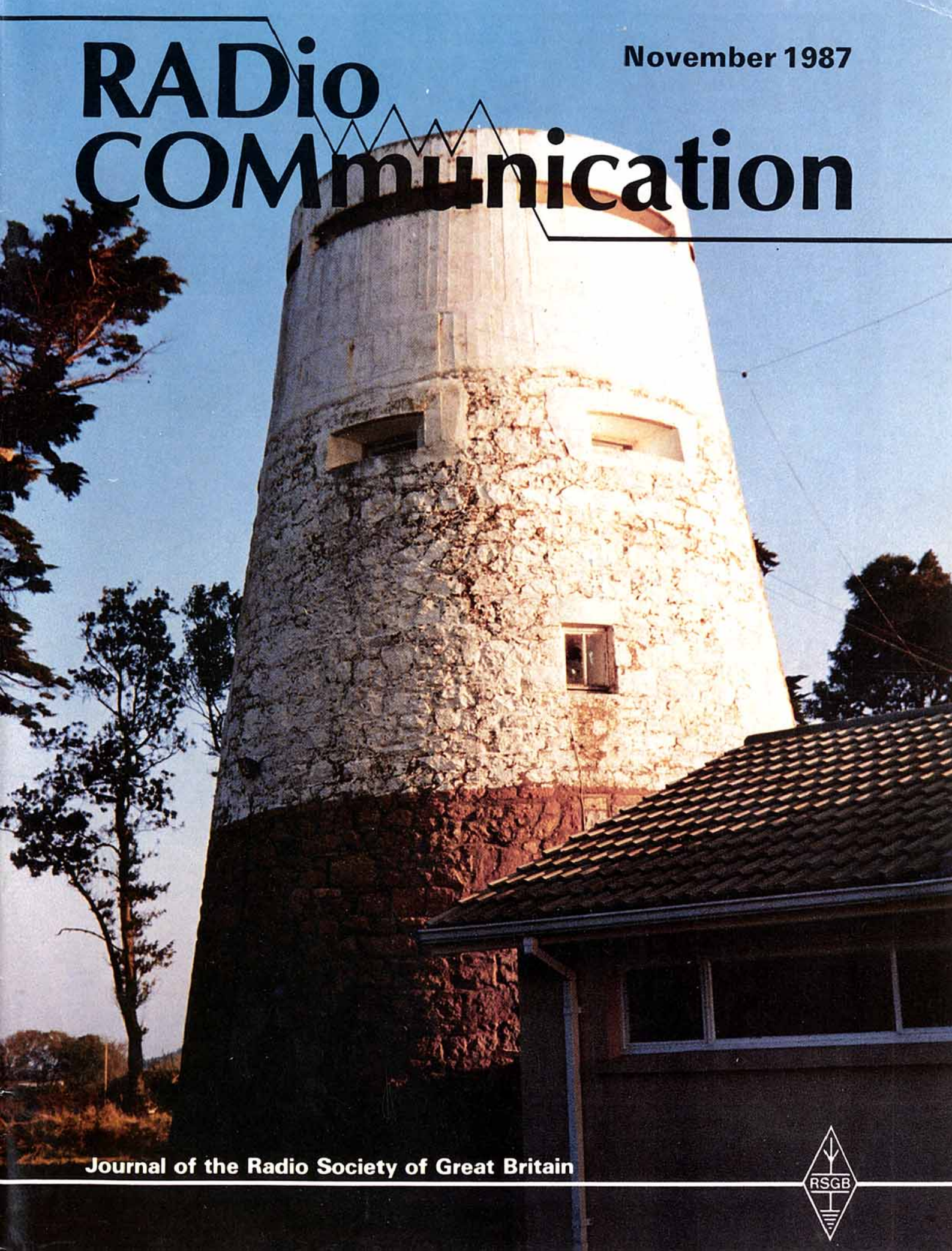
RADio COMmunication

November 1987



Journal of the Radio Society of Great Britain

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FRONT COVER
St Ouenes Mill, Jersey, headquarters of the Jersey Scouts, from where they are regularly assisted during JOTA by the Jersey ARC. *Photo:* GJ41CD

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CONTENTS

Technical articles on subjects of amateur interest are always welcome and should be sent to: The Editor, *Radio Communication*, Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.

All articles received are reviewed for technical merit by the RSGB Technical & Publications Committee, or an acknowledged expert on the subject, before acceptance. Payment at high competitive rates will be made for all articles published.

A contribution will only be considered for publication on the understanding that the person submitting it is the original author and owner of the whole copyright, and that on acceptance for publication such copyright will become the property of the RSGB in consideration of the above-mentioned payment by the RSGB to the contributor.

The editor will be pleased to send intending authors a manuscript preparation guide and to give any other advice and assistance requested.

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Closing date for contributions unless otherwise notified: five weeks before publication date

two great handhelds from KENWOOD.

Without a doubt the two new 2 metre FM hand-helds from KENWOOD now represent the best value for money in amateur radio equipment today.

For the amateur who wants a simple high quality transceiver from a reputable manufacturer at a rock bottom price but still wants high output power for shack use, the TH205E is the answer. And for the operator who is prepared to pay a little more to gain additional features, the TH215E is the obvious choice. As well as the new rigs for 2 metres, KENWOOD have produced 70 centimetre versions, these are the TH405E and TH415E.

	TH205E	TH215E
Frequency range	144 to 146 MHz for both receivers	
Power output	Depending on operating voltage up to 5 watts (with standard PB2 battery pack 2.5 watts)	
Operating voltage	Battery terminal 6.3 to 15 volts DC Top panel jack 7.2 to 16 volts DC	
Memory channels	3 with quick recall	10 with quick recall
Frequency stepping	5 kHz	5, 10, 15, 20 or 25 kHz
Battery saver	Built-in battery saver extends operating life	
Scan	Simple band scan	Band, memory and programmable scan
Size	67 (2.64) W × 173 (6.81) H × 37 (1.46) D mm (in.)	
Weight	520 g (1.15 lb) with PB2 and aerial	

£215 **£252**

Prices include NiCad, charger & VAT

high power, dual band TW4100E

Using the latest in technology, the designers of the TW4100E dual band FM mobile transceiver have achieved increased performance and, at the same time, made operation even easier. The operator can pre-set the transceiver according to the band plan and his preferences. Options available are shift (+, − or duplex), frequency stepping (5, 10, 12.5, 20, 25 or 50 kHz) and repeater shift (600 KHz, 1.6, 5, and 7.6 MHz).

With the KENWOOD TW4100E, not only do you have the normal simplex and repeater modes but crossband duplex as well. If you work another amateur who can also simultaneously transmit on one band and listen on the other, andmany stations do have this facility, then a telephone style conversation is possible. Anyone who has not experienced duplex operating will soon come to prefer the natural conversation style that is possible.

With the high level of traffic on today's roads, it is essential that a mobile transceiver is easy to operate. KENWOOD engineers have simplified the rig's operation by providing ten memories, each of which will hold information on frequency, simplex or repeater operation and whether or not the tone burst is on or off. By pushing a single button all this information can be transferred to the VFO. Of course the original information is still held in memory for future use. You therefore have ten independent VFOs. KENWOOD's attention to detail is shown by the following additional facility. If having transferred a repeater frequency to the VFO, you move onto an adjacent simplex channel, you can, by the push of two buttons, cancel the tone burst and reset the shift from repeater to simplex. Of course, two more presses of the same buttons restore the facilities.

Linear amplifiers are not needed with the KENWOOD TW4100E! Power output from the transceiver is 45 watts on two metres and 35 watts on seventy centimetres, more than enough to cope with difficult terrain.

The TW4100E has another facility not mentioned in the handbook. Not mentioned because unless you are a RAYNET member on an approved operation or engaged on a real emergency, to use the equipment in such a way is outside the compass of the licence as we presently know it.

The facility is that the TW4100E will act as a private crossband repeater. This means that you can park your car in a decent location and wander off into an RF black spot. Armed with a small low power handheld, you can talk back to the TW4100E which, since you left it, has been constantly checking the two pre-set crossband frequencies. Your transmission is received and simultaneously transmitted by the TW4100E on the other band. When a station replies, the message is again simultaneously retransmitted to you. Of course you need to have another amateur in your car to oversee the operation and it must be a recognised RAYNET use. In repeater mode the KENWOOD TW4100E has automatic time-out after approximately three minutes.

The TW4100E has provision for DCL (digital channel link) and DCS (digital code squelch) when the optional MU1 board is fitted.

TW4100E . . . £699.00 inc vat, carriage £7.00.

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE

Telephone 0629 580800 (4 lines)

the KENWOOD **TS530SP** HF transceiver, a **sensible** rig.

The TRIO TS530SP HF transceiver is similar to the TS830S in that it also uses a pair of 6146B valves in its PA stage. The transceiver has been designed for the amateur who has no need for the additional facilities that are part of the TS830S but who still requires a high level of performance from his equipment.

The TRIO TS530SP covers the amateur bands from 160 through to 10 metres. Modes of operation are USB, LSB and CW.

Operating from 240 volts AC the transceiver has its own internal power supply.

IF shift is built into the TS530SP to allow the IF passband to be moved around the received signal and away from interfering signals and sideband splatter. Even greater selectivity is achieved when an optional YK88SN (1.8 kHz), YK88C (500 Hz) or YK88CN (270 Hz) filter is installed.

A tuneable notch filter is built into the audio circuit of the TS530SP.

The speech processor in the TS530SP combines an audio compression amplifier with a change of ALC time constant for extra audio punch and increased average SSB output.

To cope with pulse type noise (such as ingnition), the transceiver has a noise blanker.

Both RIT and XIT (receiver as well as transmitter incremental tuning) are included to aid operating, XIT being a distinct advantage when calling a station that is listening "off frequency".

TS530SP HF transceiver..... **£927.51 inc vat,** carriage £7.00.

TS830S (Big brother) ..... **£1098.00 inc vat,** carriage £7.00.

TS530SP – PRICE REDUCED TO £748

SAVE £179

FREE

Send only £1 to cover postage and packing and we will send you, by return, a FREE copy of the new full colour KENWOOD catalogue which lists the features and specification of every model and accessory currently available. We will also include, FREE OF CHARGE, a copy of our general catalogue which, along with items to enhance your operating, contains much useful information. Finally, to cheer you up, we will add the latest edition of our price list.

TS940S ... **Top of the range,** the TS940S has every operating feature that the discerning HF operator needs. Amateur bands from 160 to 10 metres plus a general coverage receiver tuning from 150 kHz to 30 MHz. Modes of operation are USB, LSB, CW, AM, FSK and FM. Forty memory channels, each effectively a separate VFO and easy keyboard frequency entry make operation and ownership of the TRIO TS940S a pleasure.
TS940S ... £1995.00 inc vat, carriage £7.00.

TS930S ... **Much has been said** and written about the TS930S and it now has a place high in the affection of radio amateurs. Modes of operation are USB, LSB, CW, AM and FSK. Providing full coverage of the amateur bands from 160 to 10 metres and including a general coverage receiver tuning from 150 kHz to 30 MHz, the TRIO TS930S is the ideal rig for today's crowded bands.
TS930S ... £1695.00 inc vat, carriage £7.00.

TS440S ... **A step forward** in compact HF equipment, the TS440S covers the amateur bands from 160 to 10 metres and is also a general coverage receiver tuning from 100 kHz to 30 MHz. It has keyboard frequency entry, full and semi break-in on CW, one hundred memories and provision for fitting an internal ATU. Modes of operation are USB, LSB, AM, FM and AFSK.
TS440S ... £1138.81 inc vat, carriage £7.00.

TS430S ... **A compact HF transceiver** suit... operation, yet having all ... radio communi... bands from 160 to 10 metres and i... ...12 to 30 MHz. Modes of operati...
TS430S ... £97...

TS430S – PRICE REDUCED TO £748

SAVE £226

All prices subject to confirmation

LOWE ELECTRONICS LTD.

Chesterfield Road, Matlock, Derbyshire DE4 5LE

Telephone 0629 580800 (4 lines)

1300HC frequency counter.

Small enough to fit into a shirt pocket, the 1300HC frequency counter brings easy and accurate frequency measurement well within everyones reach.
The 1300HC uses a full 8 digit display, and measures to 1300 MHz, thus being ideal for amateur as well as all mobile radio bands including cellular.
The unit contains its own rechargeable NiCd battery pack which is charged from an external supply. The frequency counter can also be powered from any 9 to 12 volt dc supply, which charges the batteries as well.
The 1300HC has excellent sensitivity, and when used with the optional telescopic whip, easily measures transmitter frequencies of mobile or handheld transceivers, even low powered "bug" devices. When used in conjunction with a simple "dip oscillator", the 1300HC makes checking tuned circuit or aerial resonance an easy task.
The high performance of the 1300HC frequency counter makes it an indispensable tool for every amateur, engineer or technician. Its small size makes it suitable for either shack or "on the move" use.

Specification

Range	1-300 MHz
Resolution	100Hz at 2.5 sec. gate 1 kHz at 250 mS. gate
Display	8 digit 0.3" LED MHz decimal point Leading zero blanking
Gate times	Fast. 250 mS Slow. 2.5 S
Sensitivity (typical)	1-10 Mhz. . .10-150 mV rms 10-1000 Mhz. . .3-50 mV rms 1-1.3 GHz. . .10-150 mV rms
Accuracy (typical)	+,‡− 1ppm, + /− 1 count LSD
Aging	0.1 ppm/month (typical)
Gate indication	Red LED during sampling
Input connector	B.N.C.
Input power	9-12 Vdc at 150 mA
Power connector	Concentric. Centre positive.
Case	Brushed anodised aluminium
Size	3.9H × 3.5W × 1D (inches)
Weight	255 g
Power supply	Internal NiCd pack. (supplied), or external dc source (option)

1300HC ...Handheld frequency counter
£135.00 inc vat, carr. £2.00

Options
PS12.....AC mains power supply
£8.50 inc vat, carr. £2.00
BNC6.....Telescopic whip
£7.46 inc vat, carr. £0.50
CC12.....Padded carrying case
£9.90 in vat, carr. £1.00

packet radio from KANTRONICS

KPC2 . . . This KANTRONICS designed AX25 version 2 TNC features a built-in VHF and HF modem, full duplex operation and multiple connect facilities. The serial RS232 port, combined with the enhanced generic command structure allows operation with any computer.

KPC2 . . . £165.00 inc vat, carriage £7.00.

KPC4 . . . A KPC4 is your gateway into pocket flexibility. Having two packet ports, digipeating on each port and gateway between ports, the KPC4 lets you bridge two frequencies on one band or operate cross band. The KPC4 also includes the PERSONAL PACKET MAILBOX feature.

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KAM . . . Combine VHF packet, HF packet, CW, RTTY, ASCII and AMTOR in one unit.

KAM . . . £289.00 inc vat, carriage £7.00.

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NS448 with remote head. . .900 to 1300 MHz, forward 5/60 W, reflected 1.6/6.6 W, N type connections. . .**£86.60 inc vat,** carriage £2.50.

NS660P with switchable meter reading (average, normal PEP and hold PEP) and provision for optional remote head (U66V), 1.8 to 150 MHz, forward 15/150/1500 W, SO239 connectors. . .**£115.00 inc vat,** carriage £2.50.

U66V remote head. 140/525 MHz, max 300 W, N type connectors. . .**£55.27inc vat,** carriage £1.50.

SC20 extension cable for U66V, approx 20 metres long . . . **£29.21 inc VAT,** carriage £1.50.

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The new D130 from Diamond offers complete coverage from 25-1300MHz. No other antenna can offer this value for money! And an added bonus is that it can be used for transmit on all amateur bands between 50 and 1300MHz. (You cannot use 50MHz vertical polarization in the UK). Constructed of stainless steel and alloy, it comes complete with mast clamps and 50ft of coaxial cable **£82.50** p&p £3.00

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26-2250 MHz

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JUST PUBLISHED

THE SECRET OF LEARNING MORSE CODE
BY MARK FRANCIS

A brand new book covering a subject that causes many people problems. The author, Mark Francis, breaths new life into the subject and provides fresh hope for all those that are having difficulties with Morse or thought the code was beyond them. This book has been long overdue. It treats the subject of learning the code in a simple, but comprehensive manner. The recommended methods ensure that anyone can learn Morse code in the minimum of time. The title is well chosen and really does explode some of the pitfalls and myths surrounding the learning of Morse. The book forms a complete course with many practice passages for both sending and receiving. It also goes beyond the initial learning stages and takes you through your first QSO's, covering abbreviations, procedures etc. Running to almost 100 pages with plenty of illustrations, this book looks set to fill a big gap in the market.

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ICOM

Communications

IC-575, 28/50Mhz Dual band multimode base station.

The ICOM IC-575 base station was developed to meet the demand for advanced communications for the recently acquired 6m band. Similar in appearance to the IC-275/475 2m and 70cm base stations, the beauty of this new transceiver from ICOM is that it gives you the best of both worlds, 6 & 10m in one compact unit. The IC-575 covers 28-30Mhz and 50-54Mhz. Operating modes are SSB,CW,AM & FM. Power output is 10 watts (AM 4 watts) with a front panel control to reduce output for QRP operations. A pass band tuning circuit narrows the I.F. passband width, eliminating signal in the passband. A built-in notch filter eliminates beat signals with sharp attenuation characteristics.

Some PLL systems have difficulty meeting the lockup time demands placed on them by new data communications. This is why ICOM developed the DDS (Direct Digital Synthesizer) method. With a lockup time of just 5msec the DDS method allows the IC-575 to handle data communicatons such as packet or AMTOR. 99 programmable memories can store frequency, mode, offset frequency and direction. A total of four scanning functions for easy access to a wide range of frequencies, memory scan, programmed scan, selected mode memory scan and lock out scan. The IC-575 has an internal A.C. power supply, but can also be used on 13.8v DC for mobile or portable operation.

Optional accessories available are the UT36 voice synthesizer, the IC-FL83 CW narrow filter, SM7 external loudspeaker, HP2 communication headphones and SM8/SM10 desk microphones. Other transceivers available in this range are: IC-275E 2m multimode 25w, IC-275H 2m multimode 100w, IC-475E 70cm multimode 25w, IC-475H 70cm multimode 75w.

Telephone us free-of-charge on:

HELPLINE 0800-521145.

Mon-Fri 09.00-13.00 and 1400-17.30

This is strictly a helpline for obtaining information about or ordering ICOM equipment. We regret this service cannot be used by dealers or for repair enquiries and parts orders. Thank you

TOP HF

IC-761, HF Transceiver with general coverage receiver

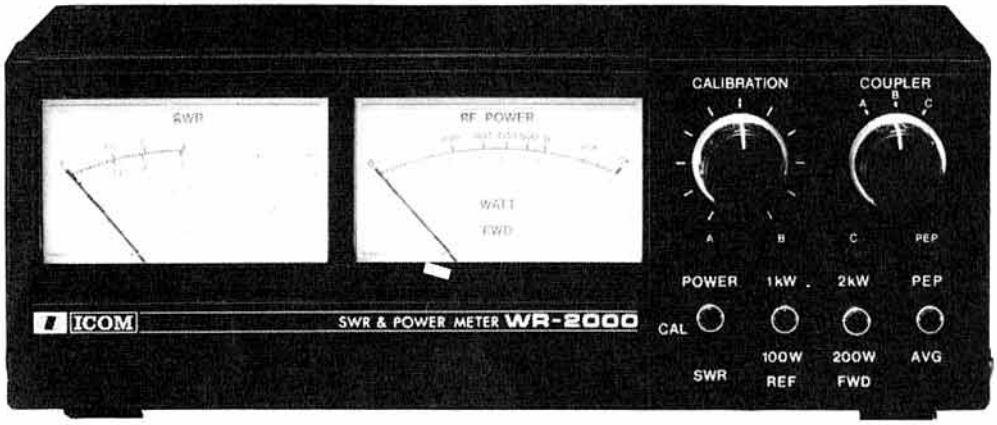
The new ICOM IC-761 H.F. Tranceiver has many features making it probably the best top of the line Amateur transceiver available today. This all mode tranceiver features an internal aerial tuning unit and A.C. power supply. The A.T.U. boasts a 3 second band selection and tune up with a VSWR matching of less than 1.3:1. For the serious operator the 100kHz-30MHz general coverage receiver and 105dB dynamic range make it ideal for DX chasing. Frequency selection is by the main VFO or via the front panel direct access keypad.

And for when reception is difficult, pass band tuning, I.F. shift, notch filter, noise blanker, pre-amp and attenuator should enable you to copy even those weak DX stations whether amateur or broadcast.

The C.W. operator will appreciate the electronic keyer, 500Hz filter and full break in (40wpm) other filter options are available. The IC-CR64 high stability crystal is standard as is the CI-V communications interface for computer control. Twin VFO's and split mode for cross band contacts the IC-761 features program scanning, memory scan and mode select scan and the 32 memories can store frequency and mode.

The tranceivers operating system is held permanently in ROM and is not dependant upon the lithium battery. The cell is used for memory back up only. A new style meter gives P.O., A.L.C., IC, VC, COMP and SWR readings. Optional accessories include the IC-SP20 external loudspeaker with audio filter selections, FL101 250Hz CW filter, FL102 6kHz A.M. filter and the EX 310 voice synthesizer. The SM8 & SM10 desk microphones are also suitable for this equipment.

ICOM Communications



WR200 and WR2000 SWR and Power Meters.

These high quality meters have been introduced to provide antenna matching and RF output power checks. The separate meter and coupler units allow simplified cable connections for all band capability. The wideband 1.8-1300Mhz frequency range is accomplished by using additional couplers. Separate AVG and PEP functions allow measurement of the average power for FM and peek envelope power for SSB.

The WR200 covers 1.8-150 Mhz with a maximum feed through power of 200W. The WR2000 covers 1.8-54Mhz with a maximum feed through power of 2KW. The optional coupler WRC450, 140-450Mhz with a maximum feed through power of 200W (SSB), 100W (FM). The optional coupler WRC1300, 1200-1300Mhz with a maximum feed through power of 40W (SSB), 20W (FM). These units would make an ideal addition to your ham station, for more information please contact your nearest ICOM dealer or ICOM (UK) LTD.

ICOM test meters

ICOM have introduced a range of test meters for the radio amateur. These new models would be a useful addition to any ham shack. The DM10 is a digital pen type volt/resistance meter. The LCD display shows measurement in the range, D.C. volts 0.1mV-500V, A.C. volts 1mV-500V. Resistance 0.1ohm-20M ohm. Its small size (21W x 31H x 161L) makes it an ideal handheld test meter.

The DM20 is a digital pocket type volt/resistance meter. The large LCD display shows measurement in A.C. and D.C. volts 1mV-450V, and resistance 0.1 ohm-200K ohms. This test meter is ideal for portable use, its size (51W x 106H x 10D) making it a useful piece of equipment to carry in your pocket.

The DM500 is the top of the range digital meter. The large LCD display shows measurements in the range, D.C. volts 0.1mV-1000V, A.C. volts 1mV-750V. Resistance 0.1 ohm-20M ohms. DC current 0.1uA-10A. This meter measures 70W x 14H x 34D and is ideal to cope with most applications in your radio shack.

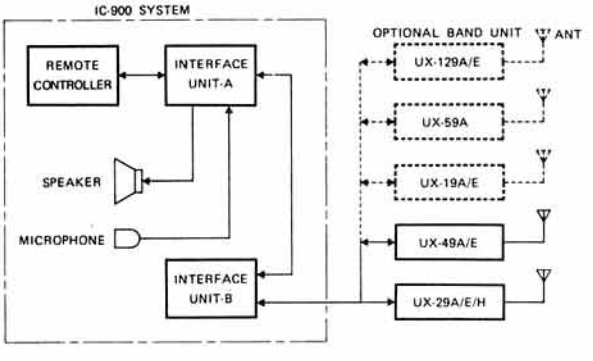
MOBILE MASTERPIECE

IC-900 Super multiband FM system

This new addition to ICOM's Ham radio equipment is a multiband FM transceiver system that allows the mobile operator to customize a communications system for his favourite bands. Up to 5 optional band-units can be installed with the IC-900 for instant access to a wide range of frequencies from the 28MHz HF band to the 1240MHz UHF band. Only a small remote controller is necessary for control of all these bands. A flexible optical fibre is used between the Remote Controller and the Interface Unit. The IC-900 has independant, full duplex capability on all bands, providing simultaneous receive and transmit operation. The function display on the Remote Controller shows two separate operating frequencies simultaneously. The IC-900 system transceiver is equipped with 10 fully programmable memory channels in each Band Unit. The system can therefore store up to 50 different memory channels. This revolutionary new concept in Multiband operation is available from your ICOM dealer. Also feel free to contact ICOM (UK) LTD for assistance or information. The IC-900 Multi-band system consists of a Remote Controller, Interface Unit A, Interface Unit B and a series of specially designed Band Units.

UX19	28—30MHz	10 watts
*UX59	50--54MHz	10 watts
*(No mobile operation allowed in UK)		
UX29	144—146MHz	25 watts
UX29H	144—146MHz	45 watts
UX49	430–440MHz	25 watts
UX129	1240-1300MHz	10 watts

Multibander system block diagram



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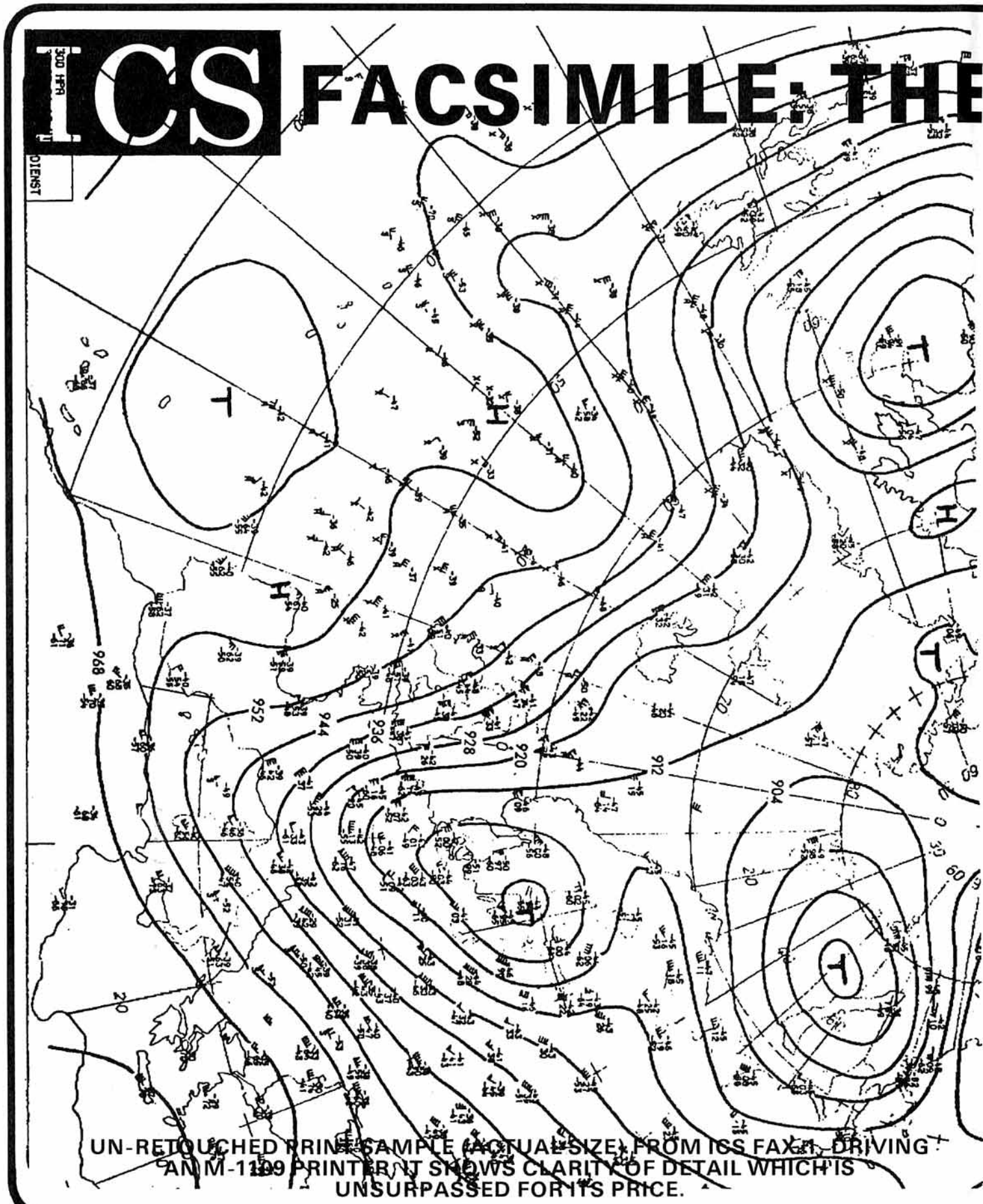
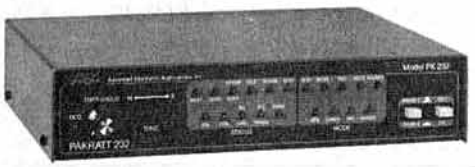

ICS
FACSIMILE-THE
UN-RETOUCHED PRINT SAMPLE (ACTUAL SIZE) FROM ICS FAX-1 DRIVING
AN M-1109 PRINTER. IT SHOWS CLARITY OF DETAIL WHICH IS
UNSURPASSED FOR ITS PRICE.

NEW DIMENSION

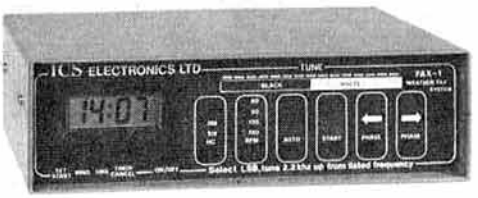
Hands up those who have facsimile in the office and still use telex! Not many, we expect. The PK-232 *SIX* mode intelligent date terminal includes radio FAX transmit and receive. Any file suitable for sending to an Epson FX-80 printer can be sent by the PK-232 in facsimile, or received. Weather maps, cloud cover photographs, press photographs etc can also be received. The FAX-1 is restricted to FAX and RTTY reception only, but is intended for use without a computer to print weather maps or RTTY bulletins either continuously or at a pre-set time each day



PK-232

The world's *only* 6 mode intelligent Terminal Unit. Gives excellent performance on PACKET, AMTOR, RTTY, ASCII, CW and FACSIMILE. Transmit, Receive on all modes with tuning indicator and modem circuitry which automatically configures itself for the mode in use. Facsimile printer cable included.

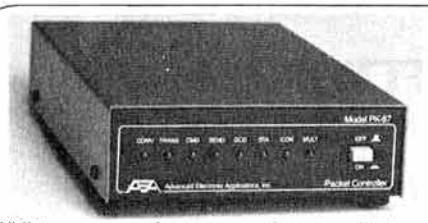
Dedicated applications programs (split screen) are available for the IBM-PC and clones; Commodore 64 and 128 and BBC-B and MASTER computers. Price: **£269.95** in VAT P&P: £4.00.



FAX-1

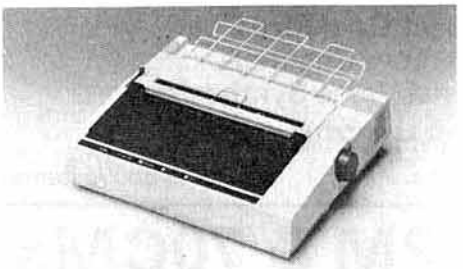
For superbly detailed weather maps from any SSB receiver. Drives any Epson FX-80 compatible dot matrix printer. Double screened, low noise printer cable supplied. Switchable RTTY receive capability standard. Mobile mounting bracket standard. Marine installation kit and application note available.

Incorporates timer for unattended weather map printing. Unlike the PK-232, requires no computer for operation: Only a printer. Price: **£329.95** inc VAT P&P: £4.00.



PK-87

Whilst many manufacturers continue to sell clones of the TNC2, A.E.A. has improved on the TNC2 with several new software features. The Host mode of the new PK-87 Packet Controller can be utilized to improve terminal program operation. Four new commands in the PK-87 allow you to restrict the use of your station for both connects and as a digipeater. The Mailbox monitoring command allows monitoring without displaying the callsign headers. While the PK-87 can be used for HF operation, AEA recommends the optional PM-1 packet modem for low band use. In addition to standard Data Carrier Detect, Push to talk, Status, and Connect indicators, the PK-87 has front panel LEDs for operational mode (Converse, Transparent, Command) and multiple connects.
Price: **£169.50** inc VAT P&P: £3.50.



SC-1200

High quality 120 cps Parallel interface FX-80 compatible printer with push tractors and tear off immediately above the print line. Ideally suited for facsimile printing.

Prices: Packet, AMTOR, RTTY, etc. **£149.50** inc VAT (P&P £4.50). (This printer is suitable for both FAX-1 and PK-232.

MULTIMODE INTELLIGENT TERMINAL UNIT		PRICE	P&P & Ins
PK-232 (6 mode)	PACKET/AMTOR/RTTY/CW/ASCII/ FAX	£269.95	£4.00
FAX OPTION	For existing PK-232 (includes new manual)	£49.95	£2.00
DEDICATED PACKET RADIO EQUIPMENT			
PK-87	1200 Baud Amateur Packet Radio TNC	£169.50	£3.50
PK-90	Commercial Packet Radio TNC	£465.25	£3.50
SOFTWARE PACKAGES			
PK232/C64/128	Cartridge, overlays, cable, handbook	£69.00	£1.50
PK232/BBC-B & MASTER	E-PROM, overlay, cable, handbook	£35.00	£1.50

MULTIMODE INTELLIGENT TERMINAL UNIT		PRICE	P&P & Ins
PK232/IBM-PC & COMPATIBLES	Disc, handbook	£39.00	£2.50
PK87/C64/128	Cartridge, overlays, cable, handbook	£69.00	£1.50
PK87/BBC-B & MASTER	E-PROM, overlay, cable, handbook	£35.00	£1.50
DEDICATED RADIO FACSIMILE EQUIPMENT			
FAX-1	Radio Facsimile Weather Map demodulator with double screened printer cable. Includes mounting bracket and new RTTY Receive facility	£329.95	£4.00
SC-1200	FX-80 compatible printer 120 cps Parallel interface version (FAX-1)	£149.50	£5.00

12 Months Parts and labour Warranty on all products sold. Send large SAE for further details.
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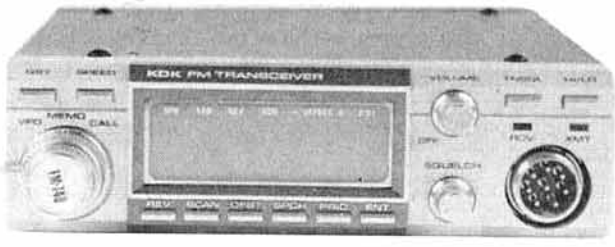

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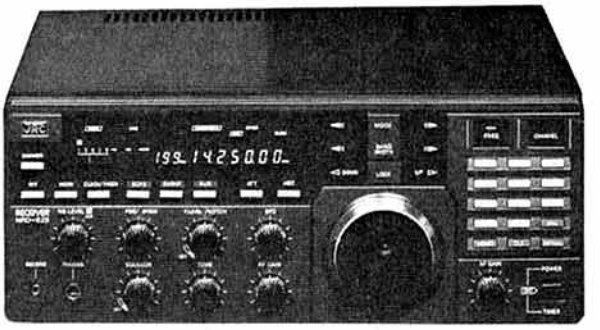
GENERAL COVERAGE RECEIVER



The JRC NRD525 receiver covers from 90kHz to 34MHz and with optional plug-in VHF/UHF convertor, can operate in the ranges 34-60MHz, 114-174MHz and 423-456MHz. Frequency selection is by either main tuning knob, or more quickly from the ten-key pad. The receiver comes complete with a 200 channel memory, each storing freq, mode, band width, AGC and ATT. For further user convenience the NRD525 is equipped with twin clocks and an optional RS-232C computer interface.

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PBM24/70	Parabeam 24 ele	15.1dBd	£51.41	£2.85
LW24/70	Yagi 24 element	14.8dBd	£33.35	£2.85
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All prices include VAT @ 15%.
Carriage extra, mainland rate shown.

LINEAR AMPLIFIERS

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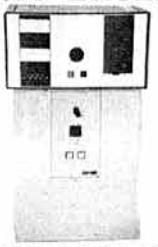

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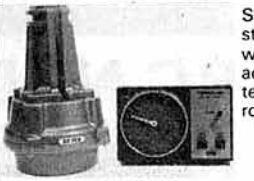
ROTATORS



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AR50	Bell type, 5 pos. pre-select		£149.00
CD45	Bell type, meter readout		£219.00
KR600RC	Bell type, 360 deg. meter		£219.00
T2X	Bell type, meter readout		£449.00
HDR300	Bell type, Digital readout		£699.00
KR800SDX	Bell type, 450 deg. var. spd		£325.00
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THE NATIONAL SOCIETY WHICH REPRESENTS UK RADIO AMATEURS

Founded 1913 Incorporated 1926 Limited by guarantee Member society of the International Amateur Radio Union

PATRON: HRH PRINCE PHILIP, DUKE OF EDINBURGH, KG

Membership is open to all those with an active interest in radio experimentation and communication as a hobby. Applications for membership should be made to the secretary, from whom full details of Society services may also be obtained.

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WILL AMATEUR RADIO DIE OF OLD AGE?

Next time you go to an amateur radio meeting, count the number of people there who are under 25. If, as we suspect, you find that disheartening, count the number of people under the age of 15!

There are many reasons why far fewer young people are coming into amateur radio now compared with a decade ago. Perhaps we, the amateurs, have wrapped up the hobby so much in commercialism that the only remaining challenge is affording the rig. Perhaps the push-button age of instant communication is to blame? As individuals, are we so wrapped up in our own special part of amateur radio that we overlook the big picture and ignore the beginners? Certainly the RSGB has not paid as much attention to this area as it should have done; perhaps the boom caused by the introduction of cb obscured the writing on the wall. While there are notable exceptions, it seems that the majority have simply forgotten that youth in amateur radio represents our future growth, without which the hobby will simply die.

One problem is quite simply that there are fewer young people around, with a much wider variety of "things to do" to attract their interest. If clubs and individuals paint a flat and boring picture of amateur radio, is it any wonder why the youngsters do not want to come out and play?

Like everything else, in amateur radio the RSGB (its volunteers and HQ) can do some jobs extremely well, but we simply do not have anything like the resources to get out into each of the 700 plus clubs in the UK and encourage you to rethink the future of amateur radio by encouraging beginners. (Our new liaison officer scheme has the encouragement of beginners as a major objective.) What the RSGB can do though is to provide you with guidance and material to help you do this very job. We can also provide a national framework in which the encouragement of beginners can flourish.

Youth in amateur radio has now been recognised by the Society's Council as being a major objective. We have done some groundwork, but much remains to be done, *viz*:
(a) The RSGB has been talking to the DTI. They share our view that amateur radio can be the basis of a career in science, engineering or electronics. A recent Government Select Committee noted the dearth of trained people in industry in these activities in the UK.
(b) We have spoken to the Scouts and schools in order to find out what interests young people and how to communicate with them.
(c) We have looked at other national societies such as ARRL and JARL to examine their programmes for attracting beginners into the hobby.
(d) The Society is developing plans for a low-power very limited band/mode Student Licence to enable beginners to get on the first rung of the amateur radio ladder. We believe that this could provide the real stimulus. Some 30 countries have already found such ideas of outstanding benefit.
(e) We are looking at forming links with organisations such as the Engineering Council, the Association of Young Scientists and the Science & Technology Regional Organisation.

Finally, to help get our "Youth in Amateur Radio" programme off to a fine start, the DTI has come up trumps; it will shortly announce the rules for the 1988 "Young Amateur of the Year" award.

As we said in May 1987 — the future of amateur radio belongs to everyone, but everyone must be prepared to make that future happen.

David Evans, G3OUF

Members' Mailbag

The views expressed in published correspondence are not necessarily those of the RSGB, and readers are urged to verify independently any factual statements on which they may wish to rely as it cannot be guaranteed that such statements are correct.

THE WORKINGS OF THE RSGB — A CRITICAL ENQUIRY

Sir — Having listened over a long period to a high level of gripe on local nets and repeaters in the Midlands and Southwest, and from many conversations, it would appear that a large number of licensed amateurs are more than disenchanted with the RSGB, and who are not reluctant to broadcast the fact.

I have recently, at my request (I am a retired consultant), and as chairman of one of the two largest affiliated societies, carried out an impartial and indeed critical enquiry at Presidential and chief executive level into the workings of the Society. Unacceptable as it will seem to the doubters, I have to say that the shortcomings complained of are largely, if not entirely, due to the members themselves.

I wonder how many members have actually read the Society's Articles of Association which are the terms under which the Society has to operate, and which were originally written in 1922. In them under "Structure of the Society" will be found the job specification for the Council and for the secretary. The Council's responsibilities list, *inter alia*, that it will "manage the affairs of the Society". The secretary is required to summon Council meetings, notify members of their election, and to countersign documents to which the seal has been affixed — and nothing else. The post is filled by the general manager. No mention is made of the chief executive or general manager, and there is no job specification for either given in the Articles of Association.

I suggest, as a manager of 20 years' experience, that the affairs of the Society, of ever-expanding subject coverage, cannot be "managed" by a Council which meets every two months, with a President, however distinguished, who serves for one year only. Neither, in any event, can it be managed by a Council, declared to be democratically elected, but whose individual management experience is in some cases virtually non-existent. Do not be misled that I am a candidate for Council, but instead be quite sure that candidates' management expertise is not stated on the ballot forms but, perhaps, the standing of a candidate's sponsors may have some "clout". Just because a person is good on the key, writes a good article, runs a good net or is generally a good fellow does not mean that he/she is competent to contribute to the Society's management, but if such criteria (as seems likely) are the current basis for candidates' sponsorship, Society members have absolutely no right to complain, having brought the management failure situation upon themselves. However, before leaving the point, I have to say that it doesn't apply to all Council members, as there are some who pull their weight.

The most frequently ventilated complaint is "I wrote in and never got a reply". Fair comment, I reckon, having suffered this one often myself. Just for the record, though, HQ has sent out three quarters of a million items of mail in the last year (about 21 per member) and its master file copies for one week's handwritten letters fills two full-size box files, with the computer-written letters filling a further one (I have seen them). There is a computer-held file of 350 standard reply letters which is accessed by all staff for regular enquiries, but which of course cannot answer the oddball queries. Incoming mail and telephone calls often total 1,000 a day together.

The second and wholly justified complaint is: "Who deputises for the chief executive when he is away on business or his (rare) holidays?" The answer is straightforward — nobody.

The day-to-day administration of the HQ itself is now firmly in the hands of a headquarters manager appointed for that purpose, but the continuity and in-depth handling of all matters political and technical with which the Society is involved remain in the hands of the chief executive alone. There is no one else on the HQ staff who is qualified, other than to "hold the fort", to accept delegation and maintain continuity in his absence. In addition to the day-to-day business of the Society, the chief executive has to take back situations and problems which have been referred to Council and which have been "shrugged off" undecided, and which cannot be allowed to disappear.

Dealing with, and endeavouring to obtain results from government departments currently occupies the chief executive for two whole days each week. Those who have not experienced this work will perhaps accept the analogy that government departments are like dry sponges, which accept a vast amount of input but which have to be squeezed to obtain output. Such is the case with the DTI, with no disrespect to any individuals in it, but to get significant progress it is necessary to camp on the doorstep (so what happens to the rest of the Society business meanwhile?). Those who doubt these words should take note that the government controls the UK ether as it thinks best, and certainly not always as we wish or need, and those who will not support the national Society in its endeavours by becoming members — about 47 per cent of licensed amateurs — give the government very good reason to ask why we need so many frequencies for such a small proportion of the licensed amateur population — for it is the Society which negotiates them.

Turning to finance, it is said that the Society could be far more efficient on its present income of roughly £1 million a year. Members can make their own judgement from the Society's accounts published every year, but this judgement cannot be more than a general one as there is no backup to the accounts in language which laymen, like me, can understand. For instance, what does it cost to run a large data bank and a 20-station computer installation? How many people are there on HQ staff and how many are of executive status? Does the Society pay above or below the level of the local/national average for the job? (It pays lower in fact, but nobody tells us.) What was last year's postage bill/phone bill?

There is now a new accountant and a procedure which enables expenditure to be reviewed by Council as it is happening, rather than as a *fait accompli* in the annual accounts. All this does not tell us why £1 million is insufficient to permit further management recruitment and development, but nevertheless it is the critical factor, as it usually is in members' household budgets, and certainly in mine!

So, after all this, what is really needed to put the Society on a proper basis and able to handle all matters political, technical and administrative which concern its members and the cause of amateur radio? There are four principal requirements;

1. To make the Council do what it is supposed to do, ie manage the affairs of the Society. Alternatively confine its activity to general policy and transfer the management of Society affairs to the control of a director-general. Rewrite the "Green Book", update the constitution/structure and hold the required egm to approve it.

2. To recruit two additional executives of quality and experience (qualifications?) to share the load as described later.

3. To raise enough money to pay them, again described later.

4. To establish local Society liaison officers throughout the UK. Other requirements are minor in comparison, but the four listed need amplification.

1. The Council is discussed earlier, but it is the Society members themselves who must see to it that they are competently represented on it. It would not be difficult to arrange for affiliated clubs to be grouped together by area throughout the UK and for each group to sponsor Council candidates, rather than 10 assorted individuals as at present. This would indeed be a truly democratic system. Should a director-general be given the responsibility he/she would report to Council at its meetings.

2. Two executives are necessary, with responsibility as follows:

(a). To have total responsibility for the Society's dealings with government, Continental, EEC and worldwide controlling authorities.

(b). To be responsible for liaison with, and monitoring of the (now) 17 Society committees, and to ensure that matters referred to them are properly processed. To have a "training" portfolio which should include proper guidance to prospective radio amateurs, committee members, and perhaps Council members. To be the public relations executive who will put out to members details of what is going on, what difficulties exist politically, what members can do to help the Society and themselves, and to continue his/her piece for *Rad Com*.

3. It may be horrifying to those of us on fixed incomes or retired pensions (I am one) but it is a fact that executives of the standard we require (and not the "top" at that) command salaries of £20,000 a year. You get what you pay for and you need to keep what you get or, like the Civil Service, regular or irregular changes result in a high "start again" factor which we cannot accept. It seems the only way to fund two executives is to raise the annual subscription to £20. Before people dismiss this, just consider whether this sum, which amounts to the cost of a pint of beer (at 75p) per fortnight throughout the year, is a reasonable price to pay for the protection of our hobby and some services. What, for example, do our local bowls, tennis, golf or social clubs charge?

4. I see that an organisation of this sort is now proposed. My own society has already implemented it for its own use. It can only help with the workload, and surely a local liaison officer rather than the Society could be asked how to connect up a microphone — this actually happened!

In conclusion it may be thought that I have been "got at" and hence my somewhat forgiving written attitude. This is quite untrue, to the extent that I resigned from the Society in disgust when matters continued in chaos, but have now rejoined if only to give me the right to comment.

However, members who are keen to criticise but unwilling to do anything else may care to accept my suggestion to back their criticism by putting some of their spare time and energy where their mouths are.

KA Cradock-Hartopp, G4PZR

21st CENTURY LICENCE

Sir — Congratulations to the RSGB for its forward thinking. I think the new licence idea is a winner and will be welcomed by every serious radio amateur.

Perhaps the maritime mobile suggestions (paras 7 and 9) could be made a standard part of the licence. (Not that I am likely to benefit from this without a small miracle.)

I feel also that a new reciprocal condition could be included; namely, licensees operating abroad can use the country's suffix followed directly by their own callsign, eg VKG4SON, GVK4RRR, DLG4SON, GDL4RRR, etc. This would make a station immediately identifiable to his friends at home, without have to use, for instance, VK4/G4SON.

With regard to using radio on public transport or a vessel, this could lead to problems and may cause harm to the good name of amateur radio. Perhaps a rethink on this one would be in order.

How about a rethink on the licence document? Something on the lines of a driving licence with photograph. Perhaps also an option for a five or ten-year licence at a suitably reduced cost.

This would also be a good idea for RSGB membership. (What has happened to long-service badges?)

I hope my suggestions are of interest, and welcome comments from other members.

Trevor Berry, G4SON

PROBLEMS WITH PACKET

Sir—In reply to Hans Kreuzer on packet radio (June *Rad Com*), the experts do know the limits. The ·X25 system is designed for a channel that is very nearly perfect; that is, there are very few retries, and for a system where collisions between packets are very infrequent. Great efforts are made in computer networks to keep the quality of the lines high and very sophisticated packet assemblers/disassemblers (pads) are used to, among other things, prevent clashes between packets.

The amateur use of packet violates the conditions for which the system was designed. Amateur channels are unreliable and noisy, and multiple users operate on one frequency where clashes are inevitable. After all, the amateur's reaction to 100 per cent copy with Germany is to try and work Japan!

There are other more subtle problems. Retries do not improve the signal to noise. They are just an attempt to be luckier with conditions on a new attempt. Where the channel is noisy, this method will not succeed. If, however, the signal from, say, 10 retries were "added together", the signal to noise would be improved by 10dB. The same as swapping your dipole for a five-element beam. This "addition" of retries could be done at the analogue or digital stage of the decoding. A system could be devised where the information bandwidth that can be transmitted varies automatically with the noise levels; that is, an average doubling of retries occurs for an increase in noise of 3dB. This is the best that, even in theory, can be accomplished.

It seems to me that there is here a perfect opportunity for the amateur community to devise a modulation and coding system which is suitable for a very wide range of conditions, especially very poor ones. The coding and decoding can all be done at audio frequencies and using home computers making the hardware relatively cheap and easy. Very realistic tests can be obtained by feeding a few microvolts of signal into one's receiver along with the normal antenna and seeing how the system copes with very nearly real conditions. Maybe even a contest between competing techniques could be arranged?

A K Forrest, BRS44566

Sir—This letter, and in particular thks sentenco, is in re'ly to the commgnts covcernmng packet r1dio operation mate by Hans Kreuzer, DL1AN, ij the JuneOissue ?f *Radio Communication*. The previous sentence had roughly one character in 10 in error, the same 10 per cent (presumably character) error rate suggested by Herr Kreuzer as being adequate for normal conversation. I would say that any packet operator would be very reluctant to suffer even a one per cent character error rate having become accustomed to the virtual zero per cent error rate of packet. Indeed, it is precisely the absence of errors that makes all the attendant facilities of packet possible. For example digipeating, message store-and-forward systems and machine-to-machine communications in general, all rely on the accuracy of the callsigns and control information in each packet to successfully route it to its intended destination.

The limitations of packet **were** foreseen by the experts, hence the current packet experiment on 144MHz to discover, among other things, just how significant the limitations would be in practice. Considering the high level of activity on 144·650MHz at certain times, it is surprising just how well the system works!

I'm sure Ian Wade, G3NRW, when he advocated higher data rates, did not assume that these would be possible with audio fsk and off-the-shelf fm transceivers. Reliable high-speed data links would be most practicable on the uhf and shf bands. Direct fsk of the carrier wave is one possibility, but any modulation scheme benefits from the use of data modulators and demodulators designed specifically for the communications channel in use. Inter-repeater links are the obvious way to exploit such high-speed channels.

And this is the whole point, packet is **not** a dx mode. Packet works best over short distances on vhf and above, where the absence of both natural and man-made interference results in sufficiently low channel bit error rates to keep retries down to an acceptable level. Once a packet has made it to a local repeater it should be communicated over a network whose aim will be to get that packet to its intended destination in the shortest possible time with the minimum number of retries. On the negative side it has to be admitted that such a network is still some time away, but we will get there. That is, unless we throw in the digital towel now because of a few failures of packet to work over what are patently unsuitable channels.

One final point, if a communications channel is not capable of providing a sufficiently low bit error rate for AX.25 packet, surely the answer is to devise a forward error correction coding scheme which will allow error-free communication.

P Cadman, G4JCP

OPENING UP 50MHz TO CLASS B LICENSEES

The letter from R T G Freeman, G4SDJ, published in "Members' Mailbag" September, brought more than 75 replies. Here is a sample of extracts from them:

"Surely he must know that we all have to learn to crawl before we walk" — *G1TMX*.

"By all means let us seek to improve general conditions within the amateur radio world. Perhaps your correspondent has some constructive ideas on how to do this . . . from my own listening experience the dubious privilege of being a lid has never been exclusively confined to the Class B fraternity — *G8LIU*.

"Mr Freeman is in fact writing his own whining letter in the first place. In the course of tarring everyone with the same brush, he has failed to acknowledge that the majority of Class B licensees do not have poor operating habits" — *G8AYM*.

"It is difficult to give a whining reply to Freeman's letter as it is based on the spacious assumption that there is a fundamental difference between a Class A and a Class B licensee. He is, in fact, suggesting that the passing of the morse test somehow endows the successful candidate with some God-ordained gift which makes him a perfect operator . . . whether the operator is a Class A or Class B licensee bears little, if any, relevance to the performance heard on the air" — *G1JHR*.

"A request to G4SDJ and others who may share his/her views: Take your carping snobbery somewhere else, it has no place in the amateur radio fraternity" — *G8YFA*.

"Can anyone tell me how passing the morse test ensures that someone will operate in a competent and courteous manner? I don't believe the argument can be supported in a rational way" — *G6JNS*.

"What does passing a plain language morse test have to do with being a good operator! Absolutely nothing! Mr Freeman falls into the trap of assuming that all Class A licensees are experienced operators, which is far from the truth. I congratulate the RSGB on negotiating a splendid new band at 50MHz, and I welcome the class B licensees to their new allocation" —*G3YPP*.

"I would hasten to point out that a fair number of Class A licensees have a pretty poor level of operating practices. I have held my licence for 19 years and am still in no hurry to obtain a Class A licence, especially after listening to some of the downright bad manners of some hf operators" — *G8BUY*.

"Surely the perpetuation of the myth that somehow the knowledge of morse code makes one a better operator can only serve to harm what should be an enjoyable hobby. Grow up, Mr Freeman; informed and constructive criticism is always welcome, but I fear yours is neither. I know that I speak for the majority in once again congratulating the Society on its hard work in obtaining the new allocations" — *G8KHF*.

"My enjoyment of 50MHz has been enhanced by the arrival of Class B stations, and they have all demonstrated very good operating standards. Let he who is without sin . . .!" — *G4WUB*.

"It would seem from Mr Freeman's letter that only Class A operators know good procedure and practice, but to judge from some of the procedures heard on 14 and 3·5MHz this is far from being the case" — *G1HJW*.

"Perhaps Mr Freeman would like to explain exactly why passing the morse code test makes him better qualified to operate on 50 and 70MHz than those who have not passed it, particularly those who have held Class B callsigns for considerably longer than the five years or so he has held G4SDJ" — *G4ILO*.

"Could Mr Freeman be suggesting that recent criticism of the RSGB as being an organisation dominated by a small group of 'old fogeys' with ageing callsigns is based on a true assessment of the facts when he states: 'Let us be kind to the Class B guys'? Who are 'us'? Parts 1 and 2 of the RAE are technical in nature. Morse is more akin to a language. In the light of Mr Freeman's letter I am led to wonder whether it is a language of love and friendship or one of snobbery and rejection? — *Philip Lane*.

"To have a bad opinion of something is understandable. To express that opinion in public, it should be both fair and accurate to the people concerned. I know many good Class B licence holders who will do justice to the new band allocations. Unfortunately I also know of a few Class As who will not" — *G8WZJ*.

"I am sure I am not alone among Class A licensees in numbering among my acquaintances many Class B licensees whose technical knowledge puts mine to shame and whose operating standards are impeccable" — *G3USF*.

"G4SDJ's letter was unnecessary. It highlighted the letter writer's own inexperience and illustrated his apparent intolerance for approximately half of the UK's licensed amateurs" — *G3BFC*.

"I know where the whining goes on. I know, where standards have fallen. Within *Rad Com's* "Members' Mailbag", that's where! — *G6MEN*.

"Since when did being able to read morse code make one holier-than-thou and a worthier and better radio amateur, fit to be seen and heard of over the face of the earth via radio? If you really want to play a class distinction game it would take less than a week's monitoring to furnish a cassette full of bad operating practices by Class A licensees. However, I am not suggesting that they are any worse or better than Class Bs, merely that there are black sheep in every flock. As a whining finale, I note that the 50MHz crossband ladder is occupied by no less than five Class B licensees. I suppose they got there by bad operating practices and wallying around?" — *G8JNZ*.

"There are good and bad operators on all bands, hf, vhf, uhf and probably cb as well: there will always be the bad-mannered person who wants to spoil it for others" — *G8POC*.

"If the International Telecommunications Union allows operation without cw on frequencies above 30MHz, I am delighted that the RSGB has secured 50 and 70MHz for all of us" — *G8ATY*.

"I would remind Mr Freeman that passing the morse test does not make him a better radio operator. Neither, it would appear, does it improve his manners or his sense of comradeship. I find his attitude classist, greedy and above all snobbish" — *G1NNB*.

"Mr Freeman's attitude is that of a petulant child who cries: 'If I can't make the rules I won't play" — *G1VIY*.

"I suspect that if you peel away the surface of Mr Freeman's letter it amounts to no more than that he, as a Class A licensee, had to pass a morse test to operate on 50 and 70MHz whereas others did not, and he is upset because in his opinion the Class Bs got a better deal".

No letters were received in support of Mr Freeman's stance.

A reminder that Class B licensees are on all bands above 30MHz because of:
(a) *the International Radio Regulations,*
(b) *RSGB action to have them applied in the UK, and*
(c) *a very positive reaction to* (b) *from the DTI.*

A 3·5MHz 5W TRANSMITTER

*C F Fletcher, BSc, MIEE, CEng, G3DXZ**

This project is intended to appeal to the inexperienced constructor. It aims to blend modern device technology with straightforward design to produce a low-cost, useful and sure-fire transmitter featuring full QSK capability and a 6·5kHz vxo range.

Introduction

The coming of the transistor brought about many changes in wireless communication. Miniaturisation and low power consumption, relative to the valves they superseded, are real advantages, but the loss of simplicity, common in any thermionic circuits, is a feature which has hit hard at the radio amateur. The truth of this latter statement is borne out by the relatively low number of home-constructed rigs to be heard nowadays. Not all is lost however, and a resurgence of interest in low-power (QRP) operation in recent times has encouraged many amateurs to try again the real delights of operating equipment of one's own manufacture. Compared to the thermionic valve, the transistor has always lacked power gain. As a result, a transmitter using transistors is forced to have more stages than the equivalent valve model. Also, junction transistors suffer from low input impedances, and until recent years the field effect transistor (fet) has been a very low power device, typically 300mW. The development of the metal oxide silicon field effect transistor (mosfet) with a special 'V' construction has led to a family of very useful devices, now generally known as vmos. Primarily intended for fast power switching, some members of the family lend themselves to low and medium power operation on amateur bands up to 10MHz with good efficiency.

The vmos is characterised by being voltage driven, ie has a high input resistance, and is in this way similar to the ordinary fet, but it will carry much higher drain currents. Drain current ratings from 1 to 20A are common. The early vmos devices tended to be delicate around the gate terminal, and cautjon was needed in handling and usage. However, recent production has been toughened up and will withstand +/— 40V between gate and source.

The power gain of the vmosfet is comparable to the valve, and it struck me that it might be possible to revert to the simplicity of valve circuitry for the lower frequency bands. The classic beginner's rig of yesteryear was the co-pa. A single valve crystal oscillator plus a single valve power amplifier produced 5 to 10W of rf, albeit getting quiet warm in the process! Hence this little transmitter was designed to try and retain the low component count of the valve designs while taking advantage of the modern device's ability to operate efficiently on low (electrically safe) voltages. Not all the valve circuit techniques can be adapted however, and whereas the co part is very valve-like, the pa looks much more modern. The reader will note that the keying circuit looks more complicated than the transmitter itself, but that's due to those transistors again and, unfortunately, the cheap "p" channel vmos devices which could replace them are not yet available. Now let's take the circuit to pieces for a better understanding of how it works, for it's only when the thing doesn't work that one finds out just how well or otherwise one does understand what's actually going on.

The crystal oscillator

The crystal oscillator part is shown in Fig 1 and, for contrast, the valve equivalent as Fig 2. If you trade an R for a C, the two circuits have the same component count. The components of the two circuits are labelled with the same numbers where their functions are the same and, as can be seen, the ancient and modern circuits are almost identical. A glance at the supply voltage, however, emphasises the superior safety of the modern circuit.

The electrical operation of the two circuits is identical. Referring to Fig 1, the tuned circuit L2, C2 must be adjusted near the resonant frequency of the crystal X so that a negative resistance is coupled to the crystal circuit through the inter-electrode capacitance of the vmos device; drain and gate being equivalent to anode and grid in the valve. This negative resistance cancels the natural positive (ordinary) resistance of the crystal circuit and, when the net resistance goes slightly negative, the crystal bursts into

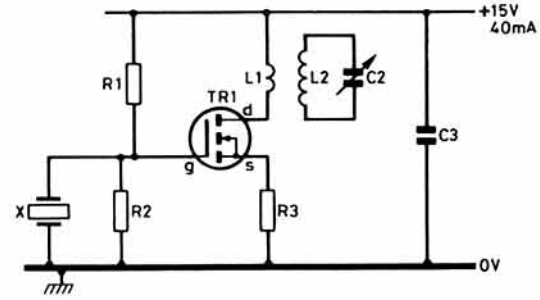

Fig 1. Tuned drain vmos crystal oscillator

oscillation at its parallel resonant frequency. Crystals can operate in two fundamental modes; ie parallel and series. In this case parallel resonance occurs and the crystal oscillates in parallel with the circuit capacitance connected across it. Quartz crystals intended for operation in this mode are typically ground so that their frequency is correct when in parallel with 30pF. The vmosfet used presents typically 50pF between gate and source which, when added to the other circuit stray capacitances, tends to be a bit much for a healthy oscillator, so the unbypassed source resistor R3 is included to reduce the effect of the gate-source capacitance. Unlike the triode valve, the vmos device needs some positive gate voltage before it will conduct. The resistors R1 and R2 form a potential divider, and the fraction (R2/R1 + R2) of the 15V supply is used to turn on the fet.

Although the oscillator will work with L2, C2 connected directly in the drain circuit, there is real advantage to be gained by using a link (inductive coupling winding), L1, to keep the drain current and voltage out of the tuned circuit. A small toroidal iron dust core is employed for the L1, L2 combination, as this provides close coupling and high Q.

Altogether, this vmos crystal oscillator works very well and has quick start, sure-fire properties of which many of its valve predecessors would be envious. In the full circuit, the winding L2 is centre tapped and grounded in order to provide the necessary earth-related, balanced, push-pull drive for the pa, but the operation is just the same.

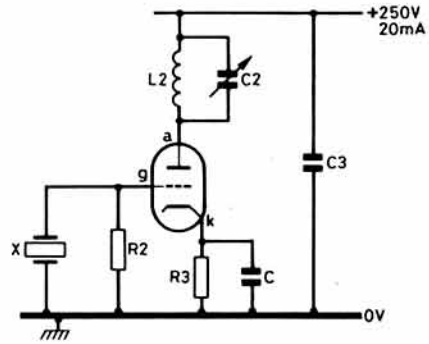

Fig 2. Tuned anode triode crystal oscillator

The variable crystal oscillator

The high stability of the crystal oscillator is its own worst feature when it comes to operation on a busy band. The variable crystal oscillator (vxo) has become popular as a means of easing the problem of dodging strong swamping signals, and some background in the technique can be found in [1].

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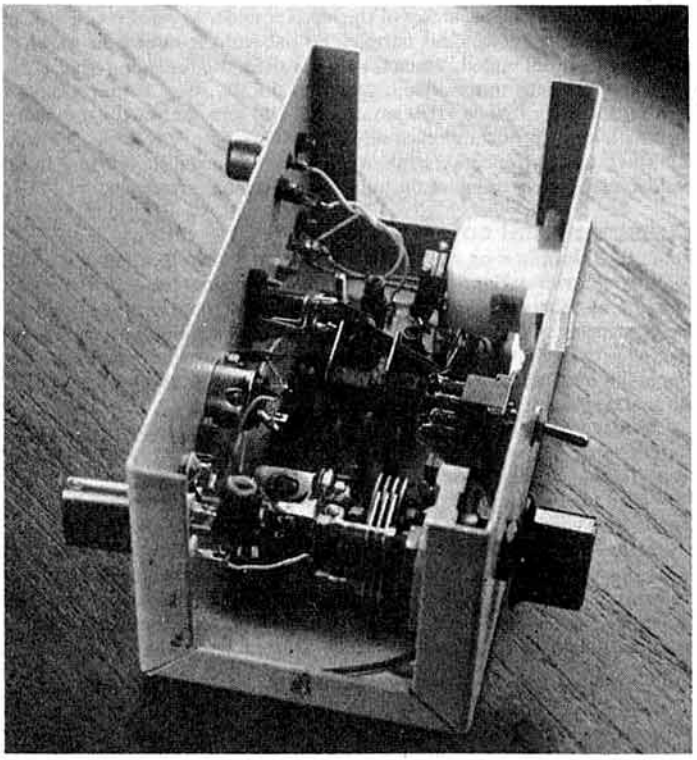


Internal view of the transmitter

The simple series capacitor method of moving the parallel resonant frequency is rated to produce a shift of 3kHz maximum. To achieve this result, the series capacitor used must have a minimum capacitance of 2pF or less, and stray crystal capacitance must be minimised. My series capacitor experiments using a ceramic insulated 20pF variable capacitor of good quality resulted in a maximum shift of 1·5kHz — not very encouraging — so an alternative approach was tried. The impedance presented at the terminals of a series LC circuit varies from capacitive through resistive to inductive as it is tuned through resonance. At resonance a high-Q circuit appears as a low resistance and if included in series with a crystal will not effect its operation. The series capacitor was hence replaced with an LC combination, and the results were dramatic when the LC circuit was tuned through the crystal frequency. Shifts greater than 10kHz were obtained using an ordinary 3·5MHz AT-cut crystal in an HC6U holder. Similar results were obtained with other HC6U crystals, and even an old 10X job in an air-gap holder moved well. The control of frequency was also spread over the range of capacitor adjustment, unlike the simple series capacitor circuit which is only effective near minimum capacitance. The limit of frequency pulling which is tolerable in a keyed oscillator of the type used turns out to be 6 to 7KHz before slow startup affects the keying characteristic. My 3559·75kHz QRP-band crystal moved from 3,555·00 to 3,561·5kHz with no discernable affect on keying sharpness.

Not any old LC combination will achieve this result however, but within the following guidelines a deal of variation is possible to suit individual needs.

1. The inductor needs to resonate at the crystal frequency when in series with about 5pF.
2. The inductor must have a high Q factor — say 50 or more.
3. The inductor should be made so as to have a minimum of associated capacitance.
4. The capacitor is not at all critical and can be air-spaced or a miniature solid-dielectric type, Cmin. typically 4pF, Cmax about 20pF.

For 3,560KHz, an inductor of 300μH is required. Unfortunately, the preferred value of 330μH is too large and it is difficult to obtain a prewound potted choke of the right size. However, Mr Toko's range of 10mm tuning coils in the 10EZ series does include a 330μH variable which covers the range nicely; available from [2]. Adjust the inductor with the series capacitor at maximum value to set the low end of the pulling range. The highest frequency is determined by the capacitor's minimum value.

Having successfully made the transmitter frequency variable, the problem of "netting" on to the received station arises. A simple method is adopted where S1, a double-pole double-throw switch, is used to simultaneously apply ht to the vxo and remove it from the pa. The resulting signal as heard by the station receiver in the unmuted state is strong but not unmanageable.

The power amplifier

A push-pull power amplifier was chosen for two main reasons. First, the tiny VN10 vmos employed cannot produce 5W of rf when used singly, and 5W is a good design figure for most QRP rigs as it is generally recognised as the maximum permissible power level in the sport. Second, the balanced operation of the amplifier generates no even-order harmonics, ie 2nd, 4th, 6th etc, and this eases the problem of purifying the rf before it hits the aether. Push-pull is also kinder to the vmos, as switching voltage overshoots at the drains are better controlled than in the single-ended amplifier.

There is, as always, a penalty to be paid for the foregoing advantages. With push-pull it is the need to keep the amplifier balanced in itself and then to match it to the convenient, but unbalanced, 50Ω feeder or load. This requires a little tricky transforming to be done, but is actually very simply accomplished — more later.

First, referring to the simplified circuit Fig 3, consider the input circuit. L2 is centre tapped and the tap grounded. Both the fixed and moving plates of the tuning capacitor, C2, are therefore above earth and this must be allowed for during construction. The opposing ends of L2 are directly connected to the gates of TR2 and TR3 — and that's all. A good 30V peak to peak should be developed across L2 when the co is running, which drives the pa hard on, albeit one side at a time. The vmos devices thrive on this type of operation and run cool under switch-mode conditions. When the co is turned off, the pa devices have zero volts between gate and source and are turned fully off. Thus the pa is brought into operation simply by applying the rf drive, no dc bias or supply switching is needed.

Now look at the output circuitry. The supply voltage is applied to TR2 and TR3 via the centre-tapped balancing transformer T1. This transformer must be wound with close coupling between the two halves of the winding in order to maintain the voltage balance between the two devices. Luckily, this is easily achieved with the aid of a small ferrite core and a few turns of wire — more later. But, unluckily, to try and understand how the output circuit works overall, a closer look at the underlying theory of the stage is necessary, although on this occasion not more than absolutely necessary.

The VN10 device with 10V or more drive at the gate presents a resistance of about 4Ω between drain and source. Power dissipation is specified as 1W, which leads us via Ohm's Law $P = I \times I \times R$ equation to a drain current of 0·5A. In push-pull the fet is only in operation for half of the time and so reduces the effective power to be dissipated to 0·5W. At 0·5W, with a small heatsink, the VN10 stays cool and healthy. Assuming a power supply of 15V, the peak voltage change at the drain—applied across half of the T1 winding —is $15-(4\times0{\cdot}5)=13$V. This infers a drain load resistance of $13/0{\cdot}5=26\Omega$. However, because this is a balanced stage the load is best applied across the whole T1 winding, and this needs a load resistance of $4\times26=104\Omega$. This factor of four is due to the transformer relation which states that load impedances are transferred as the square of the turns ratio, and T1 is a 2:1 auto transformer. Disbelievers are referred to [3].

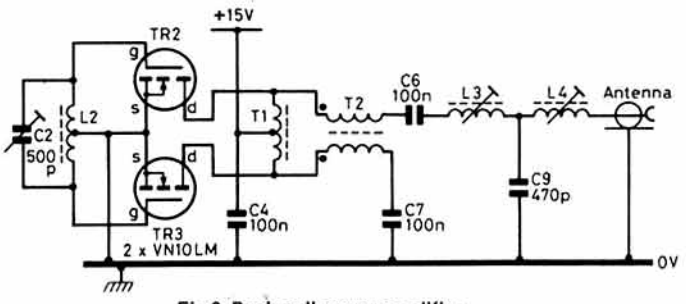


Fig 3. Push-pull power amplifier

The load resistance of 104Ω is balanced about earth and must be converted to an unbalanced, earth-related 104Ω load before connection to the harmonic filter. This feat is accomplished by T2, a straightforward 1:1 balun transformer. Those of little faith are referred to [4]. The capacitors C6 and C7 are inserted into the circuit to block the dc voltage but pass the rf without hindrance. The rf at this stage is rich in odd-order harmonics ie 3rd, 5th, 7th etc, and a filter/matching section is needed to clean up the output and accept the 50Ω presented by the antenna feeder or load. The simplest effective arrangement is probably the "T" section. This is more easily considered as two "L" sections back-to-back which transform the 104Ω drain-to-drain load resistance to some higher resistance, say 500Ω, then down again to 50Ω. This 104 to 500 to 50Ω transformation demands a reasonable Q from the "L" sections and suppresses the harmonic output to an insignificant level. The inductors L3 and L4 can be wound in a variety of ways, toroidal cores being currently popular. Although these cores are neat, they are not easily adjusted and, since one of the arts of QRP operation is to make the best of what little

power there is, optimised matching repays any effort needed to get it right. Hence I chose to use 5mm coil formers, slug tuned, for L3 and L4 which allows the pa operating conditions to be tweaked for best results.

Keying, mute and antenna switching

Since the operation of the transmitter relies on the crystal oscillator, (no oscillation — no drive for the pa stage — no output), simply interrupting the +15V line to the co will key the transmitter. This simple method does have drawbacks, eg key directly connected to the +15V rail, keyed current typically 40mA and no provision for muting or antenna switching, but by using a pair of cheap pnp small signal transistors all things are possible. Even some control of the keying waveform is not difficult.

Consider Fig 4, which shows the keying circuits removed from the transmitter proper. In the key-up state both TR4 and TR5 are off as they have no base-emitter bias. The mute output is zero, R12 ensuring this is so. No current flows in the PIN switching diode D2, so it also is off. Incoming signals, after passing through the "T" filter, are conducted via the L5, C8 series tuned circuit to the receiver socket. L5, C8 are tuned to midband, and the effect of all the tuned circuits, diodes, resistors, mismatch and all, is to reduce the incoming signal by about half when connected into a 50Ω receiver. This 6dB loss is normally no problem on 3·5MHz where signal levels are high and receivers seldom short of sensitivity.

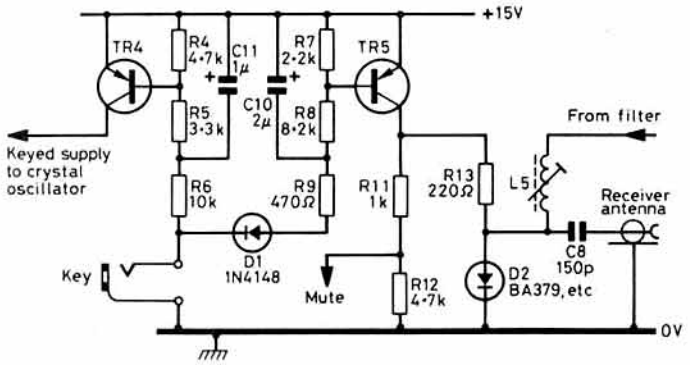


Fig 4. Keying and antenna switching

When the key is pressed, both TR4 and TR5 are biased into full conduction, saturated in fact. The resistors R4 to R9 inclusive and capacitors C10 and C11 serve to control the start and stop process as follows.

TR4 controls the ht supply to the oscillator and turns on rapidly at key-down. The oscillator, however, takes typically 5ms before oscillation begins; full output appearing progressively in another 2ms. The 5ms delay is undetectable in morse below 40wpm or so, and the 2ms rise time of the signal is only slightly faster than the commonly accepted ideal. So no problem at switch-on. If the power is removed suddenly, however, it is easy to develop a thump or plop, but by using the charge built up on C11 while the key was pressed to slow down the turn-off rate of TR4 and hence the rate of decay of the oscillations, a clean signal results. Attack and decay times are controlled by R6 and R5 in conjunction with C11 and can be varied to taste if necessary.

A similar action occurs with TR5. Rapid turn-on is required as the receiver mute voltage has to appear as soon as the key is pressed and most certainly before the oscillator strikes up. The same action also passes some 50mA through D2 which then looks like a very small resistance between the L5, C8 junction and earth, effectively shorting out the receiver antenna. The signal measured at the antenna socket of the receiver under key-down conditions was only 150m rms, which is harmless to the receiver but might frighten the operator if not muted. When the key is raised, the foregoing conditions must hold until the transmitter is dead and the R8, R9, C10 combination furnish this delay. Diode D1 separates the TR4 and TR5 circuits, making their action independent of each other. Key current is only 3mA. Resistor R11 serves as a buffer between the switch TR5 and the outside world, so that accidental short-circuiting of the mute line will cause no damage.

Constructional notes

I built the transmitter on a 2 by 4in pcb; the component location and track layout are shown as Figs 6 and 7. A 2 by 4in pcb does not leave a lot of room for error, also there is no virtue in miniaturisation for the sake of it, especially on frequencies as low as 3·5MHz. So the constructor without experience of making pcbs might well be advised to take a little more space, perhaps 3 by 5in, as this increase in size will have no effect whatever on the performance if the general pattern of the layout is retained.

The tuned transformer, L1-L2, was wound on an Amidon T50-6 core. Start by winding L2 as follows. First find how much wire is needed to form 12 turns, double it, add extra for connections, then form a long hairpin loop. Now twist the hairpin loop until about four twists per inch appear along its length, then wind 12 turns on the core with the twisted pair just formed. Cut off the loop end to leave a twisted pair of conductors. Now the tricky bit. Hold one wire of the pair, call it the start of wire 1. Using a circuit tester find the other end of wire 1, ie the finish, and loop it back to the start of wire 2. Leave no excess wire on the loopback, for this forms the centre tap of the winding. What you should now have is the start of wire 1, the centre tap and

Components list

R1	220kΩ ⅛W	**C1**	330pF polystyrene
R2	56KΩ ⅛W	**C2**	500pF comp trimmer
R3	100Ω ⅛W	**C3, 4, 5, 6, 7**	100nF disc ceramic 50V
R4, 12	4·7kΩ ⅛W	**C8**	150pF polystyrene
R5	3·3kΩ ⅛W	**C9**	470pF silvered mica 250V
R6	10kΩ ⅛W	**C10**	2µF 15V tant bead
R7	2·2kΩ ⅛W	**C11**	1µF 15V tant bead
R8	8·2kΩ ⅛W	**C12**	20pF airspaced variable
R9	470Ω ⅛W		
R10, 11	1kΩ ⅛W	**TR1**	VN10KM or VN10LM Siliconix
R13	220Ω ⅛W	**TR2, 3**	VN10LM Siliconix
R14	0·22Ω ¼W	**TR4, 5**	BC212 or similar
D1, 4, 5	1N4148	**T1**	4-0-4 turns bifilar wound on 0·5in balun core
D2	BA379 or sim		
D3	Red led	**T2**	5 + 5 turns as T1
S1	Min dpdt toggle	**X1**	Fundamental crystal resonator in HC6U holder

L1	10 turns 30swg	Wound on Amidon T50 core, 6 mix (yellow code)
L2	12-0-12 bifilar wound	
L3	29 turns 30swg 5mm slug tuned former close wound	
L4	26 turns 30swg 5mm slug tuned former close wound	
L5	36 turns 30swg two layer winding 5mm former slug tuned	
L6	Toko style 10EZ coil type RWR331208 (red)	

All components available from J Birkett, The Strait, Lincoln, or other general suppliers.

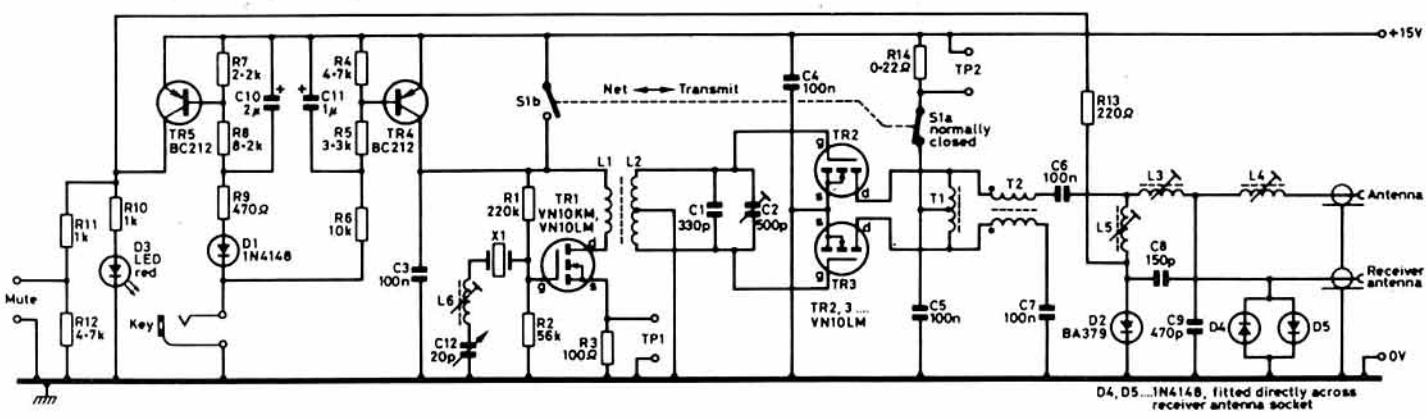


Fig 5. The complete circuit

Fig 6. Component placing

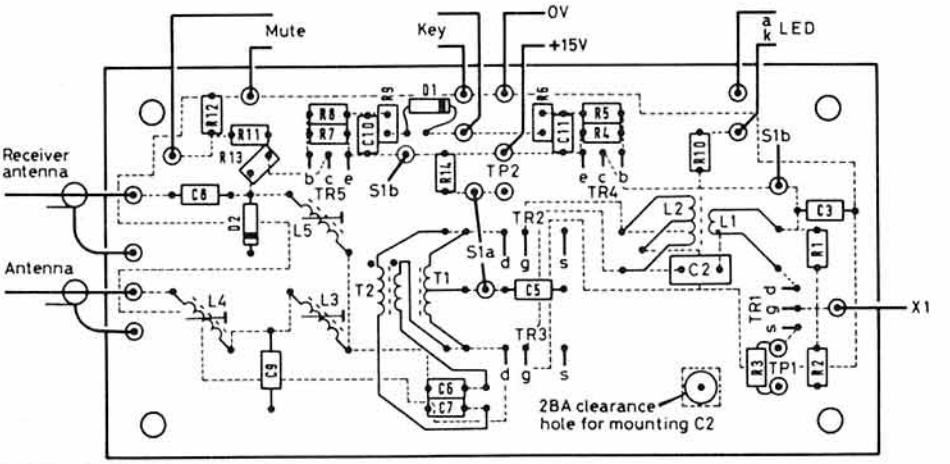
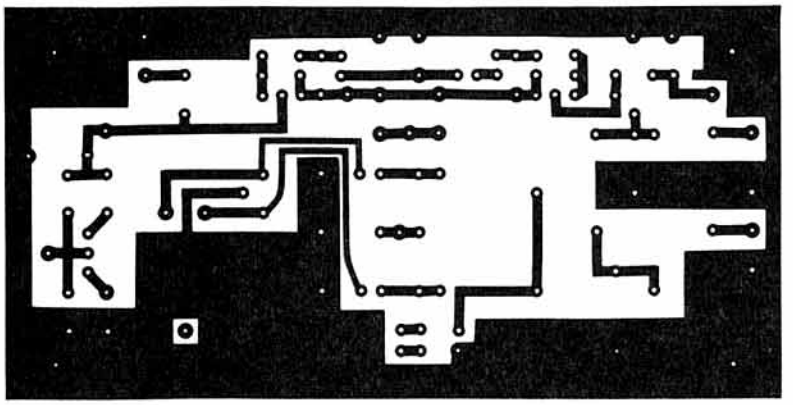


Fig 7. Track layout



the finish of wire 2. A bifilar winding is so formed. L1 is best wound over and between the turns of L2. Distribute the winding around the toroid.

T1 and T2 should also, ideally, be bifilar wound but, if twin-hole balun cores are used, the coupling between the turns is so good it just does not matter if the turns of the two halves of the winding are not twisted together. Twists can be bothersome when threading twin-hole beads. A variety of balun cores is available. Choose one with a K value of around 1·5μH/turn if available and use the winding details given or otherwise proceed as follows. Each half winding needs an inductance of around 25μH. Check the parallel resonance with 500pF and adjust the turns for a frequency no higher than 1·5MHz and no lower than 1·0MHz. Use the thickest wire possible for the windings.

So much for the easy bit — now it becomes interesting! If the tuned coils L3, L4 and L5 can be adjusted to about the correct values before the key is pressed, the circuit will work from the word "go", and only a little fine tuning is needed for the best results to be obtained. The components list shows the number of turns needed for 5mm slug-tuned coils, but where should the slug be? and suppose the constructor has ¼ or ⅜in formers to hand, what allowance should be made? In short, it is not possible to solve such an equation with so many unknown variables, but it is possible to make the coils, no matter what size, and get the inductance correct too. The answer of course lies in the ubiquitous grid or gate dip meter. No amateur's home should be without one! The technique is simple. Wind the coils with the turns suggested in the components list. Connect L3 in parallel with a 330pF capacitor and check the resonant frequency with the gdo. Adjust the core for a dip at 2·9MHz and all's well. Similarly, adjust L4 for a dip at 3·4MHz. L5 should be resonated using a 100pF capacitor to 3·55MHz. If the dip occurs at too high a frequency with the core fully in, add more turns and try again. If the dip is at too low a frequency with the core nearly all out of the former, remove turns. For further reading on gdos see [5 and 6].

One PIN diode, D2, is used for transmit/receiver antenna switching in an economical but effective circuit. Surplus diodes can make it even more economical but often arrive without any markings. If unmarked diodes are used, here's a method of ensuring correct fitting. The arrow on the schematic symbol of a diode indicates the direction of forward conduction — conventional current of course — which flows from positive to negative. All schematic symbols with arrows follow this convention. To find the end from which the current flows, ie the end to which the arrow points, you need a simple battery-driven ohmmeter. Conventional current flows into the red or "Positive" terminal of all ordinary meters. Thus it follows that when used as an ohmmeter, the internal battery-driven current leaves the negative terminal, flows through the external circuit and enters the positive terminal of the meter. So if a diode is connected across the meter and a low ohms (hundreds) reading is obtained, the diode is forward biased and the current is flowing out of the end of the diode connected to the positive meter terminal. Reversing the connections should produce a very high or open circuit reading if the diode is healthy.

Testing

To ensure correct operation, some test gear is needed. A voltmeter to read 15V, an ammeter to read 1A and a 50Ω dummy load—ideally with an rf power meter 10W maximum.

The meter shunt R14 is not fitted to the board, and first adjustments should be made with no connection across points TP2, ie no volts on the pa. Connect the voltmeter between TP1 and ground, positive to TP1. Apply 15V, plug in the crystal and press the key. Starting with C2 at minimum capacitance, the meter should read about 2V. Increase the capacitance of C2 until a sudden rise in volts indicates that the crystal has been driven into oscillation. Tune in a receiver to the oscillator and adjust C2 for the cleanest note when operating the key. The tuning point should occur a little away from the highest voltmeter reading. If the oscillator refuses to fire, check that L2, C2 are tuned to the crystal frequency—see [7] for guidance in checking resonance with toroidal transformers.

Now connect the 50Ω load to the antenna socket and an ammeter, on the 1A range, across TP2. Press the key briefly and note the current. Current up to 0·5A is healthy, but if it is in excess of 0·5A, overheating of the pa devices will occur if the drive is sustained. Adjust the cores of L3 and L4, progressively, until maximum rf output is obtained with 0·5A of drain current. A good 5W or rf should be produced if all is in order.

Metering the drain current is a good method of checking that all is well with the antenna loading. The meter needs to have a sensitivity of 1A, full-scale deflection. If space on the front of the housing is available, there are some small meters available which make for a good appearance of the finished transmitter. A 1mA fsd movement is convenient, as the scaling suits the 0-1A

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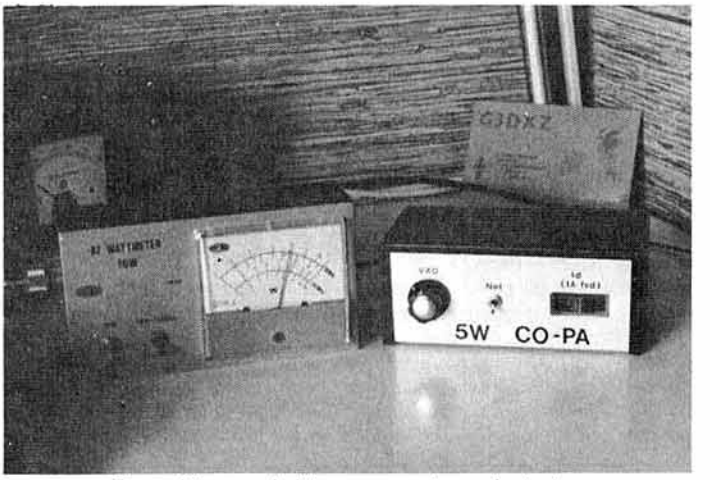

Transmitter, coupled to a power meter, under test

A BROADBAND VERTICAL ANTENNA FOR 1·8MHz

*S E Hunt, MSc, G3TXQ**

Introduction

When first licensed in 1965, I began operating on 1·8MHz using a homebrew copy of the Codar AT5 transmitter together with an HRO receiver, and ever since those days I have had an affection for top band operation.

Marriage and a young family curtailed my amateur radio interest for a time, but when I resumed activity in the late 'seventies my first priority was to erect an effective top band antenna. Although my garden extends to almost an acre, it is irregularly shaped; this, together with other constraints (imposed by the xyl), meant that the preferred site for the antenna was an area only 50ft by 50ft.

This article describes how my choice of antenna evolved, how the antenna was constructed and matched, and introduces a little antenna theory along the way.

Why a vertical?

The obvious answer is: "Only a vertical would fit!" However, other factors also suggested that a vertical was the preferred choice.

Any horizontal antenna that the average amateur can erect for 1·8MHz is likely to be only a small fraction of a wavelength above ground and will radiate predominantly at high angles. Such an antenna will give a good account of itself under night-time sky-wave conditions out to ranges of a few hundred miles.

However, my main interest was in putting out an effective ground-wave signal for local day-time operation, together with low-angle radiation for chasing dx at night—requirements which are best met with a vertical.

Top-loaded or base-loaded?

Given that I could not erect a $\lambda/4$ vertical (132ft high!) any antenna would need loading to bring it to resonance. In order to understand the advantages and disadvantages of various types of loading we need to understand a little antenna theory.

Fig 1 is a simplified equivalent circuit of a vertical antenna where:
C is the antenna's distributed capacitance to ground
L is the antenna's distributed inductance (due to its length)
Rloss is the loss resistance of the antenna system (mostly earth losses)
Rrad is a convenient mathematical abstraction which represents the antenna's ability to radiate a signal.

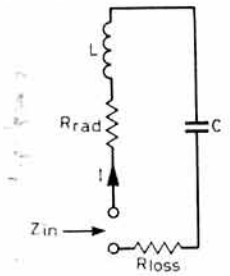

Fig 1. Equivalent circuit of a short vertical radiator

The feedpoint impedance of the antenna is a complex quantity given by:

$$Zin = Rrad + Rloss + j(2\pi fL - 1/2\pi fC) \quad (1)$$

With a $\lambda/4$ vertical the capacitive and inductive reactances cancel and the antenna is self-resonant. With short antennas $2\pi fL >> 1/2\pi fC$ and we must increase L or C by adding loading components in order to resonate the antenna. In either case, once resonant, the feedpoint impedance is resistive and is given by:

$$Rin = Rrad + Rloss \quad (2)$$

However, of the power delivered by the transmitter $I^2 \times (Rrad + Rloss)$ only $I^2 \times (Rrad)$ is radiated. Thus the efficiency of the antenna, E, is given by:

$$E = Rrad/(Rrad + Rloss) \quad (3)$$

To put this in perspective, a 30ft base-loaded vertical will have an Rrad of about 1Ω; assuming losses of 9Ω, the radiation efficiency will be only 10 per cent! The message of equation (3) is that Rrad must be kept as high as possible and Rloss as low as possible if we are to achieve high efficiency.

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We can compare the radiation resistance of top-loaded and base-loaded verticals by referring to Fig 2, which shows the approximate current distribution for these antennas over a perfect ground. The power radiated by an antenna is a function of current and length and can be visualised as the shaded areas of Fig 2 (see [1] for more details). It is evident that if both antennas are radiating equal powers, ie the areas are equal, then the current into the base-loaded antenna must be twice that into the top-loaded antenna. Put another way, its Rrad must be four times higher since:

$$It^2 \times Rradt = Ib^2 \times Rradb$$

ie $$It^2 \times Rradt = (2 \times It)^2 \times Rradb$$

and hence: $$Rradt = 4 \times Rradb$$

Referring back to equation (3) we see that in cases where Rloss > > Rrad the power radiated is proportional to Rrad and a top-loaded vertical will radiate a signal four times as strong as a base-loaded vertical of the same height!

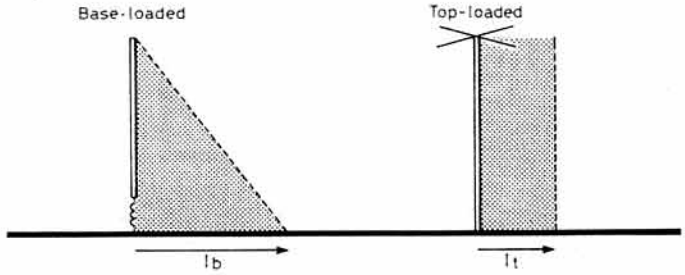
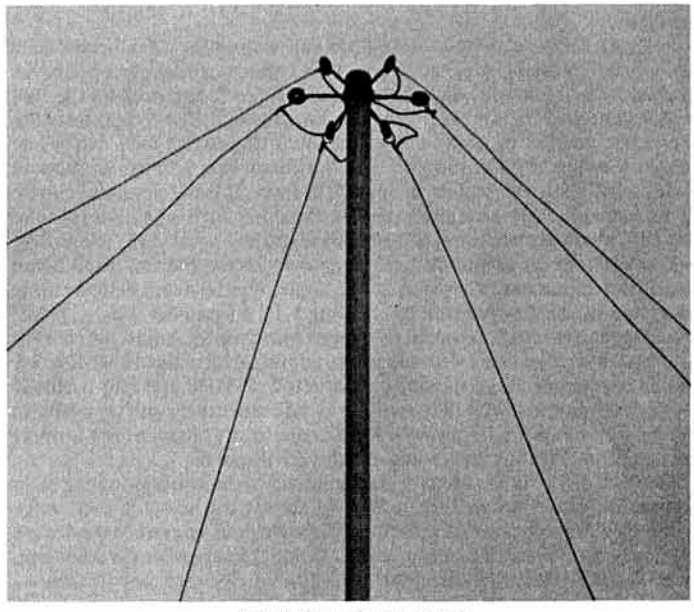


Fig 2. Current distribution on base-loaded and top-loaded verticals

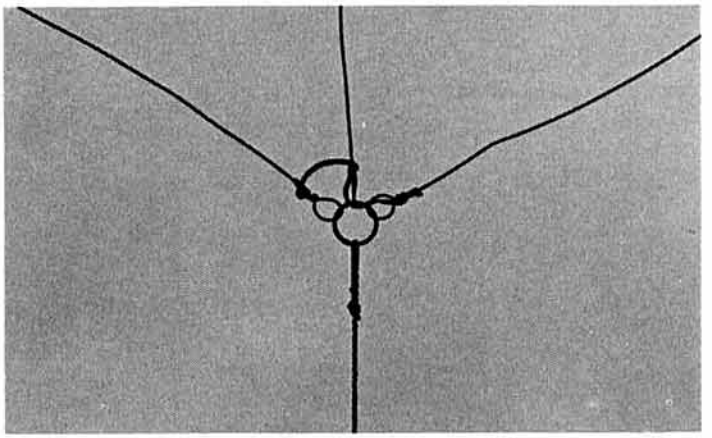
What type of top-loading?

Traditionally 1·8MHz verticals have been top-loaded by mounting a loading coil below a short whip section at the top of the antenna. However, the loading coil and whip form a very-high-Q tuned circuit and will resonate the antenna over an inconveniently narrow band of frequencies. G4WIM recently showed (2) a novel way of overcoming this disadvantage with an automatically-tuned top-loading system. The alternative, wider-bandwidth method of top-loading is to provide extra capacitance from the top of the antenna to ground in the form of a "capacity hat".



Detail of top of capacity hat

This hat can take many forms. At its simplest it comprises a horizontal wire joined at its centre to the top of the vertical and becomes a T antenna. (Note that, unlike the inverted-L arrangement, the horizontal top of the T antenna radiates little since its two halves carry equal and opposing currents).



Detail of skirt wire/spoke wire attachment

The length of the horizontal top needed to resonate a modestly-sized vertical was too great for me to accommodate. However, the same capacitive effect can be achieved with shorter wires if their number is increased. John Belrose, VE2CV, gives useful data on the number of wires and their lengths needed to resonate verticals of various heights in (3). Interestingly, this reference also shows that the effective capacitance of the hat can be increased greatly by connecting the ends of the "spoke" wires with "skirt" wires; for instance, eight spokes with skirt wires are equivalent to 21 spokes without skirt wires.

Ideally, all the wires forming the capacity hat should lie in the horizontal plane. However, mechanically it is much more convenient to allow the radial wires to slope downwards and to become part of the guying arrangement. Unfortunately we pay a penalty for sloping the wires in this way because vertical components of current are introduced which oppose the current in the radiator, and if we allow the wires to slope down too far, Rrad begins to decrease. Interestingly, (3) mentions that for a given height of radiator, a given number of wires, and a given slope of spoke wire, Rrad can be maximised by positioning the base of the capacity hat at a height 57 per cent that of the radiator.

Antenna construction

Fig 3 shows the antenna design which I finally chose as a compromise between radiation efficiency and what was mechanically achievable. The accompanying photographs show various aspects of its construction. The 40ft vertical radiator comprises sections of aluminium tubing tapering from 2 to 1·25in diameter held together with hose clips and self-tapping screws. At its base the radiator is supported by two stand-off brackets bolted to two 6ft by 5in by 3in timbers of which one third is below ground. There is no need for high-quality insulators here because the voltage never exceeds about 10V rms.

Initially I fixed the hat wires rigidly to the radiator and suffered several failures when the wind caused flexure and fracture. Subsequently I simply formed loops at the end of each wire and passed them through eye-bolts attached to the top of the radiator. I then soldered flexible braid (the outer-conductor stripped from coaxial cable) between the wires and the radiator to ensure electrical continuity. There is a similar arrangement where the spoke and skirt wires join, but using metal rings rather than eye-bolts to connect the loops (see Fig 3 for details).

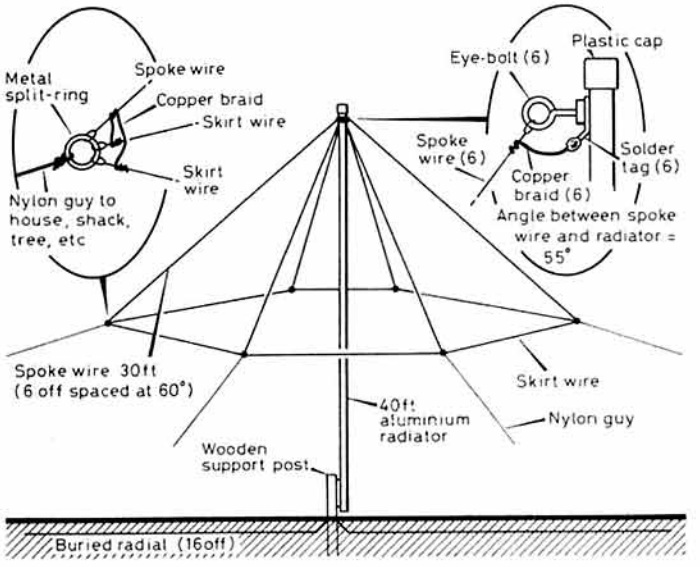
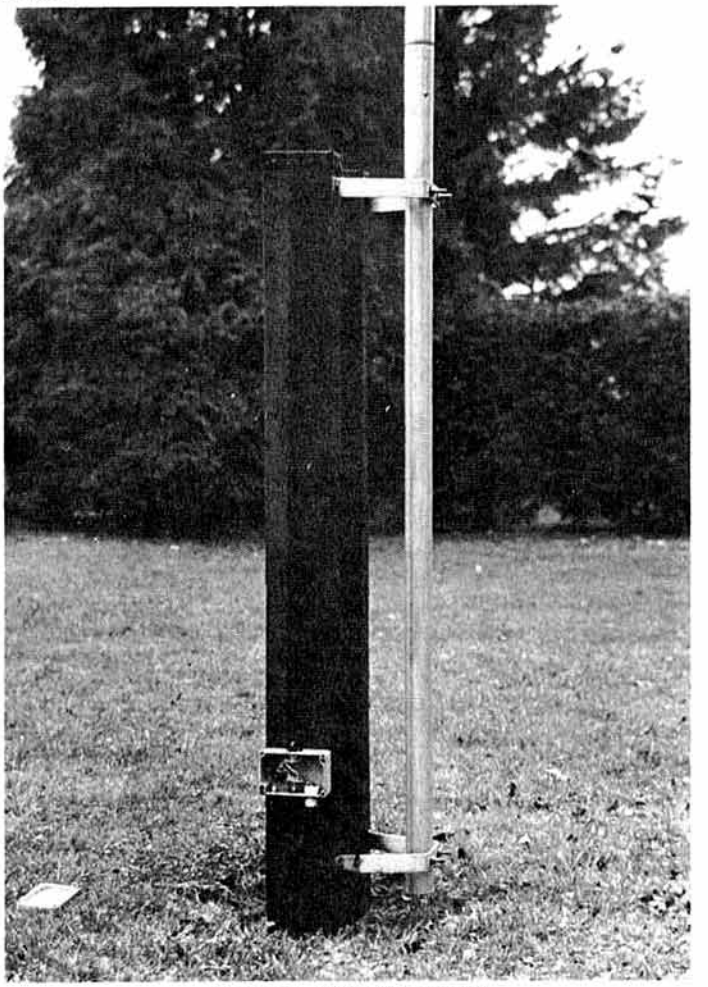


Fig 3. Practical vertical antenna design

The earthing system comprises a 4ft copper earth stake together with 16 radials—each about 50ft long—which were slotted into the lawn to a depth of 2in using a garden spade. I am fortunate in having a small stream bordering two sides of the site, and on these sides the radials were extended into the stream.



Antenna mounting arrangement

Adjustments

I would recommend anyone who is interested in making serious antenna measurements to read W6BXI and W6NKU's article on RX noise bridges (4). I built a bridge to their design and was able to confirm its accuracy by comparison with a Hewlett Packard HP4815A vector impedance meter. Using this bridge and a Smith Chart rotation program for my HP41 calculator, I can make complex impedance measurements in the shack and translate them to the feedpoint of the antenna.

When the vertical was first erected it was resonant at 2·2MHz, so I added a small amount of inductance at the base to bring the resonant frequency down to 1·83MHz. Ref (3) indicated that Rrad for this antenna should be about 5Ω. Initially I measured the feedpoint impedance with only the earth stake (no radials) in place and got a result of 33Ω—indicating losses of 28Ω and an efficiency of 15 per cent! I then added earth radials one by one and measured the feedpoint impedance as I went—ending up with the graph of Fig 4. After 16 radials I was getting tired and reckoned I was into the area of "diminishing returns". At this point I had losses of about 2Ω—an efficiency of 70 per cent. Fig 4 emphasises the inadequacy of a short earth stake and demonstrates that installing even a few radials is well worth the effort.

Fig 4 also demonstrates neatly that relying only on swr readings can be very misleading. Before installing any radials, and with no attempt at matching, the antenna system exhibited an swr of 1·5:1 (and, incidentally, a very wide bandwidth). Making the antenna more efficient by adding radials increased the swr to 7:1 and reduced the bandwidth!

The 7Ω feedpoint is matched to 50Ω using a 9:1 transmission-line

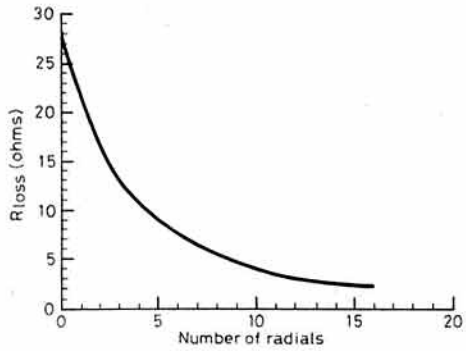


Fig 4. Relationship between losses and number of earth radials

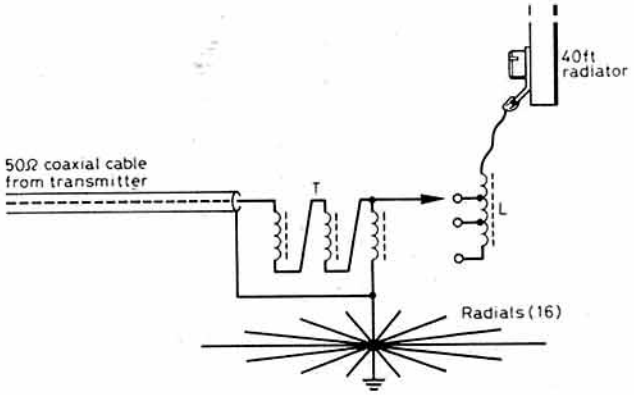
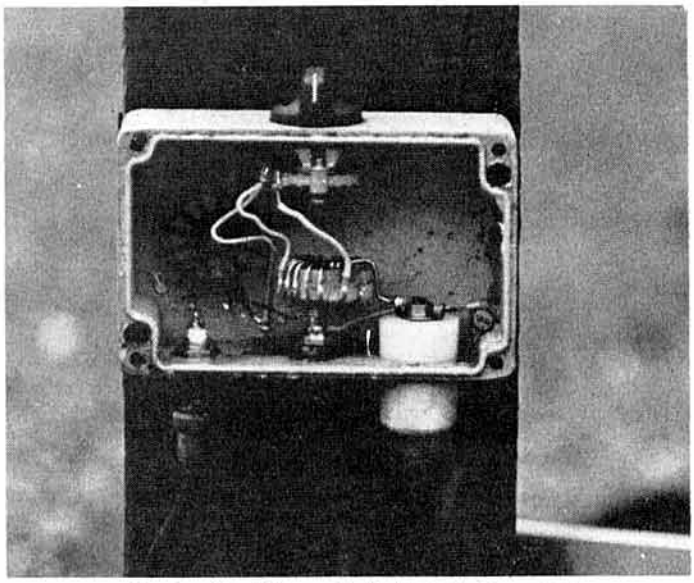


Fig 5. Tuning and matching arrangements at base of vertical. L: 15t on T106–6 core, tapped at 10 and 8t. T: 14t trifilar wound on 1in ferrite ring

transformer, resulting in an swr at resonance of 1·2:1. As expected from the theory, the antenna is relatively broadband—the bandwidth between 2:1 swr points is about 90kHz. I arrange to switch the trimming inductance at the base of the antenna to give me three resonant frequencies—1·83MHz, 1·93MHz and 1·99MHz (a local ssb net frequency). The details are shown in Fig 5.



Close-up of matching and tuning box with lid removed

Results

The antenna gives an excellent account of itself during both local and dx operation—I now have Ws answering my CQ calls rather than vice-versa. However, all verticals are noisy for reception and I am now working on a shielded-loop receive antenna so that I can hear all the dx that is calling me!

References

[1] "Short vertical antennas for the low bands", W J Byron, W7DHD. *Ham Radio* May, June, 1983.
[2] "A 1·8MHz auto tuning vertical antenna", T D Forrester, G4WIM. *Rad Com* November 1986.
[3] "Folded umbrella top-loaded vertical antenna", J S Belrose, VE2CV *Ham Radio* September 1982.
[4] "Improvements to the rx noise bridge", R A Hubbs, W6BXI, and A F Doting, W6NKU. *Ham Radio* February 1977.

A 3·5MHz 5W TRANSMITTER

(Continued from page 829)

range required. The serious lack of space in the box which I used pointed to the use of a tiny, cheap, surplus fm tuning meter for the purpose. There are many varieties about, but most have a sensitivity between 50 and 100μA full scale. The meter shunting circuit, Fig 8, is useful for pressing these little meters into useful service and can be used for any meter up to 1mA fsd. The 0·22Ω shunt drops only 100mV at 0·5A drain current, which has no effect whatever on circuit performance and the calibration can be set wih the 1kΩ preset.

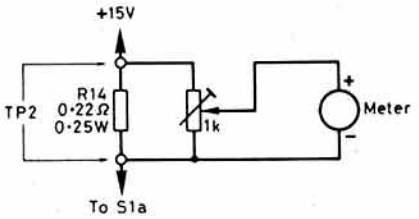


Fig 8. Meter shunting circuit

The led D3 can be included as a visual indication of keying if the meter has not been fitted, but it gives no indication of healthy transmitter operation, and shorted or open-circuit antenna connections can result in excessive heat and eventual damage to the pa if left uncorrected. In the bygone days of valves, a common maxim was "Tune for maximum smoke"! Solidstate devices unfortunately, do not have that amount of resilience and any would-be constructor is well advised to pay close attention to the current meter. Finally, as a rule of thumb, (no pun intended), if you can't bear to hold the pa heatsinks between thumb and forefinger, don't wear gloves, check the loading.

References

[1] *ARRL Handbook* 1986, p10-3.
[2] Cirkit, Park Lane, Broxbourne, Herts.
[3] *ARRL Handbook* 1986, p2-31.
[4] *ARRL Handbook* 1986, p16-6.
[5] *ARRL Handbook* 1986, p25-22.
[6] *Radio Communication Handbook*, p18.16.
[7] *ARRL Handbook 1986*, p2-35.

Appendix

This design, with appropriate changes to resonant components, will work well from 1·8 to 7MHz. Because of the preset tuning adopted, the 3·5 and 7MHz bands are covered better without trimming the tuning. The values for 7MHz operation are given below and produced a measured 5W output. The mosfets are fast enough to operate on 10·1MHz in switch mode, and any constructor wanting to use this band need not worry regarding performance.

C1 Omit this capacitor.
C8 100pF polystyrene.
C9 330pF s/m 250V.
L3 13 turns, 5mm, slugged, 28swg, close wound.
L4 14 turns, 5mm, slugged, 28swg, close wound.
L5 25 turns, 5mm, slugged, 28swg, close wound.
L6 Toko style 10E 100μH type YRCS18576AQ. □

A DIRECT-READING QRP WATTMETER

*W Farrar, BSc, G3ESP**

DELVING into the realms of QRP, I needed a simple direct-reading meter to measure the power output of such a transmitter (the G-QRP Club's maximum being 3W) and, if possible, to detect rf in lower-powered stages when initially adjusting the transmitter. These notes and the accompanying illustrations show how this was achieved. The device functions satisfactorily on the bands up to 30MHz. It is housed in a well-known brand of mustard tin.

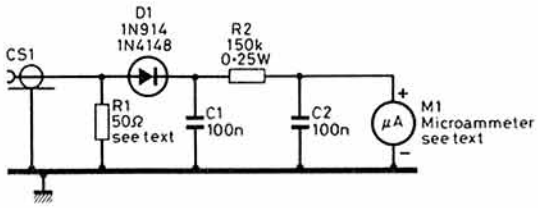


Fig 1. Circuit diagram of the wattmeter

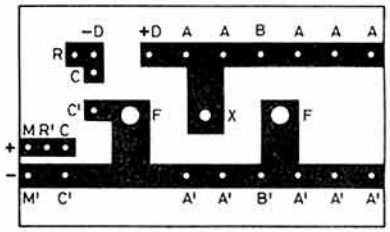
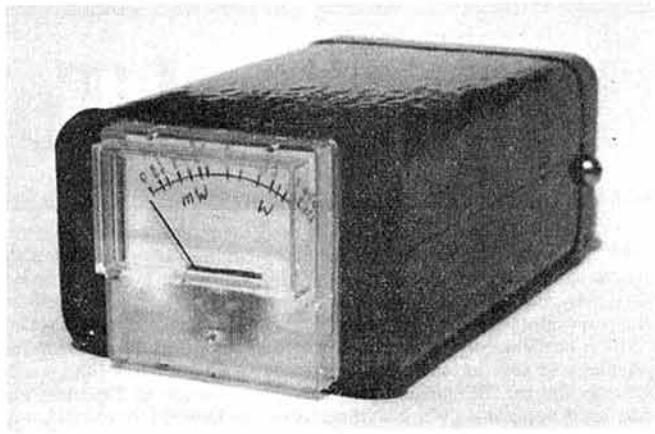


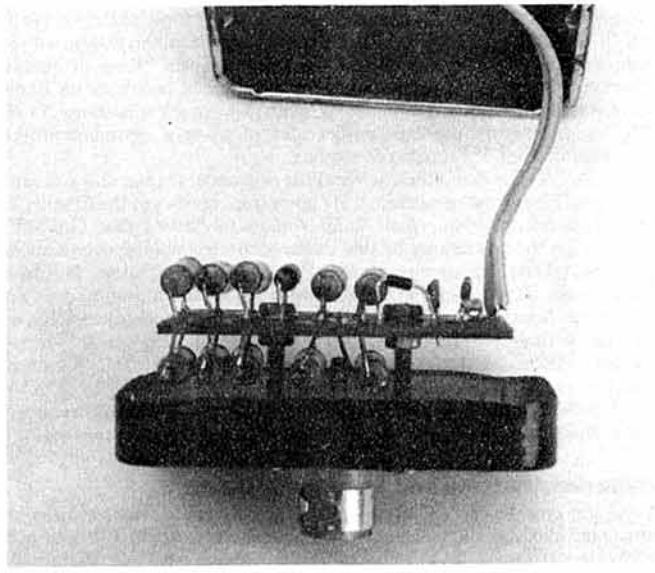
Fig 2. Printed circuit board (full size)

The circuit is shown in Fig 1. The resistor R1 consists of a number 1W carbon resistors in parallel, to make 50Ω (as near as possible). To hand I had five each of 560Ω and 470Ω, which gave a calculated resistance of 51.1Ω. An extra half-watt resistor of 2,200Ω in parallel brought the calculated combination down to 49·95Ω, which is near enough. These resistors, along with other components, are mounted on a single-sided printed circuit board measuring 50 by 30mm, depicted in Fig 2. The items are assembled and the board mounted on the lid of the tin as follows:

Across holes A-A' are soldered the five 560Ω resistors on the non-track side of the board, leaving 5mm of the wires projecting through. The projecting coaxial socket (tv/Belling type) is fixed centrally in the lid of the tin, using two 25mm lengths of 4BA threaded rod and nuts (or 25mm 4BA screws, if available). A short length of wire is soldered to the centre-pin of the socket and fed through hole X, while the 4BA rods go through holes F. The board is secured by nuts to the rods, and the wire soldered to X. The copper tracks must be accessible, with the resistors already mounted now partly concealed by the flange of the lid. To the projecting wires at A-A' are soldered the five 470Ω resistors, and the 2,200Ω resistor is added at B-B'. The wires of the resistors must now be bent where necessary so that they are clear of each other and of the threaded rods and the coaxial socket pin. The capacitors are mounted across C-C', resistor R2 across R-R' and the diode cathode to D−, the anode being left for the time being in the air. A 150mm length of thin twin flex from the meter will be connected to M+ and M−.



The finished wattmeter



Detail of pcb assembly

The meter used was advertised by CR Supply Co, Sheffield, as a "VU meter, 250μA" and priced at only 60p! It has two advantages: its dimensions (40mm square) are such that it just fits with a squeeze into the slightly recessed bottom of the mustard tin; and the moving-coil movement is far from linear (see later). The front of the meter is held to the backplate by clear adhesive tape (!). This is pulled off and the front removed, exposing the scale and the meter movement. The scale, printed on thin blue plastic, is *gently* prised off a pair of studs at the bottom and removed, care being taken not to damage the meter needle. A piece of thin white card is cut to the same size and a pair of holes made to match the originals. It is then temporarily placed in position, and the wires from the meter are temporarily connected to the points M−M on the pcb (observe polarity!)

To calibrate the scale, a continuously variable 0 to 30V dc supply is needed. Mine would give only 3 to 21V, so I put a 9V battery in series to raise the maximum of 30V, and at the appropriate time reversed this battery to give a minimum of −6V. The voltage source is connected between the negative line of the pcb and the unconnected end of the diode.

(Continued on page 838)

Walter Farrar, licensed since May 1948 as G3ESP, looks upon amateur radio as a hobby, to be enjoyed. As a teenager in the 'thirties he built various simple valve receivers. In the early 'forties, after gaining a London University degree, he joined the Signals Research & Development Establishment, where he met "real" equipment and his first radio amateurs. In the 'fifties and 'sixties he operated on the hf bands, using cw and a.m with home-built transmitters, and was sometime secretary of radio clubs in Wakefield, Pontefract and Doncaster. His first "black box" in 1968 put a stop to home construction, but of late this has started again with delving into simple solid-state QRP circuitry. Throughout, the accent has been on cut-and-try and "kiss" methods.

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Technical Topics

Pat Hawker, G3VA

THE JUNE *TT* drew attention to the need for professional engineers to receive more training in electromagnetic compatibility (emc) as part of the general electronic and electrical engineering courses in higher education. David Lauder, G1OSC, senior lecturer and Peter Jackson, head of electronics group, of Hatfield Polytechnic School of Engineering report that: "At the Hatfield Polytechnic we have already identified the need for emc teaching and have included an introduction to emc as part of the revised syllabus for the BEng/BEng (Hons) degree courses in Electrical and Electronic Engineering which is currently being submitted for re-validation. The introduction to emc forms part of a proposed 'advanced digital techniques' course to be taken by all electrical and electronic engineering degree students in their third year. We also run courses for graduate engineers in industry. Our two week 'digital systems design' course includes an introduction to emc and we are planning a new one week course on emc and reliability, with approximately 50 per cent devoted to emc."

Ron Taylor, G3AVQ points out that the concept of the "super-dc-gainer" (solid-state superhet without i.f stages by using a mixer in front of a fixed-tuned direct-conversion receiver), as described by G0FMT in the August *TT*, is not as new as I suggested. He points out that a form of this technique is used in the Century 21 and Century 22 transceivers where it is curiously described as a "double direct conversion" technique. My memory has also been jogged into recalling that *TT*, December 1977 included the front-end of a "3·5MHz dx receiver" republished from an article by E J R Hubach, PA0FIN/OH1ZAA using exactly this principle (*Electron* No 6, 1977). I should have remembered this since I also included this design, with its almost ideal form of gain-distribution, in a paper: "Keep it simple: direct-conversion receivers" presented at an IERE "Conference on Radio Receivers and Associated Systems" (*IERE Conference Proceedings No 40*, 1978) together with the even earlier idea of using a crystal-controlled converter in front of a tunable dc receiver.

As G3AVQ points out there is very little new under the sun and you can't keep good ideas from re-emerging. He notes from reviews of the Century 22 (*SWM*, February 1986, *Ham Radio Today*, July 1986) that G0FMT's remarks on the advantages of this intermediate technology over conventional superhets (or d-c receivers) are well justified. G3AVQ adds: "I too have tried a basic d-c receiver and like G0FMT find the performance does not satisfy me, being, in my view, inferior to a *good* trf (regenerative detector) receiver with really smooth regeneration". In this connection, Harvey Collett, G3KI recalls a trf design by the late Jerry Walker, G5JU: "A modern selective receiver featuring Mullard Red E valves" (EF8EF6/EL3) in the *T&R Bulletin* (March, April, May 1939) with built-in monitor/frequency meter which he says was a "truly magnificent straight receiver for its day."

Batteries, portable and emergency power

Until the emergence of the handheld transceiver, the vast majority of amateur radio operation depended upon mains-electricity or 12V lead-acid car batteries. It was often only for the field-day operations that "emergency" and battery systems came into their own, unless one goes all the way back to the two- or three-valve straight receivers of the 'thirties for which the combination of a 90V or 120V ht dry battery and a rechargeable 2V lead-acid "accumulator" provided a silent background refreshingly free from intrusive mains-hum.

Operation of a modern high-performance solidstate receiver from disposable batteries is not a particularly cost-effective operation, and even with rechargeables the interval between charges, particularly where frequency-synthesisers are used, tends to be short. Listening recently to one of the reviews of broadcast hf receivers that are a feature of the weekly BBC World Service "Waveguide" programme, I was shaken to learn that, for the model under discussion, a standard set of carbon-zinc batteries would provide only about 2h continuous listening, the significantly more expensive alkaline-manganese batteries rather longer. For such receivers, either a mains power unit or a rechargeable battery is virtually essential.

As noted in the October *TT* by G8APX, there are some useful sealed (maintenance-free) lead-acid 12V 1·2Ah units selling for around £12 as a cost-effective alternative to nicads. Where low-weight with a very high energy content are needed, there are now the Moli rechargeable lithium battery packs being marketed in Canada but at the off-putting price of $99 a pack.

Other developments, both disposables and rechargeables, are available or in the pipeline. In the USA, Duracell began marketing high-power consumer lithium batteries in 1985, directed primarily at the flash-camera market ("High power consumer replaceable lithium manganese dioxide batteries" by H Taylor *IEEE Transactions on Consumer Electronics*, August 1986, pp694–9). These 6V, 1·30Ah batteries (Fig 6) are claimed to be suitable for loads up to 200mA, have a shelf life of five years and incorporate no less than three safety mechanisms to overcome the danger of explosion that has delayed the development of lithium batteries for general use (see the letter by G4GNQ, *Rad Com* September 1987). A safety mechanism in the top of the cell incorporates a positive temperature coefficient device (ptc) that presents a very low resistance at room temperatures but switches to very high resistance at about 95°C. An external short-circuit which can result in currents of the order of 10A will quickly raise the temperature of the cell to the ptc switching temperature and limits the current. On removing the short-circuit, the ptc reverts to its low-resistance state and the battery continues working. Should the cell temperature be raised by external heat rather than current discharge, there is a vent mechanism to prevent pressure build up. As a third safety precaution, the separator is heat sensitive and effectively closes its pores to prevent the internal flow of ions between anode and cathode should both the other mechanisms fail.

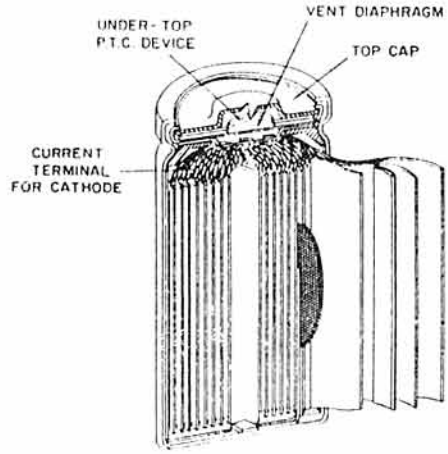


Fig 6. Schematic of a high-power lithium manganese dioxide (Li/MnO_2) cell developed by Duracell for consumer applications showing safety arrangements to minimise risk of explosion

A novel form of "wraparound" plastic polymer rechargeable lithium battery is being developed by Varta in conjunction with BASF in West Germany (*Electronics* 9 July 1987, p41). This takes the form of a thin postcard-sized package (4mm thick) when placed flat but since they are as flexible as cardboard they can be wrapped around components or bent to fit the shape of the equipment enclosure. The Varta-BASF cell uses polpyrole for the positive electrode and lithium for the cathode; output is nominally 3·6V dropping during discharge under load to about 2V with an energy density matching 1·2V nicad cells. It is claimed that at the present state of development the polymer cell can go through about 500 charge/discharge cycles, but the companies are aiming to double the energy density and raise the recharging cycles to about 1,000 before marketing them. Polymer cells were originally proposed in 1977 by Professor Alan MacDiarmid (University of Pennsylvania) and Hitachi and Toyota are also working on them.

The search for batteries that could power electric vehicles or provide emergency lighting is also continuing. The latest entrant appears to be aluminium-air batteries (*New Scientist* 23 July 1987). The US firm Alupower is marketing a dry aluminium-air battery for emergency lighting. The battery is stored in its dry state and actuated by adding salt water. An Al-air battery size 5 by 5 by 10cm is stated to be capable of supplying 1A at 2·2V for 24h, a larger version for 240h. A problem with either zinc-air or aluminium-air batteries is that once activated they discharge continuously (although slowly) when no load is being drawn.

Wendell Tulencik, K8OIP, in "A few thoughts on emergency power" (*QST* May 1987, pp30–2) is concerned with generating enough power to meet virtually any domestic requirement in the event of, for example, winter storm-damage that could result in loss of mains-power for several days. Fortunately this is rare in the UK although it can happen, and my own emergency fall-back system (box of matches and candle) does occasionally get called into use, but then I do not have to worry about any food stocks in a deep freezer. *This was before 16 October!*

K8OIP is better equipped. He has a 5kW alternator with fan-cooled 12hp engine in an acoustically-treated shed, and advises those who suffer frequent power outages to consider 10kW alternators driven by two-or three-cylinder diesels with automatic starting from a 12V battery. Engine noise is a major problem with generators and alternators, whether the installation is 100W with a two-stroke petrol engine or 10kW and a diesel. Television OB support vehicles often have trailer-mounted diesel-alternators that show that it is possible, but not easy, to achieve virtually silent running. K8OIP also stresses the need to provide safe storage of fuel, warns of dangers of fumes and engine heat, and points out that the exhaust fumes of petrol, diesel, natural gas or propane engineers are all lethal and must be properly vented out of any enclosure without relying on natural ventilation.

His 10 commandments for operating such an emergency or field-day installation are:

(1) Use only the fuel recommended by the manufacturer.

(2) Pour fuel through a large-mouth funnel with a fine screen to filter out dirt and other contaminants.

(3) Keep waste cloth or paper towelling handy for blotting spills. Store properly in a covered metal waste bin.

(4) Keep a supply of lubricating oil handy.

(5) Have some 50 or 100ft extension cords available.

(6) Keep at least one CO_2 or dry-powder fire extinguisher ready for instant use when handling fuel.

(7) A torch with good batteries is a must. Two torches are better than one!

(8) Check fluid levels and start the alternator at least once a week.

(9) If you have trees close to the house, keep a small chain-saw handy.

(10) Use a small trickle charge to keep the (starting) battery charged.

12V equipment on 24V supplies

Heavy-duty vehicles etc often have 24V electrical systems. Most 12V transceivers draw far more current on transmit than receive and would be damaged if any attempt were made to use them on a 24V supply by using a conventional voltage-dropping resistor. J Dehoog in *Electronics Australia* (May 1987, p50) points out that the answer is to utilise the constant voltage drop of about 0·7V across the junction of a silicon power rectifier. If nine bridge rectifiers, bolted to a suitable heat-sink, are connected in series (Fig 5) the output will be 12 to 13V largely independent of the load being drawn. Each bridge should be derated to about 75 per cent of its ac current rating. The ac input connections to the bridges are not used.

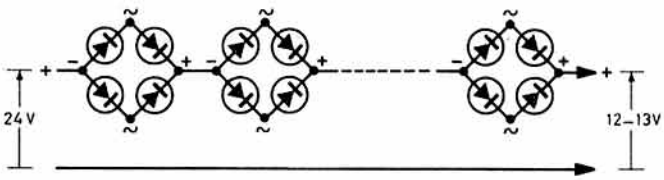


Fig 5. Use of nine silicon bridge rectifiers in series and mounted on heat sink to permit a 12V transceiver to be used from a 24V supply

Watch radiation risks?

For several years there has been a seemingly interminable controversy about whether there are any significant hazards facing those who sit in front of visual display units (vdus) for many hours a day. Much of the argument has centred around the tiny amount of ionised radiation (X-rays) that can come from high-voltage cathode-ray tubes etc, although repeated measurements have shown this to be extremely small. My own theory, for what it is worth, is that a far more likely cause of stress, migraine headaches, nausea etc stems from the visible flicker of 50Hz and even 60Hz vdus and television sets. A small percentage of the population is now known to be particularly sensitive to flicker (photo-sensitivity), though the effects are much reduced in the case of television viewers by the fact that the optimum viewing distance is of the order of 5 to 6 times the screen height. The screens of picture tubes are relatively dim compared with sunlight or disco lighting (driving along tree-lined roads can result in very pronounced flicker at a rate of a few hertz). The vdu operator, however, does sit close to a high-contrast screen.

Photo-sensitivity flicker is known to act as a trigger to about five per cent of those who suffer from epilepsy and is thought also to trigger some migraine headache attacks. The US television field rate of 60Hz results in much less large-area flicker and interlace-twitter than the European 50Hz field rate and it does appear that this results in fewer reports of television-induced epileptic attacks.

My reason for bringing this up in *TT* is that some medical researchers in the USA and the UK are reported (*New Scientist* July 23 1987) to believe that some individuals suffer "allergies" triggered by extremely weak electromagnetic fields (allergies are one of the most controversial subjects in medical research). The danger is that if this suggestion were to gain acceptance either by the medical profession or by the public it would clearly have repercussions on the operation of radio transmitters in residential areas. Apparently it is claimed that specific frequencies (within the range 1Hz to 2GHz) can induce nausea, fatigue, hyperactivity and headaches in some individuals—symptoms that sound suspiciously like those associated with photo-sensitivity. It is even claimed that some individuals are affected by the radiation from digital watches. I find it entirely possible to accept that flicker, detected by our eyes, can have medical effects, but it hardly seems credible that the rfi from a digital watch on the wrist could induce an allergy.

Antennas—theory or practice?

There is an old joke about the newly-licensed amateur who complained that he had standing waves on his antenna. But before joining in the laughter at his expense, one should not forget that there is an important class of antennas which does not (or should not) have any standing-waves on their radiating element—the so-called travelling-wave or transmission-line antennas, including the terminated long-wire, vee-beams and rhombics.

In *HF communications—a systems approach*, Dr Nicholas Maslin provides a grouping of antennas into three main classes to which I have attempted to add some examples from amateur practice:

(1) Self-resonant antennas. In this class fall all types that are based on the half-wave dipole or quarter-wave monopole. While basically single-band systems, there is also a class of multi-band antennas arranged to resonate at a number of frequencies, such as the G5RV, the W3DZZ trap-dipole, multi-wire dipoles etc.

(2) Resonated antennas. These comprise the antennas that use an antenna tuning or matching unit to transform widely varying input impedances to a specific value such as 50Ω, and can be used over a number of bands provided that the atu is adjusted correctly at the different frequencies; examples include Marconi antennas, centre-fed doublets, whip antennas, random-length wires etc.

(3) Broadband antennas. These include antennas designed to present an impedance which remains near-constant over a wide band of frequencies, and are often of the travelling-wave type. Examples include fat dipoles (caged, fan and bow-tie), Beverage and terminated long-wires, rhombics, log-periodics and some Yagi and monopole antennas using special techniques such as discones etc.

The amateur approach to antennas has always tended to be largely pragmatic, often drawing on professional designs but then making modifications and changes until satisfied with the performance by using a gdo, noise bridge etc to make final adjustments rather than attempting to analyse the design mathematically. There is a lot to be said for amateur pragmatism which avoids the complex mathematical procedures that arise from the need to take into account the many variations in siting, element/wire diameter in terms of length/diameter ratios, earth conductivity, effect of nearby objects.

But there is the danger that myths can be created by the absence of objective measurements. It is usually enormously difficult for an amateur to measure, except in the crudest terms, the efficiency or the precise radiation pattern (particularly the vertical radiation pattern) of his or her antenna. Put up a new hf antenna during a spell of good propagation conditions and even the most inefficient "piece of wet string" will span the world. Again, the logarithmic nature of the decibel makes it largely pointless to strive for small increases in efficiency; remember that a terminated rhombic antenna, hailed in the August *TT* as the "queen of antennas" has a maximum "efficiency" of around 50 per cent, compared with the near 100 per cent of a good dipole, with almost half of the transmitter power dissipated in the 800Ω terminating resistor. In the case of the rhombic this matters not at all because that power, had it not been "wasted" in the resistor would have been radiated in the opposite direction to the target area. For sky-wave contacts, it is usually only the tiny fraction of the total power that is radiated at the appropriate vertical elevation in the right direction that travels to the distant station.

In practice some antennas of extremely low efficiency have to be tolerated. Dr Maslin points out that with some of the electrically-small hf antennas used on aircraft, the radiation efficiency at 2MHz can approach −50dB; that is to say, only 10mW radiated from an antenna fed from a 100W output transmitter.

The author of the ICAP87 paper on rhombics, featured in the August *TT*, A G P Boswell of the Marconi Research Centre, is, in *alter ego*, G3NOQ. He writes: "I was pleased to see the *TT* references to my ICAP paper and

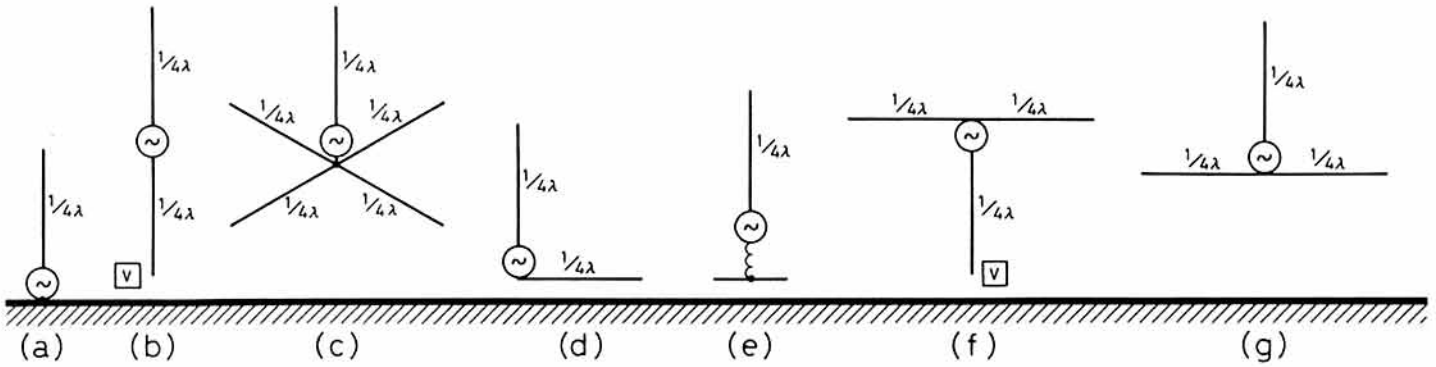


Fig 3. The family of verticals. (a) Standard monopole (unipole) antenna fed against earth. Any significant resistance in the earth connection will dissipate a substantial amount of the transmitter power so that good earthing systems (stakes, radials, mats etc) are most important. (b) The λ/2 vertical dipole requires no direct earth connection but has both high and low angle lobes of radiation. As for all vertical antennas the earth conductivity is important because of the large induced currents. Without very extensive earth mats only limited improvement is likely from any buried radials etc. The antenna can be voltage-fed at V with the current feed-point short-circuited. (c) Conventional four radial ground plane (radials usually slope downwards to facilitate impedance matching). The artificial earth formed by the four radials does not prevent large currents being induced in the real earth. (d) The "bent" dipole (ie single-radial ground plane) results in mixed polarisation and is unlikely to provide true omnidirectional horizontal radiation pattern. Nevertheless it can form an effective general purpose antenna, particularly if the earth conductivity is good. (e) G6XN's inductively loaded counterpoise form of monopole/dipole (March 1981). In practice the "coil" can be in the form of distributed inductance. (f) G3VA's 1970 "inverted ground plane" or "λ/4 T" raises the current maximum in cluttered sites. It can be voltage-fed at V if the current feed-point is short circuited. (g) The "original" two radial ground plane as developed by Dr George Brown of RCA (additional radials added later to meet customers' wishes!)

interested in your suggestions for using these antennas for the low-vhf amateur bands. This had not occured to me, but I would expect them to be equally good at frequencies above 30MHz. At really high frequencies they might benefit from an earth mat to reduce the effects of resistive losses in the ground under the antenna, but I have not done any work to determine at what frequency this effect becomes significant.

"The gain figures I quoted are related to an isotropic radiator and the gain shown in Fig 8 (free space) should be reduced by 2dB to give values relative to a dipole (dBd).

"The usual resistive termination at the unfed end of a rhombic can be replaced by a short-circuit. This does not affect the forward radiation but adds an equal lobe in the reverse direction, although the impedance match might suffer a bit. Another common technique is to run a feeder to both ends of the antenna so that either end can be fed, the other being resistively terminated."

The groundplane dissected

Professional engineers have always been far more concerned than amateurs in detailed analyses of the electrical characteristics of antennas. Computer software based, for example, on the "Method of Moments" has opened new possibilities and is encouraging antenna specialists to take a new look at some long-established designs. One antenna that has come under new scrutiny is the humble groundplane.

In a series of *TT* items in 1981 and 1983 an attempt was made to sort out some of the factors affecting the performance of the popular elevated "groundplane" with wire radials and the vertical quarter-wave monopole, with the real earth often assisted by buried radials forming the groundplane (Fig 3). *TT* also told the story (July 1981, page 626) of how Dr George Brown of RCA first used an elevated groundplane antenna with just two wire radials for American police radio operating between about 30 to 45MHz in the 'thirties. It was only when customers refused to believe that an antenna having two quarter-wave radials looking like a half-wave horizontal dipole could provide an omnidirectional radiation pattern that he simply added two more radials on the classic principle that the customer is always right. Later, for hf, amateurs found they could obtain a better match to a coaxial feeder by drooping the radials downwards, with the added convenience that these could be extended beyond the insulators to form additional guy wires.

While there is no doubt in my mind that the practical development of the elevated ground-plane antenna in the form we know it was one of the many fundamental contributions to antenna development made by Dr George Brown, and that it was from the RCA work that it reached radio amateurs, Alois Krische, DJØTR/OE8AK (letter in *Ham Radio*, June 1987, page 6) has traced an earlier description of this antenna in a series of patents taken out by Dr Maurice Ponté of CSF (French patent No 764,473 of 1933, US patent No 2,026,652 applied for in 1933, UK patent No 414,296 applied for in 1934) covering all the significant features such as elevated feedpoint, coaxial feeder and radials. Alois Krische points out that this does not diminish the role of Dr George Brown as a great American inventor and antenna specialist.

A check of the Patent Office summary of 414,296 confirms that part of a patent for "Aerials: directive wireless signalling" indisputably includes the outline of a groundplane antenna and the note: "To reduce losses in the feedline to a short-wave aerial mounted at a considerable height above the ground, a conductor which may be shaped as a disc or square, or as a series of radiating wires, is mounted at the foot of the aerial and connected to one of the feedlines". A diagram shows a current distribution with both element and groundplane a quarter-wavelength. And if you are wondering how an "omni-directional" gpa could form part of a directive system, the answer is that a series of vertical reflectors were mounted at the extremity of part of the solid ground-plane which was rotatable!

Melvin M Weiner of The Mitre Corporation (an American research organisation that specialises in R&D for the US Services) in "Monopole element at the center of a circular groundplane whose radius is small or comparable to a wavelength" (*IEEE Trans on Ant & Prop* May 1987, pp488 to 495) takes an in-depth look at elevated monopole antennas above circular thin-copper groundplanes. To quote the abstract: "The input impedance and directive gain of a monopole element at the centre of a circular groundplane in free space are summarised for arbitrary element length and element radius with groundplane radii of zero to more than two wavelengths. Numerical results are obtained by utilising various models and are compared with measurements. The models include a groundplane of zero extent, the integral equation method, method of moments, combined with the geometric theory of diffraction (gtd)."

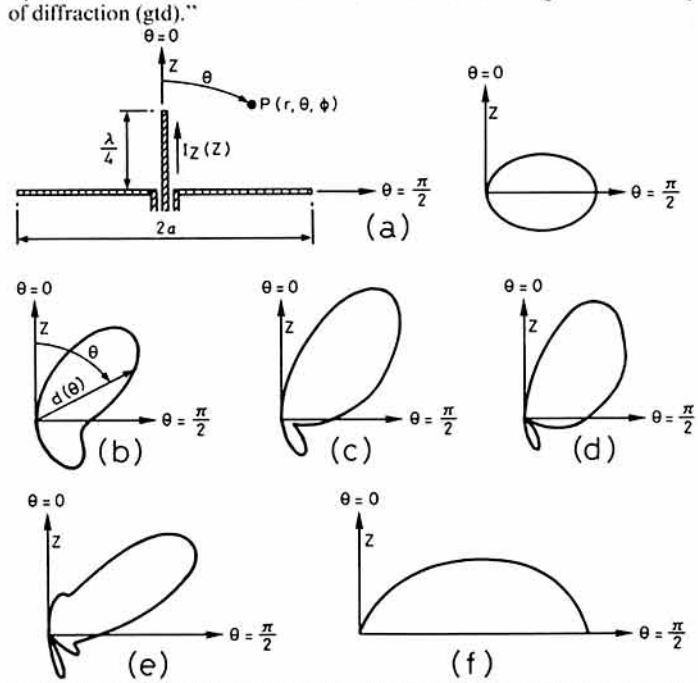


Fig 4. Elevation directive gain patterns, for any azimuthal direction, of a thin quarterwave element mounted on a ground plane of radius *a*. The patterns are polar graphs on the same linear scale. (a) $2\pi a = Ø$ ie wire radial(s) in free space. (b) $2\pi a/\lambda = 3$, (c) $2\pi a/\lambda = 4$, (d) $2\pi a/h = 5$, (e) $2\pi a/\lambda = \sqrt{(42)}$, (f) $2\pi a/\lambda =$ infinity (ie monopole over perfect "ground" such as sea water)

Such a formidable paper may seem far removed from amateur radio, and certainly much of it is far beyond my understanding, but it has the merit of including not only computer modelling but direct comparisons with practical antennas between 30 and 254MHz, using a circular copper ground plane of 4ft radius. And by a groundplane of "zero-extent" I assume that what is meant is a quarter-wave element with one or more thin-wire radials. It thus helps to settle those 1981–3 debates about such matters as the input impedance of a groundplane antenna (theoretically 19·43Ω).

Many published texts continue to give the impedance (radiation resistance) at the base of both grounded monopoles and elevated ground-plane antennas having a few insulated wire radials as about 35–36Ω (half of the 70–73Ω of a half-wave dipole, half-wave above ground), and shows how the diameter of a solid ground plane affects the vertical radiation pattern: Fig 4.

While the figure of 35Ω is roughly correct for the ideal monopole mounted on a perfectly conducting earth, or earth assisted by a large number of buried radials, this is **not** the case for the elevated gpa, as Dud Charman, G6CJ pointed out in *TT*, many years ago. He reported having measured the radiation resistance of an elevated resistance as "less than 20Ω" (the figure given in *Radio Communication Handbook*). To provide a good match to 50Ω coaxial cable it is necessary to use either a folded radiating element (*TT*, July 1987) or to slope the radials downwards by about 40°. G6CJ gave the simple formula $R = 18(1 + \sin\theta)^2$ as a useful guide. If θ is 90° the antenna becomes a vertical half-wave dipole, with an R of 72Ω; the solution for 50Ω gives θ as 42°.

Variometers and German military equipments

The discussion on variometers, launched by Kurt Grey, VE2UG with his recollection of well-constructed German marine hf variometers (*TT* June and see also *TT* September) has brought in a most interesting letter from Dr Ing Hans L Rath, DL6KG. As a member of the German Air Force Signal Corps during the second world war he recalls that Lorenz variometers were used in the standard German aircraft equipment (FuG10). The FuG10 was originally designed in 1937 by Lorenz, which incidentally was a firm within the American ITT group of international companies including STC, although subsequently also manufactured by a number of other companies, including some in occupied countries. The hf variometers used had powder-iron cores and were a popular acquisition by post-war German amateurs who often removed the iron cores for use on the higher frequency bands.

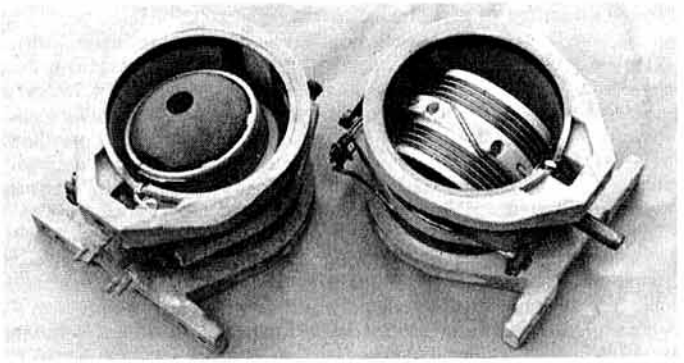
DL6KG still has two of these variometers in his junk box and has provided photographs showing their construction. He has also measured the range of inductance provided by these variometers: without core 4 to 17μH; with core 6 to 38μH, clearly a most useful component for such applications as hf pi-network tank circuits or antenna matching units.

There is in fact much that can still be learned in the art of mechanical design from those remarkable German military equipments, and I have been re-reading the articles by Dick Rollema, PA0SE "German World War 2 Communications Receivers—technical perfection from a nearby past" (Part 1, *CQ* August 1980) and "German Army Wireless Equipment" by W Farrar, G3ESP. (*The Royal Signals Quarterly Journal*, April 1947, later reprinted in *Mercury*, the journal of the Royal Signals Amateur Radio Society).

PA0SE described the FuG10 as: "consisting of beautifully-made separate receivers and transmitters for different frequency bands that were combined in a rack . . . the antenna was matched by a remote-controlled tuner . . . The superiority of Lorenz was especially evident in the mechanical engineering of their equipment. In the following years the dividing line between Telefunken (the traditional manufacturer of German military radios) became less clear as equipment was manufactured under mutual licensing contracts. Also other big firms like Siemens and companies in countries occupied by Germany took part in the production of the FuG10."

It needs to be appreciated that much of the thrust of post-war radio and electronics development has been towards replacing high-cost "mechanical" systems with low-cost electronics, and that if we were to demand today the mechanical perfection of some 'thirties designs in factory-built equipment we would truly have to pay Rolls-Royce prices. But the home constructor is not necessarily so inhibited if he can draw upon workshop facilities or can find and refurbish salvaged components surviving from the nearby past. There is also much to be learnt from the way in which the German equipment was designed with great emphasis on ease of maintenance and servicing in the field as well as reliable operation in rugged environmental conditions (although even the German radios found it hard to keep out the fine sand of the Western Desert for which they had not been designed). Visitors to the Kelham Island industrial museum at Sheffield are reminded that "The measure of the skill of any craftsman is ability in the use of the simplest of tools to create perfection."

An outstanding feature of most German military equipment was the use of a special lightweight alloy "Elektron" metal (about 90 per cent magnesium, 8 per cent aluminium, 2 per cent other metals). The main frameworks used thick, intricate castings, screens and cover plates cut and pressed from sheet Elektron, with the whole assembly bolted together. The result was a modular form of equipment, appreciably more rigid than the British pressed steel chassis, although, because of the thicker sections, no lighter in weight.



HF variometers as used in the German FuG10 aircraft transmitter-receiver initially designed and built by Lorenz from 1937. Normally these units had powder iron cores as shown in the unit on the left. When the core was removed for post-war amateur equipment as in the unit on the right it reduced the maximum inductance from 38 to 17μH. Mechanical construction made such units suitable for high-stability variable frequency oscillators. (*Photograph courtesy* DL6KG)

Multi-band receivers had well-constructed turrets from which the tuning units could be easily removed and were operated from a handle on the panel through a train of gears and sometimes levers. These were very positive in action, often with the fixed contacts lifted before the turret was rotated to avoid rubbing contacts that would have worn off the contact material. The tuning drives had precision gearing with spring-loaded split gears to reduce backlash. Tuning scales were large and clearly calibrated with up to 270° rotation and with accurate pre-settable mechanisms which had a setting accuracy of the order of 1 in 10^4. Virtually all transmitters were vfo rather than crystal controlled but the lavish use of temperature-compensated capacitors, stable inductors and extreme mechanical rigidity provided excellent frequency stability and ease of netting. Many of the transmitter coils had silver turns burned into ceramic formers, a technique that could reduce the temperature coefficient by a factor of 200 compared with conventional coils. Receiver controls were often arranged so that an operator needed to use only his left hand to adjust tuning, bandwidth, volume and audio-filter while leaving his right hand free to copy the incoming cw signals. Receivers were, as far as possible, designed to use one specific type of general-purpose pentode valve in all stages, using often the special RV2 range of miniature valves with side pins that fitted top first into fully enclosed sockets with a knob on the base of the valve by which they could be easily removed.

Almost all equipment had switched meters so that an immediate check could be made on selected voltages, some incorporating additional operational performance checks. Generous bypassing and decoupling made for stable stages. Equipment truly deserved the description "built like a battleship" or, as PA0SE has put it: "The moving parts such as gears, tuning capacitors and switches are masterpieces of mechanical engineering." Detailed and well-presented manuals facilitated servicing in the field. Army sets were often designed only for use up to about 7MHz; artillery units used 3 to 7·5MHz for communications, 25 to 27MHz for gun sound ranging; tank-to-tank communications were between 27 and 33MHz with vehicle equipment often between 20 and 25MHz. Front-line infantry used vhf, around 100 and 150MHz. Ground-to-air co-operation was around 42 to 48MHz with a tendency for vhf to be used near the front to make interception more difficult. The Germans were acutely aware of the possibilities of interception (I still have one of their *"Feinde hoert mit!"* ("The enemy also listens") plaques stuck on to my LG300 transmitter). They used many intercept receivers covering frequencies as low as 10kHz and as high as about 305MHz in their army intercept units.

Because many of their main equipments were designed and standardised about 1937–8, the circuit arrangements were ingenious rather than electrically advanced, with many receivers using "straight" rather than superhet circuitry. W Farrar has summarised the German army equipment as "from the mechanical viewpoint very well built, due to the rigid light-alloy castings, anti-backlash gearing and accurate construction methods; electrically, the equipment was good and efficient, but not modern when judged by British wartime standards, although it was in some cases quite ingenious."

Since writing the above, I have received from DL6KG a number of books published by AEG-Telefunken on German radar, radio-navigation, radio-guidance, radio-controlled missiles, df and intercept equipment of the second world war. A truly remarkable range of equipment.

Linear loading of short elements

A note from Dr Constantino Feruglio, IV3VS expresses satisfaction with the technique of "linear loading" elements for a 1·8MHz dipole antenna with an overall span of 54m. He based his design on the notes by Bill Orr, W6SAI in his *Antenna Handbook* which in turn drew upon the Hy-Gain linear loaded elements for their 7MHz beam. He simply multiplied the dimensions shown in Fig 5 by four. W6SAI points out that loading coils, unless of exceptionally high-Q construction, add considerable rf ohmic resistance loss. While the Hy-gain elements are made of aluminium tubing with the folded portions of 12 gauge hard-drawn copper wire, the version built by IV3VS for 1·8MHz uses only copper wire of 2·5mm diameter. Feed impedance will be affected by the folding and also, of course, by the height above ground which on 1·8MHz is likely to be only a small fraction of a wavelength. This is no problem if a balanced feeder (open wire, slotted 300Ω ribbon etc) is used with a suitable atu. IV3VS points out that if switched into the arrangement of Fig 4(b) of *TT*, December 1986, ("folded back dipoles") the system becomes a random "double zepp" working well on 3·5, 7, 14, 21 and 28MHz. But in the version shown here it will work without switching on the same bands. He adds: "Even shortening the span to 40m and increasing the folded lower portion, the antenna will still work satisfactorily on 1·8MHz." My own feeling is that with open-wire balanced feeder one could dispense with the linear loading altogether provided that the atu can cope with the impedances which will then be governed by the overall length of element plus feeder wire, in a conventional "doublet" arrangement.

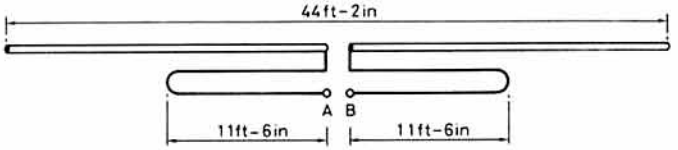


Fig 5. "Linear loading" of a short half-wave element as used in 7MHz array (W6SAI's *Antenna Handbook*)

Simple transistor tester

A simple arrangement for use with a multimeter that checks whether a transistor is "good" and can identify the emitter and collector leads has been reported by A Corben in *Electronics Australia*, June 1987, p85.

He notes that most stand-alone transistor testers do little more than can be achieved with a conventional multimeter. To use the device shown in Fig 6 the base lead must be known and connected correctly. Connections to the other two transistor leads and to the ohmmeter are unimportant (assuming, that the internal battery on the multimeter is limited to less than 3V).

First is to check that the two junctions are operating correctly as diodes in showing a low forward and high reverse resistance using the polarity switch. When this has been done, the pushbutton is pressed and the new reading noted. If the resistance increases by about 12–20 per cent, the selector switch will be in the position indicating that the lead is an emitter; if the change is only of the order of 2–5 per cent, the selector indicates a collector. Abnormal readings will usually indicate a defunct transistor.

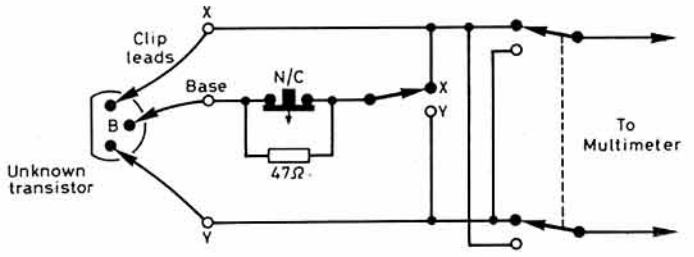


Fig 6. Transistor tester for use with conventional multitestmeter *(Electronics Australia)*

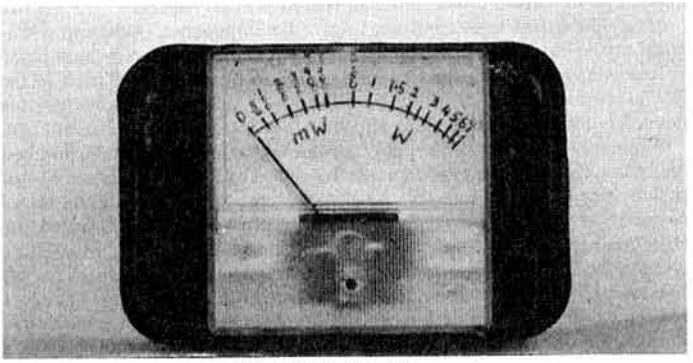
Tips and topics

Brian Castle, G4DYF noting the reference in July *TT* to the use of wrist straps to reduce the chances of zapping cmos ic devices from static electricity warns that "If you put on an earthed wrist strap it should *not* be a direct earth connection. For safety it should have a high-value resistor (eg 1MΩ) in the earth lead.

Peter Chadwick, G3RZP notes that carbon composition resistors (see *TT*, September) are still made by Allen Bradley and are available from their distributors (but possibly only in large numbers), though he is not convinced that the reason why some carbon film resistors tend to burn up when used as parasitic suppressors is due to any excess internal inductance but could indicate that either the choke has too many turns, or the dissipation of the resistor is too low. □

A DIRECT-READING QRP WATTMETER

(Continued from page 833)



The calibrated scale

In use, the transmitter feeds W watts of rf into a resistive load of R ohms, with an rms voltage V across the load. This is rectified by the diode and the capacitor next to the diode is charged to peak voltage Vp.

$$Vp = V\sqrt{2}$$
$$\text{so } Vp^2 = 2V^2$$
$$\text{and } V^2 = \frac{Vp^2}{2}$$
$$\text{Power W} = \frac{V^2}{R} = \frac{Vp^2}{2R}$$
$$\text{The dummy load R} = 50\,\Omega$$
$$\text{so } \frac{Vp^2}{2 \times 50} = W$$
$$Vp^2 = 100\,W$$
$$Vp = \sqrt{100W}$$

Table 1. Values used in calibrating the meter scale

Calibration mark	Voltmeter reading	Calibration mark	Voltmeter reading
50mW	2·24V	1·5W	12·25V
100mW	3·16V	2W	14·14V
200mW	4·47V	2·5W	15·81V
300mW	5·48V	3W	17·32V
400mW	6·32V	4W	20·00V
500mW	7·07V	5W	22·36V
750mW	8·66V	6W	24·49V
1W	10·00V	7W	26·46V

The voltages appropriate to a given power are shown in Table 1, the wattage values being those to be marked on the scale. A dc voltmeter is connected across the voltage source, which is adjusted in turn to each of the values in the table, and a point made with a sharp pencil on the card at the end of the pointer. When this has been done the card is removed and the markings neatly completed in black ink as shown in the photograph. A narrow strip of double-sided sticky tape is placed along the top of the meter backplate, the finished scale is then replaced and pressed down. The meter front is then replaced. The wires from the meter are disconnected from the circuit board and the meter placed in position at the bottom of the tin, secured by double sided sticky tape. The diode is soldered into place at D + and the wires from the meter finally connected to M + and M- on the board. The lid is pushed on to the tin and secured by two short 4BA screws into nuts soldered to the inside of the tin.

The finished calibration is so non-linear (expanded at the bottom end) that it is possible to detect, if not actually measure, a few milliwatts of rf. The top of the scale is 7W and a linear m/c meter would give 1·75W at midscale. Mine, however, gives 750mW there. One could of course use a linear meter, but the 150kΩ resistor would probably need to be changed to a different value.

With a coat of hammer-finish paint this instrument does a good job at low cost. □

NEWS BULLETIN

50 70 MHz

Botswana Heard on 50 MHz!

The 50 MHz tests mentioned by Ken Willis, G8VR, in last month's VHF-UHF column seem to have borne some fruit, although precisely how much wasn't clear as we went to press. We do know that Mike Walters, G3JVL, heard A22KZ calling CQ on Thursday 8 October at 1720 on 50.110 MHz.

The story that G4IJE worked A22 wasn't true, alas - Paul told us that he'd heard the 50 MHz 9H1 beacon and we also know that that beacon's been heard in southern Africa, but we guess some optimist muddled the two events!

Best guess at the moment is that the propagation mode was trans-equatorial propagation, extended at this end by sporadic-E. The signal heard at 'JVL from A22KZ (who incidentally is G4EKZ as well) was reported to be a good S6, and Mike said that he thought it was right at the end of an opening.

More on this fascinating event in G8VR's column, no doubt - how many more surprises is this superb new band going to spring on us? Quick reminder, though - WATCH THAT ERP! Remember that other European countries still use 50 MHz for broadcasting, especially La Belle France, so don't run a microwatt more than the limit when beaming south looking for super DX from Africa.

We've had some queries from members who wonder how a low-power 50 MHz signal from the UK could possibly interfere with a television transmitter running many kilowatts ERP. In simple terms, the answer is in the nature of the vision signal. The fact is that the luminance (and, in the case of a colour TV transmission, the chrominance) information is a real bandwidth-scoffer, and the sidebands of a vision transmission mean that it's invariably several MHz wide. The energy in the more remote sidebands isn't all that much and the proportion of the vision transmitter power which goes into them isn't a great deal - so from that point of view they're easier to interfere with. Furthermore, the way the luma/chroma information processing in the TV receiver works makes the receiver sensitive to interfering signals even though they might well be a fair bit down on the incoming vision signal level. This is especially true of the French SECAM system which, according to colleagues who've forgotten more about TV than we'll ever know, is reckoned to be about 15 dB more vulnerable in this respect than our own PAL. Basically, broadcast television isn't very spectrum-efficient - just think, Dallas and Howard's Way eating up all those precious megahertz! Be better when it's all done by cable, and we can then campaign for Bands IV and V to be given to radio amateurs.....

In doubt about your ERP? Don't forget the ERPogram - which can be found in past issues of RadCom or in the Callbook (new edition out soon - subtle hint, nudge nudge). Incidentally, have you built any of our filters yet? That old quarter-wave stub works well, you know, and takes all of 10 minutes to make.

RSGB 1988 YEAR-PLANNER DIARY

For many years, the Society has been considering producing a diary. As part of our 75th Anniversary Celebrations, we will be producing a 1988 year-planner diary which will contain the dates of all known exhibitions, rallies, conventions and RSGB contests as well as a host of other useful information.

The year-planner diary is available to members only and to be sure of receiving your copy in time for Christmas, order NOW!

Price - £2.35 inc p&p.

Credit card orders tel 0707 59015

News from Waterloo Bridge House

As you know, it's the Society's 75th anniversary next year. Plans at the moment are highly classified (i.e. we haven't quite finalised all of them) but if you take a look at what the Minister said at the NEC earlier in the year you'll get the idea. On the subject of the DTI, we've a few things to report.

As this Bulletin was going to press we heard that Gazette Notices and the associated press releases relating to packet radio were with the DTI's solicitors for final approval, so we should have the definitive story in next month's Bulletin - keep an ear on GB2RS for the latest news until then. The DTI has also published another in its series of useful Information Sheets. The latest, No.6, deals with the Radio Amateurs' Examination and offers a good introduction to how to get started in amateur radio for the novice. It's been produced in conjunction with City & Guilds, who have agreed to distribute about 40,000 copies, and the DTI said that its intention in producing the sheet was to encourage interest in amateur radio in as many people as possible who would not normally consider amateur radio as a potential hobby.

The DTI also advised the Society in October that the licensing administration in Sierra Leone has entered into a reciprocal licensing agreement with the DTI. The UK Class A licence will be considered by Sierra Leone as the equivalent of its own Class A licence under the terms of this agreement.

Finally, we've now had three preliminary meetings with the DTI to discuss the licence revision outlined in these pages a couple of issues ago. More on this as it happens.

MORSE TESTS

The following list shows the dates and locations of all the available test centres from early December to the end of January, as we went to press. Because of space limitations, we cannot print a complete list of all the test centres notified to us, but these can be found on the application form itself. If you want to take a test and any of the centres shown is within striking distance, send for an application form immediately. Completed applications will be dealt with strictly on a first-come first-served basis.

Morse tests will be carried out in groups of three and will be of half an hour's duration. Details of the test, the venue and how to get there will be sent to you as soon as your application has been processed and your place confirmed.

COUNTY	TOWN OR LOCATION	DATE
Cambridgeshire	Haslingfield, Cambridge	04/12/87
Cheshire	Macclesfield	05/12/87
Wiltshire	Swindon	05/12/87
Somerset	Burnham-on-Sea	06/12/87
Gwent	Newport	07/12/87
Co.Tyrone	Dungannon	07/12/87
Fife	Leslie	08/12/87
Derbyshire	Clay Cross	09/12/87
Tyne & Wear	Byker, Newcastle-upon-Tyne	10/12/87
Suffolk	Ipswich	10/12/87
Northamptonshire	Tiffield, Northampton	10/12/87
Lincolnshire	Grimsby	11/12/87
Greater London	Eltham, London SE9	11/12/87
Nottinghamshire	Mapperley	12/12/87
Hampshire	Winchester	12/12/87
Dumfries & Galloway	Stranraer	12/12/87
Cornwall	Liskeard	12/12/87
Strathclyde	Ayr	12/12/87
Leicestershire	Wigston Magna, Leicester	12/12/87
Humberside	Goole	13/12/87
Staffordshire	Stafford	13/12/87
West Sussex	Horsham	13/12/87
Staffordshire	Uttoxeter	13/12/87
Avon	Redland, Bristol	16/12/87
Greater London	BBC Woodlands, Wood Lane, London W12	19/12/87
Greater London	Wood Green, London N22	21/12/87
Dyfed	Carmarthen	07/01/88
Tayside	Kirriemuir	09/01/88
North Yorkshire	York	09/01/88
Isle of Wight	Binstead ARS, Ryde	09/01/88
Central	Stirling	12/01/88
Greater London	Wanstead, London E11	15/01/88
Lothian	Edinburgh & DARC	16/01/88
Essex	Colchester	16/01/88
West Midlands	Sandwell	16/01/88
Norfolk	Norwich	16/01/88
Berkshire	Reading	20/01/88
Bedfordshire	Luton	21/01/88
Dorset	Dorchester	23/01/88
Surrey	Guildford	23/01/88
Lancaster	Oldham Rally	24/01/88
Buckinghamshire	Bletchley, Milton Keynes	24/01/88
Hertfordshire	North Watford	29/01/87
Kent	Tunbridge Wells	30/01/88
Lancashire	NARSA Rally, Blackpool	31/01/88

We receive notification of new centres almost daily and the application form gives a full list of those currently taking advance bookings for Morse tests. There are now active test centres in 90% of counties in the UK. Those remaining are either in the process of having examiners appointed or have not yet found a suitable venue.

CALLSIGN ON A PLATE?:

In the course of the last couple of years we've received the odd letter from members wondering whether the "G" prefix due to appear on motor vehicle number plates in August 1989 could be used in conjunction with low numbers to form appropriate numbers for UK radio amateurs to have on their cars. We've had a fair amount of correspondence with the Department of Transport about this - some of which, we note, goes back to 1983 - but having recently had another crack at the problem the answer, most regrettably, appears to be that there's no chance.

Under the present system numbers below 20 aren't allocated for vehicle registrations - apparently because the DoT feels that they're attractive and couldn't be fairly allocated. So a number such as G 3 XXX or G 6 YYY couldn't be obtained in the first place. Although the RSGB - amongst other organisations, apparently - asked the DoT to reconsider this stance, with one suggestion being that numbers could be sold off to charity or the highest bidder, they've now decided to stick with the existing practice. We've been sounding out various people since then but to be honest it seems there's no possibility of the Government changing its mind about allocating numbers below 20 for car registrations.

We'll obviously keep our ear to the ground but it doesn't look good.

TAX RELIEF ON SUBSCRIPTIONS:

We're often asked by members about tax relief on RSGB subscriptions. Unfortunately, no tax relief is available unless you are professionally or commercially engaged in the electrical or electronics field. If you are, you should refer to the notes that accompany your income tax return - and if you can make sense of them you're a better man than I, Gunga Din...

IERE LAND MOBILE RADIO CONFERENCE:

The Land Mobile Radio Conference of the IERE takes place at the University of Warwick from 14-17 December.

RSGB members will be able to register at the reduced rate applicable to members of organisations associated with the conference, in spite of the fact that no mention is made of this on the registration form!

Helplines

RIG CONTROL:

GOHSS is having problems trying to find a way to control his FT980 with a BBC-B computer. He understands that Yaesu produces an interface for RS232 but he has conflicting information as to whether it requires modification. If you can help with this problem and possibly write some software to do the job, please contact:-

Mr P A Smeaton, GOHSS
15 Dickens Close
Hartley
nr Dartford
Kent DA3 8DP

.....he'll be very grateful and will refund all your costs.

CONVERSION GROUP:

Stephen Dyke, G3ROZ, is interested in forming a self-help group for information exchange between those wanting to adapt all-mode CB sets for amateur radio use. Contact him at 13 Abbey Grove, Sandy, Bedfordshire SG19 1QP if you'd like to join him.

STOLEN EQUIPMENT:

G1TIZ has reported the theft of his Yaesu FT208R, serial number 3F270525. If you are offered any equipment at a knock-down price please remember to check the serial number and contact Headquarters before going ahead with the purchase. The RSGB has a list of stolen equipment on its database so that members and traders can check if any item offered to them is stolen.

Any information leading to the recovery of this item should be sent in confidence to:-

Mr M I Alfred, G1TIZ
41 Wilmer Drive
Heaton
Bradford. BD9 4AS

WANT A TRANSFORMER?:

Dave Goulding, G8LNC has been looking for a transformer to complete a home-brew project. After weeks of fruitless searching (we know the feeling) he's had to resign himself to having one custom-made. Unfortunately the manufacturers require a minimum quantity order before commencing the job.

The proposed transformer would be a toroidial type with two secondaries of 850V at 600mA each. This will make it as versatile as possible without increasing the cost by having tappings, ie. connected in parallel it could be used for HF linears using TV line output valves etc, or connected in series for higher HTs required for 4CX250 or 3CX800-type amplifiers. No price can be given yet as this is dependent on the quantity ordered but Dave is hoping to make a list of all those interested before obtaining a final quote.

If you're interested in obtaining one of these transformers and would like to contact Dave, his telephone number is 0705 267540 (after 6pm).

HOME FOR OLD MAGS:

The other day we had a 144 MHz QSO with Norman Fitch, G3FPK - the VHF columnist for one of our dreaded rivals, Practically Witless (incidentally, some wag on 144 MHz a month or so ago was heard to remark that the G-QRP Club ought to rename its excellent magazine SPRAT "Practically Wattless"). Norman happened to mention that his shack floor was in danger of collapsing under the weight of some old magazines he had and that he ought to find good homes for them. As a special favour to a colleague (well, not everyone's lucky enough to write for RadCom, got to give the opposition a hand sometimes) we said we'd stick an item in the Bulletin to help him out, and here it is. Would you like any of the following?

Wireless World 1945-80 complete
QST 1947-67 complete
73 magazine Nos 1-220 complete
Radio-REF 1966-74 complete

Offers of a home to Norman, who is QTHR; help him make space in the shack for a big linear he's currently contemplating!

G2TV REISSUED:

The historic callsign G2TV was issued in 1926 to Television Ltd (later known as Baird Television) and was the the callsign used by the world's first television transmitting station. Many radio amateurs, including G6NA, G6OP, G6HP, G5PV, G5VG, G2KZ and G2KU, were involved in the design and construction of the 250W 200 metre (yes, 200 metre - we're not kidding, medium-wave television!) transmitting equipment used at the station.

G2TV has now been reissued to the Baird Museum Amateur Radio Society, whose Chairman is Prof. Russell Burns and Hon.Sec. is Ray Herbert, G2KU. The Baird Museum has now joined forces with the Museum of Moving Image, which is nearing completion on the South Bank adjacent to the Royal Festival Hall, and Ray is anxious to trace any pre-war members of the Baird Co. If you were involved with the company or know of anyone else who was involved, please contact:-

Ray Herbert, G2KU
24 Norfolk Avenue
Sanderstead
South Croydon
Surrey CR2 8BN

STEAM RADIO:

Having a keen interest in QRP operation and steam engines (no logical connection here!), Mr Money, G3HKD has been trying unsuccessfully to produce enough DC from a steam engine-driven dynamo to run an 80m QRP rig. There's no problem with the engine, which is rated at 1 HP at 180 rpm; the snag is the dynamo. The typical car dynamo seems reluctant to produce any volts whatsoever even at the highest gearing available (corresponding to around 1100 rpm) unless the field coil is separately powered from a 12V battery - which defeats the object somewhat. The power require to drive the TX is no more than 1A at 12V. Can anyone offer a solution to this problem? Would it be better to try an alternator instead?

Answers please to:-

Mr D C Money, G3HKD
125 Wroxham Road
Sprowston
Norwich. NR7 8AD

...and here's us thinking they had electricity in Norfolk!

AERIAL PHOTOGRAPHS:

The Society's Planning Committee is in the process of preparing some display panels for use at exhibitions. If any members have photographs (with negatives, if possible) of antenna systems which have been granted or refused planning permission which they would be willing to supply for display purposes, please send them to Brett Rider, G4FLQ at RSGB Headquarters. Negatives will be returned as soon as possible.

(more on p846)

Around the Groups

RAYNET NEWS:

Raynet Zonal Representatives are elected for a three-year term. Several representatives have their term of office expiring shortly and so elections will be necessary.

The zones concerned are:-

Zone 4 - Beds, Cambs, Essex, Herts, Norfolk and Suffolk.

Zone 7 - Avon, Cornwall & Isles of Scilly, Devon, Dorset, Glous, Guernsey & Dependencies, Jersey, Somerset and Wilts.

Zone 10 - Cheshire, Cumbria, Gtr. Manchester, Isle of Man, Lancs and Merseyside.

Zone 12 - all Scottish regions.

Raynet members resident in the zones may forward nominations for their zonal representative to "The Secretary (RAYNET)" at RSGB Headquarters. Nominations should be supported by five Raynet members who are currently registered within the appropriate zone, and they must be received no later than 5.15pm on Wednesday 6 January 1988. They should be accompanied by a declaration from the nominee that he or she is, a) normally resident within the zone, b) is currently a registered Raynet member, c) is a member of RSGB, and d) is willing to serve if elected. Existing Representatives are eligible for re-election.

The period of appointment is normally three years. When more than one valid nomination is received by the due date, an election will be held during the month of February 1988.

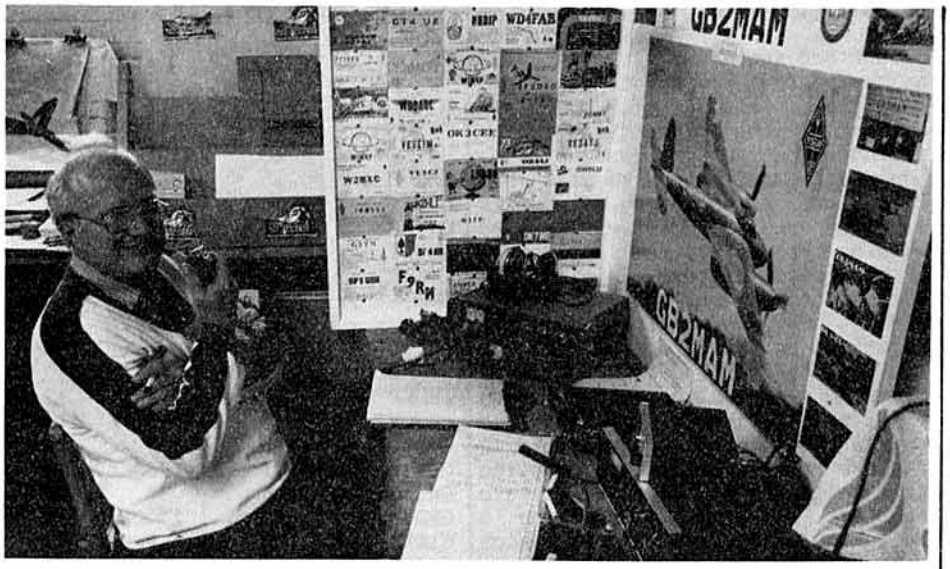
ARIEL RADIO GROUP MOVES QTH:

The Ariel Radio Group, which for many years operated from a small room at the top of The Langham in Portland Place, London, will now operate from new premises at Broadcasting House. It'll continue to use the well-known callsign G8BBC.

The National Governor and Chairman of the Broadcasting Council for Scotland, Mr Watson Peat, CBE, JP, GM3AVA, has been the President of the Ariel Group since 1984, and he'll perform the official opening ceremony of the new shack at Broadcasting House on Wednesday 4 November. G8BBC will operate on 144 and 430 MHz only, initially.

Members of the Shefford & DARS with RSGB President Mrs Joan Heathershaw, G4CHH, during her visit to celebrate the club's 36 years of affiliation to the RSGB. On the left of the President is G4MEO, the club Chairman, and on his left is G2DPQ, the club's President and co-founder. Other founder members, seen in the front row, are GOFML and G6RHL. The RSGB's Region 5 Representative John Allen, G3DOT, is seen on the President's right.

As part of the RSGB's drive for more youth in amateur radio, the Society's Secretary/Chief Executive David Evans, G3OUF, visited the Scout HQ at Gilwell Park just prior to this year's Jamboree-on-the-Air. The photograph above was taken in the group's lecture room with the 'Radio Scouting' flag in the background. (L to R) Fred Stewart, GOCSF; Terry Lockyer (Group Secretary); David Evans, G3OUF; Les Mitchell, G3BHK (behind); and Bill Livens, G2CKB.



Jim Smith, G3HJF is seen here operating the special event station GB2MAM for the Mosquito Aircraft Museum at Salisbury Hall, London Colney, Herts over the weekend of 8/9 August. Jim flew in Mosquitos when serving in 81 (PR) Sqn in Singapore. During the weekend he made over 200 contacts, many of which were with ex-RAF personnel having fond memories of the "Wooden Wonder" - the nickname given to the Mosquito aircraft. The museum was founded in 1950, and each year there's an open weekend which proves to be very popular. The next open weekend will be in July 1988 and it is hoped that GB2MAM will be active again. Grateful thanks go to David Phelps, G4WJT for the loan of the equipment and to members of the Verulam ARC for their help.

WIA NEWS:

The "Tasmanian Day" Award has been established to commemorate the foundation of Tasmania by Abel Tasman in 1642. The award is sponsored by the Tasmanian Division of the Wireless Institute of Australia and with the blessing of the Tasmanian Government.

A contest to encourage contact with Tasmanian stations takes place between 0800 UTC on 21 November and 0800 UTC on 29 November. All bands and modes may be used and short-wave listeners may also participate. To qualify for the award, amateurs and swls must log the following number of Tasmanian stations (each of which may be worked once only) according to their location.

Stations in Australia - 5
Stations in New Zealand - 3
All other stations - 1
SWLs - 5 with both callsigns

A log extract, signed by the applicant, together with the sum of $AUS 2.00, should be sent to:-

The Award Manager
Mr R Jackson, VK7NBF
Falmouth House
Falmouth 7215
Tasmania

...before 31 January 1988. QSL cards and counter signatures are not required for this award.

EIRE ON-AIR:

The first 2m beacon in Eire came on the air during September. Frequency is 144.920 MHz and the callsign is EI2WRB. The beacon is operated by the South Eastern Amateur Radio Group (SEARG) and is sited near the village of Portlaw in County Waterford. It's based on an old 50W Pye FM transmitter modified for CW and the logic is done by a home-designed unit with a 16k EPROM. The antenna is a 5-ele beam looking south-east.

The beacon sends the following:

"CQ CQ CQ DE EI2WRB
Lat 52D 15M North
Long 07D 20M West
QRA IO 62 IG
248MTR ASL
ANT DIR 95D
ERP 200W
DE EI2WRB"

The SEARG welcomes reception reports either direct or via the bureau to its QSL manager, EI3BEB.

NORFOLK ARC SILVER JUBILEE:

The Norfolk Amateur Radio Club celebrated its 25th anniversary this year, having first met on 25 April 1962. One of the founder members, Mr Bill Higgins, G3PNR, remains a committee member to this day. Congratulations to the club and its members, and here's to the next 25 years!

WAB NEWS:

There are more area awards "firsts" this month.

G3JVU is the first to work 3900 areas and is currently sitting at the top of the Honour Roll. He also receives the first endorsement for working 2100 bookholders.

The Islands Award is proving to be very popular, with GM0BVG becoming the first station to reach 180 islands worked. Short-wave listener Frank Parkhurst has reached the 180 islands heard stage on 80m SSB and G0DVT has gained the first 40m SSB Islands Award.

The first WABEMA certificate for activating areas on 80m CW has been awarded to G4WZA.

And finally, up on the VHF bands G1SMI and G1NUS have become the first stations to reach 2000 areas worked on 144 MHz SSB.

The 'Winter Activity Award' will run from 1 December 1987 to 29 February 1988 and, as was the case last year, it'll be based on a points system. One point will be awarded for each different WAB area worked, one point for the first station in each county, one point for the first station in each rateable district, and one point for each WAB bookholder (though only one point can be claimed per bookholder irrespective of the number of books held). The basic cost for the certificate is £2.00 and it is awarded for gaining 250 points. Endorsements are available for each 250 points above the basic requirement. It's worth mentioning that last year it was possible to claim the basic award on 144 MHz due to the large amount of activity generated by the award and it is a good way for newcomers to the hobby to gain an introductory award in a relativly short time. Full details of the award, claim sheets and information about the Worked All Britain Awards scheme can be obtained by sending a large stamped addressed envelope to:-

Mr Brian Morris, G4KSQ
22 Burdell Avenue
Sandhills Estate
Headlington
Oxford OX3 8ED

G-QRP CLUB NEWS:

The G-QRP Club, which is devoted to low power communication, has a new Membership Secretary. Anyone interested in joining the club should contact:-

T.David Jackson, G4HYY
Castle Lodge West
Halifax Road
Todmorden
Lancs. OL14 5SQ

EDUCATION & TRAINING - a new approach

The members of the Education Committee have been providing the Society with sterling service for over 35 years. The committee held its last meeting on 6 August 1987, and Council wishes formally to thank the recent and not-so-recent members of the Education Committee for their past efforts and contribution.

Earlier this year Council set up a working party to consider education and training within the context of the Society. Along with other national societies, we are concerned by the falling numbers of those entering the amateur radio movement. Should such a decline continue over the next decade or so, there could be problems in retaining all the amateur bands and conditions under which amateurs operate. Council therefore considered that a major effort should be made to encourage newcomers to amateur radio.

Following a complete appraisal of the Society's approach to education and training, with particular emphasis on attracting young people, it was clear that the effort and resources involved would be beyond the scope of a single committee. Indeed, in order to achieve all the objectives - which include those put forward by the Education Committee - we will need to call on the services of experts in many fields from within and outside the Society.

With these factors in mind, the working group considered the only viable way of attaining the objective is to start from scratch. The new objectives cover a wide spectrum and include many projects which will attract, encourage and retain the interest of newcomers in amateur radio. Council has accepted this long-term plan for the future and has set up a Training & Education Advisory Group, which will oversee the work and report progress directly to Council. The new group will not operate as a committee in order that it can have greater flexibility; it needs to be able to call on individual or specific advisors and approach a variety of sources for support and finance as and when necessary.

Basil O'Brien, G2AMV, RSGB Council Member and David Evans, G3OUF, RSGB Secretary and Chief Executive visited the special event station GB4RAF, operated by members of the RAF Sealand ARC in commemoration of its 25th anniversary. Sitting in the 'hot seat' is Group Captain John Bentley, Officer Commanding RAF Sealand. Guest operators were drawn from the Merseyside area of RAFARS and members of the Alyn & Deeside ARC who helped the Club to contact over 1,000 fellow amateurs in some 87 countries during the operating period.

(L to R standing): 'Linc', GW3KFA; Graham, G1NGG, Hon.Sec.; Rosemary, RS88188, xyl of G3OUF; Mike, G1KWU; Eileen, G3WIO, xyl of G2AMV (partially hidden); David, G3OUF; Nick, GW0HFL; Ken, G8DRB, Chairman; Basil, G2AMV; and Eddie, GW3GSJ, Officer-in-Charge Sealand Amateur Radio Club. (Photo - Crown Copyright)

50 MHz CROSSBAND LADDER

Callsign	Countries	Best DX	Pos
G2ADR	23	*	1
GW1SSQ	19	1957km	2
G4IDE	16	1729km	3
G1KDF	15	1928km	4
G0GZI	14	*	5
G1SEP	13	*	6=
G4TLY	13	*	6=
G1KDF	12	*	8=
G4SJG	12	*	8=
G1SMD	11	1868km	10=
G4INL	11	*	10=
G1CWP	9	*	12=
G8DKF	9	*	12=
G4GDY	8	*	14=
GM4ULP	8	*	14=
G8PYP	7	1866km	16
GW3WSU	6	*	17
G8DKF	5	1700km	18
G1AHM	2	*	19=
G4IDF	2	*	19=

We've had one or two more entries for the 'Crossband Ladder' item this month - don't forget, this is the last chance for you to get your latest totals to us as we'll be publishing the final table and winner in the January issue.

We still have ties for some positions, so please let us have the following information on the back of a postcard by Monday 23 November at the latest:

Callsign/Name
Number of countries worked
(crossband from 50 MHz to any other band)
Best DX (in kilometres)

Send the cards to David Gough, G6EFQ, News & Information Department at RSGB HQ. If you prefer to use the Mailbox facilities, that's fine.

TRADE NEWS:

As of 1 November 1987 Telecomms of Portsmouth will change its name to "Nevada Communications". Managing Director Mike Devereux tells us that they keep getting confused with BT! He adds that they're now stocking N-types to fit H100 cable, which is good news for those who have ever tried fitting ordinary Ns to the Pope product; in our experience it's a good way to end up cursing and kicking the cat. The Nevada N-types are made by Greenpar and go out of the door for £3.36.

FAX FACTS:

RSGB Headquarters now has FAX, on Potters Bar (0707) 45105, with the usual Groups 2 and 3. If you have access to a FAX machine, please feel free to send urgent items or late-breaking news for Bulletin by this route.

Events Diary

Mobile Rallies

This is a list of all rallies, exhibitions and conventions notified to HQ (as at press date). Items are given in detail for the next three months inclusive and in brief thereafter. Please send detailed information, including contact callsign and telephone numbers direct to HQ and marked 'Bulletin'.

1 NOVEMBER
*Carmarthen ARS Exhibition & Rally - Leisure Centre, Johnstown, Carmarthen. Opens at 10.30am, trade stands, flea market, cafe & bar, swimming pool. Talk-in on S22. Details GW3CUE, tel: 026 783 460.

7 NOVEMBER
*7th North Devon Radio Rally - Bradworthy Memorial Hall, near Holsworthy. Opens at 10.30am, usual traders, bring & buy. Talk-in on S22. Details G8MXI (QTHR).

7/8 NOVEMBER
*North Wales Radio Rally - Aberconwy Conference Centre, Llandudno, Gwynedd. Amateur radio & associated electronics hobbies, large bring & buy stall, flea market. Details Derrick Watts, tel: Colwyn Bay 530041.

15 NOVEMBER
*Bridgend Rally - Bridgend Recreation Centre, Angel Street, Bridgend, Mid-Glamorgan. Opens at 11am (10.30am for disabled visitors), usual traders. Talk-in on S22. Details GW1OUP, tel: 0656 723508.
*Bishop Auckland ARS 4th Annual HamDay Rally - Elm Road Working Men's Club, Shildon, Co.Durham. Opens 11am, usual traders, bring & buy, raffle, refreshments & bar. Talk-in on S22. Details G4OHZ, tel: 0325-314638.

22 NOVEMBER
*West Manchester RC Winter Rally - Pembroke Halls, Walkden. Opens at 10.30am, usual traders and features. Talk-in on S22. Details G1IOO, tel: 0204-24104.

6 DECEMBER
*Verulam Christmas Rally - St Albans City Hall. Details Hilary G4JKS, tel: 0727 59318. Trade tel: Watford 52959.

13 DECEMBER
*Leeds & District ARS Christmas Rally - Pudsey Civic Centre, Dawsons Corner, Pudsey, nr Leeds. Details G4WYD, tel: 0274-685039.

24 JANUARY 1988
*Oldham Amateur Radio Rally - Queen Elizabeth Hall, Civic Centre, Oldham. Details Cathy, G4ZEP tel: 061-652 8617.

31 JANUARY
*26th NARSA Exhibition - Norbreck Castle Exhibition Centre, Blackpool. New venue, usual traders, *RSGB stand*. Details Peter G6CGF, tel: 051-630 5790.

IN BRIEF - More details later.

27 FEBRUARY
*Rainham Radio Rally - Parkwood Community Centre, Deanwood Drive, Rainham, Gillingham, Kent. Details Bob G1LKE, tel: Medway 362154.

5 MARCH
*Blue Star Rally - Venue to be announced. Details Tyneside ARS, 13 Lothian Court, Newcastle, Tyne & Wear NE5 3TZ.

6 MARCH
*Welsh Mobile Rally - The Barry Leisure Centre, off Holton Road, Barry. Details Mike GW8CMU, tel: 0446-711426.

13 MARCH
*South Essex ARS Mobile Rally - The Paddocks Community Centre, Canvey Is, Essex. Details G0BBN, tel: 0268-755350.

20 MARCH
*8th Annual Pontefract Components Fair - Carleton Community Centre, Pontefract. Details G0AAO, tel: 0977-43101.
*Mid-Devon Rally - Pannier Market, Tiverton. Details G4TSW, Mid Devon Rally, PO Box 3, Tiverton, Devon.

10 APRIL
*North Cornwall Radio Rally - Launceston Town Hall. Details Maggie, RS90696 tel: Launceston 5632.

17 APRIL
*Trafford Rally & Components Fair - Lancashire County Cricket Ground (Old Trafford), Talbot Road, Old Trafford, Manchester. Details Graham G1IJK, tel: 061-748 9804.

1 MAY
*RSGB VHF CONVENTION - Sandown Park Racecourse, Esher, Surrey. Details G3FZL. Trade - Les, G5HD tel: 040 928-342.
*5th Anglo-Scottish Rally - Tait Hall, Kelso. Details Andre GM3VLB, tel: 0573-24664 (evenings).

8 MAY
*Swindon & DARC Radio, Electronics & Model Engineering Fair - Science Museum, Wroughton, nr Swindon, Wilts. Details Ken G8SFM, tel: 066689-307.

5 JUNE
*Southend Mobile Rally - Rochway Centre, Rochford, Essex. Details G8EFG, tel: 0268-755331.

12 JUNE
*Elvaston Castle Mobile Radio Rally - Elvaston Castle Country Park, nr Derby. Details John G4PZY, tel: 0332-767994. Trade enquiries, G4HIJ, tel: 0335-43241.
*RNARS Annual Mobile Rally - HMS Mercury, nr Petersfield, Hants. Details G4UJR tel: 0703-557469.

± 15/16/17 JULY ±
± *RSGB 75th ANNIVERSARY NATIONAL CONVENTION - ±
± National Exhibition Centre, Birmingham. Details±
± RSGB HQ. Trade - Norman, G3MVV tel: 0277-225563±

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24 JULY
*McMichael 88 Rally - Haymill Centre, Burnham, nr Slough. Details Bob G0BTY.
*Anglian Mobile Rally - High Woods Sports & Leisure Centre, Severalls Lane, Colchester. Details G6HQI, tel: 0206-862403.

28-31 JULY
*AMSAT-UK Colloquium - University of Surrey, Guildford. Details G3AAJ, tel: 01-989 6741.

14 AUGUST
*RSGB MOBILE RALLY - Woburn Abbey, Bedfordshire. Details RSGB HQ. Trade - Norman, G3MVV tel: 0277-225563.

21 AUGUST
*Red Rose Rally - Bolton Sports & Leisure centre, Silverwell Street, Bolton. Details David G1IOO, tel: 0204-24104, evenings.

28 AUGUST
*Torbay ARS Rally - STC Social Club, Brixham Road, Paignton, Devon. Details G3KZJ.

4 SEPTEMBER
*21st Preston ARS Rally - University of Lancaster. Details Godfrey G3DWQ.
*Telford Radio Rally & Exhibition - Details Martyn G3UKV tel: 0952-55416.

11 SEPTEMBER
*Lincoln Hamfest '88 - Lincolnshire Showground, 4 miles N of Lincoln on A15. Details John G8VGF, tel: 0522-25760.

17 SEPTEMBER
*Scottish Amateur Radio Convention - Aberdeen. Details GM4ZUK.

25 SEPTEMBER
*RSGB HF CONVENTION - Belfry Hotel, nr Oxford. Details RSGB.

2 OCTOBER
*Great Lumley AR & ES Rally - Community Centre, Great Lumley, Chester-le-Street, Co.Durham.
*Wakefield Mobile Rally - Details Steve G4RCH, QTHR.

8 OCTOBER (Provisional)
*Midlands VHF Convention - Details Peter G3UBX.

OTHER EVENTS

7 NOVEMBER 1987
*BARTG Annual General Meeting - The Churchill Room, London House, Mecklenburgh Square, London WC1 starting at 2pm. Nearest underground stations, Russell Square or Kings Cross/St.Pancras.

5 DECEMBER 1987
*RSGB ANNUAL GENERAL MEETING - IEE, Savoy Place, London WC2 starting at 2pm prompt. Nearest underground stations, Embankment or Charing Cross.

6 DECEMBER 1987
Pembrokeshire RS Bring & Buy Sale - Further Education Centre, Tower Hill, Haverfordwest. Starts at 2.30pm, trade space available, radio, electronics, anything, bargains galore! Refreshments, multi-prize raffle. All are welcome and details from Brian GW0IER, tel: 06462-2825.

GB Calls

The list below shows ALL the special event stations licensed for operation during November - (as at press date).

It is taken direct from the GB Calls file on the HQ computer. These callsigns are valid for use from the date given but the period of operation may vary from 1 to 28 days. There's now no need to send details direct to the editorial office.

NOTE: This list is taken from the Headquarters' database during the first week of the month prior to publication. If you have an event which is taking place during the latter part of the month of issue, you must send your form in to HQ at least 10 weeks in advance to ensure that it can be processed in time for the listing.

An unusual set of callsigns to start this month's list. Take the suffix of each callsign when worked, and rearranged into a well known phrase or saying (or not so well known, as the case may be).

1 NOVEMBER
GBOGLO - GLORIOUS CANNOCK CHASE (1st): Gt. Warley, Walsall. Details G4HMV.
GBORIO - GLORIOUS CANNOCK CHASE (2nd): Gt. Warley, Walsall. Details G4FYP.
GBOUSC - GLORIOUS CANNOCK CHASE (3rd): Brown Hills, Walsall. Details G0BSM.
GBOANN - GLORIOUS CANNOCK CHASE (4th): Burntwood, Staffs. Details GOGFC.
GBOOCK - GLORIOUS CANNOCK CHASE (5th): Burntwood, Staffs. Details G4UVM.
GBOCHA - GLORIOUS CANNOCK CHASE (6th): Burntwood, Staffs. Details G0HKF.
GB6SE - GLORIOUS CANNOCK CHASE (LAST): Hednes Ford, Staffs. Details G0EPD.
GB8SE - GLORIOUS CANNOCK CHASE (LAST): Chads Moor, Cannock. Details GOCWB.
GBOCDE - COASTAL DEFENCE "E": Fort Purbrook. Locator: IO 90 LU. Details G0DHZ.
GB1ECC/GB2EC - EISTEDDFOD CASNEWYDD: Chepstow/Newport, Gwent. Details GW6ZUQ/GW4LPA.
GB2PMS/G4PMS - PRESTON MANOR SCHOOL: Wembley/Dollis Hill. Details GOCAJ/GOEZN.
GB2RNX - ROYAL NAVAL AUXILLARY: Edinburgh, Scotland. Details GM3HUN.
GB2SCB - SCOUT COMMUNICATORS BADGE: Penketh, Warrington, Cheshire. Details G3ZHE.
GB4REC - ROYAL ENFIELD CLUB: Rosyth, Fife. Details GMOCBH.
GB4RRA - RED ROSE AWARD: Bolton, Greater Manchester. Details GOFRL.

2 NOVEMBER
GB1RGW - RAYNET GROUP OF WIGAN: Hindley, Wigan. Details G1EFU.
GB4WJS - WENLOCK JUNIOR SCHOOL: Luton, Beds. Details G4OIS.

4 NOVEMBER
GBOCDX - COASTAL DEFENCE "X": Golden Hill Fort, Freshwater, IOW. Details G3RJK.

5 NOVEMBER
GB2CDW - COASTAL DEFENCE "W": Gosport, Hants. Details GOGIA.

6 NOVEMBER
GBONWR - NORTH WALES RALLY: Canolfan Aberconwy Centre, Llandudno, Gwynedd. Details GW4UWI.
GB6RBL - ROYAL BRITISH LEGION: Wigston Magna, Leicester. Details G6PFN.

7 NOVEMBER
GB2OCK - GLORIOUS CANNOCK CHASE (5th): Chads Moor, Cannock, Staffs. Details GOBXN. (Another opportunity to catch the 5th suffix in the series)
GBOACF/GB1ACF - ARMY CADET FORCE (195 Co.): Drill Hall, Leacroft, Staines, Middx. Details G4XEX.
GBOCDR - COASTAL DEFENCE "R": Cowes Castle. Details G4ZFQ.
GB2BFQ - BELFAST FESTIVAL AT QUEENS: Queen's University, Belfast, NI. Details GI4WVN.
GB4CRS - COASTAL RADIO STATION: BT Radio Station, Whitley Bay, Tyne & Wear. Details G3UND.
GB4CBA - CB AWARD: 91st Leicester Scout HQ, Leicester. Details G4SJX.

8 NOVEMBER
GB2PPC - PRIOR PARK COLLEGE: Bath, Avon. Details G3LYW.

9 NOVEMBER
GBOCDG - COASTAL DEFENCE "G": Fort Gomer, Gosport. Grid: SZ 587 989. Details GOAYE.

12 NOVEMBER
GBONCC - NORWICH CITY COLLEGE: Norwich, Norfolk. Details G3HQS.

13 NOVEMBER
GBOCDT - COASTAL DEFENCE "T": Gosport, Hants. Details GOGIA.

15 NOVEMBER
GB1CDM - COASTAL DEFENCE "M": Fort Monkton. Grid: SZ 612 978. Details G6MWY.

18 NOVEMBER
GB1CDJ - COASTAL DEFENCE "J": Round Tower, Portsmouth. Grid: SZ 631 993. Details G6MWY.

19 NOVEMBER
GB1CDE- COASTAL DEFENCE "E": Fort Purbrook. Grid: SU 678 064. Details G1XJR.
GB4CCS - CROSSROADS CARE SCHEME: St.Nicholas Youth Club, Godstone, Surrey. Details G4WYJ.

20 NOVEMBER
GBOPSG/GB8PS - PARMITER'S SCHOOL: Garston, nr Watford, Herts. Details G4RMC.
GB1CDT - COASTAL DEFENCE "T": Fort Nelson Site. Grid: SU 607 071. Details G8POQ.
GB1TEC - INFORMATION TECHNOLOGY: Witec Ltd, Wigan, Lancs. Details G1PHL.
GB5ATC - AIR TRAINING CORPS: 18(F) Squadron ATC HQ, Wimbledon. Details G3DWW.

26 NOVEMBER
GBOCIN - CHILDREN IN NEED: BBC Pebble Mill, Birmingham. Details G4XQW.

(more over)

Mr Mirko Mandrino, YT7MM, seen in the GB3RS shack during his recent visit to RSGB Headquarters. Mr Mandrino works for the Yugoslav Licensing Authority and was in the UK on a short exchamge visit sponsored by the COI. He is also the International Liaison Officer for the Yugoslav Society (SRJ) and a member of the IARU Region 1 Executive Committee.

(cont from p841)

SPANISH SUMMER EXCHANGE:

Enrique Paniagua Pinilla, EA4JO is looking for an English-speaking family with amateur radio connections to arrange an exchange visit for one of his daughters and his son. He'd like an exchange with two English children next summer (July-August 1988) with a view to encouraging cultural enrichment through friendship and conversation in their respective languages. Enrique would also like to arrange SSB or RTTY contacts with the family on 14 and/or 21 MHz. Enrique is a Telecommunications Engineer with RTVE. His eldest daughter, born in 1970 is a student and her hobbies include basketball, riding, swimming, parachute jumping and philately. His son, born in 1972 is a student and his hobbies include skiing, water skiing, swimming, data processing, electronics, music, numismatics, and model aircraft. Finally, his youngest daughter was born in 1977 and is a student.

If you would like to offer hospitality to two of Enrique's children he can be contacted by writing to:-

EA4JO
Box 17
CP 28230 Las Rozas de Madrid
Spain.

DTI - NORTH OF WATFORD:

Mr N Heriz-Smith of the Radiocommunication Division of the DTI addressed an open meeting of radio amateurs at Gomersal Public Hall on 3 October 1987. He outlined the work of the Department relating to amateur radio and discussed some of the most common points raised with the Department by radio amateurs. A variety of questions were asked by the thirty or so amateurs present at the meeting, and the event was generally felt to be a great success.

WANTED: TV/FILM DIRECTOR

An experienced professional is needed urgently to direct a short video-film about amateur radio for the Society. If you have such skills, please contact the Secretary, David Evans, G3OUF at RSGB HQ as soon as possible.

COUNCIL BRIEF:

Unfortunately, due to lack of space in this month's Bulletin, we've had to hold over the 'Council Brief' for the meeting held on Thursday 10 September until next month's issue. We've also held over a special 2-page spread dealing with amateur radio involvement in emergency situations world-wide.

(cont from previous page)

GB0PLE - PLESSEY (BBC CHILDREN IN NEED): Plessey RC, Beeston, Notts. Details G4VFK.

27 NOVEMBER

GB2HWW - HOTEL WILLY WILLY: 61 Micklegate, York. Details G3FTS.

GB2PLE - PLESSEY (BBC CHILDREN IN NEED): Plessey Ilford RC. Details GOEAF.

RAE Courses

Some late RAE courses have recently been notified to RSGB HQ - details below.

BIRMINGHAM

*Fox Hollies Leisure Centre, Ninestiles School, Hartfield Crescent, Acocks Green, Birmingham, B27 7QG. RAE course commencing Thursday 5 November at 7.30pm. Tutor Mr M Hill, BSc, G4FPH. Details from Keith Frettsome, G4ABV, on 021-778 1311 extn 31.

LONDON

*Eltham Hill School, Eltham Hill, London SE9. RAE on Tuesdays at 7.30pm. Morse on Fridays at 7.30pm, beginners to advanced. Places still available. Morse tests held regularly. Details from the school on 01-850 7210 or from Malcolm Williamson, G0EGA on 01-698 4392, evenings.

PS

Only 8 pages this month, but it's a bumper edition again for the December issue of the Bulletin. Remember last year's Christmas Quiz? People told us that because it was a written one it was too difficult, so this year the RAE (RadCom Annual Extravaganza) will be a multiple-choice job with a pass mark adjusted in line with the time of high tide at Invercockieleekie on 25 December and the solar flux prevailing at the time. A correction factor for the potential refractive index over central London will be applied. There'll also be a fiendish Christmas Crossword and a hilarious account of a VHF DXpedition to Eire earlier this year (entitled "Three wheels on my wagon" or "Does the RSGB count as a subversive organisation?") - plus all the news before it happens.

50MHz—A GREAT RESOURCE

Ray Cracknell, G2AHU, co-ordinator, The 50MHz Reporting Club

The impression that 50MHz was a band that was usable for perhaps a few days at the peak of each solar cycle was widely held until very recently, but this idea has now been proved to be entirely false. The realisation of this has spread rapidly with a large upsurge of interest worldwide. It seems it is no mere coincidence that this upsurge coincides with the progressive release of the 50–52MHz band to British amateurs during the period since February 1983, at first to a chosen few outside tv hours, for what we refer to as the "trial period", then in February 1986 to all Class A licence holders and, since June 1987 to all licensed British amateurs.

Considerable credit must be given to RSGB for the way in which the successful return of the band was negotiated, from the first establishment of the beacon GB3SIX in Anglesea in order to investigate transatlantic propagation at 50MHz, through the acceptance of propagation experiments as justification of the early permits, to partial general release and, finally, to the present situation where the band is poised for exploitation by channelised fm and packet radio in addition to ssb and cw, which are the modes used on the band at present.

During the "trial period" from February 1983 to February 1986, permit holders were obliged to submit reports to RSGB and these were analysed and published [1]. After the first general release this obligation fell away, and in its place the 50MHz Reporting Club was established by the RSGB VHF Committee. There are 36 British and 14 overseas members of the club and they send in reports every six months to a co-ordinator whose job it is to analyse them and to produce a consolidated report which is circulated to members by RSGB HQ. Although membership was initially restricted to 50, room will now be made for several newcomers to join should they wish to do so, and information on the progress of the new modes will be most welcome.

On the first day of the partial general release on 1 February 1986, just over 200 stations were logged on 50MHz, and the number rose steadily so that, before the end of the year, over 600 were worked by club members, and 77 stations elsewhere in Europe were worked either two-way or crossband. Also on the band were the beacons, GB2SIX, GB3NHQ, and GB3RMK, as well as ZB2VHF, 5B4CY, OX3VHF and FY7THF which were monitored regularly, while LA3EQ and W2CAP were heard occasionally, and expeditions to the Azores, Iceland and Greenland provided interesting QSOs during the summer of 1986.

1987 is a year of special interest in that solar activity is near minimum. In 1986 50MHz opened to North America on the 9, 12, 17, 19 and 21 July, but there was an earlier opening in 1987 with W4s being worked from the Midlands and W1s from southern England on 7 June. The FY7THF beacon was heard in 1986 on 30, 31 May; 2, 4, 5, 6, 7 June and 4, 9 July, and this year it was first heard on 28 May, while exotic calls such as OH1ZAA/OF0, N4HSM/V2A and W6JKV/V2A as well as ZC4VHF/5B4 on the top of Mt Troodos are providing great interest. Openings to Europe also commenced earlier this year, with Spain and Portugal appearing 14 days earlier in what appears to be a wonderful sporadic-E season with a large increase in European stations and a high level of activity from Britain, including a considerable number with Class B callsigns. The OX3VHF beacon was also heard on 28 May 1987. JA1VOK reports the "best Es season he has ever heard" and SV1DH reports early sporadic-E openings to Spain and Portugal on both 50 and 144MHz. Reports from these two stations also showed that transequatorial propagation from Japan to Australia and New Zealand and Greece to Zimbabwe and Zambia had held up well at 50MHz through the solar minimum.

The summer sporadic-E season in 1986 opened on 50MHz on 28 April and lasted until 2 December. European stations were worked from Britain on at least 59 days during that period and the band was frequently open from before 0600 until after midnight. Strong signals were propagated; for instance, two stations worked into Germany using only 200mW to four-element Yagis. Fortunately, when 50MHz is open for sporadic-E to any area, 28MHz is also open, so that for most crossband working European stations used the 28,885kHz calling frequency. In 1986 this worked well except on a few occasions when two or three stations were on the same frequency, but already by early June 1987, the frequency is remarkably crowded at weekends so that after calling, stations need to be encouraged to spread out away from the calling frequency. Certainly the old idea that such conditions were merely a product of high solar activity has been well and truly exploded and it has been clearly demonstrated that conditions for sporadic-E propagation are at their best during years of the quiet sun when magnetic disturbances are at a minimum.

Nevertheless in 1986, just a week after the partial general release, from 7 to 9 February, a fine aurora occurred and stations by beaming north were able to work all parts of the British Isles, Norway and Sweden. K1JRW reported that he had "good copy on the GB3SIX beacon" and SM6PU heard K1TOL on 50MHz. The aurora yielded excellent communications on cw and ssb, and gave many newcomers a fine introduction to dx working. Opportunities for auroral Es undoubtedly existed, as shown in the American and Scandinavian reports. SM6PU reported 201 aurora openings on 50MHz during 1986, while only 19 of them produced propagation up to 144MHz. The OX3VHF beacon was heard by OH1ZAA on 3 August and on 14, 15, 29 and 30 November, of which the November openings were by auroral Es.

Apart from being an excellent band for aurora, 50MHz is undoubtedly also the finest band for exploiting meteor scatter propagation. During showers, stations at distances up to 1,700km can be worked with ease, and bursts of more than a minute were frequently reported, so that during the better showers almost normal ssb QSOs were possible. Several stations have started to make increasing use of sporadic meteors, and tests between Britain and Norway and between Scotland and England have shown that QSOs could be completed in 5–15min in the morning by this means. Opportunities exist for exploitation of crossband ms working into Europe, since the mode works almost equally well on 28MHz as it does on 50MHz, and it is hoped that some of the many stations now working crossband sporadic-E will turn to ms during the winter.

Winter is the season when 50MHz operators also concentrate upon working as many of their fellow operators as they can. The number of squares worked and country totals will this year qualify for vhf certificates. It became apparent in 1986 that, with the power allowed, distances of 200km could be worked with ease, and under favourable high pressure weather conditions this range could be extended up to at least 1,000km. Thus it is possible to work the whole of Britain from any reasonably good location within the British Isles, even without resorting to using sporadic-E, ms, aurora and back-scatter, which will enable it to be done even on fm. In general, with comparable power and antennas, 50MHz has proved to be more reliable than 144MHz over difficult paths, and although 144MHz will produce stronger signals when conditions are favourable, over hilly ground 50MHz is to be preferred for the rest of the time.

It is remarkable that 50MHz provides almost every type of propagation observable at hf and vhf. Of course these are not workable all the time, and real dx is never as easy as it is on 14MHz, for example, but, as with hunting and fishing, the more difficult and challenging it is, the greater the pleasure and satisfaction there is in working it. It is also true that F-layer work at higher latitudes is confined to years of high solar activity, but from southern Europe transequatorial paths are likely to open throughout the solar cycle, and even farther north tep plus Es is always a possibility, as was illustrated by 50MHz contacts between Japan and New Zealand in October 1986.

The outlook is encouraging. Earlier this year the RSGB requested [2] that the band be extended up to 52MHz, that the band be made available to Class B licence holders, that power restrictions should be eased, polarization restrictions be removed, and that mobile and portable operation should be permitted. Not all these were granted in the latest dispensation, but a further review has been promised in the not-too-distant future and, once the fears of our European neighbours have been placated, those still outstanding are likely to be granted. The VHF Committee has applied to put a 50MHz sub-standard frequency and time beacon locked to the MSF standard time and frequency signal from Rugby at the site of GB3BUX, mid-way between Sheffield and Manchester (1O93BF). This will be aimed at providing a frequency reference against which any amateur frequency can be checked as well as providing facilities for cracking some of the teasing problems associated with 50MHz propagation.

Activity in Britain is continuing to rise, and as more equipment becomes available, particularly gear suitable for Class B operators, use of the band will undoubtedly accelerate. More and more European countries are becoming interested and are granting facilities to at least some of their amateurs, and we sincerely hope that the interest will grow with a steady relaxation of present restrictions as the lower frequency tv transmitters are gradually

*18 Green Lane Crescent, Yarpole, Leominster HR6 0BQ.

closed down. Meanwhile, crossband working into Europe from Britain and other countries able to use 50MHz is much to be encouraged as more and more amateurs, particularly those who are experimentally oriented, appreciate what a wonderful resource this part of the spectrum really is.

References

[1] "How about trying 50MHz?". Ray Cracknell, G2AHU. *Rad Com* September 1986, pp641–644.

[2] "50MHz survey analysed—Society puts its view to DTI". *Rad Com* April 1987, p261. □

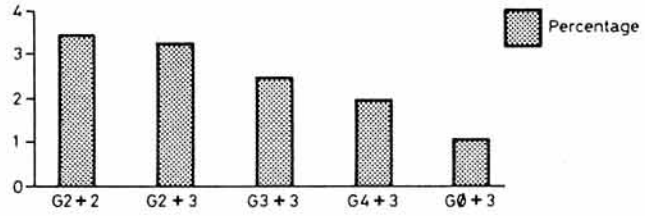
ANALYSIS OF 50MHz ACTIVITY DURING 1986

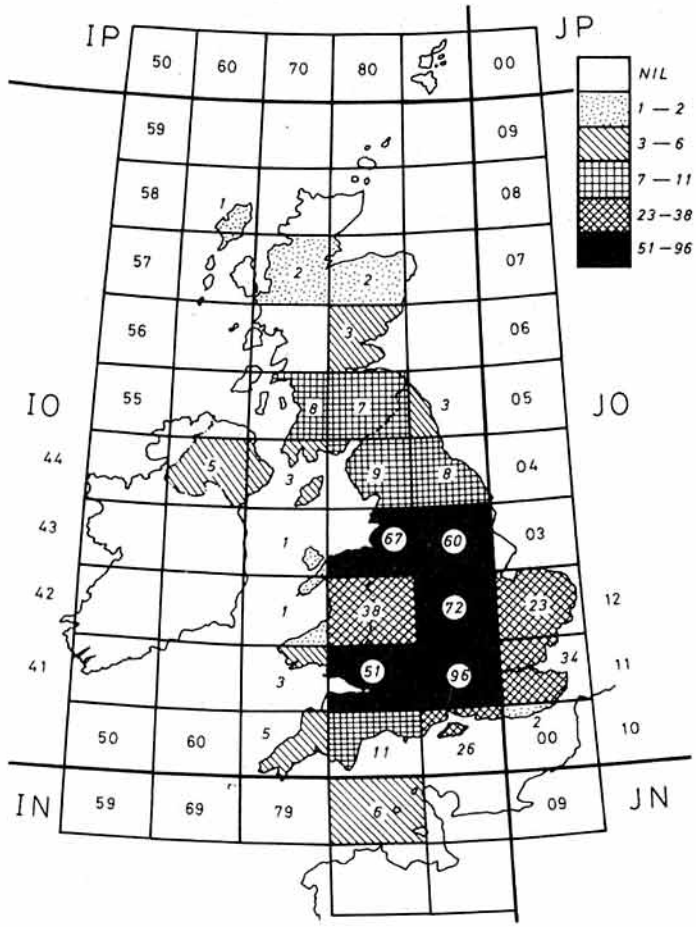
Clive Smith, G4FZH

THE STATISTICS in the bar chart and on the map of the British Isles are taken from the list of stations worked by members of the 50MHz Reporting Club between February 1986 and February 1987.

The bar chart shows 614 stations classified according to their callsigns into groups commencing G2AA, G2AAA, G3AAA, G4AAA and G0AAA. The totals are then expressed as percentages of the total numbers in each class listed in the 1987 *RSGB Amateur Radio Call Book*. These groups reflect the length of time callsigns have been held, with only a few exceptions. The G2AA–G8ZZ group being pre-September 1939 full licences and the G0AAA series the most recent licences issued.

On the map the number of stations is reduced to 547 due to *Call Book* particulars being withheld and a few doubtful calls which became apparent when stations were listed into QTH locator squares. Nevertheless a very reliable sample is used and, although activity has increased very considerably, the distributions are unlikely to change significantly.





THE INTERNATIONAL BEACON PROJECT

*Alan Taylor, G3DME, International co-ordinator**

Historical background and introduction

The 28MHz International Amateur Radio Beacon Project was started by the IARU Region 1 Division as a result of a suggestion by DJ7AA. Before then, there had been from time to time a few 28MHz beacons, used mainly for propagation studies. The more important of these were ZC4WR (1963–4), GB3LER during IQSY (1964–5), ZD7WR (1968) and DL0AR. These beacon transmitters used frequencies around 29MHz. The last-named station was used by the Max Planck Institute specifically for studying auroral propagation.

At the beginning of 1968, the DARC stated the essential features of an organised network of transmitters to be run by amateurs on the 21, 28 and 50 MHz bands, together with a companion organisation of receiving stations—the Worldwide Observation Programme (WOP). The proposal for this Worldwide Amateur Radio Beacon Transmitters (WAB)† called for stations to be established on each continent. They were to operate with a time-sharing arrangement on a common (main) frequency, of 28,200kHz in the case of 28MHz, for periods of 5min in each hour, reverting to an individual (secondary) frequency for the remainder of the time. In practice, only the 28MHz band was taken up in an organised way. There are now many beacons on the 50MHz band, brought into being by the cycle 21 sunspot activity.

As might be expected, the DARC installed the first 28MHz beacon of this new programme on Mt Predigtstuhl in Southern Germany, followed fairly soon by the RSGB with one at Crowborough in SE England. Then came VE3TEN on the North American continent, ZL2MHF in Region 3, and so the network started to grow. It is not within the scope of this description to detail the ups and downs of the endeavours made by a relatively small number of amateurs to put the stations on the air. Suffice to say that the beacons were established by the dedicated co-operation of individual amateurs and their friends to whom the amateur fraternity should be most grateful.

It should perhaps be mentioned here that originally the beacons were placed on frequencies between 28,150 and 28,200kHz. This was reviewed when the USA Federal Communication Commission (FCC) opened that portion of the band to Novice licensee cw operation—despite informed protests from Europe—and the segment 28,200—28,250kHz was recommended for beacons by Region 1 Division at the Warsaw Conference. At Miskolc-Tapolca the segment was extended to 28,300kHz to cater for expansion that was foreseen. In case any reader should wonder why a portion much higher up the band, say 29+MHz, was not used, it is pointed out that

†Changed to International Amateur Radio Beacon Project (IBP) to avoid confusion with Worked All Britain (WAB) Award.

*"Altadena", South View Road, Crowborough, Sussex TN6 1HF.

the network was established and used during a sunspot minimum period, as it is again now, and that a difference of 1MHz has a considerable effect on propagation of signals at these frequencies. Use of the lower frequency warns of rising muf at the earliest time.

At its meeting in Paris in 1984 the IARU Administrative Council (AC) considered comments raised by the Region 2 representative on various inadequacies in the project. A prime concern was the bandwidth occupied by the 28MHz beacons when compared with those of the network on 14·1MHz sponsored by the Northern California DX Foundation (NCDXF). A suggestion that the 28MHz network could be reduced to a single time-shared frequency was regarded as grossly inadequate by Region 1 and strongly resisted. Subsequently, after correspondence between the IARU international secretariat, the NCDXF and the Region 1 IBP co-ordinator, the international secretary suggested to the AC that the IARU should restrict its 28MHz beacon band plan to 28,190–28,200kHz, with worldwide and regional systems at 1kHz intervals, all to be time-sharing. In 1985 at Auckland, the AC accepted the idea.

The future of the project

At its meeting in 1986 at Buenos Aires, the AC reviewed its earlier resolution (Auckland 1985), taking into account Region 1 representations that it had no provision for continuous duty stations so necessary for serious study of some propagation phenomena. The AC came out with the following guidelines for the 28MHz part of a new IARU IBP:

1. The segment 28,190 to 28,200kHz will be assigned as time-sharing frequencies for the IBP, effective immediately.
2. A worldwide network similar to the 14·1MHz programme of the NCDXF will operate on 28,200kHz.
3. Regional networks, each encompassing approximately a continent, should be established on an integral kilohertz between 28,190 and 28,199kHz.
4. IARU member-societies are encouraged to sponsor the operation of beacons in this network.
5. Existing beacons operated by an IARU society will have preference in this new scheme.
6. The IARU/IBP co-ordinator will submit to the international secretariat the technical parameters for the beacons as well as the specifications for the regional networks, information that will be sent to all member-societies. He will be responsible for frequency management, for time allocations, and will strive for global coverage.
7. The AC will ensure that this new scheme of 28MHz beacons, as well as any other beacon systems in other bands, will be adequately publicised and that the data collected from the operation of the beacons will be distributed regularly to all member-societies.
8. The segment 28,200–28,225kHz will be reserved for use by continuous-duty beacons, to be approved by the IARU IBP co-ordinator on a case-by-case basis after satisfactory showing of special need.
9. Beacons operating outside the new system will cease to be protected from interference by IARU band plans on 1 January 1990.

Co-ordination. In its Resolution 86–1 (Buenos Aires 1986) the AC created under its aegis an appointment of IARU IBP co-ordinator and designated the IARU Region 1 IBP regional co-ordinator to fill the post. The present incumbent is Alan Taylor, G3DME. At the same time the AC recognised the potential advantages of linking the IARU IBP and the NCDXF. The foundation has been asked to appoint an officer to act as assistant IBP co-ordinator. Currently John Troster, W6ISQ, is serving in that capacity.

Implementation. The re-organised IBP will also include a worldwide network on the 21MHz band, similar to that currently operated by the NCDXF on 14·1MHz and planned for 28·2MHz. The frequency of 21,150kHz was chosen by the Region 1 HF Working Group and has been accepted by the IARU AC. It is hoped that close co-operation between the IARU and the NCDXF will result in the three worldwide networks on 14, 21 and 28MHz being co-located, and that eventually 15 stations will be established.

Use of beacons

The purpose of the beacons may be defined as follows:

1. To indicate the state over the particular path(s) and give an impression of general band conditions. This can help an operator to improve his operating prospects, eg by using directional calls.
2. To provide, within ground-wave range, reliable signals for checking and alignment of antennas and apparatus.
3. In the case of some beacons, such as the NCDXF 14·1MHz stations, to provide time checks.
4. To offer facilities for the more serious study of propagation phenomena.

It is the last of these which allows the amateur service to make a useful contribution in the scientific field. While the opportunities for amateurs to make notable advances in the use of the high frequencies—as happened in the early days—have dwindled, there are, contrary to some opinions, still many aspects of wave propagation to be explored. The sporadic-E (Es) and trans-equatorial (t–e) modes are good examples of this. Other fields include the monitoring of trans-auroral/polar paths and the study of sunrise/sunset, or other diurnal and seasonal effects, over selected paths. There is also the comparison of actual and predicted performance of hf paths. *Radio Communication* (RSGB), *QST* (ARRL) and other periodicals publish predictions for a number of routes. Some are more accurate and useful than others. Matching performance against predictions can draw attention to inadequacies and anomalies and may, by feedback to the issuing authorities, eventually lead to the improvement of prediction.

It will readily be seen that the establishment of transmitting stations is only half the endeavour to make use of the beacons in the ways outlined above. The other half is the reception of the signals, preferably on a regular basis over a fairly long period. Propagation study *can* be very time consuming, but its demands can be tailored to the interests, available time and location of the individual operator. In its simplest form, it may involve just one beacon at specific times, such as the morning path from, say, ZL2MHF to Europe or North America. However limited or complex the work, it cannot be too strongly emphasised that the essential factor is the consistency of observation. Monitoring must be systematic if it is to be worthwhile at all. On the other hand, the selected beacons should be ones of proven reliability.

Since no operator can or will want to be in the shack all the time, some aids are useful to achieve the required standard of observation. When signals are strong enough for ready identification, a chart recorder may ease the work. Otherwise it is not difficult to devise an audio recording system in which a timer circuit will operate a cassette recorder at the desired intervals. (In certain circumstances even hourly checks will produce useful results if carried out consistently.) For the more advanced there is the possibility of developing outputs into home computers which will record and store the information automatically. As so often in radio there is considerable scope for development—but it is quite feasible to do useful and interesting work with limited equipment and time.

There are also possibilities for co-operative research, eg European and Australian and New Zealand amateurs monitoring the reverse paths of beacons in VK/ZL and Europe and comparing their results. Another prime example of a co-operative activity is the organisation of the work in a club or other specialist body. It is thought that this could be particularly suitable for groups associated with educational establishments with a technical curriculum. It would make a worthwhile study for a radio course or thesis. At the same time it could involve other disciplines such as statistical studies, the design and manufacture of peripheral equipment and so on. The framework of such an effort might be:

(a) Find out who is interested and create a small co-ordinating body through whom advice might be asked or given (a steering committee).
(b) Assess the capabilities of the interested members. These would include such things as equipment available, preferred times of observation etc.
(c) Select the paths to be monitored on a regular basis and allocate them to observers.
(d) Collate and analyse the observations.
(e) Publish the results or at least make them available to some interested body so that use may be made of them.

One of the most important aspects of publishing the results is the value of demonstrating to the professionals the quality of work which can be done by the amateur service. It is known that studies in the field of hf propagation which were submitted to CCIR in the past were well regarded and would have helped our case at the 1979 WARC. With the probability of another WARC now looming in a very few years time, it behoves us to take every opportunity to show the authorities that we make good experimental use of our allocations in the hf spectrum.

Finally, it is desirable for beacon-keepers to be kept informed of observation activity. It encourages them to know that their work is useful and appreciated, and provides an incentive to maintain a high degree of reliability of their station.

SUMMARY OF FREQUENCY ALLOCATIONS TO HF BEACONS

14,100 ± 1kHz	–	***NCDXF network***
21,150 ± 1kHz	–	***International Beacon Project***
28,190 – 28,300kHz	–	***International Beacon Project (until 31 December 1989)***
28,190 – 28,225kHz	–	***International Beacon Project (after 1 January 1990)***

Note. A list of beacons may be obtained from RSGB HQ. See the RSGB Mail Order Price List in *Radio Communication*. □

NEWS & VIEWS

HF

*John Allaway, G3FKM**

ONCE AGAIN A QSL MANAGER has been misled by the "missing dot" mystery! In the September column I printed the contents of a letter received from the QSL manager of SARL reporting that the callsigns ZS5FRO and ZS5FRO have never been issued. Quite true — and duly drawn to my attention by G3HB, G4UZN, G3SWH and SM5AHK is the fact that last year, to celebrate the organisation's 40th anniversary there were special prefixes issued to the Frivilliga Radio-Organisationen in Sweden. This voluntary radio organisation trains radio amateurs for the Swedish defence force and it has some 7,000 members of both sexes from age 15 upwards. Last year stations with 7S prefixes followed by the suffix FRO were particularly active.

John Hooper (PO Box 3, Irvington, Va, 22480, USA) held a UK licence many years ago and has recently passed his Novice exam in the US. He needs to be able to provide some printed evidence of the existence of his old G3FJK call. Would anyone who could provide this please contact John direct?

Packet radio on 14MHz

Problems are being caused to those trying to copy the beacons on the North California DX Association network on 14·1MHz by packet radio signals. The people causing the problem may well be unaware that they are doing so and I would like to mention part of a resolution of the Administrative Council which was accepted in 1986 which is relevant. This says quite clearly "member societies are urged to encourage amateurs in their countries to confine routine packet operations to the segments of the bands designated for rtty and similar modes". In our region this means quite simply that packet should stop at 14·099MHz and not interfere with the beacon system. At the same time the AC also recommended that developmental work which takes place *outside* the rtty bands should be confined to one designated frequency on each band.

Cycle 22

An update from G8KG reads as follows: "August was yet another month in which solar activity was high for this stage in the new cycle. The provisional monthly sunspot number was 38·6 (mean solar flux 90sfu) and activity was more evenly spread over the month than in the preceding months. The 27 day running mean of solar flux peaked at 96 for the period centred on early August, a value which would have given quite good conditions on 28MHz if it had occurred in the winter months.

So far the take-off of Cycle 22 has been unusually steep, putting it ahead, on this score, of Cycles 18, 19, and 21. This could, however, be an artificial effect resulting from the prolonged and flat minimum i.e the physical minimum may have been earlier than that generated by the conventional method of smoothing the data. In their June bulletin NGDC Boulder predicted a maximum for Cycle 22 of 126 (90 per cent range 67-185) in the spring of 1990. This looks to be 13 per cent above the "average cycle" (mean of 8-21) and this is believed to be due to the steep "take off". At the same time they warn that the method (McNish/Lincoln) is not to be relied upon for forecasts much more than a year ahead which is a long way short of the earliest likely maximum.

Other published methods, not yet formally accepted, rely on an observed correlation in Cycles 12-20 between geomagnetic indices near the cycle minimum and the peak value of the next cycle. The equation of H H Sargent predicts a peak of 120 — somewhat higher if the physical minimum was earlier than September 1986. That of R P Kane needs the mean magnetic data for the whole of 1987 but approximating from that presently available suggests a peak in the region of 130-140. (Re-calculating Kane's 1977/78 prediction using corrected magnetic data shows that this method predicted 170 for Cycle 21 — a near miss.)

Things will probably be clearer a year from now but the consensus at present would seem to point to a most probable peak of 120-140 (90 per cent probability between 90 and 175). This would place it between the peaks of 1937 — which some of us remember as not at all bad — and 1947 which was quite a lot better. It would, however, mean that F2 propagation of 50MHz might well be rather disappointing as compared with that seen in 1979-82."

Worked all Britain awards

Bob Nash, G4GEE, reports that the first ever Diamond Award awarded to a station outside Europe has gone to Malik Webman, 4X4JU. This follows hard on the achievement of Jan Galicia, ON6JG, who recently became the first non-UK station to win the award — Jan has since been awarded trophies for working 3,000 and 3,500 WAB areas.

Bob asks us all to look out for overseas WAB book holders around the suggested frequencies of 14·28, 21·32, and 28·66MHz. Membership of WAB is via a one off payment of £6 for a WAB record book which can be obtained from the membership secretary, Brian Morris, G4KSQ, 22 Burdell Avenue, Sandhills Estate, Headington, Oxford, OX3 8ED.

Edwin Chicken, MBE, G3BIK, pictured with Arturo Alanador, HK3BED, club president of Colombian Amateur Radio League, club callsign HK3LR

The Holy Mountain

Norman F Joly, G3FNJ, formerly SV1RX, has kindly supplied the following information.

In the middle of September "Mount Athos" was in the news again when half a dozen members of the Radio Amateur Union of Northern Greece, headed by their president, Dr Nikos Georgiadis-Stefanidis, SV2RE, went on a properly-authorised dxpedition to the much sought-after "country".

Where is Mount Athos, and why should it be a separate "country" from Greece in the eyes of the ARRL? The amended criteria for including an area in the countries list were published in the June issue of *QST* about three years ago. But let us consider some of the facts relating to amateur radio activity in the area known to all Greeks as the "Holy Mountain" and not "Mount Athos".

The Holy Mountain is at the southern end of the most easterly of three peninsulas jutting southeastwards into the Aegean Sea. It is well wooded, with a bare mountain peak rising to a height of 2,033m (6,670ft) — Mount Athos — at the southern end of the peninsula. There are *no* monasteries on Mount Athos! But there are some 20 monasteries dotted around the coast of the peninsula, many hermitages, farms and tiny communities. It has been suggested that the area has remained in its "pristine state", and that the monasteries contain a thesaurus of icons, religious relics, priceless Byzantine manuscripts, frescos and other works of art of a religious nature.

So why is the Holy Mountain a separate "country"?

The area is separately administered (under the protection of the Greek state) by a civil governor and a small religious body known as "The Holy Supervisory Council" (in Greek: *Iera Epistasia*). The council, which usually consists of 20 members, is located in the small village of Karyes. There are very few streets, some small grocery stores, a post office and a couple of cafés. Tourists wishing to visit any of the monasteries have to obtain a *Diamonitirion*, literally a "permit to stay". This is a kind of ticket usually valid for four or five days and issued in the name of the intending visitor. It is a historical fact (published in *Rad Com* at the time) that the members of one of the "dxpeditions" that operated from Athos inserted their callsigns above their names on the visitor's pass after they had left the area.

The proper procedure for obtaining permission to operate amateur radio transmitting and receiving equipment, however, is quite a different kettle of fish. The licensing authority in Athens must first endorse the licence of any prospective amateur visitor with *specific* authority to operate his equipment in the area of the Holy Mountain and *provided* he also obtains the written permission to do so from the council at Karyes, on arrival there. This was the procedure followed in 1980 when three licensed amateurs from Athens, headed by "Cliff", SV1JG, went to the Holy Mountain.

*10 Knightlow Road, Birmingham B17 8QB.

Foreign nationals holding Greek reciprocal licences have to follow the same procedure. Last year some Italian amateurs made an application to the council that they wished to carry out some "scientific experiments" but they failed to get away with the ruse.

In April 1983 Gus Derdevanis, W6LAS, (a Greek-American) visited the monastery of Simonos Petra, but owing to a number of difficulties he was only able to have about 250 contacts, 19 with stations in the UK. His visit coincided with the period of Lent of the Greek Orthodox Church, of which Gus is a prominent member of the San Francisco Cathedral of the Annunciation. His authority to operate his amateur equipment during this period of meditation and prayer may have been facilitated by the fact that one of the monks at that monastery is a cousin of Gus's wife.

Iran

Several times recently an EP call has appeared in this column and this has resulted in the arrival of a letter from A Sadjadian, EP2FM, of the Anjoman Radioamateuri-e Iran which says: "Noting mention of supposedly EP stations in *Radio Communication* in August I would like to inform you of the situation over here and to ask you to reflect it in your column as you see fit to help us. To begin with, very few Iranians were ever licensed, and fewer still are around now. Also, even though our own licences have not been officially revoked there is no legal amateur radio activity from Iran at present. Pirate stations inside (or outside?) Iran using EP calls do have a fatal effect on our efforts to revive amateur activities here. Please also note that any QSL or enquiry enclosing ircs for return postage will be answered promptly."

DX news

According to *DX-NL* OD5LX is at present the only Lebanese amateur permitted to use cw. There seems to be some doubt about the legality of PA3AXU/SU and GW3ZEY/SU. SU1ER of the newly formed Egypt Amateur Radio Society told me a while ago that operations by foreign visitors were not permitted and nothing has been heard from him to make me think that the situation has changed. On the other hand PA3AXU is located with the UN forces in Sinai and may be operating under the same conditions as some VE stations did a little while ago. He is active on all bands including the new ones and schedules can be made when he is just above 14·1MHz at 1500 on Saturdays.

A station signing ST0AA has been heard but according to Gerben, PA0GAM, is most unlikely to be genuine. T5GG has been worked on 14MHz ssb but nothing is known about his legality.

F6CZB should reach Amsterdam Is late this month and appear on the air early in December. He will operate on nine bands concentrating at first on the lower frequencies. A list of frequencies to watch (given in *DX News Sheet)* is: 3·503±2, 3·797±3, 7·007±2, 7·075±5, 10·101±2, 10·145±2, 14·004/14·014/14·024/14·214/14·274, 18·070/18·100, 21·021±2, 21·221, 21·271±2, 24·892/900, 28·028, 28·528 and 28·6MHz. Dany is particularly interested in 1·8 and 3·5MHz and will make special efforts on these bands. QSLs will be answered using local stamps and cancellations if applied for direct with ircs but they may also be sent to the address in QTH Corner. Listeners must report on more than one QSO including one made with a station outside their own country.

VK3NE is due to go to Macquarie Is next month and should be on the air as VK0NE and also possibly AX0NE during 1988. VK0GC is often in the RF0EWW net around 0500 and also in the VK9NS net on 14·220MHz earlier. VK0DS has been worked on 7MHz ssb around 0700 and VK0GC around 0600. VK0ML is active on Thursdays between 0600 and 0700 about 10kHz above lower cw band edges.

Stations in Tuvalu have now had their prefix changed to T20 instead of T2 in order to conform with ITU regulations. OH1RY is still in the Pacific area and was expected to be on Nauru as ZK2AA or ZK2RY from October 28 to November 6, in the Cooks from 6-9 November, and Tahiti from 9 to 14th. He will also attempt visits to T31/KH1. *DX-NL* says that KH6AFS will be very active on 7·080MHz or thereabouts from 0430 during the winter. VK9ND keeps daily schedules on 14·160MHz with several VK5s at 0715. *The Long Island DX Bulletin* reports that FK8DD is often on 14·025MHz from 0530 and that FK0AW frequents the 14·225-260MHz area around 1300 and again at 2000. AH8C has been worked on 14MHz ssb around 0930 and KH8DV is believed to be back on the air with new equipment. C21XX has been worked from the UK on 14MHz around 0930 and Mina, C21YL has also been active on 14·204MHz at around 0900.

Ron Wright, ZL1AMO, is planning a visit to Auckland and Campbell Is in February 1988 together with ZL1BN and ZL1BQD. They will be ZL9AMO, ZL9BN, and ZL9BDQ respectively.

Reg Woolley, GW8HVI, should by now be serving with the RAF at Mt Pleasant in Falkland. He is talking about one week's operation from S Georgia and *DX News Sheet* advises checking 7·095, 14·295 and 21·229MHz.

Amateurs in Iceland can now use 100W of A1A on 10, 18 and 24MHz.

USA "200" prefixes

With effect from 5 December US club stations will be allowed to use the "200" in place of their usual call area number. They will do this for a seven day period only in each state (starting from 0001 Saturday and ending at 2359 on the following Friday) and the dates announced in "QST" when each state will begin its week are as follows:— December 5 - DE; 12 - PA; 19 - NJ; January 2 - GA, AK; 9 - CT; 16 - NM; 23 - MI; 30 - KS; February 6 - MA; 13 - AZ, OR; 20 - NE; 27 - OH; March 5 - FL; 12 - VT; 26 - DC; April 23 - MD; 30 - LA; May 7 - MN; 14 - WI; 21 - RI; 28 - SC, KY, TN; June 4 - NH; 11 - AR; 18 - WV; 25 - VA; July 2 - ID; 9 - WY; 23 - NY; 30 - CO; August 6 - MO; 20 - HI; September 3 - CA; October 22 - NV; 29 - ND, SD; November 5 - MT, WA; 12 - OK; 19 - NC; December 3 - IN, IL; 10 - AL; 17 - IA; and 24 - MS and TX.

Welcome

To the following who became members of RSGB during August: DJ0KM, DL8YB, HB9AMZ, SV4GW, W1TVN, G4DZC/W2, XX9KA, ZX6ALN and R Clews (C5). In the September "Welcome", VK5ADQ was erroneously described as VE5ADG; apologies to both stations.

Awards

ROARS 15th Anniversary Award

The Royal Omani Amateur Radio Society is celebrating its 15th Anniversary between 0200 5 November and 2000 8 November by putting on the air a special station with the callsign A4XXV. This will operate continuously on 1·8, 3·5, 7, 14, 21 and 28MHz with ssb, cw, rtty and Amtor and this specially designed award will be available to those who work or hear A4XXV on two different bands. Applicants should send a certified log extract plus 10 ircs or equivalent, no later than 30 June 1988, to The Awards Manager, ROARS, PO Box 981, Muscat, Sultanate of Oman.

We the People Worked All States

1988 is a special year for the USA as it is the country's bicentenary. To celebrate this fact ARRL is issuing a special version of the WAS award and contacts made between 0001 on 17 September 1987 and 2359 on 31 December 1988 will be valid for it. It is necessary to work all 50 US states and certificates will be dated but not numbered. QSOs may take place on any bands other than 10MHz and may be on any mode or modes. There are no endorsements but there is a version available to listeners and a special "200" endorsement will be awarded to those who have managed to work special bicentennial club "200" callsigns from each of the 50 states. This will not be available until after 31.12.88 and details of how to apply will be released later. Applicants must apply on the official application and no QSLs are needed — the form is obtainable from "We the People" WAS Award, ARRL, 225 Main St, Newington, CT, 06111, USA, in exchange for a self-addressed envelope. The award costs US $5 or 12 ircs.

Welsh Award

Available to all licensed amateurs and listeners for confirmed contacts or reports on or after 1 March 1987 with 24 stations (three in each county) in Wales. Any mode/band may be used. Send log details (certified by two other licensed amateurs) plus £1.50 or 8 ircs to Awards Manager, Carmarthen Amateur Radio Society, PO Box 4, Carmarthen, Dyfed, SA31 1AA.

FRO 40 Award

Curt Israelsson, SM5AHK, who was mentioned in the opening paragraph of this month's column, reminds us that this award was issued last year to those who earned 40 points by working stations with FRO suffixes (five points) and SL stations (one point). All QSOs between 24 May and 31 December 1986. Send full details (no QSLs), plus 10 ircs to FRO, Riddargatan 13, S-114 51 Stockholm. (It is also available for confirmed swl reports).

West Kent Amateur Radio Society Award

Available to licensed amateurs and listeners who have acquired 15 points by confirmed QSOs or listener reports with Kent stations. Club stations G1WKS, G3WKS, and GB(x)WKS are worth five points, past or present members of the club three points, and other Kent stations one point. It is available for all cw, all phone, or mixed modes either hf, vhf, or mixed bands. Send certified list giving

Stanley Ingram, G6ZY/EA6, at the operating position at this station on Ibiza

1987 ALL-BAND TABLE No 4

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
GW4RH	30	56	69	205	114	38	512
G4OTU	35	36	48	105	83	51	358
G4ODV	33	47	131	66	44	32	353
GM3YO	44	54	107	60	52	32	349(cw)
G3TXF	35	39	73	130	38	18	333(cw)
G4OBK	48	61	78	65	22	23	297
4X4FL	—	10	32	50	77	49	218
G4GOF	7	17	20	54	10	2	110
G0FYD	1	5	41	35	20	2	104
G0HGA	—	21	6	22	25	—	74(QRP cw)

Next deadline — scores **to reach G3GIQ** by **8 November** please.

10MHz COUNTRIES TABLE

	All-time	1987
G3PJT	101	71
G4YWG	64	49
G4VDX	71	37
G4OBK	57	36
G4YSN	1	1

1987 28MHz COUNTRIES TABLE

G4JBR-122	G4DXW-42
G4XAH-110	G4RWP-39
G3XQU-98 (ssb)	G0BXQ-35
G0AEV-93	GW4TEJ-27
G4MUW-74 (ssb)	G4OBK-26
G0DNV-70	G4IDF-25
GD4XTT-62 (ssb)	GM4CHX-22
GD4ELY-60 (ssb)	G5HD-10 (QRP cw)
G4VPM-56 (ssb)	G4YWG-9
G4NXG/M-51	G0FYD-2

callsign, date, time, band, mode, and QTH of each station plus 35p in stamps (one irc from Europe or two from elsewhere) to A Korda, 5 Windmill Court, North St, Tunbridge Wells, Kent, TN2 4SU.

The ZB2 Award
Open to licensed amateurs/listeners who have worked/heard five different Gibraltar stations on any band or mode. Send certified log extract plus US$3 or equivalent to the Awards Manager, G.A.R.S., PO Box 292, Gibraltar.

The ZB2BU Award
As above but for working/hearing club station ZB2BU on three different bands.

Contests

ALARA Contest
0001 to 2359 14 November
Organised by the Australian Ladies ARA. Open to all — YLs work everyone, OMs only work YLs. Listeners may also take part. Copies of rules available from G3FKM (sase please).

MARAC Maritime Activity Contest
0900-1200 (CW) and 1300-1600 (SSB) 22 November
3·520-3·570MHz only (CW) and 3·6-3·7MHz only (SSB). Organised by the Radio Amateur Club of the Royal Netherlands Navy. Copies of rules also available from G3FKM.

IPA Radio Club Contest
0600-1000 and 1400-1800 7 November (CW)
0600-1000 and 1400-1800 8 November (SSB)
Sponsored by the International Police Association Radio Club and of special help to those working for the Sherlock Holmes Award and Trophy. Copies of rules available from me (sase please).

International All Austrian 160m Contest
1800 21 November to 0700 22 November
Licensed amateurs and listeners. 1·810-1·950MHz cw only. Exchange RST and serial number from 001. OE stations will also give a three digit number to indicate their individual Austrian District Locator (ADL). Each QSO counts one point. Each worked OE call area (OE1-OE9) counts as a multiplier of two and each ADL one. Each other prefix worked also counts as a multiplier. Entries should preferably be on OVSV-HQ Forms 017 and 018, which may be requested from OVSV. Any other log must be A4 size and be written on one side only. A signed declaration "I declare that this station was operated strictly in accordance with the rules of the contest as well as with the national radio regulations" must accompany the entry which must be postmarked no later than 31 December 1987 and sent to OVSV-AOEC160M, Theresiengasse 11, A-1180 Vienna, Austria. Note that every unmarked duplicate will incur the loss of five points. Certificates will be sent to the top ten entrants from each continent. The rules for the listener section are the same as for the transmitting part.

In the 1986 contest G4ODV scored 4,543 points and G3ESF 2, 226.

HF F-layer propagation predictions for November 1987

The time is presented vertically at two-hour intervals 00(00)gmt to 22(00)gmt for each band, ie $\frac{0}{0}$ = 0000, $\frac{0}{2}$ = 0200, $\frac{0}{4}$ = 0400 etc.
The probability of signals being heard is given on a 0 (indicated by a dot) to a 9 scale; the higher the number the greater the probability with 1 meaning 10 to 19 per cent of days, and so on. Additionally, 50Hz F-layer and 1·8MHz openings are indicated by a plus (+) sign in the 28 and 3·5MHz columns respectively.

Time / / GMT	28MHz 000001111122 024680246802	24MHz 000001111122 024680246802	21MHz 000001111122 024680246802	18MHz 000001111122 024680246802	14MHz 000001111122 024680246802	10MHz 000001111122 024680246802	7MHz 000001111122 024680246802	3.5MHz 000001111122 024680246802
** EUROPE								
MOSCOW	....1331....	....3653....	....68861...	....89984...	...3888881..	321766668732	886543346888	++42....3+++
MALTA	....1222....	....35441...	....67774...	....88887...	...4878894..	463865568953	998632346898	+++3....3+++
GIBRALTAR	.....11.....	.....3221...	....26654...	....58877...	....888885..	241376667852	898853335898	++++2...25++
ICELAND	.....	.....21....	.....2542...	.....5774...	....388883..	....7777883.	663265456886	++++32.245++
** ASIA								
OSAKA	.....	....1.....	....4.....	....61.....	...17411....	...254334311	...131124773	.....45.
HONGKONG	....23.....	....451....	....784....	...18861....	...266641...	1...133345422	1....1124775	.....4+2
BANGKOK	....354.....	....676....	...17881...	...378831...	...246665...	2....13347532	2....1124786	.....4+4
SINGAPORE	....4541....	....6763....	...27886...	...368882...	...2466771..	2....13347633	1....1124786	.....4+3
NEW DELHI	....443.....	....665....	...27872...	...46884....	...346662...	421113346434	73....124788	4.....4++
TEHERAN	....4442....	...16664....	...388871...	...677883...	1.15456771..	654312347645	873....14788	+4.....4++
COLOMBO	....4542....	...16764....	...378871...	...457884...	...2256771..	32....2347745	51....114788	2.....4++
BAHRAIN	....5442....	...17664....	...477871...	...666883...	1115336772..	7642.1346756	872....14788	+4.....4++
CYPRUS	....5654....	...177772...	...488885...	...6888971..	331766789521	886543457877	996311135898	++3.....25++
ADEN	....5444....	...176661...	...466784...	...555787...	2.1422478411	8341..146877	862....14788	+4.....4++
** OCEANIA								
SUVA/S	.....	.....1.....	.....132....	.....354....	....25664...	....543463..	...1311242..	.....
SUVA/L	....1.....	....32.....	....642..2..	.1.18642.51.	121476554731	..255333651.	...221.132..	.....
WELLINGTON/S	.....	.....12....	....1442....	....3664....	....66664...	...1543462..	...1311242..	.....
WELLINGTON/L	.....	.....	....1.....	.1..41...22.	122174212541	..135323542.	....121.131..	.....
SYDNEY/S	....232.....	....5542....	....7775....	...288771...	...476675...	...25334741.	....2112462.	.....3..
SYDNEY/L	.....	.....	....12.....	....341...2.	...1.76421451	153334741	....31.1351.	.....2..
PERTH	....4541....	...17762....	...388851...	...478874...	...3466771..	1...13347743	1114762	.....44.
HONOLULU	.....	.....	.....	.....	......1.33..	.1...4232641.	.131311241..	..24.....
** AFRICA								
SEYCHELLES	....3444....	...145661...	...366884...	...455787...	211222578411	842...246877	84.....14789	+.....4++
MAURITIUS	....55451...	...166672...	...366885...	...4557881..	321222468521	852....146887	72.....14789	4.....4++
NAIROBI	....55551...	...177673...	...366787...	...5556882..	331422368732	8841...36888	872....14788	+4.....4++
HARARE	....23563...	....45785...	...2567881..	...4555794..	451422258853	9841...26898	872.....3789	+4.....4++
CAPETOWN	....13675...	....24787...	...1467883..	...25556851.	441422236864	9842...13799	873.....1488	+4.....25+
LAGOS	....57676...	....787681..	....877784..	.1.175568721	461552236875	89652...3799	8883....1588	5+5.....2++
ASCENSION Is	....25546...	....476682..	....776685..	.1..8655772.	364163224775	89963...1489	88851....269	+++2.....4+
DAKAR	....166661..	....387782..	....687785..	.1..8755772.	354174225774	889641..2589	88862....279	55+3.....4+
LAS PALMAS	....15554...	....377771..	....698884..	....8888871.	242287667862	898774335798	889842112589	+++5.....2++
** S. AMERICA								
Sth SHETLAND	.....12231..	....133452..	....466675..	.1..7776662.	254176544543	567553211234	345421.....1	..2.....
FALKLAND Is	.....22561..	....154672..	....376774..	....6866552.	244176432343	6886531..124	577621.....2	2443.....
R DE JANEIRO	.....31121..	.....53342..	....175565..	....3755562.	244165322453	899552...147	88963.....15	+++4.....2
BUENOS AIRES	.....22241..	....143362..	....376564..	....6867552.	134.76322342	7895531....25	789631.....2	4++4.....
LIMA	......5441..	......7662..	......8764..	......86541.	.11..2632221	5672133....13	688631.....1	3++4.....
BOGOTA	......4441..	......6652..	......8764..	.....186541.	..1.13632231	5561433...24	7886311....3	5+54.....
** N. AMERICA								
BARBADOS	......5441..	.....17662..	.....48664..	.....675552.	..1.16522351	5672432..136	887631....15	++54.....2
JAMAICA	......233...	......4651..	......7764..	......76541.	12642241	444.4331..24	78753111....3	5+54.....
BERMUDA	......233...	......4651..	.....17774..	.....387661.	5643551	444.34311245	8885311....16	+++4.....3
NEW YORK	.......32...	......2541..	......5773..	......68751.	.....266554.	332.23332244	88833111...15	+++4.....2
MEXICO	.......32...	.......541..	.......863..	.......18641.	....1.46322.	232.42331.12	48833111....1	.+++.....
MONTREAL	.......22...	......2441..	......4773..	......68751.	.....266664.	332.24333344	88833111.125	+++4.....2
DENVER	........1...	........2...	.......152..	.......474..	.......6652.	231.1.243222	487231111..1	2++4.....
LOS ANGELES	.....	........2...	........51..	........73..	.......3641.	121.21.44211	267231111....	.4++.....
VANCOUVER	.....	.....	.....	........22..	.......1651.	12..11.35431	366131112111	.3+4.....
FAIRBANKS	.....	.....	.....	.....	.....1.133..	12..33236631	343131124322	.234.....

The provisional mean sunspot number for August 1987 issued by the Sunspot Index Data Centre, Brussels, was 38. The maximum daily sunspot number was 56 on 11 August, and the minimum was 10 on 30 August. The predicted smoothed sunspot numbers for November, December 1987 and January, February 1988, are respectively: (classical method), 29, 30, 32 and 33; (SIDC adjusted values) 34, 35, 37 and 39.

QTH CORNER

A22KZ	G4EKZ, D Saul, Brookside, Bonchurch Vill Rd, Ventnor, IoW.
N4MJH/DU8	Amir, PO Box 36411, Tel Aviv, Israel.
FK8DD/P	Samuel Torope, BP 3040, Noumea, New Caledonia.
FT8XD	via F6FNU, Dany Prevostat, Martin de Vivies, District de Saint Paul et Amsterdam, French Antarctica.
FR5ZU/T	PO Box 4, St Clotilde, F-97490 Reunion Is, via France.
SV2UA/SY etc.	SV2SV, Epbe Club, Box 483, Thessaloniki, Greece.
VS6UN	via RSARS QSL Bureau, G4KIE, or c/o Harts, PO Box 541, Hong Kong.
XX9JN	Jose Neves, PO Box 468, Macao.
XX9TTT	(see N4MJH/DU8),
ZL7IX	Graham Hope, c/o Radio Station, Chatham Is, New Zealand.
4X75TA	PO Box 8225, Tel Aviv, Israel.
8Q7MT	via JI1DBQ, Shigemi Mori, 3-27 Iriamazu, Yokosuka 238, Japan.

CQ WW DX CW Contest
0000 28 November to 2400 29 November
A reminder that copies of the full rules are available from G3FKM (sase please) brief details appeared in the October column.

Results of the **1986 CQ WW DX Contest (CW)** have also been received from W1WY, and UK scores are as listed below:

SINGLE OPERATOR, SINGLE-TRANSMITTER

Callsign	Band	Score	Callsign	Band	Score	Callsign	Band	Score
G3MXJ	All	1,641,150	GM4MFL	All	70,325	**GM3RAO**	14MHz	38,772
G4BUO	"	1,521,674	G3GGS	"	57,000	**G3FXB**	7MHz	320,688
G4OBK	"	755,425	**GD0AVF**	"	49,816	G4CNY	"	222,138
G3UFY	"	527,672	GM8SQ	"	26,598	G3YDV	"	52,564
G3NKS	"	344,148	G4ZME	"	6,476	G4RFE	"	19,256
G3ESF	"	298,410	**G0AEV**	28MHz	3,150	G4MPK	"	6,720
G3GRS	"	200,152	G3UFY	"	910	**G4FAM**	3·5MHz	142,310
GW3JI	"	219,596	**G3HCT**	21MHz	205,288	G4WVG	"	30,336
GB8WR	"	152,092	G3LNS	"	188,622	G4ARI	"	9,844
GM3CFS	"	140,139	G4RKK	"	73,332	GB2RIP	"	1,813
G3SJX	"	115,364	**GW3KYA**	"	23,816	**G3XTT**	1·8MHz	39,270
G4ZFE	"	105,696	G6QQ	"	19,110	G4VGO	"	29,280
GW4RHW	"	101,830	**G4CP**	14MHz	204,972	**GM3ITN**	"	16,260
G3PFL	"	94,608	G3RZP	"	203,118	G3BDQ	"	6,380
G4OKN	"	78,225						

In the **Multi-operator single-transmitter section, GJ0AAA** scored 4,257,058 points and GB4DX 2,130,624. Certificate winners are listed in bold type.

Band reports

Many thanks to G2HKU, G5JL, G8KG, GM3CSM, G3s, GVV, KSH, PJT, G4s EHQ, JBR, GW4KGR, G4s LRS, MUW, NXG/M, OBK, UZN and G0HGA for the following. Stations on A1A are printed in italics:

1.8MHz 2100 *UA1AJM.*

3.5MHz 2300 K3MBF.

7MHz 0000 *ZY0FCM.* **0400** *ZL1-ZL4.* **0500** *KL7PJ, TR8JLD, V31JW, W6-W7.* **0600** CX5BW, *VK2, VK3,* 5L2BG. **1800** UZ9AYA. **1900** N4MJH/DU8, *VU2DX.* **2000** *EA9MC, JA5RH.* **2100** *4K1A, 4K1F.* **2200** *FG5XC, FY7AN, NE4L/FP, G3VOU/J3, OX3KD, V2AZP, VK6HD, 4K1AE, 9L1GG.* **2300** *FM5ES, HZ1AB.*

10MHz 0600 *LU2YA, ZL3.* **0700** *T77C, UI9IWZ, VK2-VK5.* **0800** *VK2-VK6.* **1700** *JA, RA9OS.* **1800** *PZ1DV.* **2000** *JA8JL.* **2100** *FG5XC, HZ1AB, TF3IRA, 3A2EM.* **2200** *KY9L, OX3CS, VP2MDY.* **2300** *J6LAB/9Y4.*

14MHz 0000 6Y25DA. **0500** *HZ1HZ.* **0600** *TR8JLD, W6, UA0YM.* **0700** *FK8DD/P,* HS0B, WY5L/KH3, KH6, *NL7DW,* VR6TC, YI1BGD, ZK2DD, ZL, 5W1FM. **0800** KH2CK, VK9ND, ZK1DD, *4K0E,* 5W1FT. **0900** KX6DS, *P43S,* T20AA, ZL8AV. **1100** KX6QR. **1400** *BY4RB,* SV2WT/SY. **1500** JR2ROE/JD, K9EL/VS6, *SV2UF/SY,* 9M2LE, 9V1. **1600** AP2P, V85SK, VK4RM, 9V1TJ. **1700** FR7ZU/T, KA2HH/JD1, V85GA, VK2AVA, VY1CO, 5R6JD. **1800** *DX/F6IHH,* TZ8MG, VS6UP, W6-W7, *XL1QU,* YB, 8Q7MT. **1900** A22RB, D44BC, HS0B, JA, V47NXX, XX9JN, 6T2MG. **2000** A92BE, *TK/HB9ASZ,* TR8CA, 3B1CS (= 3B8CS). **2100** V47NXX, VP8BGQ, W7. **2200** J87CD, *N6IG, PA0GAM/ST2.* V31PC, V44FAR, VK, *ZY0FCM.* **2300** FY5EM.

18MHz 0800 *WB0TAU, XN5UI.* **1300** *9M2FS.* **1400** *VU2LO, 5B4OG.* **1500** *VE1.* **2000** *J37ZY, LU5DJO, 6Y25IC.* **2100** *PY2NZP, VE3DJ.* **2200** *VE2, VE3.*

21MHz 0000 VK2APK. **0800** TR8CA, TZ6VV. **0900** VU, *4S7BF,* 9V1WP. **1000** HS0B, JA, SV2RE/SY, SU, TA, VU40TTC, YI1BGD. **1100** A71BK, A4, PA3AXU/DU1. **1300** DU, HL2INX, JA, W1-W4, *9Q5DA.* **1500** KG4GN, TV6MED, 7P8DP, 8Q7MT, 9M2AX, *9N1MM.* **1600** A22FN, *DU1BAA, VP2VI,* VP8VK. **1700** TR8CA, DF1EO/V2A, W6. **1800** CE, FG/DL1FZ, H25QA, W6-W7, 5H3MO, 5Z4DU. **1900** CE0CID, VP2EZ. **2000** CE0DFL, PY0FNI, VP8BPK, 5H3RA, *IK1FTS/5N9, 9L1GG.* **2100** KP2BJ, *T77C,* 5N0WRF. **2200** *CE0FFD,* C6ANI, V31AB, W87PAX, W1-W4.

24MHz 1900 KV4AD, *PZ1AP.*

28MHz 1300 WA9SQM. **1500** A2, Z2. **1600** TZ6BKY. **1800** A22KZ, CE, CT3BX, LU, OY, TZ6VV, ZD7BJ, ZD8MAC, 3B1FP, 6W7OG. **1900** C53CR, CE, CO, CX, HK0HEU, J8, TF6PS. TR, PY, ZD8JT, ZP, 5L1AH/8, 8R. **2000** FM4EB, J87CD. **2100** NP4AV.

Thanks also to the following for information: *Long Skip* (VE3IPR), *Lynx DX Group Bulletin* (EA2JGO), the *DX Family Newsletter* (JH1KRC), *DX'press* (PA3CXC), *CQ Magazine* (W1WY), *DXNL* (DL3RK), *Long Island DX Bulletin* (W2IYX), *DX News Sheet* (G4DYO) *The Ex-G Radio Club Bulletin* (GI3OEN/W6), and *DX Report* (VK9NS).

Closing date for receipt of material for **January** issue is **19 November.** □

VHF/UHF

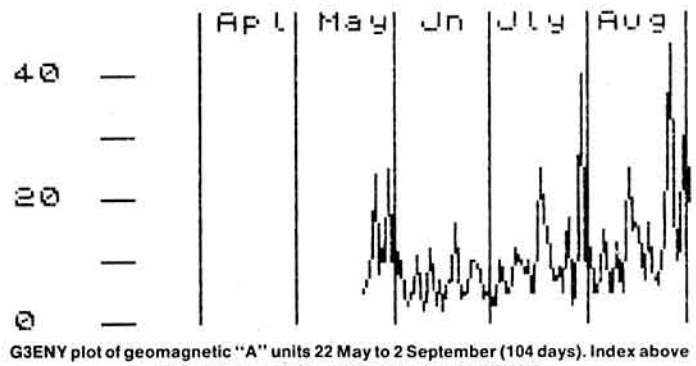
*Ken Willis, G8VR**

Solar activity

After passing through a very quiet period in early July, solar activity in August became much more pronounced, and despite my belief that we would have to wait for some time before we experienced useful radio auroras, there were several events of reasonable size during August and September, some of them affecting regions quite far to the south.

Geoff, G3ENY, observes the sun on all clear days from Bridgnorth, using a projection device attached to an astronomical telescope (see also *4-2-70,* August 1984) and during August noted several spots on the disc, monitoring their positions relative to the sun's co-ordinates as it rotated. He also keeps a regular sked on 14MHz with Ed, W2MIG, who provides him with up-to-date solar data, and based on this, the illustration, which is from Geoff's computer print-out, shows the rise in the A index from the middle of May until the end of August, and it will be seen that on several occasions it reached or exceeded the sub-storm level of cycle 20.

In his latest report, Ron Livesey of the BAA Auroral Section commented that the earth's magnetic field had become very much more active, sunspots were appearing, and that we were beginning to see magnetic storms like the one of 28/29 July which resulted from a solar flare and which repeated itself on 26 August, producing radio auroral conditions. Unless you live towards the north, much auroral activity, being weak, passes unnoticed, but it was a great surprise to receive a report from Ron, GM4ILS, (Elgin) which stated that on 144MHz at his location, auroral conditions were noted on 5, 7, 18, 19, 25, 26, 27, 28, 31 August and 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12 and 13 September, the last date being the day he wrote his letter. This represents 21 auroral events in 61 days. Another solar flare, reported on 10 September, seems to have produced the group of auroras in mid-month. Some of the bigger events which resulted in dx contacts on the 144MHz band occurred on 25, 26 and 27 August, when during one of these events GM4IPK made over 100 contacts and stations in the USSR were worked from the UK. Murphy, never far from the vhf/uhf scene, was again in evidence when towards the end of the magnificent tropo conditions over the August Bank Holiday weekend, an aurora developed and opened up at the few remaining paths which had not been blessed by the tropo. (Remember, too, the tropo to Italy during the Perseids?) Now that we have 50MHz, solar activity is of interest because of



G3ENY plot of geomagnetic "A" units 22 May to 2 September (104 days). Index above 20 for 10 days. Information supplied by W2MIG

possible F2 propagation on this band later in the solar cycle. Consequently it was a most pleasant surprise to receive a communication from "Smithy", G8KG, whose studies and writings related to solar cycles are widely read and appreciated. He says "So far, the "take-off" of Cycle 22 has been unusually steep, putting it ahead, on this score, of Cycles 18,19 and 21. However this could be an artificial effect resulting from the prolonged and flat minimum (the actual minimum may have been earlier than that predicted from the smoothed data). Boulder, USA, predicts a maximum sunspot number for Cycle 22 of 126 in the Spring of 1990, which appears to be 13 per cent above the "average cycle", believed due to the steep take-off. Smithy then goes on to discuss the reliability of the data, and then sums up by saying "Things will probably be clearer a year from now, but the consensus would seem to point to a most probable peak value for Cycle 22 of 120–140, placing it between the peaks of 1937 (which some of us remember as not at all bad) and 1947 which

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was quite a lot better." Here comes the crunch, however, for he concludes "It would mean, however, that F2 propagation on 50MHz might well be rather disappointing compared with that of 1979–82".

There was another aurora on Friday 25 September during the late afternoon. On 144MHz it did not produce anything in the way of real dx, but on 50MHz, there was quite a lot of activity since GM4DGT worked 14 G stations plus EIs 9Q, 9BG and 6AS in the period 1547 to 1944.

Beacon notes

From Geoff, G3ENY, news that Chet, PJ9EE, whom he worked on 14MHz, was planning to establish a beacon on 50·015MHz signing PJ4B from the island of Bonaire, off the Curacao coast and well-placed for Caribbean propagation. The beacon message-format will include the locator as well as the call, which is an old one specially resurrected for Chet.

Back in solar Cycle 21, Chet was much sought after for crossband contacts, and he told Geoff that he wished to be remembered to all those UK amateurs worked at that time. Since this news arrived in September, this beacon could well be QRV by this time.

G4UPS commented that by now the Maltese 50MHz beacon should have been heard since GW3LDH was known to be taking it to the site on 5 September. It was designed for operation on 50·085MHz, and as Ted, remarked, it will be invaluable now that the ZB2 beacon is "kaput."

Plans are afoot to set up a beacon, GB3BUX, on 50·000MHz (Licensing Authority permitting this QRG) at the Sheffield University site near Buxton, Derbyshire. This would be one of the new generation amateur radio beacons for path-timing measurements, requiring a high standard of frequency accuracy and stability. Current plans are for the beacon, when installed, to transmit callsign and locator every five minutes, callsign only on the minutes in between, a marker every second possibly of 15ms duration) and a marker every 0·1 second (say 5ms). Keying would be cw, with the timing markers as breeaks in the carrier. Elsewhere, Dr Anderson, ZS6PW has agreed to provide comparable timing on his 28 and 50MHz beacons at Pretoria, and Dr Fimerelis, SV1DH, will provide similar signals on an as-required basis from his special permit beacon SZ2DH. Hopefully FY7THF plus a beacon on the USA eastern seaboard will be similarly programmed. More information as things progress, but meanwhile the project is being co-ordinated by Ray, G2AHU. The need for a frequency spot-on 50MHz is that this would greatly simplify the process of locking on to standard time sources, an essential ingredient in this project.

Beacon OX3VHF on 50·045MHz used to be operated by Tommy, OX3BX in Danmarkshavn. According to KA3B, Tommy has gone to warmer climes and is now signing OZ2BQ/EA7. Herluf Rasmussen OX3RA has permission to operate the beacon which is located on the island of Simiiutaq (GP60QQ), the site being some 100m asl.

Over the air, Jeremy, G3IMW said that OX3LX had been telephoned by a W6 station to confirm reception of the 50MHz OX3VHF beacon in California during August this year, around 2200.

VHF Newsletter et al

October *Radio Communication* contained information on the RSGB *VHF/UHF Newsletter*, edited by David Butler, G4ASR, available by subscription. Readers may be confused as to the need for yet another source of vhf/uhf information. The function of this column, as I see it, is to report vhf/uhf activity on the broadest possible front and not to devote too much space in any issue to a single topic. This is not always easy to accomplish, and since space is always at a premium in *Radio Communication*, specialist topics cannot always be given the coverage they deserve. The newsletter is intended to play a complementary role in filling any gaps which thus arise. It will generally be slanted more towards the weak-signal operator and vhf-dx specialist than the operator who uses the vhf bands for other purposes such as fm, rtty, atv, repeaters and the like. For example, the newsletter will sometimes include topics such as moonbounce, not normally covered here since this mode is within the scope of only a small section of the readership of *VHF/UHF*. Another feature of the newsletter is that it is not constrained by frequency "boundaries". *Radio Communication's* regular columnists endeavour not to encroach on each other's terrain, so strictly speaking I should not mention 1.296MHz activities or 28MHz crossband operation, though sometimes it is impossible to provide a full picture without doing so. While there may on occasions be some duplication in the text of this column and the *Newsletter* (since Dave and I do not compare notes when preparing our copy), we hope this will be kept to an absolute minimum. If you wish to enter a subscription for the newsletter, information will be found in the RSGB Mail-Order Price List.

Another publication which is of a somewhat specialist nature is *Dubus*, published four times annually by Claus Neie, DL7QY, and distributed in the UK and English-speaking countries by Ken Hatton, G4IZW of Hamilton House, Carleton, Carlisle, CA4 0AD. This is of particular interest in weak-signal vhf/uhf operators, since it enjoys a wide, mostly European, readership, thus providing an invaluable source of operational information covering all modes of vhf/uhf operation. In addition, *Dubus* carries technical articles of a high standard, some dealing with home-brew equipment, others with the theory and practice of propagation at vhf/uhf. *Dubus* also seeks articles for publication, so if you have anything to contribute, don't hesitate to write to G4IZW. Some back issues are available, and issue 3/87 was sent out in September. Write to G4IZW for further information.

The International VHF-FM Guide, compiled and produced by Julian Baldwin, G3UHK and Kris Partridge, G8AUU is just off the press in its seventh edition and available from 41, Castle Drive, Maidenhead, Berks, SL66DB at a price of £2.85 plus 30p postage (50p to Europe). This little volume contains information on vhf repeaters in some 40 countries, together with details on reciprocal licensing in those countries. There are also lists of beacons in the range 28 to 24,000MHz, lists of fm channels etc. The UK vhf repeaters are each given full-page presentation with coverage maps and much information on the location, installation, method of access and group responsible. In response to many requests, the publishers have reinstated a map showing the location of the UK uhf repeaters with a listing in channel order. The majority of countries covered are also illustrated with maps showing the location of repeaters, making it a simple matter for anyone travelling abroad to identify repeaters in the vicinity. In attempting to keep this volume up to date, Julian G3UHK is always glad to receive information from repeater groups, and especially from overseas readers who can supply information not readily available from other sources. Any vhf operator whether using repeaters or not will find this book most useful both in the shack and when travelling.

70MHz

There are indications that the 70MHz band is far from dead despite the view in certain quarters that the authorisation of 50MHz facilities would result in the band being all but abandoned. Activity during the 70MHz Trophy contest on 20 September was quite high. G4IJE put together a transverter in time for it, and although limited to 5W at the time, worked two GMs, and EI and into Cornwall from Essex. He had no success with a two-band 50/70 beam antenna, so now uses a 4 element Yagi and 20W Jeremy, G3IMW heard fewer strong signals from stations in the London and Home Counties area than in previous events, and worked much the same as G4IJE during the contest, and in addition heard GJ3YHU working a GM. G3ENY heard some strong signals on the band at his QTH, notably from the Dorset/Devon direction. Apart from the contest activity, GW3MHD maintains his nightly sked with G2AOK in Gloucestershire, and G8ECI in Lincs is well-equipped for the band and active on it when at his home QTH.

Repeater news

Speyside group's September 1987 edition of their newsletter appeared in new format which, it is hoped, will result in printing cost savings. We all know that running repeaters costs money, so like several others, the group seeks donations (treasurer is Alan Wills, GM4IZY, QTHR), and an article in the newsletter makes clear why this is so. It examines the effects on the group's finances if a rumoured annual charge of one hundred pounds is levied by the IBA for each installation of a repeater at one of their sites using the authority's antenna masts. While recognising that fifty pounds a year for electricity and a similar amount for mast use is not exhorbitant, the current membership of Speyside (48), each contributing six pounds per annum, would provide barely enough income to run the two sites required for GB3SS and GB3KM (which is now licensed). If finances cannot be improved, the GB3SS antenna may have to come off the Knockmore mast and be set up at another location, probably greatly reducing its coverage.

Geoff, GJ4ICD, sent information on "the most southerly British Isles repeater, GB3GJ" finally QRV from a site near the centre of the island of Jersey on channel R2. Access is by a 400ms toneburst plus at least 5s of speech. The toneburst is not required after initial access. Time-out is 90s. The system has been built by the combined efforts of GJ8KNV, GJ8PCY, GJ6FTU, GJ4ICD and GJ1TJP, helped by donations from GJ0AME, GJ0FTZ and GJ0TMM. Further funds are needed to meet the costs of further equipment and its installation, and should be sent to GJ4ICD QTHR. All will be acknowledged.

The annual general meeting of the North Western Repeater Group is scheduled for 19 November at Globe Bowling Club, Willows Lane, Accrington at 8pm. All paid-up members are requested to attend. The agenda will include the election of officers and committee members. The group operates GB3RF (R7) from a site 1,450ft asl between Burnley and Accrington.

Another newsletter received was from the Cambridgeshire group which has under its wing GB3PI, PY, PT, PS, PV and PX. Since PS, PV and PX are all specialised forms of repeater (two are 1·3GHz systems, the other a packet

repeater), future issues of the newsletter will deal in depth on the way they all work and discuss equipment needed to access them. This newsletter has a very readable article by James Miller, G3RUH, on packet operation. GB3PX, the packet repeater located at Madingley (JO2AF) became operational on 14 August, and is getting a lot of use. It relays something like 5,000 packets a day according to Phil Mellor, G4BIK. The group's fm tv repeater GB3PV went into operation for the first time on 23 June, with GB3PS the 1·3GHz speech repeater close on its heels next day, thus doubling the number of repeaters run by the group. This is another group in need of support, and its officers note with regret the large number of users of their equipment who are non-members, contributing nothing to the upkeep of these facilities. Phil says "support your local repeater group or one day find the box is no longer there". Good advice, and G4BIK (QTH) will be pleased to hear from you if you wish to join the Cambridgeshire group.

In the September issue I credited some Scottish repeaters to the wrong groups. Alasdair, GM3AXX, secretary of the Central Scotland FM Group and Ramsay GM4RGS, president of Grampian Group subsequently straightened me out, politely refraining from comments about folks living south of Watford. Alasdair also confirmed that GB3DG has received permission to use R7, subject to no interference with GB3WT, West Tyrone, on the same channel. The "X" system is in reserve should interference be a problem.

GM4GRS said that the installation of GB3NG will await the solution of some site problems. Another of Grampians proposed repeaters, GB3BA, is not yet licensed. The licence application related to standard repeater operation, but once established, it is intended to use the installation for the linking experiment with GB3AB (Aberdeen). Grampian plan to link their uhf repeaters "in-band", unlike some other proposals which require another amateur band to provide the link. They will use a "slave" receiver at each end of the link, "listening" to output from the other repeater, thus extending uhf coverage. GB3BA is scheduled to go on the IBA mast at Durris, near Stonehaven, where GB3GN is currently located. The other linking experiment between vhf repeaters GB3AS and GB3EV is in the hands of the Carlisle group.

Nick, G6AWT of the Gloucester group was pleased to report that the licence for GB3GH (RB5) has at last been granted, and switch-on was scheduled towards the end of September. One slight delay was because the room for the repeater was to be carpeted! How many installations are so cossetted I wonder? The location is on top of the Cotswold Hills, four miles south of Gloucester at Birdlip on A417, quite a nice site as I recall, having had brake failure there with a 1929 Austin Seven on one never-to-be-forgotten occasion. Reports of reception of GB3GH to Nick, G6AWT, QTHR, please.

Tropo

Experienced vhf operators will know that late summer usually provides at least one good tropo opening, and this year was no exception. The bank holiday weekend of 28/31 August was one which will be remembered by many operators since conditions on the vhf bands were among the best ever encountered. The action started on the evening of 28 August when the 144MHz band was wide open to Eire, and some rare squares in those parts, were there to be worked. GJ4ICD worked 12 EIs and said "the most I have ever heard, very strong signals at S9 plus". At the same time there was propagation to HB9 and OE on the band, but this was only a foretaste of things to come. With most operators at home for the holiday, excellent signals from the many OK portables out on mountain-top sites gave first-ever Czechoslavakian contacts for dozens of UK stations. Later SPs appeared on the band, and by Monday morning the propagation extended as far as HG and YU. It was fascinating to hear OK2KZR/P call G3IMV to tell him that HG0HO was calling him, reminiscent more of 14MHz than 144. The personal stories of dx worked and those which "got away" were too numerous to relate ("we stayed up until 2.45am and left the washing-up in the sink all weekend" was one typical comment), and from reports received it appears that during the weekend it was possible to work into GI, GM, GD, EI, OE, HB9, Y22, OK, SP, HG and YU, as well as the nearer Continentals. Then to cap it all, there was an aurora during the afternoon of 31 August, which provided some LA and SM contacts. Conditions on 432MHz were also believed to have been excellent though no reports have come in for this band, and with Syledis interference so strong at my QTH, the antenna has been taken down so I cannot give any first-hand information.

However, one 432MHz report which was received was for 20 September when GJ4ICD worked all but five of the French squares on the band, conditions at the time being better than on 144MHz. He was also S9 plus here on 50MHz for a long period with no takers.

With poor conditions during the early part of the year, the tropo opening during the bank holiday plus the Italian event of 20 July did much to make amends. Brian, GI4KIS says his activity this year has been "restrained, only 2,000 QSOs up to the end of August"! Think of his QSL problem!

From the postbag

Maurice Aquilina, G1RQM, has thrown some light on the report in the September issue that someone was heard speaking Arabic on the 144MHz band during a sporadic-E opening in June. There was speculation whether the callsign heard was 5A1CD or 9H1CD, and if the latter, why would Henry, 9H1CD, be using this language. Maurice, who was born in Malta, says that since the Maltese language is "about 80 per cent Arabic" in its form, what was copied might simply have been a Maltese operator using his mother-tongue. Seems a logical explanation unless anyone knows for sure that there is a 5A1CD QRV on vhf.

Ken, GW4KEV, has received a letter from Harry Schools, KA3B, who is a keen 50MHz operator. Harry is writing a book covering all aspects of 50MHz operation, and to this end requires photographs of dx operators, their antenna systems, station information, details and photographs of beacons, in fact anything which will contribute to a "comprehensive and informative handbook that would make enjoyable reading". Send anything you think fits the bill to Harry, whose address is 1606 South Newkirk Street, Philadelphia, Pennsylvania, 19145, USA.

Michael Monteil, F/G6WDK, reports that French amateurs are "working towards obtaining a restricted access to 50MHz, maybe on a limited power basis at first", and that "talks are on". He goes on to say that those who insist that 50MHz operation will never be allowed in France are wrong, and that suggestions that interference would be caused to the French private tv channel are incorrect, since the transmitters for this channel are on E4 and E5, well clear of the 50MHz band. Nevertheless he confirms that at the present time, operation on 50MHz in France is definitely not permitted, and he urges UK amateurs visiting France to respect the laws of the country and not attempt to operate in this band.

Rhys Thomas, GW4RWR, feels that this column appears these days to be biassed towards 50MHz operation. I confess that this must seem to be the case, though not so long ago I was concerned that everyone reported 144MHz activities to the exclusion of, for example, 432MHz, though lots of people were known to be doing marvellous things on that band. Though I do my best to keep in touch with what is happening on a wide vhf/uhf front, I depend on your contributions in attempting to produce a column covering a broad spectrum of vhf-uhf interests. If recently 50MHz has tended to predominate it is after all an exciting new band for most readers, one which has provided some unexpected and rewarding propagation. Long may that state of affairs continue, but don't hide your light under the proverbial bushel if you have something to tell us about what you are doing on other frequencies.

Hans, PA3BJN, is hopeful that 50MHz facilities will be available to Dutch amateurs sometime in the future. Incidentally, he is QRV on 144.185MHz at 7.45am on Saturdays and Sundays and listens on 50-215MHz. He has worked GJ4ICD crossband during good tropo conditions, and here at G8VR the 288km path between us seems always to be open.

Flash! 50MHz beacon QRV 2 October, heard by A22KZ and in ZS. □

MICROWAVES

*Mike Dixon, G3PFR**

2·3GHz odds and ends

It is often a struggle to obtain anything like reasonable power gain when using 2C39 (and clone) amplifiers at microwave frequencies. This was particularly noticeable in early 1·3GHz amplifiers until the article in *Radio Communication* by G3SEK and G4PMK, way back in 1983, suggested reliable means of electrode connections using grid and anode "spring rings" in place of the more usual fingering.

The same phenomenon occurs on 2·3GHz, with very low gains sometimes recorded. The power gain is dependent on a number of things, of course; the quality of the valve (often surplus, ex-equipment), the heater voltage, the ht voltage, the drive level, the quality of the contact rings or fingers and the axial position of the valve with respect to its cavity. Even optimising all these parameters, the gain is often still below that expected.

Using a cavity built by Cyril, G3VVB, Sam, G4DDK, related his recent experience, based on a chance remark by Russ, G4PBP, that the *angular* position of the valve *may* be of significance to amplifier gain. Although in theory the valve's internal construction is symmetrical and orientation should not matter, Sam made up an insulated tool with which the valve, with drive and operating potentials applied, could be safely rotated in its cavity.

*"Woodstock", Gaze Bank, Norley, Warrington, Cheshire WA6 8LL.

Using this tool he found that "the insertion gain came up from 0dB to around 10dB, giving around 10W output for 1W input".

"During rotation it is necessary to carry out several operations in sequence:

1. **Do it safely**, remembering there may be 1kV or more on the anode.
2. Retune the cavity, as necessary.
3. Reload the cavity after retuning (or at least, check it).
4. Make sure that the heater feed choke connector does not come adrift during rotation."

Has anyone else experienced this phenomenon? Is it due to valve asymmetry or is it something to do with the fingering contacts or what? Readers comments and experiences would be most welcome.

The house quarterly newsletter *MSCellany* (Microwave Semiconductor Corporation, USA), recently carried a short feature on amateur 2·3GHz eme, using a solid-state p.a built from six of the company's microwave silicon bipolar overlay transistors. The design used two MSC 82223-12s driving four selected MSC 82327-15s, all operated at 24V. The power output of the amplifier was around 100W for 100mW of drive (30dB), the unit consuming around 12A at 24V. Construction was on an 8·5 by 9in heatsink, the whole device weighing in at 6lb — no forced air or water cooling or eht supplies!

Staff amateurs WA2FGK and N2BMP built the amplifier and its performance was proved over the weekend of 9 and 10 May, operated under the callsign WA2WEB by K2UYH, K2TKN and K2TXB. Five eme contacts were made with OK1KIR, OE9XXI, F2TU, W4HHK, SM6FHZ and LX1DB. The antenna was a 28ft dish with a W2IMU circularly polarised feed. The contacts are claimed as "solid-state firsts", repeating similar work by the same group on 1·3GHz way back in 1981. It was said that of more than 200,000 US licensed amateurs, only some 20 to 25 were active in eme mode whilst in Europe there appeared to be at least that number of club stations active, as well as several individual operators.

I'm ashamed to admit that the covering letter has gone astray, so I can't acknowledge the source — perhaps the writer of the letter would like to identify himself, so that I can!

Viewed from the Midlands

Derek, G3KFD (Kingswinford), somewhat immobilised by a fractured foot and "unable to get around and make things", sent in a long and interesting letter following my activity comments in the September column.

His remarks were amusing, often pungent and trenchant, but well outline his serious approach to microwave operating.

He quotes "Fred's law" (G6FK) as being "The best way to find out how good your kit is (and then improve it) is to run skeds". On 15 September he celebrated his second anniversary of regular 1·3GHz skeds with G6LEU in Cornwall, over a 314km path. Derek uses 50W to a two by 23 element array, whist G6LEU uses 10W to a four by 23 element array. Of the 408 attempts, 343 have "scored" — a success rate of 84 per cent. He noted that the success rate in '85/'86 was 94 per cent and in '86/'87, 74 per cent. This fits well with the overall poor weather pattern this year. He also noted that G3YGF's troposcatter program predicts a 5dB s/n on this path and that "You can tell Julian that he's got it about right . . . in case he doesn't already know!"

Derek is busy studying the effects of weather on the reception of Meteosat (1,691/1,694MHz) pictures and finds a correlation but, as might be expected from a space to earth path, much less noticeable than would be the effects on a purely terrestrial path. He is also busy trying to tie up the satellite pictures with WEFAX from the Bracknell Weather Centre. An interesting project described as being "better than 144MHz repeaters and bad language . . ."!

Apropos the word atrophy, he said "I came across this word for the first time in ages and began to wonder whether we are so atrophic that we can't oppose atrophy . . . I just got *Dubus* and they hardly bother printing technical articles in English . . . east coast stations report a reluctance of Continentals to turn their beams west (I heard PA0 . . . calling "CQ East" with no-one else on the band) and, finally the release of 50MHz seems to have turned 1·3GHz listeners into 50MHz listeners. Why, I wonder, do we have to read German magazines to find out what's new and why do parts have to be purchased in Germany when most are made in Japan, Holland, France and even UK . . . atrophy do you think? (answers, please on a postcard)".

Back to skeds: one with Eric, GU2FRO (Sark) at 384km is very marginal, G3KFD's cw signals being heard at S1 (rarely S3) 94 per cent of the time. GU2FRO is only using 1W and is audible about 50 per cent of the time, although a full report exchange has been quite rare, about 15 per cent of the time, Derek's other regular exchanges are with G8XIR (Gravesend), G4HWA (Northampton) and G8CHW (Watford). Others worked in a slight lift in August were F6ETI, F6CGJ, G2AIW, G6VXB, G4YPC, GW4IGF/P and GW3JXN/P. To complete the update, he now has a GaAsfet masthead preamp on 2·3GHz and was pleased to work G4FRE/G8TFI (as GB4GD), G8CHW, G4HWA, G0CZD, G4CVI and G4BVY, remarking that "John's signal would be conditions-independent now that he is pointing his beam at the UK again!"

Finally this month, G5UM (microwave awards manager), notified three 150km plus awards for 10GHz and one first (five squares) award on 1·3GHz. The 10GHz awards were to G0CZP/P (no 86), G40IH/P (87) and G40IG/P (88) and the 1·3GHz award to G0CPU (Harlow). The accompanying letters were illustrative of persistence and dedication: more details next month!□

SATELLITES

*Bob Phillips, G4IQQ**

WE START OFF this month with some very encouraging news concerning launch vehicles. First, the US space shuttle. It is now nearly two years since the catastrophic failure of the STS launcher and the loss of the crew of seven astronauts. A great deal of thought has gone into the re-design of many of the systems of the launcher, particularly that of the solid rocket booster (srb). Tests carried out at the end of August appeared to be highly successful though it takes many weeks to analyse the vast amounts of data recorded during the 2 min burn period. Also, the engine will then be stripped down for inspection before continuing the qualification testing. It is expected that a total of six or seven srb tests will be carried out before shuttle flights are restarted. The earliest likely date for resumed operation is mid-1988.

The second piece of launcher news concerns the European rocket Ariane. The last flight of Ariane ended in disaster when the third stage failed to ignite and the rocket had to be destroyed by the launch controllers. Again a series of design modifications were called for, followed by testing of the third stage. The final test came in the early hours of 16 September when after a series of delays, the countdown for V19 was completed and the rocket was successfully launched into its highly elliptical geostationary transfer orbit. Subsequently the payload of two communications satellites (one European and one Australian) were placed into their chosen points on the geostationary satellite orbit. Arianespace immediately announced its intention to carry out two further launches in 1987, so there is a possibility that the phase 3C satellite could be placed in orbit by the end of the year.

Kepler update

I receive many requests for the latest series of Kepler elements for the operational satellites, but due to space limitations it is usually not possible to include them. I should also add that for all except the low orbiting satellites such as Uosat 1 and Uosat 2 a data set should remain valid for many months.

	Uosat 1	Uosat 2	Oscar 10	Oscar 12
Epoch	232·5158	229·60412	230·849586	209·20329
Inclination	97·6447	98·0956	27·4444	50·0166
RAAN	251·672	294·245	6·2966	259·2656
Eccentricity	0·00002867	0·001223	0·602495	0·0010974
Arg of per	26·4083	267·8496	233·3008	29·9457
Mean anom	333·7312	92·1317	55·2279	330·2000
Mean motion	15·29957	14·62148	2·058817	12·44397
Orbit No	32,657	18,467	3,145	4,349

	RS5	RS7	RS10/11
Epoch	233·45181	229·45575	236·37078
Inclination	82·9553	82·9567	82·9315
RAAN	232·8253	226·9676	7·6815
Eccentricity	0·0007450	0·0021927	0·0013452
Arg of per	245·8504	157·3554	90·6502
Mean anom	114·1792	202·8473	269·6188
Mean motion	12·05056	12·08702	13·71881
Orbit No	24,969	24,996	851

In all the above the epoch is given as the day number and decimal portion of a day.

Fuji Oscar 12

The controllers for this satellite have had great difficulty in trying to establish a workable schedule with little success so far. The reasons for this are several, but are dominated by the extremely poor power budget resulting in the transponders having to be switched off to avoid excessive discharge of the on-board batteries. As a consequence the operating periods for the transponders (particularly the digital mode JD transponder) have had to be further reduced. A revised schedule was introduced in early September but this had to be abandoned almost immediately due to falling battery charge levels.

A contributory factor to the heavy drain on the satellite's batteries is the

*Transvaal Cottage, New Barn Road, Swanley, Kent BR8 7PW.

high level of use when the transponders are switched on. This factor has been worsened recently by the re-appearance of a number of operators, particularly from the UK, whose sole ambition in life seems to be put as much power as possible in the direction of the satellite, thus making it impossible for others to use it. The most serious offenders have been identified and are well known from similar activities on Oscar 10. The question of what to do next is under consideration, and hopefully appropriate action will be taken in the near future.

After several months' experience of using the satellite it has become evident that the practice of adjusting the uplink frequency to maintain a constant downlink frequency is probably not appropriate for Fuji Oscar 12's analogue transponder. A study by WA2LQQ has concluded that, rather than improving the situation, this practice has a detrimental effect. So, the recommendation is now that when using mode JA, major adjustments to overcome the effect of Doppler shift should be made by re-tuning the receiver.

Oscar 10

There is little to say about the satellite at this time. As reported last month, transponder operations were suspended earlier due to low levels of solar illumination resulting in inadequate battery charging capability. Satellite controllers are optimistic that the transponder will again be usable later in the year if operators refrain from trying to access the satellite in the meantime. □

SWL

*Bob Treacher, BRS32525**

G0BWA FEELS that *SWL* does not cater enough for the young schoolboy listener who spends his time listening to the broadcast bands on a domestic receiver. With respect, I would suggest that as the magazine is devoted to amateur radio, reception reports of broadcast stations would be somewhat out of place. Additionally, it is difficult enough trying to fit news for amateur listeners into this three-quarters of a page slot, without trying to cover items which are not directly associated with the amateur side of the hobby. I would be interested if others share G0BWA's views, especially my younger readers.

Low band dx software

With the winter dx season on the lower frequency bands just around the corner, readers will be interested in the software package which ON4UN has on offer. It is available in most of the commonly used personal computer formats, and because it is menu driven, is easy to use. The programs are designed to assist the average amateur or serious swl in building or designing the antenna of his dreams, or just improving the antenna currently in use. Additionally, it helps take some of the guesswork out of knowing the precise beam headings for that elusive expedition, and enables you to calculate the best time of day or best time of year to chase dx all round the world. If I have whetted any appetites, more details can be obtained from ON4UN at PO Box 41, B9000 Ghent, Belgium.

DX news

First, if any swl heard ZF1MM or ZF9SV, it appears that the two VE5s who aired the calls have notified the ZF bureau that they do not want the hoards of cards waiting for them at the bureau. The answer seems to be that if you desperately need a card from ZF, you will have to send yours direct to VE5RA or VE5SV respectively.

Michel Monteil, F11ATZ, had been monitoring 28MHz mainly. He had logged 57 countries on the band at the time of writing and his best dx had been KP2E and ZP450A/C. Brief forays on to 14MHz had provided many stations in the Middle East, including YI1BGD, YK1AO, A92EC, PA3AXU/SU and 9K2YA.

Malcolm Harrington, BRS20249, had also been on 28MHz, but managed to miss most of the dx openings, but logged a good few Europeans. OY1R was considered to be the best logging on the band. 3·5MHz had produced ZS1MH, for a new country on that band.

David Whitaker, BRS25429, had been largely inactive on the hf bands and had taken the chance to reflect on his 1·8MHz QSLs. David is most keen to have all his 100 plus countries on the band confirmed and is having trouble obtaining cards from TG9NX and FM5WS. If anyone can suggest a 100 per cent QSL route for these two stations, David will be obliged. Drop me a line, and I will pass the details on to David on the landline. Elsewhere on 1·8MHz, he had received verifications from 8R1RPN, TA2BK, HK4DUM and WB5YWU/HR1 to take him to 109 confirmed. David advised that there now seems to be some ssb activity on 24MHz. He had heard an EA5, but best dx was undoubtedly KV4AD. Has anyone else heard any ssb around 24·95MHz?

Robert Small, BRS8841, provided his usual list of interesting dx from his Stowmarket QTH. KH6JEB/KH4, C2/WB6GFJ, T32BC, KA2HH (Ogasawara Is), LA1EE/KH0 and ZK2DD had been heard on 14MHz from the Pacific, while XX9TT and BY5RT had been heard from Asia. On the "new" bands, Robert had heard an IS0 and an OE on 18MHz, but copied J6LAD/9Y4 and PZ1DV on 10MHz. On the QSL front, he had received a card from DL7FT/SV/A (Mount Athos) and VU4APR/RB1 (Andaman Is). Others of note were from ZY0ZZB, VP9BP/KH6, FO5BI, 3C2A and W5WMU/C6A.

Brad Bradbury, BRS1066, has been fairly inactive, too, but his thoughts wandered back in time to his early listening days after he had been notified that he had won the Golden Jubilee Commonwealth Contest. He collected his trophy at the National Exhibition Centre in September. Brad entered his first BERU in 1933 when he was seventh out of 24 entries. He was sixth in 1934 and fourth in 1935 from 29 entries. His first contest success was in 1935 when he won the 1·7/3·5MHz contest, which had 13 entries. He has dusted off 54 years worth of *Bulletins* and *Radio Communications* and had found some of the very early ones extremely interesting to look back on. Coming more up to date, he had heard his 178th Russian Oblast with the latest batch of cards from the bureau bringing him his 151st confirmation.

SWL Trophy

A brief mention of the UBA SWL Trophy results. This year saw the first running of this contest which coincided with the ssb and cw legs of the WPX Contest. The idea of the contest was rather innovative in that the swl could fix his own listening periods of three hours on each of the two days. Much judgement was therefore required to gauge the best six hours to use. Somehow, I managed to win the ssb leg, logging 539 stations in six hours, beating ONL-620 and ONL-2500 into second and third places. There were only 3,300 points between the top three stations and 42 swls entered. In the cw leg, our friend Jean-Jacques again conquered all, beating second place IA4-33469 by the staggering margin of 61,000 points!

Award publications

With Christmas approaching, I thought that readers might like one or two ideas for presents.

For those interested in chasing awards, *The International Award Guide* might be just what you were looking for. It consists of 434 A4 pages and has details of 1,027 awards from 72 countries. There are 371 illustrations and 116 lists of stations, cities, provinces etc. As you would expect with a book of this size, it is not cheap. It costs US$34 or 58 ircs. If anyone is interested, it can be obtained from Ieperse Radio Club v z w, Box 32, B-8900 Ieper, Belgium.

Also on the awards scene, we have the *K1BV DX Awards Directory*. This features 680 different awards from 73 countries, and includes hints for getting the QSLs. The cost is more in keeping with an swl's pocket, costing US$16.75 or equivalent ircs. It can be obtained from K1BV, 525 Foster Street, Suite 1001, South Windsor, CT 06074, USA.

VHF happenings

First, some information from mid-France from Michel Monteil. He has been quite active as GJ6WDK/P and had worked almost 400 stations during his stay. All swl reports will be QSLed. (I hope you have mine, Michel.) When he returned to JN15, he heard some fine sporadic-E on 26 July; SV1OE (KM17VX) at 1100. LX1DB was heard via short skip Es at 1545. From 1700 to 1745 he heard SV1OE again, IK8FGM/8 (JN89), SV1JO (KM17), SV1AB (KM18), SV1EX (KM17), YU7AR (JN83), YU2UH (JN83), YU8HYR (KN02) and IC8EGJ (JN70). 7 August provided SV1DH (KM27).

Mick Toms, BRS31976, gave a resume of the Perseids meteor shower from his Essex QTH. He started copying ms signals as early as 19 July when SM2CEW was heard. Others logged included OY/LA6HL, HG7SH/P, HG4XG, YU1UN, YU5CEF, and HB0/HB9QQ for country no 35. All these on cw. On ssb, he heard OK2KZR, LA1C, SM2BLY, SK3LH, UC2OEU and Y27BL. Mick heard 14TDK via Es on 28 July and an SV in LA26c who faded out before he copied the full callsign. The big event, however, was the fine tropo on 12 August when Mick heard F1ADT (ZE), FC1AJE (AF), FD1GTW/P (ZF), FC1JII (AD) and I1TEX (DF). At my QTH, much dx in southern France was heard, but also, the first Italians on tropo were heard: I4BXN (FE), IK2DMF, I2FHW and I2FAK.

David Whitaker mentioned the good tropo over the 29/30/31 August. OK1FM/P (JO60), Y25QL/P (GL), OK1KRA (JO70 – 1,168km) and GM4DMA/A in "wet" square JO08 were heard. At around 1650 David copied GM1KHU (IO87) via aurora. The same opening further south gave

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1987 UHF/VHF TABLE

The table appears for the first time this year due to lack of space. Because four bands appear, the scores shown are a total of countries and squares added together.

Station	50MHz	70MHz	144MHz	432MHz	Total
BRS32525	40	7	133	40	220
BRS25429	0	0	83	43	126
F11ATZ	0	0	94	27	121
BRS31976	0	9	88	0	97

1987 COUNTRIES TABLE

(hf updates)

Station	DXCC	28	21	14	Total
BRS8841	229	64	157	215	436
BRS25429	208	70	130	198	398
ORS45992	?	54	124	138	306
BRS1066	154	50	85	143	278
F11ATZ	116	57	73	69	199
BRS87677	97	18	54	87	159
BRS20249	82	20	36	73	129
BRS31976	55	55	0	0	55

(lf updates)

Station	DXCC	7	3·5	1·8	Total
BRS25429	176	150	146	69	365
BRS52543	138	103	115	65	283
BRS1066	113	103	61	51	215
BRS31976	?	0	72	56	128
BRS87677	76	50	57	2	109
BRS20249	64	46	41	8	95
ORS45992	?	53	28	5	86

OK2BFH/P (JN99) on tropo and OK3LQ via ms, plus OE5VRL/5 (JN78), OE3XUA (HH10b) and OE5ECM. A pity that this opening did not occur a week later during the 144MHz Contest.

Finale

News, views and comments for inclusion in January's issue should reach me by 10 November. □

DATA COMMS

*Ian Wade, G3NRW**

Sixth ARRL Amateur Radio Networking Conference

Redondo Beach in California was the venue in August of the latest in a series of networking conferences sponsored by ARRL. These conferences are the mecca of packeteers worldwide, with contributions from the gurus and down-to-earth practitioners alike.

As usual, the mainstream of the conference was devoted to the presentation of formal papers. These included:

Estelle: A Formal Description Technique for Communications Protocols by Michel Barbeau, VE2BPM.

OSI: A Plan Comes Together by J Gordon Beattie Jr, N2DSY and Thomas A Moulton, W2VY.

A High Performance Packet Switch by Mike Brock, WB6HHV, Franklin Antonio, N6NKF and Tom Lafluer, KA6IQA.

The KISS TNC: A Simple Host-to-TNC Communications Protocol by Mike Chepponis, K3MC and Phil Karn, KA9Q.

Digital Signal Processing and Amateur Radio by Dr Thomas A Clark, W3IWI and Dr Robert W McGwier, N4HY.

A Duplex Packet Radio Repeater Approach to Layer One Efficiency by Robert Finch, N6CXB and Scott Avent, N6BGW.

Packet Radio Developments over the Last Year by Terry Fox, WB4JFI.

Thoughts on the Issues of Address Resolution and Routing in Amateur Packet Radio TCP/IP Networks by Bdale Garbee, N3EUA.

The Design of a Mail System for the KA9Q Internet Protocol by Bdale Garbee, N3EUA and Gerard van der Grinten PA0GRI.

A Bit Error Rate Tester for Testing Digital Links by Steve Goode, K9NG.

A 56Kaud RF Modem by Dale A Heatherington, WA4DSY.

Reusable IP Addresses in a Dynamic Network by Robert B Hoffman, N3CVL.

Software Design Issues for the PS-186 Advanced Packet Network Controller by Brian Kantor, WB6CYT.

Another Look at Authentication by Phil Karn, KA9Q.

A High Performance Collision Free Packet Radio Network by Phil Karn, KA9Q.

The KA9Q Internet (TCP/IP) Package: A Progress Report by Phil Karn, KA9Q.

Approach for Digital Transmission of Pictures by Thomas Kieselbach, DL2MDE.

RUDAK—The Packet Radio Experimental On-Board Oscar P3C by Hanspeter Kuhlen, DK1YQ.

Improving Shared Channel Access Techniques for Amateur Packet Radio by Brian Lloyd, WB6RQN.

The Noise Performance of Several Data Demodulators by Hugo Lorente, LU4DXT.

Overview of the TEXNET Datagram Protocol by T C McDermott, N5EG.

CSMA Multihop Networks: Throughput Analysis by Dr Robert W McGwier, N4HY.

DSP Modems: It's Only Software by Dr Robert W McGwier, N4HY.

HF Packet: Where do we go from here? by Barry D McLarnon, VE3JF.

FINDER: The Family Information Database for Emergency Responses by W E Moerner, WN61, Sharon Moerner, N6MWD and David Palmer, N6KL.

Dial "O" for Operator: Message Routing in the Amateur Packet Network by Thomas A Moulton, W2VY.

Packet Radio and IP for the UNIX Operating System by Clifford Neuman, N1DMM, Wayne Yamamoto.

Pacgram Messaging Protocol for Packet Networks by Jay Nugent, WB8TKL.

Performance Monitoring, or I Wanna Fix It, Is It Broke? by Skip Hansen, WB6YMH and Harold Price, NK6K.

ASC X12.A-1985: Draft Proposed American National Standard for Electronic Business Data Interchange Amateur Radio Message Transaction Set by Jack Sanders, NC4E.

Design Abstractions for Protocol Software by Paul Taylor, VK2BLY.

An extremely interesting list of topics. Copies of the proceedings are available from ARRL HQ. Extracts will be published in RSGB's packet newsletter *Connect International*.

Packet in Ireland

Gerry Lawlor, EI9FV, reports there are now some 16 stations active on packet in the Dublin area, with a mixture of PK-232, G0BSX, Digicom 64, and MFJ tncs. There is also a seventeenth station who is a pirate, but they haven't tracked him down yet! The Dublin Repeater Group is working on getting approval for a digipeater on Kippure mountain, where the main tv transmitter operates at 2,475 ft asl. From there it is possible to work into the west coast of Ireland and into GI with little difficulty, using just a simple dipole. Plans to link various parts of the country with NET/ROM (described in last month's *Data Comms* column) are well advanced, and they are looking forward to linking to the new digipeater at Llandudno (GB3LP) to gain access to the main UK network.

Around the groups

The August issue of *AMRAC User* contains the usual chatty mixture of news, views and technical articles. These include how to get on packet with a Commodore 64, and how to apply for a licence to receive meteorological broadcasts (including a sample letter of application stating that the purpose of receiving such transmissions is to predict the best time to water the petunias!). On a more practical front, there are full details of a circuit for the PK-232 to allow it to operate on cw (!), and a particularly interesting contribution from G4CJO describing how to drive the PK-232 and PK-87 tnc's in host mode (although why this information is not included with the tncs documentation in the first place is beyond me). More details on AMRAC from Phil Bridges, G6DLJ.

SARUG's July/August newsletter has an interesting article by Neill Taylor, G4HLX, on using a nickel spray (type YM86T from Maplin) on the inside of his Spectrum Plus Two to reduce rfi hash on 144MHz from S9 + 20 down to a level too low to move the S-meter. Not a particularly new idea perhaps, but worthwhile reading about, especially if you experience the same horror as Neill when he discovered that the machine did not work after treatment. (Incidentally, Phil Bridges of AMRAC mentions other horror stories of people who coated the inside of their Beebs in a similar way, but found after a period of time that the coating started to flake away, resulting in pieces of conductive paint dropping onto the pcb, with disastrous results. Clearly this is a job that has to be done properly). Lots more Sinclair and Amstrad hints and tips in SARUG's newsletter. Details from Paul Newman, G4INP.

And finally, BARTG's agm takes place on 7 November. G4EAN has the details. □

* 7 Daubeney Close, Harlington, Dunstable, Bedfordshire LU5 6NF.

Club News

The following is the latest information received by RRs from the RSGB affiliated societies, clubs and groups in time for inclusion in the issue. Basic unchanged information on other affiliated organisations will be published again in January 1988.

RSGB affiliated organisations are requested to report all programmes and new items to their regional representatives regularly. Information for inclusion in the **January** issue should reach them by **9 November**, and for the **February** issue by **1 December.**

Club programmes are given in order of date, subject, time and place of meeting. All callsigns of club secretaries and other contacts are QTHR (correct in the current *RSGB Call Book*) unless otherwise stated.

All clubs welcome visitors and would be pleased to hear from potential new members.

REGION 1—RR B Donn, G3XSN, 7 Thurne Way, Liverpool L25 4SQ Tel 051-722 3644.

Blackburn (ELARC, G3NTJ/G1ELC)—3 Nov (Home construction), 1 Dec (AGM). 7.30pm. Conservative Club, Cliff St, Rishton. Details G6LXU, tel 0254 887385.

Bury (BRS, G3BRS)—10 Nov (tba), 8 Dec (AGM). 8pm. Mosses Community Centre, Cecil St, Bury. Details G1VQE, tel 061-796 5296.

Chester (C&DARS, G3GIZ/G8GIZ)—3 Nov (Committee meeting), 10 ("The TR 940S", G4JMF), 17 ("Clandestine radio part 2", G3LEQ), 24 (tba), 1 Dec (Committee meeting). 8pm. Chester RUFC, Hare La, Vicars Cross, Chester. Details G6IFA, tel Chester 336639.

Darwen (DARC, G4JS)—11 Nov (Surplus equipment sale). 7.30pm. Highfield WMC, Ratcliff St, Darwen. Sec G2AKK, tel 0254 73767.

Fylde (FARS)—3 Nov (equipment sale), 17 (Informal). 7.45pm. The Kite club, Blackpool Airport. Sec G8GG, tel 725717.

Liverpool (L&DARS, G3AHD/G8WCL)—Tuesdays, 8pm. The Churchill Conservative Club, Church Rd, Liverpool 15. Members also meet at the Albert Dock complex on Thursdays at 10am for coffee, ragchew and lunch. Sec Lynn, tel 051-728 8811.

Manchester (South MRC G3VFA/G3UHF)—6 Nov (Annual dinner at the Belmore Hotel, Sale 7.30pm for 8pm), 13 ("Waste disposal", G1UOI), 20 (And now for something completely different), 27 ("The past 15 years in colour", slide show, G3FNM). 8pm. Sale Moor Community Centre, Norris Rd, Sale. Details G2AKR.

Penrith (Eden Valley RS)—19 Nov (Junk sale). 7.30pm. Ullswater Centre. Sec G4FUI, tel Penrith 66728.

Preston (PARS)—5, 19 Nov (tba). 7.45pm. Lonsdale Club, Fulwood Hall La, Fullwood, Preston. Details Godfrey, tel 0772 53810.

Stockport (SRS)—11 Nov (G3FYE Memorial Lecture: "The role of radio in British Telecom's modernised network", G3NOM), 25 (Construction competition), 9 Dec (AGM). 8pm. Note new venue: Dialstone Centre, Lisburne La, Offerton, Stockport. Sec G4ECI, tel 061-439 3831.

Thornton Cleveleys (TCARS)—2 Nov (Auction), 9 (Informal), 16 ("Technical topics", G4BFH), 23 (Informal), 30 (NARSA briefing). 7.45pm. 1st Norbreck Scout HQ, Carr Rd, Bispham, Blackpool. Club net Sundays 11am. G4ATH on 1·865MHz. Details G4BFH, tel 0253 853554.

Wigan (Douglas Valley ARS, G3BPK)—12 Nov (Surplus equipment sale). 8pm. Standish Conservative Club, School La, Standish, nr Wigan. Details G0FIB, tel Wigan 213325.

Wirral (WARS)—4 Nov ("An antenna tuning unit", G3CSG), 18 ("Marine radio part two", G3LCI), 2 Dec ("Practical packet" G3VQT). 8pm. Club Room, Ivy Farm, Arrowe Park. Sec G3VEB.

Wirral (W&DARC)—11 Nov (Chairman's night). 8pm. Irby Cricket club, Mill Hill Rd. Details G1VHO, tel 051-625 5490.

Woodford (RATEC)—16 Nov ("Telecoms in north Africa", G3VSW), 30 ("The good old days", G2AKR). 8pm. British Legion Club, Moor La, Woodford, nr Bramhall, Cheshire. Details G4SFU, tel 061-485 3912.

Wyre (WARS)—11 Nov (Distribution of AGM info), 25 (AGM with pie and peas supper). 8pm. Breck Squash Club, Breck Rd, Poulton. Sec G4UHI, tel 0253 854745.

By the time you read this, the RLOs will have been nominated. I will not be putting myself forward for election as, after three and a half years, I intend to devote more time to my family and possibly to get back onto the hf bands. I wish to thank all the members and clubs within the region for the respect and courtesy shown to me. This in turn has made my job very worthwhile. My thanks also go to the "the team": the President, Council members, zonal rep, committee chairmen, the editor of *Radio Communication* and the staff at Potters Bar. *RR1*

REGION 2—RR P Sheppard, G4EJP, 9 Elvington Crescent, Leconfield, Beverley, N Humberside, HU17 7LX. Tel 0401 50397

Barnsley (UK FM Group Northern G8KRM)—1 Nov (AGM). Royal Hotel, Barnsley. Details G4UNA.

Goole (GR&ES G0GLE)—6 Nov (Natter night), 13 (Quiz), 20 (Morse testing), 27 (Social evening). 8pm. The Pavilion, West Park. Details G0GLZ, tel 0405 69968.

Halifax (H&DARS, G2UG)—17 Nov ("Japan", G0BIG). Running Man ph. Details G0DLM, tel 0422 202306.

Halifax (Northern Heights ARS G4NOK)—4 Nov ("Calderdale talking newspaper", G0BCI), 18 (Junk sale). Bradshaw Tavern, Halifax. Details G3UI, tel 0422 60574.

Hambleton (HARS)—2 Nov ("Log check with a computer program"), 16 ("Professional sound recording", G0ASC). Alletonshire School west. Details G1XLZ, tel 0609 775478.

Keighley (KARS RS84851)—10 Nov (Informal meeting), 24 (Films). Victoria Hotel. Details G1IGH, tel 0274 496222.

Leconfield (RCTARS G4GGD)—19 Nov (Monthly meeting). Normandy Barracks. Details G4EJP, tel 0401 50397.

North Ferriby (NFUARS, G0ECR)—13 Nov ("The last jump", G4CMT), 27 (Bring and buy sale. All local amateurs welcome). North Ferriby FC. Details G1LSZ, tel 0482 493777.

Sheffield (SARC)—9 Nov ("Junk sale and sausage spectacular"). 8pm. Firth Park Pavilion, Sheffield. Details G8ZHG, tel 0742 395287.

Spen Valley (SVARS, G3SVC)—5 Nov (Club project), 19 (Home brew evening). 8pm. Old Bank WMC, Mirfield, W Yorks. Details G4PHR, tel 0924 499397.

Todmordern (T&DARS, G4WYT)—2 Nov (Bash the committee), 16 (Natter night). Queen Hotel. Details G1GZB, tel 0706 817572.

Wakefield (North Wakefield RC G4NOK)—5 Nov (Bonfire night), 12 (On the air), 26 (Monthly meeting). White Horse ph. Details G4RCH, tel 0532 536633.

Wakefield (W&DRS G3WRS)—3 Nov (Pea and pie supper at G4OVW QTH), 17 (Talk by G1LTU), 22 (Visit to Jodrell Bank), 24 (Novelty project judging). Ossett Community Centre. Details G4VRY, tel 0532 820198.

York (YRCA G4YRC)—10 Nov (Cheese and wine XYL/OM night), 24 (Bring and buy junk evening). Ashcroft Hotel, York. Details G3WQM, tel 0904 793672.

REGION 3—RR G Ross, G8MWR, 81 Ringwood Highway, Coventry, CV2 2GT. Tel 0203 616941

Atherstone (AARC)—9 Nov (RSGB film), 23 (AGM). Upper School, Long St, Atherstone. Sec G4IWA, tel 0827 373670/393518.

Birmingham (Midland ARS)—17 Nov (Home construction competition). Meetings every weekday. Unit 5, Henstead House, Henstead St (off Bromsgrove St). Sec G8BHE, tel 021-422 9787.

Birmingham (Mirfield ARC)—18 Nov (Natter night). Meetings every weekday. 7pm. Mirfield Centre, Lea Village, Birmingham. New sec G0FIX, tel 021-784 4741.

Halesowen (Midlands ES&SC, G4MEB)—10 Nov ("Coping in Kenya", G6RYG), 24 (General meeting). 8pm. MEB Social Club, Mucklow Hill, Halesowen. Sec G4RWH, tel 021-747 8784.

Hereford (HARS)—6 Nov (Junk sale), 20 ("Low cost lattice beam antenna", G4FFD). 8pm. All formal lectures take place at the Three Counties Training Centre, 12a The Cattle Market. All other meetings are held at the Civil Defence HQ, Gaol St, Hereford. Sec G3WRQ, tel 0432 54064.

Malvern Hills (MHARC)—10 Nov (RSGB video night). 8pm. Red Lion Inn, St Anne's Rd, Malvern. Sec G4BVY, tel 06845 66822.

Rugby (RATS)—3 Nov (Fireworks and barbecue), 10 (IBA talk), 24 (Contest planning night). 7.30pm. Cricket pavilion, B entrance, Rugby radio station. Sec G8TWH.

Shrewsbury (Salop ARS)—5 Nov ("Model steam engines", G0EBD), 19 ("Shropshire lead mines", G4ZZP). 8pm. Old Bucks Head, Frankwell, Shrewsbury. Sec G0EIY, tel 0743 67799.

Solihull (SARS)—19 Nov (Surplus sale). The Shirley Centre, Stratford Rd, Shirley. Sec G8AYY, tel 021-783 2996.

Stratford-upon-Avon (SuA&DRC)—9 Nov ("Converting cb equipment", G4VZH), 23 ("Security alarms). 7.30pm. Baptist Church, Payton St, Stratford-upon-Avon. Sec G8OVC, tel S-u-A 750584.

Telford (T&DARS)—4 Nov (Construction night), 11 (SSB field days), 18 (Junk sale), 25 (Surprise speaker). 8pm. Dawley Bank Community Centre, Dawley, Telford. Sec G1JNZ, tel 0952 592317.

Warwick (Mid WARS)—10 Nov (Video night at Warwick School), 24 ("Aircraft radio", G3TCF). 8pm. St John Ambulance HQ, 61 Emscote Rd, Warwick. Sec G0HIH, tel Marton 632370.

Willenhall (W&DARS)—4 Nov ("Microwaves", G0DJA). 8.15pm. Cross Keys, Willenhall. Sec G0EGG, tel 0902 734475.

Wythall (WARC)—3 Nov (Committee meeting), 10 & 24 (Night on the air). 7.30pm. Community Centre, Silver St, Wythall. Sec G0EYO, tel 021-430 7267.

REGION 4—RR M Shardlow, G3SZJ, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. Tel 0332 556875

Derby (DADARS)—4 Nov (Junk sale), 11 (Visit to a communications facility), 18 ("Lighter moments of test flying Rolls Royce engines", H C Rogers OBE, DFC), 25 (Visit by SMC (Jack Tweedy) Ltd), 2 Dec (Junk sale). 7.30pm. 119 Green La, Derby. Sec G3KQF, tel Derby 772361.

Leicester (LRS)—2 Nov (Night on the air), 9 (Committee meeting), 16 ("HF antennas", G4FIB), 23 (Night on the air), 30 (tba). 7.30pm. Gilroes Cottage, Groby Rd, Leicester. Sec G4PDZ, tel Leicester 871086.

Loughborough (LADARC)—6 Nov (AGM), 13 (Audio visual with G0FTT), 17 (Annual dinner), 24 (Construction night), 1 Dec (Night on the air, vhf). 7.30pm. Hind Leys Community College, Forest St, Shepshed. Sec G0FTT.

Spalding (SADARS)—12 Nov (Construction contest). 7.30pm. The Ship Albion, Albion St, Spalding. Sec G4NBR.

REGION 5—RR J S Allen, G3DOT, 77 Rosslyn Crescent, Luton LU3 2AT Tel 0582 508515

Dunstable (DDRC)—13 Nov (RAE open evening). 8pm. Room 3, Chews House, 77 High St, South Dunstable. Sec G0COQ, tel 0582 508259.

Luton (Kent Process Controls Ltd ARC)—As the secretary and callsign holder has now retired this club is in abeyance. Details G3DOT.

Milton Keynes (MK&DARS)—The Meeting Place, Hodgelea, North Milton Keynes. New Sec G0GOF, tel 0234 767904.

Shefford (S&DARS)—Note new venue. Thursdays, 8pm. Church Hall, Silsoe Rd, Shefford. The club secretary has recently moved QTH and his new telephone number is not available.

REGION 6—RR N P Taylor, G4HLX, 87 Hunters Field, Stanford in the Vale, Faringdon, Oxon SN7 8ND. Tel 03677 503

Banbury (BARS)—4 Nov ("Emergency planning", Assistant EPO), 18 ("Construction kits", Dave Howes), 7.30 pm. "The Mill", Spice Ball Park, Banbury. Sec G1IIO, tel Banbury 51774.

Bracknell (BARC)—Second Wednesday of the month, 8pm. The Coopers Hill Community Centre, Bracknell. Sec David Sugden, tel 0734 733140.

Chesham (C&DARS)—4 Nov (Natter night), 11 ("High power linear amps".) 18 (AGM), 25 ("The history of stereo", G4BPC). 8pm. Stable Loft, Bury Farm, Pednor Rd, Chesham. Sec G0ETU, tel 09278 3911.

Didcot (Vale of White Horse ARS)—3 Nov (rig clinic), 17 (tba), 7.30pm. The Waterwitch, Cockroft Road, Didcot. Sec G4SYL, tel Didcot 816845.

Harwell (HARS)—17 Nov (Antenna forum), 7.30pm. Harwell Lab Social Club. Sec G6LNU, tel Wantage 68453.

High Wycombe (Chiltern ARC)—25 Nov (tba). 8pm.

Sir William Ramsay School, Rose Ave, Hazelmere. Details G4XVP, tel 0494 33377.
Maidenhead (M&DARS)—5 & 17 Nov (tba). 7.30pm. Red Cross Hall, The Crescent, Maidenhead. Sec G3VTS, tel Maidenhead 25443.
Oxford (O&DARS)—11 Nov (Natter night), 25 (tba). 7.45pm. Oxford Civil Service Sports Association Club, Govt Buildings, Marston Rd, Oxford. Sec G4PUU, tel Oxford 52859.
Reading (R&DARC)—10 Nov (Alignment evening), 24 (Construction contest). 8pm. Clubroom, White Horse, Emmer Green, Reading. Details G4YFB, tel Reading 867820.
Slough (Burnham Beeches RC)—2 Nov (Natter night & computer forum), 16 ("From resistors to cream box: designing an hf transceiver", G4XOW). 8pm. Haymill Community Centre, 112 Burnham Lane, Slough. Details G6EIL, tel Maidenhead 25720.

REGION 7—RR R Sykes G3NFV, 16 The Ridgeway, Fetcham, Leatherhead, Surrey KT22 9AZ Tel 0372 372587

Ashford (Echelford ARS)—9 Nov ("Propagation 3", G3LTP), 26 (tba). 8pm. The Hall, St Martins Court, Kingston Crescent, Ashford, Middx. Sec G4VAZ, tel Sunbury 783823.
Bexleyheath (North Kent RS)—3 Nov (Valve construction contest), 17 ("Awards", G3DCC), 24 (Annual dinner). 8pm. The Pop-in-Parlour, Graham Road, Bexleyheath. Sec G4DIB.
Cray Valley (CVRS)—5 Nov (tba), 19 (Natter night), 8pm. Progress Hall, Admiral Seymour Road, Eltham SE9. Details G3TAA.
Crystal Palace (CP & DRS)—21 Nov ("Power supplies", G3OOU). 8pm. All Saints Parish Room, Upper Norwood, SE19. Sec G3FZL, tel 01-699 6940.
Dorking (D & DRS)—10 Nov (Informal at the Falkland Arms), 24 (tba). Sec G3AEZ, tel 0306 77236.
Kingston (KDARS)—18 Nov (AGM). 8pm. "Alfriston", 3 Berrylands Road, Surbiton. Details G3IMK, tel 01-397 6924.
Redhill (RATS)—17 Nov ("The USSR radio amateur scene", G3FXB). 8pm. Constitutional and Conservative Club, Warwick Road, Redhill. Details G3YSX.
Sutton and Cheam (S & CRS)—20 Nov ("BBC external services"). 8pm. Downs Lawn Tennis Club, Holland Avenue, Cheam. Sec G0BWV.
Thames Valley (TVARTS)—3 Nov ("Radio Free Europe", G4JG). 8pm. Thames Ditton Library, Watts Road, Giggs Hill, Thames Ditton, Surrey. Sec G3ENI.
Wimbledon (W & DRS)—13 Nov (General activity), 27 (Mini lecture) 8pm. St Andrews Church Hall, Herbert Road, Wimbledon SW19. Sec G3DWW, tel 01-540 2180.

REGION 8—RR M Elliott, G4VEC, 20 Haysel, Sittingbourne, Kent ME10 4QE Tel 079570132

Burgess Hill (Mid-Sussex ARS)—5 Nov ("Fireworks on the air"), 12 ("Remote imaging", G3YXO), 19 (Operating evening), 26 ("Stories from behind the controls", G3IEE), 3 Dec (Operating evening), 4 (Annual dinner). 7.45pm. Marle Place, Leylands Road, Burgess Hill. Details G0GNV, tel Burgess Hill 41407.
Dartford (DDFC)—3 Nov (Pre-hunt meeting), 8 (DF hunt). Pre-hunt meeting at Horse & Groom ph, Leyton Cross, after 9pm. Details G8DYF, tel Greenhithe 844467.
Dover (SE Kent YMCA ARC)—4 Nov (Natter night), 11 (144MHz fox hunt), 18 (Natter night), 25 (Winter project discussion. High grade 10A psu). Dover YMCA, Godwynehurst, Leyburne Road, Dover. Details John Dobson, Flat 3, 145 Snargate St, Dover, CT17 9BZ.
Eastbourne (Southdown ARS)—2 Nov ("Model railways", Chris Hissingdah). 7.30pm. Chaseley Home, Southcliffe, Bolsover Rd, Eastbourne. Classes and meetings also held every Tuesday and Wednesday. 7.30pm. Hailsham Leisure Centre, Vicarage Lane, Hailsham. Sec G1UTH, tel Crowborough 63061.
Gillingham (Bredhurst R&TS)—5 Nov (Construction and natter night), 12 ("AX·25", G4VSZ), 19 ("The G4EGH ingenuity trophy"), 26 ("Regenerative receivers", G4EGH), 3 Dec (Construction and natter night). 7.30pm. Parkwood Community Centre, Parkwood Green, Wigmore Gillingham. Details G0AMZ, tel Medway 376991.
Hastings (HERC)—18 Nov ("Compact disc", Philips). 7.30pm. West Hill Community Centre, Croft Road, Hastings. Details G4NVQ, tel Hastings 420608.
Herne Bay (East Kent RS)—5 Nov ("Kanga Products"), 19 (Natter night). 7.30pm. Cabin Youth Centre, Kings Road, Herne Bay. Details G4RIS, tel 0227 262042.
Horsham (HARC)—5 Nov ("HF rx performance evaluation", G3SJX), 3 Dec (AGM). 8pm. Guide Hall, Denne Road, Horsham. Sec G4UDU, tel Worthing 60695.
Maidstone (MYMCAARS)—6,20 Nov (Natter night, RAE and cw), 13 (Junk sale), 27 (Construction contest), 4 Dec (Natter night with RAE and cw). 8pm. YMCA Sportscentre, Melrose Close, Maidstone. Details G0BUW, tel 0622 30544.
Margate (Radio Club of Thanet)—10 Nov (Junk sale), 24 (Talk by G3VTT). 7.30pm. Grosvenor Club, Grosvenor Place, Margate. Sec G1HWG, tel 0843 42480.
Worthing (W&DARC)—4 Nov (Lecture, tba), 11, 25 (Ragchew and workshop), 18 (tba). 7.30pm. Lancing Parish Hall, South Street, Lancing. Details G4GPX, tel 0903 753893.

Many thanks for the courtesy extended to me during my visit to the Hilderstone Radio Society. *RR8*

REGION 9—RR A H Hammett, G3VWK, Rosehill, Ladock, Truro, Cornwall, TR2 4PQ Tel 0726 882758

Axminster (Axe Vale ARC)—6 Nov (Junk sale). Details G3VW, tel Lyme Regis 5282.
Barnstaple (North Devon RC)—4 Nov, 2 Dec (tba), 7.30pm. The Microcentre, Unit 1, Barbican Industrial Est, Barnstaple. Details G4LST, tel 0805 23 764.
Exeter (EARS)—9 Nov (tba). 7.30pm. Community Centre, St David's Hill, Exeter. Details G3YBK, tel 0392 78 710.
Exmouth (EARC)—4 Nov (Construction contest), 18 (Visit to Exeter fire station), 2 Dec (Christmas dinner). Details G1GZG, tel 0395 274 172.
North Cornwall (NCRC)—4 Nov, 2 Dec (tba). Details G0DBD, tel Bude 4976.
Redruth (CRAC)—5 Nov (Surplus equipment sale), 9 ("Improved CP/M systems", G3OCB), 18 (Activities evening), 3 Dec (Natter session and Christmas party). 7.30pm. Church Hall, Treleigh, Redruth. Details G4ZUI, tel Stithians 860 572.
Saltash (S&DARC)—6 Nov (AGM). 7.30pm. Toc H Hall, Warraton Rd, Saltash. Details G0AKH, tel Saltash 3277.

REGION 10—D H Phillips, GW4KQ, 54 Oaklands Rd, Bridgend, Mid Glam CF31 4SN Tel 0656 60819

Bristol Channel Repeater Group (GB3BC)—Members are reminded that renewal subscriptions (£2) are now due and should be sent to Mr R J Sellek, GW6MBU, 12 Norseman Cl, Rhoose, S Glam, CF6 9FY, tel 0446 711146. Support from new licensees and users would be welcomed.
Cardiff (CRSGBG GW5BI)—9 Nov ("Air traffic control", GW4SRO). 7.30pm. Pant Mawr Hotel, Tyla Teg, Pant Mawr Estate, Whitchurch, Cardiff. Sec GW0CUM, tel 04463 3212.
Cardiff (Highfields ARC GW4LFO, GW1LFO)—5 Nov (Bonfire natter night), 12 (Technical lecture with GW4HWR), 19 (Workshop with GW4REX), 26 (AGM). Sec GW6ZHM, tel 0222 750315.
Newport (NARS GW4EZW, GW1NRS)—2 Nov (Eisteddfod meeting hopefully with a talk from a member of the Eisteddfod organising committee. We would like to invite members from all radio clubs in Gwent to attend as help will be appreciated in running the special event station at the Newport National Eisteddfod Summer 1988. Sec GW4IED, tel 0633 280958.
Powys (PARC GW4HVN)—12 Nov (Junk sale). 7.15pm. Sec GW4DWX, tel 0938 2068.
Swansea (SARS GW4CC)—3 Dec (AGM in College House, buffet to follow). 7.30pm, Room 303, Applied Sciences Bldg, University College of Swansea. Details GW0BBO, tel 0792 818100.

Thanks to all club secretaries who have sent me information. We still need more if the list is going to reflect what is going on in the region. *RR10*

REGION 11—RR B H Green, GW2FLZ, 1 Clwyd Court, Tan-y-Bryn Road, Colwyn Bay, Clwyd LL28 4AH Tel 0492 49288

First North Wales Radio Rally. 78 Nov at The Averconwy Conference Centre, Llandudno Promenade. Opens 11am each day, 10.30am for disabled visitors.
Colwyn Bay (Conwy Valley ARC GW6TM)—12 Nov (Junk sale). 8pm. Sec GW0DSL, tel 07456 5529.
Deeside (Alyn & DARS)—3 Nov (Construction contest), 17 ("Glass blowing", GW1MIK), 1 Dec (Technical evening with GW0EHB), 6 (144MHz contest), 15 (Christmas social and supper). 8pm Shotton Social Club, Shotton La, Deeside. Sec GW1ILZ.
Porthmadog (P&DARS)—19 Nov (tba). 8pm. Harbour Cafe, Ffestiniog Railway, Porthmadog. Sec GW1EGQ, tel 0766 2684.
Welsh Language Group—Wednesdays at 1115gmt on 3·750MHz. Join the net for discussions in the Welsh language, net controller GW2HFR.
Will club secretaries please send details of their future events for March 1988 onwards to enable them to be passed to the liaison officer for Area 46 *RR11*

REGION 12—RR M R Hobson, 17 Well Brae, Pitlochry, Perthshire PH16 5HH Tel 0796 2140 Prestel 107962140

Aberdeen (AARC)—6 Nov (Junk sale), 13 (AGM), 20 (Presidential address), 27 ("Computers", GM8FFX), 6 Dec (Junk sale). 7.30pm. 35 Thistle La, Aberdeen. Sec GM4GXD, tel Pitcaple 251.
Caithness (CARS)—11 Nov (AGM—a good turnout is requested). 7.30pm. Loch Watten Hotel, Watten. Sec GM1VGZ, tel 0847 82632.
Elgin (Moray Firth ARS)—2 Nov ("Satellites"). 7.30pm. Mill of Tynet Hotel, nr Fochabers. Sec GM4IZY, tel Elgin 41549.
It was a pleasure to meet so many amateurs at the society stand at SARCON 87. An excellent venue, and the raffle defied description. *RR12*

REGION 14—RR T G Wylie, GM4FDM, 3 Kings Crescent, Elderslie PA9 AD Tel Johnstone (0505) 22749

Kilmarnock (K&LARC)—3 Nov (Arrow Electronics — the latest gear), 17 (Mini quiz), 1 Dec ("DXing and awards", GM3ITN). The Glenfield Social Club, Queens Drive, Kilmarnock. Sec GM1VZF, tel 0563 24665.
Will secretaries please note that I now have no programme information and require same urgently. *RR14*

REGION 16—RR Alan Owen, G4HMF, 102 Constable Road, Ipswich, Suffolk IP4 2XA.

Bury St Edmunds (BStEARS)—17 Nov ("Weather forecasting", G3YLA). 7.30pm. County Upper School, Beetons Way, Bury St Edmunds. Details G1FUU, tel 0359 50271.
Chelmsford (CARS)—3 Nov (Junk sale), 1 Dec ("Packet radio", G0ELM & G4JUV). 7.30pm. Marconi College, Arbour Lane, Chelmsford. Details G4KQE, tel 0376 83094.
Colchester (CRA)—12 Nov ("Brazilian adventure", G4PAY), 26 ("Water board telemetry systems). 7.30pm. Colchester Institute, Sheepen Road, Colchester, CO3 3LL. Details G3FIJ, tel 0206 851189.
Felixstowe (F&DARS)—2 Nov (Night on the air), 16,

Tom Douglas, G3BA, MBE, with committee members of Cardiff RSGB Group where he recently gave a talk on "Clandestine Radio on the Burma Siam railway during the Japanese occupation". L to r: John, GW4TJQ; Bill, GW6MNC; Cyril, GW0CUM; Tom, G3BA; Don, GW3MRI; and Dave GW4KQ (RR10).

30 (Social), 8pm. The Scout Hut, Bath Road, Felixstowe. Details G4YQC, tel 0473 642595 (daytime).
Ipswich (IRC)—11 Nov (Junk sale), 25 (tba). 8pm. Rose and Crown ph, Norwich Road, Ipswich. Details G4IFF, tel 0473 44047.
Leiston (LARC)—3 Nov (AGM and surplus sale), 1 Dec ("All at sea", G1KJV). 7.30pm. Sizewell Sports & Social Club, King George's Ave, Leiston. Details G0CJX, tel Saxmundham 3222.
Loughton (L&DARS)—6 Nov (Film show, G3OPA & G1DJI). 8pm. Debden Community Centre, Loughton Hall, Rectory Lane, Loughton. Details G4FKI.
Vange (VARS)—12 Nov (Club project), 19 ("Waveguides", G4FUF), 26 ("ATUs", G3ASH), 3 Dec (Junk sale). Details Mrs D Thompson, tel 0268 552606.

REGION 17—RR T M Emery, "Wilverley", Old Lyndhurst Road, Cadnam, Southampton SO42NL Tel 0703-812435
Basingstoke (BARC)—2 Nov (Constructors competition). 7.30pm. Forest Ring Community Centre, Sycamore Way, Basingstoke. Sec G1OQU, tel 0256 59644.
Blackmore Vale (BVARS)—10 Nov ("PSUs", G1GRG), 24 (Project night). 7.45pm. The Bell & Crown, Zeals (on the A303). Sec G4YXX, tel 0963 32389.
Bournemouth (BARS)—6, 20 Nov (Natter night), 8pm. Kinson Community Centre, Kinson, Bournemouth. Sec G4DJG, tel 0202 526793.
East Dorset UHF Repeater Group (GB3DT)—For information or to join the group and help support the repeater, please contact G1VIP, tel 0202 735003.
Eastleigh (Itchen Valley ARC)—13 Nov ("Getting started on 50MHz", G2DBT), 27 ("The Birth of Broadcasting", G6NZ). 7.30pm. The Scout Hut, Brickfield Lane, Chandlers Ford, Eastleigh. Sec G1IPQ, tel 0703 736784.
Fareham (F&DARC)—4 Nov ("Amateur radio in the RN", G3JFF), 11, 25 (Natter night), 18 (tba). 7.30pm. Portchester Community Centre, Portchester, Hants. Sec G3CCB, tel Fareham 288139.
Farnborough (F&DARS)—11 Nov (AGM), 25 (Chairman's evening). 8pm. Railway Enthusiasts Club, Access Road, off Hawley Lane, Farnborough. Details M C Graffius, The Paddock, Diamond Ridge, Camberley, Surrey GU15 4LB.
Guernsey (GARS)—Please note change of sec. GU4SXM, tel 0481 25450.
Horndean (H&DARS)—5 Nov (AGM). 7.30pm. Murchiston Hall, London Road, Horndean. Sec G4RLE, tel 0705 755274.
Isle of Wight (IWRS)—6 Nov (Book review), 13 Nov (Radio clinic), 20 (Project night), 27 ("SSB generation techniques", G3PZB). 8pm. Unity Hall, Wooton Bridge. Sec G4RGE, tel 0983 872620.
Liphook (Three Counties ARC)—11 Nov ("GLORIA", Institute of Oceangraphic Sciences), 25 (Ham Radio Today). 8pm. The Railway Hotel, Liphook. Contact G4VKC, tel Liphook 723415.
New Forest Repeater Group (GB3NF)—For information or to join the group and help support the repeater, please contact G6DLJ, tel 0703 847754.
Plessey (Christchurch ARS)—Second and fourth Thursday in each month. Membership is not limited. New clubhouse with new mast is at rear of Plessey Social Club, Grange Road, Christchurch. Sec G1YHF, tel (wks) 0202 486344 ext 2415.
Portsdown Hill Repeater Group (GB3PH)—For information or to join the group and help support the repeater, please contact Mr A L G Price, tel 0329 281852.
South Dorset Repeater Group (GB3SD and GB3DP)—For information or to join the group and help support the repeaters, please contact G3VPF.
Salisbury (SRES)—10 Nov (Construction evening), 24 (Surplus equipment sale). 7.30pm. Grosvenor House Centre, Churchfields Road, Salisbury. Sec G4LDR, tel 0980 22809.
Trowbridge (T&DARC)—11 Nov (Natter night), 25 ("The RSGB", G3KWU). 8pm. Territorial Army Centre, Blythesea Road, Trowbridge. Sec G0GRI, tel 0380 830383.
UK FM Southern Repeater Holding Group (GB3SN)—4 Nov (AGM, at Chineham House, Shakespeare Rd, off Popley Way, Basingstoke, at 7.30 for 8pm). For further information please contact Mrs Jan Steele on 0323 896287.
Waterside (WSC)—24 Nov ("Earthing in the radio shack", a representative of the SEB). 7.30pm. Community Centre, Blackfield, Southampton. Sec G0BPA, tel 0703 893937.
Weymouth and Portland (SDRS)—3 Nov ("Doppler navigation", G3VMZ). 7.30pm. The Pensylvania Castle, Portland, Dorset. Sec G0FIT, tel Dorchester 67596.
Winchester (WARC)—20 Nov ("Building and use of small test equipment", G2BDT). 8pm. Durngate House, Winchester. Sec G1XCT, tel Winchester 880605.

REGION 18—RR Ian Gibbs G4GWB, 61 The Gables Widdrington, Morpeth NE61 5QZ Tel 0670 790090
Blyth (BARC G4VKY)—Wednesdays. The Community Centre, Warwick St, Blyth. New sec G0ACR, tel 0670 827585.
Consett (Derwentside ARS G4PFQ)—Please note new club venue and change of meeting night. Wednesdays. The Steel Club, 36 Medomsley Rd, Consett. Sec G3KMG, tel 0207 504198.
Corbridge (Tynedale ARC G4ONQ)—Please note new venue. First Tuesday of the month. Corstopitum Club, St Helens St, Corbridge, Northumberland. New sec G1TIK.
Durham (DARS G4VTV)—Please note new venue. Fridays. Golf Club, Mount Pleasant, Durham City. Sec G4WJV, tel 0783 853552.
Easington (EARS G4APN G6APN)—Please note new venue. Thursdays. Masons Arms, Easington village. New sec G0EQJ, tel 091-527 0745.
Newcastle (Tyneside ARS G3ZQM)—1 Nov (Junk sale), 4 (Informal, G3ZQM on air), 11 (Discussion on spectrum usage), 18 ("TVI"), 25 ("Building a two tone osillator", G0BEV), 2 Dec (Informal, G3ZQM on air), Scout Centre, Harbottle St, Byker, Newcastle. Sec G4KOT, tel 091-234 1148.
Shildon (Aycliffe ARG G4ZKZ)—Please note new venue and change of club title. Tuesdays, 29 Wallas Rd, Shildon. Sec G4OHZ, tel 0325 314638.

REGION 19—R J C Broadbent, G3AAJ, 94 Herongate Road, London E12 5EQ Tel 01-989 6741
Cheshunt (C&DARC G4MGC)—4 Nov (tba), 11, 25 (Natter night), 18 (AGM). 8pm. Church Rooms, Church Lane, Wormley, Herts. Secs G3OJI, tel Ware 4316. Morse classes held.
Chiswick (ABCARC)—17 Nov (Demo of home brew equipment). 7.30pm. Chiswick Town Hall, High Rd, Chiswick, W4. Sec G3GEH, tel 01-992 3778.
Edgware (E&DRS)—12 Nov (Films), 26 (SWR topics). Community Centre, 145 Orange Hill Rd, Burnt Oak, Edgware. Sec G4IUZ, tel Hatfield 65707.
Harpenden (HARC)—3 Nov (Talk by G3JVN), 10 (Committee meeting), 17 (Talk by G8ATO). 7.30pm. Silver Cup, St Albans Rd, Harpenden. Sec G1BJC, tel 0582 72455.
Hatfield (DHARC)—12 Nov (Bring and buy junk sale). British Aerospace Dynamics Ltd, Hatfield. Sec Keith Pollard, tel 07072 69555.
Southgate (SARC)—12 Nov (G6QM construction contest), 26 (Informal). 7.45pm. Holy Trinity Church Hall (upper), Green Lanes, Winchmore Hill N21. Details G4YLL, tel 0992 30051.
Stevenage (S&DARC)—3 Nov ("Radio interference monitoring", DTI), 17 (Construction evening). 8pm. Sitec Ltd, Ridgemond Park, Telford Ave, Stevenage. Details G0GTE, tel Stevenage 724991.
SW Herts UHF Group—This group maintains GB3BH on RM0, Bushey Heath, GB3HR on RB14, Stanmore and GB3SWH on 10·368GHz, Bushey Heath. The group would welcome donations to help maintain these repeaters and is available for talks in the area. Sec G4KUJ.
St Albans (Verluam ARC)—10 Nov (Informal), 24 ("Advanced receiver techniques", G3TDR). 7.45pm. RAFA HQ, New Kent Rd, St Albans. Club nets held on Wednesdays 7.30pm on 145·350MHz, Sundays 10.30am on 3·522MHz. Details G4JKS, tel St Albans 59318.
Welwyn (Welwyn and Hatfield ARC)—2 Nov (Construction evening). 8pm. Morse classes on Thursdays. Nets on Monday, 8pm, on 145·375MHz. Details G4WLG, tel 0707 335162.
Westminster (Civil Service ARS)—2 Nov ("Lightning protection", G4UBB), 16 (Natter). 12.30pm. Operational lunch-times on G1CSR and G3CSR. Civil Service Rec Centre, Monck St, Westminster SW1. Sec G6IMM, tel 01-698 4437. Members whose subs are overdue are asked to contact the treasurer, G8KID, at club address.

REGION 20—C H Hollister, 34 Battersby Way, Henbury, Bristol BS10 7SH. Tel 0272 508451
Bristol (BRSGBG)—30 Nov (Home brew competition). 7.30pm. Small Lecture Theatre, Queens Building, University of Bristol, University Walk, Clifton, Bristol. Details G4SQQ, tel 0272 508451.
Bristol (23cms FM TV Repeater Group —GB3ZZ)—Details G4ZQF, Kingsley, 93 Gloucester Road North, Filton, Bristol BS12 7PT, tel 0272 699947.
Bristol (432MHz Repeater Group, GB3BS & GB3BP)—Details Mr S Bailey G4MCQ, 50 Quantock Close, North Common, Warmley, Bristol BS15 5UT.
Bristol (South Bristol ARC)—4 Nov ("CW operating", G4WUB), 11 (CW activity evening, G0AWX), 18 (ATV activity evening, G4YQR), 25 (Event calendar 1988 discussion). 7.30pm. The Whitchurch Folk House, East Dundry Road, Whitchurch, Bristol. Details G4RZY, tel 0272 834282.
Cheltenham (CARA)—6 Nov (Junk sale). 7.30pm Stanton Room, Charlton Kings Library, Cheltenham, Glos. Details G4VXE, tel 0242 36723.
Gordano (GARG)—26 Nov (Annual dinner). The Ship, Redcliffe Bay, Portishead, nr Bristol. Details G6ETL, tel Nailsea 855316.
Weston-super-Mare (WsMARS)—9 Nov ("Natter night"), 23 (Constructors night). 7.30pm. The Bristol Hotel, Locking Road, Weston-super-Mare. Details G1DJW, tel 0934 514429.
Yeovil (Y&DARC)—12 Nov ("Field strength & power density", G3MYM), 19 ("RTTY Pt 2", G8AWB), 26 Nov ("Natter night"), ("VHF propagation and choosing a vhf site", G3GC). 7.30pm. Recreation Centre, Chilton Grove, Yeovil, Somerset. Details G1MNM, tel 0935 79804.

OBITUARIES

The Society records with regret the deaths of the following radio amateurs:

Mr J W Birkbeck, G3IGV
John "Jock" Birkbeck died on 7 August aged 80. Although blind, he passed the old RAE and the morse test, reading braille with one hand while sending with the other, and was well known on the hf and vhf bands and as a staunch member of the RAIBC

Mr P Buglass, G0ESQ
Peter Buglass died on 4 July 1987 aged 40 years. He was a member of the Border ARS, and was very active on both hf and vhf.

Mr T J Butler, G3EUU
Tom Butler died on 27 July 1987. He was senior morse examiner for Surrey.

Mr F J Jackson, G5FJ
Fred Jackson died on 31 July 1987 at the age of 83. He was active in amateur radio in the 'twenties, and during the second world war was involved in RSS work. In recent years he was operational on 3·5 and 144MHz.

Mr W H Robertson, G6WR
Bill Robertson died on 11 August 1987. He was first licensed in 1933 and was active on; most hf and vhf bands. He was a wartime member of RSS and SCU3.

Mr V Slater, G1TZR
Vic Slater died on 8 August 1987. He was regularly on 144MHz, keen on WAB contacts, and was a member of the RAFARS.

Mr W S Smith, G3HHZ/5Z4JH
Bill Smith died on 9 July 1987 at the age of 76. From being licensed in 1951 he operated mainly on 3·5MHz phone until 1963, when he operated as VQ4JH/5Z4JH from Nairobi and Mombasa mostly on 14MHz ssb, until returning to England in 1970. He was then usually on 3·5 and 144MHz.

Mr G C Somerville, GM3KYI
George Somerville died on 9 July 1987. A retired member of the Dundee Police Force, he was a keen and active amateur for many years, particularly on 144 and 432MHz. He organised many field day stations during the 'fifties and 'sixties in the Dundee area.

Mr R Williams, G6HQ
Bob Williams died on 1 August aged 76. He had been a keen cw operator on the hf bands, and was well known in Wirral and Merseyside.

Also:
Mr G K Adams, GW2BOU, on 17 March 1987
Dr H B Bellairs, G3LXX, on 9 July 1987
Mrs P B Breakspear, G6ZLR
Mr W Cartwright, G4IRI, in October 1986
Mr J Crankshaw, G3BIH, on 13 January 1987
Mr H M Graham, RS32601
Mr C R Harris, RS88911, on 16 May 1987
Mr I Jarman, G1BZV, on 16 July 1986
Mr J Mackley, G4ROQ, on 15 June 1987
Mr E S Morley, G1CQE, on 10 December 1986
Mr C E Mumford G3OSZ, on 29 June 1987
Mr O C Osbourne RS42281, on 10 June 1985
Mr J Reed, G2IP, on 6 July 1987
Mr J Richardson, G3JKG
Professor D A Schultz OBE, G3LTQ, on 27 April 1987
Mr E B E Soames, G4IRE, on 11 July 1987
Mr D White, G3JKA, on 8 July 1987
Mr D L Wyber, GI8PDT, on 18 December 1986

Contest News

Dartford Heath DF Qualifying Event results

After using OS Map 177 last year we felt that it was time to return to our tried and tested favourite map 188. The start, which has featured so often in Dartford Heath Cine Films, was at Shipbourne Common. Seventeen teams assembled at the start and excellent signals were received from both transmitters.

Station A operated by Colin Merry, G4CDM, was located 7km south-west in what the RSGB umpire described as a typical Dartford swamp. That is to say that all competitors got their feet wet! Colin could see the competitors following the antenna as he was at water level. Many seemed to think that he was located up a tree as the swamp was a pretty awful place in which to hide. The antenna feed was teed off some distance from the hide and carefully concealed which paid dividends!

Station B G4BDF/P operated by G4GMN and G8DYF was located 17km south of the start at Frant. The site was miles from the nearest road, full of trees, and lakes and very muddy! Tea was served in Stone village hall by Lynn G1JTX, Rosie G8YDB, and Margaret G8ARQ.

			Time of arrival	
Pos	Name	Club	Stn A	Stn B
1	B Bristow	Mid-Thames	1536	1438
2	A Simmons	Mid-Thames	1542	1439
3	P Lisle	Mid-Thames	1544	1457
4	M Hawkins	Chelmsford	1556	1449
5	B Poole	Mid-Thames	1556	1458
6	C Plummer	Mid-Thames	1557	1510
7	R Brocks	Chelmsford	1619	1521
8	C Metcalfe	Mid-Thames	1628	1511
9	G Whenham	Coventry	1629	1508
10	T Gage	Mid-Thames	1630	1519
11	P Graves	Dartford Heath	1534	—
12	P Woollett	Dartford Heath	1535	—
13	C Wells	S Manchester	1537	—
14	P Larbalestier	Devizes	1537	—
15	D Newman	Northampton	—	1554
16	R Witney	RSGB	—	—
17	M Standen	Mid-Thames	—	—

P Lisle and B Poole qualify for the National Final

Salisbury DF Qualifying Event results

Eighteen teams assembled at Abbots Well on the northern edge of the New Forest for the start. The weather was fine and good signals were heard from both transmitters.

Most competitors decided to head first for the A station G4RLF/P situated almost in the centre of Ringwood Forest about 8km south west. The super-grid overhead did not cause any problem but the long run in (over one mile by the shortest route) caused distress to many!

The B station G3YWT/P near Petts Wood enclosure 2km north east of the start was surrounded by dense thorny branches. Again, the long run in (over a mile) caused more tears!

The excellent tea, at the Downton Memorial Hall, was arranged by Mrs Pam Lampiere helped by a team of members XYLs and relatives.

Thanks go to Sir Even Nepean, G5YN, who managed the event and to members of the Salisbury Radio and Electronics Society who arranged and operated the tranmitters.

			Time of arrival	
Pos	Name	Club	Stn A	Stn B
1	A Malbon	RSGB	1452	1556
2	W North	Mid-Thames	1451	1556
3	A Judd	Mid-Thames	1451	1557
4	P Clark	Chelmsford	1448	1557
5	G Whenham	Coventry	1452	1558
6	G Foster	Stratford-on-Avon	1503	1601
7	I Butson	Colchester	1454	1603
8	G Nichols	Banbury	1454	1604
10	P Woollett	Dartford Heath	1455	1609
11	T Gage	Mid-Thames	1503	1610
12	A Simmons	Mid-Thames	1617	1418
13	D Newman	Slade	1458	1628
14	N Underwood	Salisbury	—	1455
15	C Metcalfe	Mid-Thames	1556	—
16	R Witney	Chelmsford	—	1603
17	A Collett	Dartford Heath	1416	—
18	R Goodearl	Mid-Thames	1623	—

A Malbon and A Judd qualify for the National Final

144MHz Fixed Station and Affiliated Societies Contest 1987 rules

The rules for this year's AFS inter-club competition are similar to last year. The contest will continue to be open to individual entries, both single and multi-operator, as before. Affiliated Societies are encouraged to enter as many stations and teams as they can. Individual station scores and overall team results will be separately tabulated, and certificates will be awarded to the leading stations and team in each RSGB Zone.

1. Date: 6 December 1987

2. Time: 0900–1700gmt

3. Teams. A society entering one team will have its placing determined by the aggregate scores of the five highest scoring stations in its team. A society may enter more than one team, in which case the aggregate scores of the five highest scoring stations will be placed in team "A", the next five highest scoring stations in team "B", etc.

4. Eligible entrants. Operators entering on behalf of an affiliated society must be a member of that society, but need not be a member of the RSGB. Other individual entrants must be RSGB members. All stations representing a society must be operated within 50km of the normal society meeting place. No station may represent more than one society. In the case of a society with national coverage, eg RNARS, each team may define a different society meeting place, but this should be a place of recognised significance, eg a naval base. For all purposes other than the indication of affiliation, each such entry shall be regarded as entirely separate. No operator shall use more than one callsign during the contest period.

5. Sections. There will be separate single and multi-operator sections for tabulating station scores. A team may consist of both single and multi-operator stations.

6. Entries. Each individual entry shall conform to the general rules. Each log must be accompanied by a 427–86 cover sheet, and must show the RSGB zone that the station operated from. RSGB zones are defined on page 15 of the January 1987 issue of *Rad Com*. All entries from one society are to be sent in one package to the adjudicator. Packages underpaid and bearing postage due stamps will be returned to the sender. All entries must be postmarked no later than **31 December 1987.** Each package must include a declaration signed by an officer of the society that each entrant is a member of that society, and the normal meeting place address must be given. A note stating the number of teams representing the society, and their scores, should also be included.

7. Awards. Certificates will be awarded to the following:
The leading single operator station in each RSGB zone.
The leading multi-operator station in each RSGB zone.
The leading affiliated society team in each RSGB zone.

8. General Rules. The following general rules, published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply: 1,3,5,6,8,9,12,13,15–23.

9. Adjudicator. All entries and check logs to: VHF Contests Committee, c/o J H Quarmby G3XDY, 12 Chestnut Close, Rushmere St Andrew, Ipswich IP5 7ED.

NB. Although the contest includes an inter-club element, entries from individual single or multi-operator stations are encouraged.

70MHz CW Contest rules

1000–1300gmt 13 December 1987

The general rules, published in the "Operating Guide" supplement, *Rad Com* January 1987, will apply. Only F1A and A1A modes may be used. QTH information must be exchanged. All entries and check logs to: VHF Contests Committee, c/o C J Easton, G8TFI, "Highlands", Townsend, Nympsfield, Nr Stonehouse, Glos. GL10 3UF.

The 51st Commonwealth Contest 1988 rules

Participation in this contest will count towards the HF contest championship 1987–1988 for UK entrants.

TRANSMITTING SECTION

1. The general rules for RSGB HF contests, as published in the January 1987 issue of *Rad Com*, will apply.

2. Date and time. From 1200gmt on Saturday 12 March 1988 to 1200gmt on Sunday 13 March 1988.

3. Sections. Single operator entries only from members of the RSGB resident in the UK and radio amateurs licensed to operate within the British Commonwealth or British Mandated Territories. Entries from GB, aeronautical mobile or maritime mobile stations will not be accepted. Entries may be single-band or multi-band. Single-band entries should show contacts on one band only; 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.

4. Band and mode. A1A only in the 3·5, 7, 14, 21, and 28MHz bands. In accordance with IARU recommendations, contestants are requested to operate within the lower 30kHz of each band, except when contacting novice stations that operate above 21,000kHz and 28,100kHz.

5. Exchange. 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. A contact exchange consists of RST and three figure serial number commencing with 001 and increasing by one for each successive contact throughout the contest. Serial numbers when sent from non-competing stations, must be recorded.

6. Scoring. Each completed contact will score five points. In addition, a bonus of twenty points may be claimed for the first three contacts with a Commonwealth call area on each band. Call areas for use in the contest are listed in the accompanying table. All British Isles prefixes (G,GB,GD,GI,GJ,GM,GU, and GW) count as one call area except for the special event station GB5CC. GB5CC will be active throughout the contest and will count as a separate call area for all contestants including those in the UK.

7. Documentation. Separate log sheets (HFC1) for each band must include gmt, callsign of station worked, RST/serial number sent, RST/serial number received and points claimed. Separate band totals should be added together and the total claimed score entered on the cover sheet. It is important that logs are carefully checked for duplicate contacts. Unmarked duplicate contacts for which points have been claimed will be penalised ten times the number of points claimed, and logs containing in excess of five will normally be disqualified. Your entry should include a signed declaration stating that the rules and spirit of the contest and the terms of the entrant's licence were observed.

8. Name and Address for entries. Entries should be addressed to HF Contests Committee, Alan Gray, G4DJX, PO Box 73, Lichfield, Staffs WS13 6UJ, England. All entries become the property of the RSGB. In the event of any dispute, the ruling of the Council of the RSGB shall be final.

9. Closing date for entries. Adjudication of this contest will commence on Monday 11 April, 1988. Any entry received after this date may be excluded from the contest. Overseas stations are therefore advised to forward their logs by airmail.

10. Awards. To the winner, the Senior Rose Bowl; to the runner-up, the Junior Rose Bowl and to the leading UK station, the Col Thomas Rose Bowl. Certificates of merit

will be awarded to a) first, second and third placings in home and overseas multi-band placings, b) the leading home and overseas single-band entries on each band; c) the leading station in each call area.

RECEIVING SECTION

Rules as for the transmitting section except as detailed below:

(a) Only the entrant may operate the station for the duration of the contest. Holders of transmitting licences covering the frequencies below 30MHz are not eligible to take part.

(b) 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. When both stations in contact are heard, they should be logged separately and points claimed for both entries provided that the stations are outside the entrant's own call area.

Each completed log entry will score five points. In addition, a bonus of twenty points may be claimed for the first three stations heard in each British Commonwealth call area on each band. All British Isles prefixes will count as one call area.

A separate log is required for each band. Logs should show the date/time gmt, callsign of station heard, RST/serial number sent by the station heard, callsign of the station being worked and points claimed.

(c) The Receiving Rose Bowl to the winner. Certificates of merit to the leading entrant in each continent.

COMMONWEALTH CALL AREAS

The following call areas are recognised for the purpose of scoring in the Commonwealth Contest, 1988.

A2	Botswana	VP9	Bermuda
A3	Kingdom of Tonga	VQ9	Chagos
C2	Nauru	VR6	Pitcairn
C5	Gambia	VS5	Bruni
C6	Bahamas	VS6	Hong Kong
G/GB/GD/GI/GJ/GM/GU/GW	UK	VY1	Yukon
H4	Solomon Is	VU	India
J3	Grenada	VU7	Laccadive Is
J6	St Lucia	VU7	Andaman & Nicobar Is
J7	Dominica	YJ	Vanuatu
J8	St Vincent	Z2	Zimbabwe
P2	Papua New Guinea	ZB2	Gibraltar
S7	Seychelles	ZC4	Cyprus (UK Bases)
T2	Tuvalu	ZD7	St Helena
T30	W Kiribati	ZD8	Ascension Is
T31	C Kiribati	ZD9	Tristan da Cunha, Gough Is
T32	E Kiribati	ZF	Cayman Is
V2	Antigua, Barbuda	ZK1	Cook Is
V3	Belize	ZK1	Manihiki
VE1	Maritime Provinces	ZK2	Niue Is
VE1	Sable Is	ZK3	Tokelau
VE1	St Paul Is	ZL0	New Zealand
VE2	Province of Quebec	ZL1	New Zealand
VE3	Province of Ontario	ZL2	New Zealand
VE4	Province of Manitoba	ZL3	New Zealand
VE5	Province of Saskatchewan	ZL4	New Zealand
VE6	Province of Alberta	ZL7	Chatham Is
VE7	Province of Br Columbia	ZL8	Kermadec Is
VE8	North West Territories	ZL9	Auckland & Campbell Is
VK1	Aust Capital Territory	3B6/3B7	Agalega & St Brandon
VK2	New South Wales	3B8	Mauritius
VK3	Victoria	3B9	Rodriguez Is
VK4	Queensland	3D2	Fiji
VK5	South Australia	3D6	Swaziland
VK6	Western Australia	4S	Sri Lanka
VK7	Tasmania	5B4	Cyprus
VK8	Northern Territories	5H	Tanzania
VK9L	Lord Howe Is	5N	Nigeria
VK9M	Mellish Reef	5W	Western Samoa
VK9N	Norfolk Is	5X	Uganda
VK9X	Christmas Is	5Z	Kenya
VK9Y	Cocos (Keeling) Is	6Y	Jamaica
VK9Z	Willis Is	7P	Lesotho
VK0	Heard Is	7Q	Malawi
VK0	Macquarie Is	8P	Barbados
VK0/VP8/ZL5	Antarctic	8Q	Maldives
		8R	Guyana
VO1	Newfoundland	9G	Ghana
VO2	Labrador	9H	Malta
VP2E	Anguilla	9J	Zambia
VP2K	St Kitts, Nevis	9L	Sierra Leone
VP2M	Montserrat	9M2	W Malaysia
VP2V	British Virgin Is	9M6/9M8	E Malaysia
VP5	Turks & Caicos	9V	Singapore
VP8	Falkland Is	9Y	Trinidad & Tobago
VP8	S Georgia		
VP8	S Orkneys		
VP8	S Sandwich Is		
VP8	S Shetland Is		

GB5CC RSGB HQ STATION

Low Power Field Day 1987 results

For those who braved the atrocious weather, reward came in the shape of shorter skip conditions on 7MHz providing greater inter-G activity. Although entries received were down on last year, support for the contest was apparent with a general increase in the number of contacts available. This year's winner of the Houston-Fergus trophy is G4JKS/P. Section B winner is G4FRS/P and the certificate for the non-portable station check-log goes to G4OGB. Points were deducted at a rate of five (fixed station) or 15 (portable) for a wrong callsign, and one or five for each mistake in the received information. Two entries in particular, although submitted on computer print-out, lost many points through careless errors.

The HFCC is considering several changes of the rules for future events, while maintaining the basic format as it stands at present. The use of 100W capability equipment is not seen as being in the original spirit of the contest, in addition it is felt that more incentive for home-brew equipment should be given.

G3SJJ

SECTION A (10W OUTPUT)

Posn	Callsign	Equipt	QSOs 3·5	QSOs 7	Points Lost	Points Total
1*	G4JKS/P	TS120V	69	49	10	1,110
2*	G3YDV/P	IC735	64	44	26	1,059
3*	G4JBD/P	FT77-7	54	52	7	1,038
4	G3VER/P	TS120V	37	56	20	975
	GW4ALG/P	FT707	52	44	—	975
6	G4ELZ/P	FT301D	47	46	10	945
7	G4RCC/P	TS120V	52	42	30	940
8	G4EDG/P	TS120	47	47	30	930
9	G3LCG/P	IC730	28	55	42	793
10	G4EKT/P	IC740	36	38	30	790
11	G3SFG/P	TS120V	32	41	82	723
12	G3VW/P	FT757	25	38	10	695
13	GW4CC/P	FT707	34	30	10	680
14	G3VRE/P	FT757	13	64	83	612
15	G4SXT/P	TS120V	35	39	148	502

SECTION B (3W OUTPUT)

Posn	Callsign	Equipt	QSOs 3·5	QSOs 7	Points Lost	Points Total
1*	G4FRS/P	TS130V	46	38	20	890
2*	G3VIP/P	FT301S	29	42	25	770
3*	G0BRC/P	Triton	22	46	56	654
4	G4DDX/P	Argonaut	28	23	30	615
5	G3YRC/P	Argonaut	18	29	20	585
6	GI3PDN/P	Argonaut	12	34	10	520
	GW3SB/P	HW-8	29	15	20	520
8	G0DYX/P	Century	18	26	17	463
9	G3BPM/P	2N3866	18	14	15	455
10	G4MWC/P	DSB80	39	—	51	324
11	G3NOM/P	Homemade	41	—	25	320
12	G3EAO/P	Man Pack	21	6	5	270
13	G0FKX/P	Oner	—	12	5	145

Check log received from G4OGB*

* = Certificate winner.

3·5MHz Hopscotch 1987 Contest results

The number of entries was down this year, due I'm sure in part to 2 August being the first day of sunshine after what had seemed an eternity of rain. Also many keen contesters were spotted at the Woburn rally which again fell on the same day. All participants enjoyed the novel format of the contest. The QSY rule, and the giving of christian names rather than serial numbers, added to the excitement. Five logs out of the 26 entries were error free — congratulations to G2HLU, G3EAO, G3SWH, G4DRS and G4OGB. All the others lost points for incorrectly logged reports and county codes. There were many recommendations for changes to the contest, ranging from making it am instead of pm, two hours' duration instead of four and not on the same day as Woburn. Many thanks for your constructive criticism. All comments have been noted by the HFCC. NB – Always send QRL? to check if a frequency is occupied and don't forget that one of the possible acknowledgments is QRL. This is vital when hopscotching!

G4JKS

Posn	Callsign	Points	Posn	Callsign	Points
1	G4BUO*	597	14	G4WZV	422
2	G4DRS*	550	15	GW4HDB	407
	G4OGB*	550	16	G4XPE	404
4	G3JJG	544	17	G3VIP	394
5	G3LET	537	18	G3BPM	362
6	G3YMC	527	19	G3JSK	355
7	G4UMS	517	20	G3KZJ	354
8	G3SWH	500	21	GW3SB	337
9	G2HLU	480	22	G3COR	300
10	G0CLP	471	23	G4UZN	287
11	G4LZB	437	24	GW4KVJ	281
	G4WYG	437	25	G4WDM	267
13	G3EZZ	435	26	G3EAO	110

Late entry G4OTV claimed score, 450.

Check logs received with thanks from G3WYK, G4ODV.

*Certificate winners.

HF Contests Championship 1987–8 rules

1. RSGB hf contest general rules do not apply.

2. No entries for the championship are required.

3. The championship will be decided on the basis of RSGB hf single operator contests held between 1 October 1987 and 31 July 1988.

4. Points will be awarded in each contest as follows to every UK station submitting logs:

4.1 Points will be calculated by expressing the score gained by each station in each contest as a percentage of the leading UK station in that contest.

4.2 The points calculated in **4.1** will then be multiplied by the following factors for the relevant contest:

21/28MHz Telephony	20
21MHz CW	20
7MHz Telephony	20
7MHz CW	20
Commonwealth	30
Second 1·8MHz 1986	10
First 1·8MHz 1987	10
Town and County	10
Region Round-up	10

Example: If the leading station in the 21MHz CW contest scores 30,000 points, and the entrant concerned gains 6,000 points, the points awarded to that competitor in the HF Contests Championship for that contest will be:

$$\frac{6{,}000}{30{,}000} \times 100\% \times 20 = 400$$

5. Points calculated in **4** above by UK stations using the same basic callsign (with or without suffixes) and entering two or more of the individual contests will be totalled and a table published in *Radio Communication*.
6. Club Stations. To be eligible for inclusion, a club station must be operated by the same single operator during each contest. In the event of a club station meriting an award, the award will be made to the operator concerned and not to the club.
7. Awards. The winner will receive the G2QT Trophy. A certificate will be awarded to the runner-up.

1986 IARU Region 1 VHF/UHF/SHF Contest results

The following results have been extracted from the full results table supplied by the Central Radio Club of Czechoslovakia.
Particular congratulations go to the winners of the following sections:
1·3GHz Multi Operator: G3CKR/P
2·3GHz Multi Operator: G4CDA/P
3·4GHz Multi Operator: G4CBW/P
Overall UHF Multi-Operator: Parallel Lines CG

G3XDY

144MHz SINGLE OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	F6CTT/P	797	299,596	240	G1DWQ	125	20,947
2	F6GYT/P	816	282,017	248	G6CSY/P	115	20,036
3	F6HPP/P	721	236,224	262	G1CSR	140	18,609
30	GJ6TMM/P	329	89,738	264	G6HXU	103	18,422
38	G0CLP/P	379	79,084	271	GW6VZW	87	17,556
49	G6HKM	318	67,008	287	G8UDV/P	58	16,461
57	G4NBS	317	62,876	291	G1PEF	79	16,211
58	G4ARI	387	62,464	423	G2DHV	56	6,642
76	G3XBY	284	53,211	450	G1GYC	21	4,966
117	G4AGO	198	38,103	496	DC/G8NMQ	19	1,969
189	G2VJ/P	118	25,411				

530 entries

144MHz MULTI OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	F6KBF/P	1,039	343,997	134	G4WET/P	533	93,544
2	G4LIP/P	939	309,552	143	G8ZKE/P	517	89,290
3	OK5A	968	299,272	145	GW6GW/P	529	88,597
7	G4PUB/P	812	270,361	149	G4YGW/P	345	87,414
11	G4BCH	808	246,464	153	G3ISO/P	424	85,410
17	G4APA/P	715	224,489	158	G8SMR/P	454	83,087
29	G8LNC/P	669	184,874	160	G1MDG/P	481	82,275
30	GW4GFX/P	695	182,581	163	G5BK/P	425	80,716
33	GD4IOM	643	179,911	212	G6WVG/P	337	64,425
37	GW3CKR/P	629	173,090	229	G8EQD/P	342	60,433
38	G4ANB/P	476	170,273	324	G1NUS/P	254	39,942
52	G3PIA/P	677	151,039	329	G3DCZ/P	302	38,887
72	G1HHH/P	550	133,563	338	G3TRF/P	226	36,847
87	G4CRA/P	484	123,204	373	G0FMS/A	161	28,111
89	G2XV/P	514	122,699	394	G6VAT/P	182	24,517
98	G6OYL/P	657	115,123	400	GM6FPX/P	140	23,087
107	GM0CLN/P	381	107,062	403	G3ERD/P	169	22,784
108	GM4AFF/P	282	106,112	416	G8PRH	112	19,232
111	G8NJA/P	391	103,995	433	G4SSD/P	66	15,842
127	GI4KIS/P	315	97,901				

483 entries

144MHz SWL SECTION

Posn	Station	QSOs	Score	Posn	Callsign	QSOs	Score
1	Y2-14512 H46 P	273	75,730	4	BRS32525	219	39,500
2	Y26992/F56	235	67,345	11	BRS28198	46	8,398

16 entries

432MHz SINGLE OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	OK1DIG/P	548	282,314	93	G3XBY	61	26,028
2	PA0PLY	565	200,855	98	G3JXN	95	24,610
3	DH3NAN	463	178,396	127	G4NBS	48	19,970
15	G6XVV	189	99,323	131	G6DER	39	18,653
24	G6IAT	180	77,326	163	G3CDJ	30	14,099
28	G4FOH	152	73,012	165	G1KDF	62	13,908
47	G1LSB	115	45,796	209	G4ZNM	53	8,655
74	G1HLT	93	31,418	234	G8IFT	15	5,905
91	G4XOM/P	79	26,466	257	G6CSY/P	25	4,026

292 entries

432MHz MULTI-OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	OK1KHI/P	610	340,069	19	G4ZTR/P	437	181,607
2	G4CLA/P	663	329,446	30	G8VHI/A	300	151,867
3	OK1KIR/P	656	316,626	36	G4DDC/P	316	130,883
4	G4RNL/P	582	310,126	37	GW8TFI/P	336	128,439
10	G8ZHP	438	236,514	39	G0FPT/P	346	125,437
11	G4PUB/P	605	226,789	48	GM4ZUK/P	130	106,912
12	G3UHF/P	431	226,261	69	G4SSS/P	224	64,901
16	G4LOJ/A	468	200,872	113	G6EUO/P	69	25,089
17	GW4THB/P	429	188,233	157	GM6FPX/P	13	3,697

167 entries

1·3GHz SINGLE-OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	OK1CA/P	163	80,801	41	G8IFT	39	13,335
2	DL6NAQ/P	216	58,637	68	G3ZQU	26	7,869
3	DK1VC	209	55,119	88	G1DGL/A	34	4,678
9	G4KIY	91	39,982	90	G8ZQB	29	4,109
16	G3JXN	90	27,129	93	G3COJ	10	3,684
18	G4NBS	53	22,947	107	G6CSY/P	10	1,638
21	G4PMK	45	21,093	108	G1KDF	14	1,540
22	G6DER	53	20,967	125	G6XVV	7	465
23	G6OYL	54	20,087				

132 entries

1·3GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	G3CKR/P	240	116,831	19	G0FCT/P	138	52,119
2	G4LIP/P	263	115,548	21	G3FVA/P	104	47,538
3	DL0HC/P	351	111,704	24	GW4HWA/P	116	40,939
5	G4JAR/P	220	72,527	26	GW4NXO/P	107	39,810
6	G3SIV	139	71,439	62	GM6MGS/P	15	10,715
10	G8OHM/P	159	62,878	65	G4JKN/P	32	6,410
16	G4VIX/P	174	58,442	91	GM1FML/P	3	9
17	G4ANT	150	55,604				

91 entries

2·3GHz SINGLE OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	OK1AIY/P	46	30,782	11	G6DER	19	9,033
2	DL6NAQ/P	50	14,605	18	G3ZQU	17	4,886
3	PA2HJS/A	53	13,498	23	G8IFT	14	2,985
7	G3JXN	36	9,727	34	G8ZQB	10	1,489

48 entries

3·4GHz SINGLE OPERATOR

Posn	Callsign	QSOs	Score
1	DL6NAQ/P	15	3,432
2	PA0JRS/A	15	2,959

19 entries

2·3GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	G4CDA/P	70	32,361	9	G3ZIG/A	43	13,702
2	G4CBW/P	75	27,671	10	GW4FRE/P	35	11,057
3	OK1KIR/P	57	27,445	18	G4WHZ/P	23	5,700
5	G3OHM/P	64	23,381	20	GW4XUM/P	23	5,556
7	G8LQO/P	33	14,335	22	G4DDK/P	21	5,172
8	G4FUF/P	52	14,257				

35 entries

3·4GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	G4CBW/P	10	3,684	9	GW0FRE/P	1	109
2	PA0GUS/P	14	2,891	10	G4PZZ/P	1	27
7	G4EZP/P	4	901				

10 entries

5·7GHz SINGLE OPERATOR

Posn	Callsign	QSOs	Score
1	DL3NO	6	834
2	HB9MIO/P	4	747

5 entries

5·7GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Score
1	DK0NZ	7	1,876
2	DK0HT/P	4	836
9	G4EZP/P	1	7

9 entries

10GHz SINGLE OPERATOR

Posn	Callsign	QSOs	Score
1	DJ4YJ/P	25	4,943
2	DL/OE2BM/P	13	3,345

28 entries

24GHz SINGLE OPERATOR

Posn	Callsign	QSOs	Score
1	HB9MIO/P	1	53
2	OE1KTC	1	11

2 entries

10GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	HB9MIN/P	15	3,370	13	G6CMS/P	3	105
2	DK0NA	12	3,077	15	GW0FRE/P	1	16
8	G4EZP/P	3	392	16	G0AOU/P	1	5
10	G3OXL/P	3	194	17	G8GKQ/P	1	1

17 entries

24GHz MULTI-OPERATOR

Posn	Callsign	QSOs	Score	Posn	Callsign	QSOs	Score
1	DL0NN/P	2	52	3	G6CMS/P	1	7
2	GW0FRE/P	1	15	4	G4EZP/P	1	7

4 entries

OVERALL UHF/SHF SINGLE OPERATOR

Posn	Callsign	Score	Posn	Callsign	Score
1	OK1AIY/P	576,690	33	G8IFT	102,430
2	PA0PLY	542,910	34	G6XVV	101,648
3	DL6NAQ/P	507,875	39	G3ZQU	88,205
12	G3JXN	257,525	75	G8ZQB	35,435
13	G6DER	213,818	86	G1KDF	21,608
22	G4NBS	134,705	89	G6CSY/P	12,216

98 entries

OVERALL UHF/SHF MULTI-OPERATOR

Posn	Group	Score	Posn	Group	Score
1	Parallel Lines	1,257,576	13	The Windbreakers	533,057
2	Warrington CG	1,217,891	16	The Hillbillies	448,488
3	OK1KIR/P	1,098,856	17	Sheppey Western CG	440,859
5	HADRABS CG	758,134	18	East Coast CG	437,752
7	Norfolk VHF/UHF CG	616,472	48	Radio Whisky CG	160,487
8	S Manchester RC	607,401	60	Exmoor RC	96,951
9	Five Bells CG	593,709	85	Glasgow CG	3,742
12	S Birmingham CG	552,080			

86 entries

432MHz FM Contest 1987 results

The introduction of an fm contest into the 1987 contest calendar was met with limited activity and even fewer entrants, so its future in the contest calendar will need to be reviewed. Although it was advertised in the same way as all other events, the lack of publicity was blamed by the vast majority of entrants for the lack of activity.

Many of those who entered had apparently not read the rules and omitted to claim any country multipliers. These errors were not rectified by the adjudicator.

The winners in the fixed station section, the Wirral and District ARC used 100W to either a 21 element horizontal or a 19 element vertical Yagi. The winner in the open section, Geoff Morris, used 15W to a 28 element vertically polarised multibeam. Both are to be congratulated and awarded certificates on making the most of flat conditions.

G4FRE

FIXED STATION SECTION

Posn	Callsign	Score	QSOs	Mult	Loc	Best dx	Km
1	G4MGR	2,482	52	17	83KH	G6TTL	360
2	G6IAT	1,309	27	17	91TV	G6HLL	205
3	G5UM	256	18	9	92MP	GW1ATZ/P	150
4	G4ZNM	180	10	6	00BS	G1HLP	223
5	G0DTI	115	13	5	83SR	GW1ATZ/P	177
6	G4SSD	84	9	4	80FJ	GW1VBB	140

Disqualified: G4XRV, Rule 13.
Check log received with thanks from G6GZZ.

ALL OTHERS SECTION

Posn	Callsign	Score	Qsos	Mult	Loc	Best dx	Km
1	GW1ATZ/P	1,729	51	13	82KX	G5UM	150
2	G1GVA/P	910	26	13	91GI	G6TTL	179
3	G8JXV/P	500	30	10	91VG	G4MDZ	100
4	G6LKB/P	472	19	8	84KG	G6HLL	126
5	G1OPV/P	130	12	5	83US	GW1ATZ/P	184

Contests Calendar

	RSGB HF CONTESTS
Nov-Dec	28MHz Phone Cumulative (Rules in July issue)
14, 15 Nov	2nd 1·8MHz (Rules in September issue)
	RSGB VHF CONTESTS
1 Nov	1·3/2·3GHz Cumulative (Rules in August issue)
7 Nov	IPA Radio Club (CW) (Rules in November *HF*)
7, 8 Nov	144MHz CW (Rules in August issue)
8 Nov	IPA Radio Club (SSB) (Rules in November *HF*)
9 Nov	432MHz Cumulative (Rules in August issue)
14 Nov	ALARA (Rules in November *HF*)
17 Nov	1·3/2·3GHz Cumulative (Rules in August issue)
21, 22 Nov	Int All Austria 160m (Rules in November *HF*)
22 Nov	MARAC Maritime Activity (Rules in November *HF*)
25 Nov	432MHz Cumulative (Rules in August issue)
28, 29 Nov	CQ WW DX CW (Rules in November *HF*)
3 Dec	1·3/2·3GHz Cumulative (Rules in August issue)
6 Dec	144MHz Fixed & AFS (Rules in November issue)
11 Dec	432MHz Cumulative (Rules in August issue)
13 Dec	70MHz CW (Rules in November issue)
19 Dec	1·3/2·3GHz Cumulative (Rules in August issue)
	OTHER CONTESTS
14, 15 Nov	European DX RTTY (Rules in August *HF*)
28, 29 Nov	CQ WW DX CW (Rules in October *HF*)
1988	
Jan	1·8, 3·5 and 7MHz Cumulative (Rules in October issue)
6, 7 Feb	7MHz Phone (Rules in October issue)
20, 21 Feb	7MHz CW (Rules in October issue)
12, 13 Mar	51st Commonwealth (Rules in November issue)

432MHz Low Power & SWL Contest results

A severe cold contracted after a waterlogged visit to the northern mountains kept the adjudicator off the air in this event, but by all accounts I did not miss much. The number of entrants was well down on 1986 and conditions were described as "awful" through "very poor" to "flat". "If this is all the activity on 70cms, it is hardly worth bothering" was the comment from G8LNC/P, and that seemed to sum up activity. Nevertheless, at least 10 stations commented how much they enjoyed the event, which is of course the most important point. Operating and logging standards were generally good, but when activity is low the loss of even one claimed multiplier has a serious effect on the score. Unfortunately, there are still a lot of stations who do not comply with rule 14 and these have been penalised by deduction of 10–20 per cent of the score, dependent on the circumstances. One station (not an entrant) complained that despite being intermediately situated on a line between London and the Isle of Man his 400W signal was given only 5 & 5 by a London station he called after overhearing that station give 5 & 9 to GD0FRE/P's 10W. G8TFI and G4FRE, the operators of GD0FRE/P, certainly have mastered the art of 432MHz antennas and site selection in beating the far from poorly equipped GW4MGR/P. Congratulations to the leading stations GD0FRE/P and GW4MGR/P in the all other stations section, to G6LOH and G3JXN in the fixed stations section, and to RS28198 in the listener section, all of whom will receive certificates. Thanks to all the stations who took part, especially those where activity was regretably very low. *G4JLG*

FIXED STATIONS SECTION

Posn	Callsign	Points	QSOs	Mult	Loc	Cty	Best dx	Km
1	G6LOH	15,949	82	41	IO92JC	NHM	PE1DNA	464
2	G3JXN	13,035	99	33	IO91UM	LDN	EI5FK/P	508
3	G6IAT	9,486	66	31	IO91TV	BFD	EI5FK/P	497
4	G3XBY	9,030	59	35	IO92DG	WKS	GI6ATZ/P	375
5	G4DEZ	8,904	52	28	JO01IN	ESX	GD0FRE/P	451
6	G3NAQ	7,616	56	32	IO91HL	BRK	PA3CQE	382
7	G4FOH	4,787	41	27	IO92XI	CBE	PA0ERW	393
8	G4CW	4,180	53	22	JO01BK	KNT	GD0FRE/P	432
9	G4DFI	4,056	46	24	JO01BL	LDN	GD0FRE/P	420
10	G6HKM	3,024	28	21	JO01FT	ESX	GD0FRE/P	420
11	G8DCZ	1,998	29	18	IO90VW	SXW	GD0FRE/P	462
12	G5UM	1,860	27	20	IO92MP	LEC	GD0FRE/P	280
13	G6HLL	1,805	29	19	IO83RE	CHS	EI5FK/P	368
14	G3ILO	1,344	16	16	IO81VQ	GLR	GD0FRE/P	317
15	G4YFN	781	25	11	IO91MK	BRK	GW4MGR/P	233
16	G1LYQ	492	32	11	IO91RO	BKS	G6YLW	85
17	G0GJV	462	20	11	IO91OK	BRK	G4KIY	133
18	G4KVI	290	15	10	IO91QO	BKS	G4LDR/P	125

ALL OTHER STATIONS SECTION

Posn	Callsign	Points	QSOs	Mult	Loc	Cty	Best dx	Km
1	GD0FRE/P	73,986	120	59	IO74TF	IOM	PA0RDY	648
2	GW4MGR/P	37,776	118	48	IO83JA	CWD	PA3AEF	553
3	G4KZY/P	22,176	90	42	IO82NN	SPE	PA0FRE	503
4	G4LDR/P	13,596	61	33	IO80WX	WLT	PA0ERW	539
5	GW4JZF/P	12,798	72	36	IO82JG	PWS	PA3AEF	544
6	G8LNC/P	10,920	69	35	IO90MX	HPH	F6AMK	499
7	G4XOM/P	7,552	57	32	IO82UK	HWR	EI5FK/P	365
8	G1WOR/P	5,302	75	22	IO90TV	SXW	G4HRY/P	357
9	G1BHR/P	3,400	54	25	IO92LJ	NHM	G3GIM	207
10	G6SPS/A	3,388	30	22	JO01HS	ESX	GD0FRE/P	432
11	G1ELC/P	3,280	45	25	IO83SR	LNH	EI5FK/P	398
12	EI5FK/P	3,176	20	18	IO61EX		G1LSB	565
13	G4APD/P	2,415	40	21	IO92JH	NHM	EI5FK/P	439
14	G4VRC/P	2,240	45	20	IO91RF	SRY	GD0FRE/P	421
15	G8FMC/P	1,962	19	18	IO80WO	DOR	GD0FRE/P	425
16	G4HRY/P	1,846	12	13	IN79JX	CNL	GD0FRE/P	476
17	G6LKB/P	1,118	22	13	IO84KE	CBA	G6LOH	265
18	GM1FML/P	126	3	6	IO76XA	SCD	GW4MGR/P	338

LISTENER SECTION

Posn	Station	Points	QSOs	Mult	Loc	Cty	Best dx	Km
1	RS28198	40	4	4	JO00HX	SXE	G3JXN	85

Check Log acknowledged with thanks from G4TDL.

Members' Ads

The Conditions of Acceptance are published below the Member's Ad form circulated with every issue of *Radio Communication*.

The current rate is £2.30 for 40 words or less: advertisements containing more than 40 words will cost an additional £2.30 for every additional 40 or less words. Each advertisement must be accompanied by the correct remittance, either as a cheque or postal order made payable to Radio Society of Great Britain.

FOR SALE .....

FRG7700 GEN/COV RX £200. G4ARI, QTHR, tel: 0530 243258.

MAST, TELESCOPIC COLLAPSIBLE, 28ft with pulley, rope and halliards, pegs, steel construction, collapses to 5ft, carrying cases, £25. G4FSW, 18 Tewkesbury Road, Gloucester. Tel: 0452 25311.

SOMMERKAMP FT277ZD (the connoisseur's 101ZD), fitted fm anode/screen anti-flashover diode fitted WARC bands £550; Sommerkamp FT290R MK1, new with nicads carrying case £285; Trio 9130 new, unwanted gift £450. Joe, tel: 0625 20835 before 10pm.

SWR BRIDGE £8; dummy-load £10; blower £10; latest Rad Coms, offers?; 5V to +/- 15V module £4; valve selection £10; 22in Ramtek monitor, not wkg, offers?; BBC-Basic1 ROM £3; 12W amp +spkr £50; Elektor games computer £20. G3XFW, tel: 0935 26502

TRIO TS-900, PS-900, DS-900, mint condx, price asked £350. No silly offers, cash only, buyer collects. Orig cartons etc, full h/books and new service manual. New finals and driver tubes available extra. G3GYX, QTHR Nottingham, tel: 0602 396387.

TR2300, little used, all usual bits, nicad chgr etc to incl mobile ant with magmount £120; Shure 444 mic £30; Katsumi electronic keyer £25. Buyer collects or pay postage. G4FIV, QTHR, tel: Launceston 3010 evenings or Okehampton 3131 daytime.

TRIO JR310 ham rx 3.5/29MHz with mod for top-band, gd condx £40 ono; Trio KA2002 solidstate 20W stereo amp, little used £40 ono. G2CVA, QTHR, tel: 0328 51836.

TR2300 +nicads, carrying case, chgr, as new, one owner £110: MM linear 1W-30W, one owner, as new £70. G4XAQ, QTHR, tel: Derby 792140 after 5pm.

ICOM IC30A 70cm mobile tcvr £135; IC240 2m mobile tcvr £135; both ex condx, orig pkg and accessories Realistic DX160 gen/cov rx 0.15-30MHz £70; Trio TR2200 2m portable 6-chann t'burst nicads, chgr, case £50. G8NOS, tel: 061-494 8693.

TS120V 12V 10W hf tcvr £270; Pye SSB130 xtal ssb tcvr 1.8-20MHz, 2x6146, 100W o/p, ex condx £70 ono WANTED: FT101ZD, MUST BE VCC. Tel: 0533 891960.

40ft LATTICE TOWER, needs winch and groundpost but c/w head unit £170; Sommerkamp TS280FM 2m, 40W synthesized £125; Yaesu FT107M hf £500; Trio TR7850 40W fm £160. WANTED: 15 metres LDF250 coax cable. G6ZYG, tel: 0933 318493.

DATONG D70 morse tutor £35; Howes 20m dc rx, built cased and wkg £10. G1IDY, QTHR, tel: 0536 760643 evenings.

ICOM 490E 70cm multimode 10W o/p, vgc £495; Black Star 600MHz freq counter, incl acc £130. WANTED: HF gear, p/exch for above. Ring and haggle swap, WHY? Paul, G0HWC, Northampton, tel: 0604 43344.

AMT2 RTTY CW AMTOR ASCII terminal unit by ICS Electronics, c/w BBC.B computer software on EPROM. All connecting cables incl lead suitable for FT726R, FT757GX etc, instr manuals, mint condx £199 ono. GM4SUF, QTHR, tel: 086282 246.

YAESU FT73R 70cm handheld, mint condx, boxed, c/w FNB10 nicad pack and NC28 chgr, £195. John, G1UZN, QTHR. Letters only please in first instance.

ARRL ANTENNA BOOK £6; cw filter FT101ZD £20; Howes S-meter module new, wkg £6; "Wire Aerial Digest" G400 £2; "Secrets Ham Radio DXing" £4; "Black Game" £5; "TVI Manual" £1; "Man of Action" Les Reed Orch £5. G4ICP, tel: 0376 84478.

VERSATOWER P60 new cables, ex condx, with Kenpro 400RC rotator £425; Yaesu FT757GX, mint £600; Yaesu FC707 atu, mint £85; Yaesu FP707 psu, mint £120. Chris, G4XCX, QTHR Kidderminster, tel: 0562 754388.

TRIO 9130 2m multimode, mint condx, c/w mobile brkt, manual, boxed, hardly used £395 ono; FTV 901R tvtr 2/70 modules fitted, vgc £250. Would exch above for hf rig. Nick, GW0HFL, NOT QTHR, tel: Chester 535696.

FT690 IN VG CONDX, c/w case and homebrew 50W linear/preamp £250; homebrew hf linear 80m-10m, approx 600W o/p incl psu, all in one box £300. Keith, G4MSF, QTHR, tel: 091-4693955.

2m/70cm YAESU FTV-250 2m tvtr, microwave modules MMT432/28 70cm tvtr, recent factory overhauls; KLM 70cm 30W++ amplifier, Pye U10B 70cm fm tcvr; 10A regulated psu c/w plugs, leads, manuals, unfitted 2m and 70cm receive preamps, £350 lot. G4EZG, tel: 0963 51133.

TRIO 430S, 1/spkr fm/am boards, full coverage hf £600 ono; KR400 rotator comp, as new £75 ono; Yaesu FC707 atu £50 ono; Hansen FS200 swr peak pwr £30 ono. Alan, G1TSI, tel: Aldershot 0252 23052.

ICOM 290E 2m multimode, vgc with HM10 mic £325 ono MML144/50S 5mths old, under warranty £80 ono. WANTED: ICOM 251E with muTek. Ken, G1WUH, tel: 01-595 1480.

GETTING MARRIED-"SALE" TS520 SP520 Viking atu, swr bridge, Shure 444D, MC-35S Ross-Cans; 1kW dummy load; Yaesu FF501 1pf hi-mound key, matched pair 6146Bs, 2x12BY7A, 100m 75ohm twin 100m-ohms 300ohm twin + loads of bits £550ovno. Buyer collects daytime. Peter, tel: 0642 456327.

TRIO TS711E 2m base matching SP430 spkr/mic boxed with handbook, vgc £625. G6YVX, NOT QTHR, tel: Milton Keynes 72211 daytime.

SONY ICF-7600D, mint £135; ICOM IC202S, vgc £105; 100W 144MHz linear 3W i/p £70. Tel: 0945 584640.

VC10 CVTR FOR R2000 £95; CPE2 starter kit, Varioformat, Variocopy, Krokus 2.25" square enlarger, focus magnifier, paper safe, measures, safelight, cascade, dishes, tongs, filters, paper etc £225; Yashica 124G,case, filter, five rolls of FP4 £90. Tel: Chester (0244) 533051.

SHACK CLEAROUT: Yaesu FT780R 70cm multimode £310; Icom 260E 2m multimode £230; 70cm 19-ele Tonna £15 two 4CX150A with bases £20 for both or could split Open to offer on all items. G6BKX, QTHR, tel: 021-526 6850.

ONE WIRE AND WAVES £2. WANTED: One Kenwood R1000 rx. MUST BE KENWOOD! for about £200. Wood, tel: Clochan 378.

DRAKE TR7 TCVR; PS7 psu; 500Hz filter; NB; vgc £800 ono. G4CNY, QTHR, tel: 0432 273237 evenings.

TRIO TS430S fm board am filter modified for Amtor. Pristine condx with MC/42S mic, owner's h/book and service manual, delivered £655; MML144/100S 100W linear £100; Icom FL-70 ssb 2.8kHz wide filter £20 G3RDG, QTHR, tel: 01-455 8831.

KENWOOD TS820S, spare valves £495; Datong auto notch £25. G0CGL, NOT QTHR, tel: 0202 291875 office hours.

NOVEX NC-1414-CL colour monitor, accepts composite video or RGB, well-made with metal casing (slightly scratched) £200; wooden table on wheels suitable for tv/video or monitor/computer £20; Pye b&w 14" portable tv £30; Creed 444 teleprinter (no tape punch or tape reader fitted) £30. G4KZZ, QTHR Coventry, tel: 0203 444160.

GOING SHF AND PACKET so comp hf stn for sale. Cubic Astro 103 tcvr, immac condx with service manual, all 9 hf bands, single conversion, digital readout to 10Hz, dual ptos, 100W £800, no offers; homebrew linear in 4ftx19in rack, pr 813 in grounded grid, true QRO on hf bands, clean signal £350; Redifon R50M rack-mounted gen/cov rx £50; single-chann rack mounting Pye rx 230VAC one-xtal chann 70cm (xtals for 5 channs provided) £40; Oskerbloc pwr/swr meter 52/75ohm £20. Will split at above prices or whole lot for £1200. Delivery by agreement, can deliver if you pay the gas, can install for you. G4AJJ, QTHR Scarborough, tel: 0723 85212.

YAESU FT726R, 2m/70cm, and sat units fitted, c/w MD1 desk/mic, YM48 hand/mic and operator and tech manuals £750ovno; Tokyo 70cm linear 3W i/p for 30W o/p with Gaasfet preamp £30ovno. Mark, G6PMN, QTHR tel: 01-236 8861 daytime only.

TR2500 TRIO 2m handheld c/w chgr, spare battery, mobile stand, remote mic/spkr £225; ssm Z-match atu £40. Clive, G4CLZ, Warrington tel: 0925 601236

MICROWAVE MODULES MMT70/144 70MHz tvtr £85 or exch for 432MHz tvtr. Yaesu FRG7 rx, fitted dig/display and fm board £120; pr unused 813 valves, RCA, offers? G4IDE, QTHR, tel: 0205 63454.

AMT-2 AMTOR AND RTTY terminal unit c/w prog and leads for BBC computer, £189. G4XPI, tel: 0253 28796.

CR100 COMMUNICATIONS RX, spare valves and data, in vgc £45. WANTED: FT200 tcvr or something similar, must be in gd clean condx. Cash waiting for right rig. All correspondence answered. GW0FPY, QTHR.

HF TVTR from 2m rig, with 15W solidstate amplifier Covers top band, 80m and 40m. Can have 20, 15 and 10 added as described in Aug/Dec 1983 "Ham Radio Today", £90. G3BDK, QTHR, tel: Towcester 52309.

ONE 10-ELE YAGI BEAM AERIAL; one 9-ele Tiger beam aerial, £30ono the two. G1WUA, Harlow, tel: 0279 38768 after 4pm any day.

RACAL RA117E RX, RA218 ssb cvtr MA1978 preselector All fitted Imhof cabinets in new mint condx £350; SM0BU0 slowscan monitor, superbly built £40, buyer collects. WANTED: TS99S tx Trio TS700S TS770E multimode 2m tcvr. G4LW, QTHR tel: Trowbridge 3166

ANTENNA TUNER Yaesu FC707 £100 ono. G3ABA, QTHR tel: 0703 732997 evenings.

DX33 PENETRATOR 10-15-20 with instr manual, vgc £120ono, buyer collects. George, G3GWT, QTHR, tel: 0482 648092 evenings preferred.

TWO-MANUAL ELECTRONIC ORGAN, 40 presets, cost £1000+, £650ono; FDK multi 700E 1-25W/2m £110; Wee Megger 500V two readings £40. Prefer buyer to inspect goods. Danny, G1TXW, QTHR tel: 01-254 2458

FDK MULTI 700EX 2m mobile tcvr hand/mic and mobile mic, mobile antenna with gutter-mount £150; swr pwr meter £10; Datong morse tutor £35; antenna switch £5. All in mint condx with instr manuals. G4PEV, QTHR, tel: 0932 243616.

ICOM IC271E 25W 2m multimode, boxed £500; Icom IC3200E 2m/70cm fm comp, boxed £300, both mint condx; Datong morse tutor £30. Buyers collect, cash. G1GWP, QTHR, tel: 075-782 415.

FT1, ALL OPTIONS FITTED, vgc; atu 902 Yaesu, SP102P spkr, 107R tvtr with leads for FT1, YP-1052 dummy load wattmeter, microdot, 30ft tiltover twr, h/duty rotator, tet antenna 10-15-20, all in vgc, offers? Pat, G1HSU, tel: 0707 329888 anytime.

RTTY SYSTEM, Dragon computer, mint, boxed, pnp terminal unit and G4BMK rtty/cw cartridge plus all leads £90; Minolta AF-E quartz databack compact 35mm camera with case, five weeks old £80; also Yaesu FT23 and accessories. Paul, G4XTA, QTHR, tel: 09313 359.

TRIO TS120V c/w advance 8A psu, gd condx, orig pkg and service manuals. Excellent 1st rig, regret to

sell but now upgrading, £280. Roger, G4VYK, QTHR tel: 027581 3351 home or 0272 78111 ext 4294 work.

50MHz muTek tvtr tvvf 50A 28MHz I.F 10W o/p, vgc £160; Kenwood TR2400 2m handheld, keypad entry, nicads, chgr, spkr/mic, case, vgc £110. G4SBK, QTHR, tel: 050841 8231.

ICOM IC490E uhf all-mode 10W, as new £400; Yaesu XF-8.9HCN 600Hz cw filter, £25; Jaybeam MBM48/70, 14.0dBd uhf antenna, £20. G4XEN, QTHR, tel: 0933 677573.

FT101Z 13.8 or 240V opp mic manual immac condx £395 or p/exch FT290R. G0EIR, QTHR tel: 09363 6149

RXs HAMMARLUND HQ180 £110; Icom 210 tcvr £100 Racal RA17L £100; Trio JR599S £110; Yaesu FRDX400S £100; Eddystone 770U £90; Bearcat 220FB £85; Collins R278 aircraft £80; Marconi sig/gen TF801D £60. All ex condx plus manuals. Nelson, tel: Thetford 810879.

YAESU FT404R 70cm 6-chann handheld tcvr, deluxe chgr, rubber duck, instr book, gwo £80. G6EKW, QTHR, tel: 01-337 7117.

CHEAP W/PROCESSOR SPECTRUM GP100A printer Philips data-rcdr joystick rtty I.F software £170ono; Sony ICF2001 rx £110; Ferrograph stereo amp £20; faulty FT2FB 2m £20; 12+12CH graphic equalizer £25; HW100 hf tx/rx £100. Might deliver. David, G4CKN, East London, tel: 01-790 3123 evenings.

TRIO TS711E 2m multimode base stn £560. G4DBE, NOT QTHR, 15 Pond View Close, Heswall Hills, Wirral L60 1YH

HF5 5-band vertical, very little used and in new condx £45 with instrs, 50 ohms impedance. Buyer to collect. G3EBG, QTHR, tel: Ely 740434.

TS520SE, ex condx with new pr 6146B fitted, £360; remote vfo-520 £45; Trio 7200G £90; external vfo-30G £40; Datong rf clipper £35; Daiwa CN520 £35. Jack, tel: 0242 528431.

'SCOPE TELEQUIPMENT D54, very clean, in use professionally till now, with manual £80ono; X-hatch gen by Electrocraft Instruments, type TVT/5A 405/625, vgc with manual £25ono. G3EFK, QTHR, tel: 07375 51212.

YAESU FT225RD 2m multimode base tcvr with muTek front-end and YD148 desk/mic £525ono. Prefer buyer to inspect and collect. Tony, G0CNV, QTHR Hull, tel: 0482 643231.

COMPUTER OUTFIT COMPRISING: 64k computer, disk drive, disks, 14in colour monitor, electronic daisywheel typewriter/printer. All perf order and condx, instr books. Cost 2/3yrs ago £1150. Would exch for best hf tcvr offered or sell. G3GFU, QTHR N Yorkshire.

SANYO MBC555 MSDOS computer 256k RAM dual 80T ds drives, green screen monitor, c/w Wordstar, Spellstar, Mailmerge, Calkstar, Reportstar, Infostar. All manuals and mags with RTC and serial i/face, £225. John G8BXH, tel: 01-428 0974.

HEWLETT PACKARD 230B pwr amp 10-500MHz £40; active probe HP1123A DC-220MHz, 50ohm o/p for HP8553B ect £60; HP8698A 110MHz solidstate sweeper, plug-in faulty £40; HP606B hf sig/gen £35; HP8708A synchronizer for above £40. John, G8BXH, tel: 01-428 0974.

KW500 LINEAR AMPLIFIER, £150ono. G3GKC, QTHR.

TRIO 2300 144MHz tcvr with matching VB2300 amplifier and mobile brkt, new nicads £130; 144MHz 100W linear amplifier, virtually unused, £70. G0COY, QTHR Leicester, tel: 0533 773908.

FM DEVIATION METER, Marconi TF791D, tunes 4MHz to 1024MHz, gd order with full manual £50ono. WANTED: 1.6197MHz xtal for Heathkit RG1 filter (or specification for same). Bill Bell, Pershore Worcs tel: 0386 553984.

YAESU FT290R with chgr, nicads, carrying case, muTek preamp, helical antenna, little used £220. Steve, GU4GNS, QTHR, tel: 0481 44137

FT780R 70cm multimode, mint condx £300; FT401B h/f tcvr, ex condx £230. G14TAP, QTHR tel: 0232 620728 after 5pm.

EDDYSTONE RX EC10 Mk2 built-in psu extra filter with manual £50; Eddystone rx 830 0.5-30MHz with manual £150. G8CKM, QTHR, tel: 0939 250679.

FT101ZD, 10-160m incl fm, immac condx, only 20hrs use, still in orig pkg; also FC902 atu, still in plastic wrapping, £650ono the lot incl free minibeam. Tel: 0203 664502 evenings and w/ends.

YAESU FT225RD plus muTek front-end £500; Heathkit SB200 linear £260; Eddystone EC10 rec £45; Tono MR150W 2m linear plus built-in pre-amp £140; Harrier CBX converted 10m fm £50; Datong FL3 £85. G4SUS, QTHR, tel: Deal 372173.

TRIO 9130 MULTIMODE, boxed, new condx £335; FT230 2m/25W mobile £145; FRG7 rx £110; Trio 9R59DS £45; 209RH 5W handheld spkr/mic, Vox headset, mobile brkt £175, AR22 2m pocket rx £55. G4EMG, tel: 01-534 3460 evenings or 01-553 7308 daytime.

FT101ZD FAN/MIC £490; FL2100Z hf linear £560; SB220 linear 2x3-500s £690; KW1000 hf linear £220; Trio TS520S, plus VFO520S SP520 spkr £365; Drake R4B rx T4XB tx MS4 spkr plus spare psu £360; Shure 444 mic £30; YO100 Yaesu monitor scope for FT101 etc tone/gen, not wkg £65; Trio TR7930 2m/fm tcvr 25W/2W o/p, 21-mem, programmable band scans £180. G3VOF, tel: 04023 73366.

MINT, SUPER8 SOUND SYSTEM, camera 10-1 zoom, projector with mixed films cased and boxed. Phone for a chat and make an offer. May exch for rig or gd 35mm camera. G4YNI, QTHR, tel: 061-740 7708.

ATV TX/RX MTV435 and rx cvtr £140ono; QRP Howes CTX80 assembled and boxed CVF80 vfo module, new, unbuilt MA wattmeter, homebrew, no split £32. G4YNI, QTHR, tel: 061-740 7708.

OSCILLOSCOPE SELABS EM102 £125; Solartron 1400 £95 Pye Westminster low-band fm £25; Olympic LB am £39 Shure noise cancelling mic £10; Advance audio/gen £19; AVO valve tester £40, new components £1.50 kilo. G4YVJ, Lincs, tel: 050 785 203.

B40D RXs, wkg £55; qty B40 spares, phone for details; Pye multi-chann xtal boards £3ea; unused 2m/PA 25W £8; BBC micro top cover £5; qty Philips video spares, some B40 valves, miniature types. Paul Martin, tel: 0843 61448.

IC-R70 GEN/COV RX +fm board £450; MM70cms tvtr 28MHz I.F £60; Timestep weather satellite i/face, with software £55; MM2m 100W linear £55; Jaybeam 70cm crossed 12-ele Yagi £10; homebrew BARTG ST5C rtty terminal £30. G0EVH, QTHR, tel: 021-329 2305.

TS120S TCVR plus microwave rtty tcvr with RCA keyboard, little used, exch for TS430S; Clegg 2m/fm 143/9MHz 0/25W variable o/p £150ono; 2m/28MHz tvtr and Dawe model 610B o/p meter. G4YUG tel: 0473 830147 anytime.

BBC.B COMPUTER DFS, Enigma, Philips monitor EPROM programmer, new Watford disk drive, new Olivetti SP101 printer, £500ono. G8EEM, QTHR, tel: 0532 872050.

K2RIW 1kW/70cm linear, built to high standard from GJ4ICD kit, spare set 4x250 and blower, vgc, no psu, £225ono. Buyer inspects/collects. G6XHR, QTHR tel: 0705 255459.

FREE! Creed 7E, immac separate pre-perf and reader. First come, first served. Unable to deliver. G4CIM, QTHR, tel: 01-304 8975.

IMHOF-BEDCO 19in rack-mounted fans, 2800rpm, 230V, new/unused, £30ea; Collins R390A rx plus manual, offers? Advance OS250 dual-beam 10MHz 'scope plus manual £85. WANTED: IC551. G6HUN, QTHR Tel: Woolhampton (Berks) 713640.

ICS/AEA CPI computer patch rtty terminal unit plus G3WHO driver EPROM for BBC, as new £145; Jaybeam D15/23 23cm Yagi (new) £23; Jaybeam PBM/70 70cm Yagi (new) £20. WANTED: Kenwood/Trio TL922 linear HF. G4XHF, tel: 0293 515201.

BBC ROMS at low prices, eg view £25; CDC 8in disk drive, new £55; box of ten 8in disks £15; Yaesu FR50B rx £60; also test gear, valves, S100 boards, monitors, 200 items must be sold. Simon, G8POO, tel: 0661 842389.

TS-811E TRIO 70cm base stn, current price £1098 - selling mine for £825 or phone for a good "haggle" Also have PF8 on GB3ST and 2 sets nicads, £60ono. Chris, 52 Spode Street, Stoke-on-Trent, Staffs ST4 4DY, tel: 0782 46570.

YAESU FC-700 antenna tuner, boxed as new £100 incl p&p; G5RV full size £10. Bob, G0GVZ QTHR Cambridge tel: 0223 243581 after 6pm Mon-Sun.

HEATH HW12 80m tcvr, most new valves, mains psu, £85; BC905E freq meter 140-260MHz £15; Marconi hf no.2 rf pwr meter 1W-25W in two scales, £20; EMI reel/reel tape rcdr, superb mechanics £20. G4RWL. tel: 022872 227.

BEARCAT 200 vhf scanner, little deaf £50; Revco Discone antenna model 2050 £20; Datong morse tutor almost unused £45, will separate. G1TWS, QTHR South East Essex, tel: 0268 779484 evenings or w/ends.

YAESU FRG9600 scanner, ex condx with Withers conversion, covers 100kHz 950MHz continuous, psu, Icom AH7000 super wide band discone, Datong active antenna, pole and mounting brkts all included £495 Peter, tel: Exeter 79179.

DRAKE TR7 and PS7, immac condx, orig pkg £625 cash Prefer buyer collects or carr extra. G3GVV, QTHR Tonbridge, tel: 0732 353360.

TRIO TS780 duo-band 2m/70cm, perf condx plus MC60A base/mic, straight swap for TS830S. Will negotiate for atu and base/mic if available. Chas, G0DLI, QTHR, tel: 01-309 7096.

DRESSLER D200S 2m/1kW valve linear amplifier, little used and in mint condx, £575; new 4CX350A valve £50. Reason for sale, going hf, prefer buyer collects. Syd, G0FEN, NOT QTHR, tel: Dronfield 0246 410604 afternoons or evenings before 9pm.

PYE 412 tx453MHz rx459MHz c/w PC1 controller, PC960 selective call unit and desk/mic, all 24VDC. Swap for 2m or 70cm tcvr, or sell, offers? Graham Cooper, G1PII, 19 Silsoe Road, Maulden, Beds. Tel: Bedford 327911 daytime or Ampthill 403594 eve

DRAKE TR7A TCVR AND PS7 hd psu, both in vgc with mic and all manuals. Sell £850 or exch JRC JST100 hf tcvr and NBD500G psu +mic, manuals etc. Must be vgc. GW4RLP, QTHR, tel: 0286 5322 evenings.

SHACK CLEAROUT: Yaesu FT102 tcvr, new PA valves, narrow filters, inc hand/mic, headset, boom/mic as new £500; FC102 atu £100; Yaesu FRG-7 rx, ex condx £125; Kenpro KR400RC rotator and control unit as new £100; Welz AC38 atu, 80-10m £50; Welz SP15, swr/pwr meter £20; Altron AR6-20, 3-ele space saver, 3-band beam, gd condx £100; Hi-mound key HK703 £20; 1kW Yaesu LPF £10; two hf in-line wavemeters £20; 13.8V psu 15A £15. G4UDB, QTHR, tel: Southampton 437148.

TRIO JR310 ssb/am amateur bands rx, ex condx with manual and box £75; Daiwa DR7500 med/heavy duty rotator with 360deg display controller, little wear £65; Transco Type A high pwrd coaxial relay 0-11GHz, 60dB isolation, 300W at 3,000MHz, used by the best stns, new price over £300, offers around £75?; 1296MHz h/b amplifier using ML8533 ceramic 2C39a, wkg but no psu, spare new tube £50. Ask for Andrew Renouf (shared phone) Bristol, tel: 0272 427571.

FT101ZD, FITTED FM, vgc £350; FT290R with mobile mount £180. G13VAW, QTHR, tel; Limavady 62946.

DECEASED EFFECTS: Trio R2000 rx with VC10 vhf cvtr new and boxed £450; Crotech 3131 15MHz dual-trace scope, new £150; Trio JR500S amateur bands 80-10m £50; AR88 lf £50; Jap HE40 rx 500kc/s-30mc/s £20; Trophy8 rx 500kc/s-48mc/s £18; valves PX4 £6; KT66 £5; EL34 £1; 6L6 £1; tubes VCR97 £5; 5BP1 £5; technical manuals copies, AR77, SX28, S27, R107, R216, SP600 £4ea, others, list available. Bentley, tel: 01-554 6631.

RADIO LOCATION, semi-rural 3br det cottage, open views to wooded countryside in front, permanent planning permission for 60ft twr, 450sq yd garden, separate lounge, dining room, kitchen, gas ch. £44,000. G4XEK, tel: 0538 754553.

ICOM 290E 2m multimode, ex condx £295; SMC reg 13.8V 8A psu £30; muTek 2m switched preamp £25; swr/pwr meter £10; colinear 2m ant £10; 9-ele Tonna £15; Multimatic ant rotator £30; 5/8 magmount whip ant £15. G4VGT QTHR tel: 0304 372834

TRIO TR2600E 2m handheld in mint condx with leatherette case, two nicad packs, dc/dc cvtr, rubber duck, chgr etc, boxed with instrs £190. Martin, G0HRZ, tel: 01-590 5490.

KENWOOD TS830M hf tcvr, immac condx, getting dusty in the cupboard, hence bargain at £675; FT290R with usual nicads chgr etc, reasonable condx hence £180. G4RUR, Colchester, tel: 0206 864308.

KW2000A HF TCVR, recently serviced by KW, new PA valves, clean condx, ready to go £165. Buyer collects. G0EBS, QTHR Kent, tel: Langton 2836 eves w/ends.

WW2 SURVEY CAMERAS F24 K20 control box, motor flex drive films; 1950-1980 Practical Wireless and other radio books, offers? Would exch for s/h handheld 2m, Sony 2001 2001D ICF7600D/S. Bill, GM8ZLI, QTHR, tel: 0875 610858 after 6pm.

HF5 80-10m VERTICAL with radials for roof mounting £45; SMC 15m mobile whip £5. WANTED: HF minibeam and rotator. G3XSH, NOT QTHR, tel: Southampton 760178.

TS430S WITH FM UNIT, cw and ssb filters, PS30 psu, instr and service manuals, as new £800; Thandar SC110 portable 'scope, as new £105; KW109 Supermatch atu £85; GW morse key, slate base, brass £25. G4KWA, QTHR, tel: 01-777 9061.

DRAKE MN75 atu and manual, boxed, unused £125 or exch for KW109, but must be in mint condx. GW4ZXG, QTHR, tel: 0656 3585 evenings.

FT101ZD Mk3 +manual, FC902 +manual, FT290 +muTek, £250; SP901 £625, gd condx. G0GII, QTHR, tel: 0787 475929.

FDK MULTI 11 2m/fm tcvr, c/w mobile brkt, 5/8-whip and gutter mount, 10W/1W o/ps, owner's h/book, repeater channs RO/R7 and i/ps Simplex 19/23 auto scanning £110. G3RDG, QTHR, tel: 01-455 8831.

MET 50/3, unused £30; 2m Slimjim, unused £5. Buyer to collect. G4TIF, QTHR, tel: 0926 313669.

YAESU FRG7700 RX, matching FRT7700 antenna tuner, and FRV7700 118-150MHz vhf cvtr, fitted into purpose-made teak cabinet. Super setup incl FF5 lf filter, all instr manuals and maintenance service manual, £350. John, St Albans, tel: 0727 53220.

SCOPES: TEKTRONIX 545A, CA plug-in, 24MHz D/BM, manuals, £65; Solartron CT316 10MHz? faulty £10; Jaybeam PMH2C harness, new N-conns £8; 25 4116 RAMS new £8; coax relays, submin 75W 500MHz new £5 5 £20. G3TTC, QTHR, tel: 01-391 2514.

ICOM IC-02E 2m handheld standard batty pack, chgr, IC-MB16 mobile brkt, IC-CM1 cigar lighter cable £180. G4LZG, QTHR Rainham, Kent, tel: 0634 360440.

ICOM IC28E 2m/fm tcvr, 25W o/p, rx covers 138MHz-174MHz which includes marine band and other interesting freqs, a f/b compact rig in mint condx £250 (cost new £350). G3IWE, QTHR tel: 0925 601485

FT102, IMMAC IN EVERY WAY, £525ono; also superb Racal RA17L £165 or exch for smaller g/c rx. Cash adjust either way. Reluctant to part but req space G8YEV, QTHR, tel: 061-624 2808.

SONY ICF2001 DIG/RX 150kHz-30MHz ssb/am, 76-108MHz fm scan, direct tuning mems, pwr pack, manual vgc £99; also Yamaha 2B,2HP outboard motor, mint, only seen water once, integral tank £110. John, G6PFD, S.Yorks, tel: 0709 374747. Hello Malcolm!

MICROWAVE MODULES MM4000 rtty tcvr c/w KB £100; MMT144/28 2m tvtr £75; MMA144V auto-preamp £12; MTV435 atv tx £95; Datong PC1 upcvtr £75; full ASCII keyboard £15; several G-whip coils £3ea; 20 2102-2 RAM chips £2. G8AYN, tel: Lutterworth 57790

FT290R WITH PREAMP, nicads, chgr, case and mobile mount. All boxed and in immac condx, £265ono. G1LQP, tel: Wellingborough 0933 224526.

COLLINS 75A/4 RX £350; Collins 32S/1 rx £260; KW204 tx £245; KW2000B tcvr c/wpu factory overhaul £225. All absolutely immac with manuals, carr and insurance pd anywhere in UK.
URGENTLY WANTED: KW107 or KW228. GOGGI, Cumbria, tel: 0229 89635 anytime.

DRAE 6A PSU, mint but no box £40; met 8-ele 2m Yagi £15; Welz 5/8 colin 2m £10; 2x15m RG213 £7ea; Welz 3x5/8 70cm whip £20; Kenpro KT400EE 70cm handie, chgr dc/dc, spkr/mic, case, new Jan '87 £175; 28ft tiltover mast 2in homebrew with guys £30; 5/8 2m whip £7; 7/8 2m whip £15; h/d magmount unused £8. Keith, G1FFT, QTHR, tel: 0602 845957.

432/144 TVTR with repeater shift £100ono.
WANTED: Diag for STSMC terminal unit; also vhf cvtr for FRG7700. G1MPC, QTHR, tel: 0923 228116.

MARCONI "ATLANTA" RX 15kHz-28MHz £70, ideal first set; Valradio 12V 10A psu £20; R209 manual £3; swr bridge single meter £7; buyer to inspect/collect. G3SZM, QTHR Worthing, tel: 0903 41810 after 8pm and w/ends.

SONY STEREO CASSETTE DECK type TC161SD, fault on erase, £20; Leak trough line tuner £10; Leak stereo 30A £10; Thorn 2000 col tv boards £5ea. G3ZNW, QTHR, tel: 0293 34715 home or 01-250 9427 work.

TRIO TS530SP, YK88C fitted, VF0230, AT230, SP70, Welz CT300. All perf, little used, orig pkg, manuals, prefer no splits, £900ono. Would consider p/exch for older or QRP equip, Heathkit, Howes especially. G0DFC, QTHR Aylesbury, tel: 0296 21227 evenings.

TRIO TW-4000A 2m/70cm fm mobile tx/rx, 25W both bands £350; mobile antenna and diplexer available MA4000 if required at small charge. G4REO, QTHR North Staffs, tel: 0538 722825.

AR2002 VHF/UHF SCANNER £330 mint condx, orig pkg; Prism 1000 modem £15; Prism 2000 modem £25, both with Prestel ROM for BBC. WANTED: Trio R600 or 1000 hf rx. G8PYC, QTHR Oxon, tel: 084421 5857.

TR2600E INCL MANY ACCS, boxed, vgc, Signal R532 with 12hr nicad pack, 110-140MHz airband, 25kHz steps, 100-mem, as new, boxed. WANTED: Sony ICF2001 and AR22M. Lockwood, G3XLL, QTHR,
tel: Mellis 596.

KW109 SUPER-MATCH HIGH PWR incorporating KWEZ match plus KW103 swr/wattmeter 1000W plus dummy load, antenna switching all in one cabinet, pr 813 £32pr, 6JS6 £18. Cole, tel: 0492 650707.

JAYBEAM 70cm 88-ele multibeam, gd condx, bargain at only £35. Buyer collects. Nigel, G6TNQ, QTHR, tel: 0255 432659.

SILENT KEY SALE: FR101D dig/readout fitted fm/det 2m/6m cvtrs, FL101, YO101, Dressler 2m/amp D200 500W o/p, R2000 gen/cov rx fitted VC10 VHF/cvtr, Philips monitor model 80, tvtr 70tv 28/432MHz, printer Fastext80, few other items available. Jackson, G3LKZ, tel: 0206 396352 after 7pm.

YAESU FT101ZD Mk3, fan and fm, absolutely mint condx with manual and box etc, £500. Prefer buyer inspects/collects. G0DMJ, QTHR, tel: 0529 60492.

FT480R 2m MULTIMODE £280; FV901DM vfo £60; MML144/40 linear £40; SMCGCCA 2m antenna £10; GP144 2m colinear £15; Jaybeam 2m/8-ele Yagi £10; Adonis AM303G mic £10; Daiwa SW110A swr/pwr meter £10. G4XIY, Derbys, tel: 062 986 364.

YAESU FT2700RH 2m/70cm mobile dual-bander incl duplexer £350; MM28/144 linear tvtr £15; telescopic tiltover ultimast 30ft, lacking base post (available mnfr) £100; vast qty WW2 valves US/Canadian and other components, offers? G4LQD, tel: 0932 854393.

MICROWAVE MODULES MMT432/144 tvtr, no repeater shift but usable on FT290R with 4MHz coverage; also included in price 9-ele Yagi and HB9CV aerial £95. G6DQO, QTHR, tel: 0606 888729.

LOWE SRX30 HF RX £79; and Codar CR70A Mk2 hf rxs £35, both mains operated 500kHz-30MHz with BFO, ex condx LAR vhf omni-match, mint £18; microwave modules cvtr 144MHz down to 28MHz £9. G6MNX, QTHR, tel: 0904 422773.

TRIO 9130 MULTIMODE, boxed, as new, mint condx £350; FT208 NC9C chgr £8; YM24A spkr/mic £15; PA3 car adaptor chgr £10; MC35S 50kohm mic £14; antenna 2m 5/8 foldover £5; antenna HB9CV portable £6. G0BXI, tel: 0703 263232.

VHS VIDEO DAMAGED spares/repair £30; Brenell type 16/0.5in tape-player £25; Philips cassette, mono, £10; Hitachi stereo cassette £20; S.G.Brown and Sennheiser h/phones, offers? 3BPI, QQU03-10, QQU06-40, offers? Proceeds to Hospital Friends Funds. GM8CJW, tel: 05783 311 or 387.

HITACHI 3in DISK DRIVE, new uncased, no psu £22.50 Cumana 5.25in 40T SS disk drive, uncased, no psu £22.50; Electron RS423 i/face plus Commstar ROM, £20. WANTED: Portuguese language course, anything considered as trip to South America likely. A J Anderson, G0BFM, 44 The Spring, Market Lavington, Devizes SN10 4EB, tel: 038081 3528.

FT200 +PSU, vgc £200; Trio 2300, 2m/fm with nicads chgr, case £130; Icom IC290E, 2m multimode 10W, vgc £295; FT290R, 2m multimode, chgr, case, no nicads, vgc £220; Yaesu FTV901R tvtr with 2m fitted, vgc £200; Yaesu FP80, 13.8V @ 5A psu, new, £40; Yaesu SC1 stn console for FT480 +FT780, incl psu, clock etc £50; Yaesu FRV7700 vhf cvtrs, type B,C&D, new, £30; Atlas 210/215 dig/dial £25. J P Cleak, GW4JBQ, 71 Pillmawr Rd, Malpas, Newport Gwent NP9 6WG.

FT290R MARK2, case, nicads, chgr, guttermount, 1/4wave, 5/8wave, 3mths old, mint, as left shop, orig pkg £375. G4JTK, QTHR, tel: 051 356 1757.

MICROWAVE MODULES LINEAR AMPLIFIER MML144-10-100S, vgc, little used, £105. G1HEW, QTHR, tel: 0909 565443.

2m BARGAINS IC215 full xtals and nicads £75; 30W PA/preamp £30; Stolle rotator, wire and hi-load bearing £45; 5/8 guttermount £10. Will split or sell all for £150. G4WEV, QTHR, Newbury, Berks, tel: 0635 40855 evenings.

FT290R NICADS, CHGR, soft case, manual, vgc £250; 2m hb valve linear suitable same £20; Datong morse tutor £35. G4FXI, QTHR, tel: Aylesbury 21542.

TRIO TS515 c/w PS515 psu and manual, vgc in orig boxes and pkg £200. Buyer collects or carr extra. G3YYZ, QTHR, tel: 0255 880893.

BREAKING FOR SPARES Hallicrafter S20R, some items common to SX24; xtal filter with base and phasing capacitor for SX24 £5. WANTED: Info on RIS circuitry fitted in Admiralty B28 rx. G3OWY, QTHR, tel: 0244 381051 evenings.

FT480R 2m multimode, gc, expanded coverage £300ono linear for above, 10W i/p 120W o/p, made by Tono, vgc £120. G1BJZ, NOT QTHR, tel: 0536 723866 eves.

YAESU FT757GX, as new with mic, boxed £750ovno. GOCAM, tel: 0761 415746.

ICOM505 50MHz tx/rx 10W o/p £330; TS711E 144 all-mode tcvr £625. G4ILG, QTHR, tel: 0282 812288.

IC215 2m/fm portable tcvr, 15-chann with nicads and chgr, orig pkg, little used £119ono. G8LHQ, QTHR, tel: 01-735 0762.

YAESU FT709R, spkr/mic, chgr £175; Yaesu FT708R, spkr/mic, chgr £145; Quad 405 Mk2 hi-fi amplifier, Quad 44 control unit (2x100W) £495; Philips CD304 Quad 44 control unit (2x100W) £495; Philips CD304 compact disc player (infra-red remote) £220. Offers considered. Bruce, G4WVX, QTHR, tel: 06286 64415.

YAESU FT726R 2m/70cm fitted, plus MD1 mic £900. G0HAJ, QTHR, tel: 0483 502745.

TY4-400 £40; TY2-125 £35; bases for 4-400 £15; anode connectors £5; roller-coasters various £10; AV09 Mk2 with hide carrying case £85; AV08 with DBs and carrying case £75, carr extra. G4LRT, QTHR Tel: Northampton 740633 evenings or w/ends.

FT290R muTek front-end, nicads, chgr, shoulder strap, manual, boxed £270. GW4CFC, QTHR,
tel: 0248 712944.

HY-GAIN ANTENNA: TH6 DXX Thunderbird, 6-ele tribander, dismantled and overhauled ready for collection and assembly, c/w manual, £200ovno. G4HXS, QTHR Keighley, tel: 0535 33726.

SONY AIR-7 HANDHELD RX, am 150-2194kHz, fm 76-108MHz, air 108-136MHz, psb 144-174MHz, 40-mem, scanning etc, v.sensitive, fitted nicads, 12mths old, vgc £200ono. G3WYV, QTHR, tel: 0843 587548 evenings.

TRIO 2200GX fully xtalled, mic case nicads chgr £65; extra repeater xtals for above £1ea;
Eddystone 898 dial unused £8; IQD 9MHz filter 8 pole with sideband xtals/sockets new unused £20; Atari 800XL 64k computer with disk drive and software, unwanted gift, still boxed £95; two box floppy disk new £5 per box of 10 disks; quality magmount with rubber base and lead/plug £10 still boxed; Avo CT378A sig/gen 2-250MHz £30. All above plus postage. G4YZX, QTHR, tel: 0304 375136.

TRIO 9500 70cm multimode tcvr, Kenwood PS10 psu, both brand new, unused and in orig pkg; also 19-ele Jaybeam 70cm beam £495 the lot, no offers. G1JLK, QTHR, tel: 061-799 2100.

FT902DE FM BOARD and 3 new bands, boxed with manual, vgc £545; FTV901R fitted 2m and 6m, boxed with manual, vgc £265, buyer collects. Reason for sale: upgrading my equip. G0GYX, tel: Bognor Regis 821131 6pm-9pm.

300 BAUD DATA MODEM type 2B £20; Western 30ft telescopic tiltover twr, ground post, winch, rotator head unit £165; KW107 super-match (atu, swr, 1kW dummy load) £80; antenna MET 432-17X £30 unused; pwr splitter MET 70cm 2-way £11.50 unused. Following items incl Securicor delivery: FT780R 70cm 10W, only 20hrs use £275; scanner Realistic PRO-2020, gd condx £155. Andrew, RS48317,
tel: Loughborough 844239.

MUTEK TVVF50A No.12312 20/50 tvtr in box, new £230 Drae 12A cont pwr supply £50, little used. G6XHQ, NOT QTHR, tel: 01-876 1108.

TOWER AND ANTENNA FARM. Westower 3 h/duty, 28-58ft plus extension masts to 87ft, raise and tilt winches, 2x16-ele 2m Tonna with high pwr phase-splitter, 9-ele crossed 2m Tonna, 19-ele crossed 50cm Tonna, Ringo Ranger 11, Emoto 1102MXX h/duty rotator and controller, plus elevating rotator Kenpro KR500 and controller, SEM masthead preamp 144MHz, 185m of low-loss feeders. Total cost new over £1250. Bargain at £600ono. Transport arranged extra. G6BZE, QTHR, tel: 0953 860666.

YAESU 757GX tcvr, perf condx £625; FC757AT ant tuner £225; Hiqual multiband antenna £40; Yaesu mic £10; and morse key £10. £850 the lot. G0DTJ, NOT QTHR, Essex, tel: 0206 852960.

DATONG UC/1 up cvtr, vgc £65 incl postage; UK CPV-5 2m vert colinear +cable £25, buyer collects; Farnell 12V psu 240V in 20A rated, £20, buyer collects. Tel: 051-334 4012.

PYE M4000 RADIOTELEPHONE: licensable BT 160MHz vhf/fm telephone service, fully synthesised, full coverage bandscanner, bootmount tx/rx with car mounting dial/handset, no technical data, hence complete system £30. Collect Essex, London, Bedford. G3ROZ, tel: 0767 80828 w/ends.

SEMI-DET, NW MANCHESTER: 4-beds, bathroom, sep/wc, 2 entertain, b/fast room, kit, det brick gge 22ftx20ft, economical rates, well-kept gdns, 5mins all motorways, 30ft twr, 2-ele triband beam. Offers around £43,000? G3HNT, QTHR,
tel: 061-794 2807.

BEARCAT 220 SCANNER, fm/am, 20-mem, 30-512MHz, 4-bands incl airband, marineband, military, PMR, emergency services, 6m/2m/70cm etc. Owner's and full service manuals, brkt. New house forces sale, hence only £125ono; Cantenna £10; ITT2300/5 £40ono Simon, G4ODX, tel: 0293 512924.

OSCILLOSCOPE, HAMEG HM203, 20MHz dual-trace with two X1/X10 probes and manual £170; rf sig/gen, tech TE20D 120kHz-500MHz £25, both items in ex condx. Beautiful old precision wavemeter type 724-A, offers? J Hinton, G4EZE, Newcastle, Staffs

tel: 0782 632730.

BNOS 70cm linear 50W o/p 3W i/p LPM432-3-50 £150; MM tvtr 144MHz type 144/28 with optional 15dB attenuator £50, both items vgc. G3NVO, QTHR, tel: 0635 63692.

TL922 AMP 160-10 £900; A3 Cushcraft 3-ele beam 40-10 £150; Sultronic 80-40 sloper, unused £30; 1.5kW ant tuner. G3DPX, QTHR.

SHIMIZU SS-105S ssb/cw/fm 10W £230; Sommerkamp 100W solidstate 80-10A built-in ant ch/over and preamp £70. WANTED: Kenwood 430S, Yaesu 757, 902DM 101ZD with 12V conv. Tel: 09952 5590.

FT290R MUTEK FRONT-END c/w soft case, chgr and mobile mount, ex condx £250ovno; HRO model 5T with 11-coil packs incl bandspread ones £60; HRO phasin/filter unit c/w xtal £5. GW3KAJ, NOT QTHR, tel: Llanidloes 3511.

FT290, NICADS, soft case, flexi-whip with Tono 50W linear £275; Sinclair ZX Spectrum 48k, i/face one, joystick controller, joystick and cassette unit, games, business and radio tapes £75; Pye PFIs several pairs rx and tx £10 (pair) xtalled RB12RB14SU8. G6EDD, QTHR, tel: 0763 42876.

SARTORIUS SINGLE-PAN dig analytical balance 200 gram max, reads to four decimal places serviced by Oertling since new £200ono or WHY? to swap. Buyer collects. G3RFN, QTHR, tel: 0772 421885.

PYE POCKET-FONE 70, 3-chann incl CR SU8 SU20 chgr 3 batteries £28. 1/4-wave ground plane 2m £3. G4WLI, QTHR, tel: 051-327 4280.

NEW, FT203R HANDHELD, FNB3, pack, case, chgr, spkr/mic £160. Tel: Aberdovey 367.

SHACK CLEARANCE: Icom 471H 70cm high-pwr tcvr, boxed as new £700; 70cm Gasfet masthead preamp with sequencer £80; GPV/7 70cm colinear £24; Tonna 70cm 2-way pwr splitter £20; Daiwa 30A psu PS300 £125; Hansen swr/p.e.p meter FS603M £40; Icom 2m masthead preamp AG25 £40; muTek 2m masthead preamp SLBA 144 £40; Welz CT150 dummy load £35; Tonna 2m 2-way pwr splitter £20; Cobra 148 10m tcvr £80; 30ft 3-section wall-mounted lattice twr, new, c/w head unit, top bearing, winches +wall brkts £250. G1WWO, tel: 091 268 8466.

UPGRADING SHACK EQUIP, surplus to requirement: Sommerkamp FT-767DX (FT-707), no mods £385, post via Securicor; Shimizu SS105S ssb/cw/fm hf rig 10W plus Trio TL120 200W/p.e.p linear £350; KW107 Supermatch atu £175; 48k ZX Spectrum, i/face1, microdrive, boxed +leads/books/games £175. G4XPP, QTHR.

ICOM 251E muTek fitted, orig pkg and manuals £400; Icom SM6 desk/mic £25. Phil, G1GXS,
tel: 01-672 1833 after 7pm ONLY.

FTONE WITH ALL OPTIONS £1075; FTV107 with modules for 2m&6m FBC £185; AMT2 all-mode terminal unit £145; Dressler D70 500W/70cm linear, as new £650; ICS PK80 TNC, as new £165. Peter, G8WYT, QTHR, Sussex, tel: 0444 450265

FT290R Mk1 nicads, chgr, mobile-mount £275; Howes HC280 2/80m tvtr £60; Howes AP3 £15; 70cm antennas HB9CV £3; mobile 2x5/8 £6; Adonis HX8 mobile/mic £35; DCW15A m/head preamp controller £25; YM24A spkr/mic FT208 £8. G3MEW, QTHR, tel: Portsmouth 820315.

WANTED WANTED URGENTLY, Icom IC202, Icom IC402, your price pd in cash. Will collect anywhere. G4IYA, QTHR Sittingbourne, tel: 0795 21207 anytime

AOR204 HANDHELD 144-148MHz fm with case, rubber duck, chgr, h/book, needs new nicad. Straight swap for Datong FL2 audio filter. G3JMO, QTHR,
tel: 0642 486155.

HOWES CTU-25 ATU, maximum 25W, 1.8-30MHz aluminium case £12; Oldham carefree, maintenance free rechargeable lead acid 12V, 6A battery £11; RS constant-voltage acid battery chgr £31, as new, prefer buyer collect or postage extra. G4GIG, QTHR tel: 021-777 6086.

MORSE TUTOR SPKG MMS1 £90; MMS2 with own box and psu £125. WANTED: FT707, FC700 atu, FP707 psu or BNOS 25A psu. Nigel, G1WRL Southampton
tel: 0703 433642.

MIZUHO MX-2 2m ssb cw handheld, QRP, helical, 144.250 to 144.350 xtals, ex condx, surplus to requirement £55. G8UKO, NOT QTHR (moved house recently), tel: 0532 812573 evenings only.

TRIO TS120S hf tcvr 200W p.e.p £300; Trio R1000 GCRX £195; Icom IC271E 2m multimode tcvr 25W £600. All ex condx. G3JDO, QTHR, tel: 091 4898239 eves.

HF SSB TCVRS FT401 500W and FT101 260W p.e.p. Offers over £200? Gen/cov usb/lsb rx RF 3100L £115 ono. Also 2m FDK 25W fm £130ono. Dave, GOFDV Luton tel: 0582 423495.

SATELLITE FIBREGLASS DISH 1.8m, c/w feedhorn mount £50. G4AGP, QTHR, tel: 091-2684 605 or G1SAI, tel: 04984 248.

FL2100Z LINEAR AMP, ex condx £560; Tektronix 585A scope, duel-timebase and trace £75; HP608E vhf sig/gen 10-480MHz £45. G3SJJ, QTHR Nottingham, tel: 06077 6441.

YAESU FT707 TCVR fm board fitted £395; G-whip mobile antenna 10/15/20 80m coils with mobile base included £45ono. GOFJO, QTHR, tel: 0305 779028.

DRAKE T4XC with psu, R4C, MN2000 and Drake spkr. All in ex condx and tx barely used. All recently checked by UK London agents. First sensible offer secures. Tel: 01-727 2246 after 6.30pm.

10m MULTIMODE 28MHz-29.7MHz (Spectrum conversion) 9W, superb QRP rig in ex condx £175; Mizuho KXZ swl atu, as new £25; 10m/fm (Spectrum), vgc £45. G4VEN, QTHR Havant, tel: 0705 473764 evenings.

MML144/100-S LINEAR pwr amplifier £50; MMT144/28 linear tvtr £40; SMC 25A psu £65. All items scarcely used and in orig pkg. G4IVW, QTHR, tel: Newmarket 669743.

SPECTRUM 48k, data rcdr, ZX microdrive, ZX i/face1 VTX5000 prism modem, incl Spectrum advanced user guide, ZX Spectrum +user guide, hackers h/book, Micronet info, morse tutor prog £80ono plus carr, or you collect. GWODHO, QTHR Gwent,
tel: 06333 67636.

FT790 NICADS £250. G8IQG, QTHR Southampton, tel: 04895 6377 after 7pm.

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TOP-BAND COIL for G-whip T-band helical AT150 auto atu for Icom 735. Tel: Blackburn, Lancs.673184 9am-4pm.

TRIO R600 in gd condx, untampered with, Nombrex rf sig/gen Ever Ready case for Ricoh XR-2 camera. Tel: Crewkerne 76143.

VERSATOWER OR SIMILAR, 30ft-40ft. GW4RYK,
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MICROSCOPE SLIDES of rocks and minerals in thin section. G3JMO, QTHR, tel: 0642 486155.

ANY GD 2m MULTIMODE base stn, any age. Chris, G4ILR, QTHR, tel: 0263 761612 evenings and w/ends.

EARLY WIRELESS AND XTAL SETS, particularly WW1 sets or parts, early valves, horn spkrs, bound volumes "Wireless World", catalogues, prewar tv, also interested tinplate trains and gd hf tcvr. G4ERU, Jim Taylor, 5 Luther Road, Winton, Bournemouth, tel: 0202 510400.

WARTIME SUITCASE RADIO A Mk3 (B2 minor) and Mk123 set or any other clandestine and resistance-type radios incl modern for collection. Any condx welcome. Manuals and accessories are of interest. G4OFO, QTHR tel: 01-949 2317.

RF BRIDGE 916A or rf bridge type 1606A by General Radio; rf bridge type Hatfield LE300A. G3HCT, QTHR tel: 05642 2176.

PAPER TAPE PUNCH, 8 bit, one-inch paper, serial i/face typically "Facit" or similar. G4FAW, QTHR, tel: Stowmarket 675330.

FV101 VFO for Yaesu FT101B or good second rx or WHY? Details please to G4EZC, Nettlecombe Cottage, Hadspen, Somerset BA7 7LN. All replies acknowledged.

NASCOM SOFTWARE NAS-DIS and NAS-Debug and also info on G805 disk system, also any rtty software for Nascom. G8YQS, QTHR Ruislip, tel: 0895 631825 eves or w/ends.

ICOM IC202S 2m ssb tcvr. Jack, G1NZH, QTHR Harlow, tel: 0279 32809.

MANUAL/OPERATING INSTRS for Hewlett Packard scope, model 140A. Buy, borrow or copy. GOEXE, QTHR, tel: 051-336 3819 evenings.

WIND-UP MAST 60ft, lowered height about 25ft. Will collect. G4FMO, QTHR Staffordshire, tel: 0283 840667.

BELCOM VHF/FM MONITOR AMR-217B instr circuit copy required. All expenses covered; Drake SP75 speech processor MS7 spkr 7077 desk/mic 1548 i/face cable to connect TR7A and R7A. G1DES, QTHR.

SET OF COILS for Lowe gdo model FX1 and info on RCA rx model RBC-1. Manual AR77. G4DVH, QTHR, tel: 0229 54466.

HY-GAIN TH3 MK3 Snr, tri-bander, BN86 balun, top price pd for gd example, also 1kW dummy load, either Drake DL1000 or Trio CT1000, MDL1000, Welz CT300. Notts, tel: 0602 609345 anytime.

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FT101E OR TRIO TS520 with h/book. All replies acknowledged. GM3DVX, QTHR, tel: 0333 50768.

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KW109, MUST BE IN VGC, best price pd. GW4ZXG, QTHR tel: 0656 3585.

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ORIGINAL RCA SIGNAL strength meter for AR88 rx. G3IBH, QTHR Hitchin, tel: 0462 56714.

19in CABINET TO HOUSE Racal RA17 rx, prefer correct Racal type; also require faulty or damaged rx. G3YFG, tel: 025482 3305 after 6pm.

URGENT, PLEASE: IC-TYPE SAD.1024 or TAD.1024. All replies answered. GM4AXS, NOT QTHR, "Clach a' Mhuilinn", Pulpit Hill, Oban, Argyll. Tel: 0631 65147.

URGENTLY REQUIRED: Scrap "Sky Buddy" or other Hallicrafter rx. Must contain ux 6-pin valve holder. G4IMT, QTHR, tel: Bath 891254.

STANDARD 828, also 2-ele 3-band beam, rotation or any 2m tcvr. G3OAB, QTHR, tel: 021-747 8489.

R216 TECHNICAL MANUAL, incl psu. G8DIU, QTHR, tel: 01-330 0092 after 9pm.

FAS-1-4R AUTOMATIC BAND SELECTOR for Yaesu 767GX; Radio amateurs callbooks for 1987 international and North American listings; Transistor World time clock. Howard, GOHZH, tel: 0394 460 474.

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ALDIS SIGNAL LAMP, any type for impoverished Sea Cadet unit. GW4KGD, QTHR, tel: 075881 2108 and reverse charge.

COPY OF UK CALLBOOK for any year within the period 1966-1970. Smith, G4AJJ, QTHR, tel: 0723 85212 after 6pm.

BEING VERY INTERESTED IN VHF, UHF and microwave propagation, am trying to inaugurate beacons on Irish South Coast sites so would welcome help and advice from anyone involved in similar projects, especially digital identification, possibly digital voice. Tropospheric and ducting effects occur frequently and much experimentation still remains on polarisation twist, diversity effects etc. Any practical help gratefully received. Des Walsh, EI5CD, 17 Owenabue Rise, Carrigaline, Co Cork, Eire, tel: 010 35321 371652.

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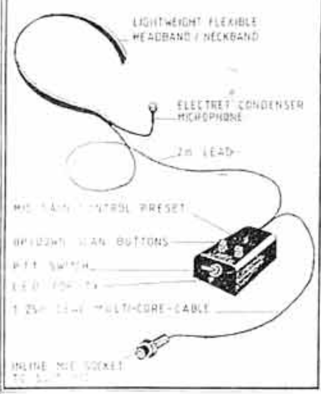

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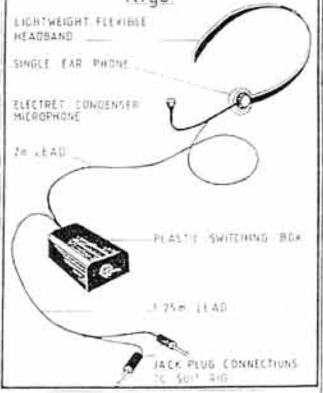

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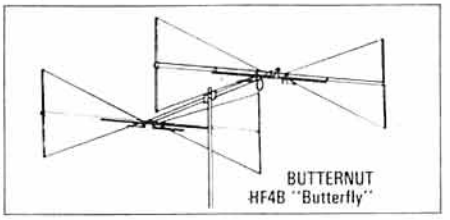

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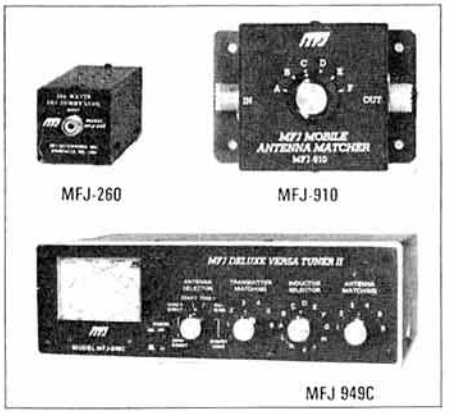

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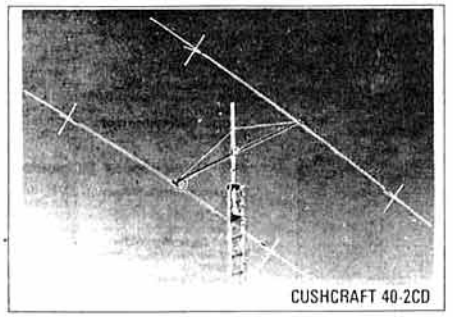

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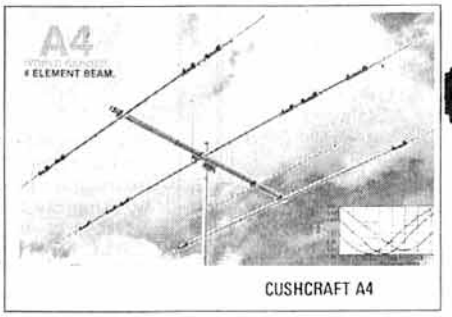

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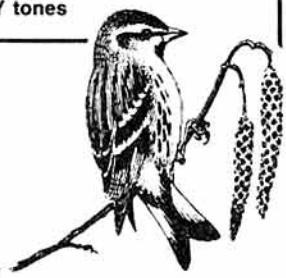

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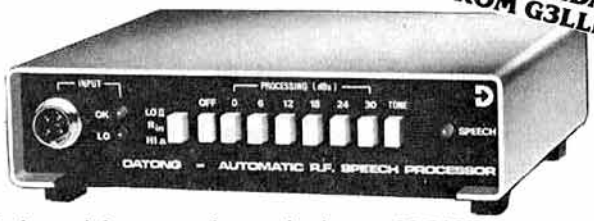

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THREE NEW BOOKS . . .

ARRL OPERATING MANUAL

The latest 1987 edition of this excellent operating guide is available for the first time in the UK. There has been a great increase in the scope of amateur radio in recent years. Twenty years ago there was, for most operators, the choice of phone or cw. Today the choice includes rtty, amtor, packet, satellites, repeaters, slow and fast scan television, fax, to name but a few. In addition there are the more traditional variations to basic phone or cw operating such as dxing, contest operating, chasing awards, training for emergency communications etc. The *ARRL Operating Manual* is designed to help you make your own personal choice of the many and varied facets of amateur radio.

Although aimed primarily at the amateur radio operator in the USA, this book very effectively complements the RSGB's own *Amateur Radio Operating Manual*. It is indeed "The most complete book about amateur radio on-the-air operating ever published" (K1XA).

Chapter titles: *Shortwave Listening; The Amateur Radio Spectrum; Basic Operating; Antenna Orientation; DXing; Overseas DXing/DXpeditions; Contests; Operating Awards; RTTY Communications; Packet Radio; FM and Repeaters; VHF/UHF Operating; Satellites; Emergency Communications; Traffic Handling; Image Communications; Reference Data.*

688 pages; paperback; 1987; £17.40 to RSGB members by post

LOW BAND DXING

This long-awaited book by John Devoldere is essential reading for anyone interested in dxing on the lower frequency bands. With over 300 countries worked on 3·5MHz and nearly three decades of experience in working dx on the lf bands the author is ideally placed to write this comprehensive book. A substantial part of the book deals with antennas relating to lower band dxing. Some theoretical aspects are addressed in more detail than is usual in amateur radio literature, but only because antennas are by far the most important tool in any lower band dx operation. A number of basic programs are given which greatly simplify many antenna calculations.

However, this book is not all about antennas. Propagation information is given, there are chapters dealing with equipment for use in lower band dxing, operating techniques are discussed in depth, and there is a comprehensive literature review. If you want to know more about dxing on lower frequencies this is the book for you.

Chapter titles: *Low-Band Propagation; Antennas; Transmitters; Receivers; Transceivers; Low-Band DX Operating; Computer Programs; Literature Review.*

266 pages; paperback; 1987; £10.75 to RSGB members by post

TRANSMISSION LINE TRANSFORMERS

Since its inception almost 40 years ago the transmission line transformer has been widely used because of its inherent wide bandwidth capability. In the past, however, little information has been published on specific design parameters such as types of windings, core materials, efficiencies, bandwidths etc. The author, Jerry Sevick, W2FMI, has made extensive studies of all aspects of transmission line transformers, some of his conclusions conflicting with existing theory. This important book is the result of his studies, and will appeal to anyone who has cause to design broadband transformers in rf applications. The chapters on baluns and rf test equipment would also have more general application.

Chapter titles: *Analyses; Low Frequency Characterization; High Frequency Characterization; Transformer Parameters for Low Impedence Applications; Transformer Parameters for High Impedence Applications; Transformer Designs with Impedence Ratios Less than 4:1; Transfomer Designs with Impedence Ratios Greater than 4:1; Baluns; Materials and Power Ratings; Simple Test Equipment; Summary Statements; References.*

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SOUTH WALES OWN ELECTRONIC surplus store now open at Electro Disposals, Lonlas Workshops, Skewen, Neath. (0792) 818451.

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"ALL RISKS" INSURANCE for portable/mobile/base station amateur radio and ancillary equipment. A service for RSGB members only. Also public liability and equipment insurance for affiliated clubs and societies. Details and leaflets from Nick Gibson, Amateur Radio Insurance Services Ltd, 19 Quarry Street, Guildford, Surrey. Tel: 0483 33771.

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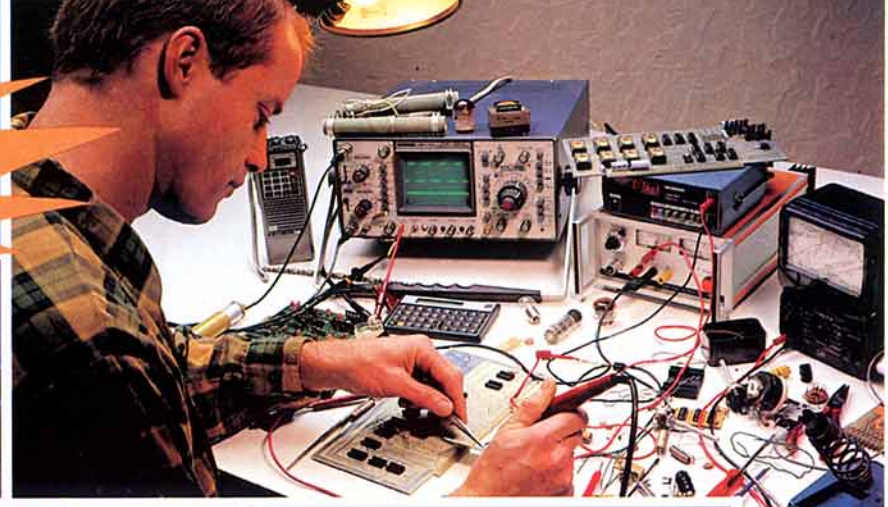

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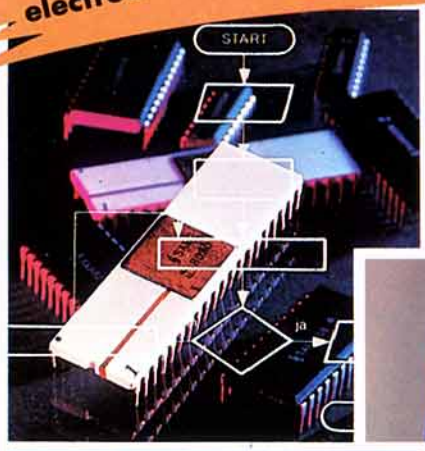

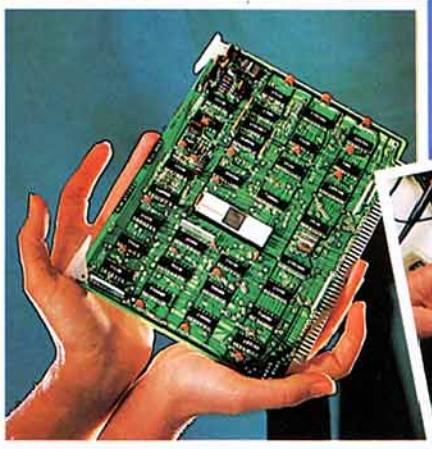

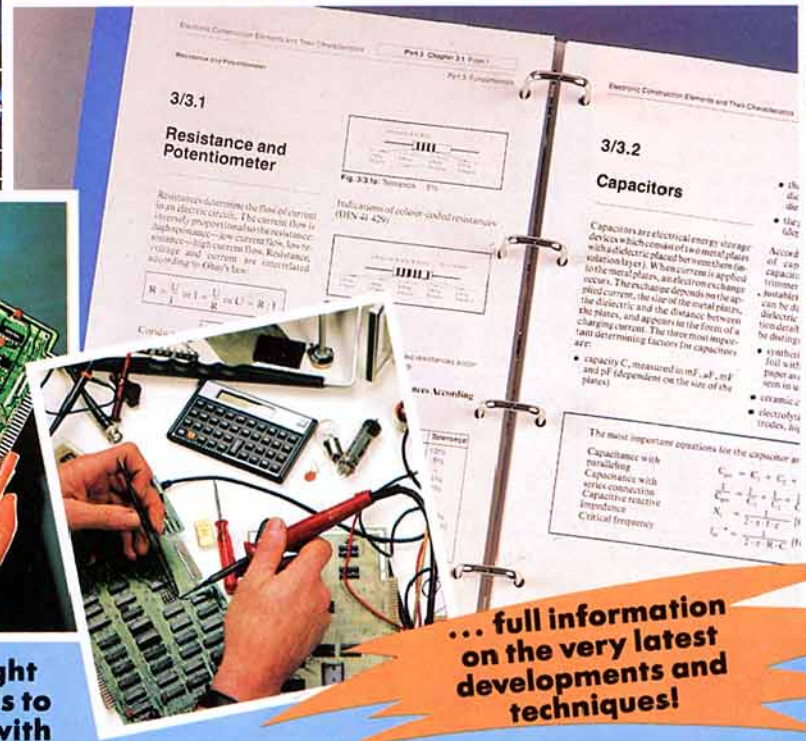

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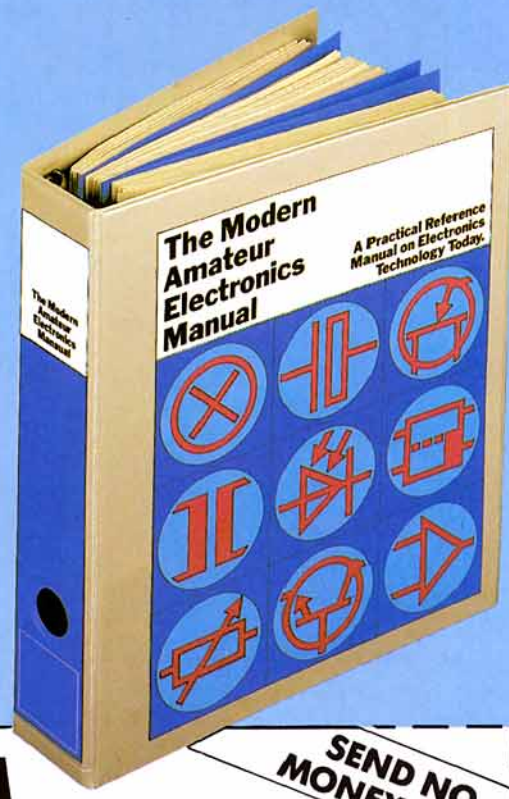

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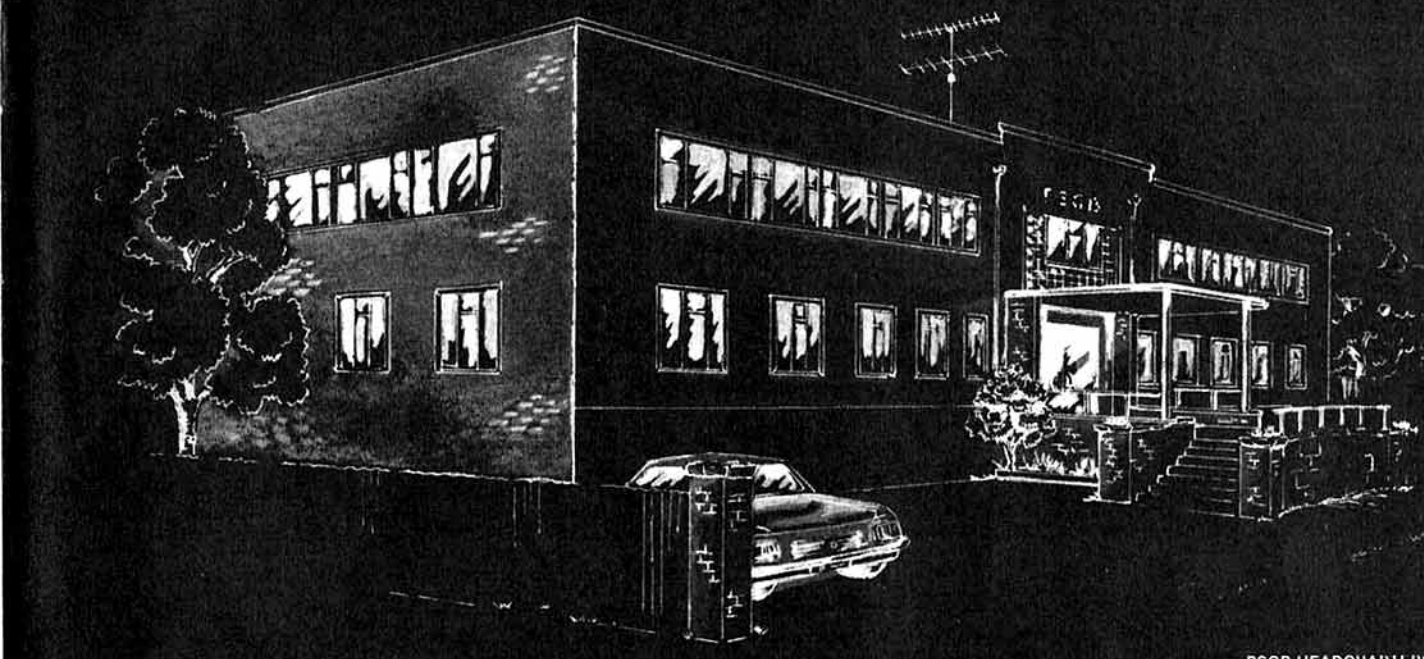

RSGB HEADQUARTERS
LAMBDA HOUSE

REPORT & ACCOUNTS
and
THE YEAR IN REVIEW

for the year ended 30 June 1987

RADIO SOCIETY OF GREAT BRITAIN

(COMPANY LIMITED BY GUARANTEE)

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F S G Rose, G2DRT
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*Retired 31 December 1986 **Elected 1 January 1987

Secretary and chief executive – D A Evans, G3OUF

Auditors – Moores & Rowland, chartered accountants

Bankers – Barclays Bank PLC

Financial report of Council to members of the Radio Society of Great Britain for the year ended 30 June 1987

The financial year started with a budget predicting a relatively small deficit; however, certain significant items of expenditure were incurred, some of which had not been anticipated. Three major items were: *(1)* The need to bring the Headquarters building up to current fire regulation requirements, *(2)* The high cost of involvement in emc problems arising out of the Society's concern about the far-reaching implications, and *(3)* The need to relieve the high organisational workload at HQ by the appointment of additional senior staff. As a result, the annual accounts show a deficit of some £27,304 before the tax provision of £6,482.

The subscription income fell somewhat short of expectations, but advertising income was improved on budget and a little better than the previous year. Sales of books were less than the previous year. This item of income has been showing a fluctuating but downward trend since 1984, as also have the profit margins. It would appear that radio amateurs are losing their appetite for books, and there is therefore some reluctance to put up prices in order to restore the margins. RSGB, as always, takes an interest in advancing technology, and this is reflected by an increase in committee expenditure.

Improved accounting has pinpointed the cost to the Society in supporting various rallies round the country. In particular the activities outside the actual trade exhibition at the NEC requires substantial support from the Society's funds. Members may be surprised to learn that the basic cost of hiring the premises, the car park, and of meeting related NEC charges exceeds £35,000. Enquiries as to the cost of suitable alternative venues in other parts of the country give no encouragement.

In recent years the Headquarters workload and consequent costs have been adversely affected by a handful of members who repeatedly write in with long lists of administrative-type queries and criticisms. They are, of course, fully entitled to do this, and some of the criticisms may be justified (we do not profess to be perfect). Nevertheless there must be many members who believe that the time and money involved might otherwise be spent on matters more closely associated with the well-being of amateur radio.

Steps have already been taken to avoid further losses. New software has been installed which will provide comprehensive details each month of every aspect of the Society's expenditure and income. In October 1987 the leasing arrangements for the main computer system come to an end with a saving of some £15,000 per annum, and it is hoped that the change in the printers of *Rad Com* will confer additional financial benefit. The budget for the 12 months July 1987 to June 1988 predicts a small surplus.

In the light of the above it may be appropriate to reflect on the cost of running your Society. It might be argued that the increased level of services now provided has outstripped the Society's income. However, the need to keep up to date with the increasing pace of technological advance has not been without its costs. Furthermore, newcomers to the hobby appear to expect much more support from Headquarters. As has been observed elsewhere there are now six members of staff in the Membership Services Department compared with none a decade or so ago. The reorganisation of the Representation Scheme is an attempt to provide help at local level in order to reduce the load at HQ.

In this context it should be realised that the corporate members' subscription is not much more than the cost of buying your favourite amateur radio magazine from a newsagent. If the reduced rates for senior citizens, students, associate members etc are taken into account, the average subscription is probably much the same as the cost of a monthly magazine. All this will prompt some to say that subscriptions should be raised by a considerable amount. This view is known to exist and has surfaced at recent annual general meetings. However, past Councils have been reluctant to see increases which do not equate with inflation.

It has to be accepted that there are members (not too many we hope) to whom RSGB only means *Rad Com* and the QSL Bureau. In such a situation RSGB is inevitably competing with other publications. Every time the subscription is increased in order to catch up with inflation, a small number of members fall by the wayside, and Council is always concerned about the number of licensed amateurs who do not support the Society's successful attempts to look after their interests both at UK level and worldwide via the IARU.

Many members would like to see further activities and still more facilities. A larger *Rad Com*, a museum at Potters Bar, a more active Headquarters station, more provincial meetings (although in recent years many of these have not been well attended) are some examples. There is support in Council and, indeed, vocal support from the membership for many such ideas. A great deal of money would no doubt provide such luxuries! At last year's agm some members present spoke of voluntary donations. There is no reason at all why those who are able should not follow the suggestion, but it must be said that luxuries do not come cheaply!

Of one fact all members must be assured; your Council is just as anxious as you are to make the Society a financial success.

RADIO SOCIETY OF GREAT BRITAIN

INCOME AND EXPENDITURE ACCOUNT FOR THE YEAR ENDED 30 JUNE 1987

	Notes	1987 £	1987 £	1986 £	1986 £
INCOME					
Subscriptions	(1)		579,127		*549,333*
Advertising	(1)		222,388		*209,174*
Book sales			302,329		*306,337*
Other income	(5)		21,983		*20,494*
TOTAL INCOME			£1,125,827		*£1,085,338*
EXPENDITURE					
Cost of book sales					
Cost of printing and distribution		150,874		*167,303*	
Cost of editing and despatch staff		68,145	219,019	*71,037*	*238,340*
Headquarters					
Rates, lighting, heating and cleaning		29,129		*24,538*	
Repairs and maintenance		6,142	35,271	*963*	*25,501*
Administration					
Staff costs		244,445		*199,896*	
Telephone, postage, printing and stationery		86,414		*76,024*	
Insurance		4,341		*4,509*	
Hire and maintenance of equipment	(7)	46,263		*54,045*	
Depreciation of fixed assets	(1)	18,921		*17,340*	
Audit fees		9,500		*8,000*	
Legal and professional fees		17,818		*9,946*	
General expenses		3,029	430,731	*6,456*	*376,216*
Finance					
Bank interest		–		*78*	
Bank charges		8,347		*2,977*	
Bad debt provision		(620)		*(3,495)*	
Exchange differences		(2,608)	5,119	–	(440)
Membership services					
Radio Communication	(8)	336,133		*343,102*	
Certificates, awards, trophies, etc		2,793		*857*	
QSL Bureau		19,072		*18,409*	
Beacons, repeaters, satellites and Intruder Watch		13,079		*8,688*	
IARU Region 1 contribution and levy		15,137		*13,156*	
Rallies, exhibitions and publicity	(9)	22,397		*7,153*	
Cost of committee, regional and Council meetings		47,074		*40,606*	
Cost of international meetings and conferences		7,306	462,991	*3,647*	*435,618*
TOTAL EXPENDITURE			£1,153,131		*£1,075,235*
(Deficit)/surplus on ordinary activities before taxation			(27,304)		*10,103*
[all of which arises in the Society]					
Less provision for taxation thereon at 28.5% *(1986: 30%)*	(10)	(6,500)		*(6,000)*	
Over/(Under) provision for corporation tax in previous year		18	(6,482)	*(200)*	*(6,200)*
(DEFICIT)/SURPLUS FOR YEAR			£(33,786)		*£3,903*

RADIO SOCIETY OF GREAT BRITAIN

BALANCE SHEETS AT 30 JUNE 1987

	Notes	1987 The Society £	1987 The Society and subsidiaries £	1986 The Society £	1986 The Society and subsidiaries £
FIXED ASSETS					
Tangible assets	(1)(2)	423,333	423,333	*413,712*	*413,712*
Investments	(3)	200	–	*200*	–
		423,533	423,333	*413,912*	*413,712*
CURRENT ASSETS					
Stocks, at lower of cost and net realizable value		145,670	145,670	*162,057*	*162,057*
Trade debtors		78,424	78,424	*58,659*	*58,659*
Prepayments and accrued income		43,340	43,340	*44,003*	*44,003*
Cash at bank and in hand		98,434	100,433	*93,766*	*95,765*
		365,868	367,867	*358,485*	*360,484*
CREDITORS: AMOUNTS FALLING DUE WITHIN ONE YEAR					
Trade creditors		(53,443)	(53,443)	*(32,387)*	*(32,387)*
Amounts due to subsidiary companies		(215,567)	–	*(215,567)*	–
Corporation tax		(5,982)	(5,982)	*(7,200)*	*(7,200)*
Other taxation and social security		(15,186)	(15,186)	*(24,317)*	*(24,317)*
Other creditors		(21,866)	(23,035)	*(19,174)*	*(20,343)*
Accruals and deferred income		(42,755)	(42,755)	*(34,874)*	*(34,874)*
		(354,799)	(140,401)	*(333,519)*	*(119,121)*
Subscriptions in advance		(296,613)	(296,613)	*(265,736)*	*(265,736)*
		(651,412)	(437,014)	*(599,255)*	*(384,857)*
NET CURRENT LIABILITIES		(285,544)	(69,147)	*(240,770)*	*(24,373)*
Total assets less current liabilities		137,989	354,186	*173,142*	*389,339*
CREDITORS: AMOUNTS FALLING DUE AFTER MORE THAN ONE YEAR					
Corporation tax payable 1 January 1989		(6,500)	(6,500)	*(6,000)*	*(6,000)*
		131,489	347,686	*167,142*	*383,339*
PROVISIONS FOR LIABILITIES AND CHARGES					
Deferred taxation	(1)(10)	(2,000)	(2,000)	*(2,000)*	*(2,000)*
		£129,489	345,686	*£165,142*	*£381,339*
ACCUMULATED FUNDS					
Income and expenditure account					
Balance at beginning of year as previously stated		153,499	369,696	*149,596*	*365,793*
Prior year adjustment	(1(f))	9,500	9,500	*9,500*	*9,500*
As restated		162,999	379,196	*159,096*	*375,293*
(Deficit)/Surplus for year		(33,786)	(33,786)	*3,903*	*3,903*
		129,213	345,410	*162,999*	*379,196*
Legacy fund	(4)	276	276	*2,143*	*2,143*
		£129,489	£345,686	£165,142	£381,339

(The notes on pages v and vi form part of these accounts)

Approved by the Council and signed on its behalf by

Joan Heathershaw, *G4CHH*
B O'Brien, *G2AMV*

NOTES ON THE ACCOUNTS

1. Accounting policies:
   (a) Subscriptions – cash received in respect of subscriptions for the year has been apportioned on a time basis from the actual dates subscriptions were receivable, after deduction of VAT.
   (b) Advertising income is the net amount receivable, after deduction of VAT, for advertisements in *Radio Communication*.
   (c) Depreciation – tangible fixed assets, except freehold land, are written off using the straight-line method over their estimated useful lives at the following rates based on cost:
   Freehold buildings – 2 per cent per annum
   Furniture – 10 per cent per annum
   Equipment – 20–25 per cent per annum
   Computer – 20 per cent per annum
   (d) Deferred taxation has been provided using the liability method in respect of timing differences which are not expected to continue for the foreseeable future.
   (e) Since a consolidated income and expenditure account is submitted, no such account for the Society alone has been presented.
   (f) In previous years it was the policy of the Society to write off the cost of lapel badges in the year in which expenditure was incurred. The Society has changed this policy so as to include the badges in the stock value at the year end and consequently carry the badges as an asset in the balance sheet. The comparative figures for prior years have been adjustged so as to reflect the new policy.

2. Tangible fixed assets

	Freehold land and buildings	Furniture, equipment and computer programming	Total
Cost	£	£	£
At 1 July 1986	417,572	100,134	517,706
Additions	–	28,541	28,541
Disposals	–	(54,322)	(54,322)
At 30 June 1987	£ 417,572	£ 74,353	£ 491,925
Depreciation			
At 1 July 1986	25,404	78,590	103,994
Charge for the year	6,351	12,569	18,920
Disposals	–	(54,322)	(54,322)
At 30 June 1987	£ 31,755	£ 36,837	£ 68,592
Net book value			
At 30 June 1987	£ 385,817	£ 37,516	£ 423,333
At 1 July 1986	£ 392,168	£ 21,544	£ 413,712

Freehold land included above amounts to £100,000 *(1986: £100,000)*.

3. Fixed asset investments

	1987	*1986*
Shares in group companies at cost	£ 200	£ *200*

The subsidiaries are Lambda Investment Company Limited (an investment company) and RSGB (Raynet) Limited, which has been dormant since incorporation. The share capital of both companies comprises ordinary shares and is wholly owned by the Society.

4. Legacy fund

	1987	*1986*
	£	£
Balance at 1 July 1986	2,143	*1,816*
Donations received	529	*327*
Transfer to profit & loss account	(2,396)	–
Balance at 30 June 1987	£ 276	£ *2,143*

5. Other income includes bank interest of £10,125 *(1986: £12,096)*.

6. Staff costs

	1987	*1986*
	£	£
Wages and salaries	320,915	*275,363*
Social security costs	26,256	*25,772*
Pension costs	8,830	*9,781*
	£ 356,001	£ *310,916*

The average number of persons employed by the Society was 32 *(1986: 30)*, divided into the following categories:

	1987	*1986*
Headquarters	25	*23*
Radio Communication	4	*4*
QSL Bureau	2	*2*
Advertising	1	*1*
	32	*30*

7. Lease rentals for equipment amounted to £23,143 *(1986 £22,814)*.
8. *Radio Communication* expenses comprise the whole of the costs of printing, distribution and the cost of editorial and advertising staff.
9. Rallies, exhibitions and publicity expenses comprise:

	1987 £	*1986 £*
Society publicity and advertising	17,089	*7,646*
Deficit/(surplus) on the Society's own events and the cost of participation in other rallies and exhibitions	5,308	*(493)*
	£ 22,397	*£ 7,153*

Book sales totalling £44,336 gross *(1986: £36,430)* made at rallies and exhibitions have been accounted for under income from book sales.

10. The Society is liable to pay corporation tax on its investment and trading income. Tax deferred owing to the effects of capital allowances has been provided for in full. The potential taxation liability, not provided for in these accounts, in respect of capital gains rolled over is £65,000.
11. The Society administers certain prize and memorial funds, totalling £660 *(1986: £666)* which are not included in these accounts.
12. Authorised Capital commitments contracted for at 30 June 1987 amounted to £ Nil, *(1986: £6,500)*.

CONSOLIDATED STATEMENT OF SOURCE AND APPLICATION OF FUNDS FOR THE YEAR ENDED 30 JUNE 1987

	1987 £	*1986 £*
SOURCE OF FUNDS		
(Deficit)/surplus for the year before taxation	(27,304)	*10,103*
Donations received (less payment made) from legacy fund	(1,868)	*327*
Adjustment for items not involving the movement of funds:		
Depreciation (including losses on disposals)	18,921	*17,340*
Total generated by (absorbed by) operations	(10,251)	*27,770*
APPLICATION OF FUNDS		
Purchase of fixed assets, less proceeds of sale	(28,541)	*(53,553)*
Corporation tax paid	(7,200)	*(6,843)*
	(£45,992)	*(£32,626)*
INCREASE/(DECREASE) IN WORKING CAPITAL		
Stocks	(16,387)	*(30,882)*
Debtors, prepayments and accrued income	19,102	*23,977*
Creditors, accruals, deferred income and subscriptions in advance	(53,375)	*(51,079)*
	(50,660)	*(57,984)*
MOVEMENT IN NET LIQUID FUNDS		
Cash balances less bank overdraft	4,668	*25,358*
	(£45,992)	*(£32,626)*

REPORT OF THE AUDITORS TO THE MEMBERS OF THE RADIO SOCIETY OF GREAT BRITAIN

We have audited the accounts set out on pages *iii* to *vi* in accordance with approved auditing standards.
In our opinion the accounts, which have been prepared under the historical cost convention, give a true and fair view of the state of affairs of the Society and its subsidiaries at 30 June 1987 and of their deficit of income and of their source and application of funds for the year ended on that date and comply with the Companies Act 1985.

Clifford's Inn,
Fetter Lane,
London EC4A 1AS.
24 October 1987

MOORES & ROWLAND
Chartered Accountants

THE YEAR IN REVIEW

Some of the activities of the Society in the year ended 30 June 1987

SECRETARY'S REPORT

David Evans, G3OUF, Secretary

MAIN POINTS

The 1986–7 financial year was dominated by three main activities. First, the granting of new spectrum space for UK amateurs at 50 and 70MHz. Second, the opening of the Society's National Convention by the Under-Secretary of State for Trade & Industry. Third, a major reorganisation of staff at RSGB HQ.

Considering the continued depressed state of the amateur radio market in the UK, the Society has done well to increase its turnover by 3·73 per cent to £1,125,827. While the deficit on this year's trading of £17,804 before tax is noted, it resulted from a deliberate policy of Council to invest now in additional staff for the future well-being of the Society. The Society has made losses in three out of the last 11 financial years. While the total of the losses has amounted to £105,248, it must be noted that the combined surpluses amount to £239,561.

Much has already been achieved towards the planning of the Society's 75th Anniversary year in 1988. In celebrating this special anniversary, the Society wishes to use this occasion not only to increase the awareness of the British public to amateur radio, but also as a focal point to begin to attract large numbers of beginners into amateur radio. In order to achieve these noble objectives for the benefit of amateur radio, the Society must rely on the support of all its members.

HEADQUARTERS ADMINISTRATION

One of the management tenets of the Society is that as much staff effort as possible should be devoted to amateur radio *per se*. However, as well as being a national radio society the RSGB is also a fully-fledged business with a turnover in excess of £1m per annum. As would be the case with any other company of this size, a wide variety of routine administrative procedures have to be carried out in addition to the primary task – which in our case is maintaining the well-being of amateur radio in the UK. A full list of these essential administrative jobs would be a long one; certainly it would encompass accounting, data processing, the efficient handling and processing of subscriptions and book orders, procurement and stock control of a wide variety of books and other items and – certainly not least – the packing and despatch of some 750,000 items which are put into the UK mailing system by the Society each year. The staff involved with these and many other tasks are not directly involved with amateur radio but they are nonetheless vital to the continuing success of the organisation.

In recent years membership and sales figures have considerably increased; however, the amount of work carried out at Headquarters in relation to both has not merely increased but has dramatically escalated. In simple terms, more members are asking far more questions and seeking much more assistance from the Society, whereas the resources to deal with the consequent workload have not been increased in anything like the same proportion. The resulting severe overload of staff has occurred at every level within Headquarters, but especially at the higher levels of management. Factors such as the loss of experienced staff and the introduction of the Data Protection Act have conspired to increase staff workloads even further – the latter caused many tens of hours of extra work. Equally, the training of new staff takes time, and this has caused considerable extra loading of senior Headquarters personnel. In the face of these problems, it is disappointing that a few members persist in making disproportionate demands on staff time with detailed correspondence. In some cases HQ can receive 10 or more items of correspondence from one member a week, handling such input simply delays correspondence to other members who make normal demands on the Society.

Although it has a formidably high workload and a respectable turnover, the Headquarters organisation is essentially that of a small business. This being so, there has to be a high degree of flexibility on the part of the staff; little back-up is available if staff members are out of the office for any reason, and there are inevitably a few occasions when the needs of members are not met as quickly as we would wish. This does not necessarily mean that we are inefficient; it does mean that our resources are stretched. In order to tackle the problem of increasing workloads, a major upgrading and reorganisation of staffing arrangements at Headquarters took place during the year under review, the reorganisation was described on page 695 of the October 1986 issue of *Radio Communication*. A new post, that of HQ manager, was created in order to bring the day-to-day administration of the Society and sundry staffing matters under direct high-level management control, and to leave the secretary more time to spend on matters relating more directly to the innovative aspects of amateur radio and its furtherance. The HQ manager is Mr Michael Blood, who came to the Society from industry. A second major change was the move of the editorial offices of *Radio Communication* from Chelmsford to Headquarters on 1 July 1986, together with the subsequent merger of the *Radio Communication* and book publication staff into a single "Publications Group" for increased flexibility.

The new Headquarters staff structure is illustrated in the organisational chart shown on page ix. The head of each section/department within HQ now reports to the HQ manager where routine matters are concerned, while working to the Secretary on innovative amateur radio related topics.

It is early days yet, both for the innovations outlined above and for Michael Blood, who was appointed to the post in September 1986. However, there is every indication that the new management structure is working very well.

Mr Reg Seaman joined the full-time staff of the Society in March 1987 as its accountant, replacing Mr Kenneth Kiely. Mr Seaman brought with him some particularly useful management accountancy skills which – with the aid of some new computer hardware and software – are now enabling the Society to review its budgeting and financial performance on a monthly basis. This facility was long overdue and is most welcome. Regrettably, Mr John Nelson, a senior member of Headquarters staff, left the Society in October 1986 to pursue a freelance career. We are happy to say, however, that he has remained in the fold as editor of the popular "News Bulletin" pages of *Radio Communication*.

For the first time in an annual report, and especially in view of the major changes which have taken place in the Headquarters structure, the work of each department is now briefly reviewed.

Membership Services Department

Brett Rider, G4FLQ
Senior Membership Services Officer

This department deals with the majority of questions raised by members and others relating to amateur radio. These arrive by mail, telephone, telex, Prestel, the DataBox or personal visits to Headquarters, MSD also deals with applications for special-event stations, which are currently running at some 1,500 each year, and the entire administration of morse tests. In addition the department handles Raynet registrations and controller nominations and is involved with both the Raynet and the Aerial Planning Committees. There have been several staff changes during the year in review, but this important department is now well established in its work.

QSL Bureau

The QSL Bureau continues to be a very popular service offered to members. In the year under review some 2·4 million cards were processed; just under one million destined for overseas and the remainder addressed to UK amateurs. These figures are substantially the same as for the previous year. Unfortunately many members do not make their best use of the bureau — failure to sort outgoing cards correctly causes much delay, and those who use oversized cards ensure that same will arrive at destination in less than pristine condition.

Between 30 and 40 per cent of our QSL cards are destroyed as they are not collected. It is obvious that many amateurs are QSLing indiscriminately and/or honouring their promise to exchange cards. The result is that much time and postage is wasted by transporting unwanted cards from point A to point B.

Data processing

Gareth Evans,
Data Processing Manager

Although not at the "sharp end", this department provides facilities which enable all Headquarters staff to operate effectively. The main projects considered or completed during the year include DataBox/Prestel software development, morse test software, IBM PC software for the handling of text transfer, Headquarters accounting packages, direct debit and credit card payment software routines, *Call Book* production software and newsletter production. The two able and experienced staff in this section not only create and maintain software required by Headquarters staff but also operate the computer systems, train staff in their use and solve day-to-day problems.

Circulation Department

Tim Charles, G4EZA
Assistant to HQ Manager (Circulation)

This department is responsible for the purchase of books and other items (including, where appropriate, components and kits) and maintaining stock levels. It also deals with the administration of newsletters, queries from cash-with-order customers and the packing and despatch section of Headquarters. In the course of the year in review 74 new items have been offered for sale, including a very popular range of emc filters. Newsletter production has been reviewed and a new newsletter – *Connect International* – was successfully launched.

News & Information Department

David Gough, G6EFQ
Senior News & Information Officer

As its name implies, this section is responsible for the output of news and information to members. Its staff works closely with those in the Membership Services Department, and its output takes several forms: the "News Bulletin", GB2RS, Prestel/DataBox, Headline News, leaflets, pamphlets, attendance at exhibitions and conventions and several others. Liaison with the media is also conducted by this department. It is worth mentioning that some 1,400 pages of up-to-date information are available via Prestel and the DataBox on a 24h basis, and it now appears that more than 10 per cent of RSGB members use these services on a regular basis. Another function of the section is to maintain various computer files – such as the Diary of Events – so that other staff can have up-to-date information.

Accounts

Reg Seaman,
Accountant

The list of tasks carried out by the accounts department is a long one and includes subscription processing, maintenance of the membership database, processing of book orders for both "cash-with-order" customers and traders, new member processing, advertising, accounting banking and cash control, money-market investments, VAT and taxation, PAYE and preparation of financial and management accounts on a monthly basis for the Finance & Staff Committee. The changes introduced in recent months in the latter area are confidently expected to be of great benefit to the Society.

Advertising Department

Although grandly entitled "department", this is a one-man band. It liaises with all companies advertising in *Radio Communication* and other Society publications, and gives extensive assistance and advice to existing and prospective advertisers. The department also deals with complaints from members where dealings with advertisers have been unsatisfactory, although such problems are infrequent.

Publications Group

Alf Hutchinson,
Editor-in-Chief

This section is responsible for the production of *Radio Communication* and all Society books, leaflets and pamphlets. Its task is complex and involves considerable liaison with the volunteer members of the Society's Technical & Publications Committee, which considers all technical articles for possible publication. Combining *Radio Communication* and book production staff has been beneficial, especially since as it happened there was considerable staff turnover in this department during the year in review.

Two main changes to *Radio Communication* took place during the year. There was a major reconstruction of the magazine in November 1986, which included a move to colour front covers for most issues. Second, the publication date of *Rad Com* was brought forward by a week – the official date now being the last Friday in each month.

Another major innovation has been the expanded information section in the *Callbook*, now published twice a year. Such work has also involved the membership services Department and the News & Information Department.

HQ Manager's Office

Michael Blood,
HQ Manager

The function of the HQ manager is, as described above, to ensure the smooth day-to-day running of Headquarters and to oversee the work of all departments. One of the biggest tasks undertaken during the year in review was the reorganisation of the Membership Services Department, with special attention being paid to the handling and routing of incoming telephone calls. A second main task was the recruitment of a new accountant and the consequent introduction of improved management accounting procedures.

Secretary/Chief Executive's Office

Although the secretary and his immediate staff continue to undertake a good deal of routine work, the role of this office is now moving more towards the furtherance of amateur radio itself; this shift of emphasis has been made possible by the Headquarters reorganisation and is long overdue. One member of the Secretary's staff is responsible for all liaison with volunteers, both on committees and in the field; the rest of the workload of the office is linked both with Council and its committees and with outside bodies such as the DTI, other national societies and so on.

And finally . . .

We hope that this brief introduction to the work of Headquarters will be of interest to members who have expressed an interest in knowing how this part of the Society functions.

COUNCIL AND COMMITTEES

The Society's 52nd President, Mr Willie McClintock, G3VPK, completed his term of office at the end of 1986. Mrs Joan Heathershaw, G4CHH, took office for the second time as President on 1 January 1987, the official installation ceremony being held in York on 31 January.

There were three ordinary vacancies for the 1987 Council. Following election these were filled by Messrs N G Brinkworth, G3UFB; G R Jessop, G6JP; and B O'Brien, G2AMV, who was re-elected for a second three-year period. No zonal elections were required for 1987.

One Council member, Dr D S Evans, G3RPE, did not continue membership of Council in 1987, because his work took him to West Germany.

In August 1986 Mr K E V Willis, the executive vice-President, resigned from his office. Council decided not to make an appointment to fill the resulting casual vacancy. In September 1986, Mr F D Hall, was appointed executive vice-President to the end of 1986. He was re-elected executive vice-President for the year at the first Council meeting in 1987.

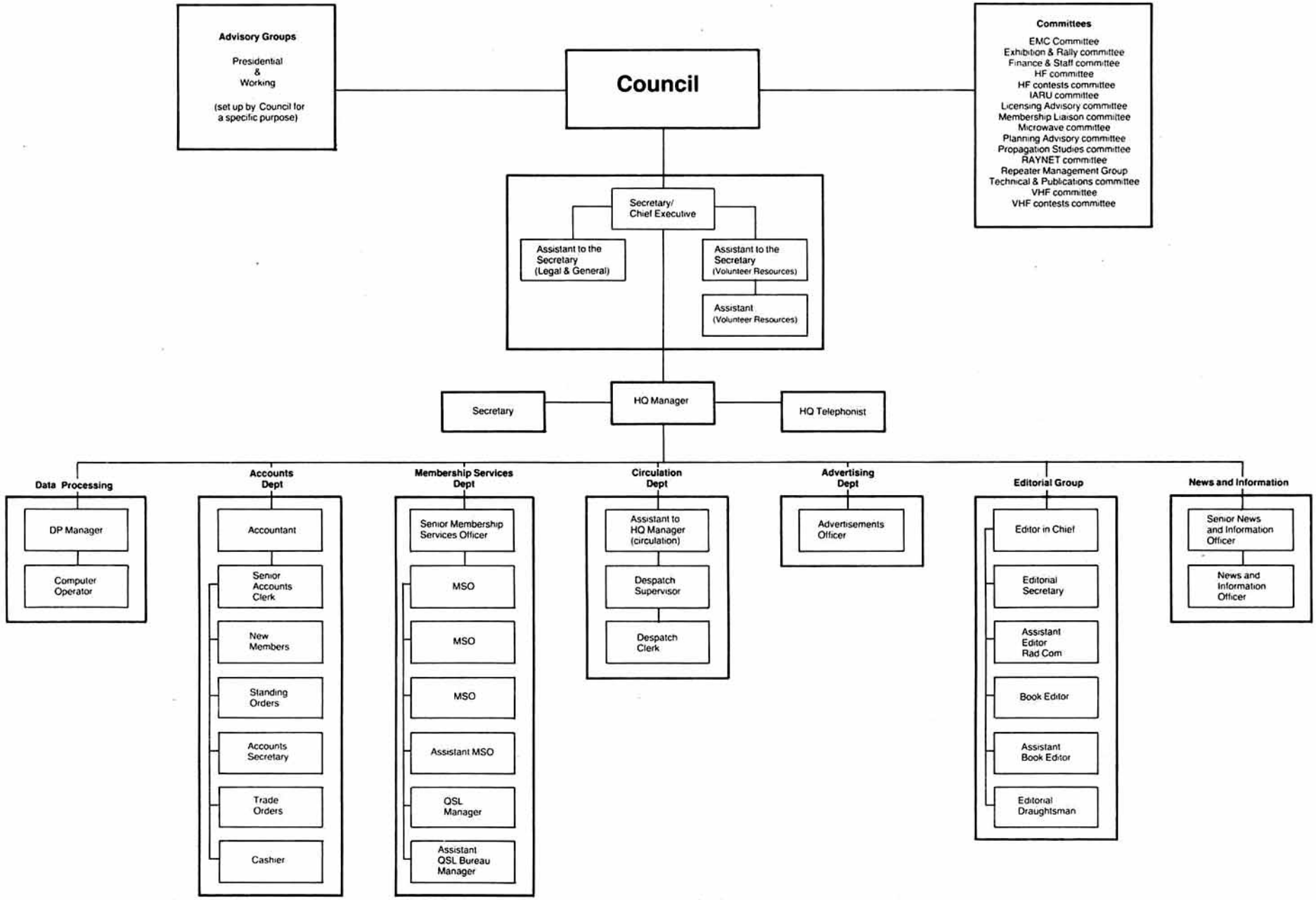
At its January 1987 meeting, Council unanimously agreed to the appointment of Sir Richard Davies, G2XM, as President-elect. Sir Richard will become President in 1988 — the year of the Society's 75th Anniversary.

During the period under review, Council and its committees held a total of 114 meetings.

ATTENDANCE AT COUNCIL MEETINGS

	1986			1987		
	9/8	25/9	25/10	31/1	14/3	21/5
E J Allaway, G3FKM	X	X	–	X	X	–
J T Barnes, GI3USS	X	X	X	X	X	X
N G Brinkworth, G3UFB				X	X	X
E J Case, GW4HWR	X	X	X	X	X	X
P F D Cornish, G3COR	–	–	–	–	–	–
D S Evans, G3RPE	X	–	–			
J N Gannaway, G3YGF	X	X	X	X	X	X
J Greenwell, G3AEZ	X	X	X	X	X	X
F D Hall, GM8BZX	X	X	X	X	X	X
J Heathershaw, G4CHH	X	X	X	X	X	X
J D Heys, G3BDQ	–	X	X	X	X	X
G R Jessop, G6JP				–	X	X
W J McClintock, G3VPK	X	X	X	X	X	X
A A McKenzie, G3OSS	X	X	X	X	X	X
B O'Brien, G2AMV	X	X	X	X	X	X
N O'Brien, G3LP	X	X	X	X	–	–
H S Pinchin, G3VPE	X	X	X	X	X	X
F S G Rose, G2DRT	X	X	X	X	X	X
D S Smith, G4DAX	X	X	X	X	X	X
K E V Willis, G8VR	X	Resigned August 1986*				

RSGB Organisation Chart



This organisational chart represented the HQ structure at the end of the 1986–7 financial year, although all the staff positions were not necessarily occupied

MEMBERSHIP

During the year the net membership fell from 37,601 to 37,061, ie by 1·4 per cent. Since a total of 3,298 members joined the Society during the year, it follows that some 3,838 members did not renew their membership at the new membership rates which were introduced on 1 July 1986.

Judging from statistics accumulated in recent years, the rate of loss of members is expected. However, recruitment is down, which is the main factor for the small fall in membership. It is interesting to note that the highest level of recruitment occurred in the 1981–2 financial year, when 5,737 new members were recruited. Although membership recruitment held steady during the 1982–3 and 1983–4 financial years; apart from that, recruitment of new members has dropped since the peak year of 1981–2. The fall in recruitment compared with the previous year, starting at the peak year of 1981–2, is: 1982–3 by 4·1 per cent, 1983–4 by 0 per cent, 1984–5 by 21 per cent, 1985–6 by 21 per cent and 1986–7 by 29 per cent had it not been for the mailing shot, referred to below, which arrested the fall to two per cent.

The actual number of members who joined the Society during the year under review by month is given below. The high figure for June 1987 is the result of a mailing-shot sent to Class B licensees who were not already members of the Society. Some 930 new members were recruited as a result of this mail-shot which showed a positive response of some seven per cent.

Persuading licensed amateurs and keen swls to join the Society is something which is in the best interests of every single member of the Society; indeed the members themselves are the best qualified to influence their relations, friends and colleagues.

Month (1986)	New members	Month (1987)	New members
July	110	January	245
August	288	February	98
September	226	March	196
October	224	April	281
November	285	May	197
December	152	June	997

LIAISON WITH THE UK LICENSING AUTHORITY

"To consider, originate and support improvements in the law which may seem directly or indirectly conducive to any of the Society's objects . . ."

These words are a quotation from the Society's Memorandum of Association, the document which sets out the reasons for the Society's existence. Perhaps it is fitting that these words are as relevant today, on the eve of the Society's 75th Anniversary, as they were when they were first written. The Society remains extremely active in the area of liaison with the licensing authority, and a vast amount of effort is directed towards formulating proposals and achieving solutions. With that in mind, and given the present-day pressures on the radio frequency spectrum, and the amount of work successfully carried out by the Society in retaining and, indeed, extending the privileges of the UK amateur radio licence for the benefit of both members and non-members, it remains our view that all UK radio amateurs should be Society members. The stark truth is "no bands, no amateur radio".

There were several highlights during the year in review. The first was the opening of the Society's 1987 National Convention by John Butcher MP, Parliamentary Under-Secretary of State for Trade & Industry. We thank the staff of the Radiocommunications Division of the DTI for their close co-operation with the Society on this matter; we also thank them for their assistance in arranging the interview with Mr Butcher which was published in the May 1987 issue of the "News Bulletin". The announcement by the DTI of its "Young Amateur of the Year Award" to coincide with the Society's 75th Anniversary in 1988 was most welcome.

The other major achievement during the year was the allocation of the 50 and 70MHz bands to Class B licensees and the release of additional spectrum space in these bands to all UK amateurs. We are pleased to have gained new allocations to the amateur service in the vhf spectrum at a time when formidable pressure for spectrum space is being mounted by other radio users. In fact, the release of the 50MHz band to all UK amateurs on 1 June 1987 represented the culmination of more than 10 years' work by the Society. We take this opportunity of thanking those RSGB officers, staff of the UK licensing authority, past and present (MPT/Home Office/DTI), and members of outside bodies who helped to make this allocation possible. In this context we must also record with gratitude the name of the late Roy Stevens, G2BVN. Roy was a vigorous and tireless campaigner for a 50MHz allocation until his untimely death in 1981.

There were other less spectacular successes for the Society. An agreement was reached with DTI in January 1987 affecting individuals who had held a UK amateur licence which had now lapsed. The agreement permitted them to reinstate their licences with a minimum of formality. This agreement has given much pleasure to many hundreds of people.

The lengthy CSPI report produced on behalf of the DTI by CSP International, which considered how market forces could be applied to management of the rf spectrum in the UK, received a largely hostile reception from the radio community. The Society felt that both its overall approach and its final proposals were unworkable and undesirable, and said as much in an editorial in the November issue 1987 of *Radio Communication*.

The arrangements for morse testing have been extensively discussed during the year in review. At the DTI's invitation the Society tendered for the provision of this service — against considerable competition — as a means of providing a better service to the UK radio amateur at a reduced cost. Despite some initial misgivings in the amateur radio press, the concensus seems to be that we have succeeded in providing both. A report from the senior morse examiner is published later in this review.

More prefixes were made available for special event stations during the year, and such stations have continued to perform a valuable role in presenting amateur radio to the public.

Progress with matters relating to the licensing of packet radio has not been made as quickly as the Society would have wished. However, the first batch of experimental unattended packet radio mailboxes and digipeaters was licensed for operation during the year in review. The occasion was marked by an enthusiastic press release from the DTI in January 1987, and also by a visit by the DTI's Head of Licensing to RSGB Headquarters, when he ceremonially switched on the RSGB packet mailbox GB3HQ. Over 500 amateurs have made contact with GB3HQ, and some 7,000 messages have been sent to date. The Society very much hopes that various press releases and Gazette Notices relating to packet radio operation will have been published by the time that this item appears in print.

In contrast to the rather slow progress made by the DTI with packet radio matters, the department has made considerable inroads into the lengthy delays in repeater licensing matters. This has been widely welcomed by repeater groups and users.

Matters relating to electromagnetic compatibility have been of great concern to the Society during the year in review, and a good deal of time, effort and money has been spent. The publication of the Society's 11-point emc plan in September 1986 marked the beginning of our determination to make quite certain that staff of the Radio Investigation Service understood the viewpoint of the radio amateur. We also considered it important to make all radio amateurs more aware of the emc aspects of the operation of their stations. EMC problems are not, of course, confined to the UK, and it was appropriate that a member of the Society's EMC Committee represented the RSGB at the IARU Region 1 Conference in April 1987.

No report on licensing would be complete without mentioning the major review of the UK amateur licence which is now under way. The proposals which the Society is putting to the DTI were assembled from the results of a very wide canvassing of the membership.

(The first of what will undoubtedly be a large number of meetings took place in September 1987. A summary of the proposals relating to the revised licence was published in the September 1987 issue of the "News Bulletin".)

A number of other matters were discussed with the DTI during the year in review. Many of these are dealt with in the report of the chairman of the Licensing Advisory Committee.

THE SOCIETY AND THE MEDIA

The year in review was not marked by any event attracting extensive media coverage, and in a sense this is no bad thing. In Britain there is a tendency for organisations to consider that they must devote considerable time and attention to persuading the media that their activities deserve to be brought to a wider audience. Unfortunately, the trade-off is all too frequently a trivialisation and distortion of the subject at issue. Broadcasters and newspaper publishers in the UK are still in our view reductivist and sensationalist by nature, and in the year under review have not successfully rebutted long-standing charges relating to unevenness of coverage and the adoption of a lowest-common-denominator approach. So, for example, any social use of radio becomes "ham radio" and a radio amateur is seen by the media as a stereotype — probably a rather odd misfit with a strange obsession about talking to other misfits via a bedroom-full of peculiar apparatus. Any sense of the vast creative possibilities of amateur radio is sadly lacking.

Having said that, some useful publicity was gained for amateur radio during the year under review — regrettably, in one case, in tragic circumstances. The capsize of the cross-Channel ferry *Herald of Free Enterprise* with its attendant loss of life was a dreadful disaster, the memory of which will not fade for many years. It is with no sense of pleasure or gratification that we record Raynet's involvement in the aftermath of the event and the subsequent media attention; it is merely mentioned for completeness. We are pleased that Raynet was able to ease the burden of those involved in the Zeebrugge disaster, and that it did so in its usual professional manner; we greatly regret that such a terrible tragedy should be the arena in which their professionalism was necessarily displayed.

A happier event was the St John Ambulance Brigade Centenary celebrations which took place during the year in review. The Grafton Radio Society ran a special event station, GB4SJA, in Hyde Park on 20 June 1987 in the course of the "Great St John Party" and a good deal of favourable publicity resulted. Well-run special event stations can be of great benefit to amateur radio since they are probably the only occasions on which the private individual can get a flavour of what the hobby is about. We have to say that we are not convinced that all special event stations do this important job as well as they might; we have visited several such stations during the year in review and found too many of them at which no effort had been made to explain to the public what was going on, no attempts were being made to involve anyone other than radio amateurs and — in short — no sense of anything either special or eventful about the station. The Society intends to consider how to improve this state of affairs next year, possibly by the provision of more and better publicity coupled with some improved guidelines.

During 1988 the Society will celebrate its 75th Anniversary and — with due attention to the strictures of the first paragraph — we hope to achieve some favourable and useful publicity. Useful, that is, in the sense of furthering the cause of amateur radio in the UK and elsewhere, and heightening the public's consciousness of what our hobby offers both to individuals and to society at large. We expect to prepare some film and video material for future use and also to prepare some packaged material for clubs and groups who may wish to involve their local media.

International matters

Radio waves do not respect national boundaries, and amateur radio almost by definition is international by nature and in scope. The International Amateur Radio Union (IARU) is the organisation which formally links the 124 national amateur radio societies, of which the RSGB is one, its headquarters is in the USA. The IARU is divided into three regions which are aligned with those of the International Telecommunications Union. Region 1 consists of the whole of Africa and Europe, together with much of the Near East and the USSR. The RSGB is not only a member of the IARU but also of its Region 1 Division. The main function of the IARU is to

maintain international co-ordination between national amateur radio societies and to monitor and participate in the work of other international organisations involved with the use of the radio spectrum.

The International Telecommunications Union (ITU) is not an amateur radio organisation; it is the agency of the United Nations responsible for co-ordination of the way in which the radio spectrum is used. The governments of 162 nations participate in the work of the ITU, which incidentally is based in Geneva. The "Radio Regulations" are devised by the ITU and agreed by nations throughout the world; it is normal for governments (including that of the UK) to adhere to the provisions contained within the two large volumes of the Radio Regulations, and it is important for all major spectrum users and their representatives to be familiar with them. It goes without saying that the RSGB Headquarters' copies are in constant use. Many other services share the radio spectrum with the amateur service; broadcasting, fixed, mobile and the rest. It is essential that, as far as possible, different services do not cause interference to one another. From time to time major conferences take place in Geneva to discuss not only basic frequency allocations but a wide variety of other matters relevant to management of the radio frequency spectrum.

This brief introduction to the international aspects of radio regulation should serve as a reminder of why it is important for the Society to make considerable efforts in this direction. Just as governments need to co-operate so that maximum utilisation of frequency allocations can be made, national amateur radio societies must also co-operate. Taking a hypothetical case, it would be pointless for the USA to advocate 14·1–14·2MHz for cw use if the UK plan called for 14·2 to 14·3MHz, while Japanese amateurs had meanwhile decided to use 14·0 to 14·1MHz.

Alternatively, imagine the results if each European country unilaterally chose a different ssb calling frequency for the 144MHz band! These straightforward examples merely hint at the nature and scope of the problems, and it must suffice to say that band plans are the ultimate result of considerable mutual co-operation between national societies. Equally, band plans are only successful because the vast majority of individual amateurs abide by them.

Each IARU region holds a conference every three years; the most recent Region 1 conference took place in April 1987 near Amsterdam. The RSGB sent a delegation of members to what was a most positive and forward-looking meeting, and a detailed report was published in the July 1987 issue of the "News Bulletin". For the record, the most recent Region 2 conference took place in Buenos Aires in October 1986, and the next Region 3 conference takes place in Korea in 1988.

In the course of each year a total of some 50 ITU meetings and conferences takes place. The IARU is involved with the major ones, such as the HF Broadcasting Conference, the Mobile Services Conference and Telecom 87. This major telecommunications exhibition takes place immediately after the Mobile Services Conference and it will feature an amateur radio stand mounted under the auspices of the IARU – an important opportunity to influence thousands of engineers and administrators intimately involved in telecommunications.

For amateur radio to be successful on an international level, radio societies everywhere in the world have to be prepared to operate at a very high level and to be able to speak with one voice to the ITU. The RGSB will continue to play a very important part in this work.

COMMITTEE AND GROUP REPORTS

EDUCATION

Committee: G2WS*, G2CVV*, G3HB, G3FVC, G3LCK, G4FZH*, G4JOV*, G6NZ, G8GPH, GI3USS, GM8BZX*, GW4HWR.

Expenses: £707.

There were four committee meetings during the year.

The lecture "Background to Amateur Radio" was given twice at the Science Museum. The committee stand at NEC was manned continuously; the fewer queries dealt with probably reflected the reduced numbers now taking the RAE.

There has been much discussion in committee on ways of spreading the gospel of amateur radio among youngsters, particularly in schools and clubs, and encouraging it in other areas and organisations. The excellent work done in some areas of the Scout movement was noted. The general feeling of the committee was that the financial and effort resources of just one committee were totally inadequate for this task which can only really be undertaken at local level.

The committee therefore welcomed Council's decision to create an advisory group on training and education for amateur radio, which will have wide-ranging authority and responsibilities.

G L Benbow, G3HB, chairman

EMC

Committee: G5HD, G3UFB, G3AEZ, G8KLH, G4JKS, G8SOZ, G3OSS*, GU3YIZ*, G3BLE*, G3GVM*, G3VWK*, G3XZB*, G4DXA*, G4FWM*, G4IWS*, G4JXO*.

Expenses: £1,139.

The day-to-day work of the committee increased during the year due to the changes in DTI, RIS, policy and the proliferation of telephone equipment susceptible to rf.

The committee manned stands at the VHF, HF and NEC conventions. Information received at these events suggests that many members are dealing with their emc problems. Articles written by committee members, one now in leaflet form, have contributed. The leaflet is now included in the package sent to all new members.

In January of this year British Telecom set up a small section to deal with emc problems. Within a few weeks the committee had made contact and a rapport has been generated which has proved most rewarding.

The majority of cases involving telephones have been dealt with promptly and efficiently. Members have been involved in testing tv receivers for immunity rating, with some indications that manufacturers are addressing the problem.

The committee has representatives on the BSI Cenelec Committee, the IERE EMC Committee, and on the RSGB Planning, IARU, HF Contests and VHF committees and on Council.

Les Hawkyard, G5HD, retiring chairman

EXHIBITION & RALLY

Committee: G5HD, G3MVV, G3TDR, G3SZJ and G4HHB.

Expenses: £930.

Monthly meetings were held throughout the year under review. Main events in the Society's calendar were planned and arranged: Woburn Abbey Rally in August, VHF Convention trade show at Sandown Park in April, and the National Convention at the National Exhibition Centre in Birmingham in March.

Two disturbing factors have taken a lot of committee time. Pilfering by visitors and exhibitors, while it is a very small percentage, it is a very disturbing element in our hobby. Second, the sale of goods purchased at events which do not perform to specification or do not work at all; exhibitors who persistently sell faulty goods in future will not be invited to Society events.

The committee would like to acknowledge the hard work put in by HQ staff during the conventions and rally, also the co-operation of committees in organising stands and lectures at NEC.

Norman Miller, G3MVV, chairman

FINANCE & STAFF

Committee: G2AMV, G3COR, G3FKM, G3LP, G3VPE, G3VPK, G6JP, GM8BZX, President (ex-officio), chief executive (staff member).

Expenses: £2,379.

The committee held nine meetings during the year, but, because of the pressure of work, the October 1986 meeting necessitated two separate sessions. Much of the committee's time this year was spent in monitoring expenditure in an attempt to arrest the movement into the red. However, these efforts were overtaken by events as will be seen in the financial report.

One of the most important items on the agenda during the year was the appointment of Mr Michael Blood as headquarters manager. This was followed by the arrival of a new accountant, Mr Seaman. More recently, new software has been obtained. All these have combined to bring about a situation where the committee can examine detailed accounts each month and compare them with budgets applicable to each department or section of the Society's activities. In this way it is hoped that it will prove possible to pinpoint and arrest adverse trends much sooner than had previously been the case. Indeed it has already been instrumental in identifying some individual losses which have already been remedied by changes in printing arrangements.

The staff appointments outlined above have enabled the chief executive to suggest to the committee a re-structuring of the organisation at headquarters, and this has now been implemented. While these far-reaching events have dominated this year's activities, a very large number of other subjects have required the committee's attention. These include membership trends, early suggestions on how to celebrate and finance the Society's 75th anniversary, payment by credit card for telephone and post orders, the level of advertising in *Rad Com*, and a multitude of routine matters.

Having regard to the increased cost of committees during recent years, each committee has been allocated a fixed sum for their year's activities. It is good to report that most committees have been able to contain their expenditure within the figure allocated. Members will appreciate however that it is very difficult to forecast these items because a committee's expenses is largely dependent on where each individual member lives.

In August G2AMV asked to be retired as chairman due to the need to concentrate on matters financial, and G3VPK was invited to take over with effect from the beginning of 1987. Other changes include GM8BZX joining the committee following his election as executive vice-president.

All committee members – especially G3VPE, the minutes secretary – are thanked for their support.

B O'Brien, G2AMV, deputy chairman

HF

Committee: G3ZAY, G3FKM, G4BUO, G3XTT, G3HCT, G3KMA, G3VTT, G4FAM, G3PJT, G3RZP, G3GIQ, G3AAE, G6LX*, G3GVV*, G3KDB*, G3DME*, BRS25429*, G4DYO*, GW4BKG*, G8GOJ*.

Expenses: £373.

The committee met six times during the year.

Committee work involved a significant amount of preparation for the 1987 Region 1 Conference at Nordwijkerhout; both the production of RSGB papers and the review, of proposals submitted by other societies. A detailed report of the conference has already appeared.

The 1986 HF Convention, organised by the committee, was a great success, with an attendance of approximately 500.

A report has been produced showing worldwide hf band plans and listing decisions taken at regional conferences and working groups. Individual members of the committee have produced a manuscript for a new awards book, and made suggestions regarding other new publications.

CW promotion continued with pile-up-style competitions at the HF Convention and the NEC, a number of training tapes have been produced for distribution shortly, and a "Straight-key Evening" has been scheduled for October 1987.

An HF Expeditions Fund has been opened to help finance expeditions of interest to Society members, and its actions will be regularly reported in *Rad Com*.

Other work included the preparation of operating information for the *Callbook*, updating Society publications, correspondence with members on a wide range of topics, provision of activities and lectures at the NEC, maintenance of Commonwealth and country check lists on the HQ computer etc.

The committee's main tasks for 1987–88 are to organise the 1987 and 1988 HF Conventions, and to prepare a policy paper on HF packet radio. In the latter context, members are invited to write to G3ZAY, at PO Box 146, Cambridge, with any comments.

M J Atherton, G3ZAY, chairman

HF CONTESTS

Committee: G3FKM, G3HCT, G3KDB, G3OZF, G3SJJ, G3UFY, G4BUO, G4DJX, G4JKS, G4RWW, G6LX, RS20249, G3AEZ*, G3RJV*, G3XDY*, G3ZAY*, G6AGE*, RS32525*.

Expenses: £1,042.

The primary task of the committee is to organise, adjudicate and report on all aspects of the Societys hf contests. In the year under review, the committee met 11 times in formal session, as well as holding a number of *ad-hoc* checking meetings attended by smaller groups of committee and corresponding members. There have been several changes in the membership; G3SXW and G3TXF left the committee, G3OZF and G4JKS transferred from corresponding to full membership, G3UFY re-joined after an absence of several years, RS32525 transferred to corresponding member, and G3AEZ joined as a corresponding member.

It has been a busy year for the committee, as apart from dealing with 25 different hf contests, a major task, the committee shared a stand with the HF Committee at NEC, and was also in attendance at the HF Convention and at other functions and meetings. Committee members visited a number of local clubs to lecture on contest matters and to answer members' questions. G6LX attended the IARU Region 1 Conference to represent the Society on contest matters. Members of the committee staffed the HQ station during the IARU HF World Championship event, and also provided and staffed a station to represent the Society during the Golden Jubilee Commonwealth Contest.

Liaison with the other societies in Region 1 has been strengthened by the conference decision to establish a Regional HF Contest Working Group. This will greatly assist the committee, as all the members of the group are contest orientated. As has been reported separately, the group resolved the differences in the NFD and SSB FD rules, and these events will now revert to the pre-1984 conference format.

The AFS, NFD and SSB FD events continue to attract more and more club entrants, and there is a steady increase in the number of entrants in the other major RSGB contests such as the Commonwealth, 7MHz, 21/28MHz Phone and the 21MHz CW. The popularity of swl contests seems to be increasing, and we continue to support them. It is the policy of the committee to frame the rules and format of RSGB hf contests to minimise interference to non-participating members, and certain changes to the timings/duration of contests and the continued introduction of contest-free frequency segments have been made. This work will continue and the committee will use its influence to encourage other IARU societies to follow the RSGB lead.

No report would be complete without a word of thanks to the members of the committee, to G3SXW and G3TXF who have retired and to the corresponding members. The dedication and hard work from these volunteers on behalf of the membership is much appreciated by the chairman, as without this, his task would be impossible.

Ron Glaisher, G6LX, chairman

IARU

Committee: G3FKM, G3ZNU, G3ZAY, G3BYW, G3RPE, G3WSN, G6LX, G3GVV, G4IQQ, G4KGC, G3PSM, G5XB*, G3AEZ*, G3DME*, Ms H M Norman (staff member).

Expenses: £771.

During the period under review, the committee met seven times. Its main task was to consider papers submitted for the Region 1 Conference by other national societies. These papers were referred to the relevant RSGB committees so that their views were known, and could be expressed by their representative on the IARU Committee; this also helped to ensure that all IARU committee members shared this information.

In preparation for the conference, each delegate had a special area of responsibility, covering every conference document. The triennial Region 1 conference was held in April, hosted by VERON, the Netherlands Society. The presence of RSGB at international meetings helps to ensure that the Society's good reputation is maintained.

It is particularly pleasing to report that Council has approved the reconstitution of the RSGB Monitoring System, with Colin Thomas, G3PSM, as its co-ordinator.

In the past 12 months, correspondence remained at a high level, the Chairman sending or receiving more than 200 documents or letters.

R J Hughes, G3GVV, chairman

LICENSING ADVISORY

Committee: G3FKM, G3RPE, G3STG, G3YGF, G3WSN, G3XDV, G3ZNU, G4FJN, GM8BZX, G3OUF (staff member).

Expenses: £1,217.

The main work of this committee involves liaising with the DTI to maintain and improve the facilities available in the amateur licences. It met eight times during the year.

The major highlights this year were the announcement of a new allocation 2MHz wide at 50MHz and an improvement of our status on 70MHz, plus the opening of these two bands to Class B licensees. While there are still some restrictions on 50MHz, we believe they are a small price to pay for a new allocation, and hope that they can be reduced progressively as it is demonstrated that there are no problems of interference to the other users. It is gratifying to find that several other countries are now following our lead and have granted allocations at 50MHz.

After further input from the membership and work on the proposals, the licence revision is now well under way, and our proposals were submitted to the DTI in June. These proposals are wide ranging. (A summary of their content was given in the September 1987 issue of *Rad Com*). An inaugural meeting with the DTI has been arranged for September, and these discussions will also cover the CEPT licence. We are only too well aware of the difficulties of trying to keep the licence conditions up to date with the rapidly changing state of technology, and this will form a key part of the discussions.

Much of the backlog of beacon and repeater licences has been cleared, and the DTI is now processing applications more rapidly. However, some applications are still moving very slowly, and we hope to find ways of further speeding up the licensing process. An experimental chain of packet repeaters has been licensed on 144MHz, and we hope that changes to ease the restrictions on individual packet operation will be announced shortly, although regrettably this has taken about a year longer than we were led to expect.

Other achievements this year include: reissue of lapsed licences – the DTI will now reissue a lapsed licence provided the licensee can provide satisfactory documentary evidence; fact sheets – DTI has issued fact sheets on club licences, callsigns and lapsed callsigns which should answer many of the questions asked in routine correspondence; special research permits – agreement has been reached on the terms for issuing these permits after three years of negotiations. With the current rate at which licences are being issued, the existing G series will soon be exhausted, and views have been sought via *Rad Com* on the various options that have been proposed for the next series. We are also trying to establish closer links with the RIS to assist in solving cases of spectrum abuse and emc problems.

Many other issues which may have some effects on amateur radio have also been discussed, including Radhaz Standards, the Defence Spectrum Review, the work of the International Frequency Registration Board (of relevence to the Intruder Watch), qualifications for installers of radio equipment, import controls on cb-type apparatus, and the CSP report on the management of the spectrum by market forces.

Looking more to the future, the Society is beginning to formulate its policy on future amateur allocations as part of the run up to the next WARC.

Julian Gannaway, G3YGF, chairman

MEMBERSHIP & REPRESENTATION

Committee: G4DAX, G3AEZ, GI3USS, G3VPE, G3YGF, G4CHH, GW4HWR, GM8BZX, G3OUF, Ms H M Norman (staff member). (G3FKM, G2AMV part of year.)

Expenses: £2,064.

This year has been a busy one for the committee, which met five times, and many aspects of amateur radio at the local level have been under review. The major topic has been the question of how best the Society can assist, represent and communicate with members and clubs. The new liaison system (described in the September 1987 issue of *Rad Com*) was the result of many hours of planning, and it is hoped that members and clubs will play their part in ensuring the success of the new system.

Following some reported problems with the GB2RS news-scripts in the early part of the year, changes were made in the way the scripts were produced and the feedback from some of our senior news readers is quite favourable. The efficient distribution of over 200 scripts each week is a subject currently under review by the committee, and methods of shortening the lead time and thus making the content more immediate are being sought.

Committee members are still having to spend rather too much time explaining to individuals and clubs that the closing dates for "Club News" in *Rad Com* are published in each issue and must be adhered to. Discussions have taken place with the Editorial Board to improve the format of "Club News".

Proposals have been presented to Council on such diverse subjects as the future of equipment bequeathed to the Society by silent-key members, and the inclusion of advertisements for 27MHz equipment in *Rad Com*. Other subjects falling within the committee's terms of reference and discussed this year include operation of the HQ station, access to private land for vhf, uhf and microwave groups, Insurance, QSL bureaux, morse testing, slow morse transmission etc.

Various members of the committee have represented the Society at meetings throughout the country during the year (often with the help of one or more dedicated staff members working in their own time). Members' opinions are canvassed at these meetings and are initially brought back to this committee for discussion. Society positions are explained and many books are sold at these local "get togethers" which are felt to be most useful.

A new slide programme of Society activities has been produced and should be ready for distribution to the new liaison officers when they start their terms of office at the beginning of 1988.

Finally, I would like to thank the staff members concerned with the committee for their help and support, and the regional representatives out in the field for all their efforts on behalf of the Society. I hope we shall see many of them again as liaison officers under the new system.

David S Smith, G4DAX, chairman

MICROWAVE

Committee: G3PFR, G8AGN, G3PHO, G3RPE, G4DDK, G3YGF, G4FRE, G3JVL, G3WDG, G4KGC, G3JHM*, G4FSG*, G4KNZ/ZL2AZQ*, G3RWL*, G4MQS*.

Expenses: £1,039.

The committee met on six occasions for general business and twice for special business (*Microwave Manual*). General business has, as usual, covered liaison with the Licensing Advisory, IARU, VHF and VHF Contests committees, Repeater Management Group, and additionally with the Planning Advisory Group and the British Amateur Television Club (a major microwave-user group). In addition, such matters as beacon/repeater planning and approval, the *Microwave Newsletter*, the Microwave column in *Rad Com* and the components service have occupied much of the committee's time, both at formal meetings and in correspondence.

In many respects our work has been hampered by the absence, in Germany, of Dr D S Evans, G3RPE, the microwave manager. In view of his continuing business commitments abroad, he resigned from the post of microwave manager at the end of the year under review. His place will be taken by Dr Charles Suckling, G3WDG, already a member of the committee and whose long and wide experience of microwave matters should provide excellent continuity in this important field. The committee wishes to record its formal thanks to Dr Evans for his extremely dedicated input to the committee as the retiring microwave manager, and to the Society at large for his many years of Council work.

Notwithstanding these constraints, the international aspects of our activities came to a successful conclusion at the recent IARU Region 1 Triennial conference where there emerged a firm band plan for 1·3GHz and tentative band plans for all the bands from 2·3 to 47GHz: these will be built upon in the coming year, allowing effective "domestic" planning within the broad framework of the IARU Region 1 plans. Our particular thanks go to G3RPE and Petra Suckling, G4KGC, for their sterling efforts in representing the Society's microwave interests in Committee B.

Since detailed UK band planning will be undertaken as a special topic in the coming year, the committee will welcome positive input from all microwave users before band plans are submitted to the Licensing Advisory Committee with DTI. Such questions as:
(i) are the whole of the space band allocations necessary?;
(ii) are nominated sub-bands for repeater linking going to be used in the forseeable future?, and
(iii) should provision be made for wideband repeaters (eg digital tv)?,
all remain to be answered and resolved in order to satisfy the needs for some years to come.

Last year's second special topic, the publication of the long-awaited Microwave Manual, "spilled over" rather later into this year than expected, due to a number of circumstances. As a result of concentrated work, the *Manual* should now be published in 1988. It turned out to be a rather larger task than we originally anticipated from both the Committee point of view and the sheer load which was placed upon the Publications Group's diminished resources, the book editor having resigned early in 1987.

The response to both the promotion of 24GHz band activity (by providing components via the components service) and to the revival of the John Rouse Memorial Trophy (for design and construction) has, at the time of writing (August) proved very disappointing to the committee: very few 24GHz components have been sold and there have been no entries, so far, for the constructional cup. Where have all the experimenters gone?

In the coming year, these two projects will continue to occupy special project status, and we hope to be able to report a more positive response next year. A further special project to be undertaken, once the *Microwave Manual* is published, and one which we feel appropriate to the Society's forthcoming 75th anniversary, will be to start work on the idea of a video presentation of the many facets of amateur microwaves. This should serve several purposes, being – hopefully – partly archival, partly topical and certainly educational! Assistance is sought from any Society members who feel able to contribute video "footage" which might be usefully incorporated into such a presentation.

Finally, may I thank all those members (and some non-members) who have supported the committee's work by contributing information to the *Newsletter* and the column and by using the components service. My special thanks go the committee members G3PHO and G8AGN (who ran the components service and prepared and edited the *Newsletter)* and to G4DDK for several excellent technical contributions. These thanks are, of course, extended to all the other committee members who have contributed in very many ways during this last year.

Mike Dixon, G3PFR, chairman

MORSE TEST STEERING

Committee: G3GDO, ME002, G3OUF, G3AEZ, G3BDQ, G4FLQ (staff member).

The committee came into being on 30 April 1986 and held only one meeting during the year. The purpose of the meeting was to consider the re-appointment of examiners and review the organisation in general.

The main task during the year has been the selection and interview of examiner candidates. This has been time consuming and has involved much travelling, but this is now almost complete and the service can be considered fully operational. Where a particular county is short of examiners, arrangements have been made to cover them from adjoining counties until further appointments are made.

There are now 256 examiners covering all counties in England, N Ireland, Wales, Scotland, IoW, IoM, Guernsey, Shetland, Orkney. Jersey has four volunteers but has asked to defer interviews and tests until after the holiday period. It may be interesting to note that the RSGB has created several "firsts" in that it is the first time ever that the islands of Orkney, Shetland, Man and Guernsey have had their own testing centres; hitherto they had to await a visiting surveyor or travel to the mainland.

During the year we have provided 5,497 test vacancies in 352 centres. The number of candidates taking up these vacancies was 2,719, which represents an occupancy of approx 50 per cent. The pass rate was 66·9 per cent. Failures were mainly due to the sending of uncorrected errors and reception of figure groups, although a number of candidates obviously were just not ready but were having a go.

The procedures now agreed with the DTI for dealing with disabled persons are working well; of the 87 disabled candidates tested, most were successful first time and all those who failed were successful on their second attempt. It is interesting to note that, taking into account their various disabilities, the standard reached by these candidates was very high and they can be proud of their efforts.

Bouquets for the service in general and the examiners in particular have been received from many individuals, some even from candidates who failed. The Minister for Trade & Industry and his officials have complimented the Society on its efforts, but I think we should record that without the ready and helpful co-operation from the DTI the task would have been much more difficult.

Considering the number of candidates dealt with by the service, complaints have been few. These were mainly concerning conditions at rally sessions and the problems inherent in running a centralised examination scheme. It would have been surprising if we had not experienced these problems, for it must be borne in mind that there were no precedents and everything had to be done yesterday, so provision of staff and software could not be planned in advance. The committee agreed that rally sessions had been a stop-gap measure adopted in 1986 in order to provide some sort of service during the first few months of operation, but has decided only to authorise further sessions where absolutely ideal conditions are provided. One or two candidates did not allow for examination nerves and complained that they should have passed because they could copy 14+ wpm from !ABC or !XYZ at home . . . but went to pieces on the night. Other complaints were that the oscillator was too low/high/loud/weak etc; however, few of these complained at the time, and in all cases other candidates who took the test at the same time produced perfect copy.

The call for volunteers to carry out morse tests at the NEC was overwhelming and 30 from various parts of the UK were selected. These were arranged into teams and their efforts enabled 60 or so to obtain their certificates. There were problems when the NEC authorities decided to knock one wall of the exam room down during tests, but alternative arrangements were hastily made and no candidate involved actually failed.

The committee endorsed current procedures and felt that the examiners could be justly proud of their efforts.

A N Ianson, G3GDO, chairman

PLANNING ADVISORY

Committee: G3OSS, G3PVH, G3TZZ, G4GJB, G4LYX, G4OIG, G4OVX, G4SHF, GW4ZXG, G5HD, G6MNF, G8GG, G8NXU, RS39901.

Expenses: £489.

The committee was only formed in March 1987, and incorporates the Planning Panel which has operated for a number of years to assist members having specific problems or difficulties with their local planning authorities regarding masts and/or antennas. The intention is to maintain and, if possible, improve service to members by more effective responses to consultations by and volunteering advice to central government departments and local authorities in respect of proposed policy changes, while continuing to deal with specific problems of members.

Only one meeting of the committee took place after its formation, but the Planning Panel met twice prior to this. Meetings are held in London on Wednesday afternoons; this being the most convenient day and venue for the majority of members.

A total of 86 cases was dealt with during the year, including those dealt with by the Planning Panel prior to March. A strength of 12 members was weakened by the loss of three members, including the Panel Co-ordinator and vice-chairman of the committee, G4HFX, who had served for many years. Pressure of case work tends to cause a continual turnover, and the loss of experienced members puts a greater strain on those who remain. New volunteers for this type of work are constantly needed, and the absence of any GM representatve is particularly unfortunate because of the differences in planning law and practice north of the border.

Comments were made to the Department of the Enviroment on two proposed advisory documents, to three local councils upon "policies" regarding masts and antennas, while work was undertaken to update the brochure *Planning Permission – Advice to Members.*

A presence was made at NEC with a minimum of display material, and efforts are being made to improve this before the 75th anniversary convention, not only to bring the existence of the service more to the notice of members but also to alert those Society members who may be able to assist, to the need for more volunteers. An introductory study of the scope for local planning representatives has been launched with assistance from G6XM and G8TKU.

Special objectives for 1987–8 include completing the review and securing the printing of *Planning Permission – Advice to Members* and reviewing possible difficulties which may arise in the field of satellite working, moonbounce and general microwave working as local planning authorities become concerned at perceived amenity problems from satellite tv antennas.

H Fenton, G8GG, chairman

PROPAGATION STUDIES

Committee: G2AHU*, G2FKZ, G3BYW, G3DME, G3HTF, G3JVL, G3LTP, G3USF*, G4AQL, G4CEB*, RS87676, DJ5DT*, F8SH*.

Expenses £601.

The Committee met six times in the period covered by this report. In general terms its work may be grouped under three broad headings: active research, data collection/distribution and services to members. Under the first, a paper on the ionosphere was contributed to the IEE 5th International Conference on Antennas and Propagation in March 1987; active participation was maintained on CCIR UK Study Groups 5 and 6, and on a British Standards Institution Working Group concerned with compiling a glossary of terms relating to propagation, and work continues on studies of various specific modes.

Our vhf sporadic-E reporting project was terminated this year, a decision prompted

by the very small number of returns received in 1986, and all the observations which had been collected were passed to F8SH for inclusion in the IARU European Es data bank. HF ionospheric predictions in the form of probabilities have continued to be published each month in *Rad Com*; we are frequently asked if they could be given more space, but this is something outside our control.

Weekly propagation surveys and forecasts have been supplied to headquarters for inclusion in the GB2RS news broadcasts, and these have included summaries of relevant solar/geophysical data. This year has seen an increase in the amount of material provided for the Databox and Prestel teletext services.

The committee manned an information stand at the various events which took place at Oxford, Telford, Sandown Park and the NEC, providing one of the lectures also at the last-named. As is our custom, several members of the committee have been active in providing an extensive series of talks to amateur radio clubs and groups.

Our thanks to all who contribute to our studies.

R G Flavell, G3LTP, chairman

RAYNET

Committee: G3FKM, G3KWU, G3RPE, G3STG, G3TJP, G3VPE, G3WSN, G3YAC, G8CAC. G8VXY*. GI4LVC, GM3RFA, GW4PUX, G3NCL, G4BCP, G4EJP, G4ETN, G4MWO, G4PFO, G4TWT, G8RWH (zonal representatives). G4FLQ (staff member).

Expenses: £1,780.

The committee met formally on four occasions during the year, and one of those meetings was held at Llandrindod Wells and combined with a Zone 8 open meeting for Welsh members. In addition, members of the committee met informally at the Woburn Rally and at the NEC Convention.

The year has once again been one of a considerable growth and development for the network, with much positive work once again being done for both the good of the community, and also the enhancement of the reputation of radio amateurs. The membership registration arrangements at HQ came under considerable pressure during the year, and volunteer effort was required to sort out short-term problems. The continued excellent support of the HQ staff has now resolved these difficulties.

The year has seen improving relationships with our user services, as well as improvements in communications with the Home Office, and with many of the Fire Brigade and Coast Guard authorities. Visits to many areas of the UK have been made by committee members and, as before, the administration of the network has been considerably assisted by the efforts and hard work of the zonal representatives who are corresponding members of the committee. An innovation this year has been the first of a series of national communications exercises designed to test the longer distance capabilities of the 250 plus active groups throughout the British Isles.

Probably the most newsworthy of all the network's operations was the carrying of trans-Channel traffic after the Zeebrugge Ferry disaster, where survivor and casualty traffic was transferred from the Belgian authorities to the Kent Police Force by amateur radio. This activity of course is carried on as part of a great deal of routine training, exercises, events and emergencies by the network's 5,000 members, with some 63,000 manhours being freely given on some 650 events during the year.

The committee intends to continue to actively support this level of volunteer activity by seeking to improve its service to members, and to continue to represent, co-ordinate and administer their efforts nationally.

G A Griffiths, G3STG, chairman

REPEATER MANAGEMENT GROUP

Members: G3PFR*, G3VZV, G3WSN*, G3XDV, G3ZNU*, G4AFJ, G4CCC, G4DAX, G4EFO, G4MQS, G6LMR, G8GOJ*, G8IMB, GM8LBC, G8SSL.
Repeater regional representatives: G0BEQ, G0COA, G1GNS, G2SP, GM3AXX, G3GHS, G3LEQ, G3TZM, GM3UKG, G3UQH, G3YXZ, GI4FUM, G4HSY, G6AWT, GM8BZX, G8FWY, G8GTZ, G8HVV, G8JNZ, G8UCY.

Expenses: £2,241.

The committee achieved all four of its main objectives during the year:

(a) A franchise document for repeater groups was drafted and agreed. This, when implemented, will give repeater groups much more information about licence conditions, insurance etc.

(b) An experimental packet repeater network was established. A specialist sub-committee, The Packet Working Group, was set up to deal with this work (see below).

(c) DTI clearance of repeater proposals was considerably speeded up following a meeting between the DTI and the RSGB. In some cases, licences are now cleared in 2–3 months, rather than the two years previously experienced. Regretably, repeaters on bands where the MoD is the primary user still take over a year to clear. There has also been a great improvement in the amount of information available from the DTI on the progress of each application. This information is now circulated to the repeater groups concerned as soon as it is received by RSGB.

(d) A book, *The Ins and Outs of Repeaters,* was produced and was available for the first time at the NEC Convention. It is packed with information invaluable to repeater users, including three maps and various repeater lists.

All repeater groups were asked to comment on the first year of the repeater regional representative scheme. The scheme was throught to be reasonably effective, though some improvements were suggested. A major difficulty is persuading groups to deal with repeater representatives; they seem to prefer the non-standard approach of consulting HQ staff (who do not have the specialist knowledge) or the chairman (who is already overloaded with general issues like licensing, and the running of the committee).

Once again, routine business formed the major part of the work of the RMG. This included vetting repeater proposals for the DTI, responding to licensing queries from the DTI, encouraging repeater groups to provide a good service, monitoring technical standards and compliance with licensing conditions, giving technical advice to repeater groups, resolving interference problems, ensuring the accuracy of HQ records, providing a stand and organising meetings at the NEC Convention, producing *Repeater Report,* briefing delegates for the IARU Region 1 Conference, checking with repeater groups the accuracy of emergency closedown information, drafting technical specifications, supervising the financing of channel changes, and collating service area maps. In addition, the RMG's views on 12.5kHz channel spacing were given to the VHF Committee, and guidelines were agreed with the Raynet Committee on the use of the repeater network by Raynet groups.

Finally, a thank-you to those many hundreds of individuals in repeater groups whose work keeps the repeater network on air.

Mike Dennison, G3XDV, chairman

PACKET WORKING GROUP

Members: G0/K8KA, G1DIL, G3MRX*, G3PLX*, G3PFR*, G3RPE*, G3RWL*, G3VPF, G3WSN*, G3XDV, G3ZNU*, G4SHJ, G4ZRT, G8LWY, G8IMB, G3NRW, G8ONH, G3OUF (staff member).

The PWG was set up as a specialist sub-committee of the Repeater Management Group to avoid the large amount of packet radio business adversely affecting the rest of the RMG's work. It comprises many of those most experienced and active in this field.

The PWG's terms of reference include promoting and overseeing packet radio networking experiments, and devising plans for a formal network of fully interlinked packet stations. Considerable progress has been made with both of these aims, hampered only by the extremely slow process of making essential changes to licence conditions.

It is anticipated that the progression from an *ad hoc* single-frequency network to a structured, multi-band, fully-interlinked one will continue apace during the coming year.

Mike Dennison, G3XDV, chairman

TECHNICAL & PUBLICATIONS

Committee: G3RZP, G3SJX, G3VA†, G3YGF, G4GYO†, G4SWX, G4VUX†, G8ONH, G3SEK†, G8EZE†*, G3MRX*†, GW4BWE* (full member for part of year), G4FAW*, G4FZH*†, G6XM†*, G3RPE* (chairman for part of year) A W Hutchinson (staff member).

† indicates member for part of year.

Expenses: £1,279.

The committee reviews articles for *Rad Com* and books, and provides technical recommendations where required. In addition it provides technical representation to outside bodies as appropriate. It met 10 times during the year.

Some 80 articles were reviewed for *Rad Com* of which 35 were rejected. An attempt to introduce a healthy discussion into *Rad Com* by means of a "Controversy" column failed dismally, because only five suggestions were made – two for some form of novice licence, one for no regulations whatever, one for including cb in the licence, and one for third-party traffic. In no case was there any mention of an opposing view, and expected topics such as "List operating v nets for dx", "QRA v Maidenhead" and "28MHz repeaters – yes or no" were not mentioned. It seemed a good idea at the time.

With the assistance of HQ, a greater degree of consideration of the viability of book projects from a financial viewpoint has been introduced, and the appointment of a liaison member for each new book project should help.

Various new books are on the way, and as books are an important source of income for the Society, the committee is attempting to put book production on to a sound footing. However, the loss of the book editor from HQ has slowed proceedings.

Because of the relative frequency of meetings, it is necessary to place an arbitrary limit on travelling time, and this has been set at two hours. Although this limits full membership of the committee to a radius of about 130 miles from London, we are always happy to hear from members outside this radius who could act as corresponding members, or as experts within a particular field.

Peter Chadwick, G3RZP

VHF

Committee: G3ZNU, G3VKM*, G3COJ, G3UBX, G4ASR, G2AHU*, G3XDV*, G3PFR*, G3WSN, G3STG*, G8GOJ*, G3GVV*, G5UM*, G3RWL*, G3OSS, GM4ANB*, G3XDY*, G3VZV*, G3FZL, G3RKL*, G3SEK*, G3ZVW, G8VR, G3UUT*, G4CCC.

Expenses: £766.

During the year G3ZVW joined the committee as its conventions manager, dealing with the committee's attendance at several events, and the small army of corresponding members was enhanced by the addition of G3VKM (Syledis), G2AHU (50MHz reporting group) and G3SEK (T&P).

The committee met on five occasions during the year, a modest number for the work involved, leading to long and busy meetings.

A major part of the committee's work this year was the preparation for the IARU Region 1 Conference, which was held in the Netherlands during April. The RSGB submitted a number of papers on vhf topics, such as packet radio standards and frequencies, meteor scatter procedures, repeaters and band planning. In addition, the committee had to consider the many papers submitted by other member-societies, and agree an RSGB policy on each one. Representing vhf interests at the conference were the chairman of the committee (G3ZNU) and the vhf manager (G3WSN). The conference has already been reported extensively in *Rad Com*, and was generally judged satisfactory for the RSGB.

During the year, the committee set up the 50MHz Reporting Group which is intended to carry on with the propagation research work started by the original 50MHz permit holders. The group is co-ordinated by G2AHU, who produces regular reports, extracted and collated from the reports of the group members. This on-going work is further demonstration of the RSGB's commitment to research in this valuable part

of the spectrum. The committee was particularly pleased when the DTI agreed to release the 50MHz band to Class B licensees in April, since it had agreed this ought to be given highest priority in negotiations with the DTI. That 70MHz was included with the release was a real bonus!

The committee's study into the feasibility of adopting 12·5kHz channel spacing for fm (primarily on 144MHz) has produced its initial findings which are, so far, none too conclusive. The study has been led by G3OSS who has been careful to include many of the aspects of how such a change could in reality be implemented. A report in *Rad Com* inviting comment will soon be produced.

The VHF Convention again proved to be a major success, although the physical difficulties this year were exacerbated by the Whitbread Gold Cup being held at Sandown on the previous day. Thanks to the many volunteers, especially the members of the Exhibition & Rally Committee, all the preparations went smoothly and all was ready for the convention on the Sunday morning. The committee also attended the National Convention at the NEC with its regular stand and lectures. The committee's theme of power amplifier linearity testing was extremely well received by the many amateurs who brought along their power amplifiers. The committee's involvement in the Midlands VHF Convention has continued, and the event remains popular among the vhf specialist fraternity.

Finally, a big thanks to all the volunteers and RSGB staff members who help to keep the act running.

Malcolm Appleby, G3ZNU, chairman

VHF CONTESTS

Committee: G3XDY, G4JLG, G3LCH, G4NBS, GM8MJV, G3FZL, G8TFI, G4FRE, G8HHI, G4WAD, G2HIF*, G6LX*, G3ZNU*, BRS32525*.
Expenses: £1,003.

During the year G8HHI and G4WAD joined the committee following the advertisement of vacancies in the June 1986 issue of *Rad Com*. Twenty-six contests have been organised for 1987, including the late addition of the first 50MHz event. It is hoped to organise more events next year for this band, but this has to be approached cautiously to prevent any Continental interference problems.

This year the committee has placed more emphasis on 432MHz events, with the addition of an Affiliated Societies section in the Fixed Station event, and a new fm contest. Some rule changes have been made to the cumulative contests to even out the imbalance that can occur if conditions are markedly better in one session than all the rest.

Some problems have arisen over the definition of fixed stations, with some groups registering callsigns at good locations without being resident at that address. Redefinition of the rules is in hand to deal with this.

Last year 2·3GHz was introduced experimentally in VHF NFD, but attracted limited support in the Restricted section, so its use was limited to the Open section this year. Comments from the entries are being analysed. If 50MHz is considered for inclusion in 1988, the number of bands involved increases to six, and it may be better to limit VHF NFD to the lower bands. Entrants' views are being canvassed on this topic.

The question of amplifiers capable of power outputs well in excess of 400w was aired extensively, both in the write-up of the September 144MHz Trophy contest, and at the Contest Forum held at the NEC Convention. Most of the views received took the position that there should be no limit placed on anode dissipation or device types. The committee is placing greater emphasis on inspections this year, and will be extending inspections to events other than VHF NFD. To date there have been no instances of stations exceeding the licence conditions.

The outcome of the IARU Region 1 Conference was broadly satisfactory for vhf contests. A multiplier system similar to the RSGB normalisation to 1,000 points scheme was adopted, which will give equal weight to all bands in the October uhf/shf event. The use of the new World-Wide Locator was confirmed. Dates of the major events continue unchanged, despite some calls to move the uhf/shf event to June.

John Quarmby, G3XDY, chairman

**Corresponding member*

REPORTS FROM THE . . .

. . . Amateur Radio Observation Service Co-ordinator

As a result of fresh discussions with representatives of the Radio Investigation Service of the Department of Trade & Industry, a useful understanding has been reached which will allow a closer and more effective collaboration for the processing of reports about spectrum abuse within the amateur bands.

It will now be possible to benefit from some direct communication where an exchange of information would be of mutual benefit.

As a result of reports submitted by the co-odinator of the Amateur Radio Observation Service, through the RSGB, a number of cases are now being followed up by the RIS.

There has been during the last year an increase in the number of problems being referred to the AROS for inquiry and possible action. These originate from a variety of sources, not necessarily members of the RSGB, and from other than licensed amateurs.

Many such complaints are anonymous and about an individual. Normally no action is taken unless there is a name and address for the originator, dates of letter and of "offence" and a signature. This information is kept confidential. There have been a number of informants providing details of a problem which seemed to be serious and authentic, yet have not responded to queries for further details, without which little more can be done.

However, many reports received have been compiled as a result of intensive research and inquiry by those who have suffered from interference or some other illegal activity, their efforts are much appreciated, as the co-ordinator and observers cannot alone solve all the problems.

The usual kinds of offence have been reported, these are: interference and misuse of repeaters; illegal use of amateur callsigns and unlicensed operation, particularly by modified cb rigs in the 28MHz band; out-of-band working, especially on a number of known hf frequencies (some licensed amateurs have been identified); arguments about band plans and traditional chat net frequencies; obscenities and other objectionable habits, not only heard, but read on cw, rtty and data; and, above all, the various, persistent kinds of interference, source not easily identified. Technical faults in transmission have been few.

The co-ordinator continues to settle most problems internally referring only the most difficult and serious for assistance or action to higher authority. Unfortunately not all have been dealt with to a satisfactory conclusion, usually because of a lack of information, particularly indentification.

R J Osborne, G4FJN

. . . Audio/Visual Library co-ordinator

The library continues to function well, and last year some 200 affiliated clubs and societies used the facility. New titles have been added including the "Fuji" satellite and "Amateur Television". A video on packet radio is expected shortly.

All member clubs using the A/V Library are urged to observe the request that cassettes, etc., must be returned within three days after use. Failure to do this creates the wasting of time and money and causes inconvenience.

The hire charge is now £1.75 PER ITEM. This includes postage.

Any club or society can write to me G2PA QTHR, for a free list of titles available, conditions of hiring, etc. Please enclose an sae.

R G Auckland, G2PA

. . . HF manager

The year was a very busy one, with preparations for the 1987 IARU Region 1 Conference occupying a significant part of the time. The RSGB produced a number of papers on hf topics, and these have already been reported on fully elsewhere. The conference itself gave me the opportunity to meet the hf managers of many other societies and to discuss mutual problems.

The disagreement over the proposal put forward by the ARRL to extend the USA novice and technician segments in the 28MHz band has been followed by a request from the ARRL which asks these operators to avoid the IBP beacon band. Hopefully, this will lessen any problem of interference which might otherwise have been the result. With effect from 1 January 1990 the 28MHz beacon band will only occupy 28·190–28·225MHz instead of the present 28·190–28·300MHz slot.

I was present at the meeting of the IARU Administrative Council when a resolution asking hf packet radio users to confine their transmissions to the rtty band segments was agreed, and also when our own Region 1 conference endorsed this suggestion. Unhappily, many users seem reluctant to follow this band-planning request and a lot of interference is being caused to the NCDXF beacon network on 14·1MHz.

Full participation in the committee which discussed hf matters at the 1986 Region 2 Conference was most useful and it is encouraging to see how the band plans of all three regions are becoming unified with only slight regional variations.

It has been possible to meet and talk with representatives of fellow societies about hf matters on many occasions during the year. These included the DARC meetings at Friedrichshafen and Hanover, and the world ARDF championships at Sarajevo – and perhaps it should be emphasised here that my attendance at all meetings outside the UK during the period under review took place at absolutely no cost to the Society.

John Allaway, G3FKM

. . . RSGB Monitoring System Co-ordinator

After a number of years inactivity, the Intruder Watch, now known as the Monitoring System, was re-activated by Council from 1 July 1987. Although in the early stages of re-formation at the time of writing, the Monitoring System consists of a small number of amateurs who have the necessary requirements to carry out monitoring to the required standard.

Generally the number of non-amateur transmissions heard in the exclusive amateur bands are now less than in previous years. A major development towards this has been the reduced hours of operation of both Radio Peking (Beijing) and Radio Tirana on the 7MHz band, and the reduced number of second and third harmonics on the higher bands. However, against this trend and with the gradual improvement in the muf, there are an increasing number of illegal cb operators encroaching on the low end of the 28MHz band. This situation will need to be watched very closely, and the Monitoring System will be working together with the Observation Service in order to identify and report as necessary.

The Monitoring System forms part of the IARU Monitoring System and as such submits reports of identified offenders both to the DTI and to the Region 1 Monitoring System co-ordinator, the latter forwarding these reports to the respective society representing the amateurs of the country concerned. That society should then make representations to its administration on our behalf.

The work of the Monitoring System remains an integral part of the continuing campaign to defend the exclusive amateur bands and to provide a service for the International Amateur Radio Union.

Colin Thomas, G3PSM

. . . HF Awards manager

(Due to the recent change-over in this position, it is regretted that it has not been possible to produce a report this year.)

. . . Trophies Manager

There have been three presentations of trophies during the year – at the VHF Convention, the HF Convention and the agm. So far the membership has been very conscientious in returning trophies on time.

New trophies approved by Council:

Two trophies bequested to the Society by the late Charles Ponting, G6ZR, are to be known as the G6ZR Memorial Trophy and the G6ZR Memorial Microwave Trophy, the former being awarded to the runner-up in HF NFD and the latter to the winner of the 2·3GHz Trophy Contest.

The Verulam Jubilee Trophy presented by the Verulam ARC in St Albans will be awarded to the person having the highest scoring, most accurate log in Ropoco 1.

I would like to thank John Cattermole, G8NPK, for his assistance in the engraving of the trophies and plaques.

H Claytonsmith, G4JKS

. . . VHF manager

During the last 12 months we hae seen a number of important changes which have affected the vhf bands. One of the most pleasing must be the improvements to the 50MHz band in terms of allocation, and the easing of some of the restrictions. The changes to the 70MHz band were also most welcome. Having these two bands open to the Class B licensees has at last materialised and is the result of much work over a long period by many Society officials.

There has been considerable work undertaken within the VHF Committee and associated committees throughout the year. Once again we held the VHF Convention at Sandown Park; this continues to be most popular.

The most significant event during the year has to be the Region 1 Conference, held in Holland. You will have seen the reports, and have been able to judge the volume of work carried out at the conference. I am well aware that not all of you will be pleased with the results. There can be no doubt, however, that we as a Society had a successful conference.

On a more general note, we have to review the whole question of the 144MHz band plan before the next conference. There are sound reasons why we might need to consider a complete change round to allow more efficient use of our allocation. Much work has also been done to complete the survey of allocations within Region 1. This most important work will continue, and hopefully the end results will be reports which can be used by national societies when in negotiation with their administrations.

We are already thinking of the next conference, and this will involve many hours of discussions within the Society. We are fortunate in that we are able to call upon you, the membership, who include experts in every aspect of our hobby.

We still have a few national problems to resolve and some major decisions to make regarding the future band plans and policies. At the international level we have been able to solve some of the problems. It is through comment from you all that we are able to reach a conclusion on many topics, and I must thank all members of the VHF, VHF Contests, RMG, PWG and other committees of the Society, and all the HQ staff, for all their work and dedication throughout the past year, and all the individual members who have contacted me on an about numerous subjects.

K A M Fisher, G3WSN

. . . VHF awards manager

The following analyses show the number of RSGB certificates issued in the year ended 30 June 1987.

Four Metres and Down Certificates

(Last year's issues in parentheses)

Category	Number		Total Issued
70MHz Standard Transmitting	1	(3)	152
70MHz Senior Transmitting	3	(1)	54
144MHz Standard Transmitting	16	(17)	744
144MHz Senior Transmitting	13	(18)	267
144MHz Receiving	1	(0)	40
432MHz Standard Transmitting	6	(18)	231
432MHz Senior Transmitting	5	(15)	129
432MHz Standard Receiving	1	(0)	40
1·3GHz Standard Transmitting	4	(8)	74
1·3GHz Senior Transmitting	3	(3)	18
2·3GHz Standard Transmitting	1	(0)	1
Supreme Award (qualification: three Seniors or two Seniors plus one 1·3GHz)	3	(5)	69

FMD Microwave Distance Award for initial contact beyond specified QRB

1·3GHz 600km	13	(14)	117
2·3GHz 500km	2	(3)	18
3·4GHz 400km	0	(1)	4
5·6GHz 300km	0	(0)	1
10GHz 150km	4	(7)	83

Total of Four Metres and Down certificates issued for the year: 75 (114)

QTH Squares Awards

(Last year's issues in parentheses)

70MHz 20 squares and 4 countries certificates	0	(2)	12
70MHz 25 squares and 6 countries stickers	0	(2)	7
70MHz 30 squares and 8 countries stickers	3	(0)	6
70MHz 35 squares and 10 countries stickers	0	(0)	2
70MHz 40 squares and 10 countries stickers	0	(0)	0
70MHz 50 squares and 10 countries stickers	0	(0)	0
144MHz 40 squares and 10 countries certificates	14	(34)	280
144MHz 60 squares and 15 countries stickers	9	(20)	127
144MHz 80/18 stickers	7	(12)	73
144MHz 100/20 stickers	11	(12)	90
144MHz 125/20 stickers	5	(6)	30
144MHz 150/20 stickers	3	(3)	17
144MHz 175/20 stickers	4	(1)	11
144MHz 200/30 stickers	4	(2)	10
144MHz 250/35 stickers	0	(1)	2
432MHz 30 squares and 6 countries certificates	5	(11)	64
432MHz 40/10 stickers	7	(4)	40
432MHz 50/13 stickers	6	(5)	26
432MHz 60/15 stickers	2	(5)	21
432MHz 70/15 stickers	3	(4)	19
432MHz 80/15 stickers	4	(2)	12
432MHz 90/15 stickers	1	(2)	3
432MHz 100/15 stickers	2	(1)	3

Total: 19 initial certificates and 76 stickers (47 and 81 in 1985/6)

Microwave Squares Award

1·3GHz 5 squares basic certificates	8	(9)	72
1·3GHz 10 squares stickers for above	7	(5)	58
1·3GHz 15 squares stickers	6	(7)	39
1·3GHz 20 squares stickers	4	(3)	28
1·3GHz 25 squares stickers	4	(4)	25
1·3GHz 30 squares stickers	4	(4)	18
1·3GHz 35 squares stickers	2	(2)	9
1·3GHz 40 squares stickers	2	(1)	11
1·3GHz 45 squares stickers	1	(1)	5
1·3GHz 50 squares stickers	1	(2)	5
1·3GHz 55 squares stickers	2	(0)	3
1·3GHz 60 squares stickers	1	(0)	2
1·3GHz 65 squares stickers	0	(0)	0
1·3GHz 70 squares stickers	0	(0)	1
2·3GHz 5 squares stickers	1	(4)	13
2·3GHz 10 squares stickers	3	(1)	4
2·3GHz 15 squares stickers	1	(1)	4
2·3GHz 20 squares stickers	1	(1)	4
2·3GHz 25 squares stickers	1	(0)	3
2·3GHz 30 squares stickers	0	(0)	2
2·3GHz 40 squares stickers	1	(0)	1
10GHz 5 squares stickers	0	(2)	25

Total: 8 basic certificates, stickers 42=50 (last year 57)

Microwave Distance Awards

(For first contact beyond specified QRB)

1·3GHz (600km)	13	(14)	83
2·3GHz (500km)	2	(3)	18
3·4GHz (400km)	0	(1)	4
5·6GHz (300km)	0	(0)	1
10GHz (150km)	4	(7)	83

Total: 19 (25)

In addition to the above, I issued large numbers of contest certificates on the instructions of the VHF Contests Committee. The scale of this operation is evident from the fact that to issue certificates for the larger contests such as VHFNFD, where there are several categories, occupies most of one day.

General Note. The reduction in the number of claims for proficiency awards is to be seen in the figures given. This arises in my view because of lack of publicity due to space limitations in the vhf feature in *Rad Com*. An occasional plug in the "News Bulletin" might be no bad thing by drawing members' attention to what is available to them.

Jack Hum, G5UM

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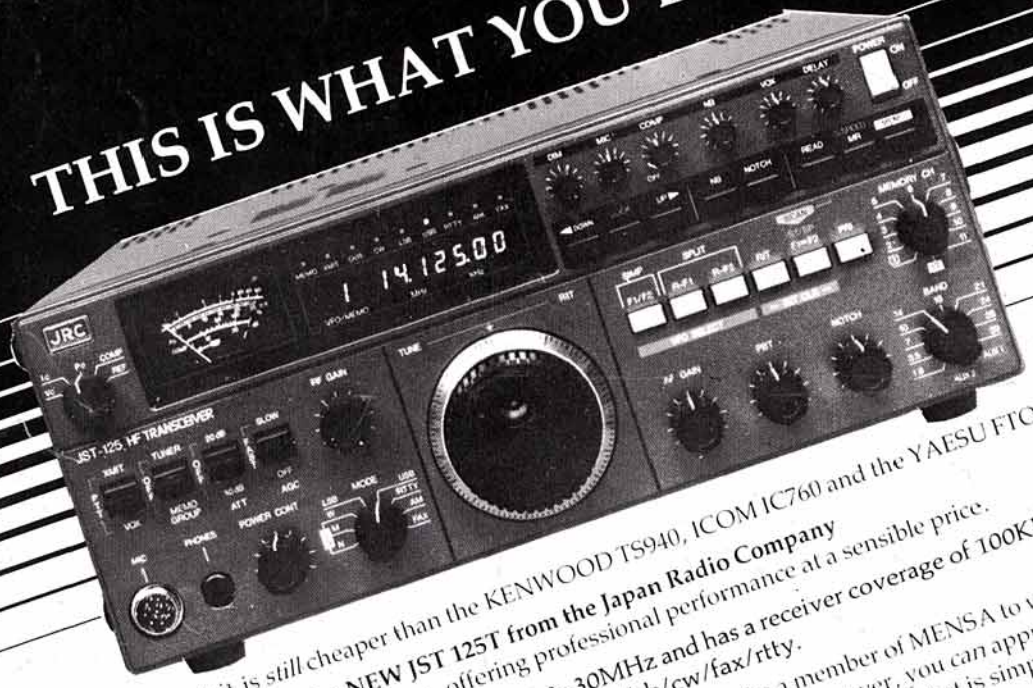

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