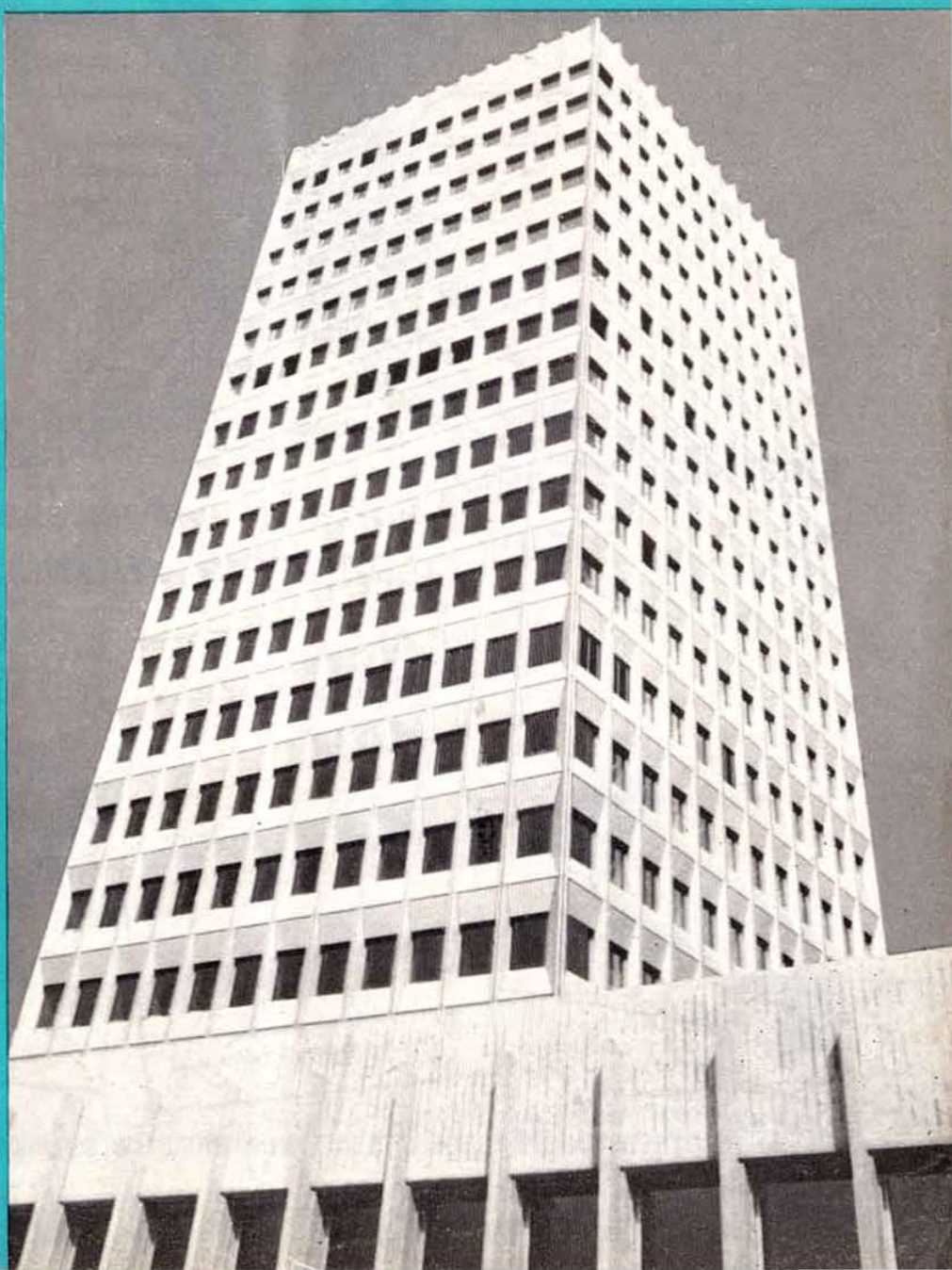
radio communication

November 1972

Journal of the Radio Society of Great Britain



November 1972

radio communication

Volume 48 No 11 Price 30p

FRONT COVER

The new extension to the ITU headquarters building in Geneva

CONTENTS

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BUYING A TRANSCEIVER?

. . . then no doubt you'll make sure it has a good RECEIVER. All Yaesu transceivers have 0·3μV 10dB S/S + N Ratio sensitivity (FT-101, FT-401) or 0·5V (FT-75, FT-200). Compare this with other makes and you'll find that one new model that has just appeared on the market requires 1·5μV at 28MHz! This is the band that sorts out the men from the boys!

On the transmitter side all YAESU models have excellent specifications and offer more watts per £1! e.g. FT-401 560W. for £230.00, 41p./watt. FT-200 260W. for £172.00 66p/watt.

YD844 **FV200 £38.00** **FT200 £132.00** **FP200 £38.00**

THE FT200 is without doubt one of the "best buys" available. Compare its features with similarly priced units and kits. SPECIFICATION: 260w. p.e.p., I/p. SSB/CW.; 75w. AM. 1 kHz readout on all bands 3·5-4, 7-7·5, 14-14·5, 21-21·5, 28·5-29 MHz. (3 optionals crystals available for 28·28·5, 29-29·5 and 29·5 30 MHz, Stability: 100Hz 30 mins. after warm-up. Sensitivity: 0·5μV 10dB S/S+N. Selectivity: 2·3 kHz (6dB), 4kHz (60dB). Solid state FET VFO with excellent linearity (like all YAESU VFO's). 25/100 Calibrator. VOX/PTT. Separate DC supply available for mobile use. Clarifier ±5 kHz. Break-in CW keying.

YD-844 **SP-400** **FT-401 £230** **FV-401**

THE FT401 offers a high power SSB/CW transceiver with many extra features at a minimum price.
SPECIFICATION: Power I/p 560w. p.e.p. Built-In CW filter, noiseblanker and blower cooled pa. Complete coverage 80-10m. Plus WWV(10 MHz) to check the 25/100kHz calibrator plus 3 spare band positions. VOX is built-in (not an extra). Dial readout to 1kHz on all bands. Sensitivity 0·5μV for 20dB S/S+N. Selectivity: 2·3kHz (6dB). 3·7kHz (60dB). CW filter 600Hz. Clarifier 5kHz. Break-in CW with sidetone. Selectable USB/LSB.

FT-75 £99

FT-75
10-80m
30w p.e.p.

Sems. 0·5μV for 10dB S/S+N.
VXO control

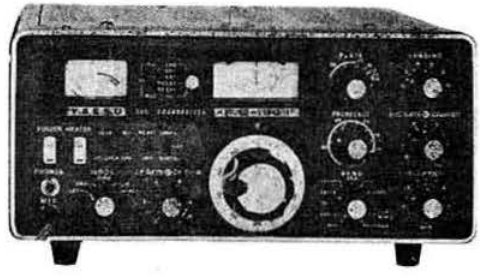
H.P.

PART EXCHANGE

SECURICOR DELIVERY

DC-75 £22.05

THE SUPERB FT-101 £249 (+ 160m. £255)



The FT-101 is a 260w. p.e.p. SSB/AM/CW transceiver with an amazingly sensitive receiver. You'll hear signals which are inaudible on many other equipments. It comes complete with speaker and microphone, AC and DC P.S.U.s built-in. There's nothing to touch it for performance.

ELECTRONICS (UK) LTD

YAESU PRICES—CARRIAGE PAID BY SECURICOR

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FT-75. 50W p.e.p. 10–80m. 3 Ch. vxo	£99.00
FP-75. AC PSU and Speaker for above	£22.50
DC-75 DC PSU, SPEAKER and MOBILE MOUNT	£22.50
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FP-200 AC PSU and SPEAKER for FT-200	£38.00
DC-200 DC PSU for FT-200	£46.50
FT-101. 10–80m. AC & DC PSU built-in	£249.00
FT-101 as above + 160m.	£255.00
FT-401. 560W. p.e.p. 10–80m.	£230.00

VHF TRANSCEIVERS

FT-2F 2m. 12 Channel, 10W. O/P	£84.00
FP-2AC AC PSU and SPEAKER	£25.50
FP-2 ACB. AC PSU/Spkr. and Ni.cad batteries	£36.00
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FL 50 fitted VOX.	£72.00
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FR50. Double conversion 10-80m.	£59.00
FR50 fitted WWV and xtal. Calibrator	£63.00
FR400DX. 160m. 80-10m. (28-29MHz)	£120.00
FR400SDX. 160–2m. 4 Mech. Filters, 28–30MHz	£160.00

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SP101, SP400, SP401	£10.00

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FV-101 for FT-101, FV-200 for FT-200	£38.00
FV-401 for FT-401.	£38.00
FV-50 for FT-75 and FL50	£27.50

FREQUENCY COUNTERS

YC-305, 35MHz. AC or 12V DC	£85.00
YC-305D. 220MHz. Built-in pre-scaler	£111.00
YC-305 to 305D conversion kit	£15.00

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FL-2100, 1200 W p.e.p. 10–80m. (Matches FT-101)	£148.00
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FL-2500 2kW p.e.p. 160–10m.	£122.00

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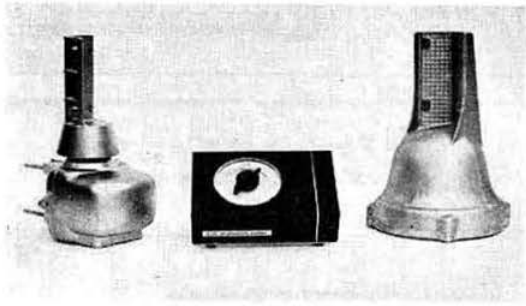
Heath SB303, new, + cwf, ass. bld.	£238.00	KW Atlanta, v. good	£150.00	Lafayette HA350, superb	£55.00	Trio 9R59DS, mint	£39.00
Heath SB301, excellent	£95.00	KW 2000 + ac + dc + mic. excellent	£150.00	Digital 500, demo. model	£225.00	Trio 9R59DE, excellent	£33.00
Heath GR78, mint	£59.00	KW 1000, superb	£85.00	Skywood CX203, mint	£21.00	Tristao 105ft. tele. tower	£225.00
				Skywood CX203, NEW	£78.50	Yaesu FT400, mint	£149.00

ROTATORS CDE AND HY-GAIN



AR20 AR22

ALL ROTATORS EX-STOCK 24/48 HR SECURICOR DELIVERY £1

We stock the best range of rotators, CDE and HY-GAIN and spares. Our stocks are good so you'll get fast delivery plus the after-sales service which counts.

AR20 This model replaces the old AR10 and is ideal for VHF beams, £20 (40p).

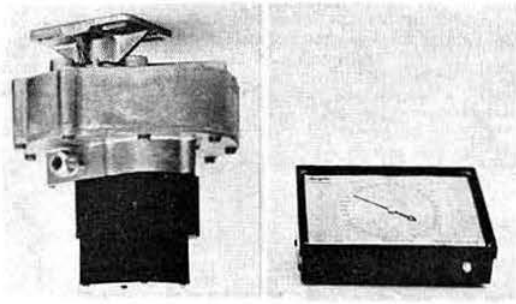
AR22R This model will turn HF antennas of TA33 Jnr. size and can be mounted on the top of masts up to 2½" diameter or onto a flat plate. It can carry a deadweight of 150 lbs. Requires a 4-wire cable, £25 (65p).

TR44 This model is also for HF beams as the AR22R but carries a 500 lbs. load and has better braking. The control unit requires a 7-wire cable, £45 (75p).

HAM-M The best of the CDE range. Carries 1,000 lbs. deadweight for large HF beams and employs a solenoid operated brake. Requires an 8-way cable, £70 (80p).

HY-GAIN 400. It's a brute but takes masts up to 3" dia. and automatically rotates to the desired direction by setting the compass control knob pointer as required. Mounts to standard tower plate on Versatower, £115 (£1).

Note—All above rotators are ex-stock and orders are despatched the same day as received.



HY-GAIN 18AVT

HY-GAIN 18AVT/WB THE GREAT NEW WIDE BAND VERTICAL SELF SUPPORTING FOR, 10-80m. (ex-stock) £33.00. Take the wide band, omnidirectional performance of Hy-Gains famous 14AVQ/WB add 80m. plus extra heavy duty construction and you have the new 18AVT/WB ★ True ¼-wave resonance on all bands ★ nominal 52Ω I/P ★ SWR of 2 : 1 or less at band edges ★ 1 kW (AM) ★ Radiation pattern has an outstandingly low angle ★ Roof or ground mounting.

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12AVQ 10-20m. Vert. self sup.	£16.50	204BA 20m. 4 ele. beam ..	£80.00
14AVQ 10-40m. Vert. self sup.	£24.50	203BA 20m. 3 ele. beam ..	£72.00
LC-80-Q. Loading coil for AVQ. 80m.	£7.75	153BA 15m. 3 ele. beam ..	£36.50
18AVT/WB 10-80m. Vert. self sup.	£35.50	103BA 10m. 3 ele. beam ..	£28.50
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TH3 Mk3 10-20m 3 ele. 2Kw. beam	£75.00	Lightning arrestor, LA-2 ..	£2.50
TH3 Jnr. 10-20m 3 ele. 600w. beam	£51.50	12RMQ roof mounting kit ..	£9.15
TH2 Mk3. 10-20m 2 ele. ..	£51.50	14RMQ roof mounting kit ..	£10.60
		18TD Reeltape port. dipole ..	£41.00
		C1 centre insulator	£2.50
		E1 end insulator, per pr. ..	£1.50
		400 Rotor	£115.00

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CRYSTALS TYPE HC/6U £1 each 10 or more ½ price. kHz: All in stock in quantity

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1820 1930 3766 3795 4002 6001 6009 6016 6024 6031 6046 6054 6076 7002 7005 7010 7017 7032 7074 7054 7077 7092 7099 7129 8081 (WAB) 11750 12000 14000 14250 24000 24020 24120 24220 24320 31200 31225 31250 31275 31300 31325 31350 31375 31400 31425 31450 31475 31500 31525 31550 31575 31600 31625 31650 37675 kHz. £1 each. 25% qty discount.

MORE HC/6U CRYSTALS £1 each. 22 22·5 23 23·5 24·5 25 25·5 26 26·5 27·5 28 28·5 23·22 23·32 23·42 23·52 23·62 23·72 23·82 23·92 24·42 24·52 24·62 24·72 24·82 24·92 25·12 mHz 11·25 to 15·5 in 250kHz steps. 5000, 5012, 5025, 3625, 3675kHz.

CRYSTAL CONTROL UNITS with 34 xtals 13·54 to 19·87mHz, 3 valves EF91 size 4 × 4 × 6" **WITH CIRCUIT** **£4**

LORAN R65/APN9 UNIT RX 1·7 to 2mHz, scope with 3BP1 tube, 100kHz xtal standard with dividers, all in box size 20 × 9 × 12" **WITH CIRCUIT** **£10**

UHF RX with 2 3-section trough lines 4⅜" long, double superhet 54 and 6·9mHz B7G, B9A valves, 20 way HC/6U xtal holder size 8 × 5 × 17" **£10**

70mHz AUTO ALARM RECEIVERS, flashing light and audio tone outputs, 3 tone filters in some for selective calling. Several types available from **£3.**

RX RF UNITS 2-24, MHz 4 BANDS. 6AK5 RF 6BE6 MIX 6AU6 xtal osc. 1·82MHz IF out also includes TX drive balanced modulator (2)6AU6 & oscl. 82MHz 6AU6, 6AU6 & 6AQ5 drivers. All inductive tuning with 5 tuned circuits at signal frequency. With circuit **£8**

RX IF UNITS 1·82MHz input, 110kHz 2nd IF, AF output with BFO. 6BA6 1·82MHz amp, 6BE6 mix, 6AU6 1·93MHz osc, 2 6BA6 IF 110kHz, 6BA6 BFO, 6AL6 det AGC, 12AT7 AF CV448 NL, OA2 Stabilizer **£10**

PLESSEY PTR61E 116-132MHZ TX/RX, 12 volt, 1½ watt output, QVO4, 7PA size × 8 × 11" **£16**

2202 TX/RX 15 watts output QQVO3-20A PA, vibrator psu 7 × 15 × 19" **£20**

VHF TRANSMITTERS 2 or 4 METRE VERSIONS
Up to 40 watts input with; Modulator, Microphone, Crystal (to our choice), Aerial change over relay, Metering points. Less case and power supply (300-400 volts 250mA HT 6·3 volts, 5A LT. Size 6 × 6 × 12".
4 METRE VERSION £20. 2 METRE VERSION £30.

MARCONI 1616 RECEIVERS 2-18·5MHz, single superhet, crystal controlled, fine tuning + or —9kHz, 2RF, 2IF, BFO, CW filter, 2uV for 10db S/N, 8 × 8 × 13" with MAKER'S MANUAL, control unit and fine tuner **£20**

MARCONI TX UNIT 100 watt output, 2-24MHz 6AQ5 driver, 829B buffer, 2 × 829B PA, tuning 23 turn 2 inch dia. roller coil, 2 gang capacitor, coil and capacitor turret. Size 8 × 10 × 16", weight 26 lb. **WITH CIRCUIT** **£8**

MARCONI ATU UNITS. Roller coils 30 turns, 3 inch dia., 20 turns, 1½ inch dia., capacitor turret, RF voltage and current sensing elements. Size 6½ × 11 × 16", weight 27 lb. **WITH CIRCUIT** **£6**

MARCONI MODULATORS. 90 watt output, transformer to match 2000 ohms and screen winding, speech clipper, audio AGC, switched metering for; PA grid, Buffer grid, PA anode, Mod anodes and screens, 500 and 1000 volts HT. Valves 12AX7, 12AT7, 6AL5, 6AU6, 12AX7, push pull pair 829Bs, 6AQ5, 6AU6, OA2 etc. HT required, 600 volts, 275 volts DC, 250 volts AC, room for PSU inside case. Size 8 × 12 × 16". **WITH CIRCUIT.** Weight 32 lb. .. **£10**

MARCONI 7092 RX 150kHz-2MHz in 4 bands, 5-1·5kHz, 400Hz selectivity, 10 uV sensitivity, 450mW output, RF stage, 2 IF 110kHz, crystal filter, needs 250V HT, 24V lt, BFO, IF & AF gain control, DF provision (not supplied) size 8 × 5 × 12", circuit.. .. .. **£10**

STORNO CQM33C FM VHF TX/RX, 10 watt output, QQVO3-10 PA with circuit and component details for 2m conversion, mic, control, speaker, 12V transistor PSU **£11**

T1154 for SPARES £6 ea. **R1155 for SPARES £5 ea.** **ALL PRICES INCLUDE CARRIAGE.**

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Service and Sales: A good range of our equipment is available (evenings and weekends only) at the following: 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.
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MAIN DISTRIBUTORS FOR YAESU MUSEN EQUIPMENT

The new Yaesu FT–75 meets the need for a very small mobile rig with fixed station potential. It is beautifully made and the performance is everything one has come to expect from Yaesu. It is crystal controlled on all bands with VXO, it is all transistor except 12BY7A driver and 12DQ6B P.A., the filter is top-notch and all in all it is yet another Yaesu winner.

Bands: 80, 40, 20, 15 and 10m. The following frequencies are fitted as standard, but others (up to a total of 3 per band) may be ordered: 3750, 7085, 14200, 21400, 28550.

VXO range: 80 and 20m. 3kHz, 40m. 6kHz, 15m. 20kHz, 10m. 12kHz.

Power: The transformers in both A.C. and D.C. p.s.u's. are tapped and on the highest A.C. p.s.u. tapping we obtained a measured output of at least 30W on all bands (35W on 10!). This corresponds to an approximate input of 60W or more which is very comfortably within the capabilities of the 12DQ6B.

The receiver has a sensitivity of ½ microvolt for 10 dB S/N and the crystal filter (5173·9kHz) has a nose bandwidth of 2·3kHz and 6:60 dB shape factor better than 2-1. All this in a compact 8" × 3" × 12" deep.
Quite clearly a great deal of thought has gone into the design of the FT–75 and there are several very nice touches which appeal to us. The Rx not only has its own r.f. coils, but its own mixer coils as well. The dual gate F.E.T. r.f. amp. has excellent signal handling with amplified a.g.c. applied to one of the gates. Separate receiver and transmitter. I.F. strips, a ring diode detector, etc. allied to a low price and small size make this rig very attractive to anyone owning a car.
As an optional extra there is the FV50C Remote VFO at **£27.50**. Note though, that there is no r.f. peaking control on the FT–75 and that the P.A. tune is pre-set, so the frequency excursion is rather limited by r.f. bandwidth from 75kHz or so on 80 up to about 450kHz on 10m. before acceptable performance is lost, In spite of this, it is a little cracker and for mobile I'm not so sure that xtal control isn't a bad idea.

New Yaesu Equipment:

FT–101 (New Model), **£255**
SP–101 Matching speaker, **£10**
FV–101 Remote VFO, **£38**
FT–101 Mobile Mount, **£5**
FL2100 Linear, **£148**
FRdx400 Super de Luxe Receiver **£160**
FLdx400 Transmitter, **£146**
SP–400 Speaker, **£10**
FL2000B Linear, **£148**
FT–2FB (New model), **£89**
FR–50B Receiver, **£59**
FT–2 Auto, **£146**
FT–200 Transceiver, **£134**
FP–200 A.C. p.s.u./speaker, **£38**
FV–200 Remote VFO, **£38**
DC–200 Mobile p.s.u., **£46.50**
FTdx401 Transceiver **£230**
FV–401 Remote VFO, **£38**
SP–401 Speaker **£10**
YC–305 Counter (New Model). **£111**
FT–75 Transceiver, **£99**
FP–75 A.C. p.s.u., **£22.50**
DC–75 D.C. mobile p.s.u., **£22.50**

The above equipment is ex stock and apart from sundry spares which go first class mail, we send all equipment by Securicor, who almost invariably deliver within 24 hours and more important, treat the gear gently. There is no extra charge for this service, nor for the fact that all equipment is thoroughly checked before despatch. Plus of course our unbeatable 12 month guarantee and our money-back guarantee.

While the Yaesu Musen FRdx400 receiver is just about the best you can get in the Amateur Band line, the price of **£160** is beyond a lot of pockets, so to cater for the lower-priced field, we very proudly introduce the Yaesu Musen FR-50B at a very incredible **£59.** In spite of this rock-bottom price, the FR-50B is a very good Amateur Band receiver indeed and provides a high degree of sensitivity and stability.

Basically, it is a double conversion receiver covering 80 to 10m with a VFO for the first oscillator and a crystal controlled second oscillator. Being double conversion (5173·9kHz and 455kHz) explains the incredibly good image rejection figure of better than 50 dB.

When it comes to sensitivity, the 6BZ6 r.f. amplifier ensures 0·5 microvolt for 10 dB S/N ratio.

Selectivity is achieved by two ceramic transducer filter elements which give a nose bandwidth of 3·6kHz at 6 dB and a skir bandwidth of 10kHz at 50 dB. These figures are extremely good for equipment in this price class (even for equipment costing much more!). A high order of stability is achieved by a stabilized transistor VFO and VFO buffer amplifier. Other niceties of design are:

1. 100kHz calibrator circuitry built in and only needs 100kHz crystal plugging in.
2. Built-in speaker.
3. Tuneable BFO.
4. I.F. trap in r.f. circuit.
5. Nice geared drive to the VFO—50kHz per turn of the tuning knob, readout to better than 1kHz. This is the same drive as on the well known earlier (and much more expensive) FR-100B.
6. Triode first mixer for low noise.
7. "S" meter fitted.
8. Noise limiter fitted.
9. Gold bonded IS1007 for AM detection.
10. Product detector (6BE6) for SSB/CW.
11. Built-in muting and monitor circuit for use with companion FL-50B transmitter.

Frequency range:	80m	3·5—3·8MHz	20m	14·0—14·5MHz	10m	28·0—29·2MHz
	40m	7·0—7·5	15m	21·0—21·5	WWV	10·0—10·5
Sensitivity:	Better than ½ microvolt for 10 dB S/N ratio in the SSB mode.					
Selectivity:	3·6kHz—6 dB 10kHz—50 dB.					
Image rejection:	50 dB or more.					
Audio:	1·5W 4/600 ohm output. Built-in speaker.					
Power:	240v. A.C.					
Size:	13" wide, 6" high, 10¼" deep.					
Weight:	17½ lb.					
Controls:	BFO, monitor agc slow/fast/off, noise limited on/off, calibrator on/off, mode switch, AF gain, RF gain band switch tuning, preselector, zero set (for calibration). "S" meter zero (on rear panel).					
Valves:	12AT7	Crystal calibrator	6CB6	1st IF amp./2nd mixer	6BE6	Product detector
	6BZ6	r.f. amp.	2SC372	2nd oscillator	IS1941	Noise limiter
	12AT7	first mixer	6BA6	2nd IF amp.	6BA6	BFO
	2SC373	VFO	6BA6	3rd IF amp.	6BM8	Audio
	2SC372	VFO buffer	IS1007	Am detector		

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Current Comment

VAT—Round 2

Now that the government has finalized its VAT regulations, representatives of the Society have had a meeting with officers of HM Customs and Excise and have been advised that all subscriptions from UK members are liable to VAT. This would mean that instead of £4 per annum, the subscription would be £4.45.

But take no action—Council is considering the point and it now looks even more certain that the annual subscription will have to be split between payment for *Radio Communication*, on which there would be no VAT, and the membership subscription.

Next year is the Diamond Jubilee Year of the Society: I wonder what the founders would have thought if they had been told that tax would have to be added to the membership subscription.

J. O. Brown, G3DVV,
Hon Treasurer

QTC AMATEUR RADIO NEWS

UK 2m Band Plan amended

A special meeting of the RSGB VHF Committee was held on 11 October at which the RSGB Raynet and Mobile committees and *Short Wave Magazine* were represented.

Subject to the approval of Council of RSGB, it was agreed to recommend that the following band plan be adopted:
(a) the existing UK 2m Band Plan as published should be retained, ie with specified geographical zones and mode frequencies.
(b) the following fm channels should be added to the band plan:

Zone A	**FM Working**	**144·40MHz**
Zone B	**FM Working**	**144·80MHz**
Zone C	**FM Working**	**145·20MHz**
Zone D	**FM Working**	**145·60MHz**
FM Calling—National		**144·48MHz**

It was agreed to leave open the question of repeater channels until the end of the one-year experimental period with GB3PI currently operating on 145·15/145·75MHz in conformity with the Region 1 Band Plan.

Those who have submitted views to the committee are thanked for their valuable contributions. These were used as the basis of the discussion.

The Cuxhaven repeater

In the article *144MHz repeater stations in the amateur service* which appeared in the July 1972 issue of *Radio Communication* it was stated that the Cuxhaven repeater is no longer in use. We are advised by DL7AC that this is incorrect and that the repeater is in full operation at the present time.

USA telephony bands

Following the various proposals made to the Federal Communications Commission, it has been decided that no extension will be made to the telephony sub-bands on 14, 21 or 28MHz. The sub-bands have been extended from 3,800 to 3,775kHz and from 7,200 to 7,150kHz. It will be remembered that in the USA the various sub-bands are the subject of regulations and not a voluntary band plan as in most countries in IARU Region 1. Following consultation with the IARU the proposed extensions on the hf bands were the subject of representations by the ARRL. Credit must be given to the foresight of those in the USA who anticipated international repercussions following large extensions to the USA telephony allocations.

QSL Bureau

Notice to holders of callsigns in the series G3IAA-KZZ and all holders of BRS and A numbers. As from 1 January 1973 the G3IAA-KZZ section of the QSL Bureau will revert to the former sub-manager, Mr G. L. V. Butler, G2BUL, 9 The Heath, Chaldon, Caterham, Surrey, CR3 5DJ, who, we are happy to say, has fully recovered from his illness.

BRS and A members will have a new sub-manager from 1 January 1973. He is Mr J. N. Garrett, G3YOU, 201 Bishops Oak Ride, Tonbridge, Kent. Mr G. S. Milne, G3UMI, who took over from G2BUL at short notice, will be taking a study course in the New Year which will prevent his spending time on the QSL Bureau. He will, however, continue as the librarian for the Tape and Slide Library.

World Radio Club

As most dx-ers and short-wave enthusiasts know, a QSL Card from the BBC is a great rarity. But in November this year, when the BBC celebrates its 50th Anniversary, there will be a chance for listeners to the BBC World Service programme, World Radio Club, to possess one of these rarities—a genuine BBC QSL, verifying reception of the club's 50th Anniversary Edition.

World Radio Club, which has an international membership of 12,000, is broadcast on Thursdays at 1330, Fridays at 2345 and Sundays at 0815gmt in the World Service, and any member who reports accurately on reception of the Anniversary Edition on 9, 10 or 12 November will receive this special QSL. Membership is free, and the address is: World Radio Club, BBC, Bush House, London.

Licence figures

The Ministry of Posts and Telecommunications advises that the following numbers of amateur licences were in force at 30 September 1972:

Class A	14,386	Class B/M	792
Class B	3,651	Television	226
Class A/M	2,824		

Stolen equipment

The Ariel Radio Group reports the theft of an Eddystone 888a receiver, Serial No LMO516, complete with speaker and S-meter, during September. Anyone offered this receiver, or one without a serial number, is advised to contact the police, or the group's secretary: c/o 14a Cavendish Place, London W1.

Reciprocal licences—Dominican Republic

A reciprocal amateur licensing agreement has been concluded between the UK and the Dominican Republic. Applications for Dominican licences should be sent to: The Department of Telecommunications, Santo Domingo, Dominican Republic.

Plessey capacitor selection guides

A series of user-guide publications giving full details of the range of Plessey capacitors is now available. This comprises *Interference Suppressors*, *Professional Capacitors*, *General Purpose Capacitors* amd *Industrial Capacitors*. Each chart deals with applications and gives full details of the capacitors.

Plessey selection guides are available from Plessey Capacitors, Bathgate, West Lothian, Scotland, EH48 2RL.

Walkie-talkie operation

The Class A and B licences are for fixed station operation, including the /A and /P facilities. The MPT advises that hand-held equipment is covered by these licences only when the operation is of a static nature.

Tower power

G3LEX is the callsign of an amateur station operating from the Tower of London. This is a permanent station, covering all bands, both cw and ssb. The licensee, Mr R. Reed, invites any amateur who may be visiting the Tower to call in at 13 The Casemates, where he will be made most welcome.

Staff Vacancy

A vacancy exists at Society headquarters for an administrative assistant able to deal with correspondence and general queries from the membership. Applicants, who must be licensed amateurs, should phone or write to:
The General Manager, RSGB, 35 Doughty Street, London WC1N 2AE.
Tel 01-837 8688.

Wireless Museum

Radio amateurs in East Anglia are mainly responsible for the recently established Wireless Preservation Society.

The society's objects are the preservation and restoration of wireless equipment for purely cultural, educational and historical purposes. President is Mr W. K. E. Geddes, who is in charge of the Radio Section at the Science Museum in South Kensington. Vice-President is Mr F. C. Ward, G2CVV, Immediate Past-President of the RSGB. Mr D. Hoult, G4OO, is chairman, and Mr W. Carter, G2NJ, vice-chairman. Hon secretary and curator is Mr D. Byrne, G3KPO (area representative, RSGB), who would like to know of any additions for the museum, which may be viewed at any convenient time. His address is Homa House, Quadring Watergate, Spalding, Lincolnshire (tel 077-584 485).

Pocket-portable phone dx

by L. A. Moxon, BSc, CEng, MIEE, G6XN*

EXAMPLES are presented from a series of experiments proving that reliable phone dx is possible with rf output powers of the order of 1W p.e.p. using ordinary horizontal or inverted-V dipoles at heights of 10-25ft above steep ground slopes.

These results are predictable on the basis of typical "main rig" signal reports and the theory of multiple ground reflections discussed elsewhere [1], the use of horizontal polarization being normally essential. The rigs used may be regarded as obsolete following the introduction of ics such as the SL600 series, nevertheless the experience gained remains relevant and the article includes a discussion of technical problems and recommendations.

THE transistor and especially the integrated circuit have opened up exciting new prospects for the amateur who enjoys the achievement of "much with little". It is now easy for the home constructor using, for example, the Plessey SL600 series of microcircuits as currently described in *Radio Communication*, to construct a miniature ultra-lightweight ssb rig. With an output stage using, say, an inexpensive 2N3053 transistor or even a CA3020 integrated circuit, and powered by a few cycle lamp batteries, it is not difficult to achieve reliable communication on 14-28MHz with most of Europe.

The aerial may consist of a thin-wire dipole which can be supported between trees or even bushes and when rolled up, complete with feeder and all accessories, fits neatly into a jacket pocket—though two or three bamboo garden canes which can be lashed together to act as a "clothes prop" in the centre are recommended unless there are plenty of trees around and the operator is skilled in the manipulation of sticks, stones or other missiles with strings attached to them!

On the other hand the amateur need not be content with Europe if he is prepared to leave the beaten track, in more senses than one; the aim in general is to place the aerial at a low height above a steep ground slope so that the wave reflected from the foreground reinforces the direct wave at low angles of elevation, and at the same time to use the hill as a "tall mast" thereby securing a total gain of 12dB at low angles [1], [3]. Used in this way the equipment described above is capable of consistent world-wide dx contacts but suitable locations can rarely be found without leaving the car and taking to the hills. This will appeal to those who, like the writer, enjoy wandering in remote and mountainous places, and there is also the possibility of adding to existing knowledge since the exploitation of low angles of propagation, a subject which has several times been raised in *Technical Topics*, involves many unknowns [2]. Not only is little known about the actual angles required, but there is still much to be learnt about the best ways of exploiting ground contours to achieve low angles of launch.

Some results

The first contact from G6XN/P was with VK2NN from a very steep south-west facing slope on Old Winchester Hill, with 0·5W output from a 2N3053 into an inverted-V dipole supported by garden canes. Signals were reported RS56, and this was followed by a contact with VK3IP, which was interesting through being achieved in the face of competition, and despite poor conditions at the VK end. This success was attributed to the exceptionally low angle of radiation. Subsequent results from the same locality included 13 contacts with North America on 21 and 28MHz within a total of two hours operating time. This site was one of several exceptions to the general rule, being within a few minutes walk of a car-park, which was fortunate as the "portable" rig then consisted of a lot of experimental units, mounted outboard from a heavy box full of run-down batteries!

After rebuilding, the rig was reduced to a volume of 8½in × 5in × 5in, and powered by silver-zinc accumulators providing 18-20V at 1·5Ah, the output being increased thereby to 1W from a 2N3553. The total weight was 8·5lb, but this was before the SL600 series became available. Rather bulky home-brew crystal filters were used, and several additional batteries were needed because of incompatibility of the supply requirements of different units, so that plenty of scope remained for further reduction of size and weight. There is no doubt that a truly pocket-sized version of this rig could now be achieved. Results included a successful daily sked with VK2NN and VK3IP as well as other VK contacts from several locations in the Isle of Mull. This was preceded by a week-end of rehearsal in the Lake District, which included pitching camp at dusk on Bootle Fell and (in the process) getting lost in the mist! A reasonable contact followed with W8 but results next morning were disappointing, signals, though audible, being reported as barely readable by VK3IP and VK2AGW.

After this the scene of activities shifted to VK and ZL, where the om and xyl were engaged in a six month camping tour in celebration of retirement. Due to other priorities a new portable rig project had to be abandoned unfinished and disembarkation took place at Hobart with a hastily-contrived monstrosity weighing all of 12lb and consisting mainly of transistorized modules originally intended for the main rig, plus a new mixer-amplifier unit with a BD123 final. Unfortunately the silver-zinc battery had to be left behind. The power supply problem was never satisfactorily solved, and it was necessary to be content with about 1·5W peak output although double this had been obtained on earlier tests. After collecting a hired car and the callsign VK7LM, the first priority was exploration of bits of VK and the rig was exercised only three times in four weeks. The most satisfying of these experiences was provided by contemplation of a 20ft "mast" after a morning spent searching

* 1 Stoner Hill House, Froxfield, Petersfield, Hants.

for driftwood among rocks on the north coast of Tasmania. Constructed of many bits, it leaned outwards from a steep slope towards the sea some 150ft below; held back by two guy wires attached to a rock face, it supported the centre of an inverted-V dipole for 14MHz. The location faced towards Europe (long path) and was as perfect as one could imagine being marred only by an occasional hissing noise, arousing the OM's latent fear of snakes! Almost at once OH4RF came back with an RS45 report and this was followed by a half-hour ragchew with LA5KG who reported signals RS57.

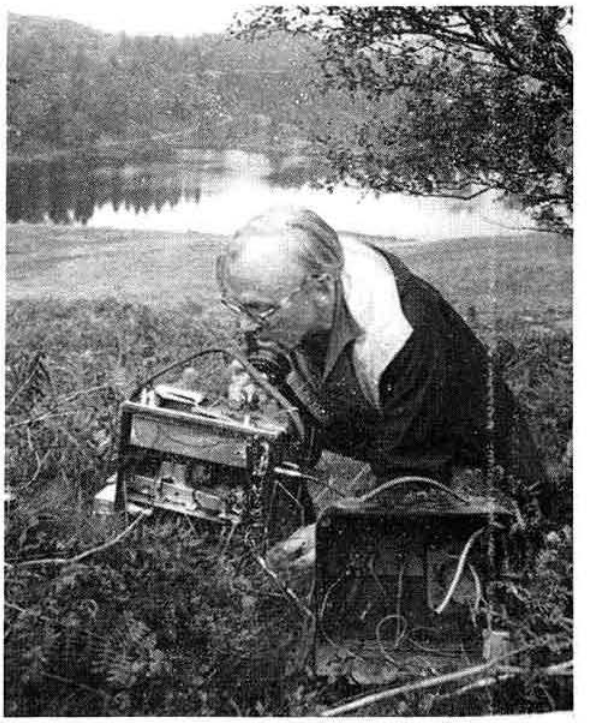
The fifth and last week in VK was spent with friends on a farm near Sydney surrounded by a wonderful selection of steep slopes, and saw much portable activity, starting, it must be confessed, with four days of frustration interrupted only by an assisted QSO with G3DDN, who had previously been worked from VK7, and a JA who was beaming long-path to Europe and seemed slightly annoyed. After moving to a new position with a railway cutting apparently acting as a "horn radiator", 15 long-path European contacts were obtained in two days with reports up to RS57.

Some operation also took place with borrowed aerials—including a report of RS51 from W2GO, using the large rhombic at VK3ATN!

During five months in New Zealand with the callsign ZL1BJF, activity was restricted mainly to contacts with VK from camp sites or roadsides, the only serious attempts to work dx being made from Queenstown and Stewart Island (ZL4), though a good "flat" location in ZL2 produced marginal contacts with G and EA, and JAs were worked on a few occasions. At the best location (Stewart Island) the centre of the dipole was pushed out horizontally 12ft from the top of a steep wooded slope dropping down about 100ft to the sea; in two days of operation, contacts included G8PO, G3BUU (twice), G3IAD, G2AMG, G5FH, OK2RZ and SM5BLH, the best report being S8 and the worst S4. There was also an incomplete contact with I1LCL, and G3YNC, who was apparently using only a dipole at 25ft, got the "BJ" of the call! A move was made two days later to a much more impressive-looking location, which produced only a negative result despite help from a VK. On the other hand a north-facing location produced embarrassing results on 21MHz in the form of a pile-up of JA stations with which it proved impossible to cope, owing to difficulties on the receiving side not previously checked on this band! Prior to complete breakdown, four reports were obtained, all S7 to S8.

Aerial systems

If the above results are considered unusual, this can probably be attributed in part to the "ground-plane myth". The ground-plane is normally considered mandatory for portable work, whereas, in fact, in most situations it is virtually useless with very low power. For short distance sky-wave working it produces insufficient high-angle radiation, and for dx it is necessary to exploit the wave reflected from the foreground. With any vertical aerial erected over sloping ground the image is tilted back towards a horizontal end-on situation so that it makes no useful contribution. A vertical aerial on a cliff top or suspended over the sea should, however, be useable for dx and, theoretically, about equal to a horizontal aerial over sloping ground without any distant reflecting plane. This was tried out during the Mull expedition, a cliff-top vertical being compared with an inverted-V some two minutes walk down an adjoining slope, the rig being carried backwards and forwards from one to the other while in contact with VK2NN, who reported the signal strength as S5 for the vertical and S6 for the inverted-V. Though not conclusive, this was consistent with the additional 6dB gain to be expected from exploitation of both reflections [1] [3].



G6XN/P at Tarn Hows in QSO with WA4GHH, showing details of portable Mark II

Some doubt has been cast on the suitability of the inverted-V on account of the strong vertically-polarized ground-wave signal radiated off the end. In free space, for a 90° apex angle, the field strength in this mode is only about 9dB down on the forward field but it involves considerable directivity since the two halves of the dipole constitute a kind of "vertical 8JK". This means that the energy loss is only 0·2dB, but the radiation resistance in this case is only half that of a normal dipole and the apex angle should therefore be as large as conveniently possible. Generally the inverted-V is so much easier to erect, for a given effective height, that there is no sensible alternative to it for this application.

The same 10·5m length of 20swg copper was used for nearly all the tests described, the ends being attached, with no other insulation, to long lengths of thin (ML1) polythene line and strung out to points as far away and as high as conveniently possible; sometimes these were only tufts of grass, though tent pegs would have been more secure. For the higher frequencies the wire was merely doubled back to the right length, looped and loosely twisted. Reflectors were not used but the really keen experimenter will want to try at least a two-element beam. This exacts a high price in terms of convenience, however, particularly as the wire size needs increasing on account of the lower radiation resistance. (It is hoped sometime to try a full-wave dipole with a pair of

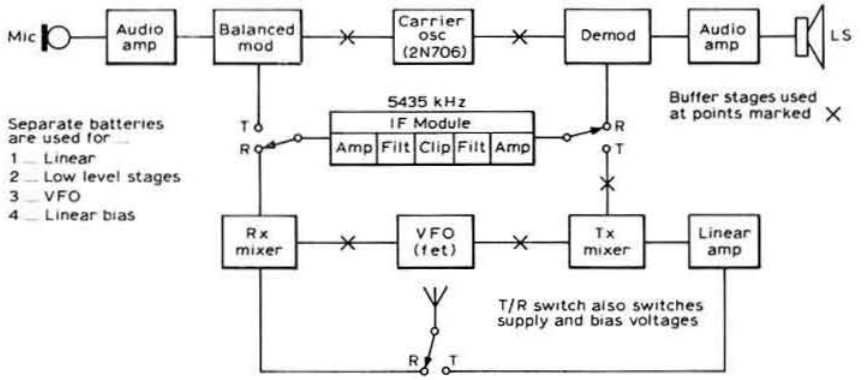


Fig 1. Block schematic of portable transceivers

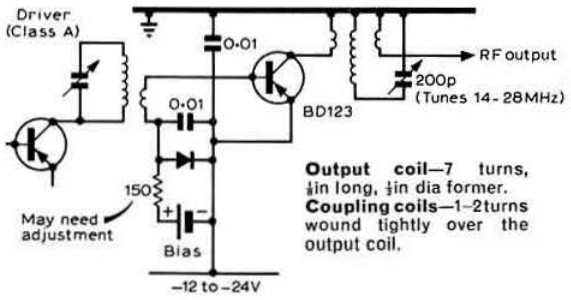
reflectors, $\lambda/4$ spacing, 16swg, and all four centres supported, estimated gain 7-8dB). Light-duty coaxial feeder was used, without a balun, and in the light of recent experience (in another context) it is thought that some failures may have been attributable to this.

Technical problems

All the rigs used have conformed to the block diagram of Fig 1 but most of the detailed circuitry is now regarded as obsolete. A much-improved exciter, based mainly on SL201 and SL600 series microcircuits is now in use on the main rig and intended also for the portable Mark IV, but the rest of this is still at the planning stage. The CA3020A integrated circuit has been tried as suggested in *Technical Topics* [4] and found to give 0·5W output on 14-28MHz with decreasing, though still considerable, gain, and it should be possible to drive it with the output of an SL640 mixer. This could be followed if required by a BD123 linear giving up to 3W or more of rf output. (The cheaper BD121 should be equally good but still awaits test).

RF speech-clipping has been used throughout [5] though performance with the portable circuitry was inferior to that with the latest exciter, and interested readers are referred to the discussion in *Technical Topics*, March 1972. RF clipping, properly implemented, should provide at least 4dB improvement in *average efficiency of the linear* compared with conventional rigs operating under "average" conditions, and is strongly advised. But the would-be portable dxer should not be discouraged by this from "having a go" with a simpler modulation system—he would, however, probably be wise to aim for at least 3W p.e.p., or be possessed of considerable patience.

Much the worst problems were those presented by the vfo in the form of frequency drift with transistor temperature and voltage, and change of frequency between transmit and receive positions however many buffer stages were used. It was found possible to compensate the latter effect more or less, but the only real cure was harmonic operation of the vfo as used from Mark II onwards. Frequency drift problems, though much aggravated by portable operation, were cured completely by changing from bipolar to field-effect transistors. Working with an i.f. of 5,435kHz, a 4·4MHz oscillator was used, doubling to 8·8MHz. This was further doubled or trebled for 21 or 28MHz, pushing the oscillator frequency down to about 3·9MHz with dust cores to avoid the use of switches which are bulky and tend to cause frequency instability.



Transmitter line-up

Rig	Mixer	Buffer	Linear	RF output (watts)
Mk I	2 × 2N706	2N706	2N3053 (2N3553)	0·5 to 1
Mk II	2 × 2N706	2N706	2N3553	1
Mk III	2 × 2N706	BD123	BD123	1 to 3
Future plans	SL640	CA3020 for QRP output or buffer	BD121 + optional 3 × BD121 for QRO	1 to 3 10?

Fig 2. Preferred circuit for output stage (used only for Mk III). Please note that the BD123 transistor should be shown as npn

Biasing the linear was also a problem, due to the stable voltage required, large base current, and non-existence of 0·7V batteries or Zener diodes! Initially a 1·5V cell was used with a low-resistance potential divider, but replacement of one resistance by an ordinary forward-conducting diode (Fig 2) was found to produce much better stabilization with less drain on the bias battery. TVI (yes, even with 1W!) was cured by a high-Q output circuit as shown, very tight coupling being required between all three coils.

On the receiving side a pair of field-effect transistors was used in push-pull as the front-end mixer which was preceded by a coupled pair of tuned circuits. Another pair was used as a product detector, the low level of lf noise from an fet allowing most of the gain to be obtained at lf. This eased many problems of rf and i.f. circuit design and transmit/receive switching. Useful sensitivity was limited at all times by external noise and an rf stage would have served only to aggravate intermodulation interference, etc. It is planned to retain these features in Mark IV, though the use of SL600 modules as described in the recent series of articles would be simpler and should provide adequate performance.

Power supplies present a major problem, dry batteries being heavy, and expensive if much activity is contemplated. VK7LM/P operation totalled some 30 hours with 40 contacts and "cost", in effect, about three 6V lantern batteries, much of the drain being accounted for by many fruitless calls from the "dud" location near Sydney. Silver-zinc accumulators provide the best power-to-weight ratio, typically about 30Wh/lb, but are initially expensive and easily damaged by overcharging or neglect; they are, however, capable of high discharge rates, and appear to provide the best answer if real portability is required. In the interests of economy the rig should be designed for the lowest possible operating voltage, probably about 10-12V, and the latest specification for G6XN/P aims at an output of at least 2W rf using six silver-zinc cells when a long portage is required and 10W using a 12V lead-acid accumulator for short portages.

Discussion

DX was nearly always workable with powers of 1-2W and a simple aerial from steeply sloping sites, but rarely from camp sites or other flat places; though experience at home, and with borrowed aerials in the course of our travels, has proved that QRP dx is equally feasible with a good aerial at a height of 40-50ft in an average location. The advantage of "special" sites appears to lie mainly in the possibility of dispensing with the 50ft tower carrying a TH6! As discussed in [1], this result is consistent with theory, on the basis of the double ground reflections obtainable from sloping sites.

Surprise is often expressed by stations worked 14,000, or even 3,000 miles away when told the power is only 1W or so, yet reports of S9 + 10dB when using 100W are accepted as commonplace, and these should (and often do) translate into a report of at least S6 with 1W, given a clear channel. Difficulties arise mainly because when conditions are as good as this, there is usually a lot of competition. Sometimes, as noted earlier, this competition may be thinned out by conditions which strongly favour very low angles of radiation, but this appears to be not too frequent an occurrence.

The "sloping site" rule noted above provides only very broad general guide lines, within which some sites may be found surprisingly bad, and others equally surprisingly good. The first location tried in VK7 had a rather gentle slope and was used only as a last resort yet it produced three G contacts in half-an-hour, with reports from S3 to S7, despite an aerial height of only 24ft. A feature common to most of the bad sites was a tendency for the contours to be convex rather than plane or concave but the importance of this has not been established conclusively.

It had been thought that a height of at least 17ft should be aimed at, even above a very steep slope, but some of the best results were obtained with even lower heights and, whereas plenty of height is always needed with a flat unobstructed site, 10ft or so is often adequate in other cases.

It is suspected, though so far without proof, that the ground-reflected wave may often be broken up or intercepted by obstructions [1], so that the usual destructive interference at low angles fails to take place, and in this case also height could possibly be a disadvantage. It is feared, on the basis of "main rig" results during previous sunspot cycles, that the G/VK long-path results described above may be difficult to repeat during the sunspot minimum years but G–ZS, G–W and probably also G–VK short-path contacts should present no serious difficulty.

References

[1] L. A. Moxon, "Low-Angle Radiation", *Wireless World*, April 1970.

[2] Technical Topics, *Radio Communication*, November 1970, p 763.

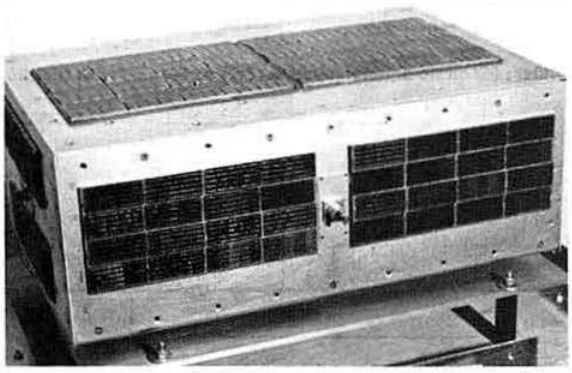
[3] K. A. Norton and A. C. Omberg, "The Maximum Range of a Radar Set", *Proc IRE*, Vol 35, p 17, 1947.

[4] Technical Topics, *Radio Communication*, June 1969, p 394.

[5] L. A. Moxon, "RF Speech Clipping", *Ham Radio*, November/December 1972.

OSCAR 6

Oscar 6 photographed before its launch on 15 October. A number of successful transatlantic contracts have already been made through the 2m to 10m translator.



Product Information

Nip Electronics announce the expansion of their range of basic etched printed circuit boards. A new range includes boards suitable for edge contacts, drilled or undrilled glass fibre boards and facilities for the mounting of both integrated circuits and discrete components. The Nip-E-system provides a range of basic printed circuit boards which the user adopts to the required circuitry. Various patterns and mounting methods are available and the varying sizes can accommodate up to 26 transistors or eight integrated circuits with 16 transistors.

All components in the Nip-E-system can be obtained through trade distributors and retail outlets in the UK. A free brochure is available from Nip Electronics, PO Box 11, Beaconsfield Road, St Albans, Herts.

Using the Plessey SL600 series integrated circuits in transceivers

by J. M. BRYANT, G8FNT, linear applications engineer, Plessey Semiconductors

Part 2

Other systems

SL600 devices may also be used in various other parts of transceivers. Some examples are shown in Fig 7.

Mixer vfo

Fig 7(a) shows a mixer vfo which mixes the output of an lf vfo with a crystal-derived frequency to produce a stable hf vfo. In a multi-band receiver several crystals may be used to tune several bands with one vfo.

Carrier alc

Fig 7(b) is an agc system designed to stabilize the amplitude of an rf carrier.

Linear amplifier

A low power, but simple, linear amplifier is shown in Fig 7(c). The emitter resistor depends on the transistor used.

Squelch

If audio squelch is required in a receiver, the system in Fig 7(d) will provide it. If pin 7 of an SL630 audio amplifier is earthed, the circuit is muted—the circuit illustrated, when on, ensures that the SL630 is muted until the agc reaches a preset level. This prevents unwanted receiver noise when no station is being received. The agc may be derived from an SL621, an SL623 or other sources. Any high-beta silicon npn transistors are suitable—an SL301 monolithic dual transistor is illustrated.

VOX

Similarly a vox (voice operated transmitter) system may be added to a transceiver using the SL622 as its microphone amplifier. A possible circuit is shown in Fig 7(e), it consists of an operational amplifier which is switched by the agc voltage of the SL622 and in turn switches the transmit/receive relay of the transceiver. The transistor can be any high gain silicon type which can carry the relay current—a Darlington arrangement must be used to ensure that the relay turns off again as the minimum output of the operational amplifier can sometimes be greater than 0·7V above the negative line.

Using the circuits

Fig 8 is the circuit diagram of the receiver in Fig 2(b). The simplest way of explaining the use of the SL600 family is to describe the circuit and its operation in detail.

The input filter depends on the band being tuned and the i.f. It must be sufficiently narrow to give rejection at the image frequency, ie that frequency on the other side of the local oscillator from the wanted frequency, and spaced the same amount from it. If such a frequency passes the input and mixes with the local oscillator it will produce an unwanted output at i.f. The method of coupling is chosen so that the SL610 input is never inductively terminated and also so that the tuned circuit is not loaded enough to reduce its Q.

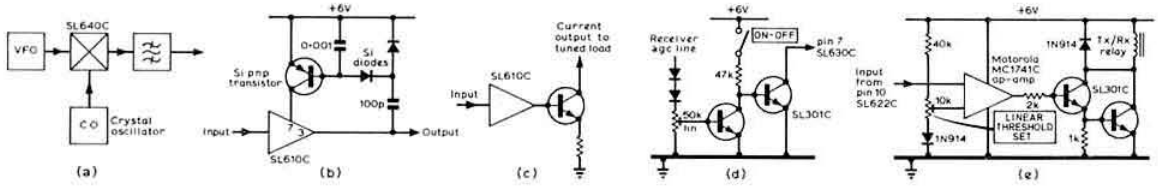


Fig 7. (a) Mixer vfo; (b) carrier agc system; (c) low power linear amplifier; (d) audio squelch system; (e) vox for use with SL622C

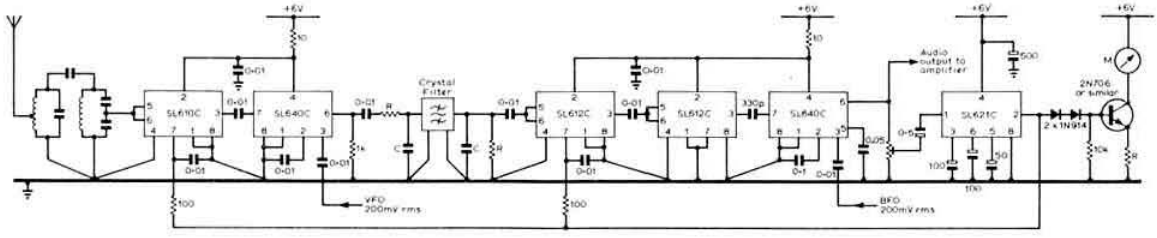


Fig 8. Circuit diagram of ssb receiver

If an SL610 input looks inductive, instability is possible. When an SL610 is driven from a source which might be inductive, the source should either be shunted with a few kilohms, or a few hundred ohms should be connected in series with the input. The SL610 is biased (as are all the other rf and i.f. amplifiers in this transceiver) by connecting its bias pin directly to its input pin. If coupling is made to an SL610, 11 or 12 as in Fig 9(a), slightly lower noise will result but this is not usually worth the extra complication. It is important that the input and output earths of these devices are kept separate—output currents flowing in input earth leads tend to produce instability.

Both the agc line and the SL610 positive supply (which is shared with the SL640 mixer) are decoupled to earth. Ideally this is not necessary but rf on ht and agc lines can cause trouble with some layouts (the SL640 supply is not internally decoupled although the SL610 is) and where expense does not rule it out it is recommended. To minimize the output current loop of the SL610 the earth of the SL640 should be as near as possible to the output earth (pin 8) of the SL610.

The SL640 acts as the first mixer and its output drives the input of the filter. The filter must be terminated by the correct impedance (pure resistance or resistance shunted by capacitance) and if the resistive component is low enough the SL641 may be used in one of the circuits in Fig 9(b). This is the case wherever SL640s are used: they may be replaced by SL641s in certain circumstances. When output pin 6 of the SL640 is used, an external load of greater than 560Ω is required. This output is an emitter-follower of low output impedance and must not be used to drive capacitive loads. Some filters have wound inputs with low (<10Ω) dc resistance to earth. In this case the terminating resistor, as long as it is over 560Ω, may also act as the load resistor, it should be connected directly between pin 6 and the input of the filter—the earthy side of the filter input must be connected to 0V.

Pin 2 of the SL640 or SL641 must be decoupled to earth by a low-leakage (<100nA) capacitor having low reactance (<10Ω) at the lowest input or carrier frequency. Carrier input from the local oscillator should be as free from modulation as possible and between 100 and 200mV rms in amplitude.

The broadband i.f. amplifier following the filter consists of two SL612s, agc being applied to one only. The SL610 has a 50dB agc range, and the SL612 70dB, giving a total for two gain-controlled stages of 120dB. If both SL612s were controlled as well as the SL610 this would be 190dB—too much.

The positive supply to the i.f. stages and the SL640 detector is decoupled and care must be taken that earth current from the output of the strip cannot flow near its input as this leads to instability. The best earth arrangement for the i.f. strip is given in Fig 9(c). No other connections should be made to the i.f. strip earth.

The filter must be correctly terminated at its output. The input of an SL612 is approximately 5kΩ and 4pF, if necessary this should be shunted (at ac only) by other resistors and capacitors to make the correct terminating impedance.

When agc is applied to an SL612, its dc output potential moves. This lf signal, if fed to the detector, will produce a change in output which, in turn, can produce agc from the SL621 and thus vlf instability or motor-boating. To prevent this, the coupling capacitor between the last SL612 and the SL640 should be as small as possible—about 330pF is usual if the i.f. is over 1MHz. Alternatively a tuned circuit at this point prevents the trouble and also reduces noise produced in the broadband stages.

The output of the SL640 detector is decoupled to ground at frequencies above 4kHz by a 0·05μF capacitor on pin 5, and the load on pin 6 is a 1kΩ preset pot. The audio output to

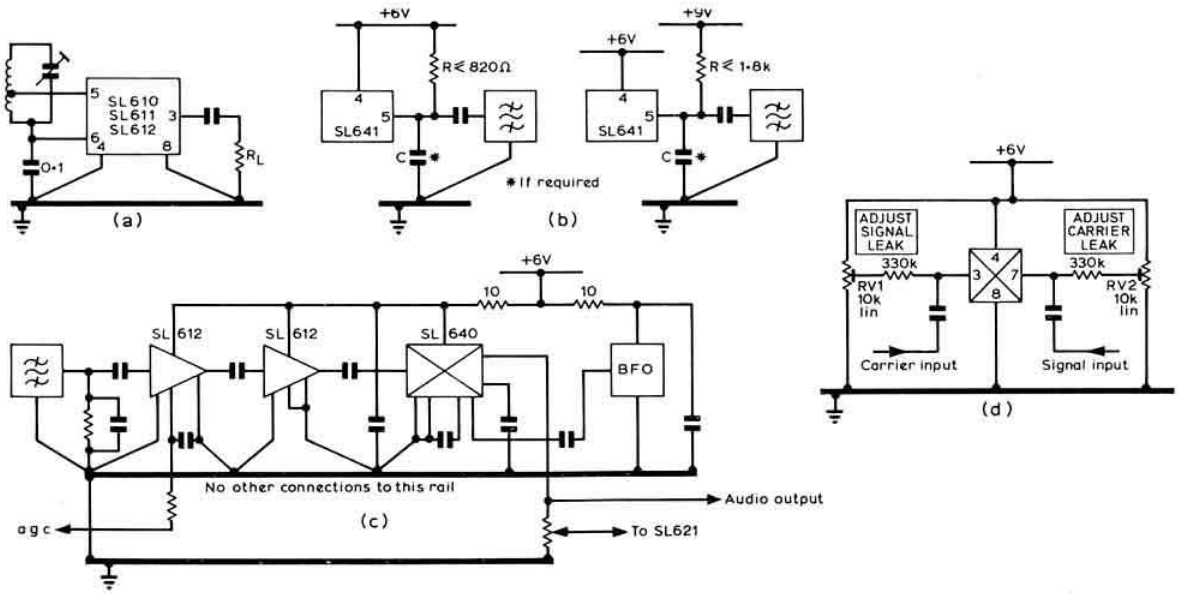


Fig 9. (a) Low noise coupling to SL610, 11 or 12; (b) matching SL641 to filters; (c) i.f. strip earth layout; (d) signal and carrier leak adjustment

the amplifier is taken directly from pin 6 but the audio for the SL621 agc stage is taken from the potentiometer wiper. This enables the agc threshold to be adjusted so that noise in the set and aerial does not turn on the agc in the absence of signal. The coupling capacitor to the SL621 should not exceed 1μF, otherwise lf instability can result.

The SL621 will usually drive a 500μA S-meter connected (in series with 5·1kΩ and three silicon diodes) from the agc rail to earth, but as such a load is sometimes too much for an SL621, the transistor circuit shown is preferable. The value of the emitter resistor depends on the meter used and is given by the formula

$$R = \frac{2{\cdot}7}{I}$$

where I is the meter fsd current in milliamps, and R is in kilohms. The S-meter reads linearly in decibels—from zero to full scale is about 120dB.

The supply to the SL621 must be well decoupled at lf—500μF is usually sufficient but if the audio output stage shares the same power supply this should be increased. If a series-stabilized supply is used it should have a source impedance of less than 1Ω.

The audio output stage may be an SL630, an SL402, an SL403 or any other suitable amplifier. If the SL630 is used, its supply should be decoupled at rf and the frequency response limited as detailed in the SL630 application note.

When the SL600 circuits are used in a transmitter or transceiver they are used much as above. One or two additional points may be noted:

As transmitters often contain large rf fields, particular attention must be paid to screening and decoupling. It may in some cases be necessary to decouple individual stages.

When generating ssb or mixing frequencies in a transmitter, the original input frequencies are not wanted in the output. The SL640 and 641 have some 30dB signal and carrier rejection, but this may be increased with the circuit in Fig 9(d). With signal and carrier, RV1 is adjusted for minimum signal leak, and with carrier but no signal, RV2 is adjusted for minimum carrier leak. All modulators used in transmitters may be adjusted in this way although it is less important in filter systems than in phasing systems.

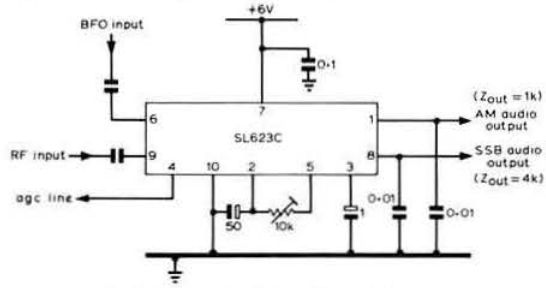


Fig 10. Suggested circuit for SL623C

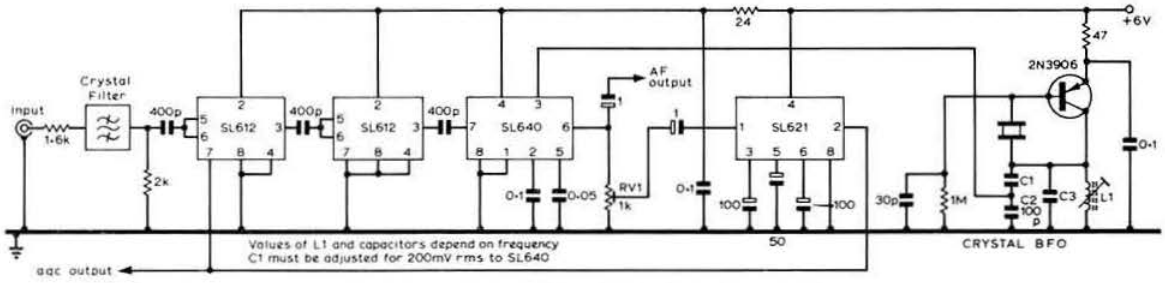


Fig 11. Circuit of 10·7MHz i.f. strip ssb detector and voice agc

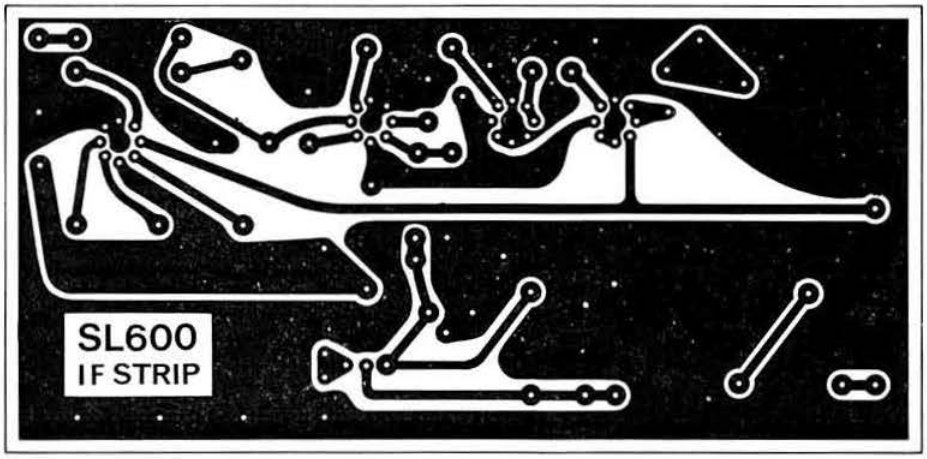


Fig 12. Printed circuit layout (track side) of Fig 11

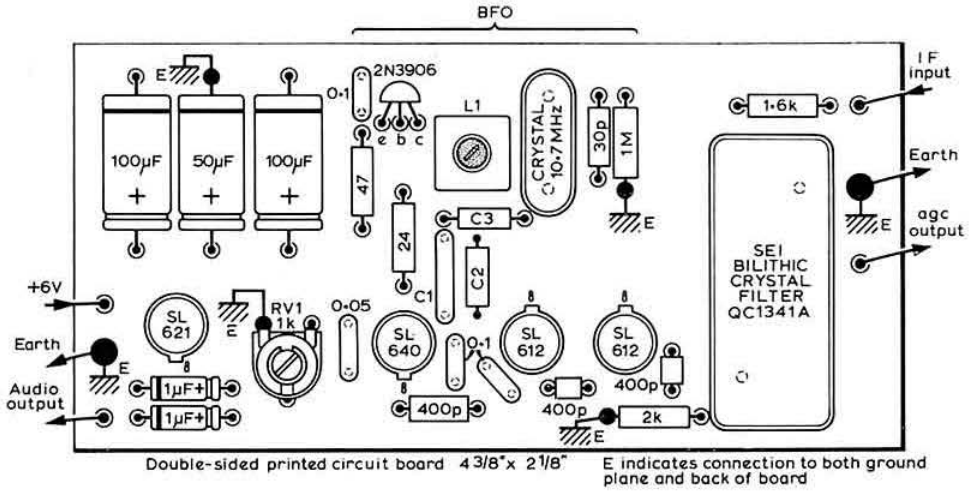


Fig 13. Assembled board (component side)

The agc characteristics of the SL610, 611 and 612 are temperature dependent. It is unwise to use a voltage on an agc pin to set the gain of a stage (although it may be done where agc is applied to another stage in the chain to compensate for variations).

SL610s, 611s and 612s tend to oscillate if required to drive capacitive loads. Such loads should be buffered either by a resistance (SL610, 611—47Ω; SL612—150Ω) or another type of amplifier. When rf is taken from these SL600 amplifiers to points far removed from them, care is essential to prevent instability caused by earth loop currents.

Using the SL623

Special mention must be made of the SL623, as it is not used in ssb receivers but only on a.m./ssb hybrid receivers. A typical application of the SL623 is shown in Fig 10. The agc from this circuit is cw derived and if audio agc is required during ssb reception, the SL621 should be used.

All the decoupling capacitors should go to one point and the positive supply should be decoupled. The circuit is as sensitive to ssb as an SL640 but requires 125mV rms of a.m. to activate the agc—thus greater i.f. gain may be necessary. Despite statements to the contrary in the provisional data sheet this circuit functions to at least 30MHz and, with reduced performance, to over 120MHz.

The resistor between pins 2 and 5 sets the value of carrier at which agc commences.

The bfo should have a clean sine wave at about 100mV rms.

Other devices

The other members of the SL600 family are the SL620, 622 and 630. The SL630 is an audio amplifier with voltage-controlled gain and up to 75mW (at 6V) or 200mW (at 12V) output. Used with the SL620, which is similar to the SL621, it forms an audio agc system. The SL622 is a self-contained audio agc system with an additional side-tone output which is not agc controlled.

These circuits are intended to be compatible with the rest of the SL600 series, use the same power supplies and, like them, are in TO5 packages.

Conclusion

This article has described how the Plessey SL600 series circuits can be used in hf transmitters, receivers and transceivers. It can be seen that, with the exception of oscillators and power amplifiers, hf transceivers can be built using SL600 devices for all functions. VHF and uhf sets can be built with SL600 devices in all but the rf and mixer stages. These devices make the design of a.m. and ssb transceivers extremely simple and their setting-up trivial.

The RSGB News Bulletin Service

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Time	Frequency (MHz)	Location and coverage (hf) or beam heading (vhf) of station
0930	3.6	Bromley, Kent (SE England)
1000	3·6	Cheltenham (SW England)
	145·8	Aberdeen (NNW)
	145·095	Farnham, Surrey (NE)
1015	3·6	Belfast (N. Ireland)
	145·8	Bangor, Co Down (N)
1030	3·6	Derby (N. Midlands)
	144·337	Weston-super-Mare (NW)
	145·8	Aberdeen (SW)
	145·89	Bishop Auckland (N)
	145·3	Sutton Coldfield (NW)
1045	145·89	Bishop Auckland (E)
	145·095	Farnham, Surrey (SW)
1100	3·6	Bridlington (NE England)
	144·3	Sutton Coldfield (SW)
1130	3·6	Motherwell (S Central Scotland)
	145·5	Bradford (NE)
1200	145·5	Bradford (SE)
	3·6	Aberdeen (NE Scotland)

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Practical braid-breakers using stock materials

by IAN JACKSON, G3OHX*

IT is widely known that the braid of a tv coaxial feeder can act as an aerial for strong local amateur (and other) signals, especially on the lower frequency bands. These braid currents can cause tvi. In addition, however, it is less often realised that the interference picked up on the braiding may be transferred to the inner conductor, causing tvi which can be cured by a conventional filter.

This article describes three ways in which tvi can occur because of braid pick-up, how a braid-breaker will cure it (even if it is entering the tv via the inner conductor), and how high-performance braid-breakers may be made from materials often found in the junk-box, or readily available at the local tv shop.

How tvi occurs

Mechanism 1—Interference directly due to braid current

In the days of the valve, and metal chassis, tvi generated in the tv set could normally be cured by rejecting the fundamental of the interfering signal flowing down the tv coaxial inner conductor. Braid currents were drained efficiently into the earthy mains via the low impedance chassis and the valves were relatively insensitive to any small voltages produced.

With the advent of transistors and chassis-less construction, braid currents can now return to earth only by flowing through a relatively high impedance printed circuit. Substantial voltages may be produced across ostensibly equipotential points, and transistors are more susceptible to these than were valves. The result is that the tv set responds to the fundamental of the interfering signal. 160m and 80m signals can cause direct interference (being within the video passband). Non-linearities cause the generation of harmonics, cross-modulation and detection.

Figs 1 and 2 show typical circuits of tv set aerial isolating networks. The capacitors present little impedance to low frequency currents as, for example, 470pF is only about 160Ω at 2MHz, and progressively less at higher frequencies. Particularly troublesome are cases where tv aerial, feeder, isolating network and mains connection represent an electrical quarter-wave (or odd multiples thereof) at the interfering frequency. This is often the case at 7MHz where resonance will occur with a length slightly longer than 33ft (due to the reactance of the isolating capacitors). Such is typical of many domestic installations. Figs 3 and 4 show the physical and electrical situations. Whether resonance occurs or not, large amounts of unwanted rf energy can be fed into a tv set operated in close proximity to an amateur station.

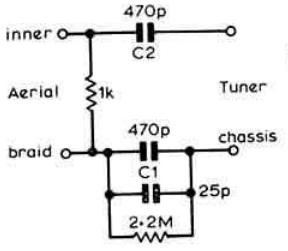


Fig 1. VHF tv aerial isolation network

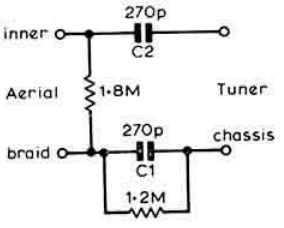


Fig 2. UHF tv aerial isolation network

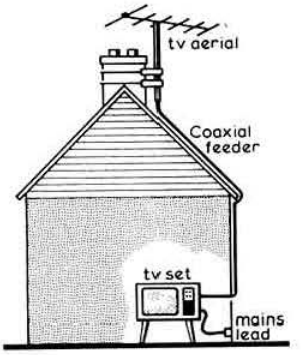


Fig 3. Typical domestic tv installation

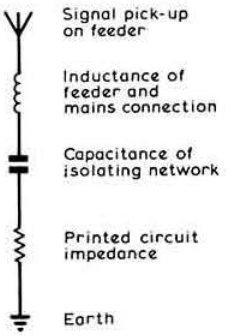


Fig 4. How Fig 3 acts electrically

Mechanism 2—Interference due to poor braid connection to the tv chassis

Consider the effect if the braid were not connected at all to the tv set. The coaxial inner would then act as a completely unscreened long-wire aerial.

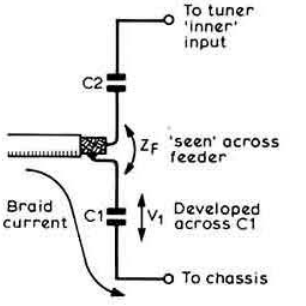


Fig 5. V1 is produced by the braid current flowing through C1. It is transferred via Z_f to the coaxial cable inner, and thence via C2 to the tuner input

This is rarely the situation which exists in a tv installation (at least, not intentionally!), but as the braid isolation capacitors (C1) of Figs 1 and 2 do have *some* impedance

* "High Legh", Chalfont Road, Seer Green, Beaconsfield, Bucks.

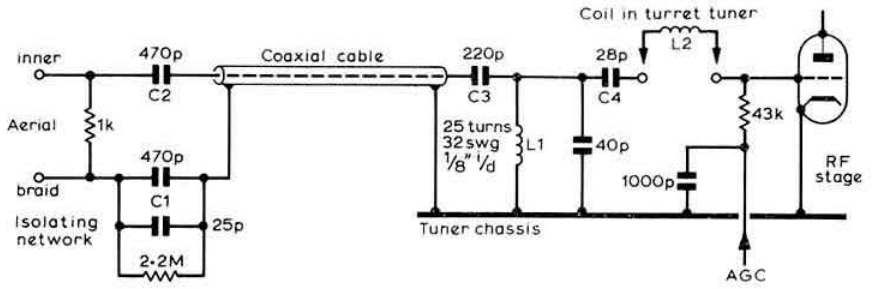


Fig 6. Aerial isolation network and input circuit of a typical older style tv set (BRC type 850). C3 and L1 form a simple hpf rolling off below 40MHz. However, the interfering current in the inner flows through C2, C3 and to the chassis via L1, across which a substantial voltage can be produced and fed to the grid of the rf stage via C4 and L2

at the interfering frequency, the screening effect of the braid is less than perfect. Some voltage can be developed on the braid, ie that produced by the braid current flowing through the impedance of C1, and this voltage can be transferred to the inner via the impedance "seen" across the coaxial cable. (Fig 5). This interfering signal is then fed to the input of the tv rf stage, shown in Fig 6, but its path may be blocked by the use of a conventional hpf or trap.

Mechanism 3— Interference when the braid is not an efficient screen

Consider a quarter-wave folded monopole, as shown in Fig 7. Amateurs often use 300Ω twin feeder for the aerial material. If the top were open-circuited, the current distribution would be the same, but the feed point impedance much lower. A tv aerial installation is similar to this aerial, the tv one usually presenting an open or short circuit at the interfering amateur frequency and the braid being the "earthed" conductor.

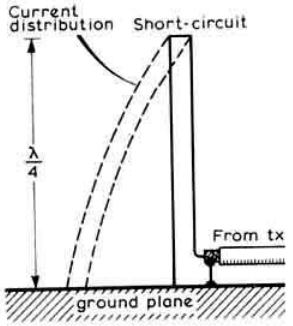


Fig 7. Current distribution in a quarter-wave folded monopole

If the coaxial braid is a good screen, braid currents will be confined by skin effect to the outside of the braid. Thus the inside of the braid is dead and the inner conductor is effectively screened from the braid current. However, the braid current may penetrate to the inside at low frequencies and when the braid itself is very thin, so that the inside is no longer dead. The screening effect is further reduced if the braid is loose with many gaps between the strands of wire.

It is very unlikely that the screening could ever be so poor as to allow the coaxial cable to respond as well as the monopole described. However, although the length may not be a quarter-wave, nor the earth connection as good as to a ground plane, it is possible that occasionally tvi may be due to this effect.

As with Mechanism 2, a conventional filter will cure this form of interference.

While these three mechanisms have been described separately, it will be appreciated that, in practice, all may occur simultaneously in varying degrees.

How the braid-breaker works

The braid-breaker effectively disconnects the feeder—both braid and inner—from direct connection to the tv set at the interfering frequency, leaving the feeder "floating". The set is obliged to respond only to the antiphase currents which are delivered from the aerial via the feeder. In most situations the pick-up of interference on the aerial is small, except where the tv aerial is of significant size compared with the interfering wavelength, eg where Channel 1 (45MHz) is being received in the presence of a 28MHz amateur signal. However, braid pick-up troubles are mainly a problem on the lower frequency amateur bands, ie 160m, 80m and 40m. Where aerial pick-up is a problem, a conventional filter may be used as a "back-up" to the braid-breaker, if this is already needed for the lower frequency bands.

It will be clear from the explanation that the name "braid-breaker" does not accurately—nor adequately—describe the electrical properties of these devices.

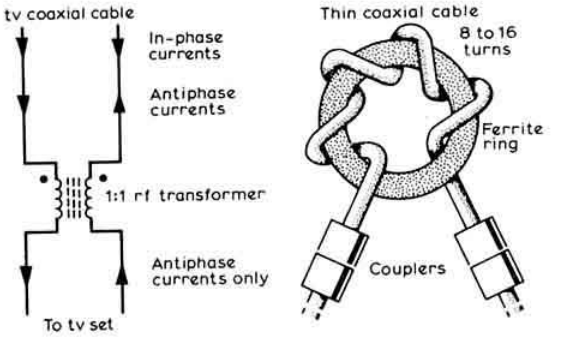


Fig 8. The tv feeder is made into a coaxial rf choke. In-phase currents are blocked while antiphase currents pass unhindered

Fig 8 shows one technique in the category of braid-breaker. The tv feeder is made to act as an rf choke to all but the aerial signals by winding it around a material of high magnetic permeability (conveniently on large diameter ferrite rings, such as Mullard type FX1588 or Neosid 4324R/1). The antiphase aerial signals are attenuated only by the extra length of thin coaxial cable required (about 1ft). This device is particularly suitable for uhf tv where the extremely small aerial means that the interfering antiphase currents will be correspondingly small.

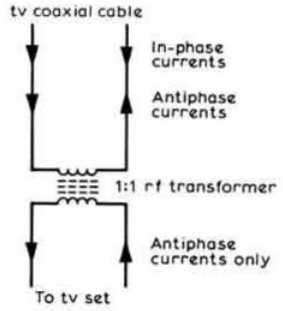


Fig 9. The use of a 1:1 rf transformer blocks in-phase currents. The windings are bifilar, ie wound using a twisted pair of wires to ensure close coupling and to reduce leakage inductance. Use four to six twists per inch, depending on the gauge of wire employed

Fig 9 illustrates another method. A 1 : 1 ratio rf transformer is interposed in the tv feeder. As the inter-winding capacitance is small, only antiphase signals are fed to the tv set. If this transformer is made carefully, using suitable materials as will be described, the loss should prove quite acceptable, even in areas of poor television reception. A certain amount of hpf action also takes place due to the fall of response below 40MHz, although some of the breakers do respond down to a fairly low frequency.

The losses of this transformer may be too great for use in weak uhf tv areas, especially at the hf end of Band 5 (high channel numbers). An alternative, and equally effective solution, is to use a simple balanced uhf hpf. This is virtually lossless, supresses in-phase currents at much lower frequencies, and is effective as a conventional filter to antiphase currents up to 2m. One objection raised to this device is that it may increase the risk of pick-up of the wanted tv signal on the feeder, and also of local interference on that frequency, because of the effect of Mechanism 2. However, no such troubles have so far been reported.

How to make them, and which materials to use

Excellent transformers covering the vhf tv spectrum (40–216MHz) can be made from purpose-made twin-hole balun cores which are, of course, designed for this sort of job. Some of the types which have been specified in earlier articles in *Radio Communication* are either obsolete or difficult for the average amateur to obtain. However, suitable core materials in other guises, the performance of which is often only marginally inferior, may be readily available. Performance can be improved considerably by using a twisted pair of wires to form a bifilar winding—by doing so the losses are greatly reduced. The wire can be anything from about 34swg enamelled copper to pvc covered flex, depending on the core size. After the core has been wound, the wire ends are untwisted and separated into primary and secondary windings.

The physical arrangement of how the breaker is mounted is really up to individual ingenuity. One suggestion is to mount the coaxial sockets on opposite sides of a short length of small diameter plastic tubing, as in Fig 10.

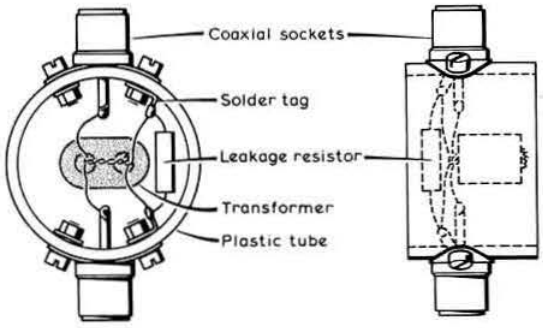


Fig 10. Suggested construction of a braid-breaker for vhf tv (40-216MHz)

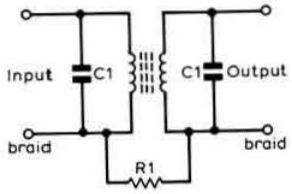
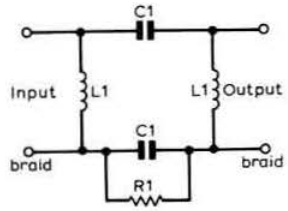


Fig 11. Circuit of vhf tv braid-breaker. The capacitors across the input and output may be added to reduce loss at 216MHz to an absolute minimum. Typical values are 0-4·7pF. R1 is about 1MΩ

The electrical circuit of all the transformer breakers is shown in Fig 11. The resistor, typically about 1MΩ, provides a leakage path to discharge static which would otherwise build up on the aerial (all tv isolating networks have them). The uhf tv filter is shown in Fig 12.

To prevent "suck-outs" (spurious notches) on the tv frequencies it is essential to keep capacitance across these circuits (input to output) to a minimum. For example, screening cans are not needed and may cause trouble, especially with the uhf filter. Avoid construction where the

Fig 12. Circuit of uhf tv braid-breaker. L1 is four turns 24swg ⅛in inside diameter. C1 is 5·6pF small disc or tubular. R1 is about 1MΩ. Physical construction must conform to good uhf practice to minimize loss, but values are not critical



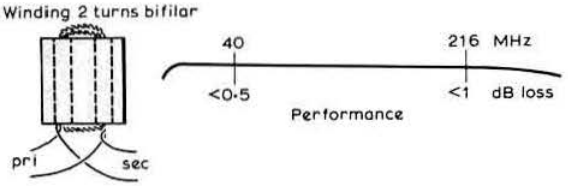


Fig 13. Purpose-made baluns, eg Neosid type 1050/1 or /2, material F14 (μ = 200); Mullard type FX2249, material B2 (μ = 200)

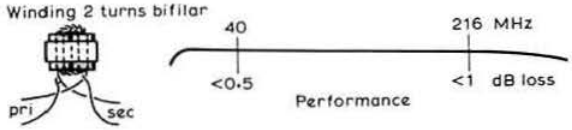


Fig 14. Pair of screening beads, the type commonly slipped onto heater, ht and other supply leads to increase their rf impedance, eg Neosid type 159 × 059 × 217/F14; Mullard type FX1242

input and output coaxial leads are made to run close together. All component leads should be of minimal length.

The information on the construction of several braid-breakers and their performances is contained in Figs 13 to 20. It may be worthwhile trying windings either through or around other similar shapes of ferrite or dust iron if they are at hand.

It cannot be guaranteed that the devices described here will definitely cure tvi, since the mechanism of the interference may be quite different—for example, direct pick-up in the tv circuitry. However, the interfering signal introduced via the aerial feeder is a common source of trouble on the lower frequency amateur bands.

If readers have any comments, ideas or enquiries on this or any other interference topic, they will be welcomed by the Interference Committee, c/o the General Manager, RSGB.

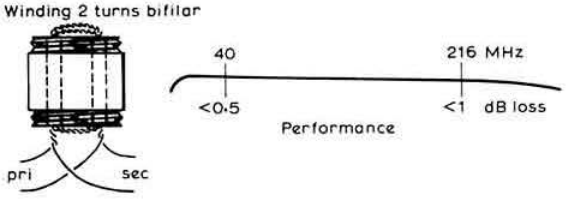


Fig 15. Pair of ferrite i.f. cores with hexagonal trimming holes, ferrite tubes of similar size etc

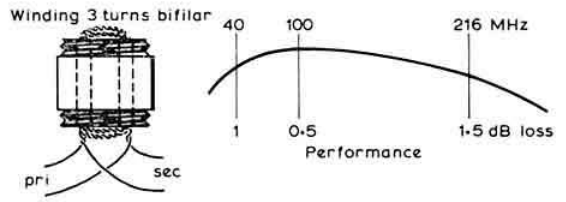


Fig 16. Pair of dust-iron cores with hexagonal trimming holes

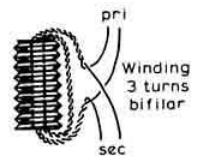


Fig 17. A single ferrite or dust-iron core, with a hexagonal trimming hole. Performance—up to 2dB more loss at 216MHz than with pairs of cores. (Note—dust-iron crumbles when touched with a hot iron, ferrite does not)

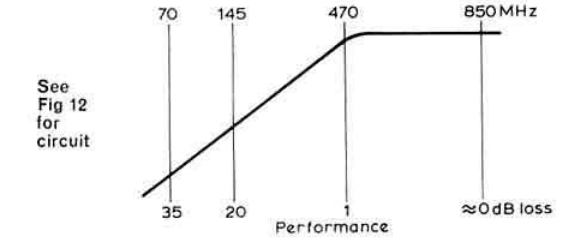


Fig 18. UHF tv filter (470 to 850MHz)

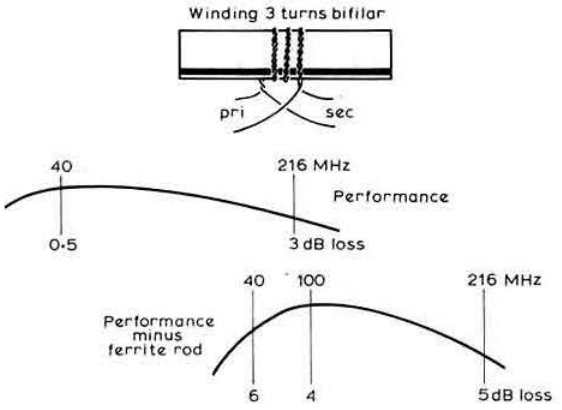


Fig 19. Transistor radio type ferrite rod, ⅜in or ½in diameter and at least 1in long

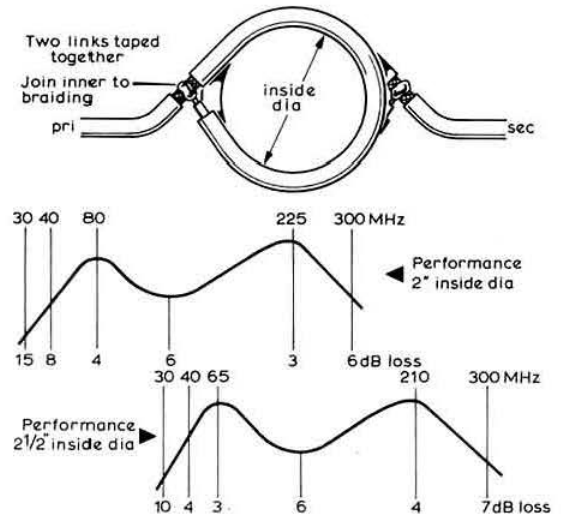


Fig 20. Faraday links

Acknowledgments

The author acknowledges technical discussions with D. M. Thomas, GW3RWX, and in addition, many hours of practical evaluation by J. Swayne, G3BLE, both fellow-members of the RSGB Interference Committee.

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Mrs K. Priestley, G3XIW, "Which Filter?", *Radio Communication* July 1969.

D. M. Thomas, GW3RWX, "Television Interference—its causes and remedies", *Radio Communication* October 1969.

I. Jackson, G3OHX, "High-Pass Filter for UHF TV" *Short Wave Magazine* June 1971.

Coils, capacitors & bandspread

by W. H. ALLEN, MBE, G2UJ

This article was written shortly before the author's death early in October and is published as a final and fitting tribute to one whose contributions to the technical pages of this journal will be greatly missed.

Over the years, Mr Allen's work in this field has been invaluable, not only for the many first-class articles which appeared under his by-line, but for the ready assistance he gave to authors whose articles he reviewed before publication.

THIS is a purely practical discussion on how to design a tuned circuit, to cover any desired band of frequencies, such as might be required when constructing a vfo. The design of a vfo itself will not be covered by this article. It is hoped that the very simple mathematics employed will not be discouraging to those whose school-days are some distance behind them.

Capacitors

The first point to remember is that when a variable capacitor is used in parallel with a coil, the frequency coverage is dependent upon the square root of the ratio of maximum to minimum capacitance. To make this clear, and to provide an aid to memory in this respect, consider a circuit to tune across the medium-wave broadcast band. The frequency limits to be considered are, in round figures, 500 to 1,500kHz, ie a frequency ratio of 1 : 3. The ratio of capacitance must, therefore, be 3^2 or 1 : 9. So if the minimum capacitance including strays, trimmer etc, is 50pF, then the maximum must be nine times that, or 450pF, giving a maximum capacitance across the coil (at 500kHz) of 450 + 50 or 500pF.

Most of the considerations here will be with higher frequencies where much smaller values of capacitance are necessary, so let us consider the tuning arrangements for a vfo which is to be used with a transmitter to cover the 3·5, 7, 14, 21 and 28MHz bands, in conjunction with suitable frequency multiplying stages.

The actual arrangement will be that shown in Fig 1. It will be seen that this leads, on all ranges except 3·5 to 3·8MHz, to some frequencies being generated which lie outside the 7, 14, 21 and 28MHz amateur bands. It will be necessary, therefore, for the tuning scale on the vfo to be so marked that the highest frequency permitted on each band is not exceeded.

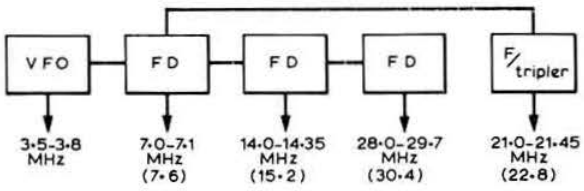

Fig 1. Block diagram suggesting a possible arrangement for the vfo multiplier stages of a transmitter covering all the hf bands from 3·5 to 28MHz. The frequencies shown in brackets for the four higher frequency bands are those which would be produced by the vfo at the hf end of its range, and are outside the band limits as mentioned in the text

From the above it will be appreciated that the range 3·5 to 3·8MHz is the largest in terms of percentage change in frequency. The ratio of lowest to highest frequency in this case is 1 : 1·086. The capacitance ratio will, therefore, be $(1 : 1{\cdot}086)^2$ or approximately 1 : 1·18.

In the interest of stability it is prudent to have a reasonable amount of capacitance in a vfo circuit even at the hf end of the range, so let us make this 100pF. Thus the maximum capacitance will be 100 × 1·18 or 118pF, and the change 18pF. The actual value of variable capacitor to use will depend upon what is available, but a 25pF (maximum) component will be satisfactory.

Coils

This brings us to the subject of coils. These have not been mentioned specifically before because the degree of bandspread depends solely upon the change of capacitance in the circuit.

The easiest way of discovering what values of inductance and capacitance are required, to tune to a given frequency, is by means of a suitable abac, or a slide-rule intended for such calculations. Admittedly an abac could provide an approximate idea of the variation in capacitance required for bandspread, but the majority of these useful aids are not large enough in scale for this to be carried out to a sufficient degree of accuracy.

In the case we are now considering, the inductance of the coil should be approximately 17·5μH.

There are several formulae which relate the number of turns and the physical dimensions of a coil to its inductance, but one which has always been found satisfactory is:

$$L = \frac{a^2n^2}{15(a + 3b)}\ \mu H \text{ or } n = \sqrt{\frac{15\,(a + 3b) \times L}{a^2}}$$

where a = diameter of coil in inches, b = length of winding in inches, n = number of turns.

Suppose that we have a convenient former of 0·5in diameter. How do we decide (a) the number of turns and (b) the gauge of wire to use? We will assume that we could, if necessary, wind a coil 1in in length on the former available, so what we want to know is " how many turns", and, therefore, the second of the formulae is the one to use.

$$n = \sqrt{\frac{15(0{\cdot}5 + 3 \times 1) \times 17{\cdot}5}{0{\cdot}25}} = \sqrt{\frac{52{\cdot}5 \times 17{\cdot}5}{0{\cdot}25}} = \sqrt{3{,}675}$$

$$= \mathbf{60\ turns.}$$

Only an approximate answer is required, so nothing elaborate in the way of calculating the square root is necessary—this could be done on quite a small slide-rule, by tables, or by trial and error.

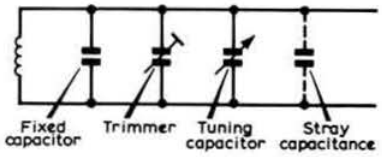

Fig 2. The various capacitances involved in a parallel tuned circuit

Reference must now be made to a standard wire table (see either the RSGB *Radio Data Reference Book* or other data publications) where it will be found that 61 turns of No 28 gauge enamel-covered wire, close wound, occupy one inch. As it is easier to take off turns than to add them to a coil, it is suggested that several more turns be wound on if possible, reducing their number as necessary later.

As to the actual values to be used in the circuit, the 100pF minimum capacitance will be made up partly by the unavoidable stray capacitances, partly by the minimum capacitance of the variable capacitor and partly by the trimmer. 25pF maximum would be a reasonable value for the latter (about half that value being actually effective in order to allow for adjustment), 10pF for the strays and the remainder, or about 75pF taking the form of a fixed capacitor. The circuit would appear as in Fig 2.

Setting up

Getting the circuit on frequency after connecting to the valve or transistor would involve the following steps:

1. Set the trimmer half in mesh and, with the aid of a receiver, check the range of frequencies covered. With the coil almost certainly too large, it will probably tune below 3·5MHz at maximum capacitance and below 3·8MHz at minimum.
2. If, with the tuning capacitor at minimum, it is not possible to reach 3·8MHz, even with the trimmer also near minimum, check the actual tuning range and see if it is possible to cover at least 300kHz.
3. Remove a turn at a time from the coil and re-check. Remember that, to be effective, the trimmer setting should not be too close either to maximum or minimum capacitance when the correct range has been found, so as to leave some scope for adjustment. Bear in mind also that the value of the fixed capacitor may have to be altered if the assessment of stray capacitance has been in error.
4. When finally the desired frequency coverage has approximately been obtained, use the trimmer to set the hf end of the range.

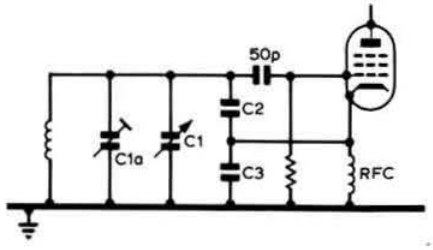

Fig 3. The Colpitts oscillator circuit

Other circuits

In the foregoing it has been assumed that a relatively low-C circuit would be used such as for the Franklin or Hartley electron-coupled oscillator (eco). There are, however, the high-C arrangements to be considered, such as the popular Colpitts which is shown in Fig 3. Here, for a frequency of 3·5MHz, C2 and C3 will be of the order of 1,000pF each and, of course, their effective capacitance across the coil will be 500pF. The valve or transistor capacitance in series with the 50pF capacitor will be negligible compared with this, and may be disregarded.

It will be assumed that the capacitance across the coil is 500 + 60pF for trimmer and strays, and the change in capacitance to cover 3·8 to 3·5MHz will still be 1 : 1·18, so that the maximum will have to be 560 × 1·18 or 661pF, and a variable of around 110 to 120pF maximum will be required. The inductance of the coil will be 3μH or about 25 turns of No 20 enamel-covered wire on the former previously described.

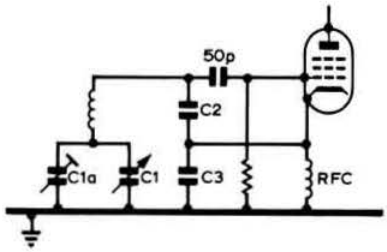

Fig 4. The Gouriet-Clapp variation of the Colpitts oscillator circuit

Perhaps the reader is interested in the Gouriet-Clapp version of the Colpitts circuit, shown in Fig 4. In this case the tuning capacitor is in series with the coil and the two capacitors C2 and C3 are across both coil and tuning capacitor which, in effect, puts all three in series across the coil. This may seem to be getting a little complicated, but it may be resolved quite simply.

It will be assumed that C2 and C3 are, as before, giving an effective value of 500pF and that the minimum capacitance due to C1 and C1a (the trimmer) is 75pF. The resultant value of capacitors in series is given by $\frac{C_a C_b}{C_a + C_b}$. In this case this is $\frac{500 \times 75}{575}$ or $\frac{37{,}500}{575}$ or just over 65pF. Applying the ratio of 1 : 1·18 to this the total capacitance at the low frequency end of the tuning range must be 65 × 1·18 or 76·7pF, and it is now necessary to ascertain what value of capacitance in series with 500pF comes to this figure. It is arrived at as follows:

Let C_x be the required capacitance, so $\frac{500C_x}{500 + C_x}$ = (say) 77pF

$$C_x = \frac{77\,(500 + C_x)}{500} = \frac{38{,}500 + 77C_x}{500} = 77 + \frac{77C_x}{500}$$

Therefore $C_x - \frac{77C_x}{500} = 77$, and $C_x = 91$pF.

In this case a variable capacitor of about 25pF would be required and the coil, on the former already mentioned, should have an inductance of approximately 26μH—say 80 turns of No 30 enamel-covered wire.

Other considerations

A coil tuned with a dust-iron core makes the exact adjustment of inductance very much easier and enables one to spread the required frequency coverage over the entire dial in a far less tedious fashion than by removing turns one by one from a coil, and so far as experience with a good many oscillators goes, the results have always been quite satisfactory provided that the core can be locked in the required position.

It is impossible to state categorically what increase in inductance an iron core will make because it depends so much on the qualities of the core and the thickness of the walls of the coil former, but with the well known Aladdin-type formers about 100 per cent increase in inductance may be expected when the core is fully in, so that if the coil is wound to have, say, 60 per cent of the calculated inductance, this should leave ample in hand.

When a variable inductance is in use, the core should be adjusted at the lf end of the range and the trimmer at the hf end.

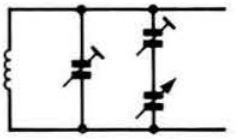

Fig 5. Method of restricting the effective range of a variable capacitor by means of a series trimmer

A further variant, when it is desired to use a larger variable capacitor than is called for by calculation, is to connect it in series with a trimmer or a combination of trimmer and fixed capacitor in parallel, so that the effective value of the variable is brought down to the figure required. See Fig 4. In this case the series trimmer is adjusted to set the lf end of the band, and the parallel trimmer the hf end, as before. This was the method employed for the bandspread ranges of the well-known HRO receiver.

It is hoped that the foregoing may go some way towards reducing uncertainty in designing a vfo. It is important to remember that only approximate values of capacitance and inductance can be obtained by the calculations described, and therefore there is little point in striving for extreme accuracy for the values of components so found, as moderate differences will be resolved in the adjustments provided.

FM repeaters in Germany

By T. BITTAN, G3JVQ/DJ0BQ

A LARGE number of repeater stations are now operating in Germany. Since radio amateurs in other countries are thinking of establishing such networks and since the repeaters can also be used as beacons, it is thought that a short report regarding the German network may be of interest.

Repeater stations have been operating in Germany for several years now, mainly as a result of the inexpensive fm-mobile stations that were available on the surplus market. This equipment was designed for operation from about 146MHz to 158MHz with a channel spacing of 50kHz and can easily be modified for the amateur band. Most repeaters are located at hill-top locations, usually together with police or other radio services. Two outstanding locations are the repeater on the Zugspitze mountain (the highest mountain in Germany) and the Stuttgart repeater on their famous television tower. The Zugspitze repeater has a coverage of about 300km in diameter, from a mobile station of course. Fixed stations with directional aerials can work over the repeater from far greater distances. However, the normal coverage of most repeaters is in the order of 60–70km in most directions.

Channels

The first repeater frequency plan used a channel spacing of 50kHz, which was sufficient at first due to the limited number of stations and suited the surplus transceivers which used a greater frequency deviation. However, with growing popularity in this operating mode and the large number of repeaters operating, it has been necessary for a new frequency plan to be established with a 25kHz spacing between channels.

All repeaters have a common spacing of 1·6MHz between transmit and receive channels. The repeater receives low-band in the range 144·150–144·300MHz and retransmits this signal in the range 145·700–145·850MHz. The exceptions to the 1·6MHz spacing are channels R7 and R8 which are later additions and were placed in between the existing channels R2 to R6. The channels and stations are as follows:

	Channel R 2	
DB0WF	Berlin	GM 47 a
DB0YC	Cham	GJ 74 c
DB0UC	Coburg	FK 55 c
DB0WW	Duisburg	DL 44 c
	Feldberg (Rhein-Main)	EK 63 h
DB0XH	Hamburg	EN 40 d
DB0WH	Hannover	EM 49 d
DB0ZF	Kaiserstuhl (Freiburg)	DI 79
DB0XE	Kassel	EL 57 e
DB0WK	Konstanz	EH 26 d
DB0WL	Lahr	DI 60 a
DB0ZM	Muenchen/Munich	FI 78 a
DB0UN	Nuernberg/Nuremberg	FJ 47 a
DB0UO	Oldenburg	EN 62 f
DB0ZO	Osnabrueck	EM 61
DB0WR	Stuttgart	EI 17 d
DB0WB	Winterberg (Au/Inn)	GI 62 j
	Channel R3	
DB0VB	Bad Koenig (F35)	EJ 15 d

DB0XY	Bocksberg (Harz)	FL 12 b
DB0WG	Goeppingen	EI 30 g
DB0VK	Koeln/Cologne	DK 05j
	Channel R4	
DB0WA	Aachen	DK 11
DB0UA	Augsburg	FI 55 b
DB0XB	Baltic coast	FO 74 b
DB0UB	Bamberg	FJ 05 a
DB0UG	Bentheim-Lingen	DM 56 c
DB0WC	Bremerhaven	EN 33 c
	Darmstadt	EJ 24 a
DB0XD	Deggendorf	GI 15
DB0WD	Deister	DM 58
DB0ZR	Dortmund	DL 47 c
DB0XR	Border of DL/HB/F	DH 30 a
DB0ZZ	Grab	EJ 78 c
DB0XG	Greding	FJ 77 c
	Hersfeld	EK 19 a
DB0YK	Homberg-Kaiserslautern	DJ 47 e
	Koblenz	DK 49 j
DB0WO	Leer (Ostfriesland)	DN 68 a
DB0YN	Lindau-Northeim (Hann.)	FL 21 g
DB0ZL	Luechow (Elbe)	FN 65 j
DB0YS	Siegen	EK 01 f
DB0WX	Triberg	EI 72 a
DB0ZW	Weiden	GJ 22 c
	Channel R5	
	Berlin-Neukoelln	GM 48 j
DB0WE	Essen	
	(at present still Channel 6)	DL 45 d
DB0VF	Frankfurt	EK 64 e
DB0XM	Hoher Meissner	EL 70 a
DB0WN	Ochsenwang	EI 38 j
DB0VP	Pirmasens	DJ 69 g
	Channel R6	
	Andernach-Mayen	DK 47 b
DB0ZA	Aschberg (Rendsburg)	EO 49 g
DB0XO	Bergheim	DK 04 a
DB0WU	Bremen	EN 75 g
DB0WT	Detmold	EL 05 g
DB0WE	Essen	DL 45 d
DB0WS	Goslar-Steinberg	DL 03 f
DB0ZH	Heidelberg	EJ 44 e
DB0YH	Hoechenschwand (Black Forest)	EH 21 b
DB0WV	Hoechsten (Oberschwaben)	EH 17 c
	Koeln-Bergheim	DK 04 a
DB0XU	Knuell	EK 08 f
DB0XS	Merzig (Saar)	DJ 43 c
DB0WM	Muenster (Westf.)	DL 09 h
DB0ZB	Ochsenkopf	FK 80 f
DB0WZ	Wuerzburg	
	Channel R7	
DB0ZU	Zugspitze	
	(at present still Channel 6)	FH 46 g
	Channel R8	
DB0XA	Altenwalde	EN 14 f
	Kalmit	DJ 51 j
DB0YY	Ludwigsburg	EJ 76 f

A number of callsigns have still to be issued or will be changed to the DB series.

Most repeaters have an output power of 5 to 20W and use vertically polarized, omnidirectional aerials. They are opened by a frequency modulated sinusoidal calling tone of 1,750-Hz. In addition to the automatic callsign generator (F3), the repeaters are equipped with numerous electronic gadgets such as circuits for limiting the transmission time of each station, automatic switch-off when the frequency deviation of one of the stations is too great, automatic alarm signal etc. In contrast to some repeater stations in the USA, no attempt has been made to limit the accessibility by use of coded calling tones or tone bursts.

Channel	Frequency Input/output	Channel	Frequency Input/output
R2	144·150/145·750	R5	144·225/145·825
R3	144·175/145·775	R6	144·250/145·850
R4	144·200/145·800	R7	144·275/145·725
		R8	144·300/145·700

Channelling of the German repeaters was established some time before the 1972 Scheveningen Conference and does not conform to the IARU Region 1 recommendation:

Consequences of repeater operation

At first one might assume that the main result would be that the 2m band would be full of repeater stations and that there would be no room left for other modes. However, the opposite is the case. Activity is now virtually limited to the input and output frequencies of the fm repeaters and to a few tens of kilohertz each side of the ssb centre frequency of 145·4MHz. AM activity has virtually ceased to exist in Germany.

Experience has shown that the repeater network must be organized on a national basis to avoid interference between neighbouring repeaters. The fewer channels used for the network, the more important is nationwide planning of sites, frequencies and coverage.

Since reciprocal licence agreements exist between Germany and a large number of other countries, this frequency list may be of advantage to you in equipping your mobile station for holidays.

Conclusion

The author has read unfavourable comments in *Radio Communication* regarding German repeaters, so please allow a comment or two from a British amateur who has been using German repeaters for over three years. He has not noted that the repeaters have caused a deterioration of operating standards. It is true that repeaters provide for a different form of communication which is not suitable for the long, personal rag-chew type of QSO. Readers should, however, note that it is not the really active vhf amateurs who are active on the repeaters, or at least only from the car, and they still continue their activities mainly on ssb. The majority of the amateurs using the repeaters here in Germany are the holders of DC licences (VHF only).

Repeater operation can and does provide a valuable service to amateurs and the public as a whole. One only has to consider the number of persons injured in road accidents who have been assisted by calling the police and ambulances via repeaters. The time saved in this manner has saved a great number of lives. A further advantage for radio amateurs is the piloting facilities in strange towns and cities, which is carried out extensively in Germany.

Repeaters do not replace vhf activity, but complement it. They are primarily designed for mobile operation where they offer a large safety factor over the conventional tuning-over-the-band type of communication.

The author hopes that he has been able to give some insight into repeater operation and its advantages. Any disadvantages will only be caused by the operators using them and will not be due to the repeaters.

*** Attention is drawn to the fact that the conditions of use described here apply to Germany. Conditions under which repeaters may be used in the UK are not necessarily the same.**

A handy chart for great circle bearings

by WILLIAM D. JOHNSTON, WB5CBC*

THE correct aiming of directional aerials is neglected by all too many amateurs, primarily because it is often difficult to visualize the shortest path between two widely separated points on the earth's surface. That path, of course, follows an arc of a great circle, and the angle that the arc forms with a line running due north is called the great circle bearing. When the aerial is positioned at that angle, both the transmitted and received signals between the two stations are at their strongest (neglecting, of course, unusual and isolated atmospheric disturbances).

Charts centred on several of the big cities of the USA have been available for a number of years, but these were accurate for only a very few amateurs, and usually provided nothing more than a simple bearing to each of the locations on the chart. During the last few years, a number of commercial versions which are made-to-order have become available. These charts are made individually, being centred on the amateur's own QTH, and in general have included the distance in addition to the bearing to each of the entries on the chart. Unfortunately, these versions have not been the complete solution, as they have invariably been expensive, clumsy, and contained information for too few locations.

There is now available a chart which has the following advantages over anything previously in use:

1. Cheapness—$1.00 postpaid worldwide, $1.75 airmail worldwide;
2. Handy Size—pages are 8½in by 11in, a perfect size for the operating table;
3. Gives bearings to many (660) locations throughout the world;
4. Contains sufficient data—bearings, distances in miles and kilometres, and return bearings;
5. Accuracy—bearings given to the nearest degree, distances to the nearest mile and kilometre.

The original work on this project was done about six years ago, using a digital computer to generate the charts. The computer programme, written in FORTRAN IV, uses the spherical triangle method of analysis. Charts centred on more than 2,000 cities and towns throughout the world are on file (they have been on file in the author's attic for six years), and copies are available for immediate shipment. For locations not already on file, a nearby research institute has been contracted to do the work, so these charts can be sent within a few days.

A few notes are in order concerning the data on the charts (see the small extract from a typical chart on this page). First of all, the bearing from the amateur's QTH to each of 660 distant locations is given in degrees from true north. The magnetic bearing is not mentioned since the magnetic declination at any given location varies from year to year, sometimes by as much as 10°. It is easier to zero the aerial on true north once (using the star Polaris, or whatever), and forget it. Next, the distances in both miles and kilometres are displayed. And finally, the return bearing from the distant location to the original QTH is given. (The return bearing is not a simple 180° difference from the outward bearing, but must be derived as part of the spherical triangle solution.) The ability to give a station being worked the correct bearing for aligning his aerial will produce results which are nothing short of amazing. When the chart indicates a distance greater than, say, 10,000 miles, the "long path", which is simply 180° opposite the indicated bearing, can be considered. The same is true for the return bearing.

The chart consists of six pages, so the author mounted his own sheets back to back in three plastic document protectors which were then fastened together with a plastic spiral binding. That way it never takes up more room than one page, and can quickly be turned to the desired entry. After six years, the chart is still like new. An alternative method would be to mount the pages on the wall, in a three-ring binder, or simply staple them together.

Charts are available for any location in the world. To order a chart, the following information will be needed:

1. Name and postal address.
2. The city for which the chart is wanted (include state and/or country).
3. If the population of the city is less than 10,000 or if the location is a rural area, also include the latitude (indicate north or south) and longitude (east or west) in degrees and minutes.
4. Include payment of $1.00 (postpaid worldwide) or $1.75 (airmail worldwide). Payment will be accepted by any of the following methods:
   USA, Canadian, or Mexican currency
   7 IRCs (12 for airmail)
   International Bank Draft
   USA Postal Money Order
   USA Postage Stamps (unused, of course)
   Personal cheque on a USA bank

Send the information to: Great Circle, 1808 Pomona Drive, Las Cruces, New Mexico 88001, USA.

Any separate queries for additional information should be accompanied by a USA-stamped, self-addressed envelope, or a self-addressed envelope plus irc.

Extract from a typical chart

		BNG	MI	KM	RBNG
KX6	Marshall Islands, Kwajalein	23	8259	13291	345
KZ5	Canal Zone, Colon	274	5624	9051	42
LA,LF,LJ	Norway, Oslo	8	792	1274	190
LU	Argentina, Buenos Aires	230	7036	11324	38
LU	Argentina, Cordoba	236	7075	11386	40
LX	Luxembourg, Luxembourg	318	110	177	136
LZ	Bulgaria, Sofia	113	853	1372	304
M1	San Marino	144	391	629	327
OA	Peru, Lima	258	6603	10627	41

* 1808 Pomona Drive, Las Cruces, New Mexico 88001.

MICROWAVES—1,000MHz and up

by DAIN EVANS, G3RPE*

DX on 3cm

In following up the G3ZKR-G3WDG-G3ZGO 3cm efforts reported last month, some mention should be made of the high signal strengths observed over the 155km path. One indication is that G3ZKR was able to establish contact on 3cm within 2min of connecting 12V to his power supply. Another is that G3ZGO could hear G3WDG's *local oscillator* which is at least 17dB down on the main signal. G3ZGO could also just copy tone modulated signals when using only the open end of the waveguide as an aerial. These observations imply a reserve of power above threshold of about 20-25dB. Doing the sums as described in the July column suggests a reserve in the region of 20dB, which is in reasonable agreement with that observed bearing in mind the number of assumptions made.

Another feature worth pointing out is that more people have now worked this long path using steam klystrons rather than the more modern semiconductor devices. Perhaps the relative ease with which klystrons usually can be made to work compensates for the effort required to make the more complicated power supply necessary. Fortunately Gunn diodes for 3cm are still available on the surplus market, and a surprising number of people seem to have a stock of klystrons, so both approaches are still open. If anyone has a surfeit of klystrons then please let me know.

Waveguide dummy loads and attenuators

A fairly effective "dummy load" when working in waveguide is simply more waveguide: if this is several wavelengths long, then the vswr should be less than 1·6:1 provided that the end of the guide is allowed to radiate freely and little power is reflected from surrounding objects back up the guide. A horn aerial provides a well-matched termination.

In making dummy loads proper, lossy materials are fitted in the guide. Fortunately there is no shortage of suitable materials to act as absorbers of microwave energy: indeed materials which are *not* lossy at microwave frequencies are rare. Two design points may be mentioned. Firstly, there is a sort of rule which says that it does not matter what you do in waveguide provided that you do it gradually—and gradually means at least a wavelength or two. This "rule" applies to bends, to tapers from one size of guide to another and to altering the aspect ratio of the guide for matching purposes. It also applies to loads and attenuators in that a poor vswr is to be expected if the wave suddenly hits a wall of lossy material. A second point is that the absorber should be stable mechanically. Thus while steel wool, rubber, graphite and even wet blotting paper make efficient temporary loads, care must be taken that bits do not pass into the system and that when the load is removed, *all* of it is removed.

A robust load can be made from wood. In the design shown in Fig 1, a good match is ensured by the long taper at the "hot" end. Its efficiency as a load may be checked by fitting it to a system. If a sliding short circuit placed behind

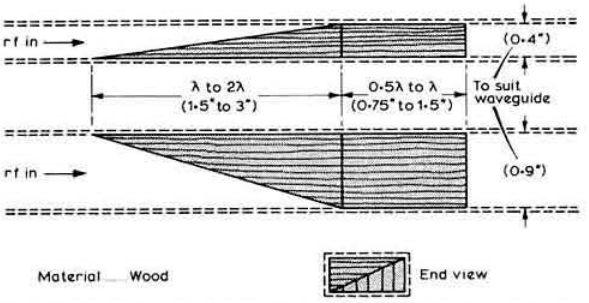

Fig 1. The design of a waveguide tapered dummy load. Dimensions in brackets for WG16 (10GHz)

the load can be moved over half a wavelength without affecting the system, then the load is absorbing all the power.

Attenuators are also made by fitting lossy material into the waveguide: in this case both ends are tapered to provide a good match in both directions. A convenient form of resistive material consists of graphite powder bonded onto paxolin-type sheet about 0·02in thick. This is available commercially and is described in terms of my favourite unit: ohms per square. A convenient resistivity is 200Ω per square, and the attenuation measured at 10GHz for this material in WG16 is shown by Fig 2. Note that as the resistivity is increased, so the attenuation decreases. Home-made resistor card can be prepared by heavily marking non-glossy card with a very soft pencil, or by dipping the card in colloidal graphite. A coating of cellulose can be used as protection.

For maximum attenuation, the resistive sheet should be fitted half-way across the broad dimension of the guide,

(*Continued on page 747*)

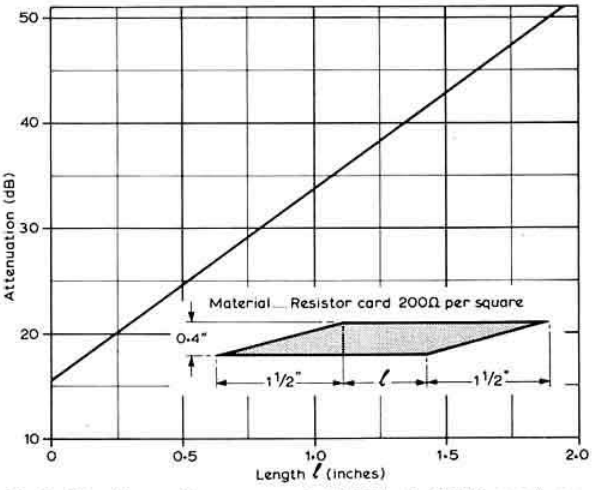

Fig 2. The attenuation measured at 10GHz in WG16 as a function of its length

* 4 Upper Sales, Chaulden, Hemel Hempstead, Herts.

TECHNICAL TOPICS

by PAT HAWKER, G3VA

OVER the past four years it has fallen to our lot to comment on the annual MPT report on radio and television interference complaints. This document is, so to speak, the official communique on the battle of tvi—and perhaps also on man-made pollution of the electromagnetic spectrum.

The latest bulletin covers 1971, representing 55,839 different cases involving 65,826 complaints—though it must always be recognized that many more households are affected by interference than the number who put in an official complaint.

Once again the trend is down—and down by a substantial 13 per cent or so. This clearly reflects the increasing use by British viewers of uhf rather than vhf television stations, partly because uhf is less susceptible than vhf to many forms of electrical interference and partly because the uhf television services are planned on the basis of relatively high field strengths (70dB above 1 μV/m for main stations and usually 80dB for local relays).

Interference specifically ascribed to amateur stations (under two per cent of the total) is down by a comparable amount, despite the steady increase in numbers of licensed amateurs (though of course it is impossible to tell whether or not total amateur *activity* has increased or decreased). Table 1 has been compiled from the official reports for the period 1968-72, with Table 2 giving the comparable breakdown of interference caused by UK transmitters other than amateur.

On the more general subject of interference, there has been a steep rise in the "tv set to tv set" category (this is now the largest single cause of interference to uhf tv reception) coming mainly from oscillator radiation from tv receivers tuned to Band III. For many years such radiation has been a problem to amateurs on vhf/uhf bands, though it may decrease with decreasing use of vhf television.

TABLE 1

BCI & TVI ascribed to amateur stations

Band	1968	1969	1970	1971
LW/MW	55	48	28	38
Band I	725	821	630	467
Band II	34	44	40	44
Band III	319	492	394	300
Bands IV-V	12	26	65	173
Mobile	6	11	4	5
Yearly totals	1,151	1,442	1,161	1,027

TABLE 2

BCI & TVI ascribed to UK transmitters other than amateur

Band	1968	1969	1970	1971
LW/MW	86	91	95	101
Band I	765	790	805	654
Band II	137	140	201	167
Band III	635	637	728	517
Bands IV-V	55	84	210	317
Yearly totals	1,819	1,876	2,206	1,883

Contact devices (thermostats, bells, buzzers etc) with 10,059 complaints represent more than double the number of complaints in any other category. The MPT report says: "A considerable proportion of interference complaints are caused by contacts which have been in service for some time. One of the conclusions . . . is that it is necessary to subject thermostat contacts to some specified number of operations on load before radio interference tests are made. Another possible method of alleviating the trouble is to require thermostat contacts to be snap acting, manufactured to the appropriate British Standard."

Electric motors (4,320 complaints) are again well down on previous years and are only one-third or so the number 10 years ago. Overhead power lines at 2,485 complaints are over 30 per cent down on 1970. As always, an appreciable proportion of all complaints is ascribed to inefficient receiving aerial installations and faulty receivers (together amounting to 35 per cent of complaints on Band V).

'Immunity" of receivers

My own feeling is that a real breakthrough in the reduction of tvi is now likely to be achieved only when the tv set makers pay more attention to making their sets less susceptible to strong out-of-band electromagnetic fields, by improving the "immunity "of sets to signals coming in by other paths than the centre conductor of the coaxial feeder cable and by improving the dynamic range of the uhf tuners. It would be over-optimistic to believe that industry is likely to be moved by the relatively small number of sets affected by amateurs—fortunately there are other reasons why we may yet see more attention being given to such factors. These reasons include the large number of vhf mobile services, the amount of industrial/scientific/medical (ism) equipment, the increasing number of local broadcasting transmitters both radio and television, and the problem of receiver oscillation which we have already mentioned.

I have referred before (*TT* July 1971) to the efforts of T. Dvorak of the Swiss Institute of High Frequency Electronics to bring such matters to the notice of industry. In a recent paper ("Electromagnetic field immunity—a new parameter in receiver design") presented at the 1972 IEEE International EMC Symposium, he points out that the increase of electromagnetic pollution is bringing modern industrial society closer to the point where regulations to control interference at source will no longer be adequate. He writes: "In the search for further means by which compatibility might be improved, the susceptibility of the receiving installations certainly deserves the most attention. It covers the frequently occurring case of a receiving installation required to operate in the vicinity of a transmitter . . . at the same time, in view of the inadequate immunity of current receivers, it offers large possibilities of improvement."

He notes that relatively little information is available on the behaviour of receivers to strong signals and his paper suggests methods of defining and measuring receiver immunity parameters. His analysis covers the cases of receivers

operating near amateur, commercial, mobile and broadcast transmitters, ism equipment and receiver oscillators (including the difficult case of nearby hf receivers). In other words, he outlines ways in which industry as a whole would be able to measure and specify the immunity of a tv or other receiver and to develop international standards.

While his paper underlines the difficulty that must be expected in the case of high-power amateur transmitters, since these may produce extremely strong local fields it would clearly be of tremendous advantage to amateurs if even some improvement on present designs could emerge, and some attempt were made to produce sets to a recognized standard. His results—like those of the Swedish tests reported in *Radio Communication*, May 1971—show that "*large differences exist between receivers of different manufacture due to the fact that little or no attention has been paid to field immunity in the past*".

I would like to see such work extended to cover not only tv and radio receivers but also the many forms of audio equipment that are only too susceptible to strong electromagnetic fields.

Dynamic range of vhf receivers

It is of course not only entertainment equipment that needs a large dynamic range—the ability of equipment to cope more adequately with both strong and weak signals is becoming ever more important on the amateur vhf bands. In *TT* (October 1971) we presented some views of Arnold Mynett, G3HBW, on the way he felt vhf receiver design should be heading; although we imagine that the hardware he then mentioned as being under development may have been delayed by his moving to South Africa.

The G3HBW approach to vhf reception in the 'seventies is applauded by George Elliott, VE2LI (ex-G5LI), who mentions that in Montreal there are not only high power 144MHz amateur stations to contend with but also many police and other mobile systems working right up to the band edge (for example he has a local 24-hour taxicab base station on 143·985MHz). All this implies much greater attention to such matters as gain distribution, better mixers, better pre-mixer selectivity, less wide-band oscillator noise and the like. Many of the problems of gain-distribution were explored more than two decades ago by H. Magnuski ("Adjacent-channel rejection receiver" *Electronics*, January 1951) and a diagram from this article has long appeared in *ART*, but it is only fairly recently that it has been possible to design low-noise vhf receivers with limited pre-mixer gain.

VE2LI points out that articles in highly-respected journals continue to concentrate on such approaches as the 20dB gain wide-band pre-amplifier and the broad-band converter technique generally, yet as he puts it, "there is not a converter with anything like optimum noise factor that will perform properly in the presence of 100mV signals—it seems we should go back to the old concept of tunable oscillator and fixed i.f."

He believes that the first step—as mentioned recently for hf receivers—would be to concentrate on better mixers, and draws attention to the balanced U310 fet mixer publicized recently by Silconix: Fig 1. This is intended as a wide-band mixer from 50-250MHz and the makers claim performance figures that have advantages (including a 3dB conversion gain) over similar Schottky diode mixers. Applications data from Siliconix Ltd, Saunders Way, Sketty, Swansea.

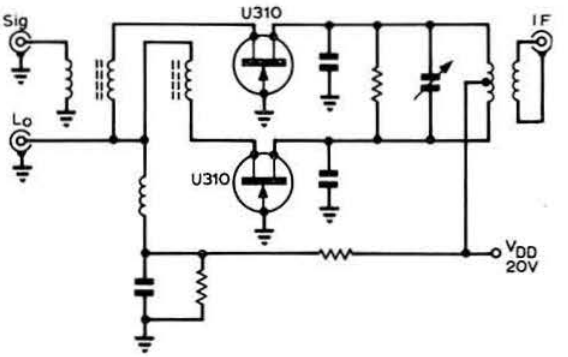

Fig 1. Wide-band (50-250MHz) balanced mixer using two Siliconix U310 field effect transistors. It is claimed that the grounded gate connection is most stable, while source injection of both signal and local oscillator make easy impedance matching into the fets. The balanced configuration reduces oscillator radiation and suppresses generation of even harmonics

VE2LI considers that there is a real opportunity for amateurs to develop a new generation of vhf receivers which will not pack up when a strong signal appears on the band, and yet still be capable of getting down close to optimum sensitivity.

Tunable oscillator for 144MHz receivers

The above notes are indicative of the slowly changing attitude towards vhf reception as the feeling grows that to cope with modern conditions it is worth thinking more about single-conversion (or even direct-conversion) receivers. This implies a stable but tunable local oscillator preferably (to avoid spuriae) working on the fundamental. Some time ago we drew attention to a 1967 Australian design for a 500MHz cavity-type oscillator for which stability approaching that of crystal oscillators was claimed (see *ART3* or *4*). This used a bipolar transistor as oscillator though there would seem to be valid reasons for using field effect devices in almost any modern oscillator application.

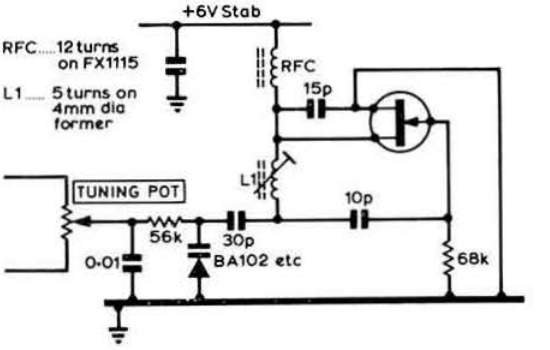

Fig 2. G8CYK's tunable oscillator (135MHz) for 144MHz receivers. The rfc comprises 12 turns on FX1115 core. L1 is 5 turns on 4mm former. Note the need for extremely good voltage stabilization and the usual mechanical and screening precautions for vhf oscillators

Bill Poel, G8CYK, has been using a 135MHz tunable oscillator (Fig 2) for 144MHz and finds this is excellent even with a 5kHz i.f. bandwidth. He reports drift as very low, but insists that a very high degree of voltage stabilization—for example by feeding through at least a two zener diode arrangement—is a *must*. It goes without saying that the unit must be well screened and very rigid. Provided that such precautions are taken, G8CYK says "it really works" and mentions that it has also been used by G3VUO to convert a Pye Westminster to tunable operation. G8CYK is also working on some other interesting projects that we hope to refer to on another occasion.

On the general question of oscillators for low noise mixers, it may be worth mentioning once again the requirement that they should have low wide-band noise output. This is not only a matter of reciprocal mixing (where the presence of oscillator noise results in spurious reception of strong adjacent channel signals or image signals) but also noise output at the i.f. We recall WoDAN many years ago (in connection with hf receivers) advising the insertion of a tuned i.f. trap between the oscillator and a low-noise mixer. We have never seen this idea applied on vhf but it might be worth considering; similarly WoDAN noted that low-noise mixers should be fed from low impedance oscillator sources.

One of the advantages of fet oscillators is that they seem to have lower wide-band noise output than valves, and much less than bipolar transistors.

144MHz Climie hand-portable transceiver

Not all vhf equipment is intended for scraping signals out of the mush. A corollary of the development of 144MHz fm repeaters is that these open the way for more effective use of low-power mobile and even hand-portable units. Such equipment can be low-power, of moderate sensitivity and lightweight, yet can still take full advantage of modern components and circuit techniques.

Such an approach can be found in a new 144MHz fm transceiver for the home constructor which has been developed by Fred Johnson, ZL2AMJ, and the Upper Hutt Branch 63 of NZART. This is the Climie unit—so-named from Mount Climie, 2,823ft high, on which there is a local vhf repeater—described in a 26-page article in *Break-in*, September 1972. While clearly in *TT* we can refer only briefly to this new design, we feel that it is encouraging to find amateur groups developing projects which (a) are reasonably easy for newcomers to build, and (b) require only a minimum of tools, use readily available components and can be aligned without undue difficulty. In other words, designs which are intended from the outset to be capable of ready duplication while still providing scope for further individual development, being based on thoroughly tested and de-bugged prototypes. While we have always believed in the "one-off" designs based on oddments, these present problems when described in the journals, and it seems certain that the group project kit has a valuable role to play.

The Climie has an all-transistor transmitter providing about 1W from a 2N3866 with provision for up to six 12MHz crystals (being multi-channel means that the rig does not always have to work via a repeater). The receiver has two dual-gate 40841 mosfets in rf and mixer stages, then a BC109 i.f. preceding a Nikko Denshi D10F20A 10·7MHz filter and the RCA CA3089E integrated circuit with its quadrature detector (only one tuned circuit needing alignment

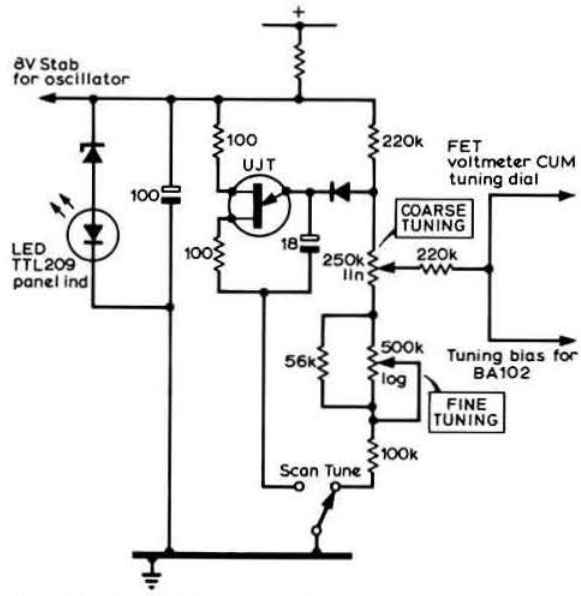

Fig 3. The electronic tuning and scanning arrangements for the Climie 144MHz transceiver; tuning range is adjusted by trimmer in series with the BA102 tuning diode on the oscillator circuit. Coarse and fine tuning controls are provided by dual-track potentiometer

in this section) and SN76001 ic as af amplifier. The tunable local oscillator operates at half-frequency in conjunction with a doubler, and is diode-tuned with an ingenious dual-track potentiometer system providing fine and coarse tuning; a scan tuning facility is also provided. The receiver "dial" takes the form of an electronic voltmeter measuring the voltage applied across the tuning diodes and which can also be used as an S-meter. The complete rig is powered by two lantern batteries and intended to be carried slung from the shoulder and used with a telescopic rod aerial. Fig 3 shows a small section of the scan and meter board.

ZL2AMJ is head of the electronic engineering department at the Central Institute of Technology at Petone and one can only admire the thorough way in which this local group has gone about the development of these constructional projects—over 160 of the Tucker Tin Mark II ssb rigs are being built. I am not sure whether there is any intention of providing part kits (eg the constructional manual plus printed circuit boards) to allow overseas amateurs to take advantage of local components—in New Zealand the complete kits are put at $NZ100 (about £50) The address is: The Secretary, Climie Transceiver Project, PO Box 40-212, Upper Hutt, New Zealand.

On the subject of kits, the interest in the September aerial noise bridge suggests readers may like to know that a complete kit for a roughly similar unit can be obtained from: Cambridge Kits, 45 Old School Lane, Milton, Cambridge CB4 4BS at £4 with ready-wound toroid, metal box etc.

Another look at the coaxial collinear

Several comments have come in on the coaxial collinear array described in September *TT* (incidentally is it collinear or colinear—both spellings abound in the various text

books?). John Roscoe, GM4QK, for example, suggests its value for amateurs who want to try an Indian rope trick by lifting one end with a model helicopter powered over the cable!

Pol Parrott, G3HAL, has come across a note in the vhf column of *QST* (August 1961) in which W6PIV briefly mentioned his use of a 144MHz vertical based on the same technique in conjunction with radials and a first element one quarter-wave long: see Fig 4. The only claims made for it were that it gave low-angle radiation and made use of odd pieces of coaxial cable. The dimensions shown are for a centre frequency of 147MHz (the American band extends from 144 to 148MHz) with a suggested change of 0·2in/MHz per half-wave section for shifting frequency.

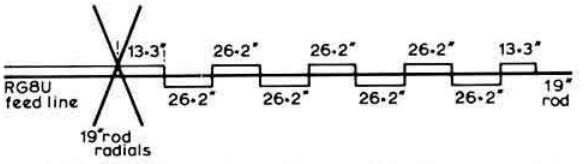

Fig 4. The W6PIV version of the coaxial collinear aerial for 144MHz (for convenience the aerial is shown horizontally but is of course mounted vertically)

But clearly the system did not catch on, and some of the reasons for this appear in some most interesting comments from "Dud" Charman, G6CJ. He recalls that the first references to this type of array date from 1935 but adds that he feels there must be something inherently amiss with the technique "or it would surely have been seen more often". He mentions that the redoubtable Alan Blumlein tried to use one as a television transmitting aerial in the early days of high-definition television, using 4in coaxial copper pipes! Sad to recount "it did not work—the reason may be that Blumlein was not an aerial man, and this was probably the only one he ever made—but there were engineers there who could have made it go it if were go-able."

Stirred by the revival of interest in this system, G6CJ has made a mathematical analysis of the array to try and reconcile the problems of some users (a fact underlined in our comments in September) with the results described in *IEEE Trans Ant & Prop*, July 1972. One conclusion he reaches is that when used as a transmitting aerial "half the power pumped into the system is cooking it" with the power reaching the outermost ends reduced. He adds: "I somehow do not think it will ever find a great use in the amateur field, partly because long lengths of coaxial cable are too expensive for most of us, but also because unless it is a fairly long array I do not think it will work properly". His analysis suggests that the fairly high attenuation in each section actually contributes to the very good radiation pattern reported, as this means that large reflections will not be returned from the ends to disturb the critical distribution of current between inner and outer conductors; this taper contributing to the low side-lobe levels.

Of course with a large number of elements the 3dB waste of power would not necessarily rule the system out of court, but for fewer elements it would be a significant disadvantage compared with conventional arrays with stubs.

But if you do get one to work really well you will have achieved something that the great Blumlein never did!

A G6CJ special

In commenting on the coaxial collinear and the use of insides and outsides of coaxial cable, Dud Charman, G6CJ comes up with another system which is unlikely to be known by many amateurs. It was invented in the fifties and the patent has now expired—and G6CJ says it worked perfectly, and is one answer for the amateur who lives in an attic and can use only end-fed arrangements. He also believes that it would make a fine aerial for uhf television reception because it could be made of stiff rods (G6CJ once tried to interest one of the firms in this field "but they didn't bite"). The system is made as follows, he writes: "You take a length of coaxial cable; join a quarter-wave of wire to the inner conductor at the far end; at the other end put a quarter-wave rejector at the point where you want it to stop being an aerial. This is fine but somewhat mismatched. So take a quarter-wave of cable as a dummy and lay it alongside and adjust the spacing. That works.

"Now double it and make a half-rhombic. The two cables are bonded at the end of the rejector, so you have a very convenient place to put the termination resistor.

"This system was made to work at 400MHz, and we were able to terminate it and match it to provide an swr of 1·1. It needed special care with the resistor."

So that—plus Fig 5—forms the basis of what I have taken the liberty of calling a G6CJ special. It would be interesting to hear how it makes out on vhf or uhf! Incidentally, this adds further support to a long held belief that the various "long wire" rhombics and vee-beams are sadly neglected on vhf and uhf, the part of the spectrum where one does not need a field to put up a rhombic.

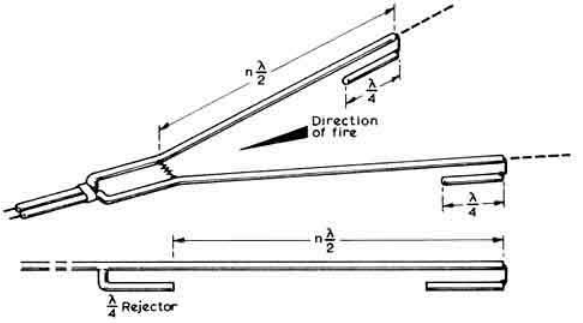

Fig 5. The G6CJ special based on coaxial cable, stubs and terminated half-rhombic configuration to provide directional beam for vhf and uhf applications

All-band terminated long-wire

From Richard White, G3SRO, comes a reminder that an all-band aerial that does not require an atu (at least for matching purposes), yet can give a satisfactorily low swr across all the hf bands, is the terminated long-wire. He uses one about 400ft long and 40ft high: see Fig 6. At the far end this is terminated with a non-inductive high-wattage 500Ω resistor earthed to an 8ft aluminium stake via a vertical down-lead. The transmitter feeds the aerial via a ferrite toroidal step-up transformer using a toroid of unknown origin about 1½in diameter. The transmitter feed goes to a three turn winding and the aerial to seven turns

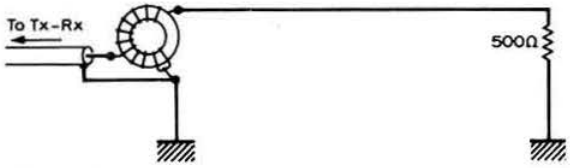

Fig 6. G3SRO's terminated long-wire aerial with ferrite broad-band matching transformer

bifiliar wound and spaced. This gives a worst swr on any band (3·5 to 28MHz) of only about 1·8 to 1. In practice the aerial has the two main lobes to be expected from the theory of non-resonant aerials, showing up well on 14MHz and above. By directing the aerial towards central America, G3SRO gets good coverage of North and South America.

Low angles for chordal hops and tep

Martin Harrison, G3USF, has been following with interest the various references in *TT* and elsewhere to the investigations into chordal hop and transequatorial propagation. He has drawn attention to another revealing paper on the subject: N. C. Gerson, "Ray tracing over a transequatorial path", *Canadian Journal of Physics*, Vol 50, p 976 (1972), based on studies made at Puerto Rico. G3USF has provided a useful summary of this long paper (and we were able to find this and some further associated references at the Science Museum/Imperial College Library), although here we can only summarize the summary. But certainly this paper seems to add further weight to the suggestions already made in *TT* that tep is just one form of chordal hop or supermode propagation and that recent work is showing that such conditions occur more often and in more places than conventional propagation theory has suspected. Further it supports the view that low-angle radiation is an important means of inducing supermode propagation—but also seems to indicate (as G6XN suggested) that these low angles can often be around the more practical 8° rather than only the extremely low angles which we have discussed before in *TT* and *ART*. (See also G6XN'S article in this issue.)

Gerson found (using ray tracing techniques) that from KP4:

(a) Occurrence of trapped rays propagating to te distances of 6,100-8,100km *without* intervening ground reflection around 0800lst, possibly at 1600-2000 and 2400. All times are in *local standard time*.

(b) Trapping *after* one F2 hop occasionally at various times between 0800 and 2400lst. Trapping after two F2 hops was observed but rare.

(c) Diurnal maximum for trapping the familiar 1800 to 2000 evening phase, with small secondary maximum at 0800 to 1000.

(d) Trapping allowed rays to propagate to over 11,000km the extreme limit of computation in his experiments, but it was not discovered where (or, as G3USF adds, whether) these rays eventually touched ground: 0800 and 1400 to 2400lst.

His work brings home the crucial importance of low radiation angles for ionospheric trapping. This varied with time of day but *in no case* exceeded 9° and at 1400lst was confined to launch angles between 5 and 7°, widening to 2—9° at 1800 and then contracting and lowering until at 2400 only 0—1° was trapped.

Of course once signals are trapped it is necessary for them to break out again if they are ever to be received by a station at ground level; this requires "paired" injection and ejection conditions to exist simultaneously. Spread F is one important condition for tep operation (see *TT* February). Gerson suggests the specific ionospheric conditions of the equatorial zone as one possible mechanism, but also refers to the auroral zones, the twilight girdle, the polar regions or "within sporadic-E" as possibly providing injection-ejection pairs so allowing long distance propagation with small loss.

He even goes on to suggest that tep may be a manifestation of a more widespread north-south ionospheric trapping condition occurring across the geomagnetic equator. G3USF seems a little surprised to find hints in the article that such trapping is not confined to tep—personally I feel that this has always been implicit in the work over the past ten years on round-the-world echoes on hf. But I agree with him that in this field, much of the initial impetus came from amateurs and there is still much interesting work that could be done by amateurs to further knowledge on the subject. At present one source of confusion is the many different terms such as tilt-mode/chordal hop/supermode/trapping/ionospheric ducting etc, all of which refer to much the same type of propagation phenomena.

More on audio-modulated and reciprocating detectors

In the June *TT*, prompted by ZE3JJ, we described the basic arrangement of the bfo-less audio-modulated cw detector originally described in *QST* (1946) by D. A. Griffin, W2AOE, and L. C. Waller, W2BRO. We then posed the question whether this unusual system deserved to have been ignored for 26 years. In doing so we had a vague hope that perhaps some reader might have investigated the system and could add something to the highly enthusiastic first write-up.

For some months there was silence—it seemed as though amd held out no interest whatsoever! Then came a letter from Stuart Meyer, W2GHK/4 (well-known for his former connection with Hammarlund and now with RCA). By a remarkable coincidence he has worked with both the original authors: with W2BRO at Dumont Laboratories and with W2AOE at Hammarlund.

At Hammarlund, W2AOE (who unfortunately died about five years ago) interested Stuart Meyer in the amd technique as recently as around 1963 to 1965. Stuart authorized a project to convert an HQ-180 to the system and so can speak with considerable knowledge of the subject.

He says that the results were very promising so long as there was no static or noise pulses, though he feels that the noise problem could now be overcome by noise-blanking techniques. But he adds that under conditions of really heavy interference, such as a dx pile-up, amd becomes virtually useless and just cannot compete with the audio selectivity provided by a pair of well-trained ears. But he adds that he hopes sometime to dig up his notes on the project to see if there is scope for further work on the system.

But the other bfo-less detection technique for all modes that was described in the June *TT*—the Badessa reciprocating detector—seems likely to prove more valuable than amd. Several British amateurs are known to be investigating the system and we hope they will pass on their findings. We have also been reading with interest the first part of an introduction to the reciprocating detector, written by Badessa, in

The Australian EEB (June 1972)—quite a major scoop for this always lively journal devoted to "common sense electronics", which makes it clear that the original object was to develop a detector for double-sideband suppressed-carrier transmissions, but in doing so has resulted in a flexible detector for cw and ssb as well.

Here and there

Once again we have had to hold over a number of readers comments and ideas, but it has always been our aim to achieve some sort of balance rather than attempt to crowd in large numbers of unrelated items. We will certainly get round to some of them in the months ahead.

In the atu for the "stretcher" long wire aerial (Fig 2 October *TT*) the coils marked L1 and L2 were reversed; the greater number of turns should be used of course for the tuned circuit and not the coupling coil.

In the notch filter (Fig 7) we referred to the values of R, R′ and C, C′ for 174Hz but omitted the values from the diagram: they are 10KΩ and 0·1μF and of course the frequency can be changed by varying this time-constant, provided that R and R′ are always the same and C and C′ always the same.

John Piggott, G2PT, draws attention to reed resonant filters used in industrial control applications which can have passbands of only 0·65 to 0·9Hz (*GEC Journal of Science and Technology*, Vol 39, No 2, 1972).

MICROWAVES—1,000MHz and up

(Continued from page 741)

and go from wall to wall in the other direction. A convenient method of supporting it is to prepare a length of expanded polystyrene (which is transparent to microwaves) to fit inside the guide, slice this into two and then sandwich the attenuator between the two halves. Dummy loads can obviously be made in the same way. Even quite low value attenuators make good loads: a 10dB attenuator should have a vswr of less than 1·3:1, and a 15dB attenuator less than 1·05:1 due to power passing back through the attenuator.

In other journals

Two articles of especial interest have been noted in other journals. There is an excellent article by K2RIW in the August edition of *QST* which describes the construction of a lightweight 12ft dish which, when disassembled, can be carried in the boot of a car, and which only takes 45min to assemble. The dish has been used on 70cm and 23cm, and also on 2,287·5MHz to listen to Apollo transmissions directly from the moon. Besides giving in detail the novel construction techniques used, the article also manages to fit in much useful practical information on, for example, the effect of errors in the shape of the dish, the properties of different meshes used as the reflecting surface, something on multiband feeds, an efficient 23cm feed, and a circularly polarized feed for 2,287·5MHz.

In the August/September issue of the French journal *REF*, there is a transistorized troughline converter for 13cm by F3PJ and F3FC. An unusual feature is the use of a transistor (BFR90) as the mixer.

BOOK REVIEW

The Radio Amateur's VHF Manual by Edward P. Tilton, VHF Editor, *QST*, with fm chapters by Douglas A. Blakeslee, Assistant Technical Editor, *QST*. Published by the ARRL. Obtainable from the RSGB Publications Section, 35 Doughty Street, London WC1N 2AE. Price including postage £1·30. 352 pages

This manual was first published in 1965 and had a second edition in 1968. Since then developments in vhf techniques have been so rapid and numerous that a third edition is not before its time. Its sphere is the world above 50MHz; a world, as the preface points out, which has always been prime experimenter territory but is now increasingly a communicator's world, as well. This means that more sophisticated equipment and tighter specifications become the trend, and devices and techniques arise which make greater demands on our understanding. To meet these circumstances *The Radio Amateur's VHF Manual* has been completely revised for the conditions of the 'seventies, but it is still in the language of the amateur, and the treatment of the less familiar techniques should be appreciated by those of limited technical background, and the better equipped reader, alike. The explanations are simple, but very sound.

The present edition has three new chapters on fm; one on theory and techniques, one on fm transmitters, receivers, and accessories, and one on repeaters; it is 32 pages thicker than previous editions, and has the familiar *QST* format.

The opening chapters give the history of the higher frequencies, and the characteristics of the various amateur frequency bands as regards propagation, with particular attention to tropospheric bending, back scatter, transequatorial propagation, ionospheric, tropospheric and meteor scatter. There is a page of data on meteor showers, with dates and times. A feature of the manual is the extensive bibliography at the end of each chapter; for instance, that on propagation has 25 references to articles in *QST*.

The chapter on the theory of vhf reception discusses suitable transistors for the several bands, and reassures the older amateur that "many inexpensive and reliable tubes do an entirely adequate job in receivers for 50 and 144MHz." There is a useful treatment of front-end design, and mixers, using semiconductors or valves but, reasonably, the constructional chapter describes only semiconductor converters, and concludes with a valve "blanker" particularly useful against radar interference.

A chapter on transmitter design precedes one, the longest in the book, with constructional details of a valve vxo exciter suitable for 70, 144 and 432MHz work, and a transistor vfo at 8MHz. In both cases frequency modulating the exciter is described. Then comes a 144MHz exciter of 10W output used at W1AW with a pa of 500W, both described in full detail, an 829B pa for 144MHz, and some kilowatt and 220MHz designs which are of limited interest here.

Transceivers, transverters and transmitting converters get generous treatment in a 28-page chapter. Aerials and feed systems are covered in theory before getting down to the building and use of vhf aerials. These are really comprehensive chapters—about 67 pages in all.

The new chapters on fm cover not only theory and techniques, but practical construction of receiving adaptors, receivers for 50, 144 and 432MHz, a transmitting adaptor, and a transmitter for 144MHz. Converting surplus is investigated and projects described; an fm sweep generator, and an "FMer's" frequency standard are included. Repeater stations are explained in theory and practice.

The manual ends with good chapters on the uhf frequencies, test equipment, and the causes and cures of interference; and some very practical tips called "Bits and Pieces".

The earlier editions were justifiably popular, and this one is certainly a worthy successor; it is a book which will be valued not only for the help it brings, but for the pleasure a well-written and beautifully produced book gives the reader. *T.P.A.*

FOUR METRES AND DOWN

by JACK HUM, G5UM*

Around the houses with GB3PI

The other Saturday we were given a demonstration run around Cambridgeshire in the G3USB Cortina. No, Richard Baker was not thinking of selling the vehicle; he had in mind selling something rather different, nothing less in fact than the new GB3PI repeater experiment now going on in Cambridge. And we will declare straightaway that by the time the dem was over he had certainly sold it to us.

In the left-hand glove compartment of the Cortina sat the familiar shape of an amplitude-modulated Cambridge, busily hissing away on the mobile channel at 145MHz. Next to it was a compact fm transceiver set up to give on 145·15 and to get on 145·75, respectively the up and the down channels of the GB3PI repeater. As G3USB/M moved off from the Pye factory where the repeater is installed in a little wooden hut in the yard, the silent fm background was broken by a powerful signal from G3VEH/M triggering GB3PI from a village three miles away. Soon other members of the Pye team involved in the repeater experiment had checked in through G3USB/M, each of them transmitting on 145·15 into the repeater and each receiving the others on its outgoing 145·75MHz.

Meanwhile, back on 145 a mass of heterodynes was overlaid by the plaintive voice from the car of a Cambridge old-timer saying "Sorry, no copy, old man" to another a.m. mobile three miles away. He could not have known that he was inadvertently demonstrating the inferiority of point-to-point a.m. by comparison with through-repeater fm. Richard Baker assured us that this was a fortuitously happy accident.

Further to convince us that there was "positively no deception" and that the two aerials on his vehicle were indeed connected to the right rigs, he invited us to hop out and take a look. Surely enough, the halo was connected to the Cambridge for horizontals on 145: on the other rig a $\frac{5}{8}$-wave whip sprouting from the vehicle's offside fin registered with the two vertically-polarized dipoles, one for send the other for receive, at GB3PI.

Not only was the superiority of via-repeater fm demonstrated: what also became clear was the merit of vertical polarization for mobiles. At a base station vertical-omni may be achieved with the simplest of aerials. On a vehicle an unobtrusive resonant rod gives compatible polarization. Long term, one could envisage "vertical" becoming the norm for vehicles, and the "'orrible 'alo" disappearing altogether as horizontal phases out.

Of course at home stations horizontal will never phase out. Herein lies a further advantage; there is a 20dB loss comparing horizontal with vertical. This will discourage "horizontal" home stations from breaking in on "vertical" repeater channels: there is no need, for they can get their communication by normal means.

Nattering and repeaters do not mix, we said on another occasion. Our trip around the houses blipping GB3PI from G3USB/M confirmed this view. When on the move you just do not wish to talk for very long. Quick finger on the button (*à la* G3BA at VHF Convention) and the info is passed across.

You interrogate the repeater at Cambridge by bleeping a 1,750Hz tone at it on 145·15 and if someone is not there to talk to you the thing just morses GB3PI automatically through an ingenious digital ic box, and drops out. If someone *is* there to talk to you, a minute's talk-time is at your disposal. After that the repeater shuts you off (and up) until you access it anew with a further bleep. It is surprising how long one minute of time actually is. You rarely need as much when talking on the move.

Excessive deviation, one of the banes of the fm mode, does the wide boy (in the frequency sense) no good at all if applied to GB3PI, for the repeater boxes, tailored to the standard IARU 3kHz deviation and sharply filtered, will distort him if he offers any more deviation than that. Unrecognizable, no one will want to talk to him. Factually, the filter cuts by as much as 60dB at 6kHz out.

Two very different filters at GB3PI are those interposed between rig and aerials. Could you keep *your* transmitter out of your receiver if it was only 600kHz away? That is what they are for.

* * *

In our third sentence we remarked that we were sold on the repeater system as it is operated experimentally at GB3PI. We think others who could enjoy a similar demonstration to the one we had would be equally convinced.

But they and we would rapidly become unsold again if this aid to communication were to become abused by inane use (not likely from the generality of commonsensical vhf folk), or were to function unreliably (not likely in the hands of technically well versed groups like the Pye one), or were to be administered inefficiently (equally unlikely: this is via the RSGB VHF Committee to the MPT exactly as the beacons are, and the Society pays the £3 licence, just as it does for the beacons).

Reservations about repeaters voiced by the membership are just about cancelled out by the expressions of positive interest in them. So in conclusion we would assure the doubtful that no repeater would be established in an area where it was not required by the membership, and we would say to the eager beavers who clamour for ". . . a 2m repeater *now*" that your enthusiasm is respected but you will need to state a good case for it as an aid to mobile and/or poor terrain communication; thirdly, that where repeaters are established there is no compulsion on anyone to use them; and lastly, the GB3PI experiment is at present but a few months through. By next spring as it approaches its twelve-month all of us will know a great deal more about it.

October opening

Older timers said there had been nothing like it since the Great Smog of '62. Newer timers compared it with June of 1970, when you could exchange RS59 with DJ on 432MHz as easily as rolling off a local. Newest timers declared that they had never heard anything like it before.

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Now hundreds of QSLs will be on their way to places many members had never worked before, eg OZ on 70cm and OK on 2m. Scores of FMD Certificate claims will be piped into the waveguide. For all who participated, the week ended 7 October with its climax on Thursday 5 October (500 miles on 5W at S9 commonplace) will not easily be forgotten. For unfortunates who did not, there is always the consolation that it is bound to happen again (perhaps even a smog *this* December!).

It was exciting while it lasted, and no surprise at all to metre-wave men who can read the portents for a big opening. Many will give you a forecast simply by *looking* at the weather, though the barometer's magic moment when the high pressure eases back a notch is the augury they wait for. And exactly according to the book the North Sea anticyclone which was the cause of it all, building up for weeks before 5 October, gave predictably dramatic propagation along the N-S axis when the mercury sagged.

Well, *how* dramatic? Working 84 stations on 70cm and only 12 of them British, from as far north as Aberdeen, is remarkable by any reckoning (GM8FFX/A). To many 70cm men simply getting that OZ was satisfaction enough. Or if you had never before worked out of these islands on 432, a DJ or a PA or two would be welcome, eg Sheffield's G3NHE invited a Berliner to change from 145·41 to 432·1 and found the 70cm signal just as good ("Mind you, he had 700W and a 21 over 21 . . . even so, nice to get my first on 70cm outside the UK," adds Martin Dann). To GM3UAG, Berlin's DL6QY at 683 miles was only three miles short of the UK record on 70cm.

Big aerials and high power were two Continental characteristics that surprised and impressed British operators, eg again, OZ6OL with 80-el and 500W or PA0HRB with 60-el, and even a portable, DC6XS/P with 20-el out.

More metal aloft was not the only lesson our European friends had to tell us through the tropo. Another was the universality of the vfo. When it was a case of "no co-channel, no contact", with ssb the preferred mode, some of the UK ex-vehicle left-over rigs seemed to show their age and inflexibility. And it did not need always to be QRO sideband: with only 2W p.e.p. on 145·41 firing straight into the Pennines from Burnley, G3YZH earned an RS57 report from a surprised DK5LA at 800km. Nearby G3PFR roped in many new ones, from north GM to south DJ to bring him to 13 plus 76 worked and 11 plus 52 confirmed, towards his claim for the FMD "Senior", wholly on ssb. But "Doc" Dixon, like many others, laments the intrusion of fm on to 145·41. As we have remarked here before, it can do little or no good on a sideband calling frequency.

Surprise in reverse from Germany to the British: many of us were amazed at the great strength of the German repeaters, these being triggered off by local mobiles and then heard over here. And not always local mobiles: G3USB/M triggered eight German contacts via DB0ZA which is near the Danish border, plus another large clutch of German and Danish stations via OZ3REI, which accepts on 144·15 and gives out on 145·75MHz. Those worked included one each Danish, Dutch and German mobile, no doubt to *their* surprise, in turn. But then, that is how conditions were on 5-6 October: Richard Baker estimates that both the OZ and DB repeaters were giving his car receiver at least a microvolt of signal on 2m. His boot-mounted transmitter has 80W to a pair of BLY89As, with plenty of crystals switchable to Continental repeater channels (as well as to GB3PI) in anticipation of just such an opening as the October one.

Busy man's guide to Oscar 6

Getting in the daily bread must come first and Oscar 6 second, much as many of us would wish it otherwise. How can the mundanely preoccupied radio amateur make the best use of the orbital satellite without its devouring too many of his precious man hours, and without the need to mug up the prediction mathematics for tracking it?

First of all, waiting for it to come up from the south, keep your beam thataway and when the moment arrives get ready to track your beam S-to-N to follow the satellite's brief passage. This is the time to let off a blast (but please do not use high power!) on 2m between 145·9 and 146MHz, preferably below 145·95 to avoid the fixed beacon stations. Your signal will come out between 29·45 and 29·55. And remember if you are a G8 you may still use this translation facility into 10m (see p. 504, August).

Thirdly, in order to listen on the down channel 29·45-29·55MHz any old bit of wire will not do. If you do not already work the hf bands try a dipole slung north-south so that it will receive best east-west (16ft coaxial fed in the middle should do the trick). This aerial will be useful also for monitoring the 29·45MHz beacon.

When? Oscar 6 should have travelled up the west coast of Denmark on its second orbit. Its third orbit takes it 28·74° farther west, and *that* happens one hour 55 minutes later. Keep on adding another 28·74° of longitude and another one hour 55 minutes of time and you have a rough approximation of when Oscar will be back on a track that favours the UK. That is the time to switch on.

Bandplanning

Members have asked how the vhf bandplanning recommendations from the IARU conference in Holland last May (see report in July *Radio Communication*) are likely to affect the well ordered zonal bandplanning we have enjoyed in the UK for many years past.

The subject was discussed at a meeting of the Society's VHF Committee last month, when representatives of mobile and RAEN interests, and G3DAH of *Short Wave Magazine*, were present. It was agreed that only very minor "mods" would need to be made to the existing geographical bandplan, subject to the approval of Council, and these seek to add the following fm channels to it: Zone A 144·40, Zone B 144·8, Zone C 145·2 and Zone D 145·6. National calling channel for fm: 144·48MHz.

On 70cm, however, the story is rather different. Practical experience on this band has shown that for some time past there has been no need to plan it geographically. Instead, the following occupancy arrangements are recommended:

432-432·1MHz telegraphy; 432·15MHz single sideband; 432·1-433·45MHz all modes; 433·45-433·5MHz beacons, for the time being; 433·5-440MHz television.

A calling frequency of 433MHz is recommended for use by mobiles, whether a.m. or fm, and spot frequencies for fm on 432·48, 432·8 and 433·2MHz. These spots will be easy to remember: the decimal digits correspond to those in use on 2m for similar services. As for teleprinter work on 70cm, a frequency of 433·3MHz is suggested.

The new "low power band" which the amateur service is to be given on 1 January of next year, 430-432MHz, will be particularly useful for duplex phone and as a talkback

segment for use by microwave operators. More about this nearer the time.

Relevant to bandplanning is the following . . .

Need a different crystal?

Under normal propagation conditions on 2m, tuning low to high (or high to low) is a waste of time. A man in Leeds is unlikely to hear anything lower than Zones D and C. A man in Salisbury is unlikely to hear anything higher than Zones A and B. A few weeks' experience of operating on 2m demonstrates that it is more economical of time to tune selected areas, not the lot. Increasingly, people announce "Tuning Zone A only" or "Zones C and D only" or whatever.

Result: poor old Grundisthorpe who is stuck with an out-of-zone crystal finds no one to talk to. They stop tuning at 145·1. He is just 50KHz away but nobody knows he is there. And it is all his fault. When he bought that new transmitter the crystal which came with it was not in his zone (he should have asked before buying).

Using the "Xtal Xchange" service in *FMD* may be the answer to his problem. All he need do is tell us the frequency of the unwanted and unloved crystal he wants to dispose of, and the frequency of the crystal he will require to get him in zone and we will publish the information here. Someone somewhere may have the crystal you need to help you get communicating again: remember to quote pin spacing offered and required.

Contest commentary

If you missed out on the two October sessions of the 70MHz Cumulatives (new transmitter not completed, new G4B— — ticket not received in time) never mind: there are five more to go. You qualify for a place if you enter only three of them—but see the rules on page 623, September, and particularly Rule 10b. All "four meteorites" will note with pleasure the civilized "clear of tv" operating times 10am to midday Sundays which apply to this series, a great improvement over last season's, held in tv hours.

For another important contest this month, the 144/432MHz telegraphy, there should be a number of bright sparks around, if we may be forgiven for saying so (5 November). Last year tacticians had to ask themselves: "Is it worth quitting 2m for 70cm?" This year they have their answer on p 539, August: *a multiplier of five will be used for* 432*MHz contacts.*

* * *

Now a procedural point taken up with the VHF Contests Committee: Is it within the spirit of a contest to work more than one station at a time? Increasing numbers of portable stations, with two receivers and plenty of operators available, have been doing so. Other contestants like it not.

Says G2HIF, Cliff Sharpe, writing to *FMD* from the VHF Contests Committee: "I am against any restrictions on the number of receivers in use by any one station because it gives the less experienced members of a club a chance to take an active part in major events. On the other hand, I am dead against working several stations 'in parallel'. It is not so much the 'fairness' aspect (I am not convinced that it gives an advantage) but I do think it represents bad manners and bad operating procedure."

* * *

Something rather different: the BATC television contest. The big effort put forth by the Dunstable Downs club may not be typical, for few have their magnificent resources (caravan as studio, a 110W video transmitter in an awning attached to the 'van, both 625 and 405 line available). What the effort did show was the country-wide enthusiasm for video, for no fewer than eight counties were worked two-way by G6AEV/T up on Dunstable Downs plus another 12 counties one way (including Huntingdon, rare enough on A3 on 70cm). And all this in eight hours of operating during the first weekend of the BATC event.

Midnight to midnight 11-12 November the UK FM Group run a contest for their members, F3 transmission only, on 4m, 2m and 70cm. An sae to G8CKT will bring a copy of the rules.

Parchment piece

Unusually in claims for the FMD 144MHz Transmitting Award there were only two G8 cards in the batch forwarded to the VHF Certificates Manager by G3PJK. Reason: Vic Mee began collecting 10 years ago, long before Class B men were on 2m, but the cards have been slow in coming. He rates the experience as ". . . very different from 4m in the early days where the counties were difficult to work but the QSLs easy", evident enough from the fact that G3PJK holds the second ever 70MHz Transmitting Award to be issued. It is No 2 dated 1963. Now he gets 2m award No 283 which we hope will help to cheer a rather extended illness Vic has had to bear (four months in hospital and another six to be faced away from work).

Cards of many years' collecting turned up also in the offerings of GM3JFG, some for auroral contacts in the early 'sixties, others for super-dx ssb from Invergordon to the far south. Deservedly, after activating so many Scottish counties during his portable expeditions that helped other members with their FMD claims, Iain McHardy now gets 2m parchment 284.

On the subject of laggard QSLs, G3BW reaches for the 2m Senior with all 60 British counties confirmed but no EI or Continentals towards the 15 countries required, which is an all too common comment. So far as Cumberland is concerned Bill Hodgson adds: "If anyone wants a sked with this rare county, sideband or cw, I will be only too pleased to oblige. When I say I will always QSL this is no false promise, for I know how frustrating this part of the act can be."

* * *

Another slant on the QSL situation is provided by G2DP. Noting *FMD* comment about slowness of QSL returns he writes: "I have several thousand unclaimed G3Y— — and G3Z— — cards in my house awaiting envelopes. There will have to be a big bonfire one day." One wonders how many G3Y and G3Z men are short of verifications for their *FM D* claims simply because they have failed to lodge SAEs with Fred Hoare at 63 Mill Road, Three Bridges, Crawley, Sussex.

* * *

Other claims handled by your "VHF Certsman" before the influx caused by the October opening were: 144MHz Transmitting No 273 to GW3ZSS/P (Peter Bacon's forays from home QTH at Lichfield helped him get this one in short order), 274 to another portable, G8DYC/P, 275 to G3GBH in spite of slow-coming QSLs (see p 683 last time), 276 to G8BPN, 277 to G8ERM, 278 G8CQW, 279 G8FFC, 280 to G8FUI, and 282 to G3XTT. Two well-known Scottish operators collect Nos 281 and 285, GM3EOJ and

GM3ZVB, with a considerable proportion of the cards representing auroral contacts.

Posted to BAOR, G8CEA says his hopes to achieve the first ever 144MHz Senior Award in the portable mode have ground to a halt at 10 plus 58. If you hear G8CEA/LX or F0PV you will know Capt Spencer is taking some leave. New DL call to be notified. Then QRV on teleprinter 144·6.

"Now QRV. . ."

There could be only one repository for a self-evident callsign like G8GPO. Yes, it is now owned by the Post Office Amateur Radio Club at Middlesbrough. "We had to wait two months for it but it was worth while," remarks club sec Graham Gaunt, G8CDP. Reports from distant listeners in the south will be welcome. The 2m rf will come off a 14-el at 100ft up. "Seventycems" is to follow. QTH for sked-fixing is 200 Marton Rd, Middlesbrough.

Much farther north, another group which seeks 2m schedules is that in Caithness, which in vhf QRB terms is 250 miles from the GM border at Gretna Green (and 420 from Leicester), and dx to most people. A recce to a hill overlooking the Pentland Firth suggested that propagation to the south has possibilities, many Midland stations and even F-men being heard during the recent openings. Now there is to be regular Monday night activity from 1830gmt on 2m either from the high ground (weather permitting) or from home sites, both A1 and A3. "Anyone desperately wanting Caithness and willing to make skeds should write to me at Ormlie Lodge, Thurso," says Andrew Symonds, GM8DQK.

"I would like meteor scatter skeds, especially for the Dec/Jan showers," says G3WSN. Letters to Keith Fisher at 88 Longmead Ave, Great Baddow, Chelmsford, Essex. He has 150W and a 12 over 12 at 45ft with tape keying available. Last month's Giacobinids produced low order but distinct returns off Meldrum on 58·25MHz.

Last words (pro tem) on low power

"Support for a 5W contest is considerable and no doubt the VHF Contests Committee are giving the matter consideration. Could they not also stipulate the dissipation of output devices used in VHF NFD in the manner employed for HF NFD?"—G3IZD.

"More consistent QSOs are obtained with high power, reports increasing in proportion to the power. In the study of propagation over extended vhf paths, low power is of little use. Building only a 5W rig tends towards degenerate constructional techniques, in transmitters at least. Cross modulation is a receiver problem and should be treated as a challenge to receiver design"—G8CXV, whose transmitter is switchable 120W to 0·75W.

"Some of our G8 plus 3s think that a QRP Contest should be added to the Contests Calendar. *But*—all home-built, solid-state gear, including the receiver to encourage the state of the art"—G3LXP, writing in *Verulam ARC Newssheet*.

Good site guide

"Who will produce a Good Site Guide for use by intending portable operators?" asked G8DVD last month. Now G8DXD of Worcester (". . . a keen portableer") has offered to produce one. He invites those with info about good sites to send him the following:

Site name, height asl and county; site NGR and/or QRA; position and bearing from nearest town or village; route to the site using an ordinary private car (not a Range Rover); does any vhf group habitually use it during contests and in which bands?; and finally, from whom should permission be obtained, if this is required?

Letters to G8DXD, D. G. Hobro, 15 Back Lane South, The Moors, Worcester WR1 3DE, who offers to correlate the site guide material for eventual publication.

Additional information which G8EPA thinks should be provided is: what are best take-off directions? Is the terrain suitable for parking cars? May masts be put up? And what professional services are already there? "My receiver doesn't like 1kW rigs on 146·1, often found on hilltops!" adds Steve Carter.

What they say

"If my ssb on 2m sounds a bit higher pitched than usual, then you're hearing my sister Barbara, amateur radio certificate No 1609, while waiting for G4BYL"—G3YZH of Burnley.

"Have operated 2m portable from more counties than I have had confirmed. Why, oh why, don't people want to send cards *to* a /P station?"—G8EPA.

"Our thanks for all the assistance we received from many people during our recent dxpedition to the Border counties. Locals from the counties visited suggested sites and even came up and offered hospitality. The age of chivalry is not dead"—G3ZUL.

"I'm following the *FMD* advice and learning cw. Not that I hear any cw in this area but at least I'll be able to read the beacons! Anyway, I have booked my G4 callsign"—G8DVD of Cumberland.

"With help and tuition from nearby G3ZGN and encouragement from *FMD*, and despite sitting O-levels in June, I passed the morse test in July. My birthday occurred in June. So 15-year-old G8EYN is now 16-year-old G4BIN. And special thanks to the staff at Highbridge Radio Station"—G4BIN of Dorset.

"A Radio Canada broadcast said that the last morse code message for official traffic in Canada was made on 30 May 1972. The present microwave service is capable of speeds up to 50K wpm compared to an average of 50 wpm for a good morse operator (hi!). As one who can manage 6 wpm is it worth bothering to try to get G23ECT in a few years' time?"—G8ECT.

Procedural points

"Some amateurs think the only frequency in the 2m band is their transmission frequency," says GW4BDO of Swansea. He adds that if co-channellers could be persuaded to search more often they would be surprised how many stations were calling them, a point made frequently here. Co-channel has its charms—but so does searching around a bit.

Even so, it is always a good thing to check one's own channel first, a fact amply demonstrated by VHF NFD this year, when laboriously "tuning high to low" simply lost points. To GW3ZTH it was at once amusing and irritating to note how many A3 contestants said they were tuning from 144MHz up, ". . . not that they could resolve cw around 144, let alone ssb with no BFOs on. How can anyone hope to win a contest unless they can receive all modes?"

When G3HGY of Hinckley visited his son GM4BKO at Thurso he had the opportunity to attend the reception laid on by the Caithness ARS in honour of President Tim Hughes, G3GVV, during his tour of northern radio clubs. Later GM—(for the day)—3HGY/P maintained 2m contact with the President's car while GM3GVV/M drove back south down the A9. Many members of the North of Scotland 2m net are in this picture: back row, l to r: G3HGY, P. Maclaren, GM3SYO, A. Mowat (officer i/c Wick Radio), GM3POT, G. Forrat, GM2FLQ, GM5AGM and GM8DQK. Front row: GM4BKO (son of 'HGY), GM3SFH (son of 'FLQ), GM3VGM, chairman of Caithness ARS, then President 'GVV, Council member GM3AEL, and GM3JUD

Next a comment from the north-west. Says G2CUZ, Norman Horrocks of Southport: "Who the blazes can sort out a 2m phone signal in a contest when the whole call is gabbled at high speed with no phonetics, and the whole lot in need of a descrambler? Let's have some good manners, and dare I mention the word, sportsmanship, instead of the modern variation, gamesmanship."

Here and there

An urgent requirement exists for donations of the following valves to help keep GB3LDN, the London 23cm beacon, on the air: DET24/TDO-20, TDO-3-10 and QQVO2/6, or direct equivalents. Donations to G8AOL, B. W. Godwin, 20 Pembury Road, Bexleyheath, Kent, who adds: "The cost of building GB3LDN has been met by the builders, G8ARM, G8AZM and G8AOL, but the cost of replacement valves will be prohibitive".

Valves in another context, ie radiation hazards (see GW8BPG last month): there is, says G8GAX, Peter Howson of Preston, a useful Techlink No 740 on this subject called "Intense RF Radiation—Code of Practice". Club secs who wish to have a copy for the benefit of their members should write to ARR Technology Reports Centre, Techlink Unit, Station Square House, St Mary Cray, Orpington, Kent (no charge).

The newly formed Wireless Preservation Society, hon sec and curator G3KPO (Doug Byrne is also RSGB Area Rep), collects and restores early radio and electronic equipment and actually has World War I receivers in working order. Its stock of metre wave gear of the pioneer 'thirties could be made representative if enough old timers donate some. Do you have a 5m or 2m rush-box or "debased valve" transmitter you could spare for the museum? By the way, W. K. E. Geddes of the Science Museum is the society's president, and G2CVV a vice-president, with G4OO chairman and G2NJ vice-chairman.

Heard on 2m in the Colchester Club contest, G4YK. Yes, it was B. M. Morrissey alright, formerly G5YK, a callsign he has gracefully relinquished upon learning that its original holder, G. W. Thomas of Surrey, wished to return to amateur radio. Geoff Thomas was hon editor of *The T & R Bulletin* in its earliest days in the 'twenties.

Bert Allen, G2UJ

At their 11 October meeting, members of the VHF Committee stood for a minute's silence in memory of Bert Allen, G2UJ, news of whose death they had just received. He was one of them for many years. Indeed, he suggested forming a VHF Committee almost 20 years ago when he was a member of Council and conductor of this page. In his own quiet way he was a leader of vhf thought and practice at a time when to many it was "difficult" and esoteric. It is not like that any more, and G2UJ helped make it so. He will be greatly missed by all concerned with 4m and down.

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25 YEARS BACK

"At 1302gmt on November 5 Mr Denis Heightman, G6DH, of Clacton, Essex, established two-way telephonic communication on 6metres with Mr E. P. Tilton, W1HDQ, of Hartford, Conn, USA, signals being reported S9 both ways. Thus, for the first time the North Atlantic has been bridged successfully on a wavelength which up to a few years ago was regarded as suitable only for line-of-sight communication. . . . In the days following this first contact a number of other Gs and Ws linked up on 6metres."

RSGB Bulletin, November 1947

SWL NEWS

by BOB TREACHER, BRS32525*

RSGB QSL Bureau

The RSGB QSL Bureau is a service which most listeners use while they hold their BRS or A numbers. The present BRS and A sub-manager is Geoff Milne, G3UMI, but from 1 January 1973 J. W. Garrett, G3YOU, will be taking over this sub-section. The bureau handles thousands of QSL cards each week and on average each card has to be handled at least three times. When sending envelopes to the bureau nothing less than those of 6in by 4in are sufficient. Small domestic and long foolscap envelopes are very little use as many of the larger cards, such as those of JY1, have to be folded. All envelopes should have your BRS, A or callsign in the top left hand corner.

Some listeners who have only recently joined RSGB are somewhat impatient for QSLs. QSLing via the bureau may not be the quickest method of receiving cards but it is certainly the cheapest. The minimum time to allow is about four months from dispatch to the outgoing bureau. While on the subject of the delivery of cards, I would point out that 2½p or 3p stamps will take 2oz of cards. This is equal to about 16 cards—although the heavier the envelope the fewer number of cards received. The sub-managers will always wait until the full weight is reached unless they receive instructions to the contrary. G3UMI still has many rare dx cards from 1963, 4, 6 and 8 waiting to be claimed, so if you have no envelopes at the bureau, send some and you may be surprised at the number of cards which are returned. Finally, all outgoing QSLs should be sent to G2MI, Bromley, Kent BR2 7NH, and not to the sub-manager as this causes extra delay and expense and you may even get the cards returned to you.

Oscar 6

AMSAT-Oscar-C, or Oscar 6 as it has been called since its launching, is AMSAT's first communications satellite, and the third to carry an amateur radio translator into orbit. It is also the first amateur satellite launched since the creation of the Amateur Satellite Service in 1971, the first to transmit in the new allocation at 435-438MHz and the first to employ a 10m link. It is hoped by AMSAT that we will make maximum use of Oscar 6 during its expected one year life and they would like reports on its transmissions.

A reporting form which consists of three parts has been drawn up. These consist of general data about your own station, a summary of completed two-way contacts heard, and stations heard through Oscar 6 but not in QSO. Comments will be welcomed, in particular with regard to any unusual propagation you may have noticed. Supplies of these report sheets can be obtained from RSGB HQ and they should be sent to AMSAT, Telemetry Dept, PO Box 27, Washington DC, 20044 USA.

News from the post

Neville Spry writes that the dx is now to be heard at reasonable times of the day, with two YJ8 stations from the New Hebrides heard on 20m at breakfast time. Conditions on 10m were the highspot during September, with much dx heard, including A2, CE0, CP, DU, EL, FB8, FR7, JY, KX6, ST2, SU1, TU, TY, VR4, YJ8, 5N2, 7Q7, 9G1 and 9V1. However, Neville remarks that some two years ago, when monitoring this band, there were no signals to be heard at all and then suddenly JY1 would come through at R5 and S9 and half the world would be calling. This all goes to prove just how inconsistent 10m can be, but would we like it any other way?

Another regular correspondent is Chris Henderson, A7460, Beckenham, Kent, who also supplies a truly magnificent selection of dx heard. They include A35FX, CE3AOF/CE0, TU2DO, VR1AA and YJ8BD. Chris is really pleased with the performance of his B40 receiver but he is thinking of buying a more modern commercial receiver in the hope of increasing the selectivity. When he wrote, Chris was looking forward to the expeditions to FS7 and KS4 (Serrana Bank) late in October.

A new correspondent to *SWL News*, but an old hand at listening, is David Whitaker, BRS25429, who, like the writer, is an 80m addict. When David wrote he was busy compiling his entry for the Cray Valley Radio Society's Listeners Contest and this was taking up a large amount of his time. However, he was pleased with his score and thoroughly enjoyed the contest which was run over the same weekend as the SAC Activity Contest. This was surely a real test for the participants.

Another with a lot of experience is Richard Nicholls, who was top SWL in the countries table of 1970. He admits that he lost interest in the hobby for a while due to receiver troubles; however, he still has the "bug" and will try to find as much listening time as possible in an attempt to catch up on all he has missed over the last two years. The list of stations which Richard submitted proves that he has got back into the swing of things very quickly indeed.

Contributions and **up-dated scores** for the table to reach the writer by **Friday 1 December.**

Updated scores for 1972 Countries Table

	10	15	20	40	80	160	Total
A7460	124	206	194	95	83	9	711
BRS25429	112	153	199	79	119	6	668
BRS17567	116	199	203	34	79	5	636
BRS25901	78	141	201	69	78	3	570
A7780	100	138	119	50	58	6	469
BRS33364	52	142	146	42	37	2	421
BRS32524	52	110	133	46	63	4	408
A7545	45	93	107	46	54	20	365
BRS33370	60	86	108	22	38	4	318
A8037	48	79	71	19	26	1	244
A6265	38	55	81	29	25	2	230
A7784	52	56	69	21	26	2	226
A7768	—	96	70	6	19	1	192
BRS32635	—	62	80	12	24	3	181
A8094	33	18	63	8	34	3	159
A8178	2	56	44	5	14	3	124

* 392 Rochester Way, Eltham, London SE9 6LH.

THE MONTH ON THE AIR

by JOHN ALLAWAY, G3FKM*

MANY are the complaints these days concerning the non-arrival of QSL cards, especially those which have been sought from that Aunt Sally—the QSL manager. There *are* a few unsportsmanlike managers who seem to be pocketing IRCs and not sending out cards, but on the other hand the vast majority are doing the job as a service and doing it well. It may be just as well to remember that very often logs are not being received from the dx station and that a great deal of extra work is being made for the manager. It seems that logs from VS9MB are rather tardy in arriving and G3KDB wishes all to know that requests will be dealt with as soon as possible.

With effect from 22 November, USA amateurs will be permitted to operate on phone down to 3,775kHz on the 3·5MHz band, and to 7,150kHz on 7MHz. There are no other telephony expansions.

DX news

VU25FBZ, who is located on the Andaman Islands, has been living there for a considerable time and expects to remain there when he retires. His equipment consists of a home-built transmitter and a BC312 receiver, and he seems to favour 14,022kHz around 1600. It has been noted that he frequently answers stations calling up to 10kHz higher in frequency.

After 1 July 1973 repeater stations in the USA will use the WR prefix.

Latest news from *INDXA* includes a request that those who apply for *INDXA* QSL cards direct should not also send second cards via the bureau as this causes a great deal of extra work and wastage of cards. It seems that both ZK1MA and CR5AJ should have received equipment which can be used on five bands by now. Operation from Spratly Island is said to be quite possible during the first week in December, and negotiations are under way for some activity to take place from Juan de Nova. A permanent radio station is being constructed on Fanning Island (VR3) and it seems likely that some amateur activity might well be associated with it.

XV5AC hopes to be very active during both parts of the CQ WW DX Contest and will be on all bands. A51PN, who is located in Thimpu, Bhutan, has been heard and worked in the UK and seems to prefer a frequency near 14,077kHz. He has a slightly rough note and is to be found between 1200 and 1500. A51TY has been in India but should be on the air again by now. Hopes of early amateur activity from Burma seem to be slender according to 9M2IR who has just visited XZ2KN. The latter's equipment was confiscated recently as someone operated illegally in Rangoon and QSLs were directed to Tara.

W6MTE/HR6 has been on the air from Swan Is (formerly KS4 but now under the jurisdiction of Honduras). VP2AAA has left Antigua and QSLs for contacts with him may be obtained from W4DQS.

British military personnel in Malta are now using the 9H5 prefix and 9H1DL is now 9H5C. G3POX (ex-DL2OX/VK8OX) is 9H5D. Please note that the Gozo ARS QSL Bureau is now being looked after by 9H4G (Eric Rogers, Dar Ghall-Kwiet, Ghajn Melel St, Zebbug, Gozo, Malta) and not 9H4H as previously.

The holders of the special 7X7 prefix calls were as follows: 7X7B (7X2BA), 7X7C (7X2HB), 7X7D (7X2HM), 7X7F (7X2ED), 7X7G (7X0GA/7X0GM), 7X7H (7X2SX), 7X7J (7X2AJ/7X2AL), 7X7K (7X2BK), 7X7L (7X2LS), 7X7M (7X2OM), 7X7P (7X2SMA), 7X7S (7X2OH), 7X7V (7X2BH), and 7X7Y (7X2MD).

VP8LR is now active on all bands from the Falkland Islands and QSLs should be sent via WB4FIN.

Expeditions to GC/GD etc

Confusion is being caused by temporary holders of GC/GD/GI/GM/GW callsigns who do not deposit envelopes for the collection of QSL cards with the QSL bureau sub-manager of the area in which they have been operating. Many cards are being received after their departure and all who have operated from a different UK prefix area are asked to send SAEs to the appropriate sub-manager.

Dxpeditions

KC4AAA will be in the vicinity of Heard Island on board the USS *Eltain* during the first two weeks in November. It is possible that a short stop may be made on the island and it is also possible that Crozet Island may be visited. KC4AAA /MM has a KWM2, KWS1, and four-element 14MHz beam, as well as a vertical aerial.

W4GIW hopes to be on the British Virgin Islands from 13 to 15 November as VP2VAV, and possibly, also active from Anguilla on the 16th and 17th. W4GIW/VP7 was scheduled to have been on during the CQ WW DX phone contest.

KA1DX (Minami Torishima) should also have been active on all bands during the CQ contest (phone), and may be on again during the cw section. Transmitting frequencies will be: 1,800, 3,557, 14,195, 21,295 and 28,595kHz. Other frequencies will be used on cw. Operators are likely to include KA2AA, KA2AS, KA2BL and KA2DX. JD1ADG may also be on at the same time.

VP1A and VP1WMU will be very active during the week-end 25/26 November on 7MHz cw in the CQ WW DX Contest. W5WMU will be one of the operators and hopes to do some all band operating for a few days before and after the contest.

JA3DJ, JA3DWT and JA3GZN expect to visit Bhutan during the period 7 to 13 November and operate on all bands 1·8 to 28MHz.

Maritime mobile

Two /MM stations have now been established on board the 14,000-ton bulk carrier mv *Sugar Producer*—by Les Anderson, G3ZXH, and Pete Bowen, G3TZL. Both are radio officers on the ship, and it is believed that this is the first time that two amateur stations have been established on one ship in the British Merchant Navy. G3ZXH/MM has a

* 10 Knightlow Road, Birmingham B178QB.

Sommerkamp FT-277 and Hustler trap aerial, and G3TZL/MM uses a Yaesu FT-101 and 66ft wire aerial. Spot frequencies (on all bands 7 to 28MHz) are 013, 020, 053, 138, 141, 198·5 and 276kHz above lower band edges (only the first three on 7MHz). The ship's current trip is to Mauritius and both stations will be looking for UK contacts in early mornings and late evenings (ship's local time).

The ISWL

The International Short Wave League now has a station on the air using an FT200 and TA33 beam. Its callsign is G4BJC, and the league runs regular nets on Friday on 3,650kHz at 2100 *local UK time*, Sunday on 14,250kHz at 1400 gmt, and on Sunday on 21,360kHz at 1200. Callers are welcome and may qualify for the Monitor Award by contacting 25 members since 1 January 1970. This is the league's silver jubilee year and it has members in 108 countries. Membership details and lists of members (price 10p) may be obtained from Eric Chilvers, 1 Grove Road, Lydney, Glos, GL15 5JE.

Awards

The request published in July *MOTA* for information on those organizations who seem to be tardy in dealing with award applications attracted only three nominations—the Budapest Radio Club for the BP Award, the Bulgarian sponsors of the RSD Award and the ZB2RE certificate. Your scribe can obtain no joy from the SP DX certificate sponsors.

Club re-formed

The Radio and Space Research ARC has been re-formed and is active on all bands 3·5 to 144MHz. Its callsign is G3RRS, and officers include Dr J. A. Saxton (President), G3UKS (Chairman), G3WCB (Vice-Chairman), J. Crawford (Treasurer), and G8BHK (Secretary).

Top Band news

W1BB has kindly provided details of the forthcoming 1972-3 season of 160m dx tests.

Transatlantic tests will take place on 19 November, 24 December, 14 January and 11 February, between 0500 and 0730.

Transpacific tests will take place on 18 November, 23 December, 13 January and 10 February, between 1330 and 1600.

In all cases W/VE stations will transmit between 1,800 and 1,807kHz. During the transatlantic tests dx stations should transmit in the "dx window"—1,825-1,830kHz. Otherwise they should use 1,800-1,805kHz. JAs are restricted to 1,907·5-1,912·5kHz, and ZLs to 1,875kHz. Procedure will be for calling of "CQ test" for the first 2½ minutes of alternate five-minute periods and spending the second 2½ minutes listening for replies. The W/VE stations will lead off the first period in each test. Please report results to G3FKM and Stew Perry, W1BB, 36 Pleasant St,Winthrop, Mass, 02152, USA. Remember that these are *tests* and *not* contests!

VK3CZ has sent along sunrise times for the VK3 area. They are as follows: 1913 1 November, 1900 15 November, 1857 1 December, 1855 15 December, 1857 1 January, 1913 15 January, 1930 1 February, 1946 14 February, 2004 1 March, 2019 15 March, 2036 1 April, 2049 15 April, and 2104 1 May. Best times for UK/VK propagation are from half an hour before sunrise to quarter of an hour after. Arthur promises to be on 1,802kHz daily at these times unless he receives advice of a better frequency (A. Berry, Box 27, Warburton, Vic, 3799).

News from overseas

Doug Hutchinson of Racal Electronics South Africa Ltd, writes to tell us that Frank Schneider, ZS6GE, is on or about 14,300kHz ssb between 1600 and 1900 most evenings. Frank is with the 12th South African Antarctic Expedition and the callsign to look out for is ZS1ANT. Previously a Racal employee, Frank's station not unnaturally comprises a Racal TA127 transmitter and RA117 receiver, the station being used for regular communications services during working hours. QSLs for contacts with ZS1ANT should be sent via the SARL bureau. Using the callsign ZS1AMB, another operator with the expedition contacted (on 7MHz) a ZS station while travelling on a dog sled many miles from base. In this case a Racal TR28 transceiver (standard dog sled/M equipment!) was used.

The latest issue of *NARS News* includes the information that Eric Sherlock, G3BQH, (formerly 5Z4ESH and 9G1ED) is back in Nigeria after a nine-year break, and has been reissued with his 5N2ESH call. He has a Collins S-line, three-element beam, and 14AVQ vertical aerial. Gordon Bracewell, G3EGK, another NARS member, will be c/o GEC Australia (Pty) Ltd, 201/209 Pacific Highway, N Sydney, NSW, by the time this reaches readers.

A. L. O'Donnell, VK2AOO (c/o United Nations, PO Box 107, Katmandu, Nepal), is on a telecommunications mission for ITU in Nepal, and hopes to be very active when he receives his 9N1 call. He has a Yaesu FTDX 560 and may also acquire an FL2000B linear. Both cw and ssb will be used, mostly on 14, 21 and 28MHz, but there will also be some 7 and 3·5MHz activity. VK2AOO has previously held the callsigns 9M2UF, ZC5AL, and most recently EP2DL.

Martin, GW3VBX, and his wife Linda, GW4ADB, are now VK4VU and VK4VV respectively. Martin has been worked around 0800 on Sundays on 14,258kHz, and is on regularly at this time looking for UK contacts, especially CHC/FHC members. His address is PO Box 638, Brisbane, Queensland, 4001, Australia.

Contests

International All Austria Contest—160m

1800 11 November to 0400 12 November

CW only. Austrian amateurs are restricted to 1,823-1,838, 1,854-1,873 and 1,879-1,900kHz. Exchange RST and QSO number; the latter must be repeated by both parties to each contact. Contacts count one point each, and the multiplier is the number of prefixes worked—each OE prefix counting as two. Logs should show date, time, frequency, station worked, number given, number received, multiplier, and points claimed. Listeners may also take part and should log similarly, but the same station may only appear three times in succession in the log, after which five other contacts must be entered before the same station appears again. Send logs, together with a declaration that all rules have been obeyed, to Ing Gustav Benesch, OE7GB, Wolkensteingasse 4, A-6020

QTH Corner

A51PN	Pradhan, Post Office, Thimpu, Bhutan.
CN8HD	via DL9WC, R. Troitzsch, Schulstr. 40, 2057 Reinbek, Germany.
C31CH	via F8YY, M. Danvel, 14 Av Frizac, 31 Toulouse, France.
C31FD	via DL2BK (new) Widdelswehrsterstr 3, 297 Emden-Hilmarsum, Germany.
C31FQ	DJ5PN, Kriegerheimstr 13, 56 Wuppertal-E, Germany.
CR3AB	(new) via K3RLY, Bud Kellam, Box 125, Simpsonville, Md, 21150, USA.
FP8DH	via VE6AYU (see 8R1N).
HB0XTI	G3BID, E. M. Wagner, 5 Ferncroft Avenue, London NW3.
HB0XTL	F8TH, 8 Rue des Chariots, 95 La Frette-Sur-Seine, France.
JT0KOK	via OK1KZD, PO Box 105, Prague 6, Czechoslovakia.
KS4KZ	WA8TDY, J. Kroll, 3528 Craig Dr, Flint, Mich, 48506, USA.
TL8LI	BP 1385, Mobaye, Central African Rep.
VA3HAM	via VE3GCO, G. V. Hammond, RR4, Main St, Atwood, Ont, Canada.
VK9GO	VK2ATZ, Box 1, Teralba, NSW, 2284, Australia.
VP2VAP	Box 200, Roadtown, Tortola, British Virgin Islands.
VP8LR	via WB4FIN, 5608 Idlewood Lane, Louisville, Ky, 40291, USA.
VR1PA	Box F-82, APO San Francisco, Cal, 96401, USA.
VU2HH	(new) Heminder Singh, 547, Sector 18-B, Chandigarh-18, India.
W6MTE/HR6	via K3RLY, Box 125, Simpsonville, Md, 21150, USA.
YJ8XX	via ZL1AMO, RonWright, Chorley Av, Massey, Henderson, New Zealand.
ZD7BB	new—via WA0WKW, M. E. Browne Jr, 2806 S Upham St, Denver, Col 80227, USA.
ZD9GG/MM	via SARL.
ZK2AK, ZK2BD	Radio Station, Niue.
3X1P	via SM bureau.
3X1P	(Op.SM0KV) Olle Ekblom, Forshagatan 28, 12348 Farsta, Sweden.
4M5A	via YV5BPJ, Av 6 Altamira, Qta Aryma, Caracas DF, Venezuela.
5N2ESH	E. Sherlock, CFAO (Nigeria) Ltd, PO Box 3034, Electro Hall, Lagos, Nigeria.
8R1N	via VE6AYU, 4416 Bulyea Road NW, Calgary, Alberta, Canada.
9H5C	Sgt T. J. Harris, Sgt's Mess, RAF Luqa, Malta.
9H5D	via G3PRS, 32 Plough Hill, Cuffley, Herts.
9N1MM	via W3KVQ, Ed Blaszczyk, 3221 Gaul, Philadelphia 34, Pa, 19134, USA.

RSGB SLQ Bureau, Bromley, Kent, BR2 7NH.

Innsbruck, Austria, before 13 December. Winners in each country will receive a pennant and a certificate.

QRP CW QSO Party

1300 6 November to 2300 12 November.

Open to all amateurs. Contest covers frequencies around 1,800-2,000, 3,540, 7,040, 14,065, 21,040 and 28,040kHz. Contacts with QRPARCI members count two points, with others one. Exchanges consist of RST, state, province or country, NM (non-member) and power. QRPARCI members give membership number. Stations may be worked on each band and power multipliers are as follows: less than 500mW output × 15, less than 10W—× 10, less than 5W—×5. Total score is QSO points × states/countries worked × power multiplier. Send log (plus declaration that rules have been obeyed) to W5JLY, Earl R. Lawler, Rt 2, Box 24-K, Burnet, Texas, 78611, USA, before 4 December.

International OK DX Contest

0000 to 2400 12 November.

1·8 to 28MHz cw and phone but no cross-band/mode allowed. Exchange RST plus ITU zone (UK is 27). A station may be worked only once on each band and counts one point. QSOs with OK stations count three points. Contacts between stations in the same country only count for a multiplier but no points. The multiplier is the sum of ITU zones on all bands added together. There are single-operator, single- and multi-band, and multi-operator multi-band categories. Separate logs must be submitted for each band and show: date and time, station worked, numbers sent and received, points, if new ITU zone. A declaration that all rules have been obeyed should be included and logs must be posted to the Central Radio Club, PO Box 69, Prague 1, Czechoslovakia, before 31 December. Printed rule sheets are available from G3FKM.

Anyone contacting 100 OK stations during the contest may claim the "100 OK" award if application is made with the log, and the "S6S" award may be claimed by those who have worked all continents. In the 1971 event only three UK stations took part—**G3NSY** (7,546 points), G3PSY (2,938) and G8VF (1,341).

A list of ITU zones and map was given on pages 198-199 of the March 1971 *Radio Communication* and in the current *RSGB Call Book*. Participation in this contest is an excellent way to collect ITU zones for the "P-75-P" Award. This is one of the world's more difficult awards and, in the writer's opinion, deserves more attention than it is apparently receiving.

Beacons

G3DME advises that he has been notified by DJ5DT that DL0IGI is active again and is located 1,700 metres asl on Predigtstuhl, a mountain near Bad Reichenhall (nr Salzburg). It is running 100W to a vertical dipole, transmits for the first five minutes of each half hour on 28,200kHz, and the rest of the time on 28,195kHz, and identifies every minute. ZS2OB has heard JA1IGY on 28,200kHz sending "VVV de JA1IGY". This beacon runs 50W to a dipole running NW-SE and is located in Tokyo. There are three Japanese beacons—the other two occupy 21,150 and 51,500 kHz, the latter running 10W to a ground plane.

WAB

Due to tremendous growth and interest, by mutual agreement WAB has now become a separate body from its founder, the Cannock Chase ARS. G3ULH has now taken over the post of WAB Awards Manager and claims and requests for WAB record and check books should be addressed to him (R. Kirk, 11 Essex Av, Kingswinford, Brierley Hill, Staffs.) G3ABG is acting as president until the national WAB/HAB meeting at Drayton Manor Mobile Rally next April. The policy of giving financial support to RAIBC will continue.

The Ex-G Radio Club

Latest information from Don Rayner, W3CTR (ex-G3BSY), who is secretary/treasurer of the club, is that VK2AKV and ZL2APT have been appointed to similar posts in Australia and New Zealand respectively. A Pacific net has been established and meets on the club's frequency of 14,347kHz at 0500 on Saturdays with VK2AKV as net controller. An Australasian net operates on 3,650kHz at 0900 on Wednesdays. The world-wide cw net on 14,065kHz at 1900 on Saturdays is looking for more UK participants, and is controlled by the UK awards secretary, G8FG. Total club membership is now over 100 and is distributed through 17 countries. The club exists "for radio amateurs born in the UK and domiciled abroad" and unashamedly attempts to "cherish and perpetuate the love and respect we hold for Great Britain and all she stands for"—a refreshing object in these troubled days! W3CTR may be reached at 416 Burkhart St, Johnstown, Pa, 15906, USA.

Band reports

Conditions seem to have fluctuated widely between the very poor period on the hf bands which occurred around the second week of September and the several days since when even 28MHz has been wide open.

Many thanks to the following for sending in information from which the following has been compiled: G2CDT, G2HKU, G3AAE, G3HB, G3GVV, G3KMO, G3UKH, GM3UMW, GW4BLE, G5JL, G6GH, BRS2098, BRS17567, BRS25429, BRS25901, BRS31301, A7511, A7545, A7768 and A7951.

Stations listed in italics were using cw, the rest ssb.

3·5MHz 0100 PW1DVG, TG9DX, VP9BO, ZF1GC, 9G1HE, 9Y4T. **0300** PZ1CU, XE1IIJ. **0500** CR4BC, VEs 2BSB, 3PT, 3DDD, W7MHE (Ariz) ZLs. **0600** KL7HN, VP2LL, K6UA, W6NLZ, W2WNK/0 (Colo), W7UI (Utah). **0700** ZL2BT. **2000** CN8HD. **2100** EA6BJ. **2200** JY1, VS6DO. **2300** HV3SJ, VO1BT.

7MHz. 0100 EA8HJ, EP2WB. **0400** CO2PY, HK4BCS, YV1DRN. **0500** HC2HM, OA4OS, PZ1AH, VK7GK, XE1IIJ, ZLs. **0600** CE2CC, KL7HIY, *KS6DY*, W7DY, (Idaho), VR1AA, VKs, ZLs. **0700** *FO8CR*, VK5PB. **0900** 4U1ITU. **1800** DU1FH. **2000** JA2BAY, 7X7Y. **2100** 5Z4KL. **2200** FB8XX, 5Z4KL.

14MHz. 0200 *FM7AA*. **0500** KH6BDS, *VQ9R/A*, *ZK1AA*. **0600** FK8BQ, KB6DA, KJ6CF, KL7s, VR1AA, VR1PA, VR1W. **0700** A35FX, *KH6s IJ*, *RC*, *KL7FBI*, KX6MD, VK9s KE, RH, VK0RC, VR4EE/MM, YJ8s BL, DE, DS, XX, ZK2BD, 3D2AN, 5W1AU. **0800** SM2AGD/CE0, KS6s CY, MD, *TA1MB*, VK9AJ (T.N.G.), ZD3D. **0900** KC4USM, VR4BS. **1000** HZ1SH, KC4USB, KX6BU. **1100** KX6JX. **1200** C21ED. **1400** *A51PN*. **1500** *FB8ZA*, FH8CH (on a.m.), SU1MA, TT8AC, YK1AA. **1600** FB8ZZ, FR7s AN, ZG, 3B8AD. **1700** XV5AC, ZS2MI. **1800** HS4AGZ, OY5NS, SU1MA, 8Q6AC. **1900** VP8ME, VP8MX (S Georgia), YB3AAY, ZD3M, ZD7SD. **2100** *KT0NEB*, *VP5RF*, VP8KF. **2200** JY1, KC4AAB/MM (off Tierra del Fuego), TL8LI, VE6s and VE7s, XT2AF, 5B4KP. **2300** CR5SP. **2400** HH2JT, *K3ZMI/KL7*.

21MHz. 0800 JAs, *TA1MB*, *YA1TCA*, 5W1AU, *9X5MV*. **1000** FL8s DS, HM, KA6HQ. **1100** HM1AQ, VKs, VK9RY. **1200** DU1FH, JAs, KG6JBO, VS6s AC, DO, VK9DM (Papua), XW8EV, 3X1P, 5H3MT. **1300** FB8XX, HM5EE, *G3FNF/JY*, YB3AAY. **1400** HS4ADZ, IH9JT (QSL to IT9JT). **1500** LA7JK/MM (S of Timor), MP4MBB, *SU1MI*, ZB2A. **1600** DU1SS, XV5AC, *XW8EV*, 3B8AW, 4S7PB. **1700** KC4USP, *M1EN*, TL8LI, 5R8AP, 9X5DA. **1800** A2CAY, VPs 1BH, *2VAM*, *8LR*, ME, MS, MX, ZS1ANT/M. **1900** EA9EA, SV1FT (Crete), VPs 2GBL, NC. **2000** CE6CA/CE0, FY7AE, HS1AHA, KH6GMP, TR8VE, VP2KF, ZD8s RW, TM. **2100** FM7WE, VP2SPH.

28MHz. 0900 TU2DO, VK6s, 9M2DQ. **1000** 3B8AD, 9N1MM. **1100** ET3JH, FB8XX, MP4TEE, VK9EM. **1200** FL8OM, FP8CT, Ws. **1400** CR7IZ, CX1BBR, FL8VL, SV1FT, W1-W5, ZD8RR, ZD9GG/MM. **1500** VU2AAA, Ws. **1600** KC4USP, TG9DX, XE1IIJ, 4M7AV. **1700** G3MUL/CE3, HK0BKX, *OX3ZO*, VP8ME (S Orkney), VP8MS (Antarctica). **1800** CE3AOF/CE0, HC2YL, K7PXI, TU2DO, VQ9MC. **1900** TI2CAP. **2000** KZ5AA, LUs, PZs.

Very many thanks to all correspondents, and to the writers of the following for information extracted from their publications: The **DX News Sheet** (*Geoff Watts*), the **29 DX Club Newsletter** (*VK6JR*), **QUAX** (*G3DME*), the **DX'ers Magazine** (*W4BPD*), **NARS Newsletter** (*5N2ABG*), **Long Skip** (*Nick Sawchuk*), the **West Coast DX Bulletin** (*WA6AUD*) the **Ex-G Radio Club Bulletin** (*W3HQO*), and **DX'press** (*PA0INA/PA0TO*).

Please send all items for **December** issue **to reach G3FKM no later than 8 November** and for January by **6 December.**

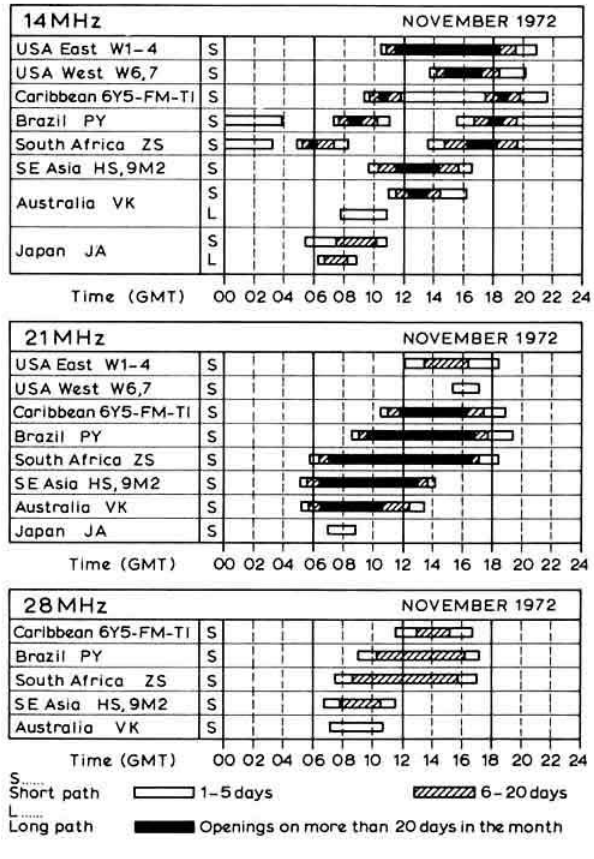
Propagation Predictions

During November the highest F2 MUFs are recorded and conditions are therefore better than during the summer. Winter conditions on the other hand mean that the 21 and 14MHz bands will close relatively early. There will be little opportunity for dx on **28MHz** except on days with above average F2 MUFs, when there will be chances to reach Central and South America, Africa and South-East Asia, and sometimes perhaps even Australia. On the whole, conditions for dx will be better in southern Europe than in countries further north.

Communication with North America will be uncertain on **21MHz** and Japan will hardly be heard. DX traffic on this band will close between 1800 and 1900gmt, and on **14MHz** it will close about 1930 to 2100gmt, perhaps a little later at the beginning of the month. Under exceptional conditions this band may remain open longer, especially to South America and Africa. The mid-winter conditions on this band favour dx traffic via the indirect path. Special mention is made of traffic with western North America in the afternoon, South America and East Asia before noon. There is a possibility of traffic with Hawaii via the direct path on 14MHz on favourable days between 1630 and 1730gmt.

As 14MHz closes so early, **7MHz** will become more important for dx traffic after 2000gmt. Decrease of atmospherics during winter months favours dx traffic on 7 and 3·5MHz, which should be possible when the greater part of the path lies in darkness. This condition is more important on 3·5MHz than on 7MHz. On **3·5MHz** local traffic will be interrupted repeatedly by the dead zone during the latter half of the night.

The provisional sunspot number for September 1972 from the Swiss Federal Observatory was 61·3 with solar activity fairly evenly distributed throughout the month. The predicted smoothed sunspot numbers for January, February and March 1973 are 50, 47 and 45 respectively.



COUNCIL PROCEEDINGS

A brief report of the Council meeting held on 3 August 1972

Present: *Mr R. J. Hughes (President, in the Chair), Dr E. J. Allaway, Messrs B. D. Armstrong, J. O. Brown, W. J. Green, E. G. Ingram, G. R. Jessop, W. F. McGonigle, L. E. Newnham, C. H. Parsons, J. R. Petty, W. A. Scarr, R. F. Stevens, G. M. C. Stone, F. C. Ward and E. W. Yeomanson.*

Apologies for absence had been received from Messrs J. Bazley, A. W. Smith, D. A. Findlay (general manager) and A.W. Hutchinson (editor).

Finance report
A copy of the provisional accounts for the year 1971-2 was presented to Council. It was noted that the income from book sales and subscriptions was larger than had been anticipated. It was also noted that expenses were lower than expected but that this was partly because the new Elliott machine had not yet been installed. The increase in telephone and bank charges was deplored.

Council was grateful to Mr Brown for his work in presenting the accounts and it was agreed that congratulations be extended to all concerned.

Membership and affiliation
Council noted the membership figures for May and June.
It was resolved:
(i) to accept reduced subscriptions from four members;
(ii) to waive the subscriptions of 11 members on the grounds of blindness or other disability;
(iii) to grant affiliation to the Lerwick Radio Club, Redifon Telecommunications Amateur Radio Club, and the KW Radio Club.

TROPHIES
It was agreed to make the following awards:
Calcutta Key—to Lt-Col Per-Anders Kinnman, SM5ZD. It was hoped that Lt-Col Kinnman would be able to come to London for the presentation.
Rotab—to Mr J. E. Bazley, G2BOZ.
Founders—to Mr C. J. Thomas, G3PSM.

LECTURES
IEE Lecture. The importance of this event was agreed and it was felt that the President should be in the Chair.
Christmas Lectures—Science Museum. Mr Newnham reported that the preparations for the lectures were under way.

Committee minutes
Council received the minutes of the following meetings:
MPT Liaison (28.3.72), Finance and Staff (7.4.72), Interference (21.4.72 and 23.6.72), VHF Contests (4.5.72, 8.6.72 and 6.7.72), HF Contests (4.5.72), IARU Working Group (9.5.72), Mobile and Exhibition (16.5.72), Finance and Staff (31.5.72), Membership & Representation (1.6.72), Technical and Publications (6.6.72), Mobile and Exhibition (6.6.72 and 5.7.72), VHF (14.6.72), Diamond Jubilee (24.6.72), Education (24.6.72).

Correspondence
A letter from Mr G. Bracewell, G3EGK, was read to the Council. He said that he would shortly be moving to Australia and regretted that it would be necessary for him to relinquish his duties in connection with planning and problems. It was felt that a replacement for Mr Bracewell should be found as soon as possible.

A letter from Mr E. Rosenberg, WN2THV, was also read to Council in which he thanked headquarters staff for their assistance on his recent visit.

Headquarters station
It was noted that work on the headquarters station was now well under way. Mr Stone reported that Mr F. W. Bennister, G3COX, had offered to erect a mast for the station.

Reports
The report from Mr R. S. Hewes, G3TDR, Representative, Region 7, was received by Council. Mr Green told Council that a report would be circulated regarding the meeting of RRs from Zone C.

CCIR study groups
It was reported that for the first time the CCIR had agreed to consider a draft question concerning the amateur service.

Organization of RSGB
The Treasurer sought the advice and permission of Council to set up an ad hoc committee to study the organization of Council and headquarters administration and to consider the future running of the Society. Mr Brown said that he anticipated that it would be mainly a corresponding committee and that he would present a list of names for consideration at the next meeting of Council.

Election of 1973 RSGB Council

Ballot forms for this election are being distributed to members of the Society with this issue of *Radio Communication*.

Personal details of the candidates

ORDINARY MEMBERS

E. J. Allaway, G3FKM
Member of the RSGB since 1946, member of Council 1970-72, member of HF Contests and MPT Liaison committees. First licensed 1949. Contributor of *Month on the Air* in *Radio Communication*, and contributor to *Radio Communication Handbook*. Member of FOC, CHC, (DXCC Honor Roll), ISWL, Midland ARS, Cannock Chase ARS, and E Worcs ARG. Active all bands 3·5 to 28MHz, and interested in dx contests, awards and tvi. Educated at King Edward VI High School, Birmingham, and Birmingham University. Profession: Doctor.

P. Balestrini, TEng (CEI), MITE, MInstAM, G3BPT
Licensed 1948, ex VS1BT, served with Royal Signals. Active on all bands, mainly interested in vhf. Served on the Society's Raynet, VHF and Exhibition/Mobile committees for a number of years. Currently chairman of Raynet Committee. Also chairman of British Amateur Radio Teleprinter Group. Profession: assistant telecommunications manager for the Port of London Authority, has worked in the telecommunications field since 1950.

A. C. Butcher, G3FSN
First interested in amateur radio in 1953 by the original GC3FSN (an uncle). Professional studies and marriage intervened and a licence was not obtained until August 1966. Rejoined RSGB in October 1966. Controller of Mid-Thames Group of Raynet from 1969-71. Active on all bands 160 to 2m but principal interest is 4m mobile. Profession: television systems design engineer.

J. Ellis, G2FNK
First interested in amateur radio in 1936. AA Licence 1938, 2FNK. Relicensed 1947, G2FNK. Interests mainly hf cw, occasionally vhf 2m. Chairman of Echelford Amateur Radio Society, one-time editor of Echelford newsletter. Profession: senior television engineer with BBC since 1947.

M. Hearsey, G8ATK
Associate member RSGB 1959-1963, corporate member 1963 onward. BRS25505. Licensed September 1966, G8ATK. QSL manager CCF/ACF wireless network 1958-1958, four metres and down 144MHz and 432MHz. Licensed reader GB2RS southern England vhf since 1970. Winner 1962 VHF Committee Cup 1970. Founder member Farnborough and District Radio Society, chairman F & DRS 1967, committee member F & DRS 1968-9, chairman F & DRS 1970, president F & DRS 1971, secretary Racal Amateur Radio Club (G3RAC)

1966-70, member Racal Mobilcal Amateur Club (G3XOX). Active 144MHz and 432MHz. Profession: engineer, hf communications company.

R. E. G. Kendall, G8BNE
Interest in radio commenced about 1960. Obtained Class B licence in 1968. Construction is a main interest and all equipment in use on 144 and 432MHz is home constructed and designed with the exception of the main hf receiver. Contest participation either solo or with other local enthusiasts has been regular. Committee member of the York Amateur Radio Club and a founder member of Harrogate and Knaresborough Radio Society in both of which takes a regular and active part.

R. A. Ledgerton, G2ABC
Age 57. Educated Chigwell School. Fellow of the Chartered Institute of Secretaries. Accountant and secretary of Dr Barnardo's. First interested in amateur radio in 1935 and between that date and outbreak of war organized local radio club. During the war served in RAF signals in this country and in India. Recommenced amateur radio activities some 11 years ago and has held office as secretary, treasurer and chairman of the East London Group of the Radio Society of Great Britain. Member of Raynet Committee. Standby news-reader for the London area.

L. E. Newnham, BSc, G6NZ
Experimental licence 1921. Member of RSGB since 1926. Pre-war TR Portsmouth. RAF 1938-46. First post-war chairman, RAFARS Cranwell. Council member since 1953, President 1958. Currently member MPT Liaison, Finance and Staff, and Education committees. Member City and Guilds RAE Committee. Delegate ITU Conference, Geneva 1959; IARU delegate Bad Godesburg, 1956; Malmo 1963; Opatija 1966; Brussels, 1959; Scheveningen, 1972. Interested in all aspects of amateur radio, Profession: retired headmaster.

D. M. Pratt, BTech (Hons), AMBIM, G3KEP
Graduated in electronic engineering, University of Bradford, January 1964. Associate member IEE and IERE. Member of RSGB since 1952: licensed January 1955. Founder member of Bradford Grammar School Amateur Radio Society, G3MHB, and a former president and secretary of Bradford Radio Society, G3NN. Has lectured for RAE and other subjects at Bradford Technical College for 10 years. Member of the RSGB Education Committee since 1966 and chairman of the committee since January 1972. Active on ssb and cw on all bands 1·8 to 144MHz; particularly interested in home construction and amateur radio training and recruitment. Has had many articles published in radio journals. Profession: Engineering training consultant. Was formerly employed as a radio and television development engineer.

C. J. Thomas, G3PSM
First interested in amateur radio in 1957. Licensed 1960 in Cyprus as ZC4CT. Active hf bands; WAB Award, Intruder Watch. Intruder Watch organizer since 1967. Member of various RAF amateur radio clubs during 12 years service career. At present engaged in gaming industry.

R. C. Wainwright, G3YMH
Age 21. Interested in radio since age of 15. Licensed May 1969. In final year of degree course in electronic engineering at Cambridge University. Member of Echelford Radio Society and chairman of Cambridge University Wireless Society. Has broad interest in amateur radio, taking part in hf and vhf contests, but works mainly hf and lf from home station in Staines. Hopes to go into tv broadcasting after graduating.

F. C. Ward, G2CVV
Interested in radio since 1930. AA licence 2CVV 1937. Society member since 1937. Service with REME and RAF 1939-1946. Post-war TR for Derby, CR for Derbyshire, RR4 1960, Zone B Manager 1968, President of RSGB 1971. Secretary of Derby & DARS 1948 to date. Member RAFARS, MARS, Mobile ARS, RAOTA. Vice-President Wireless Preservation Society. Representative RAIBC member on local committee for Duke of Edinburgh Award Scheme and Scout badges. Lecturer RAE. GB2RS News reader since 1960. Active 1·8MHz to 144MHz. Profession: investigation officer, Post Office Radio Service.

ZONE C
D. J. Andrews, G3MXJ
First licensed August 1958 while still at school. Was /MM with Marconi Marine Company for three years. Member RSGB HF Contests Committee 1965-7 and 1969 to date. Overseas in Zambia 1967-9 where was licensed as 9J2MX. Main radio interests—cw contests and lf band dx. Profession: computer engineer.

W. J. Green, G3FBA
Joined RSGB as BRS in 1946. Passed RAE and morse test in 1948 and licensed as GM3FBA. CR for Dunbarton and Argyll until 1950, and became G3FBA in 1951. Secretary, Admiralty Electronics Society 1951, CR Somerset 1953, RR9 1957, Zonal Rep D 1957. Chairman Cray Valley RS 1960, RR16 1967, ZRC 1972. Member No 79, RNARS. Holder of many hf band awards. QSL Sub-Manager G3E, F, G, H from 1954 onwards. Active all bands 3·5 to 28MHz. Retired electrical engineer.

The North-West Amateur Radio Convention

It is always refreshing to come across a new venture in amateur radio and it is possible that the Lancaster University Radio Society has scored a "first" with the North West Amateur Radio Convention. Breaking away from traditional mobile rallies, the society sought to provide something more ambitious in the form of a radio weekend convention held in the beautiful setting of Lancaster University.

The convention took place over the weekend of the 23-24 September when about 200 amateurs, some with their wives and families, gathered at the university. A wide variety of lectures were given, including :"Latest developments at vhf", "Slow-scan dx tv", "SICs", "Problems in receiver design", and "Latest developments at micro-waves". Another lecture had the intriguing title of "Japanese morse". Most lecturers took advantage of the superb ecture facilities provided by the university, including the latest developments in audio/visual aids, to present their subjects in a clear and interesting fashion.

Films were also available on a wide variety of subjects, though most amateurs seemed to prefer the live shows. Another event that caught the imagination of the participants was the Interference Forum when the RSGB, the MPT and representatives of the manufacturers formed a panel to answer searching questions from their audience.

Should the foregoing suggest that the convention was a heavy informative venture, it must quickly be stated that there was plenty of other activity less demanding intellectually and more social in nature. Manufacturers exhibits were on display; working vhf and hf stations were in continuous operation; amateur tv, rtty and Raynet stands, and home-constructed exhibits all competed for attention. During the Sunday many ladies present took advantage of a coach tour of the Lake District.

Catering arrangements were excellent and the high standard of cuisine reached its peak with an excellent dinner on the Saturday evening. On the Sunday afternoon there was an RSGB Region 1 Official Regional Meeting which is reported below.

Running continuously throughout the weekend was the refreshing experience of making new friends and the pleasure of renewing old acquaintances. It was a happy, informative and relaxing event for all who took part and we hope that this convention will set a pattern for future ventures, not only in the North-west, but throughout the country. Our congratulations go to the lecturers who provided such a high standard; to the university for providing the facilities; but most of all to the committee, including G3YLV, G3HHR, G3VNX, G3TTN, G4FM and G3ZXQ, which undertook the mammoth task of organizing the convention.

G3CSG

Region 1 ORM

This meeting was held on 24 September 1972 at Lancaster University in conjunction with the North-West Amateur Radio Convention. Almost 80 Region 1 members of the RSGB attended and the RSGB Council was represented by Mr F. C. Ward, G2CVV; Mr J. W. Petty, G4JW, zonal representative, and Mr G. Stone, G3FZL. Also attending were Mr B. O'Brien, G2AMV, regional representative for Region 1; and Mr W. M. Furness, G3SMM, deputy regional representative.

After the meeting was opened by G2AMV the various Region 1 awards were presented as follows:
The Leading NFD Station in Region 1—Leyland Hundred Group.
The RR's trophy for the leading 80m station in NFD—Wirral Club.
The Harold Hilton Rose Bowl for the leading station on Top Band in NFD—Leyland Hundred Group.
Region 1 VHF Field Day Shield—GD2HDZ.
The leading station on 70cm/P—GW3GIZ/P.
70cm fixed station—G8BCG.
4m/P—G3KUE/P.
2m/P—G8DLL/P.
Station outside Region 1 giving most points to Region 1 stations—GW8EQH.

In his general remarks, G2AMV asked that club secretaries should ensure that all reports and items for inclusion in *Radio Communication* should be with him in good time, and he further commented on the fact that 1973 was the Diamond Jubilee of RSGB and that he was hoping for a number of special events in the region during the year.

There were a number of points raised during question-time, and these ranged from the retention of various bands; applications for awards being supported by certified copies of the entry; the clarification of certain contest rules; constructional articles in *Radio Communication*; membership aspects; the maintenance of the Society's headquarters in London; organization of the RSGB structure as a whole and matters appertaining to an increase in membership of the RSGB. These wide-ranging questions were answered by the RSGB delegates and points which could not be dealt with immediately were noted and would be taken up with the RSGB in due course.

Questions were put right up to the closing moment. G2AMV thanked the members for attending and for the interesting discussion that their questions had evoked. Special appreciation was shown to the Council delegates for the helpful way in which questions had been answered.

OBITUARIES

Mr W. H. Allen, MBE, G2UJ
The death of Bert Allen, G2UJ, on 5 October will leave a large gap in the ranks of amateur radio. As a very active member of the RSGB for the last 40 years he was appointed Vice-President in January 1959, had served as a member of Council and of the VHF Committee, and was a member of the Technical & Publications Committee. During the second world war he served at home and abroad as a flight lieutenant in the Signals Group, RAF, and was awarded the MBE for outstanding technical work. He was for several years President of the West Kent ARS until he moved to Challock Lees.

Bert contributed frequently to the *Bulletin* and continued to do so when it became *Radio Communication*. He was a very popular lecturer at many radio club meetings up and down the country and was always ready to help in sorting out a technical problem when required.

He retired just under a year ago and had started on a holiday to Brazil when his death occurred in Lisbon shortly after arrival on the first stage of the trip. The amateur radio movement has lost a member whom it will not be easy to replace.

Mr F. B. Bellamy, G3ARD
Frank Bellamy died on 12 September after a short illness. He was first licensed in 1946, after serving in the RAF Signals during the war, and since then became well known on 80m.

B. Brondum-Lielsen, OZ7BO
B. Brondum-Lielsen died on 2 September 1972. He will be remembered for a keyer design used internationally.

Wijnand J. L. Dalmijn, PA0DD
PA0DD (Win to his friends) died on Monday 18 September 1972. While returning with his wife from a holiday in the south of France he suffered a heart attack when only a short distance from their home.

First licensed in 1932, PA0DD became interested in the organizational aspects of amateur radio after the second world war. From

1950 to 1962 he was vice-president of the Dutch national society, VERON, and president from 1962 to 1967, thereafter serving as a council member.

Internationally he was active in the affairs of the Region 1 Division. He served on the Executive Committee first as a member and then as treasurer. Recognition of his work and integrity was shown at the 1972 Scheveningen conference when he was unanimously elected chairman of the Region 1 Division. Professionally, Win was head of the high frequency laboratory at KEMA at Arnhem.

He was buried at Schaarsbergen near Arnhem on 22 September. Some 200 persons attended the funeral, many of whom were from the world of amateur radio.

Persons having the ability and devotion of PA0DD occur rarely and amateur radio throughout the world will mourn a man who worked unselfishly and constantly in support of the cause in which he had so great an interest.

Mr P. Flood G8DCT
Peter Flood, secretary of the Yorkshire Television Amateur Radio Society, died after a car accident during September. He was active on 2m.

Mr R. J. Johnston, GI3HCG
Bob Johnston died suddenly on 25 September. He had been active on vhf for several years, and his call will be sadly missed.

Capt D. F. Moir
David Moir died on 20 July, after an explosives accident, while on a skin-diving holiday in the Persian Gulf. He had been involved with the CCF/ACF Wireless Network, and the Royal Military Academy Amateur Radio Club, G5PM, and subsequently was associated with amateur radio stations while serving in Germany and Singapore.

Mr P. Pennell, G2PL
Peter Pennell died on 14 October 1972 after a long and very painful illness. A professional electronics engineer, his interests varied from dx operation on the lf and hf bands, to portable and vhf working. A cw operator extraordinary, he was for a long time the leading UK station on the DXCC Honor Roll. He was an active member of the Croydon NFD Group, the Surrey Radio Contact Club, and was this year's President of the First Class Operators Club. He will be sadly missed by his friends world-wide, and in particular by those in the Cambridge and Croydon areas and by all in FOC.

Mr T. Spencer, G3ILO
Tom Spencer died on 26 September, in Bristol, after a long period of poor health. An expert on the key, he was well known on all bands, 160m to 70cm.

Mr W. J. Thompson, G2MR
Mr W. J. Thompson died on 4 October at the age of 70. He was active on the 2m band, and in earlier days on the old 5m band. He was, for many years, a partner in the Quartz Crystal Co of New Malden, Surrey.

Mr T. J. H. Wood, G3JRR
Mr T. J. H. Wood died on 2 October. He was well known in the Gillingham and Dover area.

Looking ahead

1 December—RSGB AGM, Royal Society of Arts, John Adam St, London WC2.

YOUR OPINION

The Editor
Radio Communication
Sir—I refer to the item under QTC in the October issue under the heading of "Changing Polarity". I agree with the writer that it is first necessary to disconnect the battery and check the electrical installation to ascertain whether there are any electronic units such as tachometers, radios etc which could be damaged beyond repair if reverse polarity was applied, also whether there is an ammeter or any permanent magnet field electric motors installed. It will, as stated, be necessary to modify the electronic equipment for the opposite polarity, and reverse the connections to the ammeter and relevant motors.

The method given for reversing the polarity of the dc generator is I consider, both dangerous and incorrect. When the contact on the reverse current relay (cut out) is closed, the current flowing through the generator/battery circuit is only limited by the generator armature resistance, wiring and internal battery resistance, and with most vehicles this is only a fraction of an ohm. The high current flow when the relay contacts are closed by hand will result in contact burning, and possible freezing together, also the generator brushes will each burn an imprint on the commutator surface, (an ammeter, if fitted, could also be damaged). Should the relay contacts freeze in the generator, associated circuitry is at risk and the battery must be disconnected immediately.

The correct way to reverse the polarity of the generator (not alternator) is to disconnect the two leads going to it, ie field and armature, common being earth. Note—when carrying out the following it is essential that all connections are well made, and circuitry insulated, otherwise there is danger of electric shock, and/or damage to generator field insulation, due to field collapse. Connect a lead to the generator field terminal, connect the other end to a variable resistance (25Ω 50W approx) then to a suitable switch, and from the switch to a 6V battery for a 12V system, and pro rata for other voltage systems; the other terminal of the battery being solidly earthed, earth the generator armature terminal.

Ensure that the aforementioned 6V battery is correctly connected for the generator polarity required, ie negative to earth for a negative earth system. With the switch open, adjust the resistor for minimum current and close the switch. Now quickly adjust the resistor for maximum current, leave for approximately 20sec, then re-adjust for minimum current and open switch. Repeat this several times. Disconnect all the external circuitry, including the armature short. Reconnect the vehicle battery for the new polarity, and connect a voltmeter between generator armature terminal and earth, leaving the field circuit open. Ensure that leads from regulator to generator are not earthed. Start engine and check generator polarity (this voltage will be low and dependant on residual magnetism); if polarity is correct disconnect voltmeter, after stopping engine, reconnect leads from regulator, start engine and check charging rate. If polarity of generator is still incorrect repeat foregoing procedure, and again check generator polarity.

It is often advantageous to change the ignition coil for one which will avoid reversal of polarity at the plug points, as would be the case if the original coil was used, reversal of connections to the ignition coil will only result in reduced ht voltage.

I have treated this subject in great detail, in the hope that any person who reads it will be able to change the polarity of his vehicle electrical system with safety. Note! In the above text, earth = chassis.

Yours sincerely,
L. Brown, GW3ZFG, MAMEME, Tech Eng

The Editor
Radio Communication
Sir—In answer to recently voiced opinions of local (Surrey/Sussex) mobile stations as to the use of 70·26 as a mobile frequency only, I would like to say that I cannot see what harm some fixed station activity on this frequency can do (as long as breaks are left between overs for any mobiles to call in). Surely the attitude should be "The more the merrier" especially on 4m where activity is supposed to be low.

If mobiles are going to be that pedantic as to the use of 26, I would like to remind them that it is a calling frequency only and after having established contact on it they should QSY to another, leaving the calling channel clear.

Yours faithfully,
A. K. Booer, G3ZYR

The Editor
Radio Communication
Sir—*For Millionaires*
Last night I got 579 from UP2 on 3·5 cw. No staggering achievement, you might think, but I had just completed a 5-band 100W transmitter—thanks to your "Members' Ads"—for the sum of £8.08. I expect to add telephony (no, not ssb) for a further 80p. The receiver, an HRO, cannot be worth much more.

Yours fathfully,
John Roscoe, GM4QK

The Editor
Radio Communication
Sir—As a follow up to Mr Scarr's letter in the September issue.

Forty years ago, most of us had to decide between radio and eating. The lucky ones who managed both, generally used simple equipment and enjoyed it to the full.

Today, with over 15,000 licensed amateurs, a mass of technical publications, and above all financial affluence, these are the causes of the situation mentioned by Mr Scarr, and indeed by Mrs Priestley.

The vast majority have no wish to struggle with cheap, simple cw transmitters and O-V-1 receivers. They will say, "Why should we?" Have you ever judged a constructional contest? Some entrants should say, "God bless my employer and his facilities", and these frighten off the real "homebrewer".

I spend a lot of time helping people to pass the RAE, and in transmitting RSGB Slow Morse. My aim is to make each person I help to get a licence to start on a piece of gear I built for a special purpose some years ago, consisting of a one-valve, 7W, crystal controlled, cw transmitter, and a simple receiver all in one box, known locally as "The White Box".

The result is interesting. Those who did start this way can now use, and often prefer, cw operation with its simpler equipment. Those who declined my offer, and began on the microphone, are now lumbered with expensive gear, or have packed up amateur radio altogether. They have been priced out, or "cannot keep up with the Joneses."

It is an ITU requirement that all amateurs using frequencies below 144MHz must be able to operate cw, yet some gear does not have a keyhole.

Coupled with my experience as above, has the time come to press for reintroducing a compulsory period on cw for new licencees?

I feel sure that this would answer the question, "Why should we use simple equipment?" To enable them, ultimately, to get much more pleasure, more cheaply, out of amateur radio.

What affluence cannot buy is a certainty of dx operation, within the licence laws, but it can buy many more watts to operate outside the rules. How many boast of their success, without mentioning the power they used. I would like to see banned, any piece of commercial gear now offered for sale to the amateur capable of running power much in excess of that allowed on the band being used. Can you imagine a person with a 1 to 2kW linear not running it up to this input if he is failing to get through at the legal limit. There must be very few such honest people.

How many UK licences would there be if the common language was German or Spanish instead of English. This leads me to those who scorn the "rubber stamp" cw QSO. Put yourself in the place of the person who only speaks Greek or Russian. What would you do? You would be very thankful for small mercies, including the rubber stamp QSO, to increase the number of contacts you make.

Is the G8 + 3 a good thing to attract young recruits? What could be more frustrating to a youngster, unless he is a vhf/uhf technician.

I would not go so far as to reintroduce the artificial aerial licence, but judging by the number of people who seem to do transmitter development, and adjustments on an open aerial, often in a popular part of a band, instead of into a proper load. I would like to see a screened dummy load made a piece of mandatory equipment.

I, and certainly many others, would be willing to have slow cw contacts with new operators, until they build up confidence, on 160m or 80m, especially, in my case, on 1,845kHz at 1945gmt on Fridays after my RSGB morse transmission.

How about organizing some frequencies for all and sundry to join in slow cw contacts for newly licensed operators, possibly on 80m so as to give greater coverage of the country. Let us all remember, we were beginners once, and can tell funny stories about our early cw contacts. We were certified by the examiner to be able to send and receive at 12wpm. This is adequate, coupled with a little confidence, to get us started, provided we start as soon as we get our licence.

Yours faithfully,
John Barker, G3SAZ
Hon Sec: BOAC Speedbird Radio Club
President: The Echelford Amateur Radio Society

CONTEST NEWS

August 1972 70MHz Contest results

This contest, held on 13 August, attracted a total of 41 entries, 18 in the fixed section and 23 in the portable section.

The winners were G3RLE in the fixed, and G3JYP/P, with a very substantial lead, in the portable section.

Conditions seemed to be very good in the morning with some tailing off in the afternoon, many stations had contacts in excess of 450km.

There was, as usual, a very poor entry from the listeners, with Terry Cooper, BRS28005, once again sending in the only log.

FIXED SECTION

Posn	Callsign	Points	QSOs	Cnty	Best dx	km	Input power (watts)
1	G3RLE	447	51	YS	G3RQZ/P	357	50
2	G3NEO	494	58	YS	G3XCS/P	370	40
3	G3OHH	365	55	SD	G3RQZ/P	310	50
4	GD2HDZ	315	30	IM	G3YHM/P	453	40
5	G3ONP	294	44	SD	GI3TLT/P	328	24
6	G4BEL	241	45	CE	GD2HDZ	365	50
7	G3DOV	185	27	NK	GI3TLT/P	487	25
8	G6HD	165	43	KT	G3JYP/P	399	32
9	G3LVP	161	39	EX	G3JYP/P	390	50
10	G3WMR	160	40	LD	G3JYP/P	380	30
11	G3JFO	117	17	YS	G3XIG	310	25
12	G3NPI	81	21	BE	G3JYP/P	375	40
13	G3HBG	77	17	SY	G3RLE	320	30
	G3YQW	77	25	SX	G3JYP/P	430	18
15	G3ZKE	69	28	LD	G3JYP/P	320	14*
16	G4AAW	66	28	SY	G3JYP/P	400	10
17	G3JKY	38	24	KT	G3RQZ/P	75	30
18	G2AVC	3	3	MX	—	—	5

PORTABLE SECTION

Posn	Callsign	Points	QSO	Cnty	Best dx	km	Input Power
1	G3JYP/P	847	79	DM	G3RQZ/P	468	25
2	G3UCA/P	569	63	LE	G3RQZ/P	452	20
3	GW3WOS/P	407	56	MH	GI3TLT/P	372	15
4	G3TDM/P	327	75	BS	GI3TLT/P	450	25
	GI3TLT/P	327	55	—	—	—	—
6	G3XUS/P	309	69	SX	G3JYP/P	405	20
7	G3JEQ/P	305	81	SY	G3JYP/P	412	10
8	G3YHM/P	301	65	SX	GD2HDZ	450	33*
9	G3RQZ/P	234	48	SX	G3JYP/P	468	48
10	G3ZFP/P	283	66	BD	GD2HDZ	340	50
11	G5PI/P	279	53	CE	GI3TLT/P	450	15*
	GW4BGG/P	279	42	BR	GI3TLT/P	325	25
13	G3PXP/P	249	43	LR	—	—	—
14	G3XIG/P	233	64	SX	G3UCA/P	390	15
15	G3FD/P	230	42	—	GD2HDZ	410	18
16	G3FEC/P	205	55	WE	GD2HDZ	370	15
17	G4ALE/P	183	48	SY	G3JYP/P	393	25
18	G5UM/P	167	33	RD	GI3TLT/P	358	18
19	G3RCQ/P	155	37	BS	GD2HDZ	375	25
20	G3LMT/P	151	23	LN	GI3TLT/P	383	2·5*
21	G2WS/P	131	23	ST	G3DOV	270	12
22	G3ZLQ/P	88	26	BE	G5PI/P	160	3*
23	G4ABR/P	69	9	DM	G3JHM/A	440	40

LISTENERS SECTION

1	BRS28005	497	54	SX	G3JYP/P	450	—

* Output Watts

Rugby DF Qualifying Event

The last 1972 DF Qualifying Event took place on 3 September when 12 teams assembled in good weather about nine miles east of Rugby to compete for the remaining two places in the Final.

Station "A" was six miles from the start and was located on the canal bank near StrettonWharf. Graham Taylor had hidden himself in some dense undergrowth, but early competitors soon blazed a trail to his hide.

Station "B" was 8½ miles from the start and was located on the northern outskirts of Rugby.

The transmitter and operator were virtually "hidden in the open". Bob Vickers had allowed himself (not without protest) to be half buried, making such good use of short grass as a very effective cover that most competitors passed it by, giving preference to a large area of dense undergrowth nearby. The event was organised by D. Newman on behalf of the Rugby Club.

Posn	Name	Club	Times of arrival "A" Station	"B" Station
1	M. Hawkins	Colchester	1420½	1523
2	B. M. Bristow	Chiltern	1419½	1533
3	I. R. Butson	Chelmsford	1420	1542½
4	E. L. Mollart	Oxford	1419	1543
5	T. C. Gage	Oxford	1441	1600
6	R. J. Pearce Boby	Oxford	1428	1602
7	D. E. Newman	Rugby	1421	1605
8	W. J. North	Chiltern	1455	1610
9	G. Whenham	Coventry	1424	1618
10	D. C. Holland	S Manchester	1517	—
11	A. C. A. Newman	Salisbury	—	1614

One team did not find either transmitter

National DF Final

The 1972 National DF Final was held on 17 September in the Oxford and Newbury area. The weather was fine and the fourteen competitors who had previously qualified in the seven preliminary rounds took part in the Final in which for the first time three transmitters had to be located.

The starting point at Bucklebury Common Crossroads, approximately three miles east of Newbury, was situated in an area extensively covered with bracken and brambles, and the first bearings from the three stations were in the form of an inverted "T". Station "A", G3UJO/P, was situated at Baydon Woods near the M4 motorway, approximately 16 miles west of the starting point and, owing to the recent construction of the motorway, the latest issue of the map was found to be somewhat inaccurate in this area. The transmitter was in fact hidden in some nettles at the side of a disused lane, access to which was blocked at one end by the motorway. The far end was only accessible on foot and was over a mile from the nearest road.

Station "B", G3RBP/P, was only some 400yds north of the starting point among thick brambles and undergrowth. After considerable attenuation, the output from the transmitter was fed to a 520ft centre-fed aerial giving a broad null at the start.

Station "C", G3PGM/P, was situated at Burghfield Common, six miles east of the starting point, hidden among dense bracken. An end-fed aerial, consisting of two phased verticals, produced the strongest signal at the start.

Most competitors went for Station "C" first. Some had considerable difficulty in locating the exact position of the transmitter due to complex radiation patterns and wasted valuable time searching an area at the far end of the aerial.

Four competitors chose Station "A" first and, after a longish walk, found the transmitter without too much difficulty.

The organiser was in touch with all three stations on a fourth common frequency. By 1600 Station "B" had become somewhat despondent as no-one had located his transmitter. At 1613 his morale was restored when Mike Hawkins arrived. At that time he was the only competitor to locate two out of the three stations, and an extension of the contest to 1700 was announced.

All three transmitters were now operated almost continuously in order to speed up the contest. By 1630 Mike Hawkins was apparently in the lead with Station "C" still to be found. Brian Mahony and Eric Mollart were left with Station "B" to locate and Paul Tyler with Station "A" to find. Mike Hawkins spent nearly 45 minutes searching in vain at the far end of the aerial and eventually cut the aerial wire to find which direction the aerial was fed from. Meanwhile Brian Mahoney and Eric Mollart appeared to suffer from false bearings near the transmitter. At this time the contest was still open and a further extension to 1715 was announced.

Eric reached Station "B" at 1714 and was revived with a pint of milk. At the time he was thought to be the winner, but in the meantime Paul Tyler, benefitting from the almost continuous transmissions, had arrived at Station "A" in good time to take first place.

The contest was organized by D. Alexander, G3KLH, on behalf of the Oxford Society and, as was intended, proved difficult and worthy of "National" status.

After the results were announced, Mrs G. T. Peck kindly presented the National Trophy to Paul Tyler and prizes to the first two successful competitors. An excellent tea, prepared by Mrs Mollart and her helpers, was followed by discussion ending for some an exhausting but exciting afternoon.

Posn	Competitor	Club	Times of arrival "A" Stn	"B" Stn	"C" Stn
1	P. J. Tyler	Oxford	1703	1614	1531½
2	E. L. Mollart	Oxford	1507	1714	1626
3	M. Hawkins	Chelmsford	1531	1613	1728
4	B. J. Mahony	Rugby	1532	1730	1626½
5	T. C. Gage	Oxford	—	1633	1532
6	W. J. North	Chiltern	—	1637	1501
7	I. R. Butson	Colchester	—	1637½	1452½
8	J. R. Vickers	Stratford	1703	—	1541
9	B. Bristow	Chiltern	1536	—	1727
10	R. Pearce Boby	Oxford	—	—	1510
11	R. J. Slatter	S Manchester	—	—	1532½
12	D. E. Newman	Rugby	—	—	1541½
13	C. Pearce Boby	Oxford	—	—	1728
14	G. W. Anderson	Dartford Heath	—	—	—

SSB Field Day 1972 results

The extremely unpleasant weather conditions prevailing over most of the country were doubtless partly responsible for the poor support for the first SSB Field Day. The receipt of only 16 entries was made more disappointing by the appearance of at least 25 portable callsigns in the competing logs. Radio conditions were also rather flat, and the lf bands provided the bread-and-butter contacts for most groups, with only the two leading stations doing really well on 20m. 15m provided a few points for those prepared to struggle, but 10m was ignored by most groups.

First place was taken by G3RAC/P, operated by members of the Racal Amateur Radio Club. They used a Drake TR3 transceiver, running 350W, to make 813 contacts and establish a comfortable lead over the Addiscombe Amateur Radio Club, G4ALE/P, which occupies the number two slot for the second year running. Their score came from 718 QSOs, made with a KW2000B and a home-built linear running 400W. The Southgate Radio Club, G3SFG/P, move up from ninth in last year's event to take third place, having operated almost exclusively on the lf bands. Their 669 contacts were made with a KW2000A and KW1000 linear running 500W input.

All the entrants used dipoles or inverted vees for 80m and 40m, and most had commercial beams for the hf bands. The exceptions were the Racal, Addiscombe and Ariel clubs, with cubical quads, and the Border Group with a delta-loop for 20m. The long wires and trap verticals of previous High Power Field Days were notably absent.

Logs were generally well-presented, although some were on non-standard paperwork, despite the availability of printed log and cover sheets from RSGB HQ. Every station lost points in checking, due in most cases to incorrect reception of callsigns, and to the claiming of contacts which did not appear in the other log. One group gained 21 points when their total was found to be wrongly added, only to lose them again on the first page of the log. Entrants are advised to study the rules of each contest, and the general rules with care. The committee is unable to consider logs which are not sent to the correct address. One of the disallowed entries contravened this and three other rules as well

Comments received indicate a general satisfaction with the rules, but two groups suggested the introduction of a multiplier to promote multi-band operation and the working of more countries. Comments and suggestions are much appreciated by the HF Contests Committee, and are taken into consideration when new rules are formulated.

Posn	Club/Group	Callsign	Score 3·5	7	14	21	28	Total
1	Racal	G3RAC/P	684	393	1,392	36	0	2,505
2	Addiscombe	G4ALE/P	786	540	999	24	6	2,355
3	Southgate	G3SFG/P	1,113	789	273	0	0	2,175
4	Ariel	G3AYC/P	798	447	720	90	3	2,058
5	Bristol	G6YB/P	918	528	537	6	0	1,989
6	Bedford	G3WTP/P	514	516	380	21	0	1,431
7	1st Keddington Scouts	G4BFL/P	870	225	171	12	3	1,281
8	—	G3TBK/P	651	537	57	3	0	1,248
9	Wimbledon	G3WIM/P	756	342	99	9	0	1,206
10	—	G2XV/P	603	417	129	54	0	1,203
11	—	GW2FOF/P	375	618	139	0	0	1,032
12	Border	GM3KAI/P	180	0	394	0	0	564
13	Swansea	GW3ZGK/P	210	84	147	84	27	552

Disallowed—G4BEM/P—RSGB General Rule 8(b).
G4AAX/P—Field Day ,, 9.
G4AUU/P—Field Day ,, 9.

Check logs are gratefully acknowledged from G4ATH/P, G4ARD/P, G3WHK and GC3YIZ.

Certificates of merit will be awarded to G3RAC/P, G4ALE/P and G3SFG/P.

VHF/UHF Listener Championship 1971/72

There were only six entries for the 1971/72 VHF/UHF Listener Championship, and no less than five of these failed to send in the minimum number of logs required by rule 4.

The Championship Award goes, therefore, to Terry Cooper, BRS28005, who showed his determination to win by submitting 10 logs from which the four best vhf and two best uhf scores were chosen. The runner-up was Ron Thomas, BRS15822, who returned seven logs; sufficient to qualify; but lost heavily by not including more than one uhf event.

The championship, which is best summed up by the table of results, was most disappointing to all concerned.

C.S

Posn	Entrant	Total score	Contests	Scores
1	BRS28005	3,987 points	VHF NFD 1971 144MHz	936
			July 144MHz	877
			December 144MHz	654
			March 144MHz	437
			UHF NFD 1971 432MHz	561
			October 432MHz	522
2	BRS15822	1,476 points	July 144MHz	458
			VHF NFD 1971 144MHz	415
			June 70MHz	206
			November 144MHz	196
			UHF NFD 1971 432MHz	201
3	A7417	1,056 points	July 144MHz	1,056
4	A6729	363 points	VHF NFD 1971 144MHz	238
			December 144MHz	125
5	BRS31152	153 points	June 70MHz	153
6	A7783	49 points	July 144MHz	49

August 144MHz SSB Contest results

A bumper crop of 29 operator logs, five swl logs and one check log was received for the second 2m ssb contest of the year, indicating the increased activity on this mode. Most stations had contacts during the entire length of the contest, indicating that a longer event will be required in future.

Conditions were generally above average, and PA0s were plentiful in several logs. The weather was kind to the portable stations with the exception of GW3FEC/P on Snowdon. At 3,560ft asl it was rather cloudy and "not good for breathing."

Subject to confirmation, certificates go to the winning station GD8FFX/P, (Graham Knight), and the runner up, GW3BA/P T. P. Douglas).

R.G.S.

Posn	Callsign	Points	QSOs	County	Best dx	Km
1	GD8FFX/P	672	68	IM	G3AUS	500
2	GW3BA/P	664	84	MG	PA0JMV	601
3	G8BXC/P	649	77	SX	F8XT	600
4	G3SRT/A	573	72	SE	PA0JMV	570
5	G3PMH/P	561	79	HN	G3IUD	410
6	G3XIX	539	61	SF	DK2HZ	390
7	GW3FEC/P	521	61	CV	GM3EOJ	475
8	GD2HDZ	518	50	IM	G3DAH	485
9	ON5FF	517	45			
10	G3ZYC	514	63	DY	F1ASH	512
11	G4ARD/P	512	74	BD	GM3XHY/P	460
12	G3NAS	503	82	SD	PA0JMV	525
13	GW4ABR/P	479	63	MH	PA0EZ	565
14	G3WZT	410	54	SX	PA0JMV	445
15	G3NHE	400	48	YS	PA0EZ	437
16	G3BW	389	41	CD	G8BXC/P	470
17	G5PI/A	376	50	CE	PA0VJ	407
18	G8DDW	320	50	LD	GM3ZUL/P	460
19	G8CLY/P	262	51	BS	GD2HDZ	370
20	GW3ZSS/P	249	39	BR	GM3XHY/P	410
21	G4AJE	217	31	NR	PA0EZ	390
22	G3BPM	184	38	MX	GD8FFX/P	395
23	G8BPN	179	37	BS	GD8FFX/P	400
24	G3JKY	166	40	KT	G8DNK	265
25	G3OZT	163	23	HE	PA0AWN	440
26	G3XUS	149	23	SX	G8DNK	340
27	GM8BKE	133	12	DU	G3SRT/A	460
28	G4AEZ/A	131	27	MX	PA0CML	415
29	GM3EOJ	58	7	AN	GW3FEC/P	475

Check log G3MQD.

SWL logs BRS15822, BRS28005, BRS32525, A7683, A7866.

BERU 1973 rules

Radio amateurs and short-wave listeners throughout the British Commonwealth are invited to take part in the 36th BERU Contest, to be held on 10-11 March 1973.

The only change made to last year's rules is the provision of Certificates for each continental leader in the multi-band section. Each overseas entrant will receive a copy of the results by surface mail.

Reprints of the BERU rules, the General Rules for RSGB HF Contests and supplies of log sheets may be obtained from RSGB, 35 Doughty Street, London WC1N 2AE. UK members should enclose a large sae with their request.

Rules—Transmitting Section

1. The **General Rules** for RSGB HF Contests, as published in the January 1973 issue of *Radio Communication*, will apply.
2. **When.** From 1200gmt on Saturday 10 March 1973 to 1200gmt on Sunday 11 March 1973.
3. **Eligible entrants.** Members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British Mandated Territories.
4. **Contacts.** CW (A1) only, in the 3·5, 7, 14, 21 and 28MHz bands. Contacts may be made with any station using a British Commonwealth callsign, except those within the entrant's own call area. UK stations may not work each other for points. In accordance with current IARU recommendations, contestants are requested to confine their operations to within the lower 30kHz of each band.
5. **Scoring.** Each completed contact will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third contacts with each Commonwealth call area (as listed in the accompanying table) on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as one call area.
6. **Logs.** Separate logs are required for each band. Each band log should be separately totalled and should include at the end a check list of call areas worked on the band. Logs should be set out as shown in the General Rules for RSGB HF Contests. Separate band totals should be added together and the total claimed score entered on the cover sheet.
7. **Entries.** Entries may be single or multi-band. Single-band entries should show contacts on only one band; details of contacts made on other bands should be enclosed separately for checking purposes. Multi-band entries will not be eligible for single-band awards.

   Each entry will consist of the separate band logs together with a signed declaration. The form of declaration is shown in the General Rules for RSGB HF Contests.

   Entries should be addressed to the HF Contests Committee, c/o D. J. Andrews, G3MXJ, 18 Downsview Crescent, Uckfield, Sussex, England. Adjudication of this contest will commence on Monday 14 May 1973. Any entry received after this date may be excluded from the contest and may be ineligible for any award. Overseas stations are therefore advised to forward their logs by airmail.
8. **Awards.** To the winner, the BERU Senior Rose Bowl. To the runner-up, the BERU Junior Rose Bowl. To the leading UK station, the Col Thomas Rose Bowl.

   Certificates will be awarded to the leading UK and overseas single-band entries on each band; and to the leading UK and continental leaders in the multi-band section.

Rules—Receiving Section

1. **When.** Times and dates as for transmitting section.
2. **Eligible entrants.** Members of the RSGB resident in the UK and all short-wave listeners resident in the British Commonwealth or British Mandated Territories. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are not eligible to take part.
3. **Scoring.** To count for points a station outside the entrant's own call area must be heard in a contest contact. CQ or test calls will not count for points. A station may be logged only once on each band for the purpose of scoring. Where both stations in a contact are heard, they should be logged separately and points may be claimed for both entries, provided that the stations are outside the entrants own call area.

   Each complete log entry will score five points. In addition, a bonus of 20 points may be claimed for the first, second and third stations heard in each Commonwealth call area on each band. All British Isles prefixes count as one call area.
4. **Logs.** A separate log is required for each band. Logs should show the following details: (i) Date/time gmt, (ii) Callsign of station heard, (iii) Report and serial number sent by station heard, (iv) Callsign of station being worked, (v) Points claimed, (vi) Bonus points claimed. Each log must be set out on one side of foolscap or A4 log sheets and must show the band to which the log sheet refers. A check list showing the call areas heard on each band must also be included.
5. **Entries.** (a) Each entry will consist of the log sheets, check list and a signed declaration that the receiving station was operated in accordance with the rules and spirit of the contest and that the entrant does not hold an amateur transmitting licence. (b) Entries should be addressed and sent as in Rule 7, Transmitting section.
6. **Awards.** The BERU Receiving Rose Bowl to the winner. Certificates of merit to the leading entrant in each continent.

Commonwealth Call Areas

The following call areas are recognized for the purposes of scoring in the 1973 BERU Contest:

A2	Botswana
A3	Tonga Is.
A5	Bhutan
AC3	Sikkim
AP	Pakistan
C2	Nauru
G/GC/GD/GI/GM/GW	
S2	Bangladesh
VE1	
VE2	
VE3	
VE4	
VE5	
VE6	
VE7	
VE8	
VK1	
VK2	
VK2	Lord Howe Is.
VK3	
VK4	
VK4	Willis Is.
VK5	
VK6	
VK7	
VK8	
VK9	Christmas Is.
VK9	Cocos Is.
VK9	Norfolk Is.
VK9	Papua
VK9	New Guinea
VK0	Heard Is.
VK0	Macquarie Is.
VK0	Australian Ant.
VP1	
VP2A	Antigua, Barbuda
VP2D	Dominica
VP2E	Anguilla
VP2G	Grenada & Dep.
VP2K	St Kitts, Nevis
VP2L	St Lucia
VP2M	Montserrat
VP2S	St Vincent & Dep.
VP2V	British Virgin Is.
VP5	Turks & Caicos Is.
VP7	
VP8	Falkland Is.
VP8	S Georgia
VP8	S Orkney Is.
VP8	S Sandwich Is.
VP8	S Shetland Is.
VP9	
VQ9	Chagos Is.
VQ9	Aldabra
VQ9	Seychelles
VQ9/D	Desroches Is.
VQ9/F	Farquar Is.
VR1	British Phoenix Is.
VR1	Gilbert & Ellice & Ocean Is.
VR3	Fanning & Christmas Is.
VR4	
VR6	
VS5	
VS6	
VS9	Gan
VU	India
VU	Laccadive Is.
VU	Andaman & Nicobar Is.
YJ	
ZB2	
ZC4,5B4	
ZD3	
ZD7	
ZD8	
ZD9	
ZE	
ZF	
ZK1	Cook Is.
ZK1	Manihiki Is.
ZK2	Nuie
ZL1	
ZL2	
ZL3	
ZL4	
ZL5	
ZL	Auckland & Campbell Is.
ZL/C	Chatham Is.
ZL/K	Kermadec Is.
ZM7	
3B6,3B7	Agalega & St. Brandon
3B8	Mauritius
3B9	Rodriguez Is.
3D	Fiji
3D6	Swaziland
4S7	
5H3	
5N2	
5W	Samoa
5X5	
5Z4	
6Y5	
7P8	
7Q7	
8P	
8R	
9G1	
9H	Maltese Is.
9J2	
9L1	
9M2	W Malaysia
9M6/9M8	E Malaysia
9V1	
9Y4	

This list has been compiled from the RSGB Countries List and from information supplied by the Foreign and Commonwealth Office.

UK FM Group (London) 1972 Activity Contest rules

1. The contest will take place between 0001gmt on Saturday 11 November and 2359 on Sunday 12 November.
2. Entrants must use F3 exclusively; however, cross-mode contacts will also count for points.
3. Contest exchanges will consist of report, membership number (where applicable) and QTH (or location if /M or /P).
4. Repeat contacts will not count for points. However, repeat contacts with stations using an alternative suffix (eg /A, /M or /P) will, as will repeat contacts made on other bands.
5. Contacts may be made on any frequency in the 4m, 2m or 70cm bands. Operation may be simplex or duplex. Cross-band QSOs will also count for points.
6. Scoring will be THREE points per member worked and ONE point for each non-member worked on 2m. A multiplier of THREE will apply on the 4m and 70cm bands.
7. Logs should consist of a list of stations worked, stating time in gmt, frequency, membership number (where applicable), QTH and claimed points.
8. Logs should be sent to G8CKT, QTHR, and be postmarked not later than 14 days after the end of the contest.
9. All queries regarding the rules of the contest should be addressed to G8CKT.

Omission

G3XVF/A was omitted from the results of the Summer 1·8MHz Contest published in October. This was due to the log being rescrutinized by the HF Contests Committee. G3XVF/A should be placed 31st with 280 points and all logs following lowered one place in the table.

Contests calendar

5 November—144/432MHz CW (Rules in August issue)
11–12 November—Second 1·8MHz
11–12 November—UK FM Group (London) 1972 Activity
12 November—Czechoslovakian
25–26 November—CQ WW DX CW
November-December—70MHz Cumulative
9–10 December—Tops CW Club
27–28 January—CQ WW DX 160

SPECIAL EVENT STATIONS

Ariel Radio Group, London, 12-18 November
This group will operate GB3BBC on hf, and GB2BBC on vhf/uhf, commemorating not only the 50th anniversary of the BBC but also the 25th anniversary of the group itself. Special QSL cards will be issued (via the RSGB Bureau) and the operators will be pleased to contact present or past BBC staff. Address any schedule arrangements and postal enquiries to: The Secretary, Ariel Radio Group, c/o the BBC club, 14a Cavendish Place, London W1.

Manchester, November
GB2ZY will be operated by members of the Thorn Electrical Industries depot, to commemorate the opening of the BBC station 2ZY in Manchester on 15 November 1922. All bands 160-2m will be worked, using a.m., fm, ssb and cw. Special QSL cards will be available—this facility is offered to SWLs who submit accurate reports, as well as to amateurs who make contact with GB2ZY during November, QSL manager is G3LEQ, to whom all cards should be sent.

University of Bath Rag Week, 11-18 November
GB3UR will operate from the University of Bath during Rag Week, 11-18 November. Bands worked will be: 18m, 20m, 15 or 10m, and 2m. Principal operators will be GW3ZBB and G3ZLB on the hf bands, and G8EQL and G8FMV on 2m. The station will be located in the library buildings at the University.

Cornish RAC Mobile Rally, 1973
The Cornish RAC has announced that the date of its next rally will be 8 July 1973. It is hoped that this advance notice will avoid the possibility of clashes in dates with other rallies.

RAYNET

by S. W. LAW, G3PAZ*

Is your group a healthy and sturdy plant, robust and vigorous ever growing upward and outward? Can you detect signs of decay around the edges, or worse at the roots? Perhaps some major upheaval has caused a minor crisis in administration? Nothing is so certain as change in all things and it is of the greatest interest to stand back a little and note the ebb and flow of Raynet activity.

It would be invidious to identify any groups that might come in any of these categories, but this we know; there are those that not only carry the flag but go on from strength to strength while others flash up brightly for a brief period then fade inexplicably into the darkness. Some, of course, are resurrected at a later date and find a new fount of enthusiasm to the satisfaction of everyone concerned. What is of great interest, however, is to note the trend of the wider view in some areas. We note the expanding tentacles of some groups quietly but surely drawing together certain bodies of people who have similar aims to ourselves, ie to assist in the relief of suffering caused by accident or disaster. In the ordinary course of events it would be a case of the parallel lines which never meet but thanks to the unremitting efforts of some groups we are delighted to hear of a quite outstanding degree of liaison with groups of people who are now aware that rapid communications in times of trouble are quickly at hand through the correct channels.

There are examples in some areas where controllers have been instrumental in the formation of associations of like-thinking folk who, previously unaware of our activities and potential, are only too glad to form part of an association which serves mutual aims and results in the exchange of knowledge and techniques to the benefit of all.

Some Raynet groups have even considered adding to their own facilities by the acquisition of "business radio" licences and equipment in order to follow the emergency activities of other bodies who are already so equipped in accordance with the recent suggestions of the Home Office with regard to civil emergency. This development is one which will engage the attention of the Raynet Committee closely as there may be aspects which require careful examination if our identity is to be preserved in the existing framework. However, it does prove that our controllers in some areas are far from idle in the furtherance of the general concept of emergency communications, and the associations mentioned will certainly provide a new pool of willing helpers to tackle the many non-radio jobs such as transport of equipment, message handling and even the ever-present problem of the sustenance and personal comfort of our operators during long and difficult stints.

All the foregoing comes down to our continued reminders that liaison in all its aspects is of the utmost importance to any and all Raynet groups in order that as many as possible should be aware of our existence, aims and availability. Do not neglect such bodies for example as HELP (Home Emergency Liaison Patrol) or the little known Young Volunteer Force Foundation; you may even assist some of these young people to obtain a certain much-coveted award for public service and as a spin-off add to the ranks of amateur radio and hence the membership of Raynet.

Committee records
Has your group produced its own manual? If so the committee would be delighted to receive a copy. Also any details of exercises other than routine checks which are now recorded in the appropriate section of the "Call-out" book kept by G3MBQ (QTHR). The committee meets again on 25 November so get up-to-date now; and check the renewal date of your membership card at the same time!

Honorary registrations secretary: **Mrs Jane Balestrini, "Merrivale", Willow Walk, Culverstone, Gravesend, Kent.**

* 130 Alexandra Road, Croydon, Surrey CRO 6EW

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

These slow morse practice transmissions are sponsored by the RSGB. Alterations and additions to this list should be sent to the honorary organizer, Mr M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Sundays

Clock time	Callsign	MHz	Town
0900	G3KEP	1·910	Bingley, Yorks
0930	G3YZZ	3·590	Maidenhead, Berks
0930	G3HZL	1·930	Isleworth, Middlesex
0945	G3YRO	1.860	Fareham, Hants
0945	G3USK	1·975	Mablethorpe, Lincs
1000	G2FXA	437·000 to north	Stockton-on-Tees
1015	G3CGD	1·875	Cheltenham
1030	G2FXA	437·000 to south	Stockton-on-Tees
1030	G3NPB	1·875	St Ives, Cornwall
1030	G3ZNW	144·520 to east	West Molesey, Surrey
1100	G2FXA	1·900	Stockton-on-Tees
1100	GW3UMB	1·880	Colwyn Bay
1115	G3ZNW	144·520 to north	West Molesey
1200	G3HVI	1·890	Stoke-on-Trent
1330	G3FWW	1·880	Burnham-on-Sea, Soms
1330	G3XDV	1·190	Canterbury, Kent
1400	G3XWQ	1·975	Canterbury Kent
1400	G3XGJ	1·830	Huddersfield, Yorks
1930	G3YFO	144·19 to south	Burnham, Bucks

Mondays

Clock time	Callsign	MHz	Town
1800	G3SWR	1·980	Birmingham
1830	G3NCZ	145·800 omni-directional	Blackburn, Lancs
1830	G3RXH	1·910	Skipton, Yorks
1900	G3WGU	1·880	Bispham, Lancs
1900	GC2FMV	3·600	Jersey, CI
1900	G3YJA	1·920	Coventry, Warks
1900	G3YEI	1·850	Fleetwood, Lancs
1900 †	G3YED	145·640	Leeds, Yorks
	G3YEE		Bradford, Yorks
1930	G3RAF	1·910 / 3·590 / 144·050	Locking, Somerset
2000	G3YQB	1·980	Aylesbury, Bucks
2000	G3XWZ	1·910	Mansfield, Notts
2000	G3KAN	1·990	Northampton
2000	G3IBJ	1·910	Southampton, Hants
2015	G3HZL	1·845	Isleworth, Middlesex
2030	G3JHM	70·050	Worthing, Sussex
2200	GM4AJH	144·900 to north-west	Aberdeen

†Alternately

Tuesdays

Clock time	Callsign	MHz	Town
1100	G3EBU	1·952	South Woodham, Essex
1800	G3XDV	1·910	Canterbury, Kent
1900 †	G3UFO	1·980	Wirral, Cheshire
	G3XAM		
1900	G3XWQ	1·975	Canterbury, Kent
1930	G3SWP	1·850	Doncaster, Yorks
1950	G3WGU	433·500 to south-east	Bispham, Lancs
1930 †	G3XUD	1·910	Leeds, Yorks
	G3YEE		Bradford Yorks
1930	G3RAF	1·910 / 3·590 / 144·050	Locking, Somerset
2000	G3ZFE	144·896 omni-directional	Hailsham, Sussex
2000	G3TUW	145·200 to south-east	Banbury, Oxon
2000	G3UPA	1·850	Meriden, Warks
2000 †	G3TIK	1·980	Stevenage, Herts
	G3KSS		
	G3OVT		
2000	G3FWW	1·880	Burnham-on-Sea, Soms
2000	G3WGD	1·860	Leicester
2000	GM3PIP	3·590	Mintlaw, Aberdeen
2030	G3ROE	1·915	Harlow, Essex
2030	G3RB	1·975	Whitley Bay, Nth'land
2045	GM2CRY	3·590	St Andrews, Fife
2100	G4RS	1·865	Blandford, Dorset
2200	G3HZM	1·925	Manchester
2220	GM4AJH	144·900 to north-west	Aberdeen

†Alternately

Wednesdays

Clock time	Callsign	MHz	Town
1830	G3FXA	1·900	Stockton-on-Tees
1900	G3YPZ	28·700	Harlow, Essex
1930	G3WGU	433·500 to south-east	Bispham, Lancs
1930	G3YFO	144·19 to north	Burnham, Bucks
2000 †	G3AJX	1·925	Winchester, Hants
	G3TWP		
	G3YSK		
1930	G3RAF	1·910 / 3·590 / 144·050	Locking, Somerset
2000	G8QU	1·970	London, N22
2000	G3JHM	70·050	Worthing, Sussex
2000 †	G3VCV	145·020 to north-west	Wyton, Hunts. Haddenham, Cambs
	G4BEL		
2015	G3WVJ	1·845	Staines, Middlesex
2030	G3KGU	1·915	Theydon Bois, Essex
2100	G3HVI	1·890	Stoke-on-Trent

†Alternately

Thursdays

Clock time	Callsign	MHz	Town
1800	G3SWR	1·980	Birmingham
1830	GW3VBP	3·590	Barry, Glam
1830	GW3UMB	1·880	Colwyn Bay
1830	G3NC	1·968	Swindon, Wilts
1900 †	G3ZBO		Preston, Lancs.
	G3WFY	1·850	Thornton Cleveleys
	G3YEI		Fleetwood, Lancs
1900	G3WGU	1·880	Bispham, Lancs
1915	G3ZNW	144·520 to north	West Molesey, Surrey
1930	G3RAF	1·910 / 3.590 / 144·050	Locking, Somerset
2030 †	G3SJE	1·875	Harrow, Middlesex
	G3GC		
2030	G3YMJ	1·915	Harlow, Essex
2100	G4RS	1·865	Blandford, Dorset
2100	GW3XNI	1·930	Crosskeys, Mon
2200	GM4AJH	144·900 to north-west	Aberdeen

†Alternately

Fridays

Clock time	Callsign	MHz	Town
1800	G3XDV	1·910	Canterbury, Kent
1830	G3NCZ	145·800 omni-directional	Blackburn, Lancs
1900	G3IQF	1·980	Marlow, Bucks
1900	G3NPB	1·875	St Ives, Cornwall
1900	G3ZOD	145·510 to north	Stockport, Cheshire
1930	G3PQF	1·825	Farnborough, Hants
1930	G3RAF	1·910 / 3·590 / 144·050	Locking, Somerset
2000	G3EEL	1·980	Peterborough
2000	G3WGD	1·860	Leicester
2000	G3ZOD	1·928	Stockport, Cheshire
2015	G3SAZ	1·845	Ashford, Middlesex
2030	G3JHM	70·050	Worthing, Sussex

Saturdays

Clock time	Callsign	MHz	Town
0930	G2FNK	1·930	Staines, Middlesex
1000	G3PLE	1·820	Stourbridge, Worcs
1100 †	G3ZOQ	28·350	Leyland, Lancs
	G3ZRE		
1300	G2FXA	1·900	Stockton-on-Tees
1400	GC2FMV	3·600	Jersey, CI
1600	G3ZOD	1·925	Stockport- Cheshire
1730	G3TNF	1·980	Gateshead
2000	G3KPO	1·980	Peterborough

†Alternately

G3BZU morse proficiency transmissions at 20, 25, 30, 35 and 40wpm are made at 1900 gmt on the first Tuesday of each month on a frequency of 3·520MHz. For 100 per cent copy at 20wpm a certificate is awarded, and endorsement stickers are available for 100 per cent copy at the higher speeds. A charge of 10p or two IRCs is made for the basic certificate, and 2½p or one IRC for each endorsement sticker claimed. All claims should be sent to—The QRQ Manager, RNARS, HMS *Mercury*, Leydene, Petersfield, Hants.

CLUB NEWS

Items for inclusion in this section should be sent to regional representatives before the first of each month for inclusion in the following month's issue. They should not be sent direct to the editor.

The date of publication of the following month's issue, first Tuesday in the month, should be borne in mind so that events are not, in fact, history when the details are published. While regional representatives are pleased to receive clubs' events calendars for several months ahead, they still require monthly events lists so that entries can be confirmed or amended.

REGION 1 — RR B. O'Brien, G2AMV

Ainsdale (ARC)—Members should contact N. Horrocks, G2CUZ for details of meetings.
Blackburn (ELARC)—1st Thursday each month, 7.30pm, Edinburgh House, Shearbank Road, Blackburn. Secretary—W. E. Baxendale, G8FDG, "Juverna", Westland Avenue, Darwen, Lancs.
Blackpool (B & DARS)—Mondays, 8pm, Pontins Holiday Camp, Squires Gate. Morse tuition 7.30pm.
Bolton (B & DARS)—1st & 3rd Wednesdays, Bolton Recreation Club, Kensington Place. Morse tuition at every meeting. Further details from G3XUM.
Bury (B & RRS)—Meetings at George Hotel, Market Street, 5 Bury, 8pm, 2nd Tuesday in the month. 14 November. (Surplus equipment sale), 12 December (AGM). After a weekend at Lancaster University for the NW Amateur Radio Convention the verdict from Bury is: "An outstanding success". We hope there will be another next year and we look forward eagerly. The club library is being revived under the capable hands of Mike Horrocks and he would appreciate any donations of books or magazines. Club net 11.30am Sundays, 145·8MHz.
Carlisle (C & DARS)—Mondays, 7.30pm, Currock House, Lediard Avenue, Currock, The new committee is: chairman–G8DVD, treasurer–G8GIX, secretary–G8GSE, committee members–G3WDZ and G8GLR. The Society had five out of seven passes in the May RAE and they now have an officially recognised course for the exam at Carlisle Tech College. New secretary–C. M. Horne, G8GSE, 6 Carlton Gardens, Stanwix, Carlisle GA3 9NP.
Cheshire (Mid Cheshire ARC)—Wednesdays, 7pm, Technical Activities Centre, Winsford Verdin Comprehensive School, Grange Lane, Winsford. Nets on 160m, 7pm, Mondays; on 2m, 7pm Tuesdays. Details from G3JWK.
Chester (C & DARS)—Tuesdays, 8pm, except 1st Tuesday in month, which is net night, YMCA Chester. Details from G8AYW.
Douglas IOM (D & DARS)—Secretary, GD3YUM, will be pleased to hear from any member who intends to visit the island.
Eccles (E & DRC)—Tuesdays, 8pm, Bridgwater School, Worsley, Manchester. Club 2m net 1100 on Sundays, 145·65. All visitors and prospective members welcome. Secretary G4AEQ, QTHR.
Lancaster University (UOLARS)—Prospective members should write to Phil Jones, Dept of Environmental Sciences. The society's vhf station, G8DOU, is operational on 144MHz rtty and would welcome enquiries about skeds.
Leyland Hundred ARG—2nd Monday each month, 7.30pm, Rose & Crown, Ulnes Walton, Leyland. Net night Saturdays, 1900bst on 145·8MHz. Details from F. Harrison, 78 Lancaster Lane, Leyland, Lancs.
Liverpool (L & DARS)—Tuesdays, 8pm, Conservative Association Rooms, Church Road, Wavertree. Secretary G3WCS.
Liverpool (NLRC)—Tuesdays, 8.30pm, informal meeting at the "Nags Head" Thornton, Crosby, Liverpool 23. Visitors welcome. Secretary G3XMG.
Liverpool University (ARS)—Prospective members should contact G4AXA through the Students Union or via his home QTH which is 234 Derby Road, Chesterfield, Derbyshire S40 ZEP.
Manchester (M & DARS)—Wednesdays, 7.30pm, all meetings include morse classes. 203 Droylesden Road, Newton Heath, Manchester 10. Secretary G3IOA.
Manchester (SMRC)—Fridays at 8pm at the Sale Moor Community Centre, Norris Road, Sale, Cheshire. The vhf section meets on Mondays at 8pm at the club shack, "Greeba", Shady Lane, Manchester 23. November programme: 3 November ("How I started in amateur radio"—general discussion), 10 November (Annual Dinner held at the Woodlands Hotel, Wellington Road, Timperley, Altrincham, Cheshire (7.30pm for 8pm dinner), 17 November ("FET voltmeter"—by P. Torry, G3SMT), 24 November ("Life in Antarctica" part 1 (slide talk) by R. P. S. Smith, G3SVW/VP8LK), 1 December (Talk on aerials). Visitors are welcome on both Mondays and Fridays. Hon secretary G3WFT, QTHR.
Manchester University (ARS)—G3VUM is active on all hf bands. The society continues with its programme of lectures, visits and tuition for the RAE and morse test. Details from G8BVF, G3ZNS or GM3YOK at the University Union, Oxford Road, Manchester.
Preston (PARS)—9 and 23 November, 7 December, 7.30pm, Windsor Castle (private room) St Paul's Square, Preston. Secretary G. Earnshaw, G3ZXC. Morse practice 7.30pm, main feature 8pm.
Stockport (SRS)—2nd Wednesday each month is a discussion night. Fourth Wednesday is a lecture night, 8pm, Blossoms Hotel, Buxton Road, Stockport. Secretary G8BCG.
Thornton Cleveleys (ARS) 1st & 3rd Wednesdays, 8pm St John Ambulance Brigade HQ, off Fleetwood Road North (behind Police Station) Thornton, Lancs. Project group now meets on Fridays, 7.15-9pm, at the Project Laboratory, Rossall School, Fleetwood. Work in hand includes 160 and 2m transmitters and receivers. Further details from G3ZYE.
Warrington (W & DARS)—1st & 3rd Tuesdays, 8pm, Thames Board Mills Social Club, Alford Hall, Manchester Road, Warrington.
Westmorland (WRA)—1st Monday each month at New Allen Technical College. Acting secretary is N. Stanley, G3UEC, 9 Castle View, Sedgwick, Westmorland.
Wirrall (WARS)—1st & 3rd Wednesdays each month, 7.45pm, Sports & Recreation Centre (Old Drill Hall) Grange Road West, Claughton, Birkenhead. Secretary G3WSD.
Wirral (Wirral DX Association)—Last Thursday each month at members' homes. 30 November ("Selective calling" by G8AZT). December Christmas Dinner date to be announced shortly. Secretary M. Davidson, G3YSM, 43 Stuart Avenue, Moreton, Wirral. Visitors welcome, please inform secretary beforehand.

REGION 2 — RR J. E. Agar, G8AZA

Barnsley (B & DRC)—Meets at King George Hotel, Peel St, Barnsley, on Fridays at 7.30pm. Discussions are in progress as to changing the meeting night to earlier in the week. Latest details from hon sec: P. Carbutt, G2AFV, QTHR, or P. Ackley, G3LRP, QTHR.
Bradford (BRS)—Meets at club HQ, 10 Southbrook Terrace, Bradford 7. Details from hon sec: R. Harker, A7585, 65 Whitby Rd, Bradford, BD8 9JN. Tel Bradford 43971.
Easington (EAR & EC)—Meets Tuesdays, 7.30pm at Easington Village Working Men's Club, and Sunday mornings for activity on the air. Visitors are always welcome. Details from G3VSS, QTHR.
Fulford (FARS)—Meets Tuesdays 7.30pm at Scout HQ, 31 George St, York. Hon sec: G5KC, QTHR.
Halifax (NHARS)—8 November (Lecture by Mr Craven), 22 November ("Ragchew"), 29 November (Committee meeting), 6 December (Annual dinner). You and your friends are always welcome at the Peat Pitts Inn on alternate Wednesdays or on the air 145·8MHz. Hon sec: G3MDW, QTHR.
Harrogate & Knaresborough (H & KRS)—Meets 2nd and 3rd Mondays each month. Details from hon sec: R. Troughton, G8CRM/G4AZJ, QTHR.
Hull (H & DRS)—3 November ("FRDX 400" by G3YNO), 10 November (Debate ssb/a.m.), 17 November ("Semiconductors Part III" by G3SSA), 24 November ("Lasers" by G3PQY). RAE classes at 9.15pm every Friday at club HQ, 592 Hessle Rd, Hull. Hon sec: Mary Longson, 4 Chester Road, Hull.
North Riding (NRARG)—Meets at "Alma Inn", Scarborough. Hon sec: J. E. Agar, G8AZA, QTHR.
Northumberland, Morpeth (NRC)—Northumbria Radio Club meets at 3 Wheatsheaf Yard, Morpeth. Details, G3XAI, QTHR.
Otley (ORS)—14 November ("Personal transceivers" by Dr D. A. Tong, G8ENN), 28 November (Discussion on digital techniques). Details from hon sec: D. G. Mott, G8BZY, 17 Newall Carr Rd, Otley.
Scarborough (SARS)—Meets every Friday in the lecture room at the Technical College, Scalby Rd at 7.30pm, hon sec: G3VAN, QTHR, area rep and pro, G8KU, QTHR.
South Shields (SS & DARC)—Fridays, 8pm, Trinity House Social Centre, Laygate, South Shields.

Spen Valley (SVARS)—HQ, Grammar School, Heckmondwike at 7.30pm. 2 November ("Aspirin" by S. North), 9 November (Visit to GPO Sorting Centre at Huddersfield), 16 November ("Laser communications" by Dr D. W. Goodwin), 23/30 November ("Basic colour tv" by R. Maude, Hudd Polytech), 7 December (Music visit to Richard Allen Studio, Birkenshaw). Hon sec: G8DSB, 19 Cliffe St, Staincliffe, Batley, tel Heckmondwike 2433.
Sunderland (SARS)—Meets at Sunderland Polytechnic. Details from hon sec: G3XID, QTHR.
Tyneside (TARS)—Meets Mondays at 7.30pm at The Community Centre, Vine St, Wallsend on Tyne. Visitors welcome. Hon sec: G. Lowden, 21 Winefred Gdns, Wallsend, NE28 6EF. Tel Wallsend 627878.
Wakefield (WRS)—G3WRS meets alternate Tuesdays, 7.30pm at Youth Centre, Ings Rd, Wakefield. Details from hon sec: G3XVU, QTHR.
York (YARS)—G3HWW meets Thursdays at 7.30pm. RAE classes are in progress, anyone interested is invited to come along to the meetings at Club HQ, 61 Micklegate, York. Details, J. A. Rainbow, hon sec, 14 Temple Road, Bishopthorpe, York.

All Secs and PROs please get your programme details in as early as possible for "Club News". Closing date for December issue is 3 November. Many thanks 73 to all, G8AZA.

REGION 3 — RR R. W. Fisher, G3PWJ

Birmingham (MARS)—No information. The Birmingham & Midland Institute, Margaret Street, Birmingham 2. *G8BHE*.
(Slade)—17 November (AGM), 1 December (to be announced), 8pm. The Church House, High Street, Erdington Birmingham 23. *G8EYL*.
(South)—First Wednesday in the month, 8pm. Hampstead House.
Bromsgrove (B & DARC)—Second Friday in the month.
Coventry (CARS)—3 November (Club night on the air), 10 November (Stan's quiz), 17 November (Club night on the air, 24 November (Club outside visit), 1 December (Club night on the air), 8pm, City of Coventry Scout HQ, St Nicholas Str, Radford Road.
Dudley (DARC)—14 November, 28 November, 8pm, St James's Road Central Library, Dudley. *G3PWJ*.
Hereford (HARS)—First and third Friday of each month, 7.30pm, Civil Defence HQ, Gaol St, Hereford.
Lichfield (LARS)—First Monday and third Tuesday of each month. Swan Hotel. *G8EID*.
Leamington Spa (MWARS)—Every Monday, 8pm, 28 Hamilton Terrace. A Raynet Group is being formed to cover the whole of Warwickshire, all interested parties contact G8CXL.
Rugby (R & DAR & EC)—Last Tuesday of each month, Lawrence Sheriff Public House. *G3YQC*.
Solihull (SARS)—21 November, 7.30pm. The Manor House, High Street. 5 December (Informal meeting), 9pm, Malt Shovel. *G3XPY*.
Stoke-on-Trent (NWARS)—RAE Lectures, last two Mondays of each month until Christmas, 8.15pm, Harold Clowes Community Centre, Dawlish Drive, Bentilee.
Stourbridge (STARS)—7 November (Informal, 8pm, Shrubbery), 20 November (Junk sale), 8pm, Longlands School.
Sutton Coldfield (SCRS)—13 November (AGM), 8pm, Clubhouse, Sutton Town Football Club, Coles Lane. *G8AVH*.
Telford (WARS)—8 November (Bonfire "Do" at QTH, G3XQL, 8pm), 15 November (Junk sale), 22 and 29 (to be arranged), 8pm, Ketley Bank Youth Centre, near Oakengates. *G3UKV*.
Wolverhampton (WARS)—6 November ("The Birmingham Post Office Radio Tower", by Mr. J. R. Tipple, GPO Chief Engineer), 13 November (Natternite), 20 November (Visit to Neachells Cottage by Dudley ARC), 27 November (Committee meeting), 8pm, Neachells Cottage, Stockwell End, Tettenhall. *G3UBX*.
Worcester (W & DARC)—6 November, 18 November, 4 December, 8pm, Crown Hotel, Broad Street, Worcester. After the annual general meeting there has been a change of officers: chairman–H. Ashford, G3WGY, treasurer–R. Payne, G4AWA, while B. Jones, G8ASO, remains as secretary. *G8ASO* (Worcester 29208).

REGION 4 — RR T. Darn, G3FGY

Derby (DADARS)—4 and 5 November (Weekend Cumulative Contest, see club notice board), 8 November ("Programming a computer" by Ted Avery, G3WBB), 15 November (Film show, including Aerials Part 3), 22 November ("Modern developments in railway service" by D. Armstrong), 29 November ("Photographic Competition" see club notice board). All meetings are held at the clubroom, 119 Green Lane, Derby, and commence at 7.30pm. *G2CVV*.
Melton Mowbray (MMARS)—17 November ("Test equipment and its uses" by H. Miles). Meetings are held monthly at St John Ambulance Hall, Ashfordby Hill, Melton Mowbray commencing at 7.30pm. *G3NVK*.
Nottingham (ARCON)—9 November ("Shack safety" by Ken Viles, G2FUB), 16 November (Activity night), 23 November ("Single frequency, multiple channel working" by John Hill, G8FWH), 30 November (Activity night). All meetings at the Sherwood Community Centre, Mansfield Rd, Sherwood, Nottingham commencing at 7.30pm. *G4AFJ*

REGION 5 — RR P. J. Simpson, G3GGK

Bedford (B & DARC)—2 November (Visit), 9 November ("Propagation"—G2CLP), 16 November (Film evening), 23 November (Discussion—looking at linears—G3UQR), 30 November (Aerial rotators and indicators—G3FWA, G3XDU, G3XKB and G4BCS). Meetings Thursdays at 7.30pm at The Dolphin, The Broadway, Bedford. Hon sec: John Bennett, G3FWA, 47 Ibbett Close, Kempston, Beds.
Bishop's Stortford (BS & DARC)—20 November (Judging of members construction projects), 8pm. at British Legion Club, Windhill, Bishop's Stortford, Herts. Hon sec: Arthur Stanley, G3WUR 42 Havers Lane, Bishop's Stortford, Herts.
Cambridge (C & DARC)—3 November (Informal), 10 November (Junk sale), 17 November (Informal), 24 November (World by two), 1 December (Informal), 7.30pm at HQ, Corporation Yard, Victoria Rd, Cambridge. Hon sec: John Hern, G3NAC, 5 Acheson Rd, Brampton, Hunts.
Cambridge University (CUWS)—7 November, 21 November and 5 December at 8.15pm. Meetings held at Kings College. Hon sec: M. J. Atherton, G3ZAY, Emmanuel College, Cambridge.
Dunstable Downs (DDRC)—3 November ("Add scope to your shack"—G3VVS), 10 November (Between week), 17 November ("Solid state 2m ssb transceiver with digital readout"—G8ALQ), 24 November (Between week), 1 Dec (RSGB AGM visit or On the air night at club HQ). Meetings 8pm, at Chews House, 77 High Street South, Dunstable. Hon sec: C. G. Powell, G8BPK, 1 Wenwell Close, Buckland Wharf, Aston Clinton, Aylesbury, Bucks.
Ely (EARS)—2 November ("Aerials" by G3EDD), 16 November (No details), 7.30pm at Ely Adult Education Centre, St Mary's Street, Ely. Hon sec: P. Brown, 59 Fieldside, Ely.
March (M & DARS)—Tuesdays, 7.30pm, 88B High Street, March. Hon sec: R. E. Ludman, 7 Elwyndene, March PE15 9BL, Cambs.
Peterborough (PR & ES)—3 November (AGM). The club's annual mobile rally was held on Sunday 1 October at Walton School and attracted a good turn-out with visitors from the Midlands and the South-East. The RR visited the rally and the meeting held on 6 October at Peterborough Technical College. Hon Sec: A. H. Jackson, G8GNV, 57 Peterborough Road, Castor, Peterborough.
Shefford (S & DRS)—2 November ("Amateur radio astronomy"—Ross Baldwin), 9 November ("Modern communications receiver"—G3URX), 16 November ("Quadrasonic sound"—G2DUS), 23 November ("Radio transmission and the ionosphere"—G3TDW), 30 November (Workshop practice—club). Meetings at Church Hall, Ampthill Road, Shefford, Beds. Hon Sec: Chris Davies, G8DUY, 17 Brigham Gardens, Biggleswade, Beds.
Stevenage (S & DARS)—Meetings first and third Thursdays each month at 7.30pm in Senior Staff Canteen, Hawker Siddeley Dynamics Ltd, Gunnels Wood Rd, Stevenage, Herts. Hon sec: F. Collett, G3OVT, 8 Silam Road, Stevenage, Herts.

REGION 6 — RR L. W. Lewis, G8ML

Banbury (ARS)—Meeting at Woodgreen Hall, Banbury, 7.30-10pm, 17 November. Details from G3LTN. Tel Banbury 710623.
Cheltenham (RSGB Group)—First Thursday of each month, 8pm, Royal Crescent Hotel, Clarence Street, Cheltenham. *G2FWA*.
Gloucester (ARS)—First Thursday in each month at the Oddfellows Club, Barton Street, Gloucester, 7.30pm. Also each remaining Thursday in each month at the Drill Hall, Education and Leisure Centre, Chequers Road, Gloucester, 7pm. *G3MA*.
South Bucks (VHF Club)—First Tuesday in each month at Bassetbury Manor, High Wycombe. *G8DDM*.

REGION 7 — RR R. S. Hewes, G3TDR

Acton, Brentford & Chiswick (ABCRC)—21 November ("Amateur radio in Switzerland" by HB9QK), 7.30pm, Chiswick Trades & Social Club, 66 High Road, Chiswick W4. Hon sec: W. G. Dyer, QTHR.

Ashford, Middlesex (Echelford ARS)—13 November (Talk by UK fm Group G8CKT, G5AGX & G8AMG), 30 November (To be arranged), 7.30pm for 8pm, St Martin's Court, Kingston Crescent, Ashford, Middlesex. All visitors welcome. Hon sec: Vic Higgs, G3WVJ, QTHR.

Barking (BR & ES)—9 November (The 2nd G3XBF Constructors Award), 7.30pm, Westbury Recreation Centre, Westbury School, Ripple Road, Barking, Essex. All visitors welcome. Hon sec: H. Davidson, G3FZP, QTHR.

Bexley Heath (North Kent RS)—9, 23 November (No details received), 7.30 for 8pm, Congregational Church Hall, Chapel Road Bexley Heath. Hon sec: Maurice Lee, G4BAL, QTHR.

Burnham Beeches (BBARC)—2 November (Talk on 3cm by Brian Coleman, G8AZU), 16 November ("Varicaps" by R. S. Hewes, G3TDR and Andrew Holloway, G3VUQ), 8pm, Hedgerley Scout Hut, Hedgerley, Nr Slough, Bucks. All visitors welcome. Hon sec: Nina Appleby, G8ENX, QTHR.

Cheshunt (CDRC)—3 November (No details received), 8pm, Methodist Church Hall, opposite Theobalds Station, Cheshunt. Hon sec: Richard Ludwell, G3ZZQ, QTHR.

Chingford (Silverthorne RC)—Every Friday, 7.30pm, Friday Hill House, Simmonds Lane, Chingford E4. Hon sec: K. S. Arnold, G3XNP, QTHR.

Cray Valley (CVRS)—2 November (RAEN—a talk and demonstration by members of Raynet), 16 November (Surplus sale). 8pm Congregational Church Hall, Court Road, Eltham SE9. Hon sec: P. F. Vella, G3WVP, QTHR.

Croydon (Surrey Radio Contact Club)—21 November (Talk on integrated circuits by the Plessey Company), 8pm "Swan & Sugarloaf", Brighton Road, South Croydon. Hon sec: Sid Morley, G3FWR, QTHR.

Crystal Palace (CP & DRC)—18 November ("Microphones and their application" by Eric Yeomanson, G3IIR), 8pm. Emmanuel Church Hall, Barry Road, SE22. Hon sec: Geoff Stone, G3FZL, QTHR, tel 699 6940.

Dartford Heath (DF Club)—No details received. Information on club events from hon sec: Maureen Worby, G3XVC, QTHR.

Dorking (DR & DRS)—Second and fourth Tuesdays (7, 21 November) 8pm, "Surrey Yeoman", Dorking. Hon sec: P. B. Gilby, 6 Hawkwood Rise, Gt Bookham, Surrey.

Ealing (E & DRS)—Every Tuesday, 7.30pm, Northfields Community Centre Northcroft Road, Ealing W13. Details from hon sec: J. E. Alban, G3JEA, QTHR.

East London RSGB Group—19 November (G6NR talking about aerials), 3pm, Wanstead House, The Green Wanstead, E11. Further details from Ron Broadbent, G3AAJ, QTHR.

Edgware (E & DRS)—9 November (To be announced), 23 November (Informal), 8pm, Watling Community Association, 145 Orange Hill Road, Edgware. Hon sec: Alan Masson, G3PSP, QTHR, tel 01-950 6827.

Gravesend RSGB Group—Mondays at 7.30pm, "Windmill Tavern", Shrubbery Road, Gravesend, Kent. Area representative: P. F. Jobson, G3HLF, QTHR.

Guildford (G & DRS)—10, 24 November (No details received). 8pm, Model Engineering HQ, Stoke Park, Guildford, Surrey. Hon sec: Peter Hopwood, G8CQM, QTHR.

Hampton Court (Thames Valley ARTS)—1 November (No details received), 8pm, "The Three Pigeons", Portsmouth Road, Long Ditton, Surrey. PRO: Rob Muir, G3LHN, QTHR.

Harlow (H & DRS)—Every Tuesday, 8pm, Mark Hall Barn, First Avenue, Harlow. Club station now operative on 80-10m ssb/cw. Club net Sunday mornings 1030 on 28·8MHz, members use frequency most nights at 2100gmt. Hon sec: V. Heard, 106 Vicarage Wood, Harlow, Essex.

Harrow (RSH)—3 November (To be arranged), 10 November (Junk sale), 17 November ("Aerials & working dx" by Ron Ray, G2TA). Please note change of QTHR to Harrow Sea Cadets HQ, Woodlands Road, Harrow. Meetings start at 8pm, refreshments available during evening. Hon sec: Leslie Light, G3KDL, QTHR.

Havering (H & DARC)—1 November ("Transistorized regulated power supplies" by G3TPJ), 15 November (Junk sale), 8pm, British Legion House, Western Road, Romford. Hon sec: S. J. Hobday, G3SKV, QTHR.

Holloway (Grafton RS)—Mondays (RAE), Fridays (Morse & club night), 7.30pm, Archway School Annexe, Whittington School, Highgate Hill, N19. Hon sec: Tom Coleman, G8EE, QTHR.

Ilford (ARS)—Every Thursday, 8pm, 50 Mortlake Rd, (off Ilford Lane), Ilford. Hon sec: F. G. Jarvis, G3HIW, QTHR.

Kingston (K & DARS)—8 November (AGM), 8pm, "Penguin Lounge", 37 Brighton Road, Surbiton, Surrey. Hon sec: Dick Babbs, G3VU, QTHR.

Loughton (L & DRS)—10 November (Informal), 24 November (Integrated circuits), 8pm, Loughton Hall, Near Debden Station. Hon sec: David Bowers, 12 Theydon Park Road, Theydon Bois, Essex.

New Cross (Clifton ARS)—Every Friday, 8pm, New Cross Road, London, SE14. Details from hon sec: R. A. Hinton, 38 Camilla Road, Bermondsey, SE18.

Northolt (BEAARS)—First Thursday in the month, BEA Trident Club, Western Avenue, Northolt, Middlesex. (This club is open to non-BEA employees by invitation. Contact David Evans, G3OUF, tel Amersham 21573 for details).

Paddington (P & DRS)—Every Wednesday, 8pm, Beauchamp Lodge, Warwick Crescent, W2. Further details from hon sec: Mike Pawley, G8AWV, QTHR.

Purley (P & DRS)—3 November (Natter nite), 17 November (Second junk sale), 8pm, Lansdowne Hall, Lansdowne Road, Purley. Hon sec: Alan Frost, G3FTQ, QTHR.

Reigate (RATS)—2 November (No details received), 8pm, Nutley Hall, Nutley Lane, Reigate, Surrey. Hon sec: F. H. Mundy, G3XSX, QTHR.

Scouts (Baden Powell House ARG)—16 November (To be arranged), 8pm, Baden Powell House, Queensgate, South Kensington, SW7. Hon sec: Alf Watts, G3FXC, QTHR.

Southgate (SRC)—9 November (No details received), 8pm, Civil Defence Hut Howes Road, N11 (near Arnos Grove underground station). All visitors welcome. PRO: Steve White, G3ZVW, QTHR.

St Albans (Verulam) ARC—15 November (Talk and demonstration of facsimile equipment by Muirhead Ltd), 7.30pm for 8pm, Town Hall, St Albans. All visitors very welcome. Hon sec: Hugh Young, G3YHY, QTHR.

Sutton & Cheam (SCRS)—21 November (No details received), 8pm, "The Harrow Inn", Cheam, Surrey. Hon sec: Jack Korndorffer, G2DMR, QTHR.

UK FM Group (London)—Saturday 11 November/Sunday 12 November (1972 Activity contest), 21 November (Illustrated talk on "A vhf dxpedition to Andorra", by John Roake, G8EOB), 7.30 for 8pm, Scout Hut, Hayes Road, Southall, Middx. Details from PRO: Mike Tooley, G8CKT, QTHR.

Welwyn (Mid Herts ARS)—9 November (Microwave propagation by G3HWR), 8pm, Welwyn Civic Centre, Welwyn, Herts. Hon sec: Peter Wilcocks, G8AIE, QTHR.

Wembley (GECARS)—Every Thursday, 7pm, Sports Club, Preston Road, North Wembley. (This club is open to non-GEC employees by invitation, tel Dain Evans, G3RPE, at 01-904 1262 during business hours, for details).

West Middlesex ARC—Meets at Greenford Community Centre, Oldfield Lane, Greenford, Middx. Details of meetings from John Hedges, G3MMQ, QTHR.

Wimbledon (W & DRS)—10, 24 November (No details received). 8pm, St John Ambulance HQ, 124 Kingston Road, Wimbledon, SW19. Hon sec: F. W. Hill, G3WDO, QTHR.

REGION 8 — RR D. N. T. Williams, G3MDO

Canterbury (EKRS)—16 November (Film show). Looking ahead—3 February 1973 (Annual dinner dance, tickets available from hon sec), further details of future meetings from G3MDO QTHR.

Brighton (BTCARC)—Details of future meetings from hon sec: G2CMH, 35 Willington Way, Brighton.

Canterbury University (UKCRC)—Details of club meetings and activities from K. Beesley, G3XUE, Eliot College, University of Kent at Canterbury, Kent.

Crawley (CARC)—Monthly meetings held at Trinity Congregational Church Hall, Ifield, Crawley.

Eastbourne (SARS)—Meetings held first Monday in the month at Victoria Hotel, Latimer Road, Eastbourne. PRO: G3JFM.

Horsham (HARC)—Monthly meetings held at the Guide Hall, Denne Road, Horsham.

Maidstone (MYMCAARS)—All meetings at "Y" Sports Centre, first and third Fridays devoted primarily to the beginners.

Medway (MARTS)—26 November (Golden Jubilee dinner dance). Meetings held every Friday at Aurora Club, Gillingham, 7.30pm. Further details of meetings from H. E. Willis, 111 Laburnum Road, Strood, Kent.

Tunbridge Wells (WKARS)—3 November (Junk sale), 17 November ("VHF contest operating" by John Ridd, G8BQX), further details from H. F. Richards, 17 Reynolds Lane, Tunbridge Wells.
Worthing (W & DARC)—14 November ("Slow scan tv"), 28 November (Instant construction contest). Meetings held every Tuesday 8pm, Rose Wilmot Youth Centre, Littlehampton Road, Worthing. Further details from G8ETL, 12 Bramble Crescent, Worthing.
Mid Sussex (MSARS)—Details of future meetings from hon sec: G3RXJ.

REGION 9 — RR H. W. Leonard, G4UZ

Bristol (City & County PSGB Group)—27 November (Talk with Q & A session), 7.30pm, Becket Hall, St Thomas Street, Bristol 1. *G3ULJ.*
Bristol (BARC)—Every Tuesday, 7.45pm, 24 Bright Street, Barton Hill, Bristol 5. Club station (G3TAD) now back in action. *G3XEI.*
Bristol (University ARS)—Every Saturday, 2.30pm, Dept of Physics, Royal Fort, Tyndalls Park Road, Bristol 8. *G8CVS.*
Burnham on Sea (BoSRC)—Jack Robertson, G3ZOR, has returned to the Merchant Navy and has left Burnham. Any interested amateurs will find a warm welcome at the Weston-super-Mare Club.
Cornish (CRAC)—First Thursday in month, 7 December ("Closed-circuit tv") 7.30pm, SWEB Social Centre, Poole, Camborne. Visitors most welcome. *G3WKP.*
Newquay Group (CRAC)—Fortnightly on Wednesdays. 15 November (Printed circuits and cw instruction), 29 November (Completion of 1971/2 projects and cw instruction), 7.30pm, Treviglas School, Newquay. G3THT, Newquay 4512. Further details of Cornish and Newquay Group gladly supplied by G3NKE.
Exeter (EARS)—Every Tuesday. 14 November ("J-Beam aerials" by Vic Hortop of J-Beam, with demonstration). Members of local clubs are invited to this meeting. 7.30pm, Community Centre, St Davids Hill, Exeter. Club station G4ARE now in action and would welcome contacts on 80. Hon sec: A. W. Bawden, 232 Exwick Rd, Exeter, EX4 2BA.
North Devon (NDRC)—Second and fourth Wednesdays of month, 7.30pm, "Grinnis", High Wall, Sticklepath, Barnstaple. RAE session at 7pm each meeting. *G4CG.*
Plymouth (PRC)—First and third Tuesdays of month, 7.30pm, Virginia House, Bretonside, Plymouth. Hon sec: S. E. Martin, 32 East Park Avenue, Plymouth PL4 6PF.
Saltash (S & DARS)—First and third Fridays of month, 7.30pm, Burraton Toc H, Saltash. Further details from G3ZHM.
South Dorset (SDRS)—First Friday of month, 7.30pm, Alma Road Section of Weymouth Technical College. *G3VPF.*
Taunton (T & DARS)—Fridays, 7.30pm, Jelalabad Barracks, The Mount, Taunton.
Torbay (TARS)—Every Tuesday and last Saturday of month. 26 November (RSGB tape and slides—"A tour of ARRL headquarters"), 7.30pm, rear of Belgrave Road, Torquay. An RAE course is in full swing. Visitors always welcome. *G3NQD.*
Weston-super-Mare (WsMRS)—Second Friday of month. Details from G8FNL at WsM 29327. *G3GNS*
Yeovil (YARS)—Every Thursday, 7.30pm, the Youth Centre, 31 The Park, Yeovil. *G3NOF.*

REGION 10 — RR D. M. Thomas, GW3RWX

Blackwood (ARC)—Fridays 7.30pm. Oakdale Community Centre, Oakdale, Mon. *GW3TUG.*
Barry College of Further Education (ARS)—Thursdays 7pm, at the College, Colcot Rd, Barry, Glam. *GW3VKL.*
The Marconi-Kemp 75th anniversary celebrations and the issue of the special stamp by the Post Office reflect great credit on the organizer, Mr Dan Adams and his group, and indeed it is doubtful if any club has been involved in such an ambitious and sustained project.
Cardiff (RSGB Group)—Monday 13 November 7.30pm. BBC Club, Llandaff, nr Cardiff. (Showing of ARRL film). *GW3GHC.*
Haverfordwest (ARS)—Tuesdays, 7.30pm, HQ, Rosemary Lane, Haverfordwest Pembs. *GW3YBB.*
Hoover (ARC)—Mondays 7.30pm, Hoover Social Club, Hoover Works, Pentrebach, nr Merthyr, Glam. Mr F. E. Tribe, c/o Hoover Works.
Pembroke & District (RSGB Group)—Last Friday in each month at the Defensible Barracks, Pembroke Dock, Pembs. *GW3LXI.*

Cyril Parsons, GW8NP, operating the Sully House Restaurant end of the morse link to Flat Holm Island on the occasion of the issue of the Marconi-Kemp stamp

Pontypool (RSGB Group)—Tuesdays 7pm, at the Educational Settlement, Rockhill Rd, Pontypool, Mon. *GW3JBH.*
Port Talbot (ARS)—Meets second Tuesday of each month at 7.30pm, at the Rail & Transport Club, Station Rd, Port Talbot, Glam. *GW5VX.*
Sully & District Short-wave Club—Tuesdays 7pm at the Annexe, Sully Bowls & Social Club, 59 South Rd, Sully, Glam. *GW3ZSV.*
Rhondda (ARS)—Meets at Rhondda Transport Employees Club & Institute, Porth, Rhondda, Glam. Details of meetings from GW3PHH.
Swansea Radio Society—Meets on first and third Tuesday of each month. Meetings are also held on the second and fourth Tuesday, when RAE and morse classes are held. Secretary: Mr M. D. E. Connor, 54 Talley Rd, Penlan, Swansea, Glam.
University College, Cardiff (ARS)—Accommodation difficulties have been overcome, and it seems that a very successful session is ensured. Club callsign: GW3UWC. Secretary: Mr Simon Northeast, c/o Students Union, Dumfries Place, Cardiff.
South-east Wales Raynet Group—Details from GW3ZFG. Tel Cardiff 62411.
University College of Wales, Aberystwyth Radio & Electronics Society—All enquiries to the secretary, c/o Students Union, University College of Wales, Aberystwyth. Club callsign: GW4BGG.

REGION 11 — RR P. Hudson, GW3IEQ

Conway Valley (CVARC)—The club has new HQ situated at The Quarries, Llanddulas, Abergele. 9 November ("Electronic calculators" by GW3GRY & "VHF & uhf latest developments" by G3AOS). 14 December (Raffle & Junk Sale, Bring & Buy). *GW3MDK.*
Rhyl (R & DARS)—14 November ("Constructional techniques" by GW3UTG). 12 December (Film show). Mona Hotel, Rhyl.
Bangor (UCNWARS)—Meetings alternate Thursdays at 1715 in the small lecture theatre of the Engineering Dept, Dean Street, Bangor.

REGION 12 — RR A. J. Oliphant, GM3SFH

Aberdeen (AARS)—Fridays, 7.30pm, 8 Blenheim Lane, Aberdeen. *GM3HGA.* Tel Aberdeen 33838.
Dundee (Kingsway Technical College ARC)—Wednesdays 7pm (Morse practice 6.30pm), Kingsway Technical College, Old Glamis Road, Dundee. Visitors always welcome.
A Beer and Skittle Social Evening will be held in the "Golden Pheasant", Macalpine Road, Dundee on Friday 8 December at 7pm. Further details from GM3VEY. Tel Monifieth 3577.

Inverness (IRS)—Fortnightly on Fridays at 7.30pm. Next meeting 6 October. Cameron Highlander's Memorial Youth Club, Planefield Road, Inverness. Mr. L. Bell, 114 Glenurquhart Road, Inverness.

Lerwick (LRS)—Every Tuesday at 7pm, Clubrooms, Abbsbrae House, Lerwick. *GM4BBL*. Tel Lerwick 1238.

Lhanbryde (MFARS)—Wednesdays, 7.45pm, St Andrews School, nr Lhanbryde, Elgin, Morayshire. *GM3UKG*. Tel Clochan 225.

Queen's Own Cameron Highlander's Memorial Youth Club Radio Section—Tuesdays, 7.30pm, Planefield Road, Inverness. Section caters for all young people from 13 years interested in learning, and obtaining practice in, the elements of radio technique. Mr Bill Begg, 68 Tomnahurich St, Inverness.

Thurso (CARS)—Second Tuesday in each month, 7.30pm, Scapa House, Thurso. *GM3JUD*. All visitors welcome.

REGION 13 — RR V. W. Stewart, GM3OWU

Berwick (BARS)—Last Sunday in each month, 3pm, Tweed View Hotel. Further details from C. H. Crook, G3YOG, 19 Hatters Lane, Berwick upon Tweed or from the AR, G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburghshire.

Dunfermline (DRS)—Second Wednesday in each month 7.30pm, Abbot House, Dumfermline. Further details from G. Martin, GM3NVQ, 42 Rose Street, Dumfermline.

Edinburgh (LRS)—Second and fourth Thursdays, 7.30pm, 66 Hanover Street, Edinburgh, Further details from K. C. Henderson, 97 Ganton Road, EH5 3NH. (Phone 552 2147).

Glenrothes (GDARC)—First Sunday in each month, 7.30pm, Old Nursery Buildings, Leslie, Fife. Details from A. B. Givens, GM3YOR, 41 Veronica Crescent, Kirkcaldy, Fife.

St Andrews (UStAARS)—8 November (History of radio), 22 November (Weather satellites), 31 November (STV visit), 5pm, dept of Physics, North Haugh, St Andrews. Further details from R. Marchant. GM3ZCQ, as above. No meetings during December.

REGION 14 — RR M. A. Comrie, GM3YRK

Ayrshire (AARG)—5, 19 November, 7.30pm, YMCA, Howard Street, Kilmarnock.

Falkirk and District (RSGB Group)—10 November, 7.30pm, Temperance Cafe, Lint Riggs, Falkirk.

Glasgow University Radio Club (GURC)—9 November (Annual General Meeting), 23 November (Visit to Nautical College).

Greenock and District ARC (GM3ZRC)—Tuesdays and Fridays at 7.30pm, Watt Library, Union Street, Greenock. Visitors welcome. Enquiries to hon sec: GM3LYI, QTHR).

West of Scotland Amateur Radio Society (WoSARS)—3, 10, 17, 24 November at 8pm, 81 Virginia Street, Glasgow.

REGION 15 — RR J. Thompson GI3ILV

Belfast (B & D, RSGB Group)—Meeting on Wednesday 15 November at 90 Belmont Road, Belfast 4, at 8pm and third Wednesday of each month. New members welcome.

REGION 16 — RR D. G. Beattie, G3OZF

Chelmsford (CARS)—First Tuesday of each month, 7.30pm, at Marconi College, Arbour Lane, Springfield, Chelmsford. At AGM in October, the following new officers were elected: chairman—G3VPK, secretary—G3YNV, treasurer—G3PMW. Details of meetings from G3YNV.

Colchester (NEETC)—Wednesdays, 7.30pm, North-East Essex Technical College, Sheepen Road, Colchester. Details from E. T. Jacobs, 26 Pondfield Road, Colchester.

Gt Yarmouth (GYRC)—Last Tuesday of the month, 7.30pm, at the Central Library, Gt Yarmouth. Details from A. D. Besford, 49 Blake Road, Gt Yarmouth.

Ipswich (IRC)—Where possible, two meetings each month at Handford House, corner of Ranelagh Road and the main London road (A12). at 7.30pm. Next meetings—8 and 29 November. Details from G3YWM.

Norfolk (NARC)—Every Wednesday, 7.45pm, at Crome Community Centre, Telegraph Lane East, Norwich. Details from G8BLD, The Rectory, Framlingham Pigot, Norwich, Norfolk NOR 45W.

Southend (S & DRS)—Every other Thursday, 7.30pm, at the Flarepath Canteen, Southend Airport. Next meetings, 16 and 30 November. Details from G3AXN.

REGION 17 — RR L. N. G. Hawkyard, G3ZKR

Basingstoke (ARC)—Meetings first and third Saturday each month, Chineham House, Popley, 7.30pm. *G3CBU*.

Chippenham (CARC)—5, 7, November Rowde Hamfest and skittles at 8pm, c/o G3UFW. 14 November (Discuss electronic keyer project), 21 November (Discussion on propagation), 28 November (DX night). Morse lessons on Tuesday, 7.30pm at Chippenham High School for Boys, Hardenhuish Lane, Chippenham. *G3MBN*.

Harwell (AERE ARC)—Meetings on the third Tuesday of each month, also informal meetings and junk sales every Friday lunch time, 7.30pm at the Social Club, AERE, Harwell, Berks. *G3NNG*.

Maidenhead (M & DARC)—21 November ("Radio astronomy" by G3UKS), 4 December (Home construction contest). *G3VMR*.

Southampton (RSGB Group)—Saturday 11 November at the Lanchester Building, Southampton University. Every Wednesday evening at the Clubroom, Kent Road. RAE Course, Fridays, 7.30pm. G3ZKR. Tel 73378.

Swindon (SDARC)—1 November ("Peaking up your converter and receiver using a noise generator" by G8AVG), 15 November (Junk sale and social evening), 29 November ("Construction tuning and use of open wire feeders" by G3LTZ). Club meetings, 7.30pm at Penhill Junior School. *G3YKC*.

MEMBERS' ADS

These low-cost flat-rate advertisements are accepted as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the last page of each issue of *Radio Communication*, or on a postcard similarly laid out. Each **must** be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership, and a remittance by postal order or cheque for 25p (stamps not accepted). They will not be acknowledged. Those not clearly worded or punctuated will be returned. No other correspondence concerning this service can be entered into.

The closing date for each issue is the 4th of the preceding month but no guarantee of inclusion in a specific issue can be given. Valid advertisements not published in the issue following receipt will be held over until the next issue.

Trade or business advertisements, even from members, will not be accepted for Members' Ads but should be submitted as classified or display advertisements in the usual way. The RSGB reserves the right to refuse advertisements, and accepts no responsibility for errors or omissions or for the quality of goods offered for sale.

Members are advised to enclose a stamped addressed envelope when replying to advertisements.

See the current order form on the last page for further details.

FOR SALE

Gonset all-band fixed stn or /M tx and rx, mic etc, as new, buyer coll, £40 for quick sale, Mr D. A. Austin, 46 Lake Walk, Clacton-on-Sea, Essex.

40290 vhf power transistors, equiv BLY33, £1.25 ea, p & p 5p with brief data and cct ideas. W. S. Poel, Littlecroft, Mill Hill, Brentwood, Essex.

Vanguard AM25B, unmodified, complete with control unit, spkr, handset and plugs but no connecting cables or xtals, £15; Grampian DP4 mic high imp, mint, in orig packing, list £9.50, £5. G3XJJ, QTHR. Tel Northampton 39196.

Eddystone 888A, £70 ono. G3WET. Tel Aldridge 51551.

Multi-voltage tx power pack £4; Geloso 4/102 vfo with valves, less dial, £2; 25W trnsfmr 50p; 250 M/A choke 50p; table topper trnsfmr £1. G5JR, QTHR. Tel Reading 472145.

Heathkit HW100, HP23A, £120; cubical quad IMX, £15; Two 20ft Al masts 2in dia, £2.50 ea; buyer insp and coll. G3PBW, QTHR.

Heathkit Mohican GCIU rx, with mains trnsstr-regulated psu and rf attenuator, £25 ono, sae for full details. GW8FIG, C. J. Cole, Zodiac House, Porthcuring, Nr Penzance, Cornwall.

FP 2AC psu and spkr unit for FT-2F 2m tx, gives 3A @ 12V dc, from ac mains, £18 ono. **Wanted** urgently, manual or info on Lafayette HA-63 rx. Will buy or photocopy. D. Pickering, 19 Park Court Rd, Bridgend, Glam, CF31 4BP. Tel Bridgend 4251.

Mini-mitter 150W, 80-10m, a.m./cw tx, good condition, £15; buyer coll. GI3JOZ, QTHR. Tel Londonderry 2613 day, 61151 night.

Diesel gnrtr, 240/115V, approx 2K; also DX4OU and vfo as new. **Wanted** 20/15/10 beam with rotator and Mohican rx. G3AQW. Tel Stoke on Trent 533136 after 6pm.

Radiovision Commander Console rx, revalved, vgc, hndbk, £30; Heath RAI, vgc, hndbk, £23; Pye Cambridge 2m rx/tx, a.m., £25; 12V mains psu £10. G8DVZ, 87 South Oval, Kings Heath, Northampton. Tel Beckett 6635.

50 yds h/d coaxial Uniradio No 18, 75Ω, 2.7dB loss 100ft, 200MHz, £3.50; BC625 tx unmodded, £2.50. G3BYY, QTHR. Tel Wraysbury 2007.

Retirement sale, G3BDQ ssb/tx 400W, solid state power supply, £40; 50W 2m am/tx 6ft dural cab, 4 sets 3 draw rack rails, £15, circuits on all, buyer to insp and coll. D. Phillips, Firdowne, Gomeldon Hill, Salisbury, Wilts. Tel Winterbourne Gunner 409.

Star SR550 Ham Bands double convrsn rx, manual plus circ diag, £35. G8EEU, QTHR. Tel Pudsey 78475.

Trio JR310 and spkr, 4 mths old, narrow band fltr and cal osc fitted, very good condn, offers, £10 ono. W. A. T. Brunton, 4/13 Orchard Brae Avenue, Edinburgh EH4 2HW. Tel 031-322 5566.

Complete operational stn Vespa Mk1 tx, Eddystone 888A rx, KW E-Zee match, 18AVQ, Hi-gain aerial, manuals, £125. Buyer coll. G3MIX, QTHR. Tel Teignmouth 4480.

FT-DX 560 tx/rx, Yaesu, matching spkr, KW E-Zee Match, Asahi ME-11B swr mtr, DM-501 dynamic mic, hardly used and in exc condn, complete stn for £150. G3MCY, 4 Wenton Close, Cottesmore, Oakham, Rutland.

Ham Bands cnvtr, QP166 898 dial £10; compact stab psu, 300V 250mA, 6V 6A, £3; PCR2 £3; scope and other test equip, sae list. F. G. R. Cook, The Old Lodge, Seven Hills Rd, Cobham, Surrey. Tel Cobham 3117.

2m Microwave Modules solid state 5W tx, 3 xtals, £20; UMI mod trnsfmr £2.50; valves YL1130 (2), YL1080 (1), QQVO2-6 (2), all £1 ea. G8AAF, QTHR.

6 band rx, AR 158 AIWA battery/mains, ship to shore, aircraft a.m. broadcast, etc, prchsd 10/71, cost £38. As new, will accept £30. M. Dawbarn, "Mellor", 8 Daylesford Close, Parkstone, Poole, Dorset BH14 8DY. Tel Parkstone 0202-743735.

New vhf/uhf semicondctrs, half list, MM1696 (3), £9.22; MM1552 (4) MM1553 (5), £20.93; 2N5637 (1), £18.53; 2N5646 (3), £8.60; 2N5591 (3), £7.80; 2N5642 (7), £5.43; 2N5645 (2), £4.55. Other sim devices available. GM3JHL, QTHR.

Lafayette HA600 rx £35, (present price £50); large stock xtals, trnsfmrs, mtrs, state reqmnts; FT101 tx/rx, best offer over £200. G3IDW, QTHR. Tel Stratton St Margaret 2055.

FL DX2000 linear, mint, very little use as most operating is /M. Fed up seeing lin sitting idle, £90. G3USU, QTHR. Tel Kingston Blount 51689.

Sentinel 2m mosfet cnvtr, i.f. 28-30MHz, £9; cassette player with musicassettes, £5. **Wanted,** high band Pye Cambridge. GW8EQJ, QTHR.

Complete mobile installation, vgc, AT5 T28 control unit, 12V transipack, two band aerial, prefer buyer coll £25; carr extra. G8QM, QTHR.

Heathkit gdo, type GDIU, £10; KW2000, ac psu, mint, £130; field strength meter, £2; KW aerial switch, £3; Morganite 80Ω load, £3. G3VMY, QTHR. Tel 0734 340321 wkends.

B40 £18.50; Ten-Tec PM3A £17; pedal gnrtr, 12V, 40W, £8; microwave sig-gen 7·8-11cm with wattmtr and termination adptrs, £24; Pye SSB 125, xtal control, 20, 40, 80m tx/rx, £38.50; Garex 2m a.m./fm tx/rx, £95; decade attenuator, 1GHz. G3SRO, 8 Addiscombe Grove, Croydon, Surrey. Tel 01-680 3841.

160m a.m. tx, int/psu, 8 × 10 × 11, £10 ono; Buccaneer 4 band rx, 88-175MHz and mw, a.m./fm, £10; SB610E, new, £50 inc carr; Misc trnsfrms, cases, comps, sae pse. Beauchamp, GM3SYD, 22 Greensway, Newmachar, Aberdeenshire, AB5 0SL.

Complete station, MW100, with circ, max power lin 4CX250s, tower, control gear, TA33, metered Z-match, LM14 freq mtr, spare valves etc, £175. G3KPW, QTHR.

Eddystone EC10 S-mtr, modification, £35; Stolle Memomatic aerial rotator, £15; SSM Sentinal 2m cnvrtr, 4-6MHz i.f., £10, carr extra. **Wanted** dc psu for KW2000, also lin, KW500, KW1000 or why? A. R. Thackery, Westerloch, Lerwick, Shetland. Tel Lerwick 1238.

KW202 rx, exc condn, £110; Philips N4404 4-track stereo tape rcdr, good cond, £50; buyer collects. M. S. Dodgson, 150A Liverpool Road, Birkdale, Southport, PR8 4NS. Tel Southport 68385.

SSB tx, 10-80m, panel 19in × 7½in, vox and mox, pa, 4X250B, 1500V, spares, article *W/W* March 67, £50; AR88D perfect, spkr, S-mtr, hndbk, spares, £35; RCA wavemtr, TE149, mains operated, £10. G3HRO, QTHR. Tel 01-460 7660.

160m QRP tx/rx in one case, 210mW, could be increased, internal 12V batt, atu, all glass fibre pcb constrctn, easily serviceable, fully documented, £15, ovno. Buyer collects, any tests. G3MEJ, QTHR. Tel 01-648 5898.

EA12, perf condn, £120, delvd; Solartron CD711S scope with manual, £60, delvd; 40ft 2-sectn steel telescopic tower, few mths old, you dismantle and arrange removal, £50. All prices open to offers. GW3UCJ, QTHR.

2m Mosfet cnvtr, 28 to 30MHz i.f., new, £9.95. G3OLB, QTHR. Tel Oldbury (Glos) 4559.

EC10, £33; Sanyo MR4040 cassette recorder, £20; pr walkie-talkies, citizens band, £8; Heathkit gdo, plus coils, £8. G. Hall, 7 Victoria Rd, Ellesmere Park, Eccles, Manchester. Tel 061-789 2505.

KW Vanguard tx, 10-160m, + Trio JR500SE rx, 10-160m, complete with SP5D spkr, £88, good condn, buyer coll. G4ABG, QTHR.

Almost complete set of comps for Mullard 25W transistor audio amp—audio and radio circ book—majority on pc boards, requires o/p trnsts + electrolytic for psu, prefer buyer inspect, £8 ono. G8FTM, Highlands, Langholme Rd, Langton Green, Tunbridge Wells, Kent. Tel 0892 862195.

Car radio telephone "Storno", 9 chann, 12V, used to be connected to Post Office Radio Telephone Service, ideal for convrsn, for quick sale, £60. S. I. Posen, 26 Cadogan Gdns, Chelsea, SW3 2RR. Tel 730 2460.

Pye Cambridge AMIOB six channel, boot mounting with all accessories and 145MHz, tx/rx xtals, £35. G8BWW, QTHR. Tel Southport (0704) 67397, evgs.

Going solid state cw only, selling KW2000B + ac psu, sked arranged, del 100 miles, £170. **Wanted** standby rx, anything consdrd incl exch with cash adjustment, gen cov or amateur bands only. G3PDL, QTHR.

Eddystone EC10 mkI, unmrkd, £39; Class D wvmtr, ac, £5, pref buyer coll. G3WEX, QTHR. Tel 021-354 4265.

Tuning cpctr believed to be about 800pF, 5kV, £6; 100W mod trnsfmr £1.50; 3 carbon resistors to make 80Ω, 300W, £1.50; post office key switches and relays, very cheap. Phil Heap, 198 Abbots Rd, Abbots Langley, Watford, Herts. Tel Kings Langley 63889.

Hallicrafters Super Skyrider S11 gen cov rx, 240V, with diags and 12in spkr, £15. D. J. Gibbs, 42 Downshire Hill, Hampstead, NW3. Tel 01-435 2064.

2m tx, QQV06-40, pa, rack mounted PSUs, modulator, pr KT885, needs UM3, £20; Electroniques i.f. strip £7.50, Garrard SP25, with plinth, £10. **Wanted** KVG XF9B and xtals. G8BIS. Tel Dartford 29799.

3cm radar head with magnetron £5; BC221, reclbrted, with charts, £15; Pye mkIV industrial camera, spg and control unit, with cables and hndbk, working, £50 ono; colour tv RGB output video amp £5. G. D. Lean, 01-997 0901.

UHF disc sealed triode type CV82; Marconi gnrtr, type TF885A, 50Hz-5MHz; Advance audio gnrtr, Type F, offers, sae for further details. N. C. Lay, 80 Norreys Rd, Didcot, Berks. Tel Didcot 3916.

Lafayette HA350 rx, 80-10m, unmarked, as new, with manual, property late G3IV, £50 ono. G3CTE, QTHR.

Pye Vanguard 2m tx/rx, extrnl rx vfo, new front panel with all controls, etc, £40; Trio 9R59DE, £25; Garex FET cnvrtr £9; scope, Taylor, 32A, ok, £10; 12V psu, ok above tx/rx, £5. Ian McKechnie, 41 Westerlea Dr, Bridge of Allan. Tel 031-666 6570.

Trio 2m tx/rx, sae for detailed spec. Heathkit solid-state vmtr, IM-16, £20; 2m KW Valiant tx £15; BC221 in nice cab, blank book, £10; other useful oddments, sae for list. G3HCM, 14 Compton Court, Long Compton, S Warwickshire. Tel 669.

Hartley 13A dbl beam scope, rf probe, spare set valves, £20. G3BYY, QTHR. Tel Wraysbury 2007.

Selling cheap—Airflow base for 4X150A; old pattern 3in scope crt, VCR 138, perfect; new wvmtr W1646, ac powered, rack fitting, GEC 2m exciter with room for 150W pa. Parker, 133 Station Rd, Cropston, Leicester LE7 7HH.

Eddystone 680X gen cov 480kHz-30MHz; recently overhauled, aligned by Eddystone, £50 ono, cct supplied, matching spkr incl. G3NLD, QTHR. Tel 01-889 4431.

4MH 70cm trnsstr cnvrtr, i.f. 16-14MHz, new and unused, £6 or swap for KW E-Zee match. P. Rosamond, 3 The Brow, Montagu Rd, Huntingdon PE18 6RA. Tel Huntingdon 52304.

Trio JR310 with extra mech fltr, Hamgear pre-selector, spkr and phones, all mint, £70; buyer coll. E. Greenwood, 10 Naze View, Gauxholme, Todmorden, Lancs.

KW Vespa mkII, 6LQ6 pa, psu, £85; 6 × bndsprd, 2 × gen cov coils, hb, psu, £18; Pye Vanguard AM25 with control box, £15. Conway, 40 Chiltern Ave, Northampton. Tel Northampton 51422.

Heathkit HW17A and mobile power supply, vgc, £50; Nova-Tech Aviator II transistor direction finding rx, 108-136MHz, 1·6-4·5MHz, 550-1,600kHz, 190-400kHz, £25 ono. G4AIJ, QTHR. Tel Corbridge 2567.

4m tx, homebrew, £6; 2m tx, homebrew, £12, slow motion dial SMD2, 611 and 36/L reduction drive, new, £1.50; Eagle chassis punch set, new £2.50; 2 QVO4-7 valves, new 30p. H. H. Seymour, 6 Chichester Buildings, Swan Mead, London SE1 4RY.

HA700 gen cov rx with matching spkr and manual, first offer of £25, post extra. R. Banester, Fairfield, Church Rd, Sutton, Norwich, Norfolk NOR 32Z. Tel Stalham 439.

Amateur band rx, Heathkit HRIOB in perf wkng cond as in latest Heathkit catalogue, £35 inc 100kHz xtal clbrtr; Hamgear PM11 prslctr, £8. G. Cluer, 140 Church Rd, Upper Norwood SE19 2NT. Tel 01-653 1148 pref between 5.30 and 7.30pm.

KW Z-match, switched, £10; Eddystone communications spkr, type 935, £6; EKCO car radio, CR900 and 901, £12. R. E. K. Pembrook, Twin Pines, Kingsdown, Deal. Tel Deal 3538.

8·0555MHz xtal for 2m /M calling channel, 80p. **Wanted** Sommerkamp FR100B rx in perf condn, state price please. GM3ZVB, QTHR. Tel 031-443 3381.

Galvanised 32ft triangular lattice tower with all guys and fittings, CDR rotator and control box, and 20m X-beam, £35. G3XER, QTHR. Tel Leeds 658568.

TW2 tx and mains psu, incorporating aerial changeover relay, 6CW4 2m cnvtr, command rx and mains psu, spkr, all cables, £25, carr extra. **Wanted** 44·7466, 44·7666 and 51·000MHz xtals. G3NPF, QTHR. Tel Horsham 66290.

SB1OU ssb adptr, vgc, £20; B40 rx £20; will del 100 miles; 21MHz cnvtr, 5MHz i.f. perfect for BC348, £6; absorption wvmtr, 1·8-30MHz, £4. **Wanted** portable typewriter with pica type. G3YSO, QTHR. Tel 0643-3306.

Transistorised Eagle AR91 sw rx, 30MHz-5·5kHz with extra gear drive on bndsprd, ideal for beginner, cost £16 when new, hardly used, only £10. G3YXE, QTHR.

Colour tv, Rank Bush Murphy, 22in, working but requires cabinet, £80; Lorenz printer, offers? H. A. Buckenham, Steeple View, Peartree Lane, Doddinghurst, Brentwood, Essex. Tel Blackmore 822891.

Trio 9R59DS rx, mint cond, fitted stblzr, £37. Wanted Kokusai mech fltr and info on R209 rx. K. Basterfield, 51 Ruskin Cres, Crownhill, Plymouth, Devon.

2m tx, 20W with psu, £10 ono; 2m cnvrtr, i.f. 28-30, mosfet, £5. D. Boorman, 23 Whitmore Rd, Beckenham, Kent BR3 3NU. Tel 650 5129.

Sommerkamp FRDX500S rx, immac condn, £120. G3ZZQ, QTHR. Tel Hoddesdon 64896.

15m and 10m quad spider, bamboos, insltrs etc, £8; G3OMT, "Hillcote", Station Rd, Lichfield, Staffs.

DX100U with hndbk, built at Heathkit, very nice condn but needs peaking up, over 200 countries worked, no weird mods, £20. G6TC, QTHR. Tel Wolverhampton 732002.

KW Vanguard tx 160-10m, vgc, offer over £25, buyer coll; also B44 tx/rx, part mod for 4m, offers. J. K. Harvey, 22 Elm Grove, Bromsgrove. Tel 76941.

Pye Cambridge 9W rf on 2m exc cond, £22.10; brand new QYA-400 + base + heater trnsfmr + 2 used QY4-400, £12 + carr; other items incl xtal fltrs £4, sae for list. G3VFO, QTHR. Tel Brighton 684659.

AC psu well-built, 800V 500mA, 250V 3A, 130V 50mA, 12V 6A, £10. Wilders, Lincoln College, Oxford.

Heathkit GR64 commnctns rx, good cond, £18; ex RAF batt, unused, unfilled, 40Ah, £2, buyer coll. M. Kidman, "Las Palmas", 27 Norton Crescent, Towcester, Northants.

Tavasu /M whip, base, coax and all coils, new July, delvd for £9.50. G3VNI, QTHR. Tel Maidstone 53729.

Variable trnsfrmrs, 0-275V/6A, £10; 0-250V/0·7A, £2.50; 0-270V/1A, £7.50; Farwell 12V/1A stab supply, £3; capacitor decade box, £1; Samwell Hutton 100kHz-30MHz Q-mtr, good cond, £5; Dawe af microvolt attenuator, £2.50. Samaris, King Edward Rd, Sth Woodham Ferrers, Nr Chelmsford, Essex. Tel Millwood 8275.

Bargain 30ft wooden lattice tower, ideal for heavy quad or beam, only £4; buyer must collect and dismantle; joystick and tuner 300W p.e.p. model, £8. G4ADF, QTHR.

R1155 + psu, recently re-wired; some minor bugs, £10; transistors, ME0404-2, ME1120, ME6002, ME9001, 2N2369; diodes, 1N935A, 1N3065, HP2800, hot carrier diodes, all at 20p for 4. Wanted Codar T28 rx. R. A. Beament, "Ladram", York Rd, Camberley, Surrey. Tel 0276 23265.

Sphinx ssb tx £30; Codar PR30X preselctr, £5; Codar RQ10X Q-mult, £5; Heathkit QPM-16 Q-mult, £5. G3ITV, QTHR. Tel Brentwood 5718.

Eddystone 940, plinth spkr, £75; Trio 9R59DE, £29; Denco double convrsn rx, needs attn, £5; Sky-buddy, working condn, £2.50; vhf sig-gen CT53, wrkng, attenuator fault, offers? prefer buyers coll. G2HCV, QTHR. Tel 01-954 2960.

New FRDX400 de luxe rx, local demolition precludes further use, in original packing, complete, £145; 10% below new price. G3VFO, QTHR. Tel Brighton 684 659.

KW2000B + ac psu, immac condn, £155; Creed 7B teleprinter, as new, 24V, £15; Redifon CFS t/unit, exc condn, £12; 2 new 866A, £1, pp. G3YPS, QTHR.

SCR522 tx/rx, 12W output on 2m, complete with power unit and tx xtals, rx modified for continuous tuning, good wrkng order, £10 ono. G8BJX, QTHR. Tel 01-303 7638.

Heath 10.12U scope, BC221 af, both perfect working order, offers. G3KI, QTHR. Tel Crondall 560.

National NCX-5 Mk 2 with NCX-A and NCX-D PSUs, XCU27 calibrtr, good cond, £210 ono, carr by arrangement. G3MOE, QTHR. Tel Cheltenham 24217.

HW32A with psu, £60; FR100B and FL200B, £130; Pye Vanguard AM25T tunable on 2m, £35; valve vmtr, Eagle, £10. A. Townend, 6 Cannon Park Rd, Coventry. Tel Coventry 69673.

J-Beam Ltd, 6-over-6 2m beam, 9ft × 1¼in dia aluminium mast, double chimney lashing kit, never used, £9 the lot. John Owen, 76 The Glade, Shirley, Croydon, Surrey. Tel 01-654 5741, after 7.30.

Modified KW Vanguard 100W am/cw tx + legal top band, TT21 pa + rack, 4ft 8in × 19in, housing overkill psu, 807 mod, relays etc, complete unit, wrkg order, £35, pref buyer coll. G8BLI, QTHR.

Rotator TR44 + 100ft T2 core cable and control unit, £23. Dr I. Sykes, Tumbling Fields, Stinchcombe, Dursley, Glos. Tel Dursley 3232.

R216, gen cov rx 19-157MHz, psu, all 4 hndbks, amp, good order, £75. **Wanted,** *Common Core* books, *Basic Electricity* and *Basic Electronics*, Pts 1-3, Technical Press. G8ECT, QTHR. Tel Downland 54130.

B28 rx unmodified, vgc, 60kHz to 30MHz, Ferguson 4 track 2 speed tape rcrdr, Hamgear PM11 pre-selctr, offers. **Wanted** T28 or sim Top Band rx. G3YQV, QTHR. Tel Brighton 735694.

HW17A, 2m tx/rx, + fm adptr, all mods documented, in mint cond, £55 ono, will del up to 75 miles. A. Jones, 121 Upper Tennyson Rd, Newport, Mon, NPT 8HR.

Heathkit SB-303, brand new, prof wired, with SB-620 scanalyzer scope, £250; gen reason sale, might split, antique valves, some rare, sae. SSB gnrtrs (valve) fitted expensive Collins mech filter, £15 ea. G3XTN, 55 Fishponds Rd, Kenilworth, Warks CV8 1EY. Tel Kenilworth 56828.

Zeners 400mW unmrkd, sim BZY88, 100 untested, 55p; 20 tested 30p, post free; G8GPO/G4BAY, Post Office Amateur Radio Club, 200 Marton Rd, Middlesbrough, Teesside.

Mohican, £13; JXK speech comp, £5; KW2000 /M supply, £14; 49cc engine, £1.25; HB lin, 4 × PL509, £10; Parmeko trans, 6 + 8V at 8A, 50p; 813 50p. G3OAB. Tel 021-747 8489.

Hallicrafter SX17 rx, 550KHz—61MHz, 2 rf, 2 i.f., xtal filter, bfo, exc condn, £20. D. G. Lomax, 72 Avenue Rd, Torquay TQ2 5LF. Tel Torquay 27898.

Rx TCS12, 12V or 22OV tx, TCS6, 12V only, complete with all cables, property of deceased member, Scotland, offers. G3BZG, RSGB HQ. Tel 837 8688.

KW Victor, swr mtr, lpf, HRO, bndsprd coils, RF24, pre-amp, cnvrtr, BC221 w/mtr, control box, with built-in spkr, dig clock, ET2M Keyer, going concern, £75; no separation, buyer insp, coll. R. Costford, 22 Haldane Place, East Kilbride, Glasgow. Tel 22663.

Modern detached three bedroomed house at Highnam, Glos. One third acre gardens, take 80m dipole plus other aerials, exc lf and vhf site, no tvi problems, £15,000. G5BM, QTHR. Tel Gloucester 25415.

KW2000, £90; psu, £15; B44 MkII tx, psu, tunes 4m, £10. B. H. Turner, 43 Longfellow Cres, Moorside, Oldham, Lancs. Tel 061-624 6281, ext 25 (office).

Going VK land, as new, 60ft Versa tower, ground post mounted, offers. G8DPL, QTHR.

Heathkit HW30 2m tx/rx, less mic and xtals, with manual, mods to rx and modulator, internal 250V psu, £12 or exchange 46-el multibeam (70 cms). Write or 2m QSO for appt to hear/inspect/operate. G8COG, QTHR.

Unica UNR30 general cov rx, gd working order and recently realigned, ideal for top band, minor mods for use with tx, buyer see and collect, w/ends only, £8 ono. G3ZSE, 180 Windmill Road, Gillingham, Kent.

KW Vanguard early series, some mods including top band mod, info available, gd working order, £25. Mr. Helm, 94 Cotehele Avenue, Keyham, Plymouth, Devon. Tel Plymouth 42559 (work).

Heathkit gdo, £5; TY2-125, £3 ea; new 4CX250B, £5; Ranger mobile mount, 50p; used TY4-500, £5; buyers collect. G3RNV, QTHR.

KW2000B and ac psu £155; vfo 4B £20; Vespa MkI and psu £65; Hammarlund HQ170 £70; HRO coils, GC 0·9-14·4MHz, £1 ea; Philips EL3302 cassette recorder with mic, cassettes etc, £12. G3RKZ, QTHR.

Yaesu FL100 BTX, very good, £55; Trio JR500SE, top band, calib, very good, £45; Star SR550 rx, 160-10, some mods—all improvements, £25. Buyer coll, evngs and w/ends. Livermore, 11 Roe Green Lane, Hatfield, Herts.

Working Racal synthesizer MA150C, 3,601-4,600kHz, service manual, £30; 65ft lengths screened cable 6 core, £3; 25 core, £5; trnsfmr 3kV, 10mA + htrs, £1; xtals 8,066·6kHz 8,087·5kHz, 72,333·0kHz, 72,675·0kHz, 50p, carr extra. G3SBA, QTHR.

BC348 rx, internal mains psu, £10; 5CPI crt + screen, £2; 813 valves (2), £1.50 ea, trnsfmrs 370/370, 200mA, 6·3V, 2·7A, 6·3V 0·3A (2), 5V 2A, 470/470, 300mA, 6·3V 2·7A, 6·3V 1A, 5V 5A, £2.50 ea. G3GOT, QTHR. Tel Billericay 4986.

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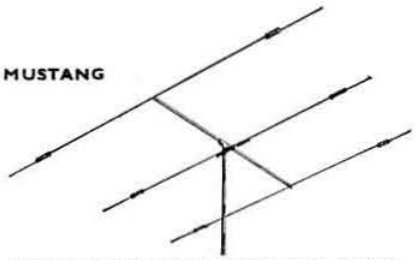

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SWAN 500C, 508 V.F.O. 230XC psu. inc vox/xtal cal. £240 o.n.o. Freq. meter LM14, charts and psu. £200 o.n.o. Hutchinson G3VGH, QTHR. Tel York 76945.

MOHICAN £13; JXK speech compressor £5; KW2000 mobile supply £14; 49cc engine £1.25; HB linear, four PL509s, £10; Parmeko transformer, 6 & 8V .. 8A, 50p. G30AB. Tel 021-747 8489.

HIGH BAND EQUIPMENT. Pye F27AM. Base station £30. Boot mount Cambridge £25. Pye Vanguard £25. 3 channel FM Bantam £15. All complete with mic. leads L.S. etc. Signal Generators CT478 1·3-4·2GHz, CT480 7-12GHz £20 each. G8BPE, 11 Belton Rd., Sholing, Southampton, Hants. Tel 444837.

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FOR SALE FT2F 2m transceiver with narrow filter and factory fitted am detector £80 ono. HW12A 80m transceiver with dc psu £55 ono. N. Brinkworth, 7 Squires Lane, Finchley, London N3. 01-346-0974.

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8×4×2"	38p	19p	13×8×2½"	76p	38p
8×5½×2"	44p	21p	14×7×3"	80p	36p
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RADIO SOCIETY OF GREAT BRITAIN

and

LAMBDA INVESTMENT COMPANY LIMITED

Report and Accounts

for the year ended

30 June 1972

Radio Society of Great Britain

35 DOUGHTY STREET, LONDON WC1N 2AE

7 November 1972

NOTICE IS HEREBY GIVEN that the FORTY-SIXTH ANNUAL GENERAL MEETING of the Society will take place at the Royal Society of Arts, John Adam Street, Adelphi, London WC2, at 6.30pm on Friday 1 December 1972, for the transaction of the undermentioned business:

1. To receive and, if approved, confirm the Minutes of the Forty-Fifth Annual General Meeting as published in the September 1972 issue of *Radio Communication.*

2. To receive and, if approved, adopt the Annual Report of the Council for the year ended 30 June 1972.

3. To receive and, if approved, adopt the Audited Accounts of the Society for the year ended 30 June 1972.

4. To announce the names of members to serve on the Council for the year 1973.

5. To report that the auditors, Messrs Edward Moore and Sons, have expressed willingness to continue in office, and to fix their remuneration for 1973.

6. To transact any other business which may be properly transacted at an Annual General Meeting.

A member entitled to attend and vote at the above meeting may appoint a proxy to attend. A proxy need not be a member of the Society.

By order of the Council
D. A. FINDLAY
Secretary

Notes (*a*) Forms for the appointment of proxies may be obtained from the Secretary upon request.
(*b*) The instrument appointing a proxy shall be deposited at the office of the Society not less than 48 hours before the time appointed for holding the meeting.

Radio Society of Great Britain

35 DOUGHTY STREET, LONDON WCIN 2AE

REPORT OF COUNCIL TO THE MEMBERS OF THE SOCIETY

THE Balance Sheet at 30 June 1972 and the Income and Expenditure Account for the year ended on that date as set out on pages 4 and 5 are submitted for the approval of the members.

The accounts have a new look. The opportunity has been taken to combine the accounts of Lambda Investment Co Ltd with those of the Society. Lambda Investment Co Ltd is a wholly-owned subsidiary company and the consolidation of the accounts should enable a more complete view to be obtained. The figures are also presented in a columnar form and it is hoped that this will result in more easily readable accounts.

The Society has had a successful year. The surplus is £4,045 and this compares favourably with the deficiency of £7,081 in the previous year.

The surplus for the year is due in part to the action taken by the Council on the advice of the former Honorary Treasurer in increasing subscriptions. Profit on the sale of publications has also increased and this helps to hold down the charge for subscriptions. Considerable thanks are due for the many unpaid hours of work put in by members in producing the Society's publications. Thanks are also due to Headquarters' staff for many hours of extra work.

Council always feels some concern regarding future publications, as the event of low sales in any particular book could cause financial difficulties for the Society. Considerable investment is being made in a Teleprinter Handbook as it is thought that there is a good market for a publication on this subject.

No particular comment appears to be necessary on the expenditure for the year. In line with other businesses, there has been a general increase in costs during the year although a careful check is maintained at all times in order to reduce expenditure where possible.

In fact, the one big problem which faces the Society, apart from the impending imposition of VAT, is inflation. The budget for the forthcoming year has taken into account a steady increase in expenses, and estimates for the year ending 30 June 1973 show that there should be a small surplus. Although the Society's financial affairs are under control the situation is very much influenced by trends in the national economy.

The Balance Sheet shows the ownership of the freehold of Headquarters—35 Doughty Street. The purchase of this property has proved to be an astute investment. It is the one asset which the Society holds which keeps up with inflation.

Details regarding the various prize funds have been dealt with in the notes to the accounts.

RADIO SOCIETY OF GREAT BRITAIN

(COMPANY LIMITED BY GUARANTEE)
AND ITS SUBSIDIARY COMPANY

CONSOLIDATED INCOME AND EXPENDITURE ACCOUNT
for the year ended 30 June 1972

1971 £	1971 £		1972 £	1972 £
		INCOME		
41,683		Subscription income		59,301
13,443		Profit on sales of publications		16,311
316		Quoted investment income (Gross)		316
55,442		**Total income**		75,928
		EXPENDITURE		
	1,928	Headquarters rates lighting, heating and cleaning	2,149	
	17,934	Staff remuneration	21,049	
	200	Pension	200	
	4,064	Telephone, postage, printing & stationery	5,187	
	337	Insurance	342	
	226	Repairs and maintenance	330	
	120	Hire of equipment	120	
	585	Depreciation of equipment (No depreciation has been provided on the freehold property)	564	
	402	Bank charges	843	
	403	Bank interest	141	
	300	Audit fees	325	
	832	Sundry expenses	413	
	1,136	Debenture interest of Lambda Investment Company Limited (Gross)	1,141	
28,467			32,804	
28,668		*Radio Communication*—distributed free to members—cost including staff remuneration and after deducting advertising revenue	33,245	
	446	Membership certificates, Awards, Trophies, etc	690	
	1,526	QSL Bureau, Beacons and Intruder Watch	1,637	
	520	Contributions to IARU Region 1	546	
2,492			2,873	
	1,000	General meetings	825	
	1,896	Council and committee expenses (after deducting surplus on rallies)	2,136	
2,896			2,961	
62,523		**Total expenditure**		71,883
Deficit £(7,081)		**SURPLUS FOR THE YEAR (all of which arises in the Society)**		£4,045

R. J. HUGHES, *President*

BALANCE SHEETS 30 JUNE 1972

1971 The Society & Sub-sidiary £	1971 The Society £		Notes	1972 The Society £	1972 The Society & Sub-sidiary £
		FIXED ASSETS			
41,675	—	Freehold property at cost	(1)	—	41,675
1,668	—	Sinking Fund Policy, premiums paid, (Surrender value £1,964)		—	2,085
2,298	*2,298*	Furniture and equipment, at cost less depreciation	(2)	2,141	2,141
—	*23,115*	Investment in and loan to subsidiary	(3)	25,202	—
9,274	*9,274*	Quoted investments at cost less amount written off (Market value £8,060—1971 £8,035)	(4)	9,055	9,055
54,915	*34,687*			36,398	54,956
		NET CURRENT ASSETS			
17,835	*17,835*	Stocks at lower of cost and net realisable value		15,841	15,841
9,298	*9,298*	Debtors, and payments in advance		5,961	5,961
4,875	*6,686*	Bank balances & cash in hand		2,086	2,361
32,008	*33,819*			23,888	24,163
30,086	*30,034*	Less-creditors & accrued charges		11,856	12,324
1,922	*3,785*			12,032	11,839
£56,837	*£38,472*	**NET ASSETS**		£48,430	£66,795
		Financed by:			
		ACCUMULATED FUND Balance at 1 July 1971		8,634	8,696
15,777	*15,834*	Surplus (*Deficit*) for the year ended 30 June 1972, as shown in the Income &			
(7,081)	*(7,200)*	Expenditure Account		4,045	4,045
8,696	*8,634*			12,679	12,741
—	—	*Less:* Amount written off Investments		(219)	(219)
(722)	—	Preliminary & debenture issue expenses of subsidiary		—	(722)
7,974	*8,634*			12,460	11,800
29,838	*29,838*	**SUBSCRIPTIONS IN ADVANCE**		35,970	35,970
19,025	—	6% **DEBENTURE STOCK** of Subsidiary (Redeemable at par on or before 30 June 1997: Secured on the assets of that Company)		—	19,025
£56,837	*£38,472*			£48,430	£66,795

(The notes on pages six and seven form part of these Accounts)

J. O. BROWN, *Treasurer*

NOTES ON THE ACCOUNTS

1. The Council are of the opinion that the present market value of the Society's freehold property (which is held in the subsidiary company) is in the region of £100,000.

2. Furniture and equipment:

Cost 1 July 1971	£6,370
Additions during year	407
Cost 30 June 1972	6,777
Accumulated depreciation	4,636
Book value as shown in Balance Sheet	£2,141

3. The share capital of the subsidiary, Lambda Investment Company Limited, is £100 in shares of £1 each and all the shares are held by the Society or its nominees. The debenture stock has been subscribed for or purchased by individual holders in their own right.

4. **Investments**

		Cost less amount written off
		£
£5,000	3% Savings Bonds 1965/75	5,000
£4,145	British Transport 4% Guaranteed Stock 1972/77	4,055
		£9,055

The 3% Savings Bonds are redeemable at par and the premium of £219 paid on purchase has therefore been written off.

Both investments are charged to Barclays Bank Ltd as security in case the Society requires overdraft facilities.

5. The sales of publications during the year amounted to £37,980 (1971—£28,229) and advertising revenue amounted to £6,148 (£5,369).

6. At 30 June 1972 there was a commitment for capital expenditure at £2,500 for the purchase of a new machine for membership records.

7. The Society administers the following prize and memorial funds:

	£	£
(a) **The Pilot Officer Norman Keith Adams Prize Fund**		
At 30 June 1972 the fund amounted to		165
Accumulated income at 30 June 1971 was	9	
Income for the year to 30 June 1972 was	12	21
		£186
Which was invested in: 7% British Savings Bonds		165
Cash at bank		21
		£186

A prize to the value of £10 will be awarded out of the income of the year.

(*b*) **The J. Fraser Shepherd Prize Fund**

At 30 June 1972 the fund amounted to		300
Accumulated income at 30 June 1971 was	5	
Income for the year to 30 June 1972 was	24	
	29	
Less: Cost of prize awarded	15	14
		£314
Which was invested in: £506.62 3½% War Loan		200
6% Debenture Stock Lambda Investment Company Limited ..		100
Cash in the general funds of the Society		14
		£314

(*c*) The fund of **The Bevan Swift Memorial** amounted to £36 at 30 June 1972, and is represented by £36 held in the general funds of the Society. £4 was paid out as a prize during the year.

(*d*) The subscribed fund of **The J. C. Clarricoats Memorial** amounted to £43, held in a separate bank account and there was no distribution during the year.

(*e*) The fund of **The Thomas Memorial** amounted to £15, held in the general funds of the Society; there was no expenditure during the year.

REPORT OF THE AUDITORS TO THE MEMBERS OF THE RADIO SOCIETY OF GREAT BRITAIN

In our opinion the Accounts set out on pages 4 and 5 give a true and fair view of the state of the Society's affairs at 30 June 1972 and of the Surplus for the year ended on that date and comply with the Companies Acts 1948 and 1967.

4 Chiswell Street, London EC1Y 4XB
17 October 1972

EDWARD MOORE & SONS
Chartered Accountants

LAMBDA INVESTMENT COMPANY LIMITED

The directors have pleasure in submitting their report for the year ended 30 June 1972. The company is a wholly-owned subsidiary of the Radio Society of Great Britain (a company incorporated in England) and was formed to acquire the freehold property, 35 Doughty Street, London, WC1, which is the headquarters of the Society. The directors are of the opinion that the market value of the property is in the region of £100,000.

The directors are Messrs L. E. Newnham (Chairman), R. F. Stevens, E. W. Yeomanson, A. C. Morris and J. O. Brown (Secretary); the first three named hold one share each as nominees of the Society and Mr Newnham holds £200 Debenture Stock. There have been no changes in the directorate or their interests during the year.

The auditors, Messrs Edward Moore & Sons, have intimated their willingness to continue in office.

By order of the Board
J. O. Brown,
Secretary

17 October 1972

BALANCE SHEET 30 June 1972
and
REVENUE ACCOUNT for the year ended on that date

1971					1972		
£	£	£		£	£	£
			ASSETS			
41,675			Freehold property at cost			41,675
1,668			Sinking Fund Policy, premiums paid (Surrender value £1,964)			2,085
241			Preliminary expenses			241
481			Debenture Issue expenses			481
—			Bank balance			275
44,065						44,757
			LIABILITIES			
	52		Sundry creditors		468	
	1,811		Bank overdraft		—	
	23,015		Loan from the Radio Society of Great Britain		25,102	
24,878						25,570
£19,187			**NET ASSETS**			£19,187
			Financed by:			
			Authorised and Issued Capital			
100			100 shares of £1 each fully paid			100
			Revenue Account			
(57)			Balance at 1 July 1971			62
	1,700		Rent receivable in the year to 30 June 1972		1,330	
		1,136	*Less:* Debenture interest	1,141		
		403	Bank interest	125		
		17	Sundry expenses	39		
		25	Audit fee	25		
119	1,581				1,330	—
			6% Debenture Stock (redeemable at par on or before 30 June 1997—secured on the assets of the Company.			
19,025						19,025
£19,187						£19,187

L. E. Newnham
J. O. Brown } *Directors*

Report of the Auditors to the Members of Lambda Investment Company Limited
In our opinion, the accounts set out above give a true and fair view of the state of the Company's affairs at 30 June 1972 and of the result for the year ended on that date and comply with the Companies Acts 1948 and 1967.

4 Chiswell Street, London EC1Y 4XB
17 October 1972

EDWARD MOORE & SONS
Chartered Accountants

RSGB PUBLICATIONS

Technical books

Amateur Radio Techniques	£1·80
Guide to Amateur Radio	50p
Morse Code for the Radio Amateur	15p
RSGB Amateur Radio Call Book 1973	70p
Radio Amateurs' Examination Manual	90p
Radio Amateurs' Examination Revision Notes	30p
Radio Communication Handbook (4th ed.)	£4.10
Radio Data Reference Book (3rd edition)	£1
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VHF/UHF Manual (2nd ed.)	£1·80
World at their Fingertips (Paperback)	80p
(De-Luxe)	£2·55

Log books

RSGB Standard Log	55p
RSGB Receiving Station Log	45p
Mobile Mini-Log	25p
RSGB De-Luxe Log	£1·30

Maps and charts

Amateur Radio Prefixes (World) Map	20p
Countries List	10p
Great Circle DX Map	65p
QRA Locator Map (Western Europe) (*in tube*)	50p
QRA Locator Map (Western Europe) (*on card*)	10p
VHF/UHF band plans (*on card*)	10p

Members' sundries

Lapel Badge (RSGB or RAEN emblem, pin fitting)	15p
Callsign lapel badge (RSGB or RAEN pin or stud fitting)	50p
Car badge (RSGB or RAEN)	70p
Callsign car badge (RSGB)	£1·25
Callsign car badge, de-luxe (RSGB or RAEN)	£2·20
Ties (Maroon or Blue)	£1.30
Tie bar (RSGB emblem)	30p
Radio Communication Easi-binders	£1·15
Car window sticker (RSGB or RAEN). (Self-adhesive)	10p
Members' headed notepaper (50 sheets) quarto	40p
octavo	25p

USA PUBLICATIONS

American Radio Relay League

Antenna Book	£1·30
Course in Radio Fundamentals	60p
Hints and Kinks	60p
Mobile Manual	£1·30
Radio Amateur's Handbook (Paperback)	£2·60
Radio Amateur's Handbook (Hardback)	£3·40
Radio Amateur's Operating Manual	80p
Single Sideband for the Radio Amateur	£1·50
Understanding Amateur Radio	£1·30
VHF Manual	£1·30

CQ (Cowan Publishing Corporation)

Amateur Radio DX Handbook	£2·05
Antenna Handbook Vol 1	£1·65
Antenna Roundup	£1·65
Mobile Handbook	£1·30
RTTY A-Z	£2·05
RTTY Handbook	£1·65
Shop and Shack Shortcuts	£1·65

Radio Publications Incorporated

Beam Antenna Handbook	£2·00
Better Short Wave Reception	£1·70
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American Callbook (USA listings)	£3.75
DX Callbook (Foreign listings)	£2.95
Prefix Map of the World	60p
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Magazine subscriptions

QST (including ARRL membership)	£3·45
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73	£2·70
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MORSE INSTRUCTION AIDS

RSGB Morse Instruction Tape (900ft)	out of stock
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Complete Course (two 3-speed LP records and one EP record plus books)	£4·50†
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† *Overseas orders: add £1.*

Prices include postage and packing.

TERMS: Cash with order. Stamps and book tokens cannot be accepted. Cheques and postal orders should be crossed and made payable to "Radio Society of Great Britain". When ordering please write your name and address clearly in block capitals at the top of the order. Giro A/C No 533 5256.

All items listed on this page are available to callers at RSGB headquarters at the above prices less postage and packing. Counter service 9.15am-5.15pm, Monday to Friday.

OTHER PUBLICATIONS

Books and Maps

Basic Electricity	£2
Basic Theory & Application of Transistors	£1·05
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Simple Shortwave Receivers	90p
Transistor Audio and Radio Circuits (Mullard)	£1·65
Transistors in Practice	£1·75
VHF Antenna Handbook (73)	£1.25
World Radio TV Handbook	£2·80

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