

*The*

# SHORT WAVE

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**WORLD WIDE COMMUNICATION**

# 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.**

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.

## SPECIFICATIONS

<b>Frequency Range</b>	80m. 3.5-4.0 mc/s. 40m. 7.0-7.5 mc/s. 20m. 14.0-14.5 mc/s. 15m. 21.0-21.5 mc/s. 10m. 28.0-29.2 mc/s. WWW 10.0-10.5 mc/s.
<b>Sensitivity</b>	CW SSB Less than 0.5 $\mu$ V for 10dB S/N ratio AM Less than 1 $\mu$ V for 10dB S/N ratio
<b>Selectivity</b>	$\pm 1.8$ kHz at -6dB ; $\pm 5$ kHz at -50dB
<b>Image Rejection</b>	More than 50dB
<b>Calibrator</b>	100 kHz (crystal optional)
<b>Audio output</b>	1.5w 4 ohm, 600 ohm, speaker built-in
<b>Power source</b>	110 ; 117 ; 220 ; 234v. A.C.
<b>Dimensions</b>	13" wide, 6" high, 10 $\frac{1}{2}$ " deep
<b>Weight</b>	17 $\frac{1}{2}$ lbs. approx.



The FR50B is without any shadow of doubt the best amateur band receiver you can buy at anywhere near the price. Take, for example the r.f. amplifier; for wide dynamic range it is true to say that a good valve will still beat a good transistor, and of the valves available, the 6BZ6 as used in the FR50B is probably the best for the purpose. This is followed by a 12AT7 triode mixer which shows its superiority over multi grid mixers in terms of lower noise while maintaining good conversion gain. Typical of the Yaesu thoroughness in design is the use of a tapped IF transformer, to provide correct impedance matching to the mixer.

In contrast to r.f. and mixer stages, the oscillator stage is one in which transistors can outperform valves. Stability is all important and the absence of heat and microphony in a transistor allied with its long-term gain and internal capacitance etc., stability, makes it an ideal choice for an oscillator. Needless to say Yaesu use transistor V.F.O.'s in all current equipment. Isolation of the VFO from following stages is essential to avoid oscillator pulling. Yaesu achieve this in the FR50B by use of an emitter follower stage.

In common with many receivers intended for use with a companion transmitter, a VFO output socket is provided on the rear chassis. I wonder how many people realise what a fruitful source of I.F. breakthrough such an output can be. The FR50B incorporates an I.F. trap in this output, thus neatly minimising breakthrough from this source. Another example of Yaesu attention to detail.

The 2nd oscillator is crystal controlled for unconditional stability and is unusual in that a double tuned transformer is used in the feed to the mixer to prevent harmonic mixing.

Ceramic transistors are used for I.F. selectivity having the advantage of long term stability and ease of alignment using a minimum of test equipment.

For easy resolution of SSB, a product detector is essential and the FR50B 6BE6 product detector used with separate BFO injection gives excellent performance without overload. The tunable BFO is a blessing for the CW man, allowing him to vary pitch without retuning the receiver.

A point which is often overlooked is the importance of isolating the BFO from the AGC system. Inadequate isolation allows the BFO signal to generate an a.g.c. voltage which of course reduces receiver gain. This

problem does not occur in the FR50B due to the use of a separately excited 6BE6. An unusual feature for a receiver in this price class is the provision of both fast and slow a.g.c.

The A.F. amplifier section has overall negative feedback applied which results in a standard of audio quality not often found in a communications receiver.

When operating transceive with a companion transmitter, an adjustable monitor control allows a continuous check on the transmitted signal.

Easy resolution of SSB signals require a slow tuning rate and this is achieved by using the same high quality gearbox as on the wellknown FR100B with its 1 kHz readout.

Good though the FR50B undoubtedly is some of our Customers have commented that it would be nice to have both top band coverage and the whole of 10m for converter use. Therefore as part of our normal Customer service we have developed suitable modifications to provide both these facilities.

For Customers wishing to have their new FR50B modified by us, the price is as follows (and it includes carriage by Securicor and V.A.T.):  
Standard FR50B ... £71.50 28-30 MHz coverage £2.75  
Calibrator Crystal ... £2.75 160m. plus 28-30 MHz £7.50  
160m. coverage £5.50

We can, if you wish, fit the 2m. converter for you, and have no hesitation in recommending the Weir Mosfet Converter, which we can supply ready fitted for £22.

With these modifications, you have a receiver, which, at the price, is UNBEATABLE.

It should be fairly clear from the foregoing that Lowe Electronics give you a bit more than anyone else.

When it comes to Yaesu equipment Lowe Electronics have more know how than anyone else.

When it comes to Service, Lowe Electronics again give you more than anyone else.

Our Customers know this, expect it and get it. It is simply that every now and again we have to remind you that for some years now we have been the best, we are still the best, and we intend to continue to be the best.

**ANTENNAS**

<b>2m "J"</b>	<b>Beams 50 or 75 ohms (specify which)</b>	
2/4Y	4 element folded dipole Yagi with 1" boom	£3.74
2/6Y	6 element folded dipole Yagi with 1" boom	£4.40
2/8Y	8 element folded dipole Yagi with 1" boom	£5.17
2/10Y	10 element folded dipole Yagi with 1 1/4" boom	
	and 45 Braces	£10.45
2/10XY	Crossed 10 element Yagi with 1 1/4" boom	£13.84
2/14P	14 element Parabeam	£16.28
2/12	6 over 6 with 1" booms	£7.97
2/16	8 over 8 with 1" booms	£9.79

<b>2m. Mobile Whips</b>		
Diamond DP-25	gutter mounting & vertical	£11.55

<b>G-Whips</b>		
Tribander (20, 15 and 10m.)		£12.10
Multimobile 20, 15 and 10m.		£14.30
160, 80 or 40m. coils for above, each		£4.40
Top whip section for above		£1.10
Flexiwhip 10m. with whip		£9.35
160, 80, 40, 20 or 15m. coils, each		£4.67
Ranger 160m.		£9.35
Duobander 160/80m.		£10.45
Base section for all G-Whips		£1.60

The above are normally sent British Rail—should you require 24 hour Securicor delivery, please add an extra £1.50.

<b>H.F. Beams</b>		
AS-203W	wide spaced 3 element 20m. beam	£72.60
AS-154W	wide spaced 4 element 15m. beam	£48.40
AS-153W	wide spaced 3 element 15m. beam	£38.50
AS-104W	wide spaced 4 element 10m. beam	£40.00
AS-103W	wide spaced 3 element 10m. beam	£22.00
Polygon	2 element glass fibre kit	£38.50

<b>Verticals</b>		
Diamond DP-KB103	80 and 40m.	£27.50
DP-KB104	20, 15 and 10m.	£20.90
DP-KB105	80, 40, 20, 15 and 10m.	£38.50
Asahi Echo 8G	40, 20, 15 and 10m.	£22.00

<b>Antenna Accessories</b>		
Coax UR43	50 ohm	m 10p
Coax UR67	50 ohm	m 27p
Twin feeder	300 ohm	m 6p
Twin feeder	75 ohm	m 6p
Rotator cable	4 core (AR22)	m 18p
Rotator cable	12 core (TR44 and Ham-M)	m 35p
Baluns HZP (1:1 or 4:1)		£5.50
Rotators AR22R		£27.50
TR44		£49.50
Ham-M		£77.00
<b>SWR Meters</b>		
Hansen	single meter	£5.50
Asahi	twin meter	£8.80
Diamond SR-435	(VHF/UHF)	£15.40
Dummy load/wattmeter	(VHF/UHF)	£38.50
PL259 plugs	33p Reducers	10p
Sockets	33p Line Connectors	80p

<b>Station Accessories</b>		
Plain brass	morse keys	£1.35
Katsumi	keys EK-9X	£9.90
Katsumi	keys EK-108A (mains)	£29.70
Katsumi	keys EK-108D (battery)	£26.40
C.V.	practical oscillators	£2.75
Headsets,	low impedance, padded	£3.30
Microphones	Yaesu YD844 table mike	£14.30
	Yaesu YD846 hand mike	£5.50
	DM501 hand mike	£3.75

<b>Valves</b>		
6AH6, 6BZ6, 6CB6A, 6CL6, 6UBA, 6EW6, 6EW6, 6EH7,		
6BM9, 12BY7A, each		66p
6GK6		£1.22
6JM6A		£1.65
6JS6C, 6KD6, each		£2.20
6146B		£3.30

**FILTERS**

<b>Crystal</b>		
S.E.I. QC1246AA	5.2 MHz SSB filter	£17.82
S.E.I. QC1246AZ	9.0 MHz CWV filter	£18.40
S.E.I. QC1246AV	9.0 MHz SSB filter 2.5 kHz	£11.00
S.E.I. QC1246AX	9.0 MHz SSB filter 2.4 kHz	£15.40
Yaesu FT101	CWV filter	£17.60
S.E.I. FT101	AM filter	£19.80

**Mechanical**

Kokusai MP455	3AZ CW filter	£15.00
Kokusai MP455	10AZ SSB filter	£15.00
Carrier	crystals for the above filters, each	£2.50

Remember that all prices include V.A.T. and postage, so you do not have to send extra.

**PRICE LIST APRIL 1973**

Price including VAT

**YAESU MUSEN**

FR400SD	£192.50	FV200	£46.20
FL400	£181.50	FL2000B	£181.50
SP400	£12.10	FL2100	£181.50
FT401	£291.50	FR50B	£71.50
FV401	£46.20	FL50B	£82.50
SP401	£12.10	FV50B	£30.80
FT101	£308.00	FT501D	£319.00
FP101	£46.20	FP501	£49.50
SV101	£12.10	SIGMASIZER	£198.00
FT75	£126.50	YC35SD	£132.00
FP75	£27.50	FT2FB	£107.80
DC75	£27.50	FT2AUTO	£172.70
VC75	£24.20	FT101 FAN	£9.90
FV50C	£30.80	FT101 CW FILTER	£17.60
FT200	£159.50	YD844	£14.30
FP200	£49.50	YD846	£5.50
DC200	£59.40		

\*FT2AUTO fitted 5 channels. Extra channels £3.32

**KARL BRAUN**

SE600 DIG	£627.00	SE600	£544.50
SE280	£242.00	DGTC 22	£24.20
DGTC 1702	£42.90	LVV 270	£41.80
TTY 1270	£29.15		
Linar 2	£151.50	Wair Mosfet Converter	£15.00

Prices include carriage by Securicor except speakers and microphones which are mailed.

**SECOND-HAND EQUIPMENT**

(Prices include VAT)

All mint, checked, serviced and aligned unless specifically stated otherwise

<b>Receivers</b>		
Sommerkamp FR500 SDL		£125.00
Sommerkamp FR500		£95.00
Eddystone 680X		£65.00
Trio JR599		£150.00
National NC303		£99.00
Eddystone 770R		£99.00
Collins 5134		£198.00
Eddystone EC10 Mk. 2		£60.00
Trio JR310		£72.00
Trio 9R59DE		£38.50
Hammarlund HQ170A		£82.00
Lafayette HA350		£55.00
Trio 9R59DS		£44.00
Trio JR500S		£52.00
AR88D		£44.00
Yaesu FR400 SDL		£135.00
Heath GR78		£66.00
Eddystone 940		£104.00

<b>Transmitters</b>		
DX40 + VFO. Choice of two		£22.00
FL500		£115.00
Labgear Topbander		£15.00
Hallicrafters HT40		£15.00
KW Viceroy IV. Minc		£77.80

<b>Transceivers. All with p.s.u.'s unless clearly stated</b>		
Yaesu FTdx500		£176.00
KW2000B. As new		£176.00
Yaesu FT101 with 160m.		£215.00
Heath HW100		£110.00
KW2000A + A.C. p.s.u. Choice of two		£165.00
Heath SB101		£165.00
KW2000 with both p.s.u.'s		£110.00
Trio TS510 remote VFO and fitted CW filter		£155.00

CARRIAGE BY SECURICOR £2.00 EXTRA

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Cat. No. 6357P 7½" x 4½" x 3",	£1.13

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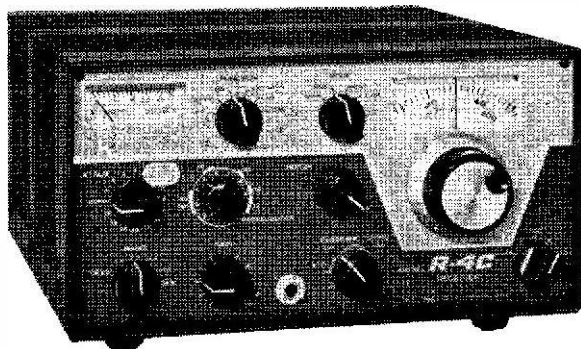
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2-CQ	Q-Multiplier/Speaker for 2-C ...	£25.30
2-NB	Noise Blanker for 2-C ...	£13.20
R-4C	Receiver—SSB, AM, SW, RTTY ...	£242.00
FILTERS	Bandwidths—250, 500, 1.5, 6-0 kHz for R-4C ...	£24.75
4-NB	Noise Blanker for R-4C ...	£31.35
MS-4	Matching Speaker for R-4C ...	£11.00
SW-4A	Receiver—AM, International SW	£165.00
AL-4	Loop Antenna for SW-4, SPR-4 ...	£14.85
SPR-4	Receiver—General Purpose	£286.00
	Amateur Band Crystal Kit for SPR-4 ...	£13.20
5-NB	Noise Blanker for SPR-4 ...	£31.35
SCC-4	100 kHz Calibrator for SPR-4 ...	£9.35
TA-4	Transceive Adaptor for SPR-4/T-4XC ...	£13.20
DC	Power Cord for SPR-4 ...	£2.42
DSR-I	Digital Receiver ...	£1,133.00

#### TRANSCIVERS and ACCESSORIES

TR-4C	SSB Transceiver ...	£297.00
34-PNB	Plug-in Noise Blanker for TR-4C	£31.35
AC-4	115/240v. Power Supply for TR-4C, T-4XC ...	£49.50
DC-4	12v. Power Supply for TR-4C, T-4XC and Receiver ...	£60.50

Carriage extra on all items

MMK-3	Mobile Mounting Kit for TR-4C ...	£3.30
RV-4C	Remote V.F.O. for TR-4C ...	£52.80
FF-I	Crystal Control for TR-4C ...	£24.20
MC-4	Mobile Console ...	£33.00

#### TRANSMITTERS and ACCESSORIES

T-4XC	SSB Transmitter (see AC-4 above)	£256.30
L-4B	Linear Amplifier (includes Power Supply) ...	£396.00
MN-4	Antenna Match Network for T-4XC, TR-4C ...	£49.50
MN-2000	Antenna Match Network—2000 watts ...	£93.50
W-4	RF Wattmeter. 2-30 MHz ...	£29.70
WV-4	RF Wattmeter. 20-200 MHz ...	£35.20
C-4	Station Control Console ...	£195.80
739 SRD	Cardioid Microphone ...	£9.90

#### ADDITIONAL ACCESSORIES

TV-1000LP	Low Pass Filter ...	£9.35
CA-1	Stacking Cabinet Adaptor for T-4XC, R-4C Crystals for 2-C, R-4C, SW-4A, T-4XC, SPR-4 ...	£2.75
	Fixed Frequency Crystals ...	£3.85
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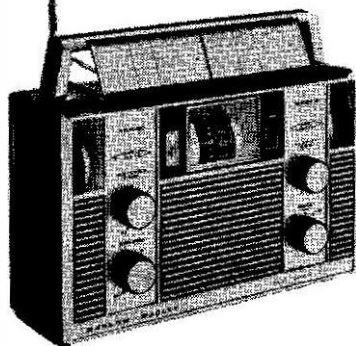
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MAURICE STANSFIELD (G8DNM), RAY BOWDEN

and the rest of the Staff here are available from 9 a.m.—6 p.m. every day except Thursday, when the hours are 9—1 p.m., and Sunday, when we are closed all day. Your queries regarding your radio and electronic requirements either by mail, telephone, or a personal visit will receive most careful attention and what we may not have actually in stock can usually easily be obtained. We are now in close contact with most suppliers of equipment and maintain constant stocks of the following:

**TRIO** — Receivers  
Transmitters  
Test Gear

**J BEAM** — VHF/UHF Aerials  
Mast clamps and  
accessories  
Stolle Rotators

**Sentinel Converters  
and Pre-Amps**

**K.W. ELECTRONICS**  
Range of equipment

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2 metres, 4 metres, 70 cm. converters  
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2 metre AM Receivers  
432 MHz Varactors  
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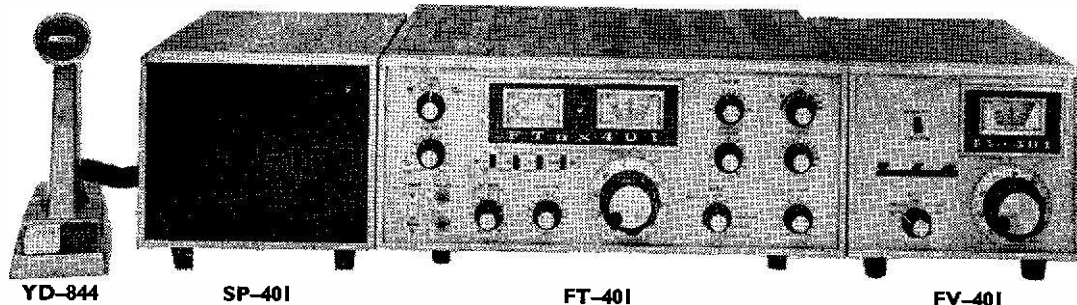
# Western Electronics (UK) Ltd

TOTTON  
SOUTHAMPTON



**YAESU MUSEN U.K. MAIN DISTRIBUTOR**

**YAESU'S NEW WINNER! FT-501**



### FT-501

Come and try it at Totton! We DO have a demonstration model. We have a demonstration unit in stock and a consignment arrives on June 13th at Southampton Docks and should be at Totton about 7-14 days later. However, we cannot guarantee that there will be any remaining unsold but at least we'll give you an honest delivery date.

### FR50B Receiver

10-80m. SSB/AM/CW Receiver with 1 kHz Readout and crystal calibrator. The receiver sensitivity is equal to units costing three times the price.

### FT-401

The "401" is becoming increasingly popular and justifiably so. We respectfully draw your attention to the excellent R.S.G.B. Test Review in April, 1973 "Radio Communication" and our own full test report in that issue. The "401" covers 80-10m. at 560w. p.e.p. input on SSB, 430w. DC i/p on CW. The unit is fitted with blower, CW Filter and VOX as standard; no extras to buy.

### FT-101 Mk. 1 SPECIAL OFFER

We still have stocks of this unit. Some people prefer it to the Mk. 2 and at £229 (+ £22.90 VAT) there is certainly no better buy so don't delay in snapping up one of these at the special offer price.

### FL50B Transmitter SSB/CW

A 50w. p.e.p. 10-80m. transmitter fitted with VOX which will work VXO control by itself or transceive with the FR50. Alternatively full VFO coverage is available with the FV50B remote VFO.

### FT-101 Mk. 2 160-10m.

You'll find the "101" in use in just about every country in the world. It bears the hallmark of Yaesu as regards superb quality of craftsmanship and performance. Naturally, we offer it EX-STOCK and with the after-sales service that one expects from us as main distributor.

### FT-75

If your requirement is for a highly compact transceiver of merely good value then this unit gives 12v. DC operation with the DC-75 or AC operation with the FP-75. Buy at pre-Yen re-valuation prices whilst stocks last.

### FT-2FB

10w. output on 144 MHz FM. Crystals fitted on 3 channels complete with microphone, mounting brackets and 12v. DC power lead fitted with a plug to fit the cigarette lighter in your car. Alternatively use it on 234v. AC with the base station FP2AC AC supply which can have n/cad batteries fitted as an extra to enable operation to continue when the mains fail or go on strike.

## YAESU PRICES (Carriage free by Securicor) add 10% VAT

### HF TRANSCEIVERS

FT-75	£99.00
FP-75	£22.50
DC-75	£22.50
FT-101 Mk. 1	£229.00
FT-101 Mk. 2	£280.00
FT/FP200	£190.00
FT-401	£265.00
FT-501	£335.00

### VHF TRANSCEIVERS

FT-2FB	£98.00
FP-2AC p.s.u.	£27.00
FP-ACB + Batts.	£39.00
FT-2AUTO	£157.00
HF RECEIVERS	
FR50 + Cal.	£69.00
FR400DX	£135.00
FR400SDX	£175.00

### HF TRANSMITTERS

FL50 + vox	£79.00
FL400	£160.00
REMOTE VFO	
FV50 for FT75/FL50	£28.00
FV-101	£42.00
FV-401	£42.00
FREQUENCY COUNTERS	
YC-355 30 MHz AC p.s.u.	£97.00
YC-355 220 MHz AC/DC p.s.u.	£120.00

### SPEAKERS

SP101, 400, 401	£11.00
SP101P Phone Patch	£26.00

### LINEAR AMPLIFIERS

FL2000B 1200w.	£165.00
FL2100 1200w.	£165.00
FL2500 2kW.	£130.00



# Western Electronics (UK) Ltd

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## ADVANCE INFORMATION

- 144 MHz** FM and SSB TRANSCEIVER. YAESU's FT-220 is the answer. This has full VFO coverage, 144-146 MHz in 4 500 kHz bands + 3 xtal channels. Power is 10w. output, Dial readout is to 1 kHz. With this unit you can work all the FM and SSB boys! Price is not fixed by Yaesu but our "guesstimate" is £150-200.
- 432 MHz** We are pleased to be the first to introduce a 432 MHz 10w. FM Transceiver. No doubt our lead will be followed by others shortly but our aim is to provide a high quality unit with good after sales service. Watch our ads!
- Satellite Tracking** To further cater for the VHF/UHF men we are introducing a new satellite tracking rotator, the only one in the world we believe! It will adjust the angle of elevation to 45°.
- Telescopic Aluminium Masts** In a few months we will have the answer to your prayers for a short mast to go in the car for holiday or portable work or tall masts up to 70' (. . . and the above are just a few of the new items in our comprehensive service!)

**144 MHz LINER 2 SSB 24 channel Transceiver (Ex Stock) £135 VAT £13.5**

## NEW/USED EQUIPMENT (3 months guarantee. Delivery £1 by Securicor)

	Price	VAT		Price	VAT		Price	VAT
Collins 7551, v. good	£170	£17.00	Racal MA79G Drive Unit	£485	£48.00	Trio T5510, remote VFO	£20	£2.00
Eddystone 880A	£58	£5.80	Sommerkamp FT-100 + 160m. good	£150	£15.00	Trio 9R39D5, excellent	£45	£4.50
Hallifacres HT32B Tx. 10-80m. good	£80	£8.00	Sommerkamp FL200B Trans 10-80m.	£79	£7.90	Yaesu FR50B as new	£55	£5.50
Heath SB303 New Assembled + CW	£38	No VAT	Sommerkamp FL200B Trans 10-80m.	£120	£12.00	Yaesu FR50B, as new	£55	£5.50
KW 204, v. good	£100	£10.00	inoue IC790 T & R	£120	£12.00	Yaesu DC200 PSU, unused	£38	£3.80
KW 2000A + AC PSU, v. good	£149	£14.90	Sommerkamp FT-500, mint	£160	£16.00	Yaesu FV400S, remote VFO for FT-400/500, etc., mint	£30	£3.00
KW2000A + AC PSU, v. good	£149	£14.90	Trisao 105fc Teles. tower	£225	£22.50	Yaesu FT-101, mint	£199	£19.90
KW Atlanta NEW, reduced to	£199	£19.90	Trio JRS005E	£45	£4.50	Yaesu FT-101, mint	£199	£19.90
KW Atlanta, used v. good	£145	£14.50	Trio JRS005E	£45	£4.50	Yaesu FT-101, mint	£199	£19.90
KW Ypsa Mk. 2 v. good	£89	£8.90	Trio JRS005E	£45	£4.50	Yaesu FT-200, 2 weeks old!	£175	£17.50
National NCX5, Excellent	£170	£17.00	Trio T5510, mint	£130	£13.00	Yaesu FV-200 VFO	£32	£3.20
National NCX500, excellent	£185	£18.50	Trio T5510, mint	£130	£13.00			

## ROTATORS. All Ex-Stock

AR20	£20	AR22R	£25	TR44	£45	HAM-M	£70	HY-GAIN 400	£115
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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.
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LF80 80m. coil	£4.00	160/90m. Duobander	£9.00	40m. coil	£4.00	Basemount for all coils	£1.45
Extendard	£4.75	Flexiwhip 10m.	£8.60	Flexiwhip Coils	£4.25		

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2 ele.	£74.50	3 ele.	£109.80	4 ele.	£144.00	Conversion kits ex-stock.
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2kVY	3 ele.	mast		
TA33 Jnr. 'E' or '2' mast	£45.50	£36.50		
	£37.00	£29.00		
		TA31 Jnr. Rotary dipole		£17.00

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18AVT, 10-80m. vert.	£35.50	TH3MK3, 10-20m. 3 ele.	DB10-15 10-15m. 3 ele.	LA2 Lightning arrester	£2.50
		2kV	£75.00	204BA, 20m. 4 ele. beam	£80.00

## NEWTRONICS HUSTLER MOBILE ANTENNAS inc. VAT

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Please ring for information on all new equipment, we have quite a lot in stock and demonstration facilities are available.

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**2 Metres**: Our 4MH 2 metre Tx and Modulator is now available again after hold up's due to shortage of components. S.a.e. for details. 2 metre 8 MHz xtals in stock at 90p inc. VAT and post are as follows:—8001, 8002, 8006, 8008, 8013, 8021, 8029, 8036, 8046, 8047, 8064, 8071, 8078, 8080, 8090, 9092, 8106, 8108. All are New 10XJ (will fit into wander sockets.)

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This month we show a corner of our demonstration room, this section of our premises being devoted exclusively to the display and demonstration of equipment, where the prospective purchaser may take a comfortable seat and test out the gear of his choice to his heart's content without the slightest question of being pressurised into buying. In other words, you are welcome to operate any equipment on display without obligation or distraction from our sales counter which is well removed.

Whilst we carry large and ever-changing stocks of used equipment, please don't forget that we also have a first-class range of new gear by SOMMERKAMP/YAESU, TRIO, KW ELECTRONICS and other leading manufacturers of equipments, aerials and accessories. This includes the SOMMERKAMP range of 2 metre FM gear and we shall shortly have stocks of 2 metre SSB equipment.

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We have again been pressed by demand into producing another new module. This is a completely new pre-amplifier, based on the proved performance of our converters. It has been produced with a very small volume (about 1 cubic inch) to fit into the receive aerial lead of transceivers. Its noise figure is the same as our Sentinel converters (2dB) and the gain is 18dB. Supply 9-18v. 5 mA. —ve earth. Supplied with fitting instructions. Price: £5.50.

**OUR EXTREMELY POPULAR SENTINEL FET 2 METRE PRE-AMPLIFIER**  
This amplifier is designed for optimum noise figure and sensitivity and selectivity performance.

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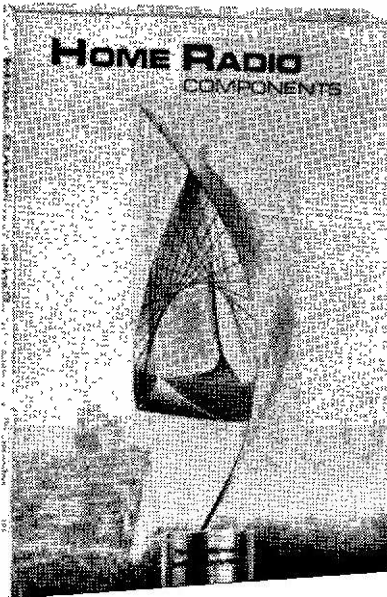
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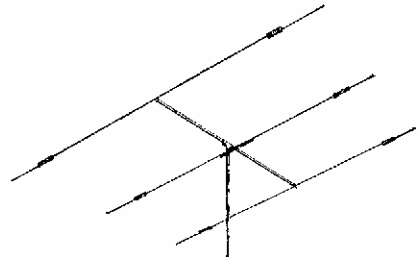
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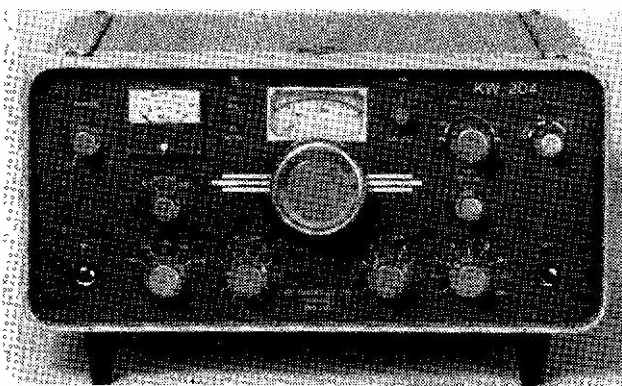


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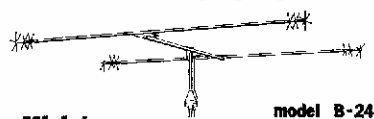
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# The SHORT-WAVE Magazine

## EDITORIAL

### ***Justification***

We have often enough outlined broadly what might be called the Argument for Amateur Radio in face of the Pressure on Ether Space—it being agreed that the ether, like the air we breathe, is free for all to use, subject to reasonable safeguards.

To deal with some questions so frequently asked when Amateur Radio is under discussion, such as—"What good are amateurs?"—"What do they do?"—"Can they serve any useful purpose? ". The quick answer is, of course, that the mere fact of there being some 18,000 of them in the U.K. alone, and nearly 500,000 in the world of the West as a whole, is by itself a good enough reply to these questions. If no benefits flowed or advantages accrued from the pursuit of Amateur Radio, it could not possibly exist on such a scale—and continue to expand at the rate it does. (In the U.K. 50% in six years).

It is this fundamental interest in and practical knowledge of radionics that make the radio amateur, and the Amateur Radio movement, so important from the national point of view. As a nation, we are among the leaders in the Electronic Age into which the world has moved. Amateur Radio is one of the influences by which radionics engineers and technicians of the best type are produced. This is not an imaginary or high-falutin' conception of the value of Amateur Radio, nor even a theoretical appreciation of its potential usefulness, but is actual fact, proved over and over again. These lines will fall under the eye of some of the leaders, senior engineers and executives, of the radio industry, to say nothing of many "lesser lights" in it—let them ask themselves how much they owe to Amateur Radio, and whether it was not as transmitting amateurs that they got their start!

For its educative influence alone, therefore, the healthy development of Amateur Radio is of the utmost importance to the nation. Those who, as juniors, learn the fundamentals simply because they want to get on the air, go on to take out a licence, and then have ideas of becoming professional, are regarded as being of the very best—provided they progress to getting themselves properly qualified. Amateurs, as amateurs, cannot expect to get far in a professional environment.

And in the larger context, can it be seriously suggested that tens of thousands of radio amateurs, in daily communication with one another all over the world—and to a lesser degree the correspondence, personal contact and mutual interest which such communication entails—do not together contribute anything to the international understanding and co-operation for which the politicians are striving?

*Austin Forsyth  
G6FO*

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

**H**ELLO, again! As your scribe sits at his typewriter on a fine evening, with birds chattering in the garden and a real June heatwave in progress, it seems almost sacrilege to think of DX, let alone work it. However, let the receiver loose on a DX call sign, and most of us would instantly drop whatever we are doing to take up the chase again.

Since this is the case, let us begin by looking at the most difficult band of them all where real DX is concerned, namely Top Band.

We make a start with W1BB (Winthrop, Mass.) and his invaluable *Bulletin*. Perhaps the first point he makes which is of interest in our context is that he found DX conditions for Top Band very poor indeed, from March 9 right through April and for the first week of May. Stew himself had been stuck fast at 113 countries since June 1972 and then in February added ZD9BM and 4W1AE to his total in one evening! Talking of 4W1AE, John believes that one can find a spot from which one can work DX, and yet not be able even to hear it from somewhere nearby, due to selective skip effects.

An interesting point in W1BB's discourse is the paragraph on loop antennae. It seems that in a noisy QTH, a loop operated into a transistor pre-amp offers some advantages over a bigger aperture aerial,

although of course the half-wave layout is clearly ahead in a quiet location. There are several W's using loops for receiving, among whom one notes W7DOL/G, who has used it for reception while working Europeans—a three-foot diameter job, and a 65-foot loaded vertical for the transmitter managed to work among others GM3YCB, and to hear but not connect with G3YUV. K5CIT/KH6 says that many Europeans don't look up as high as 1997 kHz, where he sits calling his head off. VK6HD suggests that the VK boys use 1825-1830 kHz when wanting U.S. contacts, and 1803 kHz for European QSO's. Talking of Europeans, G3YUV, G3LIQ and G3XAP might be interested to know that their signals have been heard by VK6HD.

Still with the real, intercontinental DX on this band, ELØN/MM writes (both direct and through G3CED) to let us know how his trip is coming along. The Joystick was mounted vertically on the side of the upper bridge deck, fed through about 15ft. of wire and resonated to Top Band with the Joymatch ATU—he was still hearing DHJ when off Western Australia. The FT-101 is not fitted with the CW filter, and this was the prime cause of the loss of the report from EI9J when the ship was at 29° South, 15° East. However, from 6°S, 5°W, LU5EVM was heard and

lost in QSB apparently calling ELØN/MM, and PY1DVG was also hooked. All this goes to show what an enormous difference is made to the propagation both on "send" and "receive" when a vertically polarised aerial is used in conjunction with a near-perfect take-off, despite local noise and QRN problems. His ship is the cruise-liner *Fairstar*, 5MXH.

The first ZS6-VK6HD contact fell to ZS6ZE and VK6HD at 2254z on June 9, peaking at 2300z. John is now really on the DX trail and can be found on Friday and Saturday evenings on 1932 kHz, plus possibly the odd evening in the week if he sits up late for any reason.

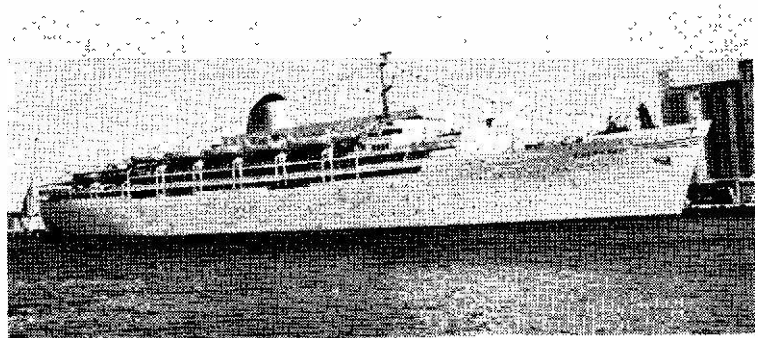
Nearer to home, we have a bind from G4BWZ, who uses only AM and CW on Top Band, that he has a feathered phoney friend on Eighty, active enough to net QSL's.

"Grass grows in inverse proportion to DX worked," theorises G2HKU (Sheppey), who adds that it doesn't take genius to guess on whose side the dice is *not* loaded! However, Ted keyed with PAØABM and PAØPN, while SSB contacts were made with GM3UPK, GM3YXU and, again, PAØPN.

## Eighty

In the main, the troops have reverted to their previous attitude of "treat with ignore" as far as

The Sittmar passenger liner "Fairstar" (5MXH) on which G3UOF (ELØN/MM) is an operator. The ship does round-world voyages under luxury conditions for about 1,600 passengers. His personal rig is an FT-101 into a Joystick, with which he has made many good DX contacts, including Top Band.



Frank Coldwell, G4ATM, 103 Harrington Avenue, Blackpool, Lancs., FY7 1QD is a professional man and another of those who did not come to Amateur Radio till his late fifties. He took the R.A.E. via Fleetwood Nautical College and then learnt Morse with the assistance of a local all without having had any previous experience of radio. He has a nice station, running K.W. gear with a Hy-Gain 18-AVT outside.



Eighty goes. G8HX (Mansfield) pops up to tell of his adventures with the latest, multi-band, aerial he has been able to twist into his garden shape. Nothing much was worked on Eighty apart from VE1ZZ, and then two hours' solid operating coming from a single CQ, from which no less than nine QSO's resulted. On a more technical aspect, the old DX-100 has had its drift cut down quite considerably by fitting semi-conductors in place of the valve diodes in the low-voltage power supply—the next stage is to repeat the dose on the HV PA line.

Only one contact comes to be mentioned by G3DCS (Ipswich), in the shape of an RTTY clash with PA0OCD. Similar situation at G2HKU, Ted's only one being SSB with 9H1BX.

Eighty for ZS6ZE (Pretoria) meant no U.K. contacts on CW, although VK6HD was worked; on SSB there were Europeans, including G3DDK, KC6SK and ZD9GC on Gough Is. A glance at a globe, or a great-circle map, will show that these QSO's cover vast distances.

#### Forty Metres

A good band being allowed to go to ruin. For ZS6ZE, all was SSB, contacts being made with 4S7AB, KC6SK, KC6JC 5R8BD, 9X5VA, 6W8DY, WB6VGI/VQ9, ZD9GC, JA3JOC and OZ5KF.

CW was the preferred mode for

G2HKU, who used it to work FC0AHY, KP4DJE, KZ5BB, EA9EW, UI8LAC and UG6AW. On SSB, one contact worthy of note was with UI8LAG, at S9 plus and with excellent English.

G8HX has been spreading his wings somewhat since he replaced his 7 MHz aerial with the multi-band array, but he still worked CW with KZ5, and built up his total of DOK's and SPPA districts nicely.

A new correspondent is G4BVS, who divides his report into two parts, from his Amersham home QTH and secondly from Beddgelert in North Wales over the Spring Bank Holiday. The home 14-AVQ gave QRP (five watts to a *Ten-Tec PM3A*) contacts with DA2SO, DL1TA, DL8YU, EA2EY, F6CBM, HB9ANW and YU4ETO, while the /P ground-plane unearthed EI6AK and G13ZAD. It is interesting to note that G4BVS, who is ex-G8GHY, finds himself fascinated by CW operation would that some more of the VHF phone-only fanatics would try it and so expand their interests.

Another holiday-maker was PA6VRZ, who was worked by G2NJ—the PA gave his camp location as Jutberg. G2NJ also found F6WW/M, motoring not far from Caen, Normandy.

Readers may recall that GW4BLE (Newport, Mon.) has been trying for planning permission to put up a tower; Stephen has now

passed the first jump, namely the local authority. It still remains for the Town and Country Planning boys at higher level to put the mockers on the project, but Stephen understands they will be meeting about the time this comes out, and till then has to exercise his soul in patience and hope. However, to pass the time, GW4BLE tackled some contacts, and on Forty offers CN8BO and TU2DO.

#### Comments on This and That

G3DCS says that he has partly offset the difficulty caused by the lack of selectivity of his RTTY filters by separating them from 170 cycles to nearer 400, the object being to reduce the "mark" signal on the space frequency and vice-versa, due to the low selectivity in his filters. On a different tack, Enver reckons 850 Hz shifts are a dead duck in amateur practice, he having only ever encountered a couple on the DX bands; the majority are on 170 Hz shift.

G3ZPF (Dudley) takes issue with your conductor over the latter's comments, last time round, on how to register a protest—David is sincerely, if misguidedly, a believer that protest marches do more good than letters to the *Times*, adducing as evidence the IARU and ITU, the Intruder Watch and, on the other side, all the "things" which wander around our bands. One ha

## BRIEF DX DATA

- A51PN** Try 14085 kHz around 1700. QSL address: H. N. Pradhan, Wireless Communications, Dechentsi, Thimphu, Sikkim.
- KSLTH** Is now on Kure Is. where he will sign KH6HDB /Kure for a period of about one year.
- OHØAM** Aland. June 28-July 3, Martin will be on as OJØAM from *Market Reef*. Going mainly to instal a Tempo-One rig and beam aerial for OHØMA, who is keeper of the Market Reef light-house.
- ZKITA** Tongareva. Operation begins June 29, lasting about 7 days. Look for their SSB on 7083, 7087, 14195, 21295, 28595 kHz and for their CW on any band 10 kHz up from the band-edge.
- VE3RCMP** Royal Canadian Mounted Police centenary. QSL address is Telecommunications Branch, Commissioner RCMP, 1200 Alta Vista Drive, Ottawa, Ontario. Station will be active till the end of August.
- C2...** JA1MCU will be going to Nauru Is., South Pacific before this comes to print. Operation mainly on 40, 80, 160 metres.
- CR8AG, CR8AL** Now the only active stations left in CR8. QSL's for either should go via PY7YS, P.O. Box 34, 6000 Fortaleza, Ceara, Brazil.
- JT...** Look around 14225-14230 kHz for JTØAE, QSL via OK1AIA. Understood UA9VH/JT1 will soon be active on all bands. QSL's to UA9VB. Vic may be able to help with QSL's from other JT's.
- FO8DF** *Tuamotu Archipelago*. Try 14144 kHz around 0515Z. QSL to B.P. 1825, Papeete, Society Islands, South Pacific.

to be a bit careful over this, since most of this interference comes from countries who for one reason or another have effectively refused to accept international law as binding on them. Many of the "intruders" are in fact spurious signals in the particular receiver/aerial set-up hearing them, and a lot of the genuine ones are stations who have lawfully registered objection to the "exclusive" allocation of a particular band to amateurs and have informed the authorities they will be on these frequencies. However, for the pirate BC station, sitting on someone else's channel, with no reference to anyone, no condemnation is too great. To revert to G3KFE's original comment, one knows from experience that the reaction to seeing a gang of demonstrators is to ring up the Police and just ask for them to be removed—about the only people who read their banners are the policemen or the TV viewer. But a letter to the *Times*, or in this case the *IARU News*, is written by responsible people knowing their case will be considered by other responsible people among the readers, who will take the trouble to read right through the argument.

That bit about a longest QSO last time was sure to cause a comment. As your aged scribe thought, 24 hours non-stop for a QSO is a mere bagatelle. G3IDG quotes QST for June 1963, reporting WA2WIR and WA2VFW having a marathon of 99 hours!

SWL Yeoman (Peterborough) writes to say he has a card from 9M2BH, who said he had changed his address. The new one is Lim Phang Choo, 187 Jalan 68, Kepong Baru, Selangor, Malaysia.

G3IDG again, this time on the question of stations in close proximity quotes G3CWZ and G3EYN, who had separate stations in the same room, five feet apart. Why not try something different, like the smallest or largest QSL cards, at the present held by CN8BV and K2SST respectively?

The American National Scout Jamboree, at its two locations, Farragut Park, Idaho, and Moraine State Park, Pennsylvania, will be on the air in August—KJ7BSA, July 28—August 9 from Idaho, and July 30—August 11 from KJ3BSA in Pennsylvania. Look for them

five kHz above the lower limit of the General and Novice sub-bands.

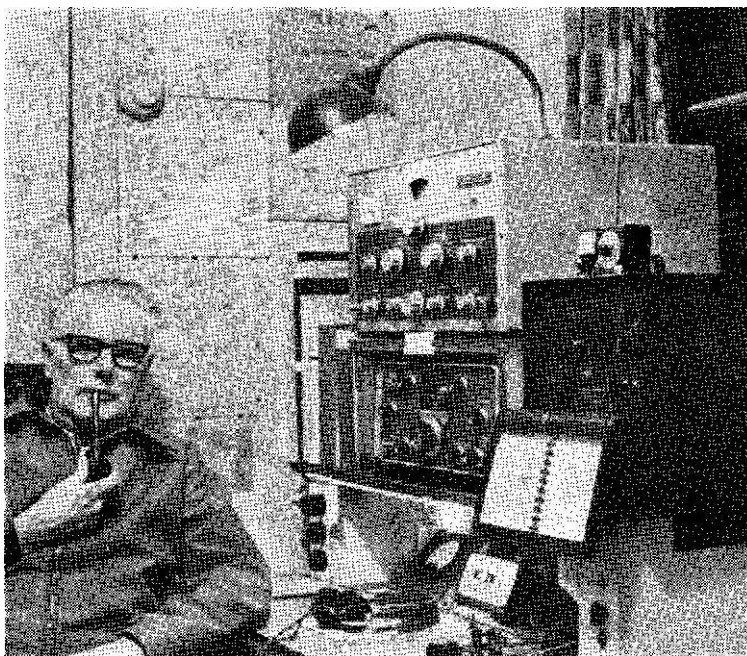
## Ten Metres

Even though we are well into the trough of the sunspot cycle, and in summer conditions, still there comes the odd mention of the band. G3RFG (Henlow) for instance tried Ten often and on the key raised DL7QU, F6KDE, HA8KUX, IØROA, OE5, RB5, UK2, UK3, UF6, UY5, SM4FKK, SP5AD and YU5JHI (not DX but interesting) with heard-ones in the shape of CR6AI, CR7FM, various LU's, PY, YV and 7Q7's, all of which were at levels between S7 and S9. However, far more interesting is the "beacon watch" which Stan has been keeping. He has logged the date and time, and on each occasion has looked for ZC4CY, DLØIGI and 3B8MS, noted their presence and strength, and then scanned the band for other signals. There is a break from May 4 to May 10 and May 12 and 13, *but signals were found on all other days*, either beacon or other signals, or both. The interesting thing is that "when the beacons are audible" seems to bear little relationship to the presence of other signals, either long-range European (which can be accounted for only by non-VHF type propagation) or true DX. The segment of the band checked was in each case 28.0 and 28.2 MHz. Another point is that no cases occurred of propagation beyond what one would assume to be single-hop distances, in an East-West direction (with the possible exception of UA9). However there were quite a few instances of PY, YV and African stations there even when the beacons were not audible! No question of significant effects of the aerial arises, because the ground-plane is essentially all-round in its pattern and appears to conform with theory. (Anyone interested in propagation at 29 MHz could think a lot about these findings. *Editor*.)

ZS6ZE worked a few on the key during NFD weekend, notably DL's, PAO, G3CAR/P, G6LX/P, G3HBR/P, G3LFM/P, G3VCP/P, G3MGP and G4ALE/P, while SSB came up during the month with KC6SK, RL7PCV and a gaggle of JA's.

As for GW4BLE, Stephen offers

Frank Bewley, G8HX, 116 Westfield Lane, Mansfield, Notts., is of course an OT, having been licensed before Hitler's War. His interests are CW on 3.5-21 MHz inclusive, and the aerial is a 136-footer, 35ft. high, contrived into a garden 60ft. long.



numerous first-hop Europeans, plus the longer hauls into 5B4ES and 5X5NK on Sideband.

#### Fifteen Metres

Nothing like so much in the doldrums as the general level of conditions and the propagation forecasts would lead one to believe.

In the main, G3DNF (Leeds), stuck to his 1½ watts on 21 MHz, and got 4Z4KF, W3WJD and WN4ZVF—the last-named coming up with the fastest-ever QSL card. Short-skip gave the little rig the chance to work loads of Europeans as well. The big rig was not completely neglected, and the bit of extra "steam" came in handy for JY9FOC.

The most pessimistic note is from G8HX, who must have picked the wrong times for he found little of interest audible on the band, let alone workable.

Fifteen for G2NJ (Peterborough) was largely a question of the /MM stations, although Nick did pick off

YU2RMS/X - the /X apparently meaning that the station is being driven by the second op., the first op. being father. (Could be a good pointer to a way of teaching the youngsters how to operate properly, to make 'em spend a probationary period as second op. to a practised OT). Back to the sea, and G2NJ came across JR3KLC/MM, YO4WO/MM, JA7HX/MM and EL0S/MM.

G3DCS eschewed his RTTY in favour of the good old pump-handle, and by this means was enabled to make contact with JA3IL, UA9JH, UA9CAL, UK9AAZ, UA0YT and UF6DX.

For G3ZPF (Dudley) the CW worked sundry Europeans and G3KPT (of QRP fame) whose two watts made the idea of running 150 watts seem a bit silly. However David reacted by going on SSB and in this manner managed to make his presence known with CR7FR, CP6EB, LU7FAG, 9J2DT VS9DX, EA6BZ, EA6BP, 9J2WR, ER3USF, SH3AP, VP2VAM, VQ9DC,

ET3USC, 9Y4EH and ZP5AN.

Only a couple of interesting ones are mentioned by GW4BLE, who offers 3B6CF and 7P8AZ on SSB, both being new countries to him.

ZS6ZE managed to work an assortment of Europeans on both CW and SSB, but also raised KC6SK, KC6JC, KH6DQ, 9X5VA, HS3AIG, ZD9GC, VS6EN, VS6DM, KV4AD and EP2NH on SSB, plus and odd AM contact (the first this column has noted for some long time now) to 5U7BA.

G3RFG as usual stuck to the basic mode, CW, using the FT-DX560 as the prime mover, with the trap vertical. This combination hooked JA1JBB, JA2FDX, JA7XJG, JR1MYZ, K3JH, K4GSS, K7DSZ, KG6AAY, PJ9BN (Bonaire Is.), PY2FFW, PY2GGF, UK9SAY, W1TW, WA2DMK, W3KWH, WB8DMF, W9SNF, WS5MSC (Johnson Space Centre, Houston) and ZS6DE, with the vital element of frustration provided by gotaways CR6OY, HS4AGN, WP4DQL, 9M2CN, and KP4NY.

#### The Workhorse

Yes, we did say *workhorse*, not *workhouse*, even though some of the "communications" are a bit on the weird side. This is, as for so

## Reporting the HF Bands

many years, the band on which to snag that essential new country, even if you later find them on one or other of the remaining DX allocations. The band? Twenty, of course!

Let's first look at what our "specialists" have to say. G3UZ (Goring-by-Sea) had a moment's chuckle when he worked G3TZL/MM, in the South Pacific, he having nearly broken his wrist to no avail to work the same ship ("Sugar Producer") when she was in Barry Docks! (See picture p.667, January) The key, as usual, for contacts with UA0AAB, UW9EY, UK9ACP, UA9WQ, UV9PS, UA9DB, UA9NN, UA9XAC, UV9SN, UA9CBH, UA9AQQ, UA9CAE, UK9WAA, UV9CO, UA9SAA, UK9LAG, UK9AAN, U8IAC, UH9AC, UH8BU, UL7WH, UL7IAN, UL7EAJ, UL7GA, UL7NAD, UK7EAQ, UL7IH, UL7TAA, UG6AG, UD6DFY, UD6DJT, UF6FAX, UF6BD, UF6FAW JA6KD VA3JJ, SV1FR, JX9TM, PY1CBW, PY1DUB, PY1BTC, PY5CFX, VP9BY, 9H1CL, 9H1BZ, 9H1DJ, 9E3USA, PZ1AP, VE3DJU, VE3AHB, HC1EM, VO1CA, 5R8AG, G3TZL/MM and LU2DSB/MM.

An HW-32 at 150 watts p.e.p. and a dipole running N-S is serving G4CCB, and in his first fortnight since changing his G8/3 to G4/3, this New Ollerton station made SSB contact with KP4AWM, PY8ADD, VE1EL, VE1AVW, VO1BT, WA2FUJ, WA2NPP, K3GJD, W3KDD, WA3QJB, WA8NPY, W0NUH, CX1EK/W4, LU1BAR/W3, YV3SZ, YV3TN, YV5HJ and

9Y4MH, which has no doubt given Tony the taste for blood.

That flea-power rig at G4BVS enabled Sean to pound brass with a lot of Europeans from home, including EA4DX, HA0KWLW, 12YBA, IS9FPH, OH0MA, SP's, UB5AAD, UB5NM, UO50BE, UP2PAW, UW6DW and YU1ACN. At the holiday site /P, using the same rig to a vertical, took in mostly the same sort of stuff, but with the addition of F, LA, ON, OK, UA4, and YO3RT. Hardened DX'ers may remark that there is nothing wonderful in these results, but the more thoughtful will think of the invaluable training in CW (or, indeed, phone work) gained by the really low-power operator in the hands of a newcomer learning about DX working the hard way. (To work a UA9 or UA0 with 5 watts or so is quite something. *Editor.*)

G2HKU made CW contacts with WB6CSY, UK0SAL, VK3MJ and W1AW (the ARRL Hq. station) the latter after years of trying. A change of mode to SSB brought him another QSO with 9H1BX.

G3RFG, as we have already seen, spent much more than usual time on Ten with his beacon watch. However, Stan did look around the CW end of Twenty on occasion, which gave him contacts with CT2AO, DU1OR, JA9HQU, K3GJD, KH6IJ, KU9AAN, UK9AAQ, UK9ACP, UK9CCC, VO1AW, W1TW, W7SF, W8HBQ and W9BR; he missed VE8RCS, the latter at "Alert," Ellesmere Is., in Zone 2.

One would have expected that ZS6ZE would have turned in a longish list for Twenty, but it was not so; John offers but KC6SK,

KC6JC and ZD9GC, all on SSB, and no more activity.

GW4BLE found true short-skip conditions on June 7, when he wrote, with inter-G working at S9 plus; earlier in the period Stephen booked in CN8BO, CX1R1, CX8D1, CR3AB, EA6BG, EA6BM, EA6BN, EA6BQ, ZC4DS, 6W8DY, 3B6CF, ZD8KO, SU1MA, 7W3ITU, LU5HF1, PY's, 9K2AU, TG9D1, OH0MAS, 9H1BB, 9H1BX and 9F3USA /P1.

Both CW and SSB were tried by G3ZPF, but David only keyed with Europeans and OY2O was the best of the bunch; however SSB was a little more forthcoming in the way of DX, with VS6GA, SU1MA, YV4AOP, ZS1JP, CI1EO, 9F3USA /P1 (in the Red Sea area), ET3USD, VP9DV, EI8BM, (a real long haul, that one?), GM3A1M/P in Arran (almost as far). GM3TDI, GM3DZB, GM3KCY, and, for a change, YA1ED. In addition, he had the usual collection of W's and Europeans.

Splitting the time between CW and SSB seemed a good thing to G3DCS and so it was. His CW raised W's PY1CBW, VP9HA and various Europeans. With RTTY he extracted copy from I8FJR, UK3DAA, VP2KH and LA1K. Incidentally, G3DCS pleads that CW operators should try to keep clear of 14090-14100 kHz, as this is the bit of the 20m. band where the RTTY addicts foregather to work other enthusiasts; seems that even a weakish CW signal makes mince-meat of RTTY copy.

G2NJ has done so much operating with the QRP lads that he has succumbed to the urge and just



Membership of the party recently operating SV1MA from Mt. Athos, Greece. Left to right, standing, SV1GA, SV1DB, SV1ER, SV1GK, DR5OS, DL1CU, DL8ME, DJ6SI and DL7RT. The arrangements were handled by DL1CU.



G4BKI, Paul Evans, Sunlea, Wheal Speed, Carbis Bay, St. Ives, Cornwall runs an HW-101 and has often been mentioned in this feature. Aged 15, his father is G3DLH and brother G4AMJ. (Another case of "quelle QRM"!.) Paul stands at 166 countries worked and QSL'd but so far holds only 55 cards in confirmation—they will come in.



completed an HW-7 for himself. With it, and an input of just the 2.5 watts, Nick managed a solid contact with WA1CGX (Boston), just to show he can do it as well as the others.

Odd how certain relatively common countries seem to elude one's grasp. G8HX worked W1, W6, W7, VK2, VK7, VK8, UK7, UK9, UM8, UA9, VE6, and XE1. The XE was the first station in Mexico to be booked into the log—and Frank has been working the DX bands since 1936!

G3DNF used his collinear for 21 MHz as the skywire with which to try out his latest QRP 14 MHz rig. However, this aerial, used on Twenty, displays a strong directional effect towards Asia, which resulted in UA9SAA being his only DX contact with the fleapower. Gordon raises a few queries about the DL QRP contest mentioned last month, on p.215. The contest call is "QRP Test." The rule about doubling one's points score, for a QSO where either end is using less than three watts seems to mean that both stations double their QSO points for that contact—at least, that's how G3KFE reads the sheet! (We get many demands/requests to print rules for this-or-that contest. Some of them are totally incomprehensible. These we ignore—or refer readers

to the originators. *Editor*).

#### Other Matters

Contests, Awards, Experiments: First, the experiment to be run by 5T5AD and 5T5CJ, on June 30, operating 5T5SOL as a beacon station during the period 0930-1130z when the eclipse of the sun is occurring, the totality being scheduled for about 1030. You are asked to listen to the beacon, sending 5T5SOL followed by a dash, every 20 seconds, on 14050 and 21050 kHz and send in reports to us, which will be forwarded to F8SH who is acting as the anchorman for the reception side of the exercise. The object, of course, is to find out what happens to propagation from an area subject to a total eclipse.

An Award now: The "Shamrock Award" is being sponsored by the Dundalk Club, rather on the lines of WAB but using the squares of the Irish grid. Details on this one can be obtained from GM3MTH, G13KVD, or G81R. Frequencies of operation, in general, around 3650-3750, nominally 3710 kHz or 7070 kHz on Forty plus-or-minus QRM.

The expedition being mounted in the second week of August by G6WGW the Blackwood Club (as mentioned last month) will be taking some HF gear to be operated

in the WAB squares on 80 and 40 metres.

Contests now: This is an advance warning of the VK/ZL/Oceania contest which has its Phone leg from 1000z October 6 to 1000z on the 7th and CW from 1000z October 13 to 1000z October 14. Exchange the usual six-digit combination of RST plus a serial number *the latter starting anywhere between 1 and 100* and rising by one for each successive contact. Score two points for each VK or ZL QSO, or one point for an Oceania contact. Total score will be all QSO points multiplied by the sum of the VK/ZL call areas worked on all bands. Logs to show, in this order: Date, time GMT, call of station worked, band, serial number sent, serial number received, points claimed. Each new VK/ZL call area worked for the first time should be underlined in the log. All entries to go to Federal Contest Committee, W.I.A., Box N1002, G.P.O. Perth, Western Australia, 6001. Entries from outside VK/ZL are to *arrive* by January 22, 1974.

The CW section of the EDXC (this is an EU event) comes up on August 11-12, and the Phone leg on September 8-9. Start is 0001 Saturday to 2359 on Sunday, all times GMT. Out of the 48 hours you use 36 hours for operating,

the rest period being taken in not more than three sessions. European stations work the world, the world works EU's. Usual five or six-digit exchange of RS(T) + serial number. Score one point per QSO, and use ARRL countries list for the multiplier, save that *call areas* of JA, PY, VE/VO, VK, W/K, ZL, ZS, UA9 and UA0 count as *countries*. In addition, the multiplier earned on Eighty may be multiplied by four, the multiplier on Forty by three, and on 14/21/28 MHz by two. Total score is QSO points *times* sum total multiplier for all bands worked. Note that non-EU stations may send back a list of up to ten stations previously worked, to score a point each for a QTC, so be ready for this to happen. (Presumably, it means that if you are told about the Contest by a DL, you make a note of it.) Logs to be in DARC form, preferably, and to be sent to DARC WAE Contest Committee, D-895 Kaufbeuren, Box 262, West Germany, to arrive by September 15 for CW, and October 15 for Phone. Incidentally, if you use your own log sheets, make them go forty contacts to the page. On the other

hand, if you are really interested, write to the QTH given, with an IRC, and ask for the rules and a supply of log sheets.

#### TVI & BCI

A write-up in the Cray Valley "Newsletter," *QUA*, discusses a lecture by G3OHX and G3VUQ, at which these two enthusiasts bombarded the meeting with practical ways of tackling TVI and BCI, guaranteeing that any case of TVI is curable, however bad the effects on the social side may be. Some staggering figures are produced—for instance, that 400 watts p.e.p. could produce as much as one amp of unwanted RF on a neighbour's TV aerial feeder! They make a valid point when they say: "Don't moan among yourselves about poor TV set design, but write to the manufacturers' organisation, BREMA, who have an Interference Committee who should be *snowed under* with our written complaints." Incidentally, BREMA is the British Radio Equipment Manufacturers Association, and their address is 31 Soho Square, London, W.1.

This whole business of TVI, as

your scribe has so often said in these pages, is almost always accepted and not dealt with; and this must have had a lot to do with the ridiculous situation that every TV set made for the U.K. market and operated from mains has a *live chassis*, which prevents earthing the chassis—that importers of foreign TV sets are refusing the anti-interference screens which the law calls for—that TV set dealers, while quite happy in many cases to sell walkie-talkies to the wrong people, are also quite happy to blame amateurs whenever their own people meet a case of interference—and that in some areas, even some G.P.O. staff on the Interference side are prepared to say "TVI is incurable." This is not at all the case and should not be accepted as such.

#### Now QRU

That's enough this time from your old conductor. For next month the deadline is to arrive by first post on July 10, the address as always being "CDXN," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. Meantime, may your grass remain short!

#### COURSES FOR THE R.A.E.

Starting in the August issue, we will as usual begin listing those centres at which courses are to be started for the Radio Amateurs' Examination, Subject No. 765 in the City & Guilds of London Institute examination syllabus.

Those responsible for organising such courses are asked to let us have the necessary details (on a separate sheet, *please*) as soon as possible, addressed: "R.A.E.," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

#### "TRANSCIVER FOR EIGHTY METRES"

In this article by G3TAG, in our June issue, values for VR1 (5K log.) and VR2 (5K linear) were omitted from the table on p.223. And R2 should be 30K.

#### AMATEUR LICENCE FIGURES

There are now well over 18,000 U.K. licences in issue, about 22% of which are Class-B (VHF only). Of the total, some 3,800 are licensed for mobile, the proportion of B-licensees in this category being somewhat higher at about 24.5%. This is reflected in the greatly increased mobile activity on two metres. For the first time, we are this year getting reports of more /M's worked on Two than on Top Band, hitherto by far the band most used by mobiles.

#### RECIPROCAL LICENSING

We are informed by the Ministry that for what they call the "alien licence", U.K. licensees will in future be allowed to use RTTY and "any recognised spoken language", *i.e.*, English is no longer insisted upon as the only language to be used over the air by foreign amateurs licensed in the U.K.

#### MORSE AT MABLETHORPE

Under the guidance of a professional operator, it is intended to organise a class in Morse tuition at Tennyson School, Mablethorpe, Lincs., as part of the winter evening educational programme. For details, contact P. J. Bradshaw, G8AWX, 46 Camelot Gardens, Sutton-on-Sea, Mablethorpe, Lincs., LN12 2HP, enclosing an s.a.e.

#### ENSIGN ELECTRONICS, QUORN, LEICS.

Due to the untimely death in a motor accident of the proprietor of this firm, all business outstanding is being dealt with by his father, Mr. P. R. Twells, 18 Chaveney Road, Quorn, Nr. Loughborough, Leics., to whom applications should be made with reference to completion of orders or refunds of cash paid.

## GENERAL COVERAGE RECEIVER

### CONCLUDING POINTS

We now go on from p.230 of the June issue, on the subject of IF alignment.

With crystals in use, the procedure is the same, except that the IFT's have to be centred between the crystal frequencies. This is most easily done by shorting VC1, and injecting from a signal generator at 2 of V1, swinging the generator from about 464 to 466 kHz, as necessary to find the crystal peaks. Then set the generator between these, and adjust the IFT cores as mentioned. With patience, a similar result can be achieved by tuning in a stable BBC signal, and adjusting the IFT cores. With correct adjustment, selectivity should be quite a notable feature.

#### Band Coverage

Band coverage at the LF ends of the bands can be altered by moving the cores L5, L6, L7 and L8, as required. At the HF ends of the bands, adjust T5, T6, T7 or T8, as necessary.

#### Aerial Alignment

If necessary, adjust L1, L2, L3 or L4 at the LF end of the band, for best results. If required, adjust the appropriate aerial trimmers T1, T2, T3 and T4 near the HF end of the

bands.

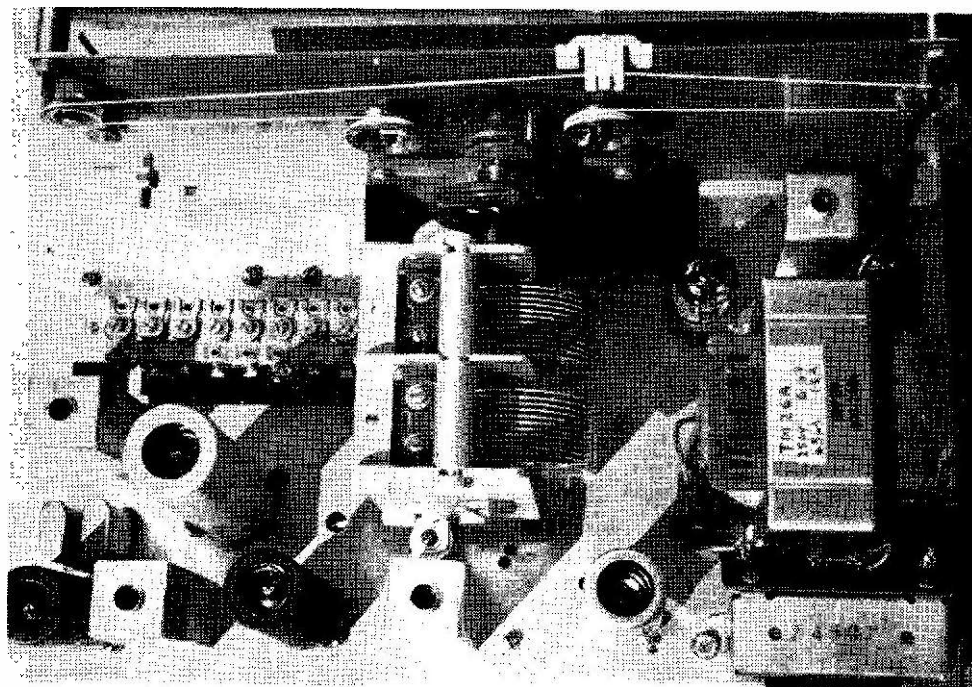
#### Aerial

For general use, any end-connected wire can be used. But a properly erected aerial, designed for all bands, or operated in conjunction with a tuner, will *greatly* improve results. A very long aerial, of no specified or known characteristic, will add considerably to 2nd channel whistles. A shorter aerial is much less liable to this trouble. Placing a pre-set capacitor in the aerial connection at A will improve results. Best results of all will be with a resonant tuner, which can be operated in conjunction with an end-connected aerial, or tuned couplet, or other tuned system, in the usual manner.

#### To Repeat

It ought to be noted again that this circuit was used with the aim of producing an essentially simple receiver, based on a home-made coil-pack, which is put in as a ready-made and approximately aligned unit. The limitations imposed by lack of pre-mixer selectivity have been described. But, as also noted, there are various quite expensive receivers on the market with a 470 kHz IF and no extra 2nd channel rejection than has this receiver.

As regards adjacent channel selectivity, that exhibited by this circuit is of course much better than that of the type of commercial receiver with which it is being compared. In fact, if the crystal filter is omitted, this receiver will have about the same adjacent channel selectivity as a very large number of commercial receivers, including certain models which are in much general use for amateur and all-band coverage.



*Another interior view of the Rx as described*

## BOOK REVIEW — 1973 ARRL HANDBOOK

BEFORE settling down to review the 1973 (50th) Edition of the ARRL *Radio Amateur's Handbook*, your reviewer compared it with some of the earlier editions on his shelf, dating back to 1939. About the only thing in common with these earlier editions is the page size and the soft cover. Compared even with so recent an issue as the 1971 *Handbook*, this new one is very largely rewritten. Emphasis has been laid on the modern developments, so that, for instance, Fig. 8-8, covering "detectors," shows types using a valve, a bipolar transistor, a FET, a diode, or an IC. Similarly with the drawing of various types of mixer. A section now deals with digital IC's, and another shows some of the many ways of using the operational amplifier type of IC. When one looks at VHF pre-amplifiers, there is not a valve to be seen.

Chapters are not in their accustomed order, neither are the titles of the chapters the same—and the advertisement section has disappeared altogether. A sign of the times is a list of American companies willing to accept small-number orders from amateurs for components—it seems that problem is not only confined to Britain!

Of course, many buyers of the *ARRL Handbook* (as it is usually known) are professionals, who find it a worthwhile volume of information to have on desk or lab. bench at work; for them also, the 1973 Edition out-dates all the earlier ones because of its extensive modernisation, and indeed since your reviewer took his to work for a lunchtime read, three people in a lab. of twelve, all non-amateurs, have asked him to get a copy for them for reference, after borrowing it for long enough to get a good "feel" for the contents.

Perhaps the most interesting thing for most people is to note that the chapter on Interference now carries notes, not only on BCI and TVI, but also interference to Hi-Fi equipment and electronic organs. However, for your reviewer, the most interesting item by far is the RF Impedance Bridge, giving indication of both resistive and reactive components to a degree adequate for use with a Smith Chart—this can revolutionise our amateur ideas on Aerials and their measurements.

To sum up: Speaking as a professional as well as an amateur, your reviewer is torn between keeping his copy in the shack, or on his desk at work.

The ARRL *Radio Amateur's Handbook*, 50th edition, 1973, of nearly 700 pages, covering design, construction and operation of amateur-band equipment of every type, fully illustrated in line and half-tone, indexed, price £2.85 in limp cover (or £3.65 hard back) post free, from stock, of the Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H OHF. *E.P.E.*

## AS IT WAS IN THE BEGINNING

## NOTE OF NOSTALGIA

J. W. PADDON, G2IS

COMMUNICATION was first carried out (by the writer) by what can be properly described as a pulse train having constant amplitude and varying lengths. That was half a century and five years ago. The propagation medium was two strands of a barbed-wire fence running through the Ontario bush from my back door to that of a friend on the other side of the hill. QSO's were solid—no QRM, no QRN and no QSB. The power supply was half a dozen dry cell batteries. A key and a telegraph sounder at each end completed the system. We learned Morse from the operator at the local railway station who was bored, underworked and liked children.

When my friend moved away the urge to communicate was in no way abated. To fill the gap attention was turned to wireless (who ever heard of "radio" then? That word came into being many years later). There was little technical literature available. Gear was nearly non-existent and what there was priced far beyond the resources of a youngster.

Things really got going when an amiable Aunt returned from a visit to England with a present in the form of a pair of headphones—excellent ones from a manufacturer who, happily, still flourishes. About the same time an article on how to build a receiver appeared.

In those days it was overwhelmingly L and precious little C. What C there was came from the antenna/earth capacity except for the capacitor across the headphones. Fine DCC wire was readily available as was galena crystal. With a little more trouble some square brass rod and sliding contacts to run on it were found. A large, cylindrical cardboard box (which originally contained oatmeal) was heavily painted with orange shellac and baked in a low oven. Turn by turn the winding was put on—hundreds of turns. Two square pieces of wood made the end supports for the coil. A couple of careful passes with a red-hot poker burned away the insulation and provided a path for the sliding contact. Thus was produced the "tuner," to load the antenna. A similar device but with two sliders on completed the great hunk of inductance. A by-pass condenser for the headphones was dug out from a Model "T" Ford sparking coil salvaged from the local garage junk heap.

The final problem was the aerial. In those days they were heroic affairs made up of six parallel wires on twenty foot spreaders. That meant 12 insulators. These looked like baked mud cricket balls with a screw eye on each side. The cash to buy these was raised by picking innumerable boxes of strawberries at 2d. each. The contraption filled the hundred and fifty foot space between the peak of the barn and a big fir outside the shack window. Earth was the casing of a deep well and probably a good one for the pipe went straight down sixty feet.

### Putting It Together

Soldering up the connections was an interesting job. The bit of the iron was a one pound lump of copper and was heated in the fire box of a wood-burning kitchen stove. Soldering paste had never been heard of. Flux was made by dissolving slips of zinc in muriatic acid which made a good joint but flew sizzling in all corrosive directions when the hot iron was applied. Solder came in great hefty bars meant for plumbers.

The great moment finally came. Connections were checked and the shiny new headphones clamped over the ears. Total silence until a few prods with the cat's whisker found a sensitive spot on the crystal. There were thunderstorms about so above the background hiss there were reassuring crashes of static—and nothing else. After dark and much patient juggling with the sliders a Morse signal finally emerged. Faint it was but going steadily along at an easy pace. Utter frustration set in for not one scrap of sense could be made of it—not surprising for this was international Morse and not the familiar continental. It took some time to find out that this code even existed but a chance meeting with a fellow who worked for Marconi somewhere up the St. Lawrence solved the riddle and provided a copy of the "wireless" code.

### Results!

The tedious business of learning this new code began. There was no one who knew the code for hundreds of miles so the instructors were: FL, the Eiffel Tower; POZ, Nauen in Germany; and NAA, the U.S. Navy station at Arlington, Virginia. The signals they put out were actually machine made, generated by Alexanderson or Goldschmidt alternators. These were towering contraptions which, by the use of high rotational speed and an enormous number of field coils produced at VLF, AC current which could be made to radiate. Keying was achieved by exciting the field coils and the hysteresis of the iron in the system held the code speed down to a low enough figure to enable a patient and persistent youngster slowly to learn it. The highest frequency they could achieve was 200 kHz but in practice they worked on a far lower frequency. The wave form was so full of overtones and other anomalies that it ceased to be pure CW and could be copied without a BFO.

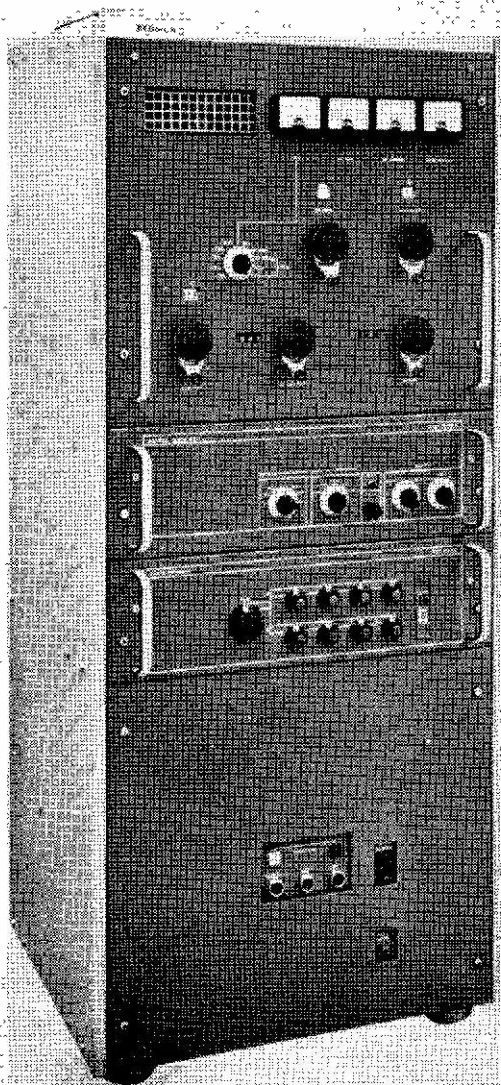
It is an interesting historical fact that after Pearl Harbour the U.S. Navy dug out an alternator left over from the Kaiser's War. This was on the Island of Hilo. After shovelling away the accumulated rubbish of years the machine was cleaned up and the windings dried out. It fired up on the first twist and provided solid VLF all over the Pacific until the end of hostilities with Japan.

That was the way a career in Amateur Radio began. Perhaps there was more satisfaction in it than there is today. It developed an amateur population without passengers. Those who wanted it the easy way soon dropped out. The few who stuck it out were a close-knit band of enthusiasts. Unlimited help was poured out upon anyone who asked for it. While QSO's were very few and far between each one was an event and an achievement far beyond a two-hour, ten-station round-table on SSB.

### REDIFON TELECOMMUNICATIONS EXHIBITION

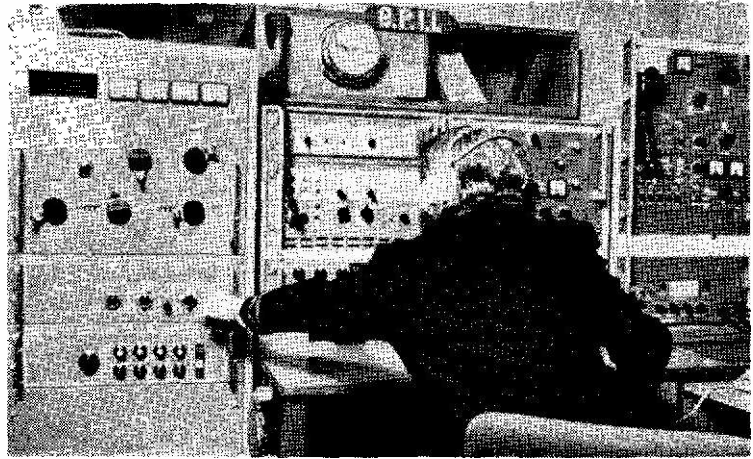
London, June 5-8

**A**LTHOUGH Redifon products are beyond the financial resources of most amateurs, the Redifon '73 Exhibition had much of interest for the electronically minded. Attracting a great deal of attention were the new, solid-state, broadband, HF amplifiers rated at 400 watts and 1 kW. The latter has no less than 48 transistors



The new RMT-1500S frequency-synthesised 1.5 kW marine-band SSB transmitter by Redifon Telecommunications, Ltd. see text.

The RMT-1500S frequency-synthesised 1.5 kW SSB marine transmitter installed in the radio room of the new B.P. tanker "British Tamar", GPIL, which is fitted with Redifon Telecomms. equipment.



in the output stage arranged round the periphery of a drum, a layout which not only gives even cooling, but is also electrically convenient. The problems of matching and balancing are obviously formidable, but the modular construction eases the servicing problem. Full protection against short circuited and open-circuited antenna conditions provides an additional safeguard against catastrophic misuse.

A new marine transmitter, designated the RMT-1500S, runs up to 1.5 kW on all marine radiotelegraph and radiotelephone bands with a frequency stability of 1 part in  $10^7$ —or about 2.5 Hz at 30 MHz—more than adequate for selective calling and RTTY working. The frequency is selected in 100 Hz steps from a synthesiser so designed as to permit the setting up of a working channel as well as a calling channel, the former becoming available, once communication has been established, merely by pressing a button. Modes available from the synthesiser, which is a standard piece of equipment producing 100 mW of output and capable of driving a number of transmitters of varying output powers, are A1, A3A (SSB with pilot carrier), A3H (SSB with equal carrier for DSB), A3J, and A2H (one sideband with equal carrier for MCW transmission). The idea of using a small drive unit with multiple facilities also has much to commend it in the amateur context and, with the addition of NBFM, can be used to produce all the usual modes on various amateur bands by appropriate mixing and linear amplifier techniques.

Other new Redifon products were a mobile, all solid-state, 400-watt HF transmitter covering the usual range of HF communication frequencies, an automatic alarm receiver operating on the international distress frequency and, a sign of the times perhaps, an audio entertainment and intercom. system for small vessels.

A surprise announcement came from the Managing Director of the company, Mr. J. R. Brinkley, that Redifon are going into the mobile and fixed station VHF/UHF market—quite a departure from previous policy, but one which is in line with Mr. Brinkley's previous interests.

Although some £100,000 per annum is being invested

in this project, it will obviously be some time before the ubiquitous Rangers and Cambridges, so popular for amateur mobile working, are supplanted.

A.H.D.

#### SPECIALLY ON THE AIR

Quite a number of new entries under this heading, all in connection with events at which the public will be present in large numbers. In some cases, the exhibition station is put on with the intention of attracting mobile operators, *i.e.*, talk-in facilities are offered for possible /M's. In fact, some of these events could assume the proportions of a Mobile Rally, though probably without the trade stands of radio amateur interest now associated with Rallies. In each case, the name/QTH given is the address for QSL's.

**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.

**GB3MKB, June 30-July 7:** At Ballycastle, Co. Antrim, to commemorate the 75th anniversary of the Marconi link to Rathlin Is., operating all bands 10-80m., with a special QSL card. (This station should be worked for the "G16YM Golden Jubilee Award").—J. Beattie, G13NQH, 170 Lower Braniel Road, Belfast Northern Ireland.

**GB2DTS, July 7-8:** Put on by Barking Radio & Electronics Society for the Dagenham Town Show, running all bands 2m.-160m. inclusive, with talk-in for mobiles on 145 MHz.—R. E. Clark, G8BXC, 62 Waltham Road, Woodford Bridge, Essex.

**GB3SF/G, July 12-14:** Finchley Carnival at Victoria Park, Ballards Lane, London, N.3, operated by the Southgate Radio Club, all bands 2-160m.—A. C.

- Edwards, G3MBL, 244 Ballards Lane, London, N12 0EP.
- GB2FS, July 14:** Organised by Farnborough & District Radio Society for Frogmore School fête, to work on 80m. and the HF bands.—D. Underwood, G3MBK, *QTHR*.
- GB2RHR, July 14-15:** For the Robin Hood Vintage Car Rally, Wilford Lane Sports Ground, Nottingham, with SSB 10-80m. and AM on two metres. All contacts will be QSL'd by special card.—A. Veitch, G8FRB, *QTHR*.
- GB2SCW, July 19-21:** Put on by the Stowmarket District Amateur Radio Society for the local carnival week, running 20-160m. and 2m./70cm., CW and phone, from the Recreation Ground, Stowmarket.—K. J. Bertrand, 35 Cuewen Road, Stowmarket, Suffolk, IP14 1JX.
- GB3SS, July 22:** At the Polegate Steam Engine Rally, off the A.27 Polegate-Lewes road, with talk-in on 2/4/160m., also an HF band station signing GB2SS.—B. Houghton, G4BCO, *QTHR*.
- GB2BEX, from mid-July:** In connection with the "Bristol 600" charter celebrations, organised by the Shirehampton Radio Club, working all bands, contacts to be QSL'd by a special card.—A. H. Kelle, G4AYB, 48 Station Road, Shirehampton, Bristol, BS11 9TX.
- GB3BSI, July 28-August 4:** Operating from Brownsea Island, Poole Harbour, Dorset, running 10-80m. SSB and AM/FM on 2m./4m.—P. Dutfield, G3OBD, 16 Talbot Drive, Poole, Dorset.
- GB2SJC, July 28-August 4:** For the Welsh Scout Jamboree at Penryn Castle Park, Bangor, North Wales, for which a large number of Scout campers is expected. A CW/SSB station will be operated on all bands 10-80m., for which some volunteer Licence operators and SWL assistance, with logging and QSL card work, would be appreciated.—D. Roberts, GW3UBV, 33 St. Martins Park, Haverfordwest, Pembrokeshire.
- GB2GB, August:** Station to be operated from Brunel's famous old steamship *Great Britain*, now dry-docked, at Bristol, for the City's charter anniversary celebrations. GB2GB will be available for operation by visiting licensed amateurs during the entire month. Contacts will be QSL'd by special card. Information from G. Mather, G3GKA, 8 Hills Close, Keynsham, Bristol.
- GB2YEO, during August:** From the Yeovil Technical College, running all bands 10-80m., also two metres.—D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.
- GB3RAF, August 10-27:** In conjunction with the R.A.F. Exhibition, Billesley Common, Birmingham, operating on HF and VHF from the exhibition site, 10 a.m. till 8.0 p.m. daily. Operators will be R.A.F. personnel.—Hon. Secretary, R.A.F. Amateur Radio Society, R.A.F. Station Locking, Weston-super-Mare, Somerset. (*Call GB4CES may also be used*).
- G3CAR, September 1:** For the 27th annual Wycombe Show, at The Rye, High Wycombe, Bucks., organised

by the Chiltern Amateur Radio Club, to operate CW/SSB on all bands 10-80m. RTTY skeds would also be welcomed. QSL by a card minted for the occasion.—A. C. Butcher, G3FSN, 70 Hughenden Avenue, High Wycombe, Bucks.

Any further notices that are wished for under this heading should be in the form shown here—in particular, we must have the name/QTH of whoever is to be responsible for handling enquiries and the QSL card business. We cannot accept notices that do not include this information. Address to: "Specially on The Air," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

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### WHAT SOME READERS SAY

" Thank you for all you have done for me; I knew nothing about Amateur Radio till I picked up a copy of your Magazine on a station book-stall. Now I have my own call sign . . . "

"—I am professionally interested in radio but I like your amateur Magazine because it is written in English . . . "

"—While I have learnt a lot from SWM, I think you should pay more attention to beginners . . . "

"—I am getting tired of your Magazine because you devote so much space to the SWL interest . . . "

" Thanks to your SWL feature, my son and I now have a joint station for logging DX on the amateur bands . . . "

"— Because my main interest is VHF, I am not renewing my subscription . . . "

"—I think you devote far too much space to VHF, which is surely not the main activity of DX-minded amateurs . . . "

" I would like to ask you to cut you the Clubs article, and who works what on the HF bands. This is surely old stuff. I would like to see more technical articles . . . "

"—Your articles are far too technical for me . . . "

"—The first thing I turn to is your DX commentary; it tells me just what I want to know about what is happening on the bands . . . "

"—You should pay less attention to valves and more to transistors . . . "

"—You publish a lot of articles using transistors but seem to forget that many ordinary radio amateurs still understand valves, of which they have hundreds in their junk boxes. . . "

"—It is easy to talk about anti-TVI measures but a great deal more difficult to deal with neighbours who complain if you have planning permission for a beam in your garden . . . "

[over

" You should devote more attention to BCI/TVI. I live on a housing estate and just don't know to cope with the problem . . . "

" - The local Post Office engineers have been most helpful and co-operative in dealing with my TVI difficulties . . . "

"—I have to thank you for opening up an entirely new field of interest in my enforced retirement . . . "

"—You should not worry about criticism. You do

a good job for Amateur Radio and I have been a reader for more than 20 years . . . "

(As we have on occasion remarked, we cannot hope to please everyone all the time, but we do try to catch the interest of most of our readers for at least some of the time. The foregoing comments are *verbatim* extracts from letters received over the last three months or so—and we have many more such! *Editor*.)

## QRO LINEAR FOR TWO METRES

### CHOICE OF CIRCUITRY AND DESIGN FOR PAIR 4CX250B

#### Part I

J. D. V. LUDLOW (GW3ZTH) and  
C. J. DUNBAR (GW8EHK)

*Some detail drawings and illustration will follow in Part II—Editor.*

AS a result of observation made over a considerable period on two metres it became apparent that certain stations over two hundred miles away could always be heard even under normal conditions; very often these stations could not be raised using 200w. p.e.p. input. Subsequently it was determined that these stations were using high power linear amplifiers and were, in some cases, being heard off the side of their beams! Similarly the converse is true, that the other station would stand more chance of hearing and replying to CQ calls if higher power were available.

Another factor that has to be considered is that in certain areas of the United Kingdom the local terrain has great attenuating effect. The use of higher c.r.p. over these paths certainly produces more contacts and to a great extent reduces the depth of fading on these long-distance signals.

Communication *via* the Auroral curtain and meteor trail ionisation (MS) is rarely possible from GW3ZTH using CW, leave alone SSB. However, it is likely that the highest powers are necessary to achieve this at all successfully.

The methods of increasing one's e.r.p. are twofold:—

Modification to the station's antenna system would involve putting twice as much metal up in the sky to achieve approximately 3 dB power gain.

This was seriously considered because any gain realised would be useful on "receive" as well as "transmit." However, in the author's case this would involve considerable mechanical engineering and so the choice was made to construct a high-power linear amplifier.

On the other hand, it should be noted that the use of high power does have disadvantages:—

- (i) The incidence of TVI does appear to affect those stations who consistently run higher powers to a greater extent than other stations, the problem usually being overload of the TV Rx. front end and/or breakthrough,
- (ii) The high probability of overloading the mixers of poorly designed local two-metre receiver/converter set ups with the resulting complaints of "excessive power," "bad signals", "spurious products," etc., causing strained relations between oneself and the locals,
- (iii) The cost of constructing, maintaining and even running such an amplifier must be considered as a disadvantage,
- (iv) The element of danger involved during the alignment of the amplifier and in the general lay-out of the station supplies which are potentially lethal is yet another disadvantage.

With the above in mind the project was undertaken in the winter of 1972. There are few articles available on 2m. linear amplifiers and only two were referred to, these being in the *VHF/UHF Manual*, and the other in the A.R.R.L. *Radio Amateur's VHF manual*. Both of these complement each other but omit some salient points. These the authors hope to make without omitting any of the others.

### Table of Values

Fig. 1. Circuit of the QRO Linear

C1-C15, incl. — .001 $\mu$ F 500v. disc ceramic	FT1-FT5 incl. — .001 $\mu$ F 500v. bolt-in feed-thru
C12, C13 — 68 $\mu$ F 8 kV wkng., disc	R1, R2, R3, R4 = 150-ohm 2w carbon
VC1 — 15 + 15 $\mu$ F, split stator	R5 — 25-ohm 10w. w/wound
VC2 — <i>to be described</i>	L1 — 2 turns 16g., $\frac{1}{16}$ in. dia.
VC3 — 15 + 15 $\mu$ F butterfly	L2 — 3 turns 16g., $\frac{1}{16}$ in. dia., tapped at 1t. ( <i>see text</i> )
TC1, TC2 — 0.3-6 $\mu$ F ceramic tubular	L4, L5 — <i>to be described</i>
TC3, TC4 — 0.2-5 $\mu$ F min tubular	V1, V2 — 4CX250B, with base and chimney

NOTES: Screen decoupling capacitors C in diagram Fig. 1 are built into 5K610 valve holders for 4CX250B. Shunts MS1-MS5 should be carbon, valued to suit meters used. Capacitors C12, C13, rated 8 kV, can be *Radio Spares* "disc-ionisation free" items. Drawings for inductances L4, L5, will be given in Part II. Coils L1, L2 are also covered above.. R5 is in effect an RF choke.



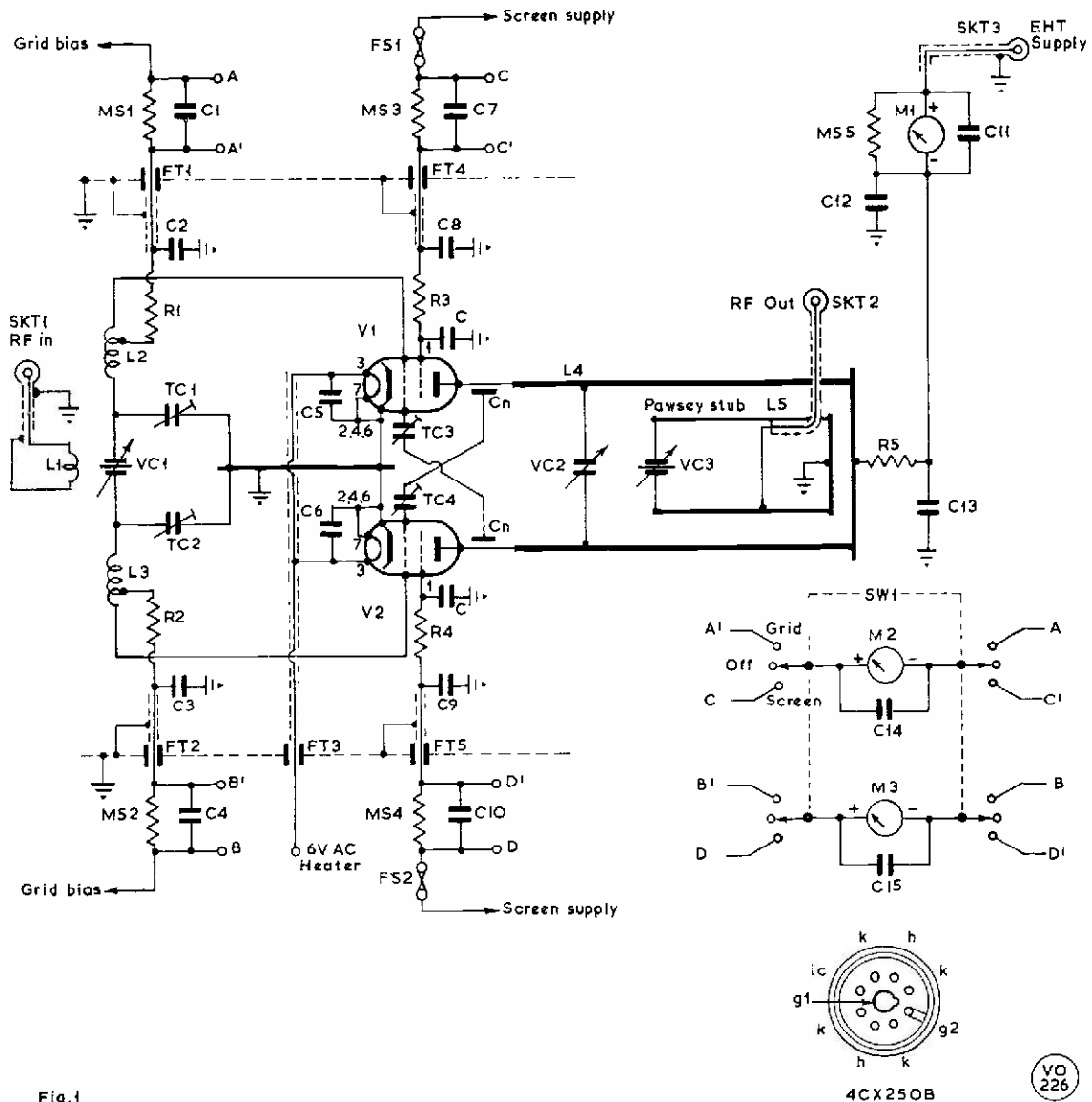


Fig.1

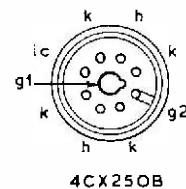
Fig. 1. Basic circuit of the two-metre high power Linear Amplifier

The basic design was initially determined by two factors—one being the type of anode lines and the other the space available in the shack.

Any amplifier of this type has to be made physically large, as not only is there a heat problem but also one of high RF fields. As the effect of high RF currents appearing in the metal box can be disastrous the amplifier was built into a box of 17 x 10 x 4½ inches, with a front panel of 19 x 8½ inches, these being manu-

factured professionally. The amplifier is mounted in the box, open side uppermost, with the 4CX 250B air system sockets mounted on a vertical 4½ in. high partition having its edges folded over and drawn in tight to the amplifier box side walls to form an effective air seal.

The box top plate was split into two, the blower being mounted on the one above the grid compartment leaving the only path for the air flow through the 4CX250B air system sockets and the valve anode coolers; this cover



VO 226

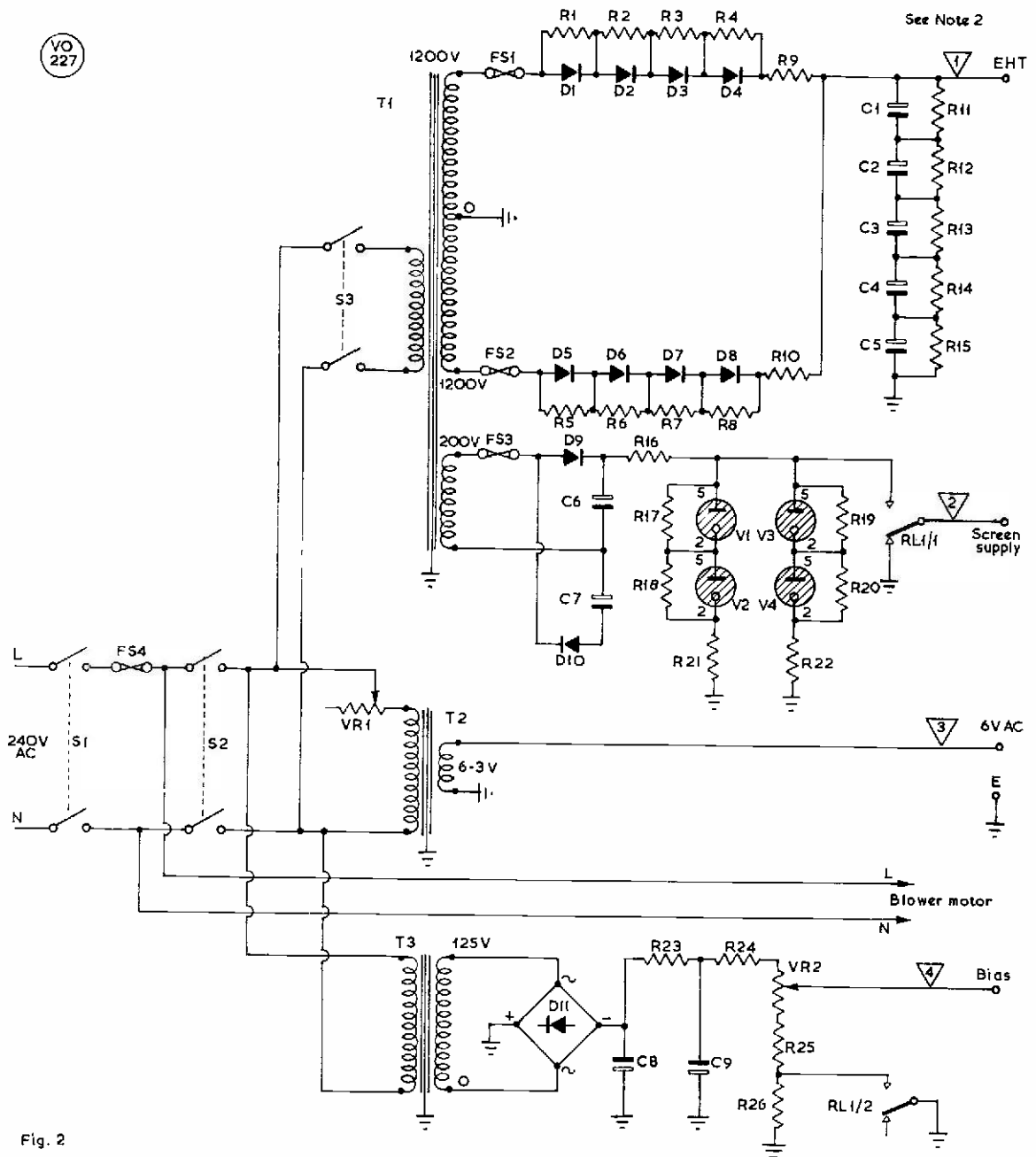


Fig. 2

Fig. 2. Suitable power supply unit for the QRO Linear Amplifier

was air sealed with the normal household self-adhesive draught excluder which was obtained from a local D.I.Y. centre for a few pence.

Large anode lines were used because it was felt that

they would aid in removing the heat dissipated by the valves. The anode lines were therefore made of copper pipe with a nominal 1½ in. bore. This material was obtained from a local central heating firm.

**Table of Values**

Fig. 2. Circuit of The PSU

C1-C5, incl. — 100 $\mu$ F, 450v. elect. C6, C7 — 32 $\mu$ F, 450v elect. C8, C9 — 16 $\mu$ F, 450v. elect. R1-R8 — 220,000 ohms, 2w. incl. R9, R10 — 50-ohm 10w. w/wound R11-R15 — 110,000 ohms. 4w R16 — 5,000-ohm, 30w. R17-R20 incl. — 150,000 ohms, 2w R21, R22 — 150 ohms, 2w. R23 — 680 ohms, 2w. R24 — 15,000 ohms, 2w. R25 — 2,200 ohms, 2w. R26 — 10,000 ohms, 2w.	VR1 = 500-ohm 25w. w/wound VR2 = 10,000-ohm 3w. w/wound RL1, RL2 = 2-pole c/o with heavy duty contacts D1-D8 incl. = 1N4007 D9, D10 = BY100 D11 — Bridge rectifier, 400 p.i.v., 500 mA T1 — Sec's 1200-0-1200v 1 amp and 0-200v 120 mA T2 — Sec. to give 6.3v at 5 amp T3 = 0-125v. 50 mA.
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NOTES: Transformers T1, T2, T3 have standard primaries. FS1, FS2 should be rated 500 mA anti-surge, and FS3 250 mA. Switches S1, S2, S3, should be heavy-duty DPST, rated 6 amp. at 240v. Resistors R11-R15 can be built up by putting 220K resistors in parallel. R16 can be three 15K 10-watt wire-wound resistors in parallel.

The decision to tune the lines with a flap was dropped in favour of discs, because of the height limit set on the box. However, if the would-be constructor has more space available a flap is recommended because it avoids hot spots being developed at the disc-supporting bushes.

Drawings were made up for the lines. These were then prefabricated by mounting them together with the end plate in a jig to keep them square. They were then soldered together using a blow torch. It is best to silver solder the lines but normal radio solder can be used with equal success.

The tuning discs were made out of scrap  $\frac{1}{8}$ in. copper plate by using a tank cutter. They were then soldered onto  $\frac{1}{4}$ in. brass studding which had been previously

mounted through the lines. The finished product was then cleaned up and the anode ends of the lines were fluted to take the anode coolers of the 4CX250B's, these being clamped in place by Jubilee clips.

The lines were to have been held in place by means of a tufnol plate across the width of the box, but this was dropped because of the difficulty in getting the lines out for valve changing. The present arrangement consists of two tufnol plates supporting the ends of the line.

Because the lines were slightly too long in the authors' case a copper shorting strap of one-inch flashing was made up, and works well. However, this needs to be a good fit and high grade copper is necessary. Should lines with different dimensions to those specified be used then a simple check will show if an alteration is required. Assemble the anode lines (without soldering the end plate in place) in the box with valves and supporting brackets and check the resonant frequency with a GDO. No supply voltages are needed for this check, but since the top cover and Pawsey stub effect the resonant frequency allowance must be made for them.

Initially, a coupling loop was made out of  $\frac{1}{4}$ in. dia. copper tube (pyrotenax cable) but this was later abandoned in favour of the Pawsey stub as the latter was found to be more efficient in getting all the RF out from the tank circuit. It is interesting to note that others have also found the ARRL arrangement inadequate.

The Pawsey stub was also made out  $\frac{1}{4}$ in. dia. copper tube (pyrotenax cable) which was suspended from the underside of the lid of the anode compartment. Care must be exercised to prevent accidental shorting to the lines when the lid is in place.

No attempt was made to balance the lines with individual capacitors as it was not needed. A suitable choke (R5) and careful adjustment of TC1 and TC2 practically eliminate the effect of any slight unbalance providing of course that R5 is not decoupled at its hot RF end.

The grid circuit is a coiled up half-wave line, being only slightly less efficient than its straight out counterpart and it occupies far less space. It is formed by winding a 6-turn coil of 16g. copper on a  $\frac{3}{16}$ in. mandrel with  $\frac{5}{16}$ in. spacing of turns and long tails. The coil is then cut in half so forming two separate windings. These are mounted so that the grids of the 4CX250B's are connected to their outer ends and VC1 the split-stator tuning capacitor, to the inner ones. The correct point of connection of the bias feed resistors R1 and R2 should be determined by monitoring the grid current whilst touching a lead pencil along the grid coils, the correct point of connection being where *no* reaction of the grid current is observed. The use of carbon resistors here and for feeding the screens is a "must" if parasitic instability is to be avoided. The input coupling loop L1 is a two-turn link and is adjusted for maximum grid current during the initial testing.

The grid circuit is balanced by two small tubular Mullard trimmers TC1 and TC2 instead of the more usual differential trimmer—this arrangement gives excellent results and no problem has been experienced in balancing the grid circuit. It should be pointed out that both the rotor of VC1 and VC3 are left ungrounded, as grounding them may severely unbalance the circuit.

TABLE I

	Receive	Transmit	
		ZERO SIGNAL TOTAL ANODE CURRENT=100 mA	SINGLE TONE I/P 400w. RF OUT.
(1) EHT	1800v.	1675v.	1500v.
(2) Screen Supply	Zero*	330v.	329v.
(3) Heater	5.8v. AC	5.8v. AC	5.8v. AC
(4) Grid Bias	-80v.	-55v.	-55v.

\*Screen grids earthed via relay contact—as per text.

Readings derived from the PSU of Fig. 2.

(To be concluded)

# • • • SWL • • •

## SHORT WAVE LISTENER FEATURE

By Justin Cooper

### PROPAGATION FACTOR — MODERN RECEIVER CONSTRUCTION POSSIBILITIES - DISCUSSING READERS' LETTERS — LATEST LADDER LISTINGS

**P**ROPAGATION affects our activities from Top Band down to Ten. On these bands, as we know, it is possible, by selection of band and time, to hear stations on the far side of the Earth. How is this achieved?

Our globe is encircled by layers of ionised air at different heights above ground—layers which are ionised by the action of the sun. The layers of interest to us are designated D, E, and F layers, with the latter sometimes splitting into upper and lower levels, the former being the F2 layer and the latter F1 when this occurs. All the layers are affected by daylight, the lower ones indeed almost disappearing by night.

Now, the lower, D and E layers, are primarily absorbers of radio signals, the absorbent effect increasing at the lower frequencies; this results in the well-known effect whereby Top Band and Eighty will only support propagation to distant parts normally at night. At the higher frequencies the absorbent effect is least and the DX is there by day. The actual reflection, or, rather, refraction (the wave is bent round rather than abruptly reflected) occurs at night in the F layer, and by day in the upper, F2, layer when F1 and F2 layers are in existence together. Thus, the higher bands are less absorbed and can reach the F or F2 layer by day to be refracted, while lower frequencies can only reach the F layer and be bent back by night.

The ionised layers are collectively called the *ionosphere*, and are subject to several factors. The prime one is the effect of the sun's rays. Additionally, there is an effect directly connected with the presence of sunspots, ionisation being greater when more sunspots are present, and there are monthly and seasonal changes as well.

Broadly speaking, we prefer on the lower-frequency bands to have an all-darkness path, and on the higher an all-daylight path. Depending on the degree of sunspot effect, Forty and Twenty may support communication by day or by night and so fall midway between the two extremes. Furthermore, at times when the sunspots are few (at the trough of the 11-year sunspot cycle) the ionisation may not be enough to support *any* long-distance communication on Ten, or even Fifteen. As more sunspots appear, Ten will open up North-South for an hour round noon, while Fifteen may be good all round. At the peak, Ten will still be a daylight band, but Fifteen may be open well after dark, while Forty will take on something approaching the characteristic

of Eighty. An additional effect is that dawn or dusk at one or both ends of a path will often produce a peak in propagation effect.

Summing up, the SWL can see that a change in listening hours will very likely produce a change in the type of DX heard—and that there are best times for switching on the receiver if one wishes to hear a particular part of the world.

### Some Newcomers

Odd are the ways in which people come to Amateur Radio. *W. Baker (Bognor Regis)* was in hospital and made friends with a couple of other chaps; they all had had an interest in the idea of Amateur Radio but had not done anything about it. On their release, the three decided to "have a go"—and may we hope to hear more of them.

*M. Wickstead (Taplow)* has returned to the fold after some years' absence, and is mainly interested in Mobile and RTTY operation. *Maurice* has a Trio 9R-59DS, whose potential is as yet only partly plumbed: but he knows what to look for as he is professionally occupied in the communications field.

Another newcomer is *H. Houghton (Worcester)*, who has a National 100X general-coverage receiver and, more recently a Trio 9R-59DS. On the VHF side, there is a DL6SW converter on 144 MHz with crossed dipoles in the loft.

*C. M. Little (Croydon)* has at least one "phoney" in his list, in the shape of "AC4RF" whose real-life existence was way back in the late Forties; *Bob Ford, AC4RF*, was captured by the Chinese and later wrote a book about his experiences, both in Tibet and in Chinese hands.

A Unica UNR-30 with a 14 MHz folded dipole is used by *P. Davies (Stoke-on-Trent)* who has been a listener for two years now.

We mentioned *M. Smith (Matamata, New Zealand)* last time, as far as his rig goes; this time he has sent in a list of Prefixes of which several are queried, all being OK saving "VK9R" who we reckon is more likely VQ9R. On the aerial front there is a twenty-foot pole which is to be adorned with a TH3 beam; then there is a "cats cradle" to which is added a 14 MHz dipole.

*C. L. Lee (Ilford)* has a nice collection of 367 prefixes for the Table, heard on all bands with a Drake R4A receiver and 150-foot wire aerial.

Back in November 1971 was when *P. Eaton (Folkestone)* made a start with listening. Paul uses a home-brew transistor receiver in conjunction with a 14 MHz inverted-Vee and a 66ft. end-fed aerial to choice, the operation being mainly on Twenty, but a little on 7 and 3.5 MHz.

Miss K. Ramsay (London S.E.12) has a CR-100 receiver used in conjunction with a DL6SW converter and halo aerial, or alone to a sixty-foot wire. Karen says she has had much help from the local VHF licensees, and is going to R.A.E. classes and Cray Valley Club meetings—she says her repayment is to make coffee and provide moral support when contests do not go so well for the local lads!

What is the reason for the use of the DT prefix, wonders M. Whitfield (Stroud) in the covering letter with his Table entry of 467 prefixes. Easy, Malcolm, this is a "special" used by stations in the German Democratic Republic (East Germany), to commemorate 20 years of Amateur Radio activity.

### Other Reports

A goodly collection of DX in any language has been garnered by A. Judge (Bishops Stortford). Tony raised a smile when he suggested that maybe the IT57 prefix from Sicily might have some connection with a well-known baked-bean firm!

People get their prefixes in some odd ways. M. Kitchener (Hitchin) had been pretty inactive for a period, but was asked by a local G8 to demonstrate his new cassette tape-recorder. To do so, Mick recorded some SSB from 21 MHz and the Trio receiver. When they played it back, it occurred to Mick that this was an odd signal—sure enough, on looking it up he found he had a new prefix to count!

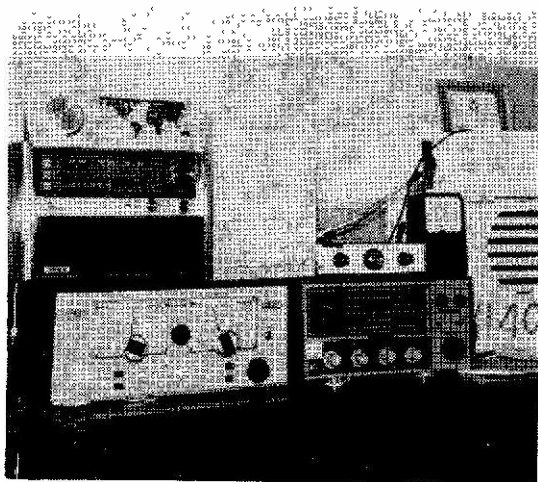
Like so many others, P. L. King (Emsworth) has found DX conditions pretty poor—a combination of solar activity and the low summer MUF's account for most of our problems and will continue to do so for a while—and has also suffered from lack of time. However, the enthusiasm is still there, and good conditions will find Pat ready to take advantage of them.

Sad to say, E. Parker (Hove) has had ill-health creep up on him, and worse, put paid to his R.A.E. studies. Ernie has some pointed remarks about people who QRM net operations by WAB, or whatever; it seems to him that twenty stations patiently waiting on one frequency can only reduce the QRM over the situation that would arise if they split up and took up twenty rag-chew channels. A good point—and an even better one when he says that most of the rag he hears being chewed on Eighty is only fit for the bonfire!

Like so many others, P. Barrett (Welwyn) has been inactive, R.A.E. revision taking priority, although he did find time to comb through old logs to find a few more prefixes. Talking of R.A.E., your old J.C. had a look at the paper and came to the conclusion that it was a lot fairer than those of recent years; anyone who went in properly prepared—and that is the crux of the matter—should have had no difficulty in passing provided he worked to his time schedule.

Another one to have been working seriously toward a ticket was J. Fitzgerald (Gt. Missenden), who will now be concentrating on CW listening to improve his speed, at least until the R.A.E. result comes out.

I. Brown (Newtownabbey, N.I.) has concentrated on 3.5 MHz since the start of the year, with a total score on the band of 111 countries since January 1. This is not to say Irwin has neglected the bands otherwise, as he has



SWL station of M. Cornwall, Ivy Cottage, Newdigate Road, Harefield, Middlesex, who runs Codar and Heath receivers and is acquiring DX-heard totals.

loggings right up to two metres: for the latter, he has now an eight-element beam arranged for rotation by hand.

The letter from O. Cross (Bexleyheath) says he has bought a Yaesu FR-DX400S receiver, relegating the old 840A to the position of reserve. The new box seems to be finding plenty of new countries to add to the score, which now comes to 221 countries, 703 prefixes.

The short list from M. Williams (Sleaford) is mainly due to the absence of a receiver. That sound a reasonable conclusion to draw! Apparently, Maurice has persuaded one of the lads at the club to take on the overhaul of his AR88—yet another demonstration of the advantages of being a member of the local group.

On to D. Noakes (Cranbrook) who has been comparing the performance of his two-metre halo against the six-over-six, the halo being five feet the higher. Looking at the locals, on some signals there is little in it, and as far as DX goes, there are loggings of PA0 and F stations in one direction, and G's as far distant as Gloucestershire the other way. As Sam says, when one can get a converter so cheaply and get decent results from a halo, why should anyone be deterred from making a start with VHF?

Reverting to our comments last time round on the way to drive a receiver for SSB, H. Alford (Burnham-on-Sea) finds after four years of practice with his EA-12, he can obtain best results by careful manipulation of RF, IF and AF gain controls. True, when one has them—but with a simple receiver having a combined RF/IF gain control, the method advocated of using full AF and the RF/IF gain as a main control is at least basically correct—one can, with practice, find a more delicate balance of controls, but at least the method suggested last time will enable skill to be based on a sound basic technique.

W. J. Smith (Benfleet) heard a station giving its

callsign as "Kilowatt Denmark (figure missed) Table Mountain" and wonders what it could have been. In letters it would be KD?TM, which suggests it may have been some sort of special-activity station if indeed it were genuine. Has anyone else any details?

It seems we got things a bit wrong about the aerials owned by N. Henbrey (Northiam)—we turned his TA31 into a TA33. Norman's photographs—alas, not quite good enough to reproduce—show he has the eight-over-eight skeleton slot beam on Two, the TA-31 also rotatable with electrical rotation at the masthead, plus an 18-AVQ to cover 3.5—30 MHz—quite an aerial farm.

\* \* \*

M. Cornwall (Harefield) uses his letter to "grind an axe." As he so rightly says, Amateur Radio is not advertised enough, with the result that there are probably people about who would enjoy the hobby but don't know it even exists. True enough in a way; but one tends to feel that the sort of mind which has never heard of Amateur Radio is unlikely to make a good recruit. After all, it has been mentioned even in the women's magazines, let alone the odd reports in daily or local papers.

L. A. S. Poole (London N.21) has managed to find one of the numerous sources of interference, that due to a new gas central heating system installed next door. It seems that the makers have now, after tests by the GPO, installed a new control unit which has reduced the QRM to an occasional burp. However, he still has the electric lawnmowers, washing-machines, TV timebases and other electrical noises to contend with. As he is moving in the early part of next year. L.A.S.P. is holding fire for the moment on the question of installing his 14-AVQ vertical. In any case, he would like to know how one is meant to fit the 80m. loading coil—can anyone help him out?

Having a comb-out of the listings is always a good thing to do, and it nearly always reveals one or two prefixes as yet unclaimed, as the Bingham family from Carrickfergus have found.

Our suggestion that the drift in the receiver could be a function of the ventilation proved correct, says W. McFaul (Londonderry). Once the current crop of examinations are over, therefore, time will be taken to introduce some ventilation holes. We could add a comment that there should be a few holes in the chassis, too, to make sure that hot air is not trapped underneath even though there is provision for getting it away from the upper side.

There was a hiccup in the recording system at the shack of E. W. Robinson (Bury St. Edmunds) which knocked his total down by ten last time; however, a new method being used should avoid such problems in the future.

The loss of CW and SSB reception mentioned last time by J. H. Sparkes (Trowbridge) turned out to be caused by a dud 6BE6 valve which has now been replaced, thanks to the help of G6ACY/T. SWL Sparkes mentioned a joker on April 1, heard on Twenty signing "AP|RIL"

and taking in a fair number of stations. (This happens every year.—*Editor*.)

A spell in hospital with a chest ailment has rather limited the activity of A. Glass (Plymouth), but Bert still managed to add a few more prefixes to his CW list.

H. Londesborough (Swanland) has a bumper crop of prefixes to offer on Phone, and says he will shortly be sending in a first entry to the CW table—good.

Where is UA9WT, enquires H. M. Graham (Harefield). A look at the list published by Geoff Watts in his *DX News Sheet* some time ago suggests that he is in Bashkir oblast (county), in Zone 16. Maurice remarks on the number of FR-50B receivers about these days among the SWL fraternity, and says he likes the one he uses.

R. H. McVey (Weston-super-Mare) asks about the method of callsign allocation for reciprocal licensees. Broadly, there are two methods in use. The first one is to allocate a callsign in the normal run to the chap, such as for example giving an American a U.K. call—for example W4WFL holds G5AYL in this country. A variation on this is to make no distinction in the series and just to allocate as though the chap were a local native. The other system involves using his own callsign followed by a suffix consisting of the prefix letters of the country he is in, as for instance W4WFL/4X, who would be W4WFL operating in Israel, or G3KFE/W4 who would be operating a station in W4-land.

At D. Rodgers (Harwood) the object of the exercise, at least for the moment, is to keep up the Morse speed while waiting for the R.A.E. results this should be fairly easy, as Dennis is up to "twenties" already.

\* \* \*

P. L. Newman (Thame) is another of the hopeful band who wait for the R.A.E. results—he sent in his letter before the day of the exam. in case it demoralised him too much! On the aerial front there are beams for 144 and 432 MHz driven by the "handraulic" principle by judicious use of cable-and-pulleys. On a different tack, Paul wants to know if anyone has any idea about a suitable NBFM discriminator for 1.6 MHz IF. One possibility appears in the fourth edition of *Amateur Radio Techniques* on page 73; and there is another device worth looking into in the 1973 *ARRL Handbook* among the several shown on pages 430-434.

Although not taking the exam. this time, T. Rootsey (Ilford) has been preparing for the great day by getting together the needful bits and pieces, particularly in view of the onset of VAT. As a result he now listens on a KW-2000B, after taking the chance to try all the common sets at his local dealer—for whom, incidentally, Terry has nothing but praise. At a different point, we made a bit of a mess of his HPX score—how it happens escapes us—and unwittingly docked him a couple of hundred hard-won prefixes. However, unless the Law of Murphy strikes yet again, things should now be put to rights.

One of those who try to put in his hobby more than he takes out is R. Carter (Blackburn) who tries to keep up correspondence, by letter or tape, with people interested in radio but are unable to get out and about. Indeed, Ben's wife recognises most of the WAMRAC



tunable oscillator frequency and the BFO frequency, in the manner already done by one of the Heathkit accessories, one could obtain digital readout of the receiver frequency, using normal TTL for all save the first decade, which would need an HSTTL device, the mixing required being done in a couple of op-amps. There would be no need for a tuning capacitor, as the tunable oscillator could be handled by a varicap diode controlled by a potentiometer on the front panel. Controls could therefore be on the panel in the best ergonomic positions, with the digital readout so placed as to be easily visible at the operating position. The whole bag-o'-tricks would fit nicely in to a printed-circuit board, which could be etched easily enough at home by laying out the board and painting the parts to be retained with the XYL's nail-varnish, before etching in the conventional way. Thinking time and drawing time would not be impossible, but building time, and, most of all, metalworking time, could be reduced virtually to nothing.

How about someone thinking a bit harder along these lines—after all, between the FET's and IC's now on the market, it ought to be possible to build a receiver which can at least match, and probably better, the best of the current valve or transistor receivers, at all points, and at a economic price.

The main difficulty that is brought up is the problem

of getting the bits. This is greatly exaggerated. Quite a lot of firms, throughout the country, can and will supply the home-constructor market. Your scribe has bought one-off items, in the last few months, from various firms, never having to go more than a few miles either by post or in person.

#### Wind-up

This is where we mention the chaps who have only sent in score entries, perhaps covered by a brief note. Among these are: P. Barker, *Sunderland*; A West, *Herne Hill*, G. G. Proud and S. J. Proud, *Letterston*; R. Smye, *Shrewsbury*; R. Shilvock, *Lye*; S. Scott, *Stockport*; M. Hartley, *Preston*; T. Gravell, *Burry Port*; C. Henderson, *Beckenham*; G. W. Raven, *London, S.E.13*; M. Cuckoo, *Herne Bay*; B. F. Hughes, *Worcester*; W. B. Taunton, *Meopham*; M. J. Quintin, *Wotton-under-Edge*; and K. Williams, *Swinton*.

#### Conclusion

Now we have reached the other end of another pile of letters; all have yielded your scribe much satisfaction in reading, with their problems, their chuckles and whatever. For next time, the deadline is July 26 latest, addressed to "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

### \* \* \* THE MOBILE SCENE \* \* \*

#### REPORTS, PICTURES AND FIXTURES

For the Spalding Tulip-Fine Rally on May 6 they had a very large attendance (estimated at about 1,000) under Wx conditions much better than had been expected. More than 300 cars were parked by mid-afternoon. The marquee housing the nine trade stands was always crowded—other attractions were a CC/TV demonstration by the B.A.T.C. and a display of vintage wireless equipment.

One most interesting result was that recorded by the talk-in stations—G3MMS/P worked 35 mobiles on

two metres, but G3VPR/P was wanted by only 17 /M's on Top Band; there were also a few mobiles on 4m.

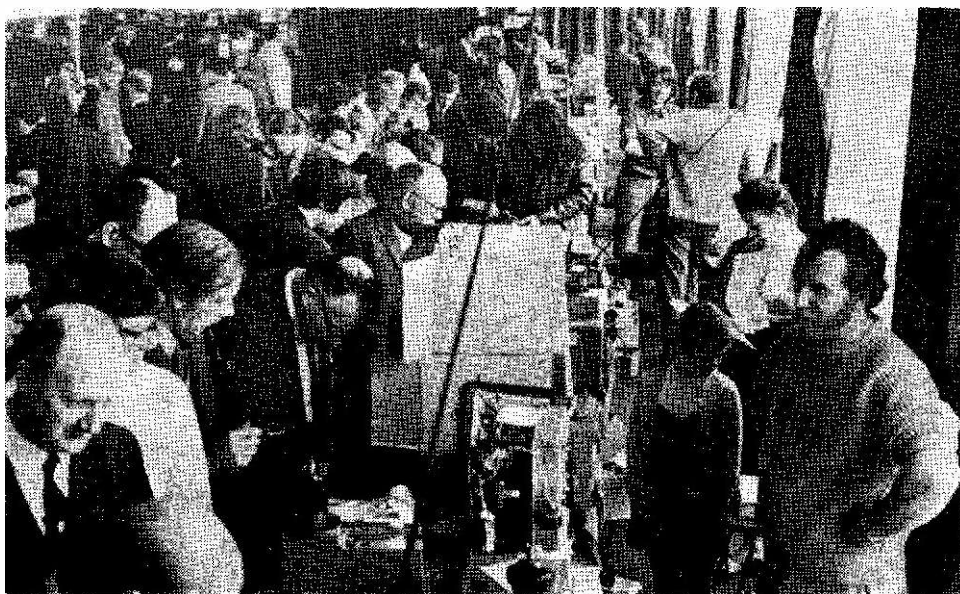
\* \* \*

Mrs. Frances Woolley, G3LWY, reports an excellent turn-out on May 20 at Romsey for the R.A.I.B.C. Picnic, a new event. Some 300 people came in, many more than expected, some from considerable distances, accompanying invalid or blind friends. The R.A.I.B.C. have the Southampton group to thank for laying on the meeting, providing talk-in, refreshment and such necessary background organisation, whereby a profit of over £50 was made for the R.A.I.B.C.



This fine ship is the Norwegian m.v. "Taimyr", LAVP, from which G5NX (Windermere, Westmorland) has been operating during a recent trip to the Far East. An ex-sea-going operator himself, G5NX has a special liaison with the LA authorities.





*Scene during the afternoon at the Northern Mobile Rally at Leeds*

We are told that the Northern Mobile Rally, Leeds, also taking place on May 20, was well attended, with good trade support.

\* \* \*

A change of venue has had to be made for the Wessex Mobile Rally on July 29. It will be at the School of Signals, Blandford, Dorset—other details as before.

#### THE RALLY CALENDAR

**July 1:** South Shields Mobile Rally, Redwell School, Prince Edward Road, A.1300, South Shields, the same as last year. There will be talk-in on Top Band and 145.8 MHz, trade stands, competitions, prize draw and refreshments on site, which is only half-a-mile from the coast.

**July 7-8:** At Lytchett Matravers, near Poole, Dorset, in conjunction with the Steam Rally & Fair, with talk-in on 145.00 (AM), 144.48 (FM) and 70.26 MHz (AM and FM).—A. G. Emery, G3YWG, 7 Brunel Drive, Preston, Weymouth, Dorset.

**July 8:** Worcester & District Amateur Radio Club annual Mobile Rally at Hill Secondary School, Upton-on-Severn, will include family attractions as well as trade stands, a model aircraft display and a stall for the disposal of unwanted gear. Talk-in will be by G8JC/A on 1910 kHz, and G3GJL/A on 145 MHz (AM and FM) also 145.41 MHz for SSB.—B. A. Jones, G8ASO, *QTHR*, or ring Worcester 0905 29208.

**July 8:** Cornish Mobile Rally at Treviglas School, Newquay, Cornwall, with trade stands, prize draw and various other attractions with the family in mind, also refreshments on site.—R. T. G. Tremelling, G3FWG, Finnartmore, Oakland Park, Falmouth, Cornwall.

**July 15:** Annual Mobile Rally organised by the Scarborough Amateur Radio Society at Burniston Road Barracks, Scarborough, as in previous years. Details: P. B. Briscoombe, G8KU, Roscaire, Irton, Scarborough, Yorkshire, YO12 4RL.

**July 29:** To be put on by the Wessex Amateur Radio Group at Royal School of Signals, Blandford Camp, Blandford, Dorset, with talk-in on 160/80/4/2 metres. Trade stands and refreshments.—A. G. Emery, G3YWG, 7 Brunel Drive, Preston (3177), Weymouth, Dorset.

**August 5:** RSGB Mobile Rally at Woburn Abbey, near Luton, Beds., as in previous years. Talk-in by GB3RS on 1910 and 3700 kHz, and by G3VHF on 70.26, 144.48 (FM), 145.00 (AM) and 145.41 MHz (SSB). There is a flat-rate charge of 50p for vehicles entering the Park, the bring-and-buy stall will charge 10% commission on sales, and the site is just off the A.50. There will be local sign-posting.—G. P. Shirville, G3VZV, 2 Orchard Close, Toddington, Dunstable, Beds.

**August 12:** Torbay annual Mobile Rally at Newton Abbot Rugby Club ground, with talk-in on 1867 kHz and two metres, the usual stands and com.



Seen at the Northern Mobile Rally at Leeds, left to right: G3WVD, G4JW, G8BZY and G8DFZ. This was a very successful Rally, organised by the Otley Radio Society.

petitions.—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.



Among those visiting the RAIBG Picnic at Romsey, Hants. on May 20, were, left to right: G2FIX, G3HRJ and old-timer Kenneth Alford, G2DX.

**August 26:** Stratford-on-Avon Radio Club Mobile Rally at the Town & Country Festival, National Agricultural Centre, Stoneleigh, Kenilworth, Warwickshire (on the A.444) one of the finest sites in England for an event of this sort, with attractions and activities too numerous to cover in this space. A consortium of Midlands radio amateur societies will organise an exhibition station and SWL display, and there will be a radio trade section, including GB3TCF to work visiting mobiles on Top Band or Two Metres. Information, including pamphlets and layout map, from: I. A. Cobbold, G3RPJ, 184 Loxley Road, Stratford-on-Avon, Warwickshire.

**September 23:** The annual Harlow & District Amateur Radio Society Rally will take place at Nettleswell School, Harlow, Essex, with ample indoor space available. There will be trade stands and the usual attractions at this regular event. Correspondence and trade enquiries to: V. Heard, 106 Vicarage Road, Harlow, Essex, CM20 3HQ.

**September 30:** Mobile Rally, opening at 11.0 a.m., at Walton School, Mountstevens Avenue, Walton being about four miles north of Peterborough city centre. Talk-in on Top Band and two metres by G3DQW, callsign of the Peterborough Radio & Electronics Society.—J. Chapman, 10 Bettles Close, Peterborough, Huntingdonshire.

We would be glad to have reports on these events, with photographs, from the organisers responsible. Address to: "Mobile Scene," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

#### MULLARD POWER TRANSISTORS

Mullard, Ltd. have produced a very interesting booklet bringing together a lot of information on the applications of their power transistors, with particular reference to SSB linear amplifiers. Five general designs are offered, ranging from a Class-A driver rated at 6w. p.e.p. to a 300w. Class-AB broad-banded RF amplifier, all these linears being intended for the range 1.6-30 MHz. The transistors used are the 2N3632, BLX13, 810BLY/A, BLX14 and, for the 300-watt amplifier, a pair of BLX15's, an n.p.n. silicon-planar type operating at 50v. on the line. The design data are very complete and useful notes on construction are also included.

*Transistors for Single-Sideband Linear Amplifiers*, TP1337, Mullard, Ltd., Mullard House, Torrington Place, London, WC1E 7HD.

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

### Airborne Transponders

THE two French transponders launched on May 20 and May 31 respectively were a considerable success. The first, with the callsign *Mirabelle*, reached a height of 25,000 metres after the launch from Nancy, and was finally retrieved at Sully-sur-Nied (Moselle) from the top of a high tree. Contacts were made with OE, DL, ON, HB, G and PA. (F9FT had a total of 77 QSO's *via* the transponder!). G8CCH (Basingstoke) first heard the beacon on two metres at 1510z and the last signals were received at about 1700z. He logged 17 DL, eight F, two PA and one each OE (OE20ML) and G (G3LQR). Most signals were at 5 & 9 and all on SSB with the exception of F3YM/P, who was on AM. Heard, but not identified, were SS/TV burbles at 1552z. Fading was negligible, and Andrew reckons this must be just about the easiest way of working six countries on 70 cm. that he has come across. G8CFZ reports good reception of the beacons on 145.2 MHz and 145.8 MHz although he only made two contacts due to his poor antenna heading.

Details of the flight times of the second transponder, *Anjou 3*, are not yet to hand, but this also seems to have been a most successful happening. Launch was from Angers (ZH48h) with a beacon on 145.9 MHz and transmission between 145.45 MHz and 145.75 MHz and reception between 432.35 MHz and 432.65 MHz. Transmit power was 1.5 watts. G8CCH again reports logging many French and German stations, mostly on SSB, and gives arrival as 0850z and loss at 1033z. G8CFZ found conditions a little better on this occasion and had a total of 18 French contacts. G3COJ was unable to be on for the whole flight, but sent in an impressive list of stations worked, with the best DX as F8CH/P in Toulouse. He comments, also, on the preponderance of SSB signals, although most of his contacts were on AM.

The reports from Mike Walters, G3JVL are very comprehensive. Unfortunately, space does not permit inclusion here in their entirety, but the following extracts give an idea of the performance as logged in Hayling Island. *Mirabelle*: The beacon on 145.2 MHz was first

# VHF BANDS

A. H. DORMER—G3DAH

heard at 5 & 7 at 1458z, rising to S9 by 1510z. Some 30 different stations were heard, including OE3UXA, although Mike was unable to get in due to his very low power at the time. He notes that the best signals were very much stronger than those from *Oscar VI*, and that the use of excessive power reduced signal strengths in a similar manner to that experienced with the satellite. *Anjou*: The beacon signal on 145.9 MHz was first logged at 0844z at 5 & 7, and the first station heard was F2RP calling CQ at 0848z, RST 579, followed by F9FT at RST 599. At this time, Mike was copying his own translated signal (one watt RF to an 8-ele Parabeam) which finally faded out at 1020z, although the beacon was still audible until 1040z.

Future launches are scheduled for July 4, July 29, August 26 and September 23 (or October 22) and we shall endeavour to give you plenty of advance warning with more detail nearer the time.

### Beacons & Repeaters

It is reported from GM that the 2m. beacon GB3ANG is operating at reduced strength, and that the fall in e.r.p. coincided with the thunderstorms of May 27, the two events possibly being connected. GB3SX appeared again for about an hour on June 2, but without any keying. It signed off on CW at 2345z. The signal was very variable in strength throughout the transmission. Signal strength from GB3VHF has also been variable

recently—even at close range.

ZB2VHF is in the news again, and several reports of reception have come to hand. G3ZRH in Brentwood copied the signal first on May 10 and G5DF (Reading) and G3DOR (Staines) both heard it on May 27. According to G3ZRH the frequency is 70.264 MHz. G3OHH (Mow Cop) received it at 599.579 between 1810z and 1820z on May 29 and noted that there were no breaks between callsigns. G8PY (Nottingham) was getting an S9 signal from 1730z to 1815z on May 30 and G3SMU (Manchester) noted that the keying was faulty and the note chirpy at 1800z on June 1. There was some difficulty in getting a bearing on it—not uncommon with Sporadic-E. G4BDW (Oxon) copied the beacon at 589 on May 24. 27 and 29 using a Pye Vanguard with a  $\frac{1}{4}$ -wave whip! He reports that the beacon keeper is now ZB2BL, who would like to have reports *via* PO Box 292, Gibraltar.

An Austrian translator has been set up near Salzburg with the callsign OE2XSO. Input frequency is 432.0 MHz and output 145.6 MHz. Radiated power is 20 watts, so this could be on from the U.K. during an opening.

Several Swiss translators are now in operation: HB9Z (Vetliberg), HB9B (Basle), HB9AA (Pilatus), HB9FG (Chaumont), all operating with input on 431.05 MHz and output on 438.65 MHz, also HB9CC (Santis) and HB9BA (Weissenstein) with input on 431.2 and output on 438.8 MHz. Other repeaters are in operation on channel R74, *i.e.* 431.15 MHz input and 438.75 MHz output.

News has just arrived that G3ZRH (Brentwood, Essex) worked ZB2VHF at 1345z on June 9. He is the first station to have made contact with Gibraltar this year—on 4m. that is. Gear at ZB2 is an FT-101 with a two-element horizontal antenna. Operation is automatic on weekdays and manual at weekends.

ZC4VHF is now operating on 50.5 MHz beaming towards the U.K. and has been heard by G4BEG (Walton-on-Thames) on a four-metre beam.

### Oscar VI

*Oscar* continues to survive in spite of the power, temperature and

switching problems. The latest reports from AMSAT give the following parameters: Orbital time 114-9946 minutes: Orbital shift 28-7484°W. Reports on the behaviour of the *Oscar* signal during the solar eclipse on June 30 will be of particular interest—see p.237, June. Although the eclipse will not be much over this country, the partial effect should be visible in the South from 1102z till 1128z, maximum shadowing occurring at a sun altitude of 61° and azimuth of 158° at 1119z. No *Oscar* pass within range of the UK occurs between these times, but, as the Table shows, Pass No. 3228 crosses 52°N just after the event and should be worth watching.

*Reports on Oscar:* Bob Holmes, G6RH, has now worked a total of 52 different prefixes, calculated on the basis outlined in last month's "VHF Bands," and has had 640 contacts of which 104 have been trans-Atlantic, a pretty impressive result. He is still using the inverted dipole for 10m. reception, and has just completed a solid-state Rx using IC's to go with it.

G3NHE (Sheffield) has made it with 42 prefixes and a total number of 502 QSO's, while Dewi Davies, GW3FSP (Bridgend) has now had 1,000+ contacts of which 400+ arc across the Pond! Mike Walters, G3JVL, has booked in 570 contacts with 182 different stations in 33 countries, acquiring 40 prefixes. He is one of the few who have

ever heard, let alone worked, W5 via *Oscar*.

Regular observers will certainly know the callsign F9FT. Working with Marc the other evening he reported that he had by then had 3,462 QSO's with 450 different stations in 41 countries, of which 233 were trans-Atlantic—including W5! He has worked K2GUG, another regular, no less than 40 times.

From AMSAT reports of the analysis of the first six weeks of operation of *Oscar VI*, it is noted that about two-thirds of the contacts were on CW, just over a quarter on SSB and the remainder a mixture of the two modes.

#### VHFCC Awards

First award this month, No. 188, goes to Geoff Spencer, GW8FOL, Anglesey, and we are very pleased to welcome another GW aboard—we don't have many GW claims, possibly because the terrain is often pretty difficult for VHF/UHF. Most of the contacts in this claim were made on AM with 13 watts to a QQVO3-10, but recently acquired is the FT-200 and a transverter driving a QQVO6-40A with 120 watts p.c.p. input feeding a 10-ele. at 60ft. The receive converter is a BF180 RF amplifier and 40602 mixer. Plans for the future include 70 cm. gear, an improved antenna system for 2m. and a linear with a pair of 4X150A's—which should

put his rare county within the reach of many.

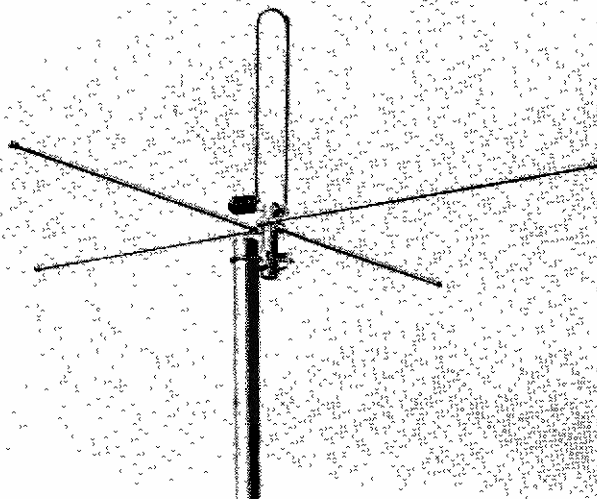
Award No. 189 is for Colin Baker, G8GMR (Luton) for two metres. He became interested in 1965 and passed the R.A.E. in 1968, but a long spell in hospital after a road accident prevented him from getting on the air, and it was not until 1972 that he got his ticket. (He mentions how grateful he is to the Dunstable Downs Radio Club, not only for fixing him up with a Tx/Rx while he was in hospital, but also helped him greatly with setting up the gear at the home QTH once he was able to get about again). Present outfit is a *Microwave Modules* two-watt driver with PA giving 20 watts of RF for the 14/14 antenna at a mean height of 70ft. on a 530ft. a.s.l. site. Two converters are in use, one with an FET (40673) mixer and the other a *Burns Electronics* job with HP2811 diodes. Main Rx is the GEC RC410/R, but an RA-1 is also available.

We say again, and this point crops up at least once a month, that claims for the VHF Tables and for VHFCC *must* be for QSO's made from a *fixed* location. /P and /M contacts are *not* admissible as additives. But callsign changes from G8/3 to G4/3 are acceptable.

#### The Caledonian Vista

Graham Knight, GM8FFX, found conditions good for the 2m. Portable Contest on May 26. He was on

The well-known Ae. manufacturing firm of J-Beam Engineering, Ltd., of Northampton, can now offer a vertically-polarised GP antenna for the two-metre band. Its 61 ohms input impedance will match nicely into 50 or 75 ohm coax with a low VSWR and the polar diagram, which is truly omnidirectional in the horizontal plane, will give better home-station communication with the whip aerials now being popularly used by two-metre /M's. The price is about £3.50 when VAT is taken at 10%.



from Kincardineshire and had 83 contacts, with best DX as G8AGU/P in Devon. Others active at this time were GM3ZBE from Aberdeenshire and GM8AOB in Banffshire, to say nothing of a visitor, GM3BA/P, in Wigtown. Incidentally, GM8AOB is now two-metre working in Burghhead, Morayshire, and will be active on SSB from there and from Banffshire, both places much sought after by the county-chasers. Also out for the day, were GM3OWU, GM3KJF, GM3ZVB, GM3SAN and GM3BQA (who was putting out a very nice signal to the South from the Lammermuir Hills). A newcomer in the North-East is GM8GHV (Dyce). GM8FFX will be portable in the Isle of Man again for the 2m. SSB contest on August 19 and will shortly have higher 70 cm. power.

SSB operation continues to flourish in GM, two recent converts being GM8FM and GM8DKB. GM8BKE now has SSB on both 2m. and 70 cm. and hammered a few front ends when he operated mobile on 70 cm. with that mode from a well-known site near Edinburgh. GM8BJF is still beavering away on the construction of his 2m. transceiver and GM3OWU hopes to join the SSB ranks shortly with a transceiver.

## About The VHF Spectra

GM3TNT in Argyllshire reports reception of the ZB2VHF *Gibraltar* beacon on 4m., at S9 on occasions; that's a fair old haul! GM8GEL is a comparative newcomer to 2m. and runs a mere 80 milliwatts to a 3-ele. indoor Yagi, but nevertheless got an S9 report from a portable on the summit of Ben Nevis, which is not a bad beginning! GM8HEY, following the Dunfermline tradition, is putting out an excellent 2m. signal these days.

GM6XI had many good wishes for his survival after the note last month that he had now reached the three-score-years-and-ten-mark, but in an endeavour to ensure it, he reports that he has had to change the halo on the car for a whip after having been nearly pranged on three occasions by drivers whose attention was fixed more on the aerial than on the road!

GM3BQA is now running a Parabeam at 70ft. and an 8/8 slot at 80ft. This set-up, with a transverter and the FT-101, helps to

explain the ease with which he seems to be able to make G contacts.

### DX-Peditions

The North Bucks. group will be coming up as GD4AFN/P during the 432 MHz contest on July 22, and will stay on in the Island until August 3. They will have SSB, AM and NBFM on 2m. and AM and NBFM on 70 cm. Skeds via G8FIK, *QTHR* (with s.a.e. pse.) and further details from G8AAT, *QTHR*.

The Blackwood Club trip to some of the rare Welsh counties during the second week in August was mentioned in May "VHF Bands," and further details are now to hand. Two-metre equipment will give 30 watts of AM/CW and it is anticipated that 200 watts of SSB will also be available. They will have a low-power SSB rig for anyone interested in the WAB Award, and a "black box" with all the usual FM channels. The antenna is an 8-ele. Yagi. Participants are GW3WTZ, GW4BLE, GW8FXM and SWL Rees, and the callsign will be GW6GW/P. Counties to be visited are still to be announced.

G3ZUL and G8ACB will be operating from Wales as follows: July 17, *Montgomery*; 18, *Cardigan*; 19, *Pembroke*; 20, *Carmarthen*; 21, *Monmouth* and 22, *Brecon*. Frequencies are 432.36 MHz and 145.6 MHz—AM and CW on 70 cm. and AM and SSB on two metres. They hope to have 23 cm. gear with them, and if this materialises that QRG will be 1297.08 MHz. Callsign is GW3ZUL/P on 70 cm. and 23 cm. and GW8ACB/P on 2m. Operating times 1800z to 2100+z, band according to conditions. Requests for skeds, stating mode, frequency and power output to G3ZUL, *QTHR*.

### Contests

*Results:* We congratulate G3VIZ/A and G3MOT as winner and runner-up respectively of the March 144 MHz fixed station contest. In parallel with this event was the 144/432 MHz Open, won by

### OSCAR VI — Prediction Data

Orbit	Date	Time	Position	Direction
3226	June 30	0802	27°E	N/S
3227		0957	02°W	N/S
3228		1152	30°W	N/S
3231		1713	39°E	S/N
3232	July 1	1908	11°E	S/N
3233		2103	18°W	S/N
3238		0702	42°E	N/S
3239		0857	13°E	N/S
3240		1052	15°W	N/S
3241		1247	44°W	N/S
3244		1808	26°E	S/N
3245		2003	03°W	S/N
3246	July 14	2158	32°W	S/N
3401		0726	36°E	N/S
3402		0921	07°E	N/S
3403		1116	21°W	N/S
3407	Jul 15	1832	20°E	S/N
3408		2027	09°W	S/N
3409		2222	38°W	S/N
3414		0821	22°E	N/S
3415		1016	06°W	N/S
3416		1211	35°W	N/S
3419		1732	35°E	S/N
3420		1927	06°E	S/N
3421	2122	23°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. Time in GMT. East/west positions in degrees relative to Greenwich, 0°.

## THREE BAND ANNUAL VHF TABLE

January to December, 1973

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
GD2HDZ	19	3	60	8	17	4	111
G4BEL	8	2	54	11	29	4	108
G3NHE	13	3	51	11	25	3	106
G3OHH	45	6	37	5	8	2	103
G3FIJ	27	3	38	6	15	1	90
G8FU1	—	—	59	9	17	2	87
G8EOP	—	—	50	8	27	2	87
G3DAH	28	3	40	8	5	1	85
GW8FOL	—	—	62	8	—	—	70
G8DNK	—	—	59	10	—	—	69
G2AXI	20	2	33	3	6	1	65
G8FMK	—	—	38	2	23	1	64
G8BXX	—	—	40	7	15	1	63
GW3ZTH	—	—	53	9	—	—	62
G8GNE	—	—	42	5	12	1	60
G4BMM	7	1	34	5	12	1	60
G8CKZ	—	—	45	9	—	—	54
GM3ZVB	1	1	42	8	—	—	52
G3XDY	—	—	44	8	—	—	52
GW8FKB	—	—	45	7	—	—	52
G8FQE	—	—	45	7	—	—	52
G3BW	—	—	43	8	—	—	51
G4ASR	—	—	47	2	—	—	49
G4BKG	—	—	40	7	—	—	47
G3SMU	12	3	10	2	16	3	46
GM3ZVL	—	—	34	7	4	1	46
GW8DUP	—	—	38	7	—	—	45
G4AFQ	—	—	25	2	13	3	43
G8CBU	—	—	32	3	6	1	42
G4AJE	—	—	32	6	2	1	41
G8DGR	—	—	32	2	6	1	41
G8BKR	—	—	30	3	6	2	41
GW8EHK	—	—	28	7	—	—	35
G8GPR	—	—	30	4	—	—	34
G18EWM	—	—	26	5	—	—	31
G8GNC	—	—	28	2	—	—	30
G8DOT	—	—	25	5	—	—	30
G8COG	—	—	23	3	—	—	26
G8EMS	—	—	20	2	2	1	25
G8GBV	—	—	16	3	5	1	25
G8GJB	—	—	21	3	—	—	24
G4AEZ	—	—	22	1	—	—	23
G8ECU	—	—	19	2	—	—	21
G3EKP	8	3	4	2	2	2	21
G3WHK	—	—	17	3	—	—	20
G8FUL	—	—	18	2	—	—	20
G4BOW	—	—	16	2	—	—	18
GW8CMA	—	—	14	3	—	—	17
G3CBY	—	—	11	5	—	—	16
G8GXE	—	—	14	1	—	—	15
GW8CGH	—	—	7	2	—	—	9

The Table shows claims to date from January 1 1973 and runs through to December 31st, 1973. Your claims should be sent to:—"VHF Bands," Short Wave Magazine, Buckingham, MK18 1RQ each month.

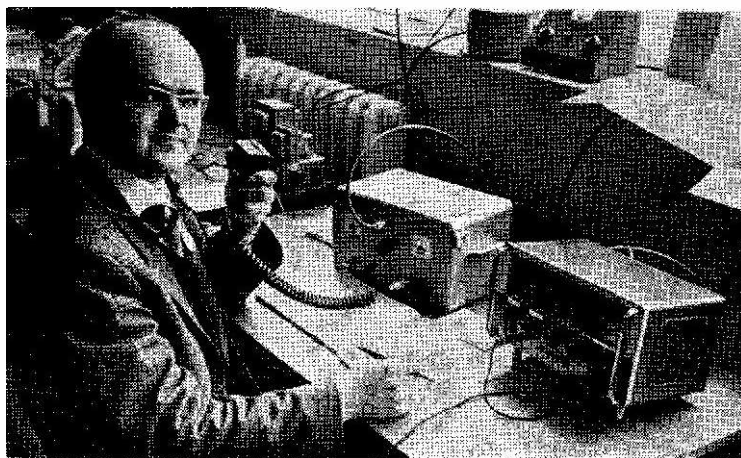
GW3ERP/P in Denbyshire followed by G4BEL in Cambs. The 432 MHz Open over the weekend of April 1 brought victory to Arthur Russell, operating in Derbyshire as G8AWS/P, and Roger Taylor, G4BEL was once again the runner-up.

The Mid-Severn Valley RTTY contest on May 13 attracted nine entries and was won by GW4AYK/P in Brecon, who seems to have coped quite nicely with the extraordinary situation where the South-East was on 49 bauds and the Midlands on 50 bauds. It is time this anomaly was resolved, surely?

*Reports:* Early comments on the contests of May 5/6 were included last month. As a follow-up to these, it is learned from GW8FOL that, although 2m. conditions were poor with him in Anglesey, he noted an increase in activity from G1 with G13WTC, G14CBW, G18EWM and G13EPG all good signals. But, he asks, where have all the EI's gone? Only one has been heard this year, and that in spite of the fact that it is only some 60 miles across the sea from Eire. Most correspondents report the difficulty of making DX contacts on 70 cm. at this time, G3UBX (Wolverhampton) in particular, remarking that he finished with 42 points only and that, although he made it with GW3UCB in Anglesey on 2m., a QSY to 70 cm. produced no result, a QSO which would just have doubled his score!

Propagation seems to have been reasonably good for the 144 MHz portable contest on May 27. Many operators report good reception of the GM people, GM3BA/P in Wigtown, GM8FFX/P on Cairn o' Mounth and GM8BJF/P in Lanarkshire in particular. G8AGU/P in Devon provided some nice DX for the Northern Midlanders as did G3JXN in London, who was 5 & 9 for much of the time in the North West. G8GXE and G8ETB were operating in Bucks. and also found conditions good for North/South contacts. They were only running 5 watts, but finished up with 60 contacts in 28 counties and 2 countries, best DX being with G8FTZ in Co. Durham. Gotaways were GD2HDZ, GM3BQA and F1CCP GW8EHK did not reckon conditions to be too good, but

For the Northern Mobile Rally at Leeds on May 20, the two-metre talk-in was provided by G8AWN/A with this neat set-up.



nevertheless he made it with GM3BA/P and GM3BHT/P. GI8EWM in Co. Antrim made it with plenty of Northern G, GW and Southern GM stations, but could not raise anyone in the Midlands although he was hearing G3OSS in London at 5 & 4. He expects to be operating from one of the rarer GI counties during the July 7/8 contest and should have some fairly high power SSB available in addition to the AM. Known to be active were GI8AYZ/P and GC8EZA/P (Jersey) for a couple of good DX contacts. Best score heard towards the end of the contest was that of G3OBD/P (Brecon) with 150 QSO's completed.

Conditions for the four-metre event on June 9/10 were variable, but better than might have been expected in view of recent poor propagation (excluding Sporadic-E) on the band. Good DX in the shape of GI and GM was to be had for brief periods. Scores around the 100 mark were typical of the leaders, indicating but an average level of activity. Such as there was seemed to be shared equally between AM and CW with very little NBFM or SSB. Among the Welsh portables, GW4ABR near Newtown in Montgomery and GM4KF/P (Usk) provided consistently good signals and GW3UCB/P in Anglesey was spasmodically well received in the South. An outstanding signal from Wales was that of GW3MHW in Montgomery—not a callsign particularly well-known on 4m. in much of the country, but one which is likely

to become so, one would opine. Stations in the South were heard calling EI/GI without result. GM3WOJ/P in Peebleshire (Broadlaw?) was called and worked by many Southerners. Procedures were good, although operators on this band have far to go to match 2m. for co-channel and VFO/VXO working.

*Forthcoming Events:* Ainsdale Radio Club are organising the Region I VHF contest again this year. Date is Sunday, August 5 from 0900z to 1800z on 4m., 2m. and 70 cm. Entries from operators outside the Region are welcome, and a special "Outside Section" has been set up for them. Further data and completed logs from and to Norman Horrocks, G2CUZ, *QTHR*.

July 7/8 for the RSGB Jubilee VHF/UHF event and July 22 for the 432 MHz portable.

#### News Items

*Four Metres:* A newcomer on 4m. who is putting out a good signal is G4BGZ in Leicester. He runs a QQVO3-10 PA into a 4-ele. at 30ft. and although he enthuses about the activity on the band at weekends, he is disappointed by the lack of it during the week. Aren't we all?

Mike Gibbings, G3FDW (Retford, Notts.) has raised his all-time 4m. score to 73 counties and has worked 16 of them on 2-way SSB. As he says, it has only taken him 10 years to get that far! Incidentally, what a good signal he was during the last 4m. contest while operating /P from Co. Durham.

*Two Metres:* The TVI troubles at GD2HDZ have been cleared with the help of the local P.O. engineer and Arthur is back in full operation again. G8EOP reports that G3YRM in Northumberland is QRV with SSB, as is G3ZJY in Co. Durham. The G8EOP / G8DNK / G8BCL / DC9KU skeds on 145-350 MHz at 2100z daily have resulted in 100% success to date. Breakers with good manners are welcome to join in! G4BKG (Tunbridge Wells) is now active on SSB with a "Liner 2".

G3WW reports an SS/TV 2-way QSO on 2m. when he exchanged video with G8DXC over a 10-mile path on the morning of May 21 last. He hopes that this may encourage others to try this mode on 144 MHz.

*Seventy Cm:* G8GBV draws attention to a new form of the TVI menace which is likely to become more troublesome. He has found that his 70 cm. signals can get into the front end of some of the newer UHF TV sets which are varicap tuned, there they are rectified, and the resultant DC alters the varicap bias and hence the tuning of the RX. Nasty, but the usual filter remedies should get rid of it.

G3DAH hopes to be back on 70 cm. for the next contest.

#### General

G4ASR is now operating on 4m., 2m. and 70 cm. from a new QTH near North Weald. The site is 364 ft. a.s.l., which may partly account for his big signal. He

runs 22 watts out to a 4-ele. Yagi on 4m., 25 watts to a 12/12 on 2m. and either 10 watts input or 70 watts output (from a 4CX250B) on 70 cm.

G8CIW, commenting further about the note last month on the long-distance mobile contact between G8EYO/M and G3NHE, reports another which involved himself out portable in Epsom, Surrey, and G8EYO/M again. This time, the contact was maintained from Pontefract, Yorks. to Epsom, Surrey, a distance of about 180 miles with signal strengths ranging from 5 dB to 20 dB above noise. 'EYO had a "Liner 2" with a pre-amp and a 4-ele. beam about 4ft. above the top of his van, and 'CIW was running a Braun SE600 and 10-ele. beam at 20ft. A notable feature of this solid

QSO was the absence of annoying mobile flutter—another advantage of this mode for mobile operation. The disadvantage is, of course, that mobile-to-mobile contacts will be few until more SSB equipment is fitted to vehicles.

G8CBU and G3YV1 impressed Sir William Gladstone, the Chief Scout, when they set up a 2m. station at Amphil Park during the latter's visit. They worked 75 stations all told with a Pye Cambridge and a 6/6 slot, and had some 300 visitors to the shack.

G3KDL made the round trip from Wembley to take in both the Belgian VHF/UHF Convention in Brussels and the RAIBC picnic at Romsey. Although he was not there for the latter event, your

scribe has attended the former, and can recommend the trip, although a wary eye must be kept open, as the hospitality of the ON amateurs can be quite staggering in every sense of the word!

The new *Burns Electronics* components catalogue is now available, and lists many "goodies" at reasonable prices. With components becoming more and more difficult to obtain, this publication is a very useful addition to the library.

#### Deadline

Deadline for the next issue is July 6. The address for news, views and comment is:—"VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

Cheers for now and 73 de G3DAH

#### MONITORING I.C. PIN VOLTAGES

**O**FTEN the hardest part of getting IC equipment to work is when it comes to trying either to measure the voltage on a particular pin or to fix an oscilloscope probe to a pin of a dual in-line package.

Trying to use crocodile clips or test probes usually results in them either shorting adjacent pins or falling off completely (and dropping on to some other part of the circuit where they usually wreak some form of havoc).

After a number of IC's had met their end in this way it was decided that some simple tool should be made up to solve the problem.

The device was made by taking a DIL holder and giving each pin a 90° twist with a pair of pliers so that it can then be plugged into another DIL holder (the one containing the IC under test). An insulated wire is then carefully soldered to each pin as near to the holder as possible and using as fine a wire as is practicable. These wires are then brought out to a small plastic box with 14 or 16 sockets on its lid which are numbered to correspond to the pins of the holder.

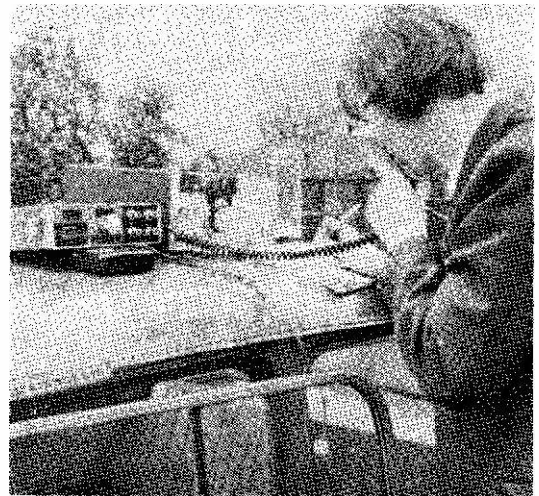
When the device is in use the IC to be tested is simply removed from its holder, plugged into the test holder which is in turn inserted into the IC normal holder. Pins can then be monitored without the danger of shorting anything out.

Since building this little device it has not only proved useful for the purpose for which it was originally designed but also for cut-and-try work, enabling a component to be tried in place without the inconvenience of soldering.

K.C.W.

#### NAME AND ADDRESS, PSE!

We are anxious to get in touch with the holder of G3AUS, name and address unknown and not listed in any call-book. If he will make himself known to us, he will "hear of something to his advantage," as the saying is.



For the two-metre contest on May 27, G18EWM/P ran a Liner-2 and a JR-599. His final score was 263 points from 35 QSO's—"not sufficient to warrant an entry," as he puts it. Pity!



# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for August issue: July 5)

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

AT this time of the year, when Test cricket, the garden, holidays, summer weather, all are competing with the attractions offered at a Club meeting, the programme should have something special to offer if attendances are to be maintained. Just what "that something" should be depends largely on the nature of the group—some go for competitive activities such as Field Day, or portable expeditions, whereas other Clubs are utterly non-competitive and would stay right away from outdoor portable activities. For the latter, a visit to somewhere of interest, such as a mobile rally, or an "extra-special" lecture may be the prescription. Of course, another way of dealing with the problem is accepted by many groups, and that is just to have no meetings during August while holidays are depleting the usual attendance.

Now we must get on with the mail, taking it as usual in a "territorial" fashion and looking first at the national organisations.

First on this clip is the Royal Navy who get together by way of nets on the one hand, and their consistently good *Newsletter* on the other, containing news of members in all parts of the world, articles, jokes, and all sorts of interesting items.

A.R.M.S. is the crowd to be with if you have an interest in the mobile facet of Amateur Radio, whatever band you operate from Top Band to UHF, as transmitter or as SWL. The group organises a Mobile Rally, has a monthly newsletter, *Mobile News*, and offers some very useful services to members.

The full members of R.A.I.B.C. are all either invalids or blind, while the objects of the Club are in the main sustained for by the "supporter" members. The latter function could include anything from helping to get an aerial up for someone, through technical help, to just being ready to transport the odd item for somebody in the group in the course of one's normal running around in the car. All the details can be obtained by writing to G3LWY, address as in the Panel p.304.

Now a truly National Society, in the shape of the Nigerian. From their newsletter we hear of the doings of all the 5N2's, and of the frustrating lack of progress in obtaining the release of some new licences to those who are waiting. Let us hope the long-for issue will take place soon.

## The Midlands

Might loosely be defined as the frontier area between the North and the South.

Our first port of call is **Kettering**, where the old group that used to exist prior to 1939 has been reformed, interestingly enough with the same Secretary (SWL) as took the duty in those distant days, and with another member of the pre-War group taking office as chairman. As to the pattern of events, it is not possible at this time to be specific about talks, but it is known that the lads foregather on the second Wednesday of each month at the Youth Centre, School Lane, Kettering. If you are intending to visit them, or to join, we suggest you first get in touch with the Secretary (as Panel), as they are very actively pursuing the goal of a place of their own where a shack can contain the gear for their own old G5KN call.

The dates for July at **Slade** are Fridays 13th and 27th, and their Hq. is at the Committee Room, Church House, High Street, Erdington.

Not far away is **Wolverhampton**, where there is a full programme; Morse classes appear each week, on July 6, 13, 20, and 27, at Hq. Then on July 2 there is a tape lecture—"An Anthology of Radio Signals"—and Natter sessions on July 9 and 30. July 23 is a committee meeting, and on July 16 comes the Junk Sale, with, as usual, a 10% "cut" for Club funds. The venue is Neachells Cottage, Stockwell End, Tettenhall, Wolverhampton.

**South Manchester** are another lot of busy bees; the VHF element get together at Grceba, Shady Lane, Manchester 23, every Monday, while the main event is on Fridays at Sale Moor Community Centre, Norris Road, Sale. July 6 sees them off on a visit, while July 13 is set aside for G4BJT to talk about and experiment with an RF Noise Bridge, showing its value in Aerial investigation work. July 20 is also an "away," this time at the Manchester Flower Show, Platt Fields, Manchester, where they are to have a station set up. Finally, July 27, and the competitive types will be giving keen ear to G8DMJ, when he talks about the preparations and operation in VHF Contests.

For **Midland** the attraction on July 17 is a talk by Bob Palmer, G5PP, on "Chassis-Bashing"—at the usual venue, namely the Midland Institute in Margaret Street,

Birmingham, 3. Incidentally, secretary G8BHE writes that he thoroughly enjoyed the North Midlands Mobile Rally, which was a joint venture by the Stoke and Midland groups.

Coventry will keep things simple during July; on 6th, 20th and 27th, they will be at Baden-Powell House, St. Nicholas Street, Radford Road, with the Club rig fired up on the bands. As for July 20, on that date the chaps get out their gear for a visit to Coventry Swimming baths(!).

The Swan Hotel, Bird Street, is the Hq. of the Lichfield chaps, who get together there on July 2 and July 17, at 8.15 p.m. The first date is down for G3WPB to talk about "Test Instruments and their Uses around the Shack," and on the 17th there is a Junk Sale. As an extra diversion on Sunday, July 1, there is a D/F competition.

Wirral are still at their temporary Hq. at the Com-

munity Centre, Carr Bridge Road, Woodchurdh, the entrance to which is through the large doors on the left side of the building. July 4 is "to be arranged," while on July 18, G3YGL will be talking about Servicing Tricks. In between, over the weekend July 7-8, there will be a weekend DX-pedition, for which one hopes the weather will be kinder than it was last time!

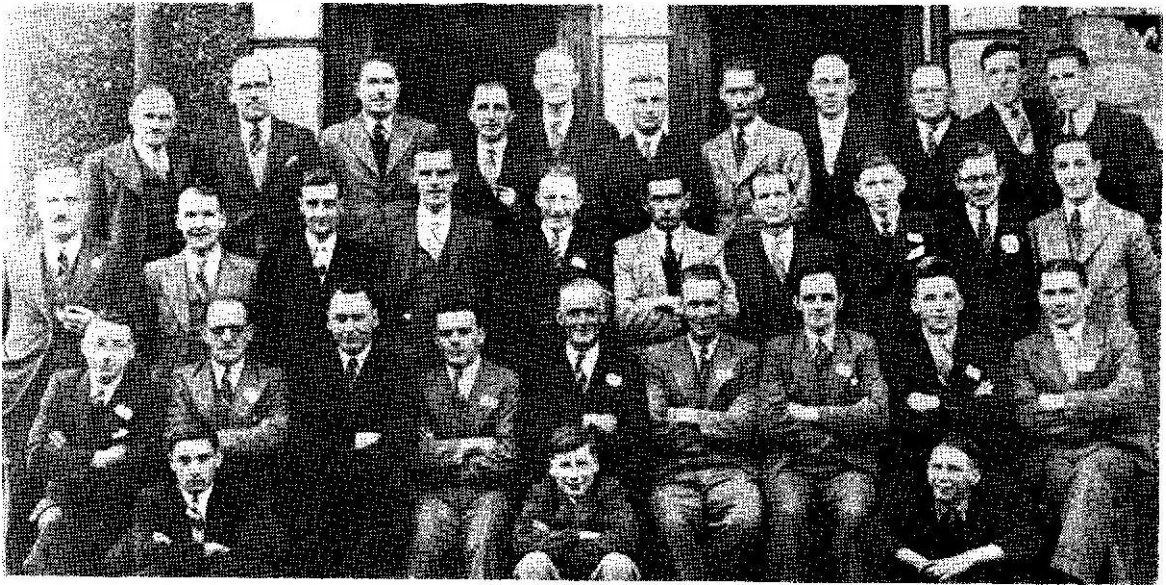
### Northwards

Here our first port of call is at Derby, where the venue is normally 119 Green Lane, Derby. Additions and alterations to the advertised programme are put out on Sunday mornings on GB2RS, and also mentioned by Radio Derby on 96.5 MHz, not counting any detail given out at meetings or stuck up on the Club notice board. No one has any excuse for missing out on anything! In general, Mondays are "Project Nights" when the lads make-do and mend the Club equipment and

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

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W3-8LB.  
A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey, CR2-1EZ.  
BASINGSTOKE: R. Oakley, G8FKT, 81 Camrose Way, Basingstoke.  
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.  
BOLTON: S. MacDonald, G4AQB, 8 Archer Avenue, Bolton (20668), BL2-2SJ.  
CHILTERN: F. Rose, G2DRT, 84 Cock Lane, High Wycombe, Bucks. (Penn 4240).  
CORNISH: H. Webster, G3XTF, Crandale, Gillyfields, Redruth (6903).  
COVENTRY: G. A. Whenham, G3TFA, Lavernock, 33 Chapel Street, Bishops Itchington, Warwickshire.  
CRAY VALLEY: P. F. Vella, G3WVF, 78 Hurst Road, Sidcup, Kent.  
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23-3BN. (01-699 6940).  
DERBY: F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby (21931), DE3-7GE.  
DERBY (Nunfield): I. Cage, G8GBV, 25 Petersham Drive, Alvaston, Derby, DE2-0JU.  
DUNDALK: D. M. Jones, G13KVD, 6 Mullagh Place, Limavady, Co. Derry, N. Ireland.  
DUNSTABLE DOWNS: C. G. Powell, G8BPK, 1 Wenwell Close, Buckland Wharf, Aston Clinton, Aylesbury (630600), Bucks.  
ECHELFORD: V. W. Higgs, G3VWJ, 205 Commercial Road, Staines, Middx.  
EDGWARE: A. Masson, G3PSP, 62 Coldharbour Lane, Bushey WD2-3NY (01-950 6827), Herts.  
FARNBOROUGH: A. M. Stretton, G8FWE, 10 Sirhurst Road, Camberley (22887), Surrey, GU15-3AW.  
HAVERING: S. J. Hobday, G3SKV, 31 Sackville Crescent, Harold Wood, Romford, RM3-OEJ, Essex.  
HORSHAM: T. Wadsworth, G3NPF, 39 Church Road, Broadbridge Heath, Horsham (66290), Sussex.  
KETTERING: I. L. Holmes, 8 Hall Lane, Kettering (3767), Northants.  
KINGSTON: R. S. Babbs, G3GVU, 28 Grove Lane, Kingston-on-Thames (01-546 2801), Surrey.  
LICHFIELD: R. Smethers, G3NLY, 46 Church Road, Burntwood, Walsall, WS7-9EA, Staffs.  
LINCOLN: F. Day, G4BXL, 5 St. Marks Avenue, Cherry Willingham, Lincoln (51058), LN3-4LX.  
LOTHIANS: B. Howie, GM8DJJ, 3 Libberton Brae, Edinburgh, EH16-6AQ.  
MAIDENHEAD: A. K. Chennell, 10 Lower Cippenham Lane, Slough (20417), SL1-5DF.  
MEDWAY: H. E. Willis, 111 Laburnum Road, Strood, Kent, ME2-2LB. (Medway 76953.)  
MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham 32. (021-422 9787.)

NEWBURY: D. J. Williams, G8FNS, Damar, Cold Ash Hill, Cold Ash, Newbury, Berks.  
NIGERIAN: E. A. Lomax, 5N2ABC, P.O. Box 68, Kaduna, Nigeria.  
NORTH BUCKS: R. J. Pye, G8AAT, 7 Meadow View, Potters-pury, Towcester. (Yardley Gobion 640.)  
NORTH DEVON: H. G. Hughes, G4CG, Crinnis, High Wall, Sticklepath, Barnstaple, Devon.  
NOTTINGHAM: S. F. Clarringburn, 49 Fernleigh Avenue, Westdale Lane, Nottingham, NG3-6FN.  
PLYMOUTH: C. Mitchell, G3UVS, Kechil Rumah, Green Lane, Yelverton, Devon, PL20-6BW.  
R.A.I.B.C.: Mrs. F. Woolley, G3LWY, Woodclose, Pensewood, Wincanton, Somerset.  
READING: D. King, 34 Crawshay Drive, Emmer Green, Reading, RG4-8SY, Berks.  
REIGATE: F. H. Mundy, G3XSZ, 2 Conifer Close, Reigate (43130), Surrey.  
ROYAL NAVY: A. G. Walker, 4 Woodcroft Gardens, Love-dean, PO8-9PZ.  
SHEFFIELD: S. Illman, G6VF, 134 Baslow Road, Totley, Sheffield, S17-4DR.  
SLADE: J. E. Drakeley, G8GRC, 186 Conway Road, Chelmsley Wood, Birmingham, 37.  
SOUTH BIRMINGHAM: R. J. Thompson, G8GDZ, 23 Fox Hill, Selly Oak, Birmingham, 29. (021-472 0533.)  
SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire, M33-3GW.  
STAR: T. Leeman, G4BUU, 115 Asket Drive, Seacroft, Leeds, LS14-1HX.  
STOWMARKET: A. P. Ashton, G3XAP, 30 Ford View Road, Stowmarket, IP14-2BL, Suffolk.  
SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, CR2-8PB. (01-657 3258.)  
SUTTON & CHEAM: A. Kecch, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey.  
THAMES VALLEY: C. B. Seaman, G3ATF, 40 Park Road, Ashford (56030), Middx.  
TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot, Devon.  
VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford, WD2-5JQ, Herts.  
WEST KENT: S. E. Jones, G4BKG, 36A London Road, Southborough, Kent.  
WHITE ROSE: R. Nettleton, G3YED, 129 Stainbeck Lane, Leeds, LS7-2EB.  
WIRRAL: A. Fisher, G3WSD, 34 Glenmore Road, Oxtou, Birkenhead, Cheshire.  
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).  
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil, Somerset.



A fine Club photograph of many years ago—it was taken in 1938 on the occasion of the annual dinner of the Rhondda Radio Society. Unfortunately, at this distance of time, few call signs can be identified. Support was drawn from a large area of South Wales. It is noteworthy that for this more or less formal occasion everybody wore a collar-and-tie, with his hair cut and neatly brushed—also that the distaff side is conspicuous by its absence. Other times—other manners!

shack. Wednesdays are the main meetings, and the July programme runs something like this: July 4, a Surplus Auction; July 11, a talk on Mobile Operation by Tom Darn, G3FGY; July 18, a D/F event; and on July 25, a tape-and-slide lecture by VK4KS, on the DX-pedition to Mellish Reef.

There is a regular pattern to the weekly Wednesday meetings of the Star club in Leeds. The first one is a tape-and-slide talk, the second is a Constructional session, the third a Communications night with the Club rig on the air, and the last Wednesday is a Bingo evening, the prizes of course being radio items. On a different line, they want to hear from ten or fifteen stations on Two who would take part in a relayed contact between the Star lads and a station either in North Scotland or down on the South Coast.

Up in Scotland now, to Lothians, who write to advise that there will be no more meetings until September. Furthermore, they will reconvene in a new Hq., the old place at Hanover Street being due to be demolished. Details from GM8DIJ—see Panel, opposite.

Now to Leeds and the White Rose group. They have Hq. at 83 Town Street, Armley, and meet every Wednesday evening. A highlight in July will be on the 11th, when Neil Glover, G3AAV, is coming along to talk about Two-metre Sideband.

If you are a member of the Bolton formation you probably join in the regular weekly nets, on Tuesdays, on 145.73 MHz at 1900z. However, on the third Tuesday in each month, you can go one better and put in an appearance at the get-together at the White Lion, Moor Lane, which constitutes the formal meeting of the Club.

Sheffield seem to have their Hq. at the Sheaf House Hotel, Bramall Lane; but for details of the current

goings-on we have to refer you to G6VF, address as in the Panel.

### Going West

Very westerly for a start, right to Dundalk, where a Club exists which is sponsoring a series of awards, rather like our WAB but based on the Irish Grid, details of which are given in our "Communications and DX News" feature. GI3KVD, up in Limavady, Co. Derry, is one of the people concerned, and in the absence of any other detail on the Club, we have, for the moment, put him in the appropriate column of the Secretaries' Panel, opposite.

Cornish serves a wide-flung area, having not only a main meeting at the SWEB Clubroom, Pool, Camborne, but also subsidiary groups at Newquay and Penzance. On July 5, after some discussion on the forthcoming Mobile Rally and a Question-and-Answer session, they will hear a talk by Gordon Nicholas, G3XTE, about Fluid Logic.

At Torbay it sounds as though Tuesday evenings are mainly devoted to the problems of R.A.E. and Morse, but there are also Saturday sessions, and the one on July 28 will cover the vital question of "What went wrong on NFD." The Hq. is at Bath Lane, rear of 94 Belgrave Road, Torquay.

Reading give no details of what goes on at their meetings on July 3, 17, and 31, but they do say all are welcome. The place to head for is the White Horse public house, Kidmore End Road, Emmer Green.

Nice to hear again from North Devon, who have their Hq. at Crinnis, High Wall, Sticklepath, Barnstaple. The dates are July 11, for a talk about sea-going radio operators and their work, and July 25 for a Ragchew.

Perhaps the most important item is the proposal to hold an R.A.E. class at North Devon College during the 1973/74 season—anyone interested please get in touch with the Secretary, G4CG, *immediately*.

The AGM has just been taken at **Yeovil**, where G3NOF returns for yet another year as hon. secretary—the lads obviously know they have a good one and don't mean to let him off the hook! Meet them by going to the Youth Centre, 31 The Park, Yeovil, on any Thursday.

A long letter from the new Secretary at **Plymouth** tells us more about the group than we could ever use in this space, but at the same time gives your conductor a good picture of the activity. At the Hq., Virginia House, Brestonside, they are planning to have two shacks, one for SWL's and one for the transmitting types. Lectures and film shows are being lined up for the autumn season, and plans made for a Picnic on August 5 on Yelverton Down where refreshments will be laid on, and there is hoped to be a display of radio-controlled model flying; talk-in of course, on Top Band and Two.

#### South-East

A big clip this, as one would expect. At the top we find **Verulam** who will be hearing G3AAZ on July 18, talking about Systems Engineering, the venue being the Market Hall, St. Albans, at 7.30 for an 8.0 p.m. start.

South of the Thames now, to the **Thames Valley Club** which is now fifty years old, and has had many names in the industry among its members. They have recently changed their Hq. address, and now get together on the first Wednesday of each month, at the King George Hall in Esher, next to the fire station. (Incidentally, the hon. secretary's callsign was given wrongly in the photo-caption on p.241 of our last—it should be G3ATF).

**Havering and District** use the British Legion Hq., Western Road, Romford, as their home, getting together on alternate Wednesdays, which gives July 11 and 25. The first of these is a Top Band D/F evening, while the latter date is probably a visit to North Weald radio station, but may be a business meeting if necessary—no doubt G3SKV would give the latest details—see Panel.

**Chiltern** seems to be an active crew, based on the Ernest Turner factory in Totteridge Avenue, High Wycombe. We seem to be talking a little ahead of the organised programme, but we can tell you the dates are July 10, for the informal, and July 25 for the "main" event of the month.

As usual there are two dates in July for **Cray Valley**; July 5 sees G30OU and G3FZL combining forces to give a talk on Semiconductors and Stabilised Power supplies, and the 19th is purely an informal, both being at the United Reformed Church Hall, Court Road, Eltham, London, S.E.9.

If you are in **Reigate** on July 17, head for the St. Mark's Church Hall in Alma Road, and you will hear G3JMJ talking about Top Band topics, mainly for the benefit of the newcomer. July 3 is an informal, in the Marquis of Granby, Hooley Lane, Redhill.

The usual weekly arrangements apply at **Dunstable Downs**; the gatherings are at Chews House, 77 High Street South, Dunstable, as follows: July 6 is set aside for the final arrangements for their participation in the VHF/UHF contest, while July 13 is what they like to call a "between week." July 20 is given over to a demonstration of amateur TV, and July 27 to the erection of the marquee on the Down, and final preparations for the exhibition station that is to be mounted inside it, over the following weekend July 28-29.

The **Medway** chaps have a regular Friday booking at the Aurora Hotel in Gillingham, where the formal meeting starts at 2000, in order that R.A.E. students may have the previous hour for their classes.

A change in the slate of officers of some magnitude occurred at the recent AGM of the **Sutton and Cheam** crowd, due mainly to the departure of G3HQX to the Winchester area to live. However, it does not for the moment affect the venue, still to remain at the "Harrow" in Cheam, on July 17, when G3HSP gives his follow-up talk on Marine radio operation.

A long time since last we heard from **Newbury**, who are still using the South Berks College of Further Education as their Hq. July 2 is the next date booked, for a talk on a VHF subject from 7.30 to 9.30 p.m.

#### SHORT CLUB NOTICES

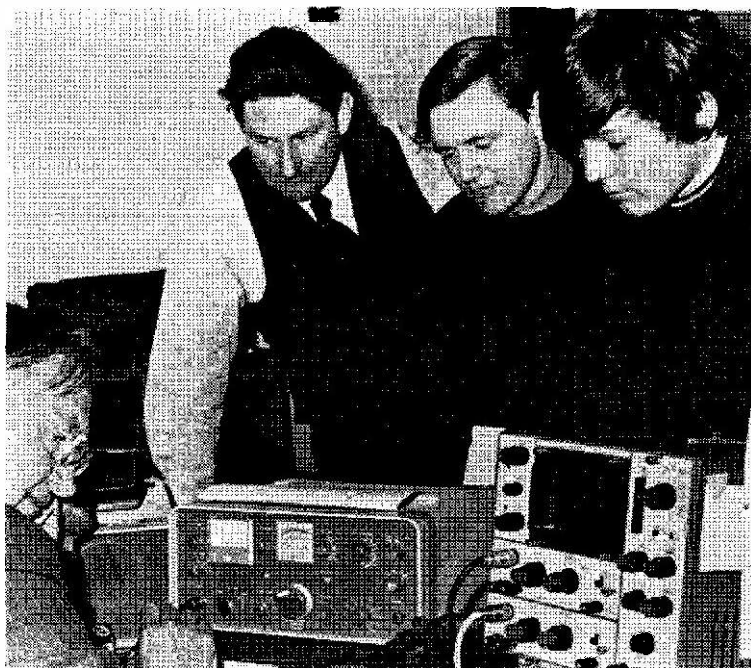
CLUB NAME	HEADQUARTERS LOCATION	MEETING MONTHLY
Acton, Brentford & Chiswick	66 High Road, Chiswick	July 17
Basingstoke	Chineham House, Popley Basingstoke	July 7, 21
Bedford	"The Dolphin," The Broadway	July 5, 12, 19, 26
Crystal Palace	Emmanuel Church Hall, Barry Road, S.E. 22	July 21
Derby (Nunsfield)	Nunsfield House, Boulton Lane, Alvaston	July 6, 13, 20, 27
Edgware	145 Orange Hill Road, Edgware	July 12, 26
Farnborough	<i>Not quoted</i>	July 10
Horsham	Guide Hall, Denne Road	July 3, 17
S. Birmingham	Hampstead House, Fairfax Road, West Heath	July 4
Lincoln	Astronomical Society Hq., Westcliffe Street	July 4, 11, 18, 25
Nottingham	Community Centre, Mansheld Road, Nottingham	July 5, 12, 19, 26
Stowmarket	Adult Centre, Onehouse Road, Stowmarket	July 2
Worcester	Old Pheasant, New Street	July 2, 21
Worthing	Rose Wilmot Centre, Littlchampton Road	July 3, 10, 17, 24, 31

NB —In each case, the Secretary's name and address appears in the Panel, on p 304

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When the Cornish Amateur Radio Club put on a station for the Open Day at the Technical College, Carnborne, G2ABC did some air-testing, watched by G8DZE, G4DHD and G8FSX.

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Nothing like a change, says the **Kingston** chaps; they have had a talk or something laid on at every meeting for the past couple of years, so there should be plenty of nattering done at the July 11 session for which nothing has been arranged. They now meet at the Scout Hq., Stirling Walk, Raeburn Avenue, Surbiton, at the rear of the Lagoon. Incidentally one of the useful Club activities is the Morse class, held every week on Wednesday evenings.

For **Bishops Stortford** the date is always the third Monday in the month, at the Royal British Legion Club at the top of Windhill. July 16's programme is, at the time of writing, not finalised completely, but something will be happening for certain, says the Secretary.

July in **Echelford** gives two dates. The first one, July 9, is still not settled at the time of writing, but on July 26, G3HSP will be talking about Marine operation. The meetings are both at St. Martins Court, Kingston Crescent, Ashford, Middlesex.

Pessimists they are at **West Kent** where they are not committing themselves as to what will happen on July 13. As for July 27, the evening will be in two parts, the first being planning for VHF NFD, the second in the form of an "Any Questions" session about VHF topics.

July 17 is the date the **Surrey** lads have booked, at

the "Swan and Sugarloaf" in South Croydon, when G3YJC will be talking about the design and construction of Digital Frequency Counters, to lead, possibly to a Club Project in the foreseeable future.

Their new secretary writes in from **Maidenhead**, to let us know how they are getting along. The chaps still have their Hq. at the Victory Hall, Cox Green, Maidenhead, and on July 2 will be listening to G4CDZ talking and demonstrating RTTY on VHF. As for July 17, this is the Grand Junk Sale—an opportunity to change the scenery in the shack!

#### Sign-Off

We seem to have dealt with all the current crop of reports. Your next ones, covering your club programme for *August* should be posted to arrive with us by **July 5**, addressed "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ.

*Editorial Note:* Reports too late for taking into this piece were received from the following Clubs: Mid-Sussex, BARTG, Southgate, York and Stevenage. As frequently explained, our production schedule is so tight that we cannot write-in reports received after the deadline.

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and should be obtainable to order through any newsagent.*

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# NEW QTH's

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

- GM3WKM**, K. G. Melton, 23 Tuzo Close, Balivanich, Isle of Benbecula, Outer Hebrides.
- G4BLW**, E. Evans, The Ramblers, 55 Church Lane, Holton-Le-Clay, Grimsby, Lincs. (Tel. *Grimsby 822596*.)
- G4BVY**, I. R. Dixon, 8 Kingsway, Skipton, Yorkshire, BD23 1BA.
- G4BWP**, F. C. Handscombe (*ex-G8HAW*), 24 Hitchin Road, Henlow, Beds. SB16 6BB.
- G4BXU**, G. W. Butler, Lulworth Private Hotel, 8 Surrey Road, Cliftonville, Kent. (Tel. *Thanet 20009*.)
- G4BYV**, J. Tye (*ex-G8BYV*), Internos, Swanton Morley, Dereham, Norfolk.
- G4CBK**, L. H. Weston, 52 Shireview Road, Pelsall, Walsall, Staffs.
- G4CCF**, Royal Signals Amateur Radio Society (Cadet Forces Section), School of Signals, Blandford Camp, Blandford Forum, Dorset.
- G4CCQ**, M. Stanton (*ex-G8GNH*), Sweetbourne Cottage, Hastings Road, Lamberhurst, Tunbridge Wells, Kent, TN3 8JG.
- G4CDP**, J. Everett (*ex-G8FAJ*), Marloes, Comp Lane, St. Marys Platt, Sevenoaks, Kent.
- G4CDQ**, N. H. Gordon, 59 Lower Howsell Road, Malvern, Worcs., WR14 1DP.
- G4CDT**, A. R. Dexter, 41 Bedford Road, Shefford, Beds., SG17 5DJ. (Tel. *Chicksands 7497*.)
- G4CEC**, P. V. Knight, 7 St. Marks Close, Rushden, Northants. NN10 9QS.
- G4CED**, G. E. Coward, 41 Bakers Lane, Southport, Lincs., PRN 9RM. (Tel. *Southport 87279*.)
- G4CEP**, G. R. Morris, 90 The Promenade, Withernsea, East Yorkshire, HU19 2JE.
- GW5CBN**, W. P. Binger, The Flat, Bryn Ioreyn Manor, Caergwrle, Wrexham, Denbighshire.
- G8AIP**, M. C. Osment, 194 Fernhill, Harlow, Essex, CM18 7LG.
- G8BDA**, P. J. Harvey, 8 Walnut Drive, Witham, Essex.
- G18GTM**, H. McLroy, 28 Curran's Brae, Moy, Co. Tyrone.
- G8GWT**, R. H. Young, 22-A Lambourn Road, Clapham Northside, London, S.W.4.
- G8GYA**, J. T. Hilton, 4 High Street, Dover, Kent, CT16 1DR. (Tel. *0304 206 460*.)
- G8GYG**, P. Allan, 2 Park View, Queensbury, Bradford, Yorkshire, BD13 1PL. (Tel. *Bradford 882354*.)
- G8GYM**, R. D. Claridge, 124 Pemdevon Road, West Croydon, Surrey, CR0 3QP.
- G8HDS**, P. W. MacKimm, 47 Chatburn Square, Castleton, Rochdale, Lancs., OL11 2YF.
- G8HEP**, B. R. Hughes, 46 Leinster Gardens, London, W2 3AT.
- G8HFW**, T. E. Hall, 23 Burcott Gardens, Addlestone, Weybridge, Surrey, KT15 2DE.
- G8HHD**, H. Foster, 9 Meadows Avenue, Thornton Cleveleys, Lancs. (Tel. *Cleveleys 5939*.)
- G8HIM**, A. G. Falla, Flat 3, Lamcote House, Radcliffe-on-Trent, Notts.
- G8HJO**, A. D. Lincoln, 62 Chapel Street, Halton, Leeds, Yorkshire, LS15 7RG. (Tel. *Leeds 647120*.)
- G8HKE**, M. A. Holder, Carlton, 23 Woodhill Avenue, Portishead, Bristol, Somerset, BS20 9EX.
- G8HKI**, E. F. Trickey, 53 Hollyguest Road, Hanham, Bristol, BS15 3RN. (Tel. *0272 671409*.)
- G8HKO**, M. J. Beecham, 22 Liquorpond Street, Boston, Lincs., PE21 8UF. (Tel. *Boston 3747*.)
- CHANGE OF ADDRESS**
- G2AXO**, W. J. Purser, 2 Dobson Close, Great Houghton, Northampton. (Tel. *Northampton 61794*.)
- G3AKG**, P. J. Fay, 5 Harland Way, The Glebe, Washington, Co. Durham.
- GM3ITN**, L. Hamilton, Hallsland, Hardgate, Clydebank.
- G3JFF**, M. J. Matthews, *H.M.S. Hermes*, B.F.P.O. Ships, London.
- G3NPY**, J. Joslin, 195 Roman Bank, Skegness, Lincs.
- G3PHN**, S. B. Lord, 14 Dorset Drive, Moira, Burton-on-Trent, Staffs.
- G3PXV**, R. E. Wiseman, 3 Squires Close, Somersham, Huntingdonshire, PE17 3HT. (Tel. *Somersham 489*.)
- G3RGF**, R. D. V. Young, Ranelagh, 138 Main Road, Danbury, Chelmsford, Essex, CM3 4DT.
- G3RQR**, N. L. Kirtley, 14 Byron Avenue, Winchester, Hants. (Tel. *Winchester 68565*.)
- GM3SZP**, R. Paton, 61 Waterside Road, Kirkintilloch, Glasgow, G66 3QW. (Tel. *041-776 6650*.)
- G3TSH**, R. J. Wilcox (*ex-GW3TSH*), 8 Jane Street, Chadderton, Oldham, Lancs. OL9 8QP. (Tel. *061-624 7667*.)
- GW3TSH/A**, R. J. Wilcox, 33 Treowen Road, Pembroke Dock, Pembrokeshire. (Tel. *Pembroke 2771*.)
- G3UUZ**, H. Bluer (*ex-GW3UUZ*), Anvil Point Lighthouse, Swanage, Dorset.
- G3VFX**, D. N. Davison, 75 Shaftesbury Avenue, South Harrow, Middlesex. (Tel. *01-864 3629*.)
- G3WXB**, K. Watmough, Woodlands, Warren Close, Meads, Eastbourne, Sussex.
- G3XDD**, S. C. Crampton, 11 Pine-wood Avenue, Brookhouse, Lancaster, Lancs., LA2 9NU. (Tel. *Caton 770738*.)
- G3XVP**, P. V. Pimblott, 52 Park Edge Close, Leeds 8, Yorkshire.
- G4AHO**, K. M. Jones (*ex-ZC4KJ /5B4AK*), 31 Brookfield Road, Haversham, Wolverton, Bucks.
- G4BOW**, R. A. Royall, The Rectory, 63 Coborn Road, Mile End, London, E3 2DB. (Tel. *01-980 2074*.)
- G4IV**, E. T. Carter, Bass Point Bungalow, The Lizard, Helston, Cornwall, TR12 7AP.
- G4RJ**, B. Farleigh, 22 Hillhead Park, Brixham, Devon.
- G8BPA**, M. E. Kirk, Pet Store, 8 Broad Street, Spalding, Lincs.
- G8CZM**, K. A. Jones, 57 Frankley Avenue, Halesowen, Worcs.

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**SELLING**: Three Sinclair 250's, two brand new at £4.50 each, and one almost new at £4; P.28 PSU, almost new, £6.80; Sanken SI-1025A 25-watt audio amp. IC, with data, as new, £6. (Manchester).—**Box No. 5152, Short Wave Magazine Ltd., 55 Victoria Street, London. SW1H-0HF.**

**FOR SALE**: Transistor HF converter, £4; RSGB "Radio Communications Handbook," £2.50; 1971/2 "Call Books," £1; 1973 "DX Call Book," £2. (Leeds).—**Box No. 5153, Short Wave Magazine Ltd., 55 Victoria Street, London SW1H-0HF.**

**OFFERING**: National HRO-500 receiver and LF pre-selector, 5 kHz to 30 MHz, sensible offers please. All letters answered.—**Wilberforce, G4AXS, Little Yaffes, Womenswold, Canterbury, Kent.** (Tel: Barham 362).

**WANTED**: Cathodeon 1.4 MHz filter type USB1 (will exchange LSB1 for this if required); also carrier crystal for above, and High Band AM Band. —**Holburn, G3XZP, QTHR.**

**SELLING**: K.W. Atlanta, brand new, excellent buy, £150; FT-75 with two power supplies and external VFO, £120; K.W. SWR bridge, £5.—**Ring Goodbody, G3YQE, 01-592 7800.**

**SELLING**: Hy-Gain 18-AVT 10-80m. vertical aerial £18; Heathkit SB-610E monitor 'scope, mint, £45; Heathkit RA-1 receiver, xtal calibrator, £20. Buyers collect for cash.—**Metcalfe, Thorndale, Caerwys, Mold, Flintshire.**

**FOR SALE**: Trio JR-310 communications receiver with matching SP-5DS speaker, both in excellent condition, £65; Unica UR-1A receiver, £18.—**Darby, 52 Lenville Way, Rotherhithe, London, SE16 3HJ.** (Tel: 01-237 9784).

**SALE**: **R.216** receiver, coverage 19-156 MHz, with AC/PSU and circuit diagram, £75; Windsor 65C signal generator, 100 kHz to 160 MHz, 6 bands, circuit diagram, needs alignment, £6; Signal generator Type 106, 5.5-55 MHz, £4; Hallicrafters S.27 Rx. coverage 27-144 MHz, needs alignment, £12; Taylor 45C valve tester, £7.50; **WANTED**: Sentinel X dual gate Mosfet 2-metre converter, will part-exchange any of above.—**Hughes, Rock House, Flint Mountain, Flint CH6 5QG.** (Tel: Northop 279).

**SILENT-KEY SALE:** Trio TS-510 and PSU with Shure mic., and K.W. LPF, little used, no mods., CW filter not fitted, best offer over £185. Inspection SW London.—BM/Ethos, London, W1.

**FOR SALE:** Eddystone EC-10 Mk. II, new, 365.—Ring Walmsley, Nottingham 269109.

**SELLING:** K.W. 2000A complete with AC/PSU, Shure 201 mic. and manual, £150; Heathkit SB-200 linear amplifier with manual (new mid-'72), £110. All in excellent condition.—Axford, G4AQZ, QTHR (Tel: Thorpe-le-Soken 632).

**OFFERING:** "G2DAF"-type Mk. II Rx and "G2DAF"-type Mk. II Tx with 4X250B in output stage and separate power unit. Both in good condition, will sell separately if necessary, inspection invited. Examine before offer. Pye Vanguard AM-25B, complete with xtals on 145.8 MHz, £18; Heathkit OS-1, £4. Buyers collect. **WANTED:** First class SB-200 and SB-640. Details and price, please.—Airey, G3GEJ, 19 Horseman Drive, Copmanthorpe, York (66453).

**SALE:** Beltex 5400 2-metre transceiver, new, boxed, a complete station, £60 (shop price £75 plus VAT). will deliver reasonable distance.—Osborn, 32 Bushey Mill Crescent, Watford (29984), Herts.

**OFFERING:** Vespa Mk. II, with AC/PSU and extra 21 MHz crystal, spare PA valves, Shure mic. and other items, as new. Buyer arranges transport.—Mildren, G3FVD, QTHR. (Tel: Bodmin 2487).

**WANTED:** Codar Q-multiplier, must be in good condition. Details and price please.—Dowling, Ballytiglea, Borris, Co. Carlow, Ireland.

**SALE:** AR-22R rotator with 70-ft. cable, £20; KW-202 speaker unit, £3. Prefer buyers collect.—Baker, 65 Crompton Street, Chelmsford, Essex.

**SALE:** K.W. Valiant with PSU; Lafayette HA-600; also home-built Top-Band Tx. £60 The Lot.—Berwick, G4BOP. (Tel: 0702-24 4105 after 6 p.m.).

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**FOR SALE:** Trio TS-500 transceiver with PS-500 and remote VFO-5 dynamic microphone, excellent condition. £90. Have gone QRT.—Llewelyn, GW3RXD, 33 Awelfryn, Amlwch, Anglesey.

**EXCHANGE:** Trio 9R-59DS receiver with SP-5DS speaker and service manual FOR complete 2-metre FM mobile, preferably fully tunable Rx. No rubbish please. Cash adjustment if necessary.—Ring Russell, 01-977 7705 evenings.

**WANTED:** K.W. Vespa Tx with PSU, E-Zec Match. 103 or 101 meter, Shure 444 mic. All must be in good condition.—Johnstone, Waverley, Golspie (325), KW10 6SR, Sutherland, Scotland.

**WANTED:** For FT-101: Car mounting bracket, aerial tuning unit and cooling fan. Details and price please.—400 Edgware Road, London. (Tel: 01-723 5521).

**SELLING:** Collins R-390A/URR manual, £2; BC-221AK, £12.50; Half R.216 receiver, £10; AN/URT-33 transmitter, £4.50. (Manchester).—Box No. 5155, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

**WANTED:** For Heathkit HW-32A SSB transceiver: HP-13 mobile PSU and HP-23 fixed station PSU. Details and price please, call or write. Club meetings every Wednesday at 8 p.m.—Star Radio Club, New Inn Hotel, Bramley Town Street, Bramley, Leeds 13.

**SALE:** Pair of 6146's, seldom used, £2; RSGB "Radio Communication Handbooks," 1970 to 1972, £1.30; 100 kHz xtal transistor marker, £1.50; "ARRL Handbook," 1936, £1. New and boxed: one 6J6 and four 6AK5, £1.15.—Duncan, 12 Ivanhoe Place, Lunde.

**WANTED:** Modified 19 Set Rx/Tx for Top Band operation. Details please.—King, 2 Bushell House, Bentons Lane, Westnorwood, London, SE27 9TS.

**FOR SALE:** KW-202 with calibrator and phones, new last March, first £100 secures.—Williams, 39 Clockhouse Way, Braintree, Essex CM7 6RD.

**WANTED:** Spares for R-390A/URR and R-417/TRC receivers; sub-units etc. in any condition. **FOR SALE:** IF unit for R-390/URR receiver. Offers?—Laskaris, 4 Alpine Close, Woodlands Road, Bromley, Kent. (Tel: 01-467 0162 after 7 p.m.).

**SALE:** KW-2000 G-line, excellent condition, £100; KW-1000 linear, as new, £90. Both with manuals. Delivery reasonable distance.—Kirk, Merris Court, Churchill, Oxford. (Tel: Kingham 270).

**SELLING:** IIV-100 with HP-23 PSU, both in mint condition, £120. Prefer buyer collects.—Linney, G3VQL, QTHR. (Tel: Shrewsbury 51733).

**SELLING:** 2m. AM Cambridge, dash-mounted with cradle, Tx/Rx aligned on 2m., with crystals, very clean, £40; DJ9ZR 2m. SSB TTx, complete with K.V.G. 9 MHz filter and VXO giving 100 kHz swing per channel. £30; 70 cm. Varactor tripler, up to 15 watts output, microstrip lines, £15; Heathkit GD-1U with extra IFT range coils, £12; Airmec 830 'scope, ideal for photographic work (heavy — callers only), £10; BC-454 Rx, 3.0-6.0 MHz, with output transformer inside, ideal tunable IF, immaculate condition, £8; Various used VHF aerials.—Sneap, G3ZYC, QTHR. (Tel: Ripley [0733] 3883, Derbys.).

**DESPERATELY WANTED:** Transformer with 240v. primary, and 60-120v. with at least 12A. secondary; also any MW D/F equipment, receivers, aerials and any such information!—Richardson, 30 Gainsborough Road, North Finchley, London, N12 8AG.

**OFFERS OR EXCHANGE:** Ex-Govt. "Moaning Minnie" intercom., takes 12 extensions; Valve variable stabiliser; 45 copies "Practical Wireless," 1944-51.—Ring Aufenast, 01-656 1766.

**SALE:** Heath HW-100 with HP-13 DC/PSU and handbook, £110; Yaesu FT-75 transceiver with FP-75 AC/PSU and DC-75 DC/PSU, extra xtals for 37.40, 37.50, 140.75 and 141.70 MHz, 2 handbooks (U.K. and J.A.), good condition and only 5 months old. £120. Delivery 100 miles.—Partridge, 2 York Crescent, Torquay. (Tel: 0803 34904).



**FOR SALE:** Viceroy Mk. III, £65; two CR-150's, £20; Heathkit DX-100U, £25; Panda PR-120V Tx, £20; HRO's, £20-£30.—de la Bertauche, G3RCO, QTHR. (Tel: Seaton 21016).

**SELLING:** T.W. 2m. transceiver with ten crystals and preamp, etc. Also new Heath GDO; unused Skybeam aerial; Books like "Basic Electronics." Please write for list.—Burnett, G8GVF, 4 Dale Road, Norton, Stourbridge, Worcs.

**SALE:** HW-100 transceiver with mains home-built PSU, in excellent condition, £95. Buyer collects.—Crabbe, G3WFM, 47 Torrington Drive, Potters Bar (51532), Herts.

**SELLING:** FT-200 with AC/PSU, immaculate condition, £130. No offers. Can deliver up to 40 miles, or buyer collects (S. Bucks).—Fowler, G3IQF, QTHR. (Tel: Marlow 6421).

**FOR SALE:** Sommerkamp FR-100B amateur band receiver, coverage 160-10m., excellent condition. £75. WANTED: Eddystone 888A receiver.—Davies, 24 Upland Grove, Leeds 8. (Tel: 0532-656888).

**WANTED:** Hammarlund SP-600 and R.C.A. AR8516L receivers. Details of condition and price, please. **SALE:** IIRO dial, new, boxed, £3-50. Original manuals: 51-J3, £3-50; 51S1, 75S3, £4; RA-17L, £4-50. All plus postage.—Murray, 64 Moss Lane, Garstang, Lancs.

**SALE:** FT-DX400 (basic FT-DX401), mint, new May 1972, with pair of spare new boxed final valves and drivers, dynamic mic., £160. Delivery by arrangement, prefer buyer inspect.—Burgis, G6FB, 11 Morningside Avenue, Portchester, Fareham, Hants. (Tel: Portsmouth 21892, daytime).

**SELLING:** Eddystone 750 double-conversion general coverage receiver, with circuit and instructions, good condition, £32.—Ring Knox, Bradford (0274) 630266.

**FOR SALE:** Eddystone EC-10 Mk. II receiver, £45; Codar PR-30 self-powered preselector, £5. Also Codar AT-5 Tx, T.28 Rx, 12-MS mobile PSU, 12R/C control switching, complete with Halson mobile aerial, £30.—Druce, 6 Kennedy Drive, Goole, Yorks.

**SELLING:** KW-204 Tx, 7 months old, £130.—Long, Room 16 North, YWCA, Fourth Avenue, Harlow (31146/7), Essex CM20 1DN.

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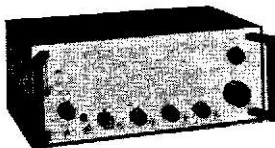
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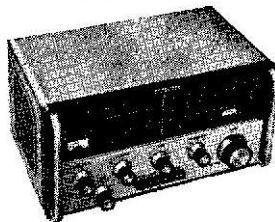
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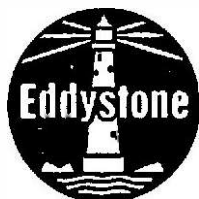
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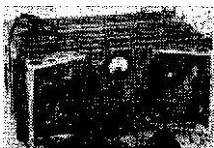
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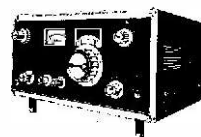
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