reference to Fig. 3, a sync. pulse generator involving five IC's and locked to 50 Hz mains will produce the sync. pulses which are applied to the monitor time bases to make a raster; they also trigger a multi-vibrator to produce 1200 Hz audio.

The raster on the monitor is then covered with transparent material on which simple captions have been drawn. As the spot scans the tube its light passes through the transparency, and light output varies according to the density of the transparency—black passes no light, then goes through grey to clear (white) when all the light is passed. A photomultiplier tube is placed about 12 inches from the monitor tube and this converts the variations in light intensity into voltage variations, which are also applied to the multi-vibrator, set up to produce between 1500 Hz and 2300 Hz, depending on the voltage swing.

The transparency is scanned every $7\frac{1}{2}$ seconds approximately (1 frame) the spot being returned to the start of the scan with each frame pulse, also transmitted as are the lines pulses, thus the distant monitor is kept in step with the transmitter.

If suitable optics are available, the raster can be made to scan through a 35 mm. transparency and reduced to a focal point, where a photo-transistor can be placed with its output applied to the multi-vibrator, thus dispensing with a photomultiplier tube and its HT supply. This is where there is plenty of scope for experiment, and readers could no doubt devise systems of their own.

General

With the simple equipment outlined here remarkable results have been obtained, quality of pictures in many cases being excellent, with sharp-contrast callsigns and equipment details; still photographs of a foreign amateur's QTH on which could be seen his antenna on the roof and its elements counted; and similar high detail pictures have been received. Not all pictures are good—quite a few are very poor, the quality depending on the signal strength and the level of QRM at a vulnerable frequency in the 20-metre band.

Pictures have been received *via* Oscar, colour has been transmitted and received (by the use of colour filters at each end) each of the three colour frames being photographed separately, the end result being a colour photograph.

Those are some of the possibilities. There are many others with regard to equipment—for example, AGC, continuous running timebases, better filter response, all enabling weaker signals to be received in more QRM, also the use of more IC's to reduce equipment size.

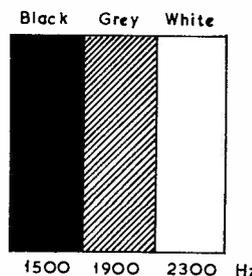


Fig. 1

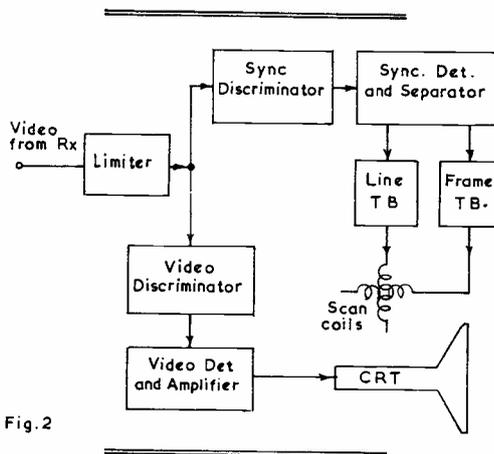


Fig. 2

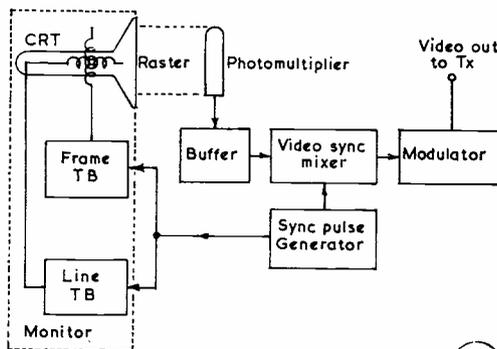


Fig. 3

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Licence Requirements

To transmit SS/TV application must be made to the MPT detailing the standards to be used, and the frequencies; the applicant must also hold a valid U.K. amateur Licence A (for HF) or B (for VHF).

Permission to operate is free. A Class-A holder is allowed to operate on the 7, 14, 21, 28, and 144 MHz bands, a Class-B licensee is allowed 144-146 MHz, and although no particular mode is specified, sideband transmission is normally used on the HF bands. In the writer's case no objection came from the MPT

when application was made also to use an AM transmitter on two metres.

Standards

The frequencies used for SS/TV are around 14.230, 21.340 and 28.680 MHz.

The U.K. standards are: Number of lines per frame, 128 ± 8 ; Aspect ratio, 1 : 1; Horizontal frequency, $16\frac{2}{3} \pm 1$ Hz; Vertical frequency, 7.68 secs. (limits 6.79—8.68 secs.) Horizontal sync. pulse, 5 milliseconds; Vertical sync. pulse, 30 milliseconds; FM subcarrier sync. = 1200 Hz; Black = 1500 Hz; White = 2300 Hz. Sync. must be locked to 50-cycle mains.

Future

The SS/TV movement is gaining some impetus, with plenty of pioneering still to be done, and so giving a new field of experiment in our HF bands. Where Sideband was in the fifties, SS/TV is today—it is quite legal now

to transmit video on one sideband and speech on the other.

In not too long we may see the transceiver with a video input/output/upper/lower sideband facility and an additional unit for a camera monitor about the size of a loudspeaker unit, with the exchange of pictures as commonplace as is the discussion about weather today. Two metres is wide open for G8/3's to experiment with SS/TV—the writer knows of none who have accepted the challenge.

Editorial Note: For more information about SS/TV and references to available material, the reader is advised to consult the BATC booklet *Slow Scan Television*, by B. J. Arnold, G3RHI, obtainable at 28p post free from BATC Sales, Kyrles Cross, Peterstow, Ross-on-Wye, Herefordshire. Though not in itself a complete treatise, it does open up the subject for those who might like to try SS/TV on the HF bands.

BOOK REVIEW — WIRE ANTENNAS

TEACHERS of R.A.E. classes will all tell you of the glazed look in the eyes of their students after ten minutes of the lecture on Aerials. If you are one of those glassy-eyed ones, this book, *Wire Antennas* is for you. There is a whole lot of material in the earlier chapters, to explain simply what the R.A.E. lecturer had to cover in a few minutes; these chapters put it all in a beautifully easy manner. Orr, W6SAI, the author of this volume—who is a well-known writer who has specialised in the Amateur Radio field—then goes on to discuss the nature of the earth system, and how it can be improved, to dipoles, and how they should be made, to the ground-plane aerial, G3RFG's multi-band version of the vertical, and then on to several versions of the "invisible aerial" for the chap who isn't allowed any form of aerial. Oddly enough, your reviewer has used the "invisible aerial" concept for years now, to get a better skywire up than the size of his own plot allows, and he is well able to say that this chap Orr talks sense; and what is maybe even more important, if you have aerial problems, he shows possible ways out, and encourages the reader to come up with his own ideas, along sensible lines.

Some amateurs will object to all this that they "just aren't practical enough" to do the things the book suggests by way of home-built aerials. Not so! The author obviously has met people who just don't know, for example how to put a coax plug on a cable properly, or how to strip a cable ready for terminating at the centre of a dipole, or whether there might be some "gunge" which will stop the weather from ruining one's nice new aerial in a few weeks—even whether to use surplus coax cable or buy new, and exactly why.

This reviewer has a whole shelf of books on aerials, and he will say that, for the price of £1.72, he only wishes he had had it earlier, to show him the way—now he knows a bit about aerials, he still regards this book as a good buy for himself, with a very strong recommendation to anyone who is interested in the vital part

of his station but who doubts his own knowledge and ability not only to buy it but also to sit down and read it carefully. In terms of station operation, in the long term, it will surely improve results.

Wire Antennas, price £1.72, from Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H 0HF.

E.P.E.

1973 ARRL HANDBOOK

The latest (50th) edition of this indispensable radio amateur manual—for so many years recognised as the "bible" in the Amateur Radio field—should be available from us shortly after this appears in print. We already hold many orders and it is much to be regretted that for the first time in the 16 years we have been handling the ARRL's famous *Radio Amateur's Handbook* it has not been in stock by early March. Apparently, there has been some sort of production hold-up at the American end. The price of the 1973 *Radio Amateur's Handbook* is £2.85 in limp cover, or £3.65 in hard-back ("library edition"), prices post free. Orders to Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H 0HF.

MATERIAL FOR PUBLICATION

We are always glad to see material—in the way of technical articles and similar matter—for possible publication, for which we pay at good rates on appearance. Articles should be set out in the form outlined under "Authors' Mss.", to be found on the Contents page of any issue.

Photographs of Amateur Radio interest are constantly required. They should be good quality black-and-white prints, about post-card size, with details on a separate sheet.

All such material should be addressed: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

ANTENNA NOISE BRIDGE

CONSTRUCTED FROM A
COMMERCIAL KIT

G. DENBY (G3FCW)

A SMALL box with an impressive sounding name. But what can it do? This question has been put to the writer on several occasions, and the answer is that this bridge takes over where the grid-dip oscillator and SWR bridge leave off.

Applications

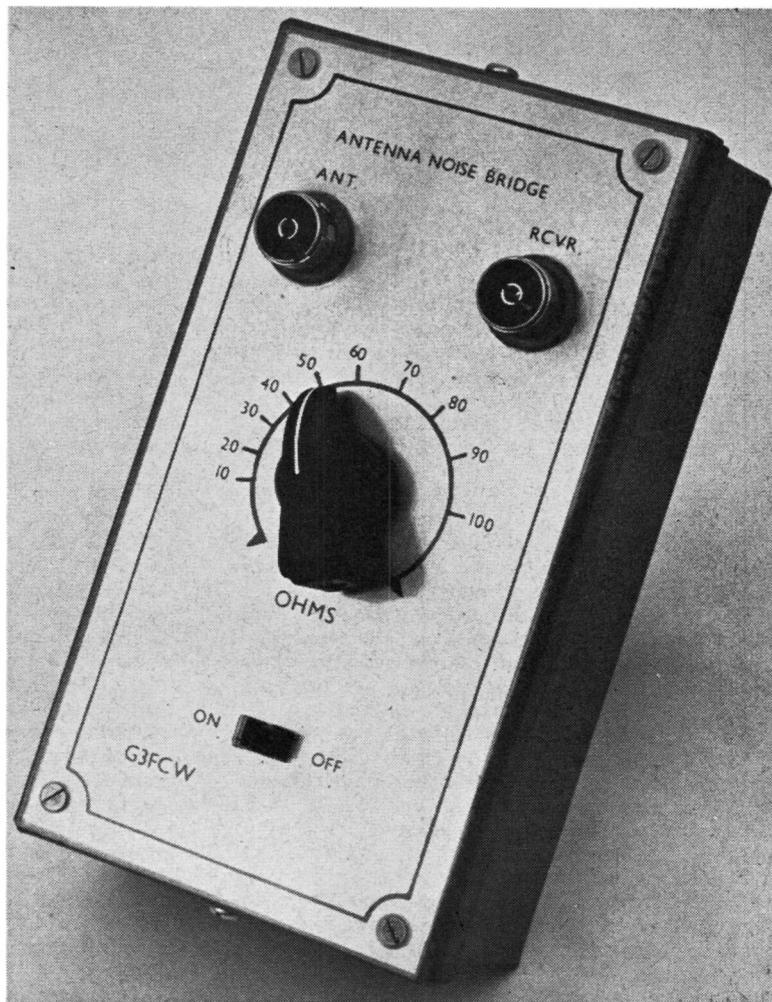
Aerial theory (for instance) is not everyone's cup of tea, but a certain amount of aerial practice *should* be. After all, many constructional hours are spent building

a transmitter, say (or a considerable amount of money buying one) to produce a number of watts of RF—the intention being to radiate this RF off the antenna. How well we do this depends on the aerial *and* its feed. Any inefficiency results in power being lost as heat. Power produced at great cost.

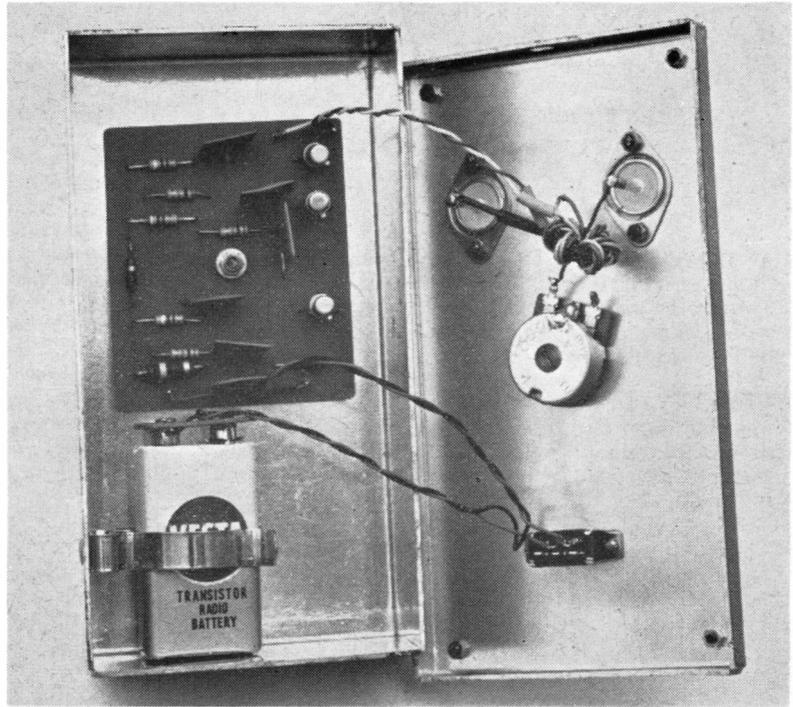
First, then, the antenna must be made resonant at the operating frequency. Many people cut to the “book-length” and leave it at that, ignoring perhaps, that their own local site conditions can modify this. (What they do not know, they don't worry about). Others, after reading the manuals, will say the GDO is the answer. After all, it is an instrument designed to measure the resonant frequencies of tuned circuits, antennae etc. So it is, but it gets a bit difficult when the aerial is *in situ* tens of feet up in the air.

Then there is the impedance at the feed point. To assume, for example, that the impedance at the centre of a half-wave dipole is 75 ohms is to ignore local conditions, height above ground and so forth which can

The completed Ae. Noise Bridge as described in the text by G3FCW. The coax sockets and switch can be fitted using countersunk bolts which are hidden when the front panel is in place.



Interior lay-out of the Noise Bridge as built from the "Cambridge" kit —see text. The toroid is suspended in the wiring between the coax sockets and the reference potentiometer.



alter this figure, either way.

Oh, yes, your SWR bridge in your 75-ohm line may show a low reading, but have you wondered why it was never *quite* 1 : 1? You will have found that any adjustments made at the transmitter end of the line made no difference. Perhaps the antenna impedance is not 75 ohms after all?

You may say it does not matter. The reply is that it does. Remember those hard-earned watts of RF, and where they are going?

Methods

Enter the antenna noise bridge. An instrument from which you can read your antenna impedance directly, and the resonant frequency from your receiver.

The unit comprises an RF source of very wide bandwidth ("white noise") as a signal, which drives the bridge. The bridge compares the unknown (antenna) impedance against a calibrated potentiometer, and the receiver is used as a (tuned) null indicator.

For example, the bridge is connected to the aerial feed point, and the receiver to the bridge. With receiver RF gain reduced (the bridge puts out a hefty signal) and AGC off, the tuning is adjusted for a null. This occurs at the resonant frequency of the antenna. Then adjust the noise bridge control for a deeper null, and read off the antenna impedance. Just like that!

Remember trying to tune your mobile whip to frequency? Or adjusting your receiver input circuit coupling for an optimum match? Cutting baluns, or stubs to correct length?

All become easy and routine with the help of a noise

bridge. For a full treatment in the use of the bridge the excellent article by G6LX in *SHORT WAVE MAGAZINE* for July, 1971 is to be recommended.

Construction

Having decided to acquire a noise bridge, then three approaches are open. We can go out and buy one of the commercial models which are available, and which are no doubt excellent, but the prices of which were a deterrent to the author for an instrument which is not in constant use.

The second way is to build one, and certainly the circuit is uncomplicated. Several designs have been published, and usually consist of a zener diode used as a noise generator, followed by two or three stages of amplification. The noise signal is coupled *via* a wide-band transformer to the bridge circuit, which essentially is a calibrated potentiometer.

No problems arise until one reaches the wide-band transformer. This literally is the heart of the unit, and success or failure depends upon it. Its form is a multi-wound toroid, and the choice (and availability) of a suitable ferrite ring, and the correct winding to put on it, determines the upper frequency limit. No problem in reaching 14 MHz say, but what about 144 MHz? This proved another deterrent to the writer.

The third approach opened when it was found that a noise-bridge kit is being marketed by *Cambridge Kits*, 45 Old School Lane, Milton, Cambridge, for £4.00. This included all parts, with the all-important toroid, ready wound.

Now there are kits, and kits. One thinks of Heathkit,

with their attention to complete detail, and a step-by-step construction system. By comparison, the *Cambridge* kit is more a collection of parts. This is not criticism, as the kit is complete with components of first-class quality, even including the box and battery. A 100-ohm carbon potentiometer is supplied, an item you would normally have to search the shops for.

A piece of perforated board is included, together with a practical layout as well as the circuit, on which to build the noise-generator and amplifier. Although this is perfectly adequate, the writer decided to etch a printed circuit board as it looks better. The recommended layout was followed and the circuit marked out using some cellulose paint as a resist. A few minutes etch in acidified ferric chloride solution was followed by cleaning, drilling and the soldering in of the components. In all, not more than an hour or so's work.

The mini-box lid was drilled for the potentiometer, and the switch and coax sockets were fitted using countersunk bolts which did not show when the panel was completed. All non-critical, but remember to keep connections short between toroid, potentiometer, and the coax sockets. A Terry clip was pop-riveted to the box side to hold the battery and the box then finished in silver hammer enamel. The circuit board was bolted on a spacer to the base of the box, and the inter-connections completed.

Calibration

It is recommended that the potentiometer be cali-

brated at low frequency (2 MHz, say) by using non-inductive carbon resistors as the load. This was done, and on checking with a Model 8 Avo, the potentiometer resistance was found to agree precisely with that of the calibration resistors. This is as one would expect, but it did suggest that calibration could be done at DC, by merely calibrating the potentiometer itself—angular position against track resistance—and calibration was completed this way. Although a potentiometer with a linear law is supplied, the calibration shows this to be not quite so. Checking various resistors at 144 MHz showed the DC calibration to hold true.

Finish

The difference between amateur and commercial equipment often shows in the finish of the panel. The layout as shown was drawn full size on paper and the letters and numbers applied with dry print lettering. This could have been used as the panel but the writer photographed this using line film, which accentuates black and white, and subdues any intermediate grey shades. The resulting negative, of high contrast, was then printed on to *Kentmere Kentint*, a photographic bromide paper having a metallic silver base. This gives a silver panel with jet black lettering. It is only paper of course and so a covering of 2.5 mm. clear Perspex was fitted as a protection. It is held in place by the potentiometer, and four countersunk bolts at the corners.

The result is a neat portable unit, with a performance to 144 MHz, and at a very reasonable price.

SMALL ADVERTISEMENT FACTS

In the spread of Reader Small Advertising in the April issue of *SHORT WAVE MAGAZINE* the total value of the priced "For Sale" items alone was about £5,700. The cost to the readers concerned for placing this advertising was about 1½% of the sales value—surely there could hardly be a better bargain! (This computation takes no account of the "wanted," or "what offers" or "exchange" notices).

For years now—and, remember, we've been in this business since before Hitler's War—our Reader Small Advertising (through which all manner of radio amateur apparatus is bought, sold or exchanged) has established the second-hand market value of a wide range of equipment. And not everything has gone down in price over the years—there are at least a few that have increased and others that have held their value.

The cost of reader advertising in *SHORT WAVE MAGAZINE* is 3p a word (to include QTH but not callsign, which is not charged and should always be quoted where applicable) which a *minimum* of 50p even if fewer than 17 words. Bold face, like this, is 25% extra. (These rates are, of course, as they were when the freeze was imposed last November, the issue for that month appearing on October 27).

As we cannot run ledger accounts for small advertising (with all the book-word and postal charges entailed) remittance must accompany the notice. Where there is doubt about the cost, we can accept a signed blank cheque for filling in (yes, many readers do it this way!)

protected by an endorsement "not over £3," or some such reasonable amount depending on the reader's own rough calculation as to what the cost might be. The charge entered on the cheque is notified on acceptance of the advertisement. Remit, with instructions, to: Advertising Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H 0HF.

HELP, PLEASE!

Readers who are direct subscribers (meaning those who obtain the *Magazine* by post on subscription paid to us in advance) are asked to let us have back their wrapper or envelope when notifying a change of address. It is also a great help if, when sending in a new QTH or C/A for the "New QTH" page, mention is made of whether the reader is or is not a direct subscriber. This can save hours of office time when the Subscriber Index is being checked for any necessary alterations to be made to address-plates. *Thank you!*

REDIFON EXHIBITION

The well-known manufacturers of commercial radio equipment, Redifon Telecommunications, Ltd., of London, will be putting on a display of their products, with lecture-demonstrations covering trends and developments in civil, naval, military and merchant-ship radio communication and navigational aids. This will be at the new West Centre Hotel, Earl's Court, London, during the period June 5-8.

ABSORPTION AND INDICATING WAVEMETERS

PRACTICAL NOTES ON CONSTRUCTION, CALIBRATION AND USE

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

THOUGH an absorption wavemeter can be an exceedingly simple device, it is most useful in checking the order of harmonics, and can help with the tuning up of oscillators and circuitry of all sorts. It is an essential basic tool because it tells you things. In addition to its simplicity, the wavemeter has the advantage that its indications are unambiguous. Though its uses are mainly with transmitting equipment, it can also have other purposes.

Probably its greatest limitation is its lack of close accuracy over a narrow band of frequencies, but if correctly used its accuracy can be adequate for many applications.

Suitable wavemeter circuits for amateur work are given here, followed by constructional information, then more detailed notes on the manner in which such wavemeters are employed.

Absorption Wavemeters

The simplest wavemeter is shown at A in Fig. 1. The variable capacitor C is in parallel with the inductor L, and rotation of C allows the combination to cover a band of frequencies. As only one coil and one capacitor are required, it is practicable to have such a wavemeter for each frequency range wanted. This avoids any need for coil changing, and has the advantage that C can be smaller for the VHF ranges.

The alternative, where more than one range is necessary, is to employ plug-in coils as at B, Fig. 1. The inductors L are then wound on some of the plug-in coil formers which are available, or on suitable alternatives devised from items to hand—such as old octal valve bases, or paxolin tubes fitted with plugs.

These absorption wavemeters work by taking a little RF from the circuit investigated, and resonance is indicated by a meter already fitted in the equipment—such as that showing PA grid or anode current. The wavemeter coil is located so that it is coupled to the tuned circuit to be checked, and the wavemeter tuning is then adjusted to resonance, which will be shown by a small dip in the PA grid current reading, when as example investigating the grid or earlier circuits.

Coupling is maximum when the coils are in line and close together, falling off as the distance is increased, or when the wavemeter coil is at an angle to the coil in the transmitter or other equipment.

For accuracy of reading, the loosest possible coupling which will give an indication should be used. This will usually mean that the wavemeter is held with its coil some inches away from a circuit where there is appreciable power. But with a circuit such as a low-level oscillator, the coils may need to be much closer

Indicating Wavemeters

A wavemeter often has its own indicating device, such as a 100-microampere moving coil meter. This gives a sensitive indication of resonance. A 250 μ A or 500 μ A instrument is also quite suitable, though less sensitive.

A semi-conductor diode is also added, as in Fig. 2. Resonance is shown by tuning for maximum meter reading. However, coupling from the wavemeter to the circuit being checked should be loose until it is seen what kind of reading is likely to be obtained, or the meter may be damaged. Loose coupling also gives more accurate results, as it reduces pulling of one circuit by the other.

To obtain sharper tuning, wavemeters sometimes have a tapped coil, or a coupling winding for the diode, as in Fig. 3. Coupling between the tuned winding L1 and second winding L2 can be relatively small, to reduce damping which causes flat tuning. L2 may have about one-eighth the number of turns used on L1 (or 1 turn for small coils), while the tapping T can place the diode and meter across about one-tenth of the total winding.

To avoid the meter, a 6 volt 0.04 ampere or other low consumption bulb is sometimes used, as in Fig. 4. L2 can have about one-third to one-quarter the number of turns on L1. Closer coupling of L1 with the RF circuit is necessary than for Fig. 3, and Fig 4 is unsuitable for circuits where the level of RF is very low.

An output jack can be provided in series with the indicator in Fig. 2 or Fig. 3. Its main use is to take a plug for headphones or other equipment (such as a tape recorder) so that when the wavemeter is lightly coupled to the PA tank of an AM transmitter, the modulation may be heard, recorded for playback, or observed with a 'scope.



Fig.1 Absorption Wavemeters for one or several ranges

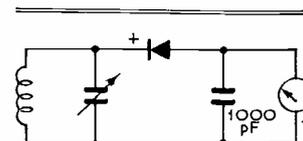


Fig.2 Circuit of Indicating Wavemeter

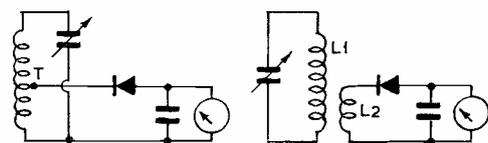


Fig.3 Modifications to reduce damping of tuned circuit

Coupling Link

With compact equipment or a bulky wavemeter it may be impossible to couple the wavemeter to the RF circuit directly. This can be overcome by providing a twin or co-axial lead with links L2 and L3, Fig. 5. A 15in. lead can be used up to 144 MHz, or a 3ft. lead up to 30 MHz. The main point is that the accessory should not be self-resonant in the working range.

For VHF, L2 and L3 can be one turn each, about 3/4in in diameter, or as required to suit the wavemeter coils. For lower frequencies, 2 or 3 turns can be used. The whole is made from insulated wire or has joints insulated to avoid possible contact with HT or other circuits. Coupling at each end of the circuit should not be made tighter than necessary to give a reasonable indication on resonance.

Other Circuits

A switched inductor such as that at A in Fig. 6 is sometimes used. Here, the single coil provides four ranges. It may be found that the tapped coil results in absorption effects on some ranges, or other effects which are absent with circuits such as those in Fig. 1. For this reason, a tapped coil is not much recommended.

Some commercial instruments have a fixed capacitance C in parallel with the tuning capacitor VC, B in Fig. 6. This is a good plan if a reliable capacitor is used at C, and it allows VC to cover a relatively narrow band of frequencies.

Construction

A circuit such as at A, Fig 1, is most easily assembled as in Fig 7, (p.161) with a pointer reading on a calibrated scale, or with a numbered dial for use in conjunction with a graph. For VHF purposes this form of construction can be duplicated with sufficient accuracy to give a wavemeter which should be found to cover a particular band quite accurately. (It will be realised that *exact* duplication of frequency coverage cannot be expected with a home-constructed item, but coverage should be sufficiently near that expected for easy calibration.)

L is 4in. of 20g. wire, insulated or in sleeving to avoid HT shorts. VC is a Jackson C.804 capacitor of 4.5 μμF, or similar. The wire is bent into a staple having 1in. between sides, ends being adjusted to overlap the soldering points 1/8in. each. A parallel capacitor (C, Fig. 6) of 10 μμF (2% or ± 1 μμF) is used. The range

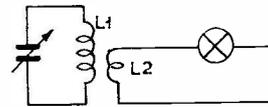


Fig. 4 Use of lamp as resonance indicator



Fig.5 Coupling a Wavemeter with a link line

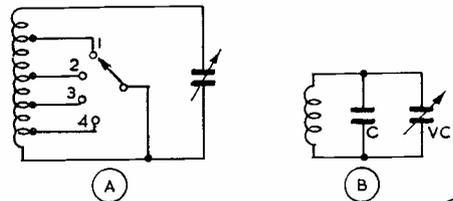


Fig.6 Other Wavemeter circuits

F 145

is then 138-148 MHz.

Similar construction, but using a C.804 100 μμF variable, and omitting the fixed capacitor, can give a range of 42-160 MHz, which is useful for many stages of a 2m. Tx. L is then made of 6in. of wire, having 1 1/2 turns 3/4in. in diameter, with ends as for L1 in Fig. 7. (See Table II p.160 for calibration of 0-100° dial.)

For a larger single range wavemeter, a 100 μμF miniature variable capacitor can be fitted in one end of a paxolin tube, with the winding at its other end. To keep accuracy of calibration windings should be cemented. Semi-calibrated wavemeters such as those in Fig. 7 should be stored in a box or safe place when not in use.

For plug-in coils, sockets or a holder can be mounted on a piece of metal which also carries the variable capacitor, as illustrated. Constructional details are not too important, but a compact assembly allows the wavemeter to reach confined spaces. Rigid construction and wiring will help maintain accuracy.

Table I gives details for *Denco* plug-in miniature formers which are 3/8in. in diameter. These formers should be fitted in a holder while soldering to their pins. The capacitor is a Jackson C.804, 75 μμF.

For continuous coverage from about 1.8-150 MHz without too much crowding, five ranges will suffice. Due to the absence of other stray parallel capacitances, the ranges obtained are very wide. Frequencies tend to become crowded near the fully open position of the tuning capacitor, so it is as well to ignore part of the scale here.

The table will aid in selecting suitable windings. All coils are air cored. Where typical frequency calibration

Table I

- Plug-In Coil A. 1 1/3 turns. Ends 1in. and 0.9in. to pins.
- Plug-In Coil B. 7 1/2 turns. Ends 1in. and 0.8in. to pins.
- Plug-In Coil C. 25 turns.

All above use 26g. wire, with turns side-by-side.

- Plug-In Coil D. 60 turns 34g. enam. wire side-by-side.
- Plug-In Coil E. 100 turns 34g. enam. wire in pile occupying 0.3in.

C.804 75 μμF with 0-100° dial. Lead from holder to fixed plates tag = 0.8in. Lead from holder to moving plates tag = 1in.

Table II

Approximate dial readings against frequency with coils as specified.

42-160 MHz Wavemeter		Plug-In Coil C	
160 MHz	6°	30 MHz	8°
150	8°	28	10°
140	9°	26	13°
120	12°	24	15°
100	17°	22	18°
90	21°	20	23°
80	27°	18	30°
70	34°	16	38°
60	46°	15	43°
50	65°	14	48°
45	80°	13	56°
42	95°	12	65°
		11	76°
		10.5	85°
		10	95°
Plug-In Coil A.		Plug-In Coil D	
150 MHz	10°	12 MHz	12°
140	12°	11	15°
130	14°	10	19°
120	16°	9	23°
110	19°	8	29°
100	23°	7	37°
90	29°	6	52°
80	37°	5	80°
70	47°		
60	66°		
55	81°		
Plug-In Coil B		Plug-In Coil E	
75 MHz	4°	4 MHz	4°
70	7°	3.5	12°
60	11°	3	21°
50	18°	2.5	39°
40	29°	1	71°
35	38°	1.8	94°
30	51°		
28	60°		
25	74°		
24	81°		
23	90°		

points for ranges are given, these can apply only when the specified variable capacitor is fitted, and they are intended only as a basis for more accurate calibration.

Means of Calibration

As there are only two components in an absorption wavemeter, calibration may prove to be quite near that given. This will in any case simplify checking, which should be done to verify the coverage actually obtained.

A good means of calibration is to draw a graph of dial readings against frequencies, ignoring the extreme positions of the variable capacitor. Four or five calibration points will then allow the graph to be completed, to show all frequencies in the range.

An indicating wavemeter, such as Figs. 2 and 3, can be calibrated directly from a signal generator by taking the generator output to a 1 or 2 turn loop, which is situated an inch or so from L1. Use the loosest possible coupling, this depending on the generator output and meter sensitivity. Do not use generator ranges where the dial is calibrated for harmonics.

An absorption or other wavemeter can be calibrated from a receiver by holding L1 near enough the receiver oscillator coil to produce a slight chirp or change in

frequency (with BFO on) when the wavemeter is tuned through resonance. When the oscillator is HF of the signal frequency (check this if in doubt) the wavemeter frequency will be receiver signal frequency *plus* 1F, and the graph can be marked accordingly.

Incidentally, should a regenerative or super-regenerative receiver be used on VHF or be among old gear, wavemeter resonance will be shown by pulling the receiver out of oscillation. (Regeneration should not be advanced too far.)

Probably the best method of calibration is to use a transmitter already correctly set up. This will give calibration points at that of the VFO or crystal, plus multiples which are available in later stages.

Uses

An absorption or indicating wavemeter will show that a stage is operating in the band of frequencies expected. An indicating wavemeter can also be used to show relative strength of the RF present, and thus improvements resulting from adjustments or circuit modifications.

Fig. 8 is a typical crystal oscillator for VHF equipment where output may be taken at 2x, 3x, or some other multiple of the crystal frequency. As example, assume a crystal around 8.8 MHz, with the anode circuit tuned to 35.2 MHz, to be followed by a doubler for about 70.4 MHz. If the wavemeter is used to check that VC/L Fig. 8 are tuned to 35.2 MHz, correct operation of the



An indicating absorption wavemeter, using a plastic box as container to minimise hand-capacity effects, and an 0-100 microamp. m/c meter as the resonance indicator.

doubler is virtually certain, and output from this stage can be checked to assure it is on 70.4 MHz. With home-built equipment, VC/L could possibly be tuned to 3x, or around 26.4 MHz, in error. This could be followed by mistakenly tuning the doubler for 3x, resulting in 79.2 MHz drive to the PA—which is of course outside the band, but could probably be reached by the 70 MHz PA tank coil.

Similar considerations arise with two-metre or other VHF equipment. With LF band apparatus, the multiplication of stages following the LF VFO to bring it to higher frequency bands can be checked in the same way.

With some overtone circuits, a check is necessary that the oscillator is crystal controlled, and that output is on the wanted overtone. Fig. 9 is a simple circuit of this kind. Output increases as the tap is moved along L1 away from the crystal, but a point is reached where the oscillator is no longer controlled by the crystal, instead oscillating at any frequency to which L1 is tuned. If adjustment to L1 tuning moves the wavemeter tuning up and down, the circuit is not crystal controlled. After checking that L1 is on the right frequency (often 3x or

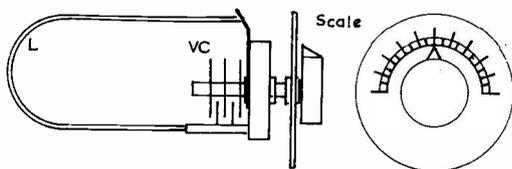


Fig. 7 Construction of VHF Wavemeter

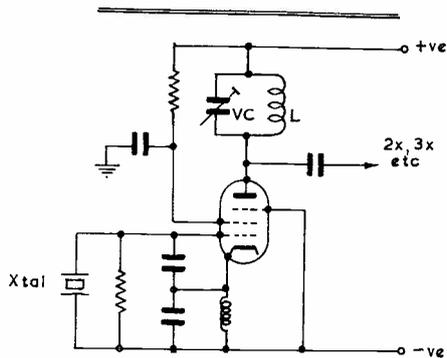


Fig. 8 Typical oscillator with harmonic output

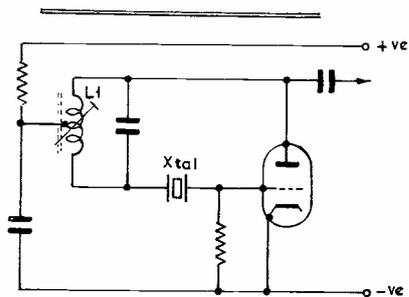
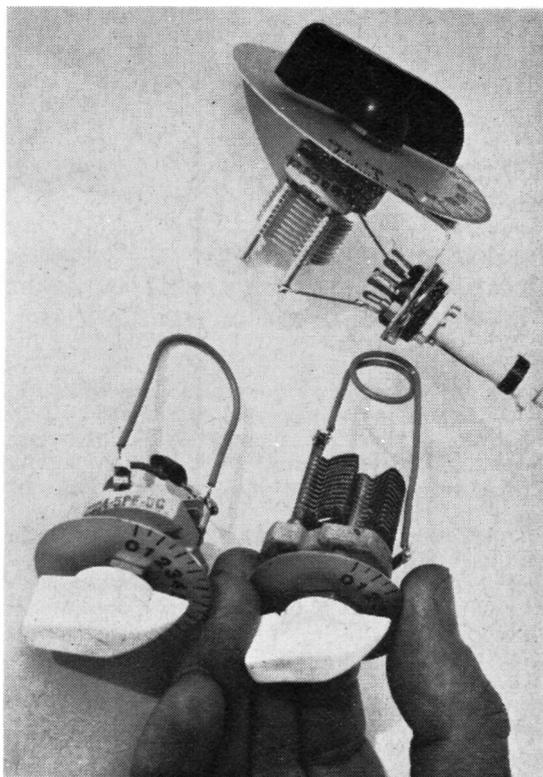


Fig. 9 Triode Overtone oscillator

F 146



Single range absorption wavemeters of the type discussed in the text for 138-148 MHz and 42-160 MHz, also (at top) a five-range wavemeter with plug-in coils for 1.8 to 150 MHz.

5x) this fault must be corrected, and frequency stability confirmed with a receiver.

RF Indication

If the indicating wavemeter is positioned so that its coil picks up a little RF from an appropriate anode or grid circuit, tuning or other adjustments to earlier stages can be directed to securing the best meter indication. (But a crystal oscillator may have to be slightly off-peak for reliable starting.)

Some VHF transmitters have some kind of RF tune-up indicator, as the PA anode current meter dip is not a reliable indication of best tuning. Where no such indicator is provided, the indicating wavemeter can be positioned to pick up a little RF from the PA tank, and adjustments are then for maximum RF here, which correspond to maximum RF output of the PA.

The presence of strong harmonics, or parasitics, will show up as unexpected and unwanted indications on the wavemeter, if it is coupled to the PA tank and tuned upwards in frequency. Breakthrough on what is sometimes termed a sub-harmonic (as when a simple 160m. Tx doubles to 80m. but does not sufficiently suppress the original frequency) will also show on a sensitive indicating wavemeter. All such defects should be eliminated before putting the equipment on the air.

• • • SWL • • •

SHORT WAVE LISTENER
FEATURE

By Justin Cooper

INTERESTING TECHNICAL POINTS — ANOTHER
HEAVY MAIL — SOME QUERIES ANSWERED
— NEWS AND GOSSIP — THE HPX SIDE

PERHAPS the most consistent theme running through the letters, if one discounts HPX matters, is the QRM caused to SWL's by "lessons," whether professional studies, O or A Levels at school, R.A.E., or whatever. And yet—it is quite strange—we live in a most untutored age.

The reason is not far to seek. This is the first generation to pursue education solely as a means to an end, and not for its own virtue alone. Thus, we have the distressing spectacle of the person who, for example, takes and passes an HNC in, say, Electrical Engineering, which gives him a responsible job and a good salary; and yet, once the coveted certificate has been obtained, its owner quite firmly and unequivocally sets his face against any sort of activity involving formal learning for the rest of his life.

This attitude appears in Amateur Radio, too—the SWL who boasts that he knows nothing of the technicalities, or the licensed type who buys his first receiver after passing the R.A.E.; or, less directly, the chap who thinks he should have a Novice or Citizen's-band licence (not available in the U.K.) because he doesn't want the bother of learning any more.

The Mail

Persistence pays, is the theme of the letter from *K. Plumridge (Southampton)* who reports happily that he has passed the R.A.E. after four tries, and the Morse at the first attempt, so that he now is the proud possessor of G4BYY—and as he has his ticket, Dad has caught the SWL bug again and purposes a re-entry to the All-Time Post War HPX Ladder.

Another happy chap is *C. Lancaster (North Ferriby)* who is now G8HDR, and welcomes reports from other SWL's, always providing they are "proper ones", of course. Chris intends to go on for his Morse in the shortest possible time, but the G8 call is a staging-post in Amateur Radio, at least until the dreaded A-Level exams are out of the way.

The *Singletons*, John and Shelagh, of *Hull*, have written to say they are, regretfully, retiring from the HPX ladder, thanks to a spread of other commitments, and overtime for John, not to mention two young children. We wish them well, and hope we shall in due course hear from them again.

A long and interesting letter from *B. Heppenstall (Holyhead)* details how he came to make the acquaintance of an unmodified R.1155A, and then to bring it up to par with his own modifications. Of course, there was

a certain incentive, with Dad operating 400 watts p.e.p. of VHF, to improve the cross-modulation performance, and to go for the R.A.E. Then there are A-Levels to go through, with a degree in electronic engineering to come later—but for the moment the old 1155 is doing fine at raking in the prefixes on CW, as his first list shows.

Also from *Holyhead*, also a first entry, is *M. Wright*, who is in for R.A.E. this December, all being well. Martin has a Yaesu FR-50B, with an R.1155 used as the Top Band receiver only, as reserve. The aerial is in a small—very small—garden, and so its 132 feet are spread out by the kindness of a couple of good neighbours.

In *Beckenham* lives *C. Henderson*, who has a B.40 receiver as the mainstay, plus two-metre converter. Since he kicked off in October 1970, Crispin has booked in 277 countries, mainly on Eighty and Ten although all bands are watched. On the aerial side there are a 200-foot wire, an inverted-Vee, and an endfed full-wave for Twenty.

M. J. Marsh (Sudbury) is working for his R.A.E. at Colchester Tech., and on the Rx side uses a Yaesu FR-50B into a Mosley RD-5 aerial running approximately N-S. With this set-up he puts in a list of DX which covers all bands and all continents, with perhaps the prize catch as VK4AVA on Forty.

After a lapse of about six years, *P. Barrett (Welwyn)* has made a come-back to the bands, with the help of a FR-50B receiver and dipoles for 14-21-28 MHz, running E-W. One of his more interesting observations was on Ten, where once or twice he heard W's working Europeans when both ends of the QSO were beaming towards South America—which only goes to show how large are the side lobes on most practical beam aerials.

C. B. Russell (Runcorn) has, since last he wrote, managed to elevate his aerial to twenty feet, to the improvement of his DX results. On a different theme, Brian waxes philosophical about the fact that he can get QSL's by return post from MP4, a PY8 1200 miles up the Amazon, and sundry other rare spots, but not at all from such as GD, GC, and EI!

Although he still listens for the same time, the results in terms of new prefixes have been disappointing for *C. Verstage (Old Basing)*; but on the other hand some of the few prefixes heard have been quite rare ones, which is some compensation!

The help of a new FR-50B receiver, and the raising of the aerial have both helped *D. Churchill (Bexleyheath)* to make a far better start on the Tables than he did in the same period for the 1972 Table—but we could add that a year's extra listening expertise has some bearing on this year's score.

* * *

A. West (Herne Hill) raises the interesting point that

one can go for years without hearing, say, 5N2—and then, having heard the first one, several more are manifest in the next few days! Incidentally, he has built up the omni-directional aerial described in the *March Magazine* for use with the Oscar downlink on Ten. It seems to be fulfilling expectations, judging by the 10-metre prefixes recorded in his letter.

Oh' dear! We got it all wrong about *H. M. Graham's* (*Harefield*) set-up. For a start he has Eddystone 840C and FR-50B, not an EC-10—and the shack is exclusively radio, although it has in the past served, at separate times for darkroom, store, and so on. Interestingly enough, since Maurice moved into his den, the colour TV timebase noises, which plagued him downstairs, have ceased.

L. A. S. Poole (*Winchmore Hill*) has set your scribe a bit of a problem—he mentions a station which in the query looks like YY4CUE but in the list reads as YV4CVE—despite reader Poole being blessed with a handwriting which is easier than most to decipher! If it is YV, then it could be quite OK; but if YY4, Heaven only knows!

We have, in answer to *A. Williams* (*Stockport*) to be quite firm; stations claimed as /AM, must be signing with an amateur radio call proper to their country of origin. We cannot accept claims involving alleged amateurs, operating within our bands, using the aircraft's own call.

On to *B. Londesborough* (*Swanland*) who has some HPX points, as follows: JY5, quite possible; 5V7GE in Togoland; and a mystery "ZD5KKK". ZD5 is in fact down for Swaziland, superseded by the 3D6 prefix—your scribe has his doubts about this one, but would hesitate to put the red pencil through him in the absence of some other evidence. Perhaps someone else has some ideas?

K. C. Webb (*Reading*) has been preparing for his final examinations in accountancy, and so has been a bit out of touch; and on top of that his 840C receiver seems to have a fault somewhere aft of the detector—possibly an open-circuit capacitor coupling the audio stages? On the prefix front, Keith has AJ3VI, and a CI1ADV. The former is U.S. MARS (military) and therefore not amateur within our definition for HPX purposes, while the latter is a "special" from Canada.

One or two people have mentioned ZVØWH, who was a DX-pedition to Fernando de Noronha Is., by PYØWH. It is quite a good prefix, and understood to have been cleared by ARRL before departure.

Technical Matters

A. R. Holland (*Malvern*) has a Trio JR-500SE which occasionally blows a fuse. One would guess that this is usually an event which occurs at switch-on, and the right answer is to use a "slow-blow" fuse which takes just that bit longer to blow than the normal one. If anti-surge fuses are not easily come by, it would be safe to raise the fuse rating a little; it must always be borne in mind that a fuse is basically a short-circuit protection, and over-currents of less than 100% do not necessarily result in the fuse blowing instantly—it may indeed hang on for hours till the heat melts the solder and so solders the fuse inside its holder!

Matching impedances is the problem raised by

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 a *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 callsigns.

(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 MP4K which count as one prefix.

(6) Only calls issued for Amateur Radio operation may be included. Undercover and pirate callsigns will not be credited, nor may any MARS stations be claimed.

(7) G2, G3, G4, etc., all count 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, the new list of prefixes, and the new total. Give your name and address on each sheet, and send 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 January 1972, and with the current edition of the *DX Zone Map*.

M. Stringer (*Southend*) who is trying to couple a five-element Quad for 144 MHz to the feeder. One would expect the extra elements, over and above the first two, would pull the feed-point impedance down considerably, and possibly make direct co-axial feed possible, provided the directors and reflectors are pre-cut and do not have tuning stubs—tuning four stubs on the parasitic elements, *plus* another on the driven element would seem darn near impossible!

Not so far from Southend is *Rochford*, where lives *J. Cowan*. John has a problem in that he always believed

increase of RF gain would both improve sensitivity and selectivity, thus upsetting your conductor's statement last time about effective tuning of SSB. Now, look at it this way: For AM reception it is normal to have full RF gain and to let AGC control the overall gain, with AF set to a comfortable level. However, excess of RF gain, and to a lesser extent IF gain too, will result in an apparent loss of selectivity, due to signals on the skirts of the IF selectivity curve being strong enough to be detected and appear as QRM. In addition, all the strong nearby signals will probably cross-modulate at the mixer, and so generate a high noise level within the receiver IF which can well mask a weak wanted signal. The reduction of RF gain will not essentially reduce the sensitivity, until it has so far reduced that a given signal is no longer able to penetrate the detector diode and so become AF out of the speaker. Thus, the best method of taking SSB is to run maximum audio gain, and control the receiver, first with RF gain, and in the case of a really big signal, IF gain, or to run the receiver at nearer full gain and use an attenuator between the receiver and the ATU, balancing RF gain and attenuator settings for best signal-to-noise ratio. On a different line, John wants to know about the Cubical Quad aerial—a tall order since there is a book which deals exclusively with the Quad. Basically, it is a diamond shape, made by putting a pair of half-wave dipoles one above the other with the ends joined at each side. If you now short the feedpoint of the upper dipole, and feed the bottom one more or less normally, you have a single Quad element, the lower dipole feeding the upper one through the joined ends. The reflector or director element is just the same except that where the feeder would have gone is placed a shorted stub which is adjusted to resonate the element.

D. Rodgers (Harwood) did his 144 MHz converter an injury during the final tweaking after he had got it working and fitted it inside its box—oh, well ZTX-108's are not too hard to come by! Dennis's filing system may be of interest; he buys the 3-by-5 index cards which are sold at most good stationers, and uses them in conjunction with the metal tags also obtainable from office supply stores. When a new prefix is heard it is entered on a card, and the card tagged. All prefix cards are kept in strict order in a filing box. When the prefix is entered in the list to be sent to the Editorial Dept., the tag is removed and the card re-filed. Thus, any card with a tag awaits entering into the HPX list for next time. Neat and simple! There is also room on the card for any other data required, such as hearing on each band, without any further confusion.

W. McFaul (Londonderry) is swotting up for both R.A.E. and Morse, which has reduced his air-time somewhat. To make matters worse, he is now noticing drift on his receiver, which so far has not yielded to treatment. A quick check could be to replace the local oscillator valve with another one, and if that fails and no other misoperation is observable, to try the effects of improving the ventilation—for a first try take the case off and see if it improves matters, or if possible just lift the lid, which by itself could have a considerable effect. Free circulation of air under the receiver helps, and a pile of magazines and call-books atop will hinder—J.C. found that out the hard way!

An interesting suggestion that some receivers are

more prone to TV timebase QRM than others is put forward by A. Glass (Plymouth), who has changed his FR-DX400 for a FR-50B for this reason, and so far is very pleased with his new box-of-tricks, both on CW and Sideband.

Another one with line-timebase troubles is B. Thomas (Pontefract). Perhaps the greater part of the noise is mains-borne, picked up by induction on to the earth connection, whence it gets into the receiver through common-impedance coupling. A first move, therefore, is to attack the SWL receiver earth connection—take a separate feed from the safety earth, straight down to the water-pipe where it emerges from the ground—that is, lower than the mains earth. If that is not enough, you could try adding a counterpoise earth, cutting one to resonate on each band of interest and either, preferably, "losing them" in the garden hedges or similar places, or even at a pinch around the room or under the carpet. The correct length is half that of a dipole for the same band.

Rest of The Mail

On which clip come all sorts of interesting letters. G. Ridgeway (Darlington) has an HRO and a 52 Set, coupled through an ATU to a long-wire round the loft, which in its turn finally arrived at a Joystick, which between them have netted enough prefixes to make a start.

C. L. Lee (Ilford) has an untuned 150-foot wire out, the home end of which is hooked to a Drake R4A used on all bands from 160 to 15 metres. VK, ZL appear with W's on 80 and 40, a list covering all continents on Twenty, and almost as good a list on 15, with the latter covering all the W call areas.

The penalty of sticking to Eighty for L. Tarassenko (Dorchester) was that he just missed making the 200 for an entry in the 1973 table. However, in addition he likes them to be at least R5S7, from his W3DZZ trap aerial, although for the Ladder we make no band rules, save that a prefix must be heard with certainty.

P. Barker (Sunderland) had his revenge on the germs during a recent malaise, by hearing JY1 and much other DX.

ANNUAL HPX LADDER

(Started January 1, 1973)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
P. L. Barrett (Welwyn)	452	C. L. Lee (Ilford)	298
M. J. Stringer (Southend)	408	W. J. Smith (Benfleet)	288
R. H. McVey		J. Gravell (Burry Port)	286
(Weston-super-Mare)	390	M. J. Wright (Holyhead)	261
M. A. Londesborough		M. Hartley (Preston)	221
(Swanland)	381	G. Ridgeway (Darlington)	210
K. Williams (Swinton)	346	W. McFaul (Londonderry)	208
D. Churchill (Bexleyheath)	336	C. B. Russell (Runcorn)	202
S. Scott (Stockport)	309		

Starting score 200, in accordance with the HPX Rules.
All prefixes to be heard on or after January 1, 1973.

SWL station of 15-year old Mike Allisette, Springbank, Les Ozouets Road, St. Peter Port, Guernsey, C.I.—whose father is GC3NDX and elder brother GC8DCO (quelle ORM!). Mike is, of course, going for his own ticket. The rig shown here includes a Heathkit RA-1 Rx with home built ATU and a B2 receiver as stand-by. He has a long-wire aerial, favourite bands are 1.8 and 21 MHz and he can hear the mainland Top Band nets on a Sunday morning.



R. H. McVey (*Weston-super-Mare*) notices the large number of non-English-speaking stations in the DX Phone portions of both Twenty and Fifteen. This has for long been the case, as there are bits of the band where the W's don't penetrate, and a chap can have a QSO in his own language in peace if he wants to. But there is some resistance building up to using "American-English" as the *lingua franca* of the bands.

Two letters from J. H. Sparkes (*Trowbridge*) show that he has been down with 'flu—and since then he has had to send away the receiver, as its BFO decided to go on the blink and eliminate reception of SSB and CW signals.

P. L. King (*Emsworth*) wonders just what sort of prefixes the leaders offer each time—answer is much the same as his own, except that they have more of them, gained by intensive and selective listening!

Oddly enough, the list from S. Foster (*Lincoln*) is right after reading King's comment—Stew this time has six new ones to offer, namely A4, C11, GD2, OH4/MM, 4X25 and 4Z25, to take up to 1307.

Another high scorer, J. Fitzgerald (*Gt. Missenden*) has, by the sound of it, rather given up his 3.5 MHz searching in the small hours in favour of more R.A.E. revision; we hope so, for his own sake! John is much pre-occupied with the question of what aerial should grace his transmitting set-up, space being somewhat hard to come by. A Good Question, indeed! Present thoughts are running on a 14-AVQ.

P. G. Jerromes (*Newton Abbot*) contrasts the activity on Eighty at lunch-times with the late-evening situation, to the detriment of the latter. His activity has had one interesting result in that his father, in Birmingham, has once again been bitten by the bug, and is very active with a Yaesu FR-400SDX himself. After the R.A.E. and Morse have been overcome, P.C.J. wonders about a transmitter, and fancies a K.W. *Vespa*—why not, indeed!

S. Scott (*Stockport*) is busy constructing at the time of writing, the project being a converter for Ten and

HPX LADDER

(All-Time Post War)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
R. Shilcock (Lye)	1353	M. Williams (Sleaford)	727
S. Foster (Lincoln)	1307	E. W. Robinson	
A. W. Nielson (Glasgow)	1131	(Bury St. Edmunds)	724
J. Fitzgerald		C. Henderson (Beckenham)	711
(Gt. Missenden)	1119	W. B. Taunton (Meopham)	703
W. Bingham		A. West (Herne Hill)	688
(Carrickfergus)	1092	C. K. Verstage (Old Basing)	685
K. Kyezor (Perivale)	1082	B. Thomas (Pontefract)	681
T. Rootsey (Ilford)	1058	C. A. Lancaster (N. Ferriby)	671
R. Carter (Blackburn)	977	S. Wessely (Sheffield)	669
W. Edwards (Tadworth)	976	A. Judge (Bishops Stortford)	659
Irwin Brown (Newtonabbey)	972	O. L. Cross (Bexleyheath)	652
A. Mercer (Wigan)	922	D. A. Shepherd	
M. J. Quintin		(Brierley Hill)	651
(Wotton-u-Edge)	922	L. Thomas (Castleford)	632
H. Alford (Burnham-on-Sea)	920	J. Woods (Chillesford)	609
B. Hughes (Worcester)	905	M. Cuckoo (Herne Bay)	603
D. Rodgers (Bolton)	890	J. R. Cowan (Rochford)	579
R. Pullen (Crawley)	885	B. Cushing (Hove)	573
J. H. Sparkes (Trowbridge)	853	K. C. Webb (Reading)	571
L. A. S. Poole		A. I. Williams (Stockport)	534
(London, N.21)	842	M. North (Bath)	530
N. Askew (Coventry)	840	M. Kitchener (Hitchin)	523
N. Hembrey (Northiam)	832		
K. Plumridge		CW ONLY	
(Southampton)	822	A. Glass (Plymouth)	914
S. Proud (Letterston)	820	G. Proud (Letterston)	673
G. W. Raven		T. Rootsey (Ilford)	668
(London, S.E.13)	805	W. B. Taunton (Meopham)	600
P. L. King (Emsworth)	791	C. Henderson (Beckenham)	464
M. Fisher (Bradford)	779	D. Rodgers (Harwood)	411
H. M. Graham (Harefield)	742	J. Whittington (Worthing)	316
E. Parker (Hove)	735	J. Dunnett (Liege)	311
A. R. Holland (Malvern)	731	B. Heppenstall (Holyhead)	228

Starting Score 500 for Phone, 200 for CW. Listings include only recent claims. Rules for HPX—see Panel, p. 163. DX Zone Map with latest Prefix List 85p post free (Prefix list alone 23p post free) from Publications Dept., SHORT WAVE MAGAZINE, 55 Victoria Street, London, SW1H-OHF.

Fifteen, to extend the range of the BC-348.

The contrast in behaviour, as between his old SX-24 and the new FR-50B—fitted with Top Band, calibrator and full ten-metre coverage—which now replaces the

earlier box, is outlined by *A. Judge (Bishops Stortford)*, who finds it has done quite a lot even for his Top Band score.

E. Parker (Hove) feels rather like a cat on hot bricks just now, the reason being that he awaits the arrival of the last few cards to complete the Hundred Countries confirmed. Ernie admits that once this hurdle is passed he will be able to log many prefixes which have so far not been logged while the hunt for countries was at its height.

Although it has not generated any problem in most people's minds in the prefix context, the question of the calls recently appearing with 25 or 100 as the numeral have worried several correspondents, *M. Hartley (Preston)* among them. To clear the situation up, a 4X25 counts as just that, not as 4X2. (Actually, such numerical aberrations are contrary to I.T.U. callsign stipulations).

Pushing his luck was *N. Henbrey (Northiam)* just lately, trying to lift a 40ft. Telomast with, on top, a TA-33, a rotator and a two-metre eight-over-eight! No wonder he had to cut the height down to only 30ft.—but even then his aerial set-up must be one of the best SWL installations in the country—and any sign of that lot toppling could spell money! On a different line from prefix chasing, Norman has changed his receiver, from the FR-500 to the FR-400, for listening to VHF signals, both in the contests and over *Oscar VI*, through SSB signals have been heard from both sides of the Atlantic.

Though he submits a *nil* return, *K. Kyezor (Perivale)* mentions that his wife, going through his HPX records while he was away, found several unclaimed prefixes in the log—so it looks as though we should, ere long, have a large list from this quarter!

His list of prefixes is the shortest ever, says *H. Alford of Burnham-on-Sea* (not one of our youngest readers) the reason being that he is well occupied with the building of his "Mark II" version of the home-built effort of last year, a receiver to end 'em all. As he says, this sort of thing makes an interesting occupation for the long evenings.

P. L. Newman (Thame) has been really making progress, with most of the shack problems ironed out, several constructional projects completed, and a fault in the receiver cured with an assist from G8FMK. As if all that were not enough, Paul is in for the May R.A.E.

* * *

M. Smith (Matamata, New Zealand) uses a Gulbransen general-coverage receiver and a Sanyo (types we've never heard of before!) coupled to dipoles for Twenty, Forty and Eighty coupled through a common feeder. Mike queries 9M1MM, but we would think it most likely is a misreading of 9N1MM, who is pretty active.

W. J. Wellington (Whitley Bay) has been, he says, chased from one room to another with a paint-pot—but he found the time to build a transistor RF amplifier and to tame it. Since his XYL went over to colour TV, he has been plagued with that time-base noise which makes Top Band all but unusable—the cure, as far as we can suggest anything, has been mentioned earlier in this piece.

A good—and novel—reason for an improvement in

scoring emanates from *R. Carter (Blackburn)*. Seems his dog has been waking earlier, at 0500, and getting Ben up as well, so early-morning stints on Eight are showing profit. It is always a good thing when the rate of scoring lags to change the listening hours, and so to open up new areas of the world for the logbook.

T. Vale (Abingdon) takes your scribe up on the question of *buying* versus *building*. He makes a valid point when he says that for five of the eight years he has been an SWL he has had to study for professional examinations, which, with such distractions, as YL's, clubs, discos, and so on, take up too much time to leave much for construction—and anyway few amateurs have adequate test-gear to set up a project once it is all wired up. When your Editor was a youngster, the current YL had to sit in on DX sessions, do the logging, tolerate the heat of a carbon-lamp battery charger and the shriek of a DC/DC 500-volt motor generator—all without asking silly questions! Changing the subject, OM Vale has a few things to say about known pirates, and those characters who blow into microphones, swear, and make a nuisance of themselves generally. He takes bearings of them over several sessions, makes as many notes as he can, callsigns if these are "inadvertently" given, and any other useful data for a QSL—and then sends the lot to the Ministry! A nice idea and if several hundred more people would do so, the various bearings so taken would probably give enough information for MPT to take action.

The May R.A.E.

This is dated for May 10, and by now all candidates will know where they have to go and will have been well briefed on the procedure. All we can do is to wish them luck and offer a few words of advice for what is basically a simple test (if they have done their homework).

Arrive in good time, take it easy, read carefully through the Paper, pick out the questions you can answer right away, and then tackle Part I, in which you have to deal with both questions. Long and complicated answers are not required. Remember that the Examiner expects to be able to read your writing—an illegible scribble annoys him and does not help you. Circuits where required should be drawn tidily, and that's all—there is no need to spend time on copper-plate presentation. Give yourself about ten minutes or so to read through your offering and mark clearly any amendments or second thoughts. Take no notice of what anyone else is doing.

If you tackle it this way, and you go in knowing the stuff, you should pass, no trouble at all.

Conclusion

As usual, the space runs out before the while pile could be covered. Therefore, all those who sent in just a list for the Tables and maybe a brief note, have had their entries taken in—if their letter arrived by deadline-time.

So that's it once again. Keep those letters rolling, and tell us the news of your doings, addressed as ever to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ, and post it to arrive before May 24.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for June issue: May 3)

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

AS this comes to be read, outdoor activities, visits, and such-like goings-on add to the attractions of Club life, while the bands are all but through their spring peak, all of which is reflected in the reports, one way or another. Perhaps a Club session could be profitably filled by having a working party look over the gear; aerials, masts, tents, generators, all need some care and maintenance after their winter hibernation—and provide a means of filling, maybe, an awkward gap in the programme.

The Reports

First, the clubs with no "local" affiliations. The first of these is **British Rail**, who have a very interesting, even if slightly late, Newsletter, once again with comments from Stateside.

B.A.R.T.G. caters for the radio teleprinter section of Amateur Radio activity—the boys with RTTY gear, both transmitting and SWL. Perhaps the main items to be noted is the convention, which once again will be held at Meopham Village Hall, in Kent. June 30 is the date for this, with visitors being met, if needed from the railway station. All the details from G3VZV—see Panel, p.168.

For **R.A.I.B.C.** this is the time for the Statement of Accounts, which shows, despite rising costs, an offset in terms of increased subscription income, and a most satisfying situation revealed of practical help by way of the provision of radio gear, receivers, transmitters, etc., to members who are invalid or blind. And, for the first time, those same members are going to have their own "do" by way of the Picnic at the Fairground, Broadlands Estate, Romsey, on May 20. Trains from Town will be met on prior request; for those coming by road, the

A.27, Romsey by-pass, is the route to take.

Nigerian next, where there still seems to be the scent of new licences in the air—one sincerely hopes the negotiations bear fruit, which must mean an influx of new members into the society.

A.R.M.S. are running a membership campaign, to garner in as members all the chaps with a /M ticket. One thing is certain that, for the lads who join, one of the benefits, aside from the *Mobile News*, is the advice service on such things as vehicle suppression. Details of membership can be obtained by dropping a line to G3FPK (see Panel).

The **Royal Signals** group has well over 900 members, of whom some 700 are licensed. Membership is open in full to serving or ex-Royal Signals chaps, or as associate to past and present members of the British Army, T.A.V.R. and Commonwealth Signals Corps—all these despite the title limitation. Details from the Secretary, as in Panel, p.168.

South & East

Harrow start the ball rolling in this part of the world; they have a weekly session on Friday evenings, at the Harrow Sea Cadets Association Hq., Woodlands Road. May 4 sees a Junk Sale, and on the 11th Commander Marshall Turner of the Sea Cadets will talk on a topic of his own choice. May 18 is a Practical, and a week later the results will, hopefully, be entered in the Construction Contest.

At **Reigate** they have a monthly formal get-together and another informal. The latter comes up on May 1, at the "Marquis of Granby," Redhill, while the formal session, on Direction-Finding, is down for May 15, at

Group of Spalding & District Amateur Radio Society members taken during their visit to the Post Office Coast Station Humber Radio (GKZ, near Mablethorpe, Lincs.) which covers a wide range of maritime frequencies and Services.



St. Marks Church Hall, Alma Road, Reigate.

The lads at **Bedford** turn up once each week at the Dolphin, Broadway, Bedford, on Thursdays. May 3 is a Junk Sale, and on May 10 they have an Inventors' Club. May 17 sees G8HGW talking about Digital Techniques in Communications, and on May 24, G5AGU and G4AHE get together on the dais to present equipment for D/F on 144 MHz.

G3GEH is ever-present in this clip, with news of the **Acton, Brentford and Chiswick** events; this time, on May 15, G3CCD is to open a discussion on Speech Processing Techniques for SSB. As usually, the meeting is at the Trades and Social Club, 66 High Road, Chiswick.

A new Hq. is to be noted for **Kingston** who now have a billet at the 5th Tolworth Scout Group Hq., Stirling Walk, Raeburn Avenue, Surbiton, near Surbiton Lagoon. We understand the new place has "distinct possibilities," for a future permanent Club station and aeriels. The date for you to go and see is May 9, when there will be a Junk Sale, with the usual 10% cut for the funds.

Saturday May 19 is the date, Emmanuel Church Hall, Barry Road, London S.E.23 the venue, and G3OOU the speaker, for the **Crystal Palace** group meeting. Sad to say their last month's "special" a repeat of G5CS's

lecture at the IEE, on the "First Five Years of Wireless" was not noted in time for our deadline; a combination of their bringing their date forward a week, plus the rail chaos, meant that G3FZL's letter just missed this piece.

Chiltern's chaps are taking an interest in the art of Slow-Scan TV, according to their current programme. There is a talk on the subject down for May 23, as well as the informal on May 8. Both these are at the Ernest Turner works canteen, Totteridge Avenue, High Wycombe.

Well organised are the folk at **Dunstable Downs**, with every Friday from March to June accounted for in a newsletter printed around New Year time. For May we note a couple of "between weeks" on the 4th and 18th. May 11 is for G6JP to talk about 430 MHz PA stages; there is a two-metre D/F Hunt on May 13; and on May 25 G8FAL will be showing his 6-amp PSU for a Pye Cambridge, and also talking on RF Power measurement.

Another Club has to record a change of venue, namely **Stowmarket**, who now have a booking for the *first Monday* in each month at the Adult Centre, Stowmarket High School, Onehouse Road, Stowmarket. At the time of writing, they are in the middle of a series of lectures on the mechanics of getting on the air.

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.
 BEDFORD: J. Bennett, G3FWA, 47 Ibbett Close, Kempston (2427), Bedford.
 BISHOPS STORTFORD: E. P. Essery, G3KFE, 17 Ascot Close, Parsonage Lane, Bishops Stortford (52501), CM23-5BP.
 BRADFORD: R. Harker, 65 Whitby Road, Bradford (43971), BD8-9JN.
 B.A.R.T.G.: G. P. Shirville, G3VZV, 2 Bradford Way, Toddington (2470), Dunstable, Beds.
 BRITISH RAIL: L. C. Carter, G3ILC, 35 Barnfield Gardens, Kingston-upon-Thames, KT2-5RH.
 BURY & ROSSENDALE: J. D. Clifford, G4BVE, 10 Arley Avenue, Bury, BL9-5HD, Lancs. (061-764 3466.)
 CHELTENHAM (RSGB): E. Janes, G2FWA, Hillside, Bushcombe Lane, Woodmanocote, Cheltenham. (Bishops Cleeve 2229.)
 CHILTERN: F. S. G. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks. (Penn 4240.)
 CORNISH: H. Webster, G3XTF, Crandale, Gillyfields, Redruth (6905), Cornwall.
 COVENTRY: G. Whenham G3TFA, 33 Chapel Street, Bishops Itchington, Warwickshire.
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London S.E.23. (01-699 6940.)
 DENBY DALE: J. Clegg, G3FQH, 8 Hillside, Leak Hall Lane, Denby Dale, HD8-8QZ. (Skelmanthorpe 2390.)
 DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (2193), DE3-7GE.
 DUNSTABLE DOWNS: C. G. Powell, G8BPK, 1 Wenwell Close, Buckland Wharf, Aston Clinton, Aylesbury (630600).
 ECHELFORD: V. W. Higgs, G3VWJ, 205 Commercial Road, Staines (57021), Middx., TW 18-2QT.
 EDGWARE: A. J. Masson, G3PSP, 62 Coldharbour Lane, Bushey, Herts., WD2-3NY. (01-950 6827.)
 HARROW: L. Light, G3KDL, 22 Chippenham Avenue, Wembley.
 HEREFORD: S. Jesson, 181 Kings Acre Road, Hereford (3237).
 HULL F. Moss, G8GDD, 334 Ings Road, Kingston-on-Hull, HU8-ONA.
 KINGSTON: R. S. Babbs, G3GVU, 28 Grove Lane, Kingston-on-Thames. (01-546 2801.)
 LINCOLN: F. Day, G4BXL, 5 St. Marks Avenue, Cherry Willingham, Lincoln (51058), LN3-4LX.

MEDWAY: H. E. Willis, 111 Laburnum Road, Strood, Kent. (Medway 76953.)
 MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham 32. (021-422 9787.)
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill (3552), Sussex.
 NIGERIAN: The Hon. Sec., Nigerian ARS, P.O. Box 2337, Lagos, Nigeria.
 NORTH BUCKS: R. J. Pye, G8AAT, 7 Meadow View, Potterspury, Towcester. (Yardley Gobion 640.)
 NOTTINGHAM: S. Claringburn, 49 Fernleigh Avenue, Westdale Lane, Nottingham, NG3-6FN.
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, Woodclose, Penselwood, Wincanton, Somerset.
 READING: D. King, 34 Crawshay Drive, Emmer Green, Reading RG4-8SY.
 REIGATE: F. H. Mundy, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.
 ROYAL SIGNALS: Captain (TOT) J. Cooper, Royal Signals, Blandford Camp, Blandford Forum, Dorset.
 SALTASH: J. A. Ennis, G3XWA, 14 Station Road, Saltash.
 SLADE: J. E. Drakeley, G8GRC, 186 Conway Road, Chelmsley Wood, Birmingham 37.
 SOUTHGATE: J. Batchelor, G3XMV, 22 Faversham Avenue, Bush Hill Park, Enfield. (01-360 6537.)
 SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire.
 SPALDING: R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs., PE11-1QX.
 STAR: T. Leeman, G4BUU, 115 Asket Drive, Seacroft, Leeds, LS14-1HX.
 STOWMARKET: A. P. Ashton, G3XAP, 30 Ford View Road, Stowmarket, IP14-2BL.
 SUTTON & CHEAM: J. Korndorffer, G2DMR, 19 Park Road, Banstead, Surrey.
 TORBAY: Mrs. G. Western, G3NQD, 10 Truro Avenue, Hele, Torquay.
 VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford, Herts., WD2-5JQ.
 WIRRAL: A. Fisher, G3WSD, 34 Glenmore Road, Oxtou, Birkenhead.
 WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton, WV3-7LX.
 WORCESTER: B. A. Jones, G8ASO, 12 Woodside Road, Larkhill, Worcester (29208), WR5-2EG.
 WORTHING: G. Hooper, G8ETL, 12 Bramble Crescent, Durrington, Worthing (62013), Sussex.
 YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.

The Guernsey Radio & Electronics Society have Hq. at The Lodge, La Corbinerie, Oberlands, St. Martin's, this being taken on the occasion of their annual construction contest, when GC3YIZ (right) received the cup from GC8BM0. There was a good entry, the winning one being an SS/TV monitor.



North Bucks. have an interesting one down for May 14, namely a lecture on British Rail Telecomms. The Hq. for this is at Wolverton Youth Club.

"To be announced," says the Secretary regarding the **Edgware** date on May 10; and of course there will be an Informal on May 24, as usual. Hq. is at the Watling Community Association, 145 Orange Hill Road, Edgware.

Before the weekly meetings of the *Worthing* group get going at 8.0 p.m. the room is occupied for thirty minutes with Morse practice for the keen types. As for the rest of the evening, we see a lecture on May 1, and

a Junk Sale on the 8th. G3JHM has a talk to give on May 15, on VHF topics, and both May 22 and 29 will be occupied with NFD preparations.

Good stuff at **Cray Valley**, where on May 3, G3VUU will give a talk on "TVI, Causes and Cures," The Natter evening is on May 17; both dates are booked at the United Reformed Church Hall, Court Road, Eltham, London S.E.9.

The second Thursday in each month is the date for the **Southgate** meeting. However, should you feel like attending, it would be as well to contact G3XMV,



Amateur Radio at the Shelburne Youth Club, Hornsey Road, London, N.7, where they get together on Monday evenings, 7.0 to 9.0 p.m. They have their own call G4BXW and the instructor is G3SLF (right).

at the address in the Panel, p.168, as there are indications that a change of Hq. address is very much on the cards.

Up North

The cannibals must have been raiding in force in these parts, for hardly a letter is to be seen in the clip!

One of the survivors is at **Lincoln**, where there is to be a talk on May 2; an Open Night on the 16th; films on the 23rd; and a treasure hunt on the 30th. However, G4BXL forgot to mention the Hq. address this time, so for that detail we must refer you to him, as Secretaries' Panel, p.168.

However one may feel about a scribe forgetting to mention the Hq. address, how about a chap who forgets the *name of the Club* he writes for? Luckily, we know that handwriting of old—it comes from **Nottingham**, and tells us to look for them on Thursday evenings at the Sherwood Community Centre; as they have just had the AGM, it was not possible at the date of his letter to give much more detail than that.

No less than 151 members fully paid up is the proud record at **Derby**, making them one of the strongest Clubs in the country—and maybe the G2CVV stint of nearly 25 years as hon. secretary has something to do with that! Wednesdays are the main meeting-nights,

at 119 Green Lane, Derby. May 2 is a Surplus Sale; May 9 a Surprise Night; and May 16 a D/F Practice Night. Then comes a tape-and-slide talk on their trip to Andorra by the Nottingham lads, which is also a Ladies' Evening. Finally on the 30th, there is a film show.

Midlands

First we visit **Wolverhampton** where the venue is at Neachells Cottage, Stockwell End, Tettenhall on Monday evenings, May 7 being a home-construction contest, and May 14 a Natter. May 21 is for the two-metre Project under G8ENP and the 30th is the committee evening. In addition, there is a Morse class, which runs on Fridays at Hq.

Midland have their place at the Midland Institute in Margaret Street, Birmingham, where, on May 15, they have a talk on RTTY by G3MNV.

Alternate Fridays is the routine at **Slade** in their Hq. at the Committee Room, Church House, High Street, Erdington, Birmingham; this gives us May 4 for a talk on "How to Make a Portable Receiver in an Evening," by G3JZF, and May 18 for a session topic for which has yet to be settled.

Coventry get together on May 4 and 18 for a Night-on-the-Air, between which falls the 11th, which is a Two-metre session, and then the 25th, on which date there is a possible visit to Elmdon Airport.

Now to **Bury and Rossendale** who have their monthly meeting on May 8, when there will be a Quiz at home, against the Blackburn crowd. The address to look for is the George Hotel, Market Street, Bury.

The lads at **Worcester** are on the move again, this time to a room at the Old Pheasant, a black-and-white building in New Street, Worcester. On May 7, there is to be a talk on the Navigation and Docking of the Mammoth Tankers, while on May 19, the plot for NFD will be unrolled.

May 3 is the date for the regular monthly sessions of the **Cheltenham RSGB** group, at the Royal Crescent Hotel, Cheltenham, when Freddy Butler will be, mainly, talking about Power Control, with, doubtless, asides on other subjects. On May 17 comes a limited-number party to the Police Headquarters in Lansdown Road; please notify G8ML if you wish to be in on this one.

Unfortunately we are not quite up to date on the doings of the **Wirral** group—but we can say that they are to be found on the first and third Wednesdays in each month in their temporary Hq. at the Community Centre, Carr Bridge Road, Woodchurch, where the entrance is through the large doors on the left side of the building.

Western Parts

Perhaps the entrance to the West is through **Reading**, who write to advise us they get together on Tuesdays May 8 and 22, between 7.30 and 9.30 at their Hq. the Clubroom, the White Horse, Kidmore End Road, Emmer Green, and add that all visitors will be welcome.

A new venture for the **Torbay** gang is a news letter, first edition of which seems to be a winner. A sad event for this club recently was the death of G5IP at 85 years of age; members of the group were in attendance at the funeral to pay their last respects. For May, they have May 26, and they split the time between getting

SHORT CLUB NOTICES

CLUB NAME	HEADQUARTERS LOCATION	MEETING MONTHLY
Bishops Stortford	British Legion Club, Windhill	May 21
Bradford	Bradford Liberal Federation, 10 Southbrook Terrace, Bradford 7.	May 1, 15, 29
Cornish	SWEB Clubroom, Pool, Camborne	May 3
Denby Dale	Denby Dale Parish Hall	May 30
Echelford	St. Martins Court, Kingston Crescent, Ashford	May 14, 31
Hereford	Civil Defence Hq., Goal Street	May 4, 18
Hull	592 Hessle Road, Hull	May 4, 11, 18, 25
Medway	Aurora Hotel, Gillingham	May 4, 11, 18, 25
Mid-Sussex	Marle Place, Leylands Road, Burgess Hill	May 3, 17
South Manchester	Sale Moor Community Centre, Norris Road, Sale	May 4, 11, 18, 25
Spalding	Ship Albion, Spalding	May 18
Star	New Inn, Bramley Town Street, Leeds 13	May 2, 9, 16, 23, 30
Sutton & Cheam	The Harrow, Cheam	May 15
Verulam	Market Hall, St. Albans	May 16
Yeovil	Youth Centre, Park Lodge, Yeovil	May 3, 10, 17, 24, 31

N.B.—In each case, the Secretary's name and address appears in the Panel, p.168.

At the recent annual dinner of the Scarborough Amateur Radio Society, G3TKX (right) received a memento in appreciation of his long service to the Society as hon. treasurer. The presentation was made by G3JBR, their president.



ready for NFD and having a Junk Sale, at the Hq., rear of 94 Belgrave Road, Torquay.

Saltash revive their *Tamar Pegasus* in newsletter form; and they have also taken the trouble to write as well, to remind us that Burraton Toc H is still "home," on alternate Fridays, but, sad to state, they gave us the dates for April! Not to worry, just look up the secretary's address in the Panel, and drop him a line.

Finale

And that's the lot for this month. For next time, your news and views for June, addressed as ever to "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ, to arrive on (or before if possible) May 3. Sorry it's so tight, but that's the way the Calendar runs! Closing dates following are June 7 and July 5—and don't be late.

R.A.I.B.C. FINANCES

The latest statement covering the activities of the Radio Amateur Invalid & Bedfast Club shows that, during the last year, £645 was spent on the purchase of equipment for members. Donations totalled £816 and the printing and distribution of *Radial* (their monthly newsletter) cost £321, of which postage alone accounted for £193. Interest-bearing investments at year's end totalled £624, showing that R.A.I.B.C. is in a sound financial position. This is, of course, mainly due to the fact that no administrative expenses are incurred, all that necessary work being done *gratis* by the Woolleys, G3LWY and her husband G3ESR.

DAILY SLOW MORSE

The Royal Air Force Amateur Radio Society now has a regular schedule of Slow Morse transmissions at 5-15 w.p.m. going out on Monday-Friday evenings, starting at 7.30 p.m. clock time, for about half-an-hour. Frequencies are 1910, 3590 kHz and 144-024 MHz in the two-metre band. The callsign used is G3RAF, emanating from the R.A.F. Station at Locking, Weston-

super-Mare, Somerset, Hq. of the Society. Eight operators are available for the duty and transmission is by auto-Morse tape—so you get as nearly as possible "perfect" Morse. Those using the service are invited to drop a line to the Asst. Hon. Secretary, RAFARS, G3GNS, *QTHR*, or to Locking, with a comment on results at the listening-frequency used. It should be noted that all these Slow Morse transmissions are provided quite voluntarily in the interests of Amateur Radio.

INTERNATIONAL SCOUT FREQUENCIES

For regular communication on the amateur bands and for Scout net operating purposes, the following frequencies are in use: CW 3590, 7030, 14070, 21140 and 28190 kHz, and for Phone 3740 (3940 in U.S.) 7090, 14290, 21360 and 28990 kHz.

The regular Scout Nets are: For the U.K., Saturdays on 3740 kHz at 9.0 a.m. clock time; *European Net*, Saturdays at 0930z on 14290 kHz; *Australian Net*, fourth Sunday evening every month on 14120 kHz at 2300z. There is also a Scout World Net each Saturday evening at 1800z on 21360 kHz.

* * * **THE MOBILE SCENE** * * *

FURTHER FIXTURE DETAILS

The Mobile Rally Calendar now looks to be about full up, there being no less than 19 events scheduled (of which two will have taken place by the time this appears).

That on April 1, the annual White Rose Rally at Leeds, is reported as having been a great success, attracting all of 2,000 visitors, with brisk business round the trade stands and 56/M's worked by the Top Band (25) and two-metre (31) talk-in stations, respectively signing G3XEP/A and G4BAO/A.

As in previous years, we shall be very glad to have reports (and good pictures, please) as quickly as possible after an event, for coverage in these pages. Send to: "Mobile Scene," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

THE RALLY CALENDAR

- May 6:** Tulip-Time Rally, at Sunfleet on the A.16, four miles north of Spalding, Lincs.—Information from R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs.
- May 13:** South Leicestershire Mobile Rally at Westfield Activity Centre, Rosemary Way, Hinckley, opening at 11.0 a.m. Talk-in by G3ZOP/A on Top Band, G8CGW/A on two-metre AM/FM, and G3WPB/A on 2m. SSB. There will also be a bring-and-buy stall. Trade stands are to be organised and applications are invited. Details from J. Elliott, G8CGW, 92 Hinckley Road, Barwell, Leicester.
- May 20:** RAIBC gathering at the Fairground, Broadlands Estate, Romsey, Hants., in conjunction with the Southampton Group—Mrs. Frances Woolley, G3LWY, Woodclose, Penselwood, Wincanton, Somerset.
- May 20:** Otley Radio Society's Northern Mobile Rally at Moor Grange School, Ring Road, Leeds, offering all the usual attractions.—D. G. Mott, 17 Newall Carr Road, Otley, Yorkshire.
- May 27:** Maidstone Mobile Rally at YMCA Sports Centre, Melrose Close, opening at 11.0 a.m. All main events under cover, talk-in by GB3YSC on 2-4-80-160m. Contact A. S. Walter, G3WXL, 4 Oak Farm Gardens, Headcorn, Kent.
- May 27:** Hull & District Mobile Rally at Bishop Burton, East Riding College of Agriculture, on the A.1079, York-Beverley, with entertainment and attractions for the whole family, trade stands and a raffle. College grounds will be open from 12 noon, and the talk-in stations, G3AMW/A on 1981 kHz and G8GBY/A on 145.5 MHz come on the air at 11.0 a.m. Rally organiser is L. D. Colley, G3AGX, 13 Ferry Road, Wawme, near Hull, East Yorks., HU7 5XU.
- May 30-June 2:** Rally to be held in conjunction with the Bath & West and Southern Counties Show at Shepton Mallet, a well known and very popular event in the West Country. GB2BWS will be on 3710 kHz or near, depending on QRM, and it is hoped to have talk-in on two metres as well for the period of the Show. Operator assistance is invited, with free car/caravan entrance and parking for helpers. It is proposed to have a dinner for radio amateur visitors on Friday, June 1. Contact: R. B. Holman, G2DYM, The Old Saw Mills, White Ball, Wellington, Somerset.
- June 10:** The fourth Elvaston Castle Mobile Rally in the grounds of the Castle Country Park, off the B.5010 south-east of Derby. Talk-in on 2-4-160m. by G3EEO and G3ZBI. A bring-and-buy sale and various other attractions.—I. Cage, G8GBV, 25 Petersham Drive, Alvaston, Derby, DE2 0JU.
- June 17:** The Amateur Radio Mobile Society's Rally will be held at R.A.F. Station, Cosford, on the A.41 about eight miles north-west of Wolverhampton, with talk-in on Top Band and two metres. Of particular interest is that the R.A.F.'s own Historic Aircraft Museum is at Cosford, and will be open to Rally visitors. A large trade show is being organised and will be accommodated in a big hangar—business men interested in the Amateur Radio trade are invited to get in touch immediately with the A.R.M.S. exhibition manager, S. Barwick, 34 Malvern Road, London, N8 0LA. For further details: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2 1EZ.
- June 24:** West of England Mobile Rally at Longleat House, near Warminster, Wilts. This will be the usual good show, put on for many years now in a particularly attractive setting—the house and park alone are well worth a visit.—Rally details from A. H. Williams, G8CKJ, 58 Britannia Road, Kingswood, Bristol.
- July 8:** Upton-on-Severn Mobile Rally, organised by the Worcester & District Amateur Radio Club. Details: B. A. Jones, G8ASO, 12 Woodside Road, Larkhill, Worcester, WR5 2EG.
- July 15:** Annual Mobile Rally organised by the Scarborough Amateur Radio Society at Burniston Road Barracks, Scarboro', as in previous years. Details: P. B. Briscoombe, G8KU, Roseacre, Irton, Scarborough, Yorkshire, YO12 4RL.
- August 12:** Torbay annual Mobile Rally at Newton Abbot Rugby Club ground, with talk-in, the usual stands and competitions.—L. H. Webber, G3GDW, 43 Lime Tree Walk, Newton Abbot, Devon.
- August 12:** The 1973 Mobile Rally at Derby, organised by the Derby & District Amateur Radio Society, to be held at the Rykneld School in Bedford Street, as in previous years. Ample accommodation if wet, free entrance and plenty of parking space, many attractions for all comers. This is a well-established annual event, which regularly attracts a large attendance.—F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby, DE3 7GE.
- August 19:** Preston (North Lancs.) Annual Mobile Rally at Kimberley Barracks, Deepdale Road, Preston, Lancs., with free car park, trade stalls, refreshments and a bring-and-buy offering. Talk-in will be given on Top Band and two metres.—Contact man G. W. Earnshaw, G3ZXC, 12 Withy Parade, Fulwood, Preston, Lancs., PR2 4JN.

A firm well known in the Amateur Radio trade is J. & A. Tweedy, Ltd., of Chesterfield, Derby. They were at the White Rose Rally, Leeds, on April 1, with a well-stocked and attractively laid out stand.



August 26: Town & Country Festival Rally, National Agricultural Centre, Kenilworth, Warwickshire.

September 23: Harlow & District Mobile Rally, this year at Netteswell School, Harlow, to give more space and scope for their activities.—V. Heard, 106 Vicarage Road, Harlow, Essex.

SPECIALLY ON THE AIR

The Ministry will grant "for duration only" licences for AT-stations to be mounted for some special public occasion—such as shows, fêtes and similar events of immediate local interest. The callsign is issued to a licensed amateur who takes responsibility for the operation of the station under the usual radio amateur regulations.

Applications should be made to MinPosTel, Radio Regulatory Division, Amateur Licensing Dept., Waterloo Bridge House, Waterloo Road, London, SE1 8UA.

Where these licences are granted and publicity is desired in this space, please set out notices in the form shown here—noting that we also want the name/QTH of the contact man responsible for the operation of the station and the handling of QSL's. Address to: "Specially on The Air", SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

GB3STF, May 12-13: From the Grammar School, Priory Road, Spalding, Lincs., by the Spalding & District Amateur Radio Society, running CW/SSB on all bands 10-160m. (and AM on two metres), all contacts to be confirmed by special QSL card—Details from R. Harrison, G3VPR, 38 Park Avenue, Spalding, Lincs.

GB2OCC, May 16-June 15: To be operated by Keele University Amateur Radio Society, in co-operation with other North Staffs. groups, for the Newcastle-Under-Lyme Octocentenary Charter Celebrations. Operator and SWL assistance is requested for station manning. Contact G3COY or G3UOK, QTHR, telephone *Stoke-on-Trent* 44875 or *Keele Park* 371, exten. 128.

GB3LEC, May 19: For the Long Eaton Carnival, to be held at West Park, Long Eaton, Nottingham, organised by the Radio Club of Nottingham, running SSB on 10-80m., and possibly two-metre A.M. All contacts confirmed by special QSL card.—A. Veitch, G8FRB, QTHR.

EI0DMF, May 18-27: Operating evenings from 5.0 p.m. clock till midnight, on all bands Ten to Eighty, for the Dundalk Festival.—W. Scully, 48 Woodland Drive, Ard Easmuinn, Dundalk, Co. Lough, Eire.

GB3HCF, May 25-June 3: For the Hereford Cider Festival, mounted by the Hereford Amateur Radio Society, running all HF bands (but mainly 20m. and 80m.) also RTTY. Enquiries: S. Jesson, 181 Kings Acre, Hereford, HR4 OSP.

GB2FJE, June 13-14: From the Shefford Community Centre, put on by the Shefford & District Amateur Radio Society, operating 2m. and 160m. AM, 10-15-20m. SSB. Contacts to be QSL's by special card.—D. Pike, G3VMI, 11 Hazel Grove, Stotfold, Hitchin, Herts.

GB3HCW, June 30-July 7: Operating all bands Top to two metres, with three stations on the air. This event is in conjunction with the Hanworth Carnival Week.—V. W. Higgs, G3VWJ, 205 Commercial Road, Staines, Middlesex, TW18 2QT.

VHF BANDS

A. H. DORMER, G3DAH

THE event of the month must be the Auroral opening affecting Two and Four Metres on Sunday, April 1. This would appear to have been the best experienced for some years, with DX at 59A from as far afield as UR2. The first characteristic T5 signals appeared shortly after lunch time in the North and around tea time in the South, and the second phase started mid-evening and continued until well after midnight. Due to a move of QTH at this time (Murphy and his Law) your scribe missed it all, but prolific reader reports fill in the gap, and extracts are quoted below which give a synoptic picture.

GM3KJF in Ayr had 68 contacts, on SSB. **GM3ZVL** (Edinburgh) had 35 QSO's with five countries and 22 counties, many with 59A reports. **GM3ZVB** had 50 contacts, including 35 G's, and describes the opening as "fantastic." **GM3ZBE** (Aberdeen) observed the two phases of the aurora, the first lasting from 1636z to 1750z, and the second from 2130z to 0019z. He had a total of 39 contacts of which nine were on phone and the remainder on CW, and was pleased to hear the number of GM4's and G4's up on their keys. He was getting *Ar* signals from DLØPR the following evening with the beam heading much further to

the North than on the previous day, but no amateur signals were heard. **GM8FFX**, also from Aberdeen, reports the first phase as lasting from 1345z to 1830z and the second from 2200z to 0030z on the Monday morning. Between them, he and **GM3ZBE** worked 80 stations in eight countries and during the first phase Graham had 14 contacts while mobile with a *Liner 2!*

From up in Forfar, **GM2DRD** sends in a comprehensive list of stations worked which seems to include most of the DX reported from other parts of the country; he also noted an impressive visual display for much of the time. On April 1 he made 61 contacts before midnight but then had seven more *Ar* contacts early the following evening. Jim also draws attention to a brief spell of *Ar* activity on the evening of March 19 and again on the afternoon of March 25, when **G3LTF** was 58A at times. According to **GM3DIJ**, 70 MHz was alive with *Ar* signals, many of them from aircraft beacons.

GW8FOL (Anglesey) had his first-ever contact *via* Aurora on March 19, and was also up for the April 1 event. First *Ar* signals were logged during 1600-1800z and later over 2000-0010z. Best DX was **GC8AAZ**, (most unusual for the effect to be observed so far South) and the total worked amounted to 52. **GW3ZTH** (Glamorgan) reports *Ar* activity over 2040-0010z, with best DX as **GM3ZVL** (59A both ways just before midnight)—but it may be that his QSO with **GM3OXX** just prior to that may prove to have been better since 'OXX runs very low power. Joe also recorded the Auroras of March 19/20, but was unable to raise anybody.

GW3WRE (Glamorgan) worked two SM, five GM and a string of G's during the afternoon phase. **GW8DUP** in Swansea made it with four GM's and **G13RNO** on SSB, including **GM8FFX/M!** **GW8EHK** (Port Talbot) on SSB had his first contact at 1615z and the last at 1825z. He notes that there was much CW activity at times when the higher frequency SSB channel appeared dead. For him, the second phase started at 2100z and lasted through to 2330z, signals being much weaker than during the afternoon. (For

example, **GM8BKE** was 58A at 1620z and 53A at 2130z).

GD2HDZ found that *Ar* conditions had developed by 1615z and continued for about two hours. The evening phase appeared at 2040z and lasted until 0015z. GM, GI, PA and DC were all worked, with OZ and F heard but got away. All his contacts were on SSB.

G8FUI (Dudley) raised GI, GM, G and GW and remarks that **GW8FOL** was audible for some time before other stations appeared. LA and SM are still get-aways for **G3BW** (Cumberland), although he made it with PA and DL and a whole host of G, GW and GM.

For **G3COJ** (High Wycombe) this was the best auroral opening he had ever encountered. He missed the start of the first phase but logged the close at 1825z and at 1855z on 4m. Phase 2 started at 2045z and yielded a contact with **G13RXV** on 4m. QSY to Two produced contacts with **GM3ZVB**, **GM3ZVL**, **GM2DRD** on CW and **G13RNO** on SSB. A string of G's preceded a contact with **GM3UAG** on both 2m. and 4m. Around 2330z the real DX was coming in and Brian worked **LA5UG**, **UR2HD** and **SM5AII**, among others. He also heard **UR2CO** working **G3BHW** ('BHW also worked **UR2CQ**). By midnight the EU/DX had disappeared, but GM was still very strong. On April 2, **GM2DRD** was heard auroral at 1820z, but, as elsewhere, the effect was short-lived. '3COJ also reports that **DK1KO** was heard with a auroral note on 70 cm.—one of the very few occasions on which this band has been subject to *Ar* effects, although reports of contacts on that band have come from the States.

Both first and second phases brought some good DX for **G8DNK** (Bradford) who comments further that optimum beam headings appeared to be due East for the EU and North-East for the G and GI stations! (An unusual contact was that at 59A with **G8BCL** five miles away!)

Still in Yorkshire, **G3NHE** (Sheffield) first cottoned on to the fact that a two-metre auroral opening was in progress when he heard some very peculiar notes *via* Oscar, and a QSY to 144 MHz after the orbit quickly revealed the cause. He stuck

to CW and worked DJ, G, GW, GM, PA, SM, OZ and LA—24 contacts in all—and heard a further 30 stations including ON, DM and, unusually, OK. He also logged OH, SP and UR being worked.

G3XDY (Cleethorpes) raised the usual DX stations but reports an interesting two-way SSB QSO at 1620z with GW8FOL via Aurora while he, '3XDY, was mobile in Goole, Yorks, on his way back from Leeds Rally. A noticeable feature of this QSO was the complete absence of the usual flutter, indicating, possibly, that the signals were coming down at a fairly steep angle. Incidentally, the gear in the G3XDY car is pretty ambitious—an FT-101 into a transverter running 150 watts p.e.p. input with a halo on the roof. G3OHH (Mow Cop) caught the first phase at 1725z and lost it at 1915z, but during that time logged some very good DX and comments on the level of SSB activity. He noted GB3SU and Gdansk as both auroral on 4m. at the time. Beam headings was NE veering to NNE. G3OSS (London) worked G, GM, GI and GW and found the most consistent signal to be that from GM3BKE near Glasgow who was 59A for much of the time.

Finally, a most interesting and comprehensive report from G3USF at Keele University. His first comment concerns the exceptional number of low power contacts which were being made. He quotes as examples that between G8CFQ/M using a Liner-2 near Barton Airport and G8CFY in Nantwich, 58A at 1635z, and that between G8AMD (Sutton Coldfield) and a GM/M in Fort William. G8FCQ also reported that there appeared to be a Doppler shift of about 1 kHz on the G8CFY auroral signal compared with his tropo. signal a few minutes earlier. One marked feature was the fact that nearby stations were auroral at such strength as to constitute a major factor in the reception of what would normally be considered a local signal. First auroral indications on 2m. came as early as 1410z, although fewer EU contacts were made during the afternoon than during the second, evening phase. In text book manner, there was a lull until about 2050z, signals peaked at around 2130z and disappeared at 0015z. It was characteristic of this

opening that most SSB signals were much less distorted than is usually the case (suggesting a much higher than usual reflecting efficiency off the auroral curtain. *Editor*). G3USF took the opportunity to check on 10 metres during all this activity and noticed "burble" on G3NSA and G3BKS, both in the Manchester area. The afternoon 10-metre session also produced auroral tone on signals from UA1, SM2, DK, SM3, OH4, SM6, SMØ and LA. At 2234z and 2241z, non-auroral signals were received from W3 and at 2159z from W9. SM2 signals, which may have been at F2 rather than E's range, were also non-auroral. Altogether a very puzzling and complex propagation event. For the record, G3USF notes the following as providing the most consistent signals during the evening phase: GM2DRD, GM8BKE, GW8FOL, GD2HDZ, GI3RNO, GM3ZVL, G4BEL, G4BKP, GM3AUG, GM3OVB and GM3OXX.

Well, there it is—or was! Just when we shall get another opening like this is anyone's guess. It will, perhaps, be worth having a look at the band(s) with the beam NE on April 27/28 (just as this comes out). Though on the occasions when a repeat had occurred it was just a shadow of its former self, and

more often than not, there has been no repeat at all. Still, there had been considerable sunspot activity just before April 1, and one can only hope that the 27-day cycle will yield some results.

Oscar VI

Interest is waning somewhat and there seems to be little point in giving more than general comment this month. Most devotees are finding it difficult to work anything new and the repetitious exchange of quick-fire reports is becoming a bit of a bind. Operation is still intermittent, the 70 cm. beacon is off and reception of the 10m. marker rare. For those whose interest has not flagged, the predictions for May are given in our usual Table. It is not proposed to publish the Results Table this month (shortage of space is one factor) but please send in your up-to-date reports of *prefixes* worked for next month as usual.

Just to wind it up, GW3FSP has now had over 800 Oscar contacts, of which more than 300 are Trans-Atlantic. EI6AS has added UA9 to his total, giving him 32 countries and 437 QSO's. G3NHE has 500+ worked and 33 prefixes to his credit. G4AJC has now made it with TF to give him 28 countries, and also noted the effect of the April 1 Aurora on

OSCAR VI — Prediction Data

Orbit	Date	Time	Position	Direction
2525	May 5	0831	20°E	N/S
2526		1026	09°W	N/S
2527		1221	38°W	N/S
2530		1742	32°E	N/S
2531		1937	03°E	S/N
2532		2132	25°W	S/N
2537	May 6	0731	35°E	N/S
2538		0926	06°E	N/S
2539		1121	23°W	N/S
2543		1837	18°E	S/N
2544		2032	10°W	S/N
2545		2227	39°W	S/N
2700	May 19	0755	29°E	N/S
2701		0950	00°E	N/S
2702		1145	29°W	N/S
2705		1706	41°E	S/N
2706		1901	12°E	S/N
2707		2056	16°W	S/N
2708		2251	45°W	S/N
2712	May 20	0655	44°E	N/S
2713		0850	15°E	N/S
2714		1045	14°W	N/S
2715		1240	42°W	N/S
2718		1801	27°E	S/N
2719		1956	01°W	S/N
2720		2151	30°W	S/N

Times shown are for crossings at 52°N. Orbits beyond 45° E or W are not included. To calculate later orbits, deduct 5-15 minutes and add 1-29°E each 25 orbits. Orbits shown are for weekend operations only in view of the revised AMSAT procedure. Times in GMT. Easterly-Westerly positions in degrees relative Greenwich, 0°.

several orbits on that day. G6RH has added the following prefixes to his total: UK1, UT5, UQ6, UA0 and SM0.

On the subject of prefixes, since the Russian prefixes can now be claimed, the German ones may be treated similarly.

We will re-start the Oscar Results Table in forthcoming issues.

DX-Peditions

The Heriot-Watt A.R.S. plan an expedition to Lowther Hill in Lanarkshire for July 6-9. They will have gear for 4m., 2m. and 70 cm. and operating times and modes will be kept flexible to suit propagation conditions, with a bias in favour of CW. Skeds may be arranged through GM3ZVL, *QTHR*.

G8AGU and GM3JFG will again be portable in GM during June 18-29. This time they will have 2m. and 70 cm. and would welcome skeds on the higher frequency band, in particular. They will be starting in the Border counties and gradually working their way North. Frequencies are: 432.15 MHz and 145.4 MHz (SSB) and 144.05 MHz CW. Operation will be over 0715-0745 BST on SSB and CW—1900-1930 and 2000-2030 BST for 2m. SSB—and 1930-2000 and 2030-2100 BST for 2m. CW. From 2100 BST onwards, operation will be *ad hoc* with QSY to 70 cm. on demand on Two, or by previous arrangement. They will have 100 watts to a '640A on Two and 200 watts p.e.p. from a 4CX250B on Seventy. Skeds G8AGU, *QTHR*, and last-minute panics via G3BA, *QTHR*, who is the anchor man for this trip.

GM3YCQ/P will be operating from Kirkcudbrightshire on May 27 during the 2m. SSB contest.

Advance Notices: G8GGP and others are planning to be in Cardigan, Merioneth and Montgomery in August, on two metres.

GW4BLE and others intend to visit six of the rarer Welsh counties during the second week of August. Their two-metre gear, in a Ford Transit van, will be tested during Easter from Brecon.

VHFCC Awards

G8ECT (Coulsdon, Surrey) heads the list this month with a claim for Two-metre Award No. 182. He runs a Pye base station with a '640A at 30 watts input to a 6-ele.

About The VHF Spectra

beam at 30ft. and although the QTH is at 320ft. a.s.l., he is still at the bottom of a valley! Licensed as G8ECT in September, 1970, though he was, he held an "experimental receiving and portable licence" in 1923!

Roger Manners, GM3ZVL (Edinburgh) gains Award No. 183 for 2m. operations. He runs 40 watts into a 320A from a VFO controlled driver and receives on a 2N4416 converter into a HA-600A. The antenna is an 8/8 at 40ft. and the QTH at 250ft. a.s.l. is far enough away from the Pentland Hills to enable him to get out well to the East and South, although West and South-West are difficult.

Bryn Llewellyn G8DOT, gets two-metre Award No. 184. From Tiptree, Essex, he used a Pye Ranger with a home-built, VFO controlled, FM rig with a '320A PA. Currently, he has 50 watts input to a '640A feeding a 10/10 slot-fed Yagi at 40ft. The Sentinel dual-gate Mosfet converter feeds a Star SR-200 Rx.

It was a pleasant surprise to get a claim from Old Timer G2DRA of Harrogate, who gains Award No. 185. Ted has been on 2m. since 1952, but with a break of several years. He runs 20 watts input to a '320A with a 4/4 slot at 28ft. The converter is a Mosfet front-end job, and feeds into an Eddystone S.640—aged, but still efficient! Modulator is a pair of KT66's. The QTH is up at 560ft. a.s.l. with a good take-off to all points except due West. Operation is on two metres only at present, but plans are afoot to come up on Four also.

The Scottish Scene

The GM6XI QTH in Edinburgh was recently invaded by willing helpers to get up the two-metre 8-ele. and 70 cm. 46-ele. beams for Jack, who is active on both bands, and will shortly be running higher power.

SSB activity is on the increase in GM with GM5VG, GM6ZV and GM3BKE from the Glasgow area, and GM4AOR in Edinburgh all putting out fine signals, as is Harry

Mackie, GM3FYB in Dunfermline.

With the advent of Spring and (sometimes) better weather, mobile activity is also on the up-and-up, helped, one may guess, by the arrival in the area of a number of "Cambridges" suitably modified to give a tunable Rx and increased modulation. GM8GEC and GM3BQA in particular, seem to be much occupied with this aspect of Amateur Radio.

GM3OXX is back on 2m. and 70 cm. and has started his mountaineering feats again (he will be /P in Bute at the end of the month). GM8EKF, lately returned from Jersey, and much impressed by the hospitality of the GC local amateurs, is back on 2m. and reminding the locals that they are not the only ones who must patiently wait for contacts on the band.

Still waiting to get into a new QTH is GM3ZBE of Aberdeen. The site has already been tried out with very favourable results, as many contacts with GDY stations testify, and with the pair of 4CX250B's now available as a linear on 2m., Alec should get his share of the DX. He is also on 70 cm. SSB with a transverter and a '320A PA.

GM3ZVB has been climbing in the Lake District and took his 100 mW rig with him. With this gear, and a 19in. whip, he was managing QSO's at around the 50-mile mark! He and GM3ZVL, both of Edinburgh, would welcome CW skeds on two metres any evening after 10.30 p.m.

International VHF/UHF Convention

The 19th International VHF/UHF Convention was held at the Winning Post Hotel, Whitton again this year and the attendance was such that serious consideration is being given to finding a larger venue for this event. The lectures were particularly well supported, and it was standing-room-only for most of the time. Rather fewer visitors stayed for the dinner than was the case last year, and enquiries showed that rather

less business was done at Trade stands—but, once again, this was a very popular occasion providing, as these affairs always do, the opportunity of meeting old friends and making new ones in a congenial atmosphere.

News Items

Four Metres: EI6AS reports that the 4m. band in Eire has now been extended to cover 70-125 MHz—70-450 MHz. G3NHE (Sheffield) is now QRV on this band, as are EI4AL and EI7AF, the two latter both on SSB.

Two Metres: EI4AL and EI7AF will both be portable on 2m. SSB during the major VHF contests this year. EI5BH has SSB and RTTY on this band. EI4CF will be active on 2m. CW shortly. EI9Q is also on SSB and available most weekends. EI4AL was the first Eire operator to make a contact *via* Oscar 6.

G8DGR has a solid-state FM Rx under construction which will incorporate channel scanning and reckons that it is still cheaper to build one's own, even to this degree of sophistication, and certainly is more fun. G3KCR is now in a new QTH at 700ft. a.s.l. near Crowborough, Sussex. Although only running 10 watts of NBFM to an 8-ele. Yagi, he reckons on putting out a good signal and would welcome all or any contacts on this, his first experience of VHF.

G3XDY raises an important point in connection with 2m. talk-in stations at Rallies and on similar occasions: Now that large numbers of "Liner-2" equipments are in use, it behoves organisers of these events to cater for this sort of working as well as for the more usual modes.

70 Centimetres: A national amateur contest, organised by the British Amateur Television Group, will take place on June 30, 1700-2300z and 0800-1200z, on July 1. The contest is open to all amateurs licensed to transmit or receive A/TV. Full details from Brian Kennedy, G3ZUL, *QTHR*.

Tailpiece

An astonishing story, printed in the French magazine *L'Express*, has been sent in by a regular reader M. Bernard Stroh, and is summarised

THREE BAND ANNUAL VHF TABLE

January to December, 1973

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G4BEL	8	2	47	11	29	4	101
GD2HDZ	12	2	48	6	13	4	85
G3NHE	—	—	48	11	23	3	85
G8FUI	—	—	50	9	16	2	77
G8EOP	—	—	41	6	27	2	76
G3OHH	23	2	31	5	8	2	71
G3DAH	14	2	40	8	5	1	70
G2AXI	20	2	33	3	6	1	65
G3FIJ	15	2	27	5	14	1	64
G8DNK	—	—	53	10	—	—	63
GW8FOL	—	—	50	8	—	—	58
GW3ZTH	—	—	48	9	—	—	57
G8GNE	—	—	35	4	12	1	52
G3BW	—	—	43	8	—	—	51
G8FMK	—	—	30	2	16	1	49
GM3ZVB	—	—	39	8	—	—	47
G8BXX	—	—	28	2	15	1	46
G4AEQ	—	—	25	2	13	3	43
G3XDY	—	—	35	8	—	—	43
GM3ZVL	—	—	33	7	1	1	42
G4AJE	—	—	32	6	2	1	41
G3SMU	10	3	5	2	16	3	39
GW8DUP	—	—	31	7	—	—	38
G8DGR	—	—	28	2	6	1	37
GW8FKB	—	—	27	7	—	—	34
G8BKR	—	—	24	2	6	2	34
G4BKG	—	—	28	4	—	—	32
G8CBU	—	—	23	2	5	1	31
G8GNC	—	—	28	2	—	—	30
G8FQE	—	—	25	5	—	—	30
G8DOT	—	—	25	5	—	—	30
G8GPR	—	—	26	4	—	—	30
GW8EHK	—	—	20	7	—	—	27
G8COG	—	—	23	3	—	—	26
G8EMS	—	—	20	2	2	1	25
G4AEZ	—	—	21	1	—	—	22
G8GBV	—	—	14	2	3	1	20
G3WHK	—	—	17	3	—	—	20
G8GJB	—	—	17	3	—	—	20
GW3CBY	—	—	11	5	—	—	16
G8FUL	—	—	13	2	—	—	15
GW8CMA	—	—	11	3	—	—	14
G8GXE	—	—	12	1	—	—	13
G3EKP	4	2	2	1	2	2	13
GW8CGH	—	—	7	2	—	—	9

The Table shows claims to date from January 1, 1973 and runs through to December 31, 1973. Your claims should be sent to:—"VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ, each month as they accrue.

here without further comment. It appears that Duncan Lunan, a graduate of the University of Glasgow and a member of the British Interplanetary Society, has been examining the findings of two eminent scientists, Dr. Van der Pol and Professor Carl Stormer, who some years ago investigated the phenomenon of long-delay radio echoes. He has come to the conclusion that these may be attributed to the presence of an extra-terrestrial object circling Earth. Now, this

solution for LDE's has been postulated before—but E.M.I., at least, are treating the matter seriously enough to provide equipment to maintain daily transmissions for one year with the object of testing this theory. (A good deal of discussion on this topic is going on in the scientific press. It is not new—it is just strange. *Editor*)

Deadline

Deadline for the next issue is **May 5**, addressed: "VHF Bands,"

SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. Cheers for now and *73 de G3DAH*.

Stop Press: The French authorities are to launch a transponder on the morning of May 20. Up frequency: 432.1 MHz-432.4 MHz. Down frequency: 145.6 MHz-145.9 MHz. Power is 8 watts into horizontal dipole. Beacon on 145.2 MHz. Expected life is 8 days. Please listen and report.

NEW TROPO-SCATTER LINK

It is interesting to hear that the Marconi Company will be installing another radio communication path using the tropospheric-scatter mode of propagation—in effect, meaning as much power as possible on the highest attainable frequency. This one will be in the Persian Gulf, to link Abu Dhabi and the island of Das, 104 miles out in the Gulf. The frequency to be used for the punch-through will be 2,500 MHz and the transmitter power one kilowatt (not easy to achieve at that frequency). However, high-gain dish aerials will be placed at both ends, sufficiently elevated to clear the superstructures of the great 200,000-ton tankers operating in that area.

It just shows what engineering problems are involved in setting up reliable radio links of this sort.

OBITUARY

Having only recently had to announce the passing of Jack Drudge-Coates, G2DC, we now have to record, with the deepest regret, the deaths of three more old timers. Norman Spooner, G2NS, died at Southborne, Bournemouth, at the age of 75—he was one of the earliest regular contributors to SHORT WAVE MAGAZINE, starting in the pre-War days. Out in Australia, Alfred Perkins, VK2ZW (ex-G6KP, formerly of Morden, Surrey), died in March, and more recently Harry Marshall, G5IP (Dawlish, Devon), aged 85.



The new Racal-Mobilcal TRA.1338 is a commercial 25-watt SSB transceiver to cover a frequency range of 2.0 to 8.0 MHz, there being ten crystal channels which can be pre-set in that range. The design is solid-state, with output matching possible into virtually any type of aerial. Modes of operation are AM/CW/SSB and, being intended for mobile working, it is light and compact and runs off a 12v. negative-earth supply.

To keep in touch with the world of Amateur Radio, read "Short Wave Magazine" regularly — Independent, Unsubsidised and now in its 31st volume.

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. callsigns, as issued or changes of address of transmitters already licensed. All addresses published here will be 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.

- EI2CH**, G. P. Morgan, Porleek, Ravensdale, Dundalk, Co. Louth.
- G4BQT**, Radio and Electronics Society, Sorby Hall, Endcliffe Vale Road, Sheffield, S10 3ES.
- G4BTK**, A. G. Whitehouse, 24 Longfield Close, Amington, Tamworth, Staffs., B77 3BJ. (Tel. Tamworth 4636.)
- GM4BUI**, J. M. Simpson, 18 Binny Park, Ecclesmachan, Broxburn, West Lothian, EH52 6NP. (Tel. Broxburn 4100.)
- G4BUN**, H. Bunting, C.Eng., M.I.E.E., 34 Bowerfield Avenue, Hazel Grove, Stockport, Cheshire, SK7 6JA. (Tel. 061-709 3956.)
- G4BUX**, K. Bucey, Cold Wall Farm, Mellor, Stockport, Cheshire, SK6 5NH.
- G4BUY**, P. C. Hufton, 16 Patricia Drive, Arnold, Nottingham.
- G4BVA**, J. A. Edwards, 81 Hunter Avenue, Shenfield, Brentwood, Essex. (Tel. Brentwood 180.)
- GM4BVC**, G. R. Kelman, 2 Baillieswells Crescent, Bieldside, Aberdeen. (Tel. Aberdeen 48202.)
- GM4BVO**, C. M. Smith, 15 Strathmore Avenue, Kirriemuir, Angus, DD8 4DJ.
- G4BVR**, C. H. Pye, 54 Chester Road, Edmonton, London, N.9 8JG. (Tel. 01-807 4610.)
- G4BWB**, R. W. Andrews, 82 Wellington Hill West, Westbury-on-Trym, Bristol, BS9 4SN. (Tel. Bristol 49074.)
- G4BWN**, P. J. Funnell, 51 Bramhall Road, Bilborough Estate, Nottingham, NG8 4HU.
- G4BWQ**, P. T. Russell, 13 New Road, Bolter End, High Wycombe, Bucks., HP14 3NA.
- G4BWQ/A**, P. T. Russell, Church Farm, Boughton, Kings Lynn, Norfolk.
- G4BXD**, B. Nock (ex-G8ESY), 4 Park Crescent, West Bromwich, Staffs., B71 4AJ.
- GW4BXE**, P. Edwards (ex-GW8FJK), 1 Matthew Terrace, Pentrepiod, Pontypool, Mon. NP4 6PU.
- G4BXL**, F. Day, 5 St. Marks Avenue, Cherry Willingham, Lincoln, LN3 4LX. (Tel. Lincoln 51058.)
- G4BXQ**, A. Pressley, 22 Springbank Avenue, Farsley, Pudsey, Yorkshire, LS28 5LW.
- G4BXT**, P. Homer, 79 Gordon Road, Dartford, Kent, DA1 2LG
- G4BXY**, H. F. Barker, 372 Gosbrook Road, Caversham, Reading, Berks., RG4 8EG.
- G4BYP**, A. G. Scott, 74 Vale Road, Woolton, Liverpool, L25 7RN.
- G4BYY**, K. J. Plumridge, 219-A Priory Road, St. Denys, Southampton, SO2 1LR.
- G4BZW**, T. C. Clark, 78 Lansdowne Drive, Hackney, London, E8 3ER.
- G8GLQ**, C. A. Short, 175 Wellington Hill West, Westbury-on-Trym, Bristol, BS9 4QW. (Tel. Bristol 625502.)
- G8GND**, D. Crowe, 2 Cheriton Cottages, Ivy Dene Lane, Ashurst Wood, East Grinstead, Sussex.
- G8GOJ**, A. G. Hobbs, 83 St. Peter's Street, South Croydon, Surrey, CR2 7DG. (Tel. 01-688 2564.)
- G8GOZ**, 72 Catherine Road, Newton Hall, Durham, Co. Durham.
- G8GUP**, J. McGee, 6 Ripon Road, Newton Hall, Durham, Co. Durham.
- GM8GVQ**, A. H. Pardoe, 14 Kinkell Terrace, St. Andrews, Fife.
- GM8GVQ/A**, A. H. Pardoe, Madras College, St. Andrews, Fife.
- G8GXR**, Radio and Electronics Society, Sorby Hall, Endcliffe Vale Road, Sheffield, S10 3ES.
- G8HAA**, J. R. Wood, 28 Greenleaf Drive, Barkingside, Ilford, Essex.
- G8HAC**, J. J. Males, 12 Wantage Close, Moulton, Northampton.
- GM8HBU**, M. Parks, 6 Stamperland Hill, Clarkston, Glasgow, G76 8AE.
- G8HDR**, C. A. Lancaster, 16 Mill Road, Swanland, North Ferriby, E. Yorkshire, HU14 3PL. (Tel. Hull 633109.)
- G8HDZ**, P. Torrance, 4 Penpool Lane, Welling, Kent.
- G8HED**, I. S. Camm, 25 Sunnyhurst Lane, Darwen, Lancs.
- G8HEP**, B. P. Hughes, 46 Leinster Gardens, London, W2 3AT.
- G8HFP**, D. C. J. Matthews, 7 Foxgrove Gardens, Felixstowe, Suffolk, IP11 7JX.

CHANGE OF ADDRESS

- G2ABC**, R. A. Ledgerton, West Lea, Hugus Road, Three Milestone, Truro, Cornwall.
- GM3IBU**, A. W. Wright, c/o Procurator Fiscal's Office, Sheriff Court House, Kirkwall, Orkney Islands.
- G3KCR**, D. Payne, Bramley, Eridge Road, Crowborough, Sussex.
- G3KWW**, Dr. R. W. Wilkinson, Lower Stonehams, Pangbourne Hill, Reading, Berks.
- G3PBQ**, M. Keen, 71 Deakin Road, Erdington, Birmingham 24.
- G3RHU**, M. F. Stanbridge, 12 Hancock's Close, Leiston, Suffolk.
- G3TMQ**, R. J. Harrison, 30 High View Road, Farnborough, Hants.
- G3UGO**, Mrs. Edna Cooper, The Firs, Treskerby, Scorrier, Redruth, Cornwall.
- G3URA**, R. G. Whittering, Arnocks, High Street, Herstmonceux, Hailsham, Sussex. (Tel. Herstmonceux 3273.)
- GM3VEY**, F. Baxter, Carnegie Lodge, Sunnyside Royal Hospital, Montrose, Angus. (Tel. Hillside 217—Ext. 278.)
- G3XDS**, P. J. Wilde, 151 Avondale Drive, Hough Green, Widnes, Lancs., WA8 7XB.
- G3ZDR**, W. C. Stampton, 88 Wilberforce Way, Gravesend, Kent.
- G3ZJZ**, J. P. Mason, 35 Broadway, Hockley, Essex, SS5 5EL.
- G4AHJ**, M. E. Downey, 11 Woodlands Drive, Lepton, Huddersfield, Yorkshire, HD8 0JB. (Tel. Kirkburton 4789.)
- G4AKC**, D. S. Starkie, 31 Endsleigh Gardens, Blackpool, Lancs.
- GW8FVY**, R. T. Pill (ex-G8FVY), 73 Park Avenue, Mynydd Isa, Flintshire.

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READERS

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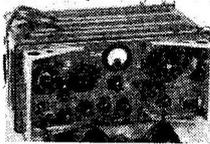
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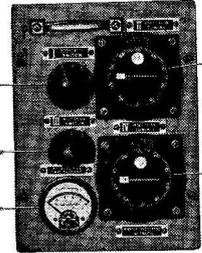
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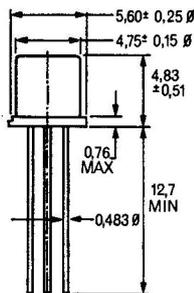
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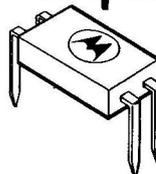
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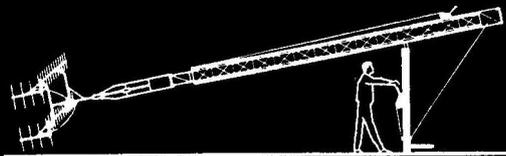
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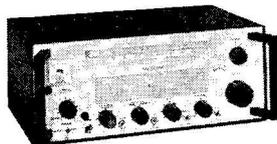
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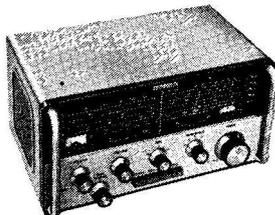
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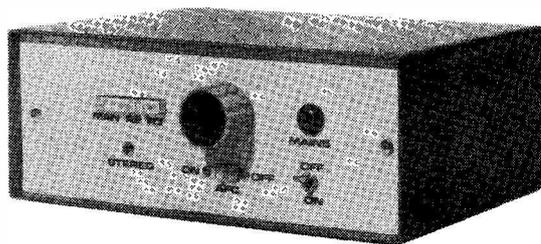
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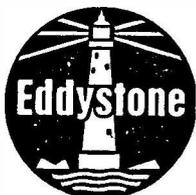
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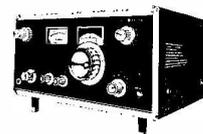
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