radio communication

December 1970

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FRONT COVER
The Clifton ARS VHF NFD site on the South Downs

Radio Communication **(incorporating** *The RSGB Bulletin***) is published by The Radio Society of Great Britain as its official journal and is posted to all members of the Society on the first Tuesday of each month**

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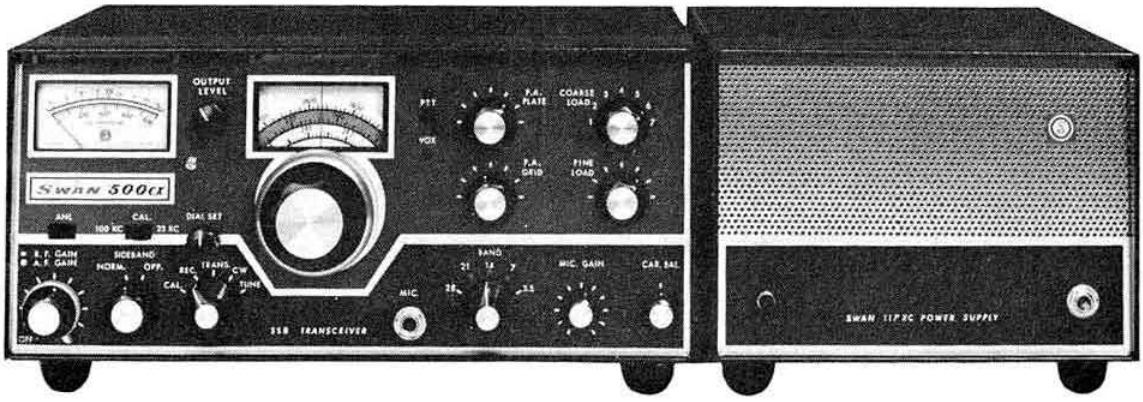

All the outstanding features of the famous 500C, plus the following improvements:

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

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550 Watts p.e.p input.

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500-CX De Luxe	313	10	0
500-CX. SS-16 De Luxe	355	0	0
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New Equipment

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R-4B receiver-SSB, AM, SW, RTTY.	240	0	0
SPR-4 receiver—General purpose	230	0	0
T-4XB SSB Transmitter	250	0	0
TR-4 SSB Transceiver with 34-NB Noise Blanker fitted	355	0	0

COLLINS

KWM-2 HF Transceiver	574	0	0
516F-2 AC Power supply for KWM-2	76	5	0
75S-3B HF Receiver with Mechanical Filter provision	405	0	0
75S-3C HF Receiver with 28 Crystal Positions	425	0	0
30L-1 HF Linear Amplifier	260	0	0

EDDYSTONE

EC10MK2 Communications Receiver	74	10	0
EA-12 Amateur Bands Receiver	205	0	0
940 Amateur Bands Receiver	159	0	0

HALLICRAFTERS

SR-400 "Cyclone" Transceiver	434	0	0
P500AC AC Power Supply	79	0	0
Heathkit HW-100. 10-80 m Transceiver	150	0	0
National NCX-500. 5 Bands—500 Watts Transceiver	185	0	0
TEN-TEC PM2 CW Transceiver	32	10	0
PM3A CW Transceiver	42	10	0
KR40 Electronic Squeeze-Keyer	45	0	0

TRIO

TS510 with PS510 SSB Transceiver with Power Supply	180	0	0
9R-59DS General Coverage Receiver	42	10	0
JR-310 SSB, CW Receiver—Amateur Bands	77	10	0

USED EQUIPMENT

Codar T28. 160 & 80m Receiver	14	0	0
Codar AT5. 10-160m AM Transmitter	14	0	0
Codar AC Power Supply for AT5 TX. Type 250/S	6	10	0
Codar DC Power Supply with Control Unit	9	0	0
BCC 69-9 Transceiver. 12V operation DC. Tx Crystal for 2m. Dash-mounting. With circuit diagram & mic. (Carr. exrta)	8	10	0
GEC BRT-400 Amateur Bands Receiver	65	0	0
Hallicrafters SX146 Amateur Bands Receiver. 80-10m	85	0	0
Hallicrafters HT-46. SSB Transmitter	85	0	0
Hallicrafters SX-117 Amateur Bands Receiver	95	0	0
Hallicrafters SR2000 "Hurricane" Tcvr. & P.S.U.	500	0	0
Hallicrafters SR-46A. 2m Transceiver	65	0	0
Heathkit HW-12A. 80m Transceiver	45	0	0
Heathkit HW-12. 80m Transceiver	40	0	0
Heathkit GR-54. General Coverage Receiver	35	0	0
Heathkit 310. Broadcast Receiver & some Amateur Bands.	115	0	0
KW 2000A. Transceiver with AC P.S.U.	155	0	0
KW 2000B. Transceiver with AC P.S.U.	185	0	0

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9R-59DS

JR-310

Tune in for total communications reception. Tune in with TRIO's 9R-59DS and/or JR-310 SSB receivers. Amateur operators and short wave listeners the world over agree that TRIO's master engineers have ingeniously combined technique and design to achieve quality usually found in much higher-priced models. Distortion is hushed to an absolute minimum. Top-tone clarity at all times. Handy and expertly designed to help beginners easily enter the wide-wide world of communications.

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JR-310

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- Precision double gear dial—a TRIO innovation—with linear frequency variable capacitor. Possible to get finer reading 1KHz. One dial rotation covers 25KHz, makes SSB demodulation easier.
- Frequency range covers entire amateur band from 3.5MHz to 29.7MHz. One-touch selection system switches bands. WWV reception of 15MHz possible.

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84/88, Nelson Street, Tower Hamlets, London E. 1. Phone: 01-790 4824

AMATEUR ELECTRONICS G3FIK

TRIO COMMUNICATIONS EQUIPMENT. We are able to supply the **TRIO TS-510 TRANSCEIVER** from stock, all units being supplied against orders in a fully bench and air-checked condition. Every sale is backed by a full twelve months guarantee and excellent after-sales service is assured.

Our apologies to those customers who are presently awaiting delivery of the new **TRIO 9R59-DS** general coverage receiver due to the fact, however, that the demand for this set has been exceptional but by the time that this appears in print we hope to be in a position to meet all outstanding orders.

We list below a selection of quality used equipment in stock at the time of going to press and as we have a large turnover in top-grade used commercial gear URGENTLY require equipment of all types for outright cash purchase. Write, call or 'phone for a spot cash deal.

DRAKE 2-C RECEIVER. Fitted calibrator. An excellent specimen of this fine receiver **£105.0.0**
PARK AIR TWO METRE TRANSMITTER. Absolutely brilliant and as new. List price £80.0.0 **£50.0.0**
HAMMARLUND SP-600 JX RECEIVER. Rack mounting, good condition. **£90.0.0**
HALLICRAFTERS R-274/FRR (S73) A very rare receiver indeed. General coverage 540 Kc/s to 54 megs. Beautifully built. **£105.0.0**
KW 2000A TRANSCEIVER. Just in, not previously advertised. **£165.0.0**
JR-310 RECEIVER. Absolutely as new. A bargain at **£60.0.0**
TRIO 9R-59 RECEIVER. This is the model with in-built Q multiplier. Brilliant condition. **£30.0.0**
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KW VANGUARD TRANSMITTER. Choice of two, both Mk II's with 160 metres. **£39.0.0**
EDDYSTONE EC10 MK II RECEIVERS. Choice of two both mint. **£65.0.0**
HEATHKIT RA-1 RECEIVER. Very clean indeed. **£30.0.0**
HEATHKIT RG-1 RECEIVER. Again, very good condition. **£30.0.0**
HEATHKIT RG-1 RECEIVER. Fitted calibrator and as above **£32.10.0**

EDDYSTONE 888A RECEIVER. Grey wrinkle finish, unmarked. **£65.0.0**
EDDYSTONE S640 RECEIVER. Good condition and performance. **£27.0.0**
SOMMERKAMP FR100B RECEIVER. Excellent. **£80.0.0**
DX-100U TRANSMITTER. Very good condition. **£35.0.0**
AR88D RECEIVERS. Several excellent used sets in stock from **£42.10.0**
TW TOPMOBILE 160 METRE COMMUNICATOR complete with mains PSU. **£38.0.0**
PANDA CUB TRANSMITTER. Clean condition. **£21.0.0**
AR88D RECEIVERS. *Brand new.* A small quantity remaining. All sets supplied in fully tested condition. Complete with trimming tools, spare valve set, manual and headset. **£82.10.0**
Plus carriage of 50/- and a fully refundable deposit of £5 on the transit case.
HAMGEAR PMII PRE-SELECTOR. Without doubt the best on the market and with a performance that will make the world of difference to your receiver. **£7.19.6**
HAMGEAR PMIII TOP BAND CONVERTER. **£10.10.0**
HAMGEAR PMIV CALIBRATOR. **£5.10.0**
MEDCO FILTERS. All models ex-stock..
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G-WHIP MOBILE ANTENNAE: All models in stock.
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ECHO DUAL IMPEDANCE HEADPHONES. (8 ohm and 4K). Lightweight and padded. **£5.12.6**
S. G. BROWN TYPE F HIGH IMPEDANCE PHONES. **£2.5.0**
SME 3009 PICK-UP ARMS. Complete with ultra light shell S2. Absolutely *brand new* and boxed. **£25.10.0**

Full details of **HAMGEAR, G-WHIP, MEDCO & JOYSTICK EQUIPMENT** or any item listed upon receipt of your SAE. Full credit facilities on ALL sales.
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Telephones: 021-327 1497 021-327 6313

EMSAC

TX2 EMSAC 2 metre transmitter. A general purpose 5 valve transmitter which may also be used as a driver for a power amplifier on 144MHz or a driver for a tripler to 70cm. Six switched crystal channels are available using crystals in the range 8·0 to 8·111MHz. The anode of the Colpitts oscillator is tuned to 3 times the crystal frequency. The output of the oscillator stage is multiplied by three to 72MHz. A buffer amplifier is used to drive the final stage. The power amplifier is a push-push power doubler, the efficiency of which approaches that of a push-pull power amplifier. The input to this stage may operate up to 20 watts.
A speech amplifier and series gate modulator provide the AM facility. FM is provided by means of a varicap diode in the crystal circuit. A CW facility is also provided. These are all switched facilities so that the key and microphone may be left plugged in at all times.
A front panel meter is switched to measure PA grid, anode currents. Valve line-up 12AT7—5763—QQV03-10, 12AX7—12BH7.
Power supplies, +250 to 300v, 150mA, 6·3v, 3A and —100 2mA are required The EMSAC PS2 may be used. Cabinet—size 8¼" × 7⅛" × 6¼" high. Styled to match the EMSAC CN2, etc. Weight approximately 4 lb. There is sufficient extra space in the Cabinet to construct a power amplifier, e.g. 6146. The same modulator may be used without modification. The transmitter is supplied fully assembled and tested complete with all valves, less crystals and power supply. Price **£28.10.0**, plus 6/6 post and packing. COD available.

TX1 EMSAC 4 metre transmitter. This is identical to the TX2, but the output is push-pull at 70MHz.

PS2 A suitable power source for the EMSAC TX1/2. "On-off" switch and pilot indicator. "Send-standby" switch and indicator. Chassis construction. Assembled and tested. Price **£16.10.0.**

CN1 **190/-**, P. & P. 4/6.
2 metre converter. Double Nuvistor cascode design. Band-width better than 4 dB over band. Measured NF better than 3dB. Complete with 38·666 MHz crystal for 28–30MHz IF. Low Z cathode follower output. Well proven design.

CN2 **300/-**, P. & P. 6/6
CN1 together with mains power supply in attractive case. Mains load, pilot lamp, on-off switch, etc. Ready to switch on. The easiest possible start to VHF reception.

CN3 **190/-**, P. & P. 4/6
A 4 metre converter similar to the CN1. Complete with 42MHz crystal for 28·1–25·7MHz output.

CN4 **300/-**, P. & P. 6/6.
The 4 metre version of the CN2. Attractive case to match.

CN5 **170/-**, P. & P. 4/6
Crystal controlled 160 metre converter. Transistorised. 9v. PP11 internal battery required. In cabinet 6½" × 3⅝" × 3" high. Input 1·8-2MHz. Output 800–600KHz (car radio medium wave).

PR1 **95/-**, P. & P. 4/6
State of the art IG/FET preamplifier for 2 metres (RCA 3N128). Gains well in excess of 15 dB above noise level. Assembled and aligned in small aluminium box for the operating table top. Requires 11-14 volts at only 5mA. Complete with power plug/socket, switch, etc.

PS1 **70/-**, P. & P. 4/6
Mains PSU for CN1 and CN3 giving 150 volts at 15mA and 6·3 volts at 1A. Can be easily modified to give up to 45mA if required.

KM1 **160/-**, P. & P. 4/6
RF actuated keying monitor 50-70 ohms, plus morse practice oscillator. Audio mixing from receiver, phone jack socket, volume control, pitch control, loudspeaker. Smart case to match other EMSAC gear. Requires PP6 internal battery.

GV1 **92/-**, P. & P. 7/6
All-band vertical suitable for 1·8–30MHz. 7ft.-23ft. fully adjustable.

GD1 **80/-**, P. & P. 4/6
Multi-band dipole 5RV type. 102ft horizontal (18g.) 110ft feeder, fibreglass encapsulations.

GD2 **60/-**, P. & P. 4/6
Smaller version of GD1. 55ft. top and 90ft. feeder.

Production of the TX1 and TX2 is limited so please check delivery to avoid disappointment. At the time of writing all other lines are available for immediate delivery. G3RYV will be away in VK-land for the next 12 months so goods will not be available at Maidenhead for this period. We wish Peter and his family well and a safe journey. Mike/G3IAR.

SAE with enquiries please

G3IAR **ELECTRONIC & MECHANICAL SUB-ASSEMBLY CO. LTD.**
Highfield House, St. Clere Hill Road, West Kingsdown, Kent. **Tel: West Kingsdown 2344**

THE HEATH APPROACH
KITS ARE OUR BUSINESS

This we feel is the half-way house, with which the often repeated criticism that the amateur is no longer constructive, can be answered.

In the present day when few manufacturers are producing components for the amateur, and lets face it, in terms of economics, it is not a viable proposition on either side to do so, why not allow us to help you. The kits we offer, together with a comprehensive manual, satisfies the true amateur desire to create and build equipment, to gain both technical and operating knowledge.

We appreciate that there are a few amateurs who, for various reasons, are unable to assemble our kits but still desire the quality and service we offer. To cover this demand we can arrange factory assembled units at the following prices. For models not appearing on the list below, quotations can be obtained on application.

A/DX60BE	**£85.00**	**Carr 70 NP**	**A/HW30**	**£45.00**	**Carr 40 NP**
A/GR54	**£73.00**	**Carr 60 NP**	**A/HW32A**	**£88.00**	**Carr 50 NP**
A/GR64	**£37.00**	**Carr 50 NP**	**A/HW100**	**£190.00**	**Carr 60 NP**
A/GR78	**£90.00**	**Carr 40 NP**	**A/SB102**	**£255.00**	**Carr 70 NP**
A/HD10	**£34.00**	**Carr 30 NP**	**A/SB200**	**£160.00**	**Carr 80 NP**
A/HG10B	**£50.00**	**Carr 40 NP**	**A/SB220**	**£228.00**	**Carr 110 NP**
A/HM15	**£11.00**	**Carr 20 NP**	**A/SB301**	**£195.00**	**Carr 70 NP**
A/HN31	**£8.00**	**Carr 30 NP**	**A/SB310**	**£200.00**	**Carr 60 NP**
A/HP13A	**£50.00**	**Carr 40 NP**	**A/SB401**	**£250.00**	**Carr 80 NP**
A/HP23A	**£35.00**	**Carr 60 NP**	**A/SB500**	**£135.00**	**Carr 60 NP**
A/HR10B	**£65.00**	**Carr 60 NP**	**A/SB600**	**£12.00**	**Carr 30 NP**
A/HW12A	**£90.00**	**Carr 50 NP**	**A/SB610**	**£70.00**	**Carr 40 NP**
A/HW17A	**£88.00**	**Carr 50 NP**	**A/SB620**	**£97.00**	**Carr 50 NP**
A/HWA-17-1	**£22.00**	**Carr 30 NP**	**A/SB640**	**£72.00**	**Carr 40 NP**

SPARES SERVICE When ordering spares please quote Model, Part No. and Part description. To calculate price of spares, most manuals state cost in dollars and cents. Convert on the basis $1.00 = 50 NP (10/-) or .10 = 5 NP (1/-).

YET ANOTHER NEW MODEL FROM HEATH

New Heathkit Wattmeter/SWR bridge for only £14.6.

.Measures RF output From 10 to 2000 Watts
.Remote Monitoring Capability

You asked for a low cost Heath wattmeter . . . and here it is. Two switch-selected ranges allow measurement of RF output from 10-200 W & 100-2000 W . . . built-in calibrator permits 10% accuracy throughout the 80-10 M ham bands. Modern low loss torroidal circuitry. Built-in SWR capability allows proper tuning, transmission line-to-antenna impedance matching . . . ideal for antenna experimenters. Negligible loss permits permanent insertion into any 50 ohm line. Remote detector permits placement of meter in a convenient location (six feet of cable supplied).

Kit HM-102 £14.6 Carr 30np

HM-102 SPECIFICATIONS: Frequency range: 3.5 to 30 MHz. Wattmeter Accuracy: ±10% of full scale. Power Capability: 2kW. Impedance: 50 ohm. Insertion SWR-Less than 1.05:1. Ranges: 200 and 2000 Watts full scale. SWR Bridge: Continuous duty type. Connectors: UHF type SO-239. Dimensions: 5¼"W × 5⅛"H × 6½"D. Nett Weight: 2½lbs.

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Merry Christmas and Happy New Year From Us to You

Getting a bit sick of seeing those crummy pictures month after month. People tell me they don't do the equipment justice and I must agree it is better than it looks. Anyway, Sommerkamp equipment is so well known that I shouldn't have to keep pushing it. There are so many happy users I reckon I can ease off advertising and push some of my other gear. Needless to say, I have all Sommerkamp gear in stock for immediate delivery, checked, serviced and ready to go. I also have a huge stock of spares, including spare manuals (12/6d. ea.), and we can carry out any future servicing very promptly. This of course is why the wise man gets his gear from me. Anyway, enough of this—what about the FE-600 transceiver at £165. complete? Don't be fooled by the price—it's a darned good rig—200W to a pair of 6146B's, 9 MHz xtal filter, VOX, PTT, calibrator, RIT—all the gubbins and a built-in p.s.u. for £165. The companion FE-3500 1500W linear at £100 with built-in S.W.R. and electronically regulated screen voltage is a pretty good buy too. And, from the same stable comes a new one—the Digital 500. A 500W transceiver wth a built-in five figure digital frequency meter like the Signal One. Mind you, D.F.M.'s are not cheap and hence the price will be £300, but you can pay this money for the D.F.M. alone. To be honest, though, it'll take a month or so of thrashing it on the air before we can decide on its merits, but if we like it, you'll be hearing more of it. I must say it's nice to read off "28.572" just like that ! Sorry we haven't any glossy brochures on this gear—just a spec. sheet, but glossy brochures will be forthcoming in due course.

I can't leave this section without mentioning the Inoue IC-700 series—a very nice all transistor Rx and transistorised Tx to go with it. As a complete station £180, or the Rx by itself at £85. This is the only transistor Rx I know of which will compete with a good valve amateur band Rx. There is, however, one big snag. Delivery is about two months generally speaking, because the demand exceeds the supply (must be a reason!).

Finally, in the transceiver line I must mention the Inoue IC-2F. Doubtless you've heard 'em or heard the lads admiring 'em. It's a 20W all transistor xtal controlled FM transceiver for 2m giving 10 or more watts output. The PA is automatically protected from damage by means of an SWR bridge and a couple of DC amps which bias off the driver and PA if it sees a high SWR. Other features include electronic switching to eliminate relay problems, DC input filter for alternator hash, a thermistor squelch circuit to eliminate temperature induced squelch drift, an L.P. filter in the output and all-in-all a beautifully designed little handful ready for mobile or fixed station.

By the time you've got 10W of output, a Rx, mobile p.s.u.'s, coax relay and generally messed about, you'll wish you'd got an IC-2F at £80.

Well, that wraps up the expensive and beautiful new stuff—what about some lower priced items for Christmas presents POST FREE.

Electronic keyers—the EK-9X at £8.

Headsets. Low impedance padded £2.8.0 (£2.40).

Digital clocks. 12 hour AC Mains, red or blue £5.14.0. (£5.70)

Intercomms. Ideal for shack, baby alarm, etc. complete with cable and battery £3. SWR Meter. Asahi Sangkyo twin meter job 4½" × 3" × 2½". One meter reads SWR and the other relative output power, meter sensitivity control. 50 ohms standard but resistors for 75 ohms supplied if required £6.16.0 (£6.80) PL259 plugs to fit 6/-d each (£0.30).

Mikes. Either the very popular Teisco DM501 hand-held PTT 50K dynamic at £2,18.0. (£2.90) orthe luxurious and beautiful YD844 desk mike at £10.4.0. (£10.20). It has lift to talk, PTT and locking switch, high output 50K dynamic and sounds terrific.

Solid state p.s.u.'s. Electronically regulated. Anyone working with transistors should have one (Wot? You can build one? Not electronically regulated at these prices!!).

SE-700 switchable 3, 6, 9 and 12v up to ½A (£5.14.0 (£5.70)

SE-101A as above to 1A £8.14.0 (£8.70)

SE-800 variable, metered 0-15 v up to ½A (£8.14.0 (£8.70)

Tech TE-65 VTVM (£16.10.0 (£16.70)

The above prices are POST FREE.

Elsewhere in this issue are second-hand items, sundries and small components. If you'll drop me a line enclosing a large sae, I'll send you loads of guff.

SERVICE DEPARTMENT

The presence of Alan G3MME at Matlock means that the work load on poor John G3PCY has eased off a bit and we can now carry out servicing jobs on the spot. Speeds things up a bit, which does us both good.

M1 DELIVERY: Next run 20th December. Write for time table.

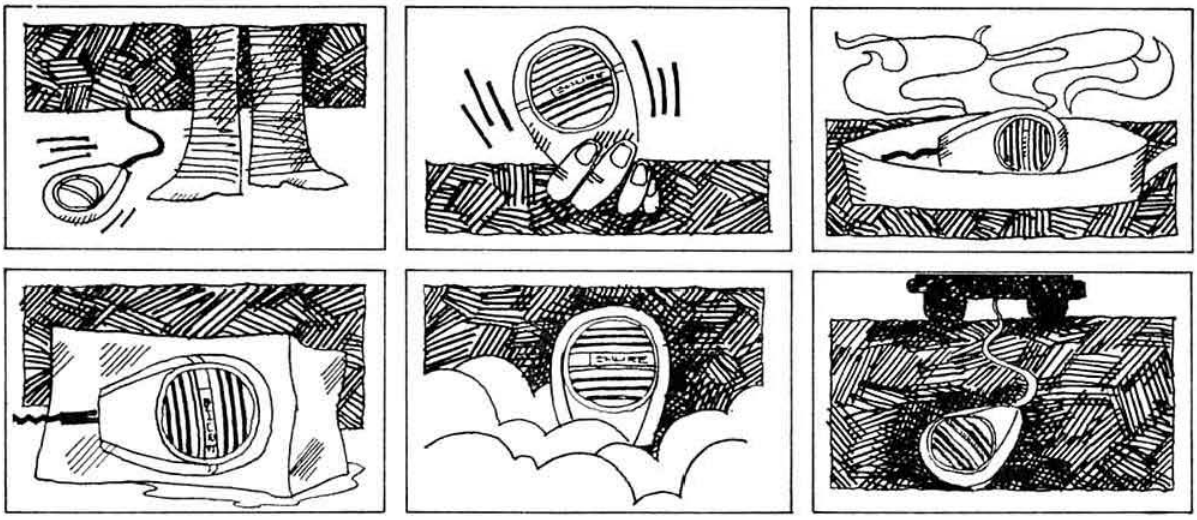
Hours: Tuesday to Saturday, 9-5.30 (closed for lunch 1-2.0 and all day Monday).

73 de Bill

P.S. October Radcom. Just as well my advertising copy didn't read "Agents—at your convenience"!! Oh no!!

Before we sell you a Shure microphone we try to ruin it

just to make sure that you never will



Microphones have to be rugged. Think of the punishment they take. That's why Shure Safety Communications Microphones get a tremendous going over before we dream of selling them.

We drop them. We vibrate them.
We fry them. We freeze them.
We steam them in Turkish baths.
We drag them behind fast moving cars.
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Electrostatic fields. High altitude . . .

and still they work

This savage testing, backed by stringent quality control, ensures that every Shure communications microphone will give you reliable performance. And will go on doing so even under conditions where other microphones would pack up. Always use Shure, the microphones that never fail to get the message through.

Communications
Controlled magnetic hand microphone providing a clear, crisp, highly intelligible voice response. Rugged and dependable, ideal for outdoor-indoor P.A., and communications. Frequency response 200 to 4,000 cps. High impedance. High output.
Model 414.

Amateur Radio
Provides optimum radio communications performance from single sideband transmitters as well as AM and FM units. Response cuts off sharply below 300 cps and above 3,000 cps, ensuring maximum speech intelligibility and audio punch to cut through noise and interference.
Model 444.

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A Seasonal Message From The President

WE have come to the end of another year and to the end of my duties as President. I greatly appreciated the honour conferred on me by the Council and members of the Society in electing me to be President for 1970, and I have found the experience most rewarding. In trying to serve the Society I have been staunchly supported by the members of Council, and I pay tribute here to their unstinting efforts.

It has been a great pleasure to me to visit clubs and societies outside London and to experience the enthusiasm for amateur radio which I have found everywhere. As I retire from office I wish to exhort all members of the Society to exploit still further the opportunities afforded to us by our hobby and to make continued contributions to the advancement of radio communications with particular emphasis on the uhf and higher frequency bands: we can then look forward with confidence to the future.

Warmest seasonal greetings to members of the Society; may 1971 be a happy and prosperous year for all.

J. A. Saxton

QTC AMATEUR RADIO NEWS

"Radio Communication" Vol 46 index

The index covering the 1970 issues of *Radio Communication* will be enclosed with the January 1971 issue of the journal.

RSGB Dinner Club

The next meeting of the RSGB Dinner Club will be at the Kingsley Hotel, Bloomsbury Way, London WC1 on Friday 11 December at 7.30pm for 8pm. The Kingsley Hotel is a few minutes' walk from Holborn tube station and there is ample car parking space in the vicinity. The cost of the dinner is 26s, and bookings accompanied by a remittance may be sent to Miss Sheila Sims at RSGB headquarters. Please note that bookings must close 24 hours before the dinner.

All RSGB members are welcome to this informal occasion and a particular invitation is extended to overseas amateurs who may be visiting London.

Presidential Installation

Mr F. C. Ward, G2CVV, will be installed as the thirty-seventh President of the Society during a social evening to be held at the Bonnington Hotel, Southampton Way, London WC1 on Friday 15 January 1971, commencing at 7.30pm. All members and their ladies will be welcome.

50MHz beacon station

VE8YT, located at Clyde River on the north coast of Baffin Island some 1,700 miles north of Ottawa, went into full-time operation on 4 October 1970. This beacon operates on 50·098MHz with an erp of 65W into an omni-horizontal aerial.

Reception reports are requested and these should be sent to Larry Kayser, VE3QB, 59 Westfield Crescent, Ottawa 5, Ontario, Canada.

The beacon has been heard on two occasions by TF3EA and is expected to be heard in Europe during unusual propagation conditions.

Can you help ?

SSA, the Swedish counterpart of RSGB, is seeking back issues of the *RSGB Bulletin* for December 1964, October 1965, April and October 1968 for inclusion in its library.

Anyone who can help is requested to contact Mr T. I. Lundegard, G3GJW, 37 Birchwood Road, Petts Wood, Orpington, Kent, BR5 1NX.

Licence figures

The Ministry of Posts and Telecommunications advises that the following numbers of amateur licences were in force at the end of September 1970:

Class A	13,643
Class B	2,448
Class A/M	2,598
Class B/M	334
Television	189
Model control	18,896

The Cheshire Homes Amateur Radio Network Fund

To date a total of £512 2s 5d has been raised and 11 Homes have been equipped with a complete receiving station, but there are still 35 Homes with no equipment.

To continue the fund's efforts to equip them the committee governing the fund has introduced the following new effort. All who donate 1s (5p) or a multiple of that amount will receive a ticket for each shilling donated to participate in a Prize Draw. The star prize is a TRIO 9R-59 DS receiver and matching speaker, and there are numerous other prizes.

Tickets may be obtained through clubs or direct from the secretary/treasurer, Mr W. M. Clarke, G3VUC, 66 Fillace Park, Horrabridge, Yelverton, Devon, PL20 7TE. Applicants for less than five tickets should enclose 4d sae.

The draw will be held in the Cann House Cheshire Home, Tamerton Foliot, Plymouth, on a date yet to be arranged.

Earth communications systems

Roger Lapthorn, G3XBM, G9BIB, whose address is c/o 41 Searle Street, Cambridge, has recently received from the MPT a testing and development (radiating) licence to experiment with communications systems through the earth at very low frequencies using the callsign G9BIB.

Initially he proposes to make test transmissions in the Cambridge area using cw on 1kHz (ELF) with a power output of 25W, and he would appreciate reception reports from amateur stations in the area. A receiver capable of detecting these transmissions need only consist of a pair of headphones connected to two earth rods separated by as great a distance as possible.

Equipment stolen

Mr J. G. Halyday, VK4HZ, G3ZMI/M, of 26 Brewery Road, Gympie, Qld, Australia, while on holiday in the British Isles had his car broken into on the Edinburgh Castle Terrace car park on 10 October and among the many personal effects stolen from it was a Swan 350 No C611052, an Australian army headset and a Hansen swr bridge.

Any information concerning this equipment would be welcomed by the Edinburgh Police.

West of Scotland ARS

The West of Scotland Amateur Radio Society, a new club, has been formed in the Glasgow area, with Mr J. A. Shelton, GM3TDS, as president; Mr D. Horsfield, GM3VIU, chairman; and Mr K. McDermott, GM3SSB, secretary. Meetings are held each Friday (see Club News), and are divided into two main parts, cw and radio theory instruction. Full details are available from Mr D. McDermott, GM3SSB 22 Fettercain Avenue, Glasgow W5.

"A simple transistor tester"

The author of this article which appeared in the October issue, G3NUQ, wishes to make it clear that through his own oversight R14 was omitted from the circuit diagram and information regarding it was incorporated in the caption and components list at the last possible moment. However, some readers have overlooked this and G3NUQ asks readers to note that R14 1·8kΩ should be inserted in series with the collector terminal.

Obituary

Mr R. N. L. Caws, FCA, G3BVG

Mr Norman Caws, a former President and Honorary Treasurer of the RSGB died on 2 November at the age of 69.

Educated at the City of London School, he qualified as an incorporated accountant in 1926 and as a chartered accountant in 1960. He and his brother were partners in a firm of accountants, and from 1938 to 1967 he was director and secretary of a public company. He retired in 1967.

He first became interested in amateur radio in 1923, joined the RSGB in 1946 and became licensed in 1947. His principal interest was in vhf and he was active on 2m and 70cm for many years, his main inclination being towards construction of equipment in his own well-equipped workshop.

His services to the Society began in 1958, when he was appointed Honorary Treasurer, serving also on the Finance and Staff and VHF Committees. His next appointment was to a special committee established to organize the Golden Jubilee celebrations. Norman had to forgo his duties as Honorary Treasurer in 1963, the year of the Jubilee, when he was elected President of the Society. His activities spread further in 1964, when he joined the IARU Working Group, and he moved still further into the workings of the Society becoming a member of the Membership and Representation Committee. His close association with the running of the Society entitled him to attend important functions—in 1960, for example, he went to the IARU Region 1 Conference in Folkestone; three years later, as President of the Society, led the RSGB Delegation to the Region 1 Conference in Malmo; and in 1969 to the Brussels Conference.

He was closely involved with the purchase of 35 Doughty Street as he Society's new headquarters, and his skill as an accountant was nvaluable in the intricate business of the financial arrangements nvolved. He was a director and secretary of the Lambda Investment Company, the Society's property-owning subsidiary.

Because of the illness which eventually led to his death, Norman had to relinquish all his offices with the Society earlier this year, and in token of its appreciation of all his arduous work, often carried out under difficult circumstances, the Society's Council recently elected him an Honorary Member, an honour which was to have been formerly announced at the next AGM.

The funeral took place on 9 November at Mortlake Crematorium where the Society was represented by Council Members G. R. Jessop, G6JP; L. E. Newnham, G6NZ, and R. F. Stevens, G2BVN. Also present were Mr J. C. Graham, a Past President of the Society, Mr P. A. Thorogood, and Mr R. G. B. Vaughan, general manager.

The Society extends to Norman's widow and his family its most sincere condolences and mourns the passing of a true and loyal friend.

Mr R. N. L. Caws

A 1-10-100kHz calibrator

by S. N. GALL, G3UCM*

A PRE-REQUISITE of a modern amateur station is an accurately calibrated receiver. It is preferable to have one's receiver calibrated to better than 10kHz; 1kHz representing a worthwhile ideal. One method of achieving and checking such calibration accuracy is to use a calibrator of the type described below.

The calibrator can be divided into three sections, the first of which is the 100kHz oscillator. This utilizes a 100kHz crystal, sufficient pulling range being given by VC1. L1, C2 provide a medium impedance load for TR1, resonant near 100kHz. The output of the oscillator is fed to the harmonic generator diode D1, and thence to the 100kHz output socket.

TR3 and TR4 constitute a 10kHz astable multivibrator, synchronized by a 100kHz feed via RV1. The design frequency, given by $F = 1/1{\cdot}38\,CR$, is slightly lower than 10kHz, to allow for shortening of the oscillatory period by the synchronizing waveform. C7 and C8 have the value of 7,100pF, made-up of 6,800pF in parallel with 300pF, the type not being critical.

The third section of the calibrator is the 1kHz multivibrator, TR5 and TR6, synchronized from the 10kHz output via RV2. C13 and C14 are 0·0748μF, made-up of 0·068μF and 6,800pF.

The switch S was introduced to provide separate outputs from each stage, eliminating crosstalk problems. All transistors are type 2N706, being cheap and plentiful. The crystal X1 is a Brookes 100kHz type, designed for parallel resonance with 30pF.

The circuit was constructed on a piece of Veroboard, with 0·15in pitch holes, the layout being uncritical. The unit, complete with a 9V battery, type PP3 or PP9, is housed in an STC die-cast box, which helps to contain the rf.

Typical dc voltages, using a 20kΩ/V meter give 8·5V on the oscillator transistor collectors, and 1·4V on the 10kHz divider collectors. On the 1kHz circuits, the collector voltage is 2V. Alignment is best carried out using laboratory instruments, but can also be performed using an hf receiver.

The procedure is as follows:

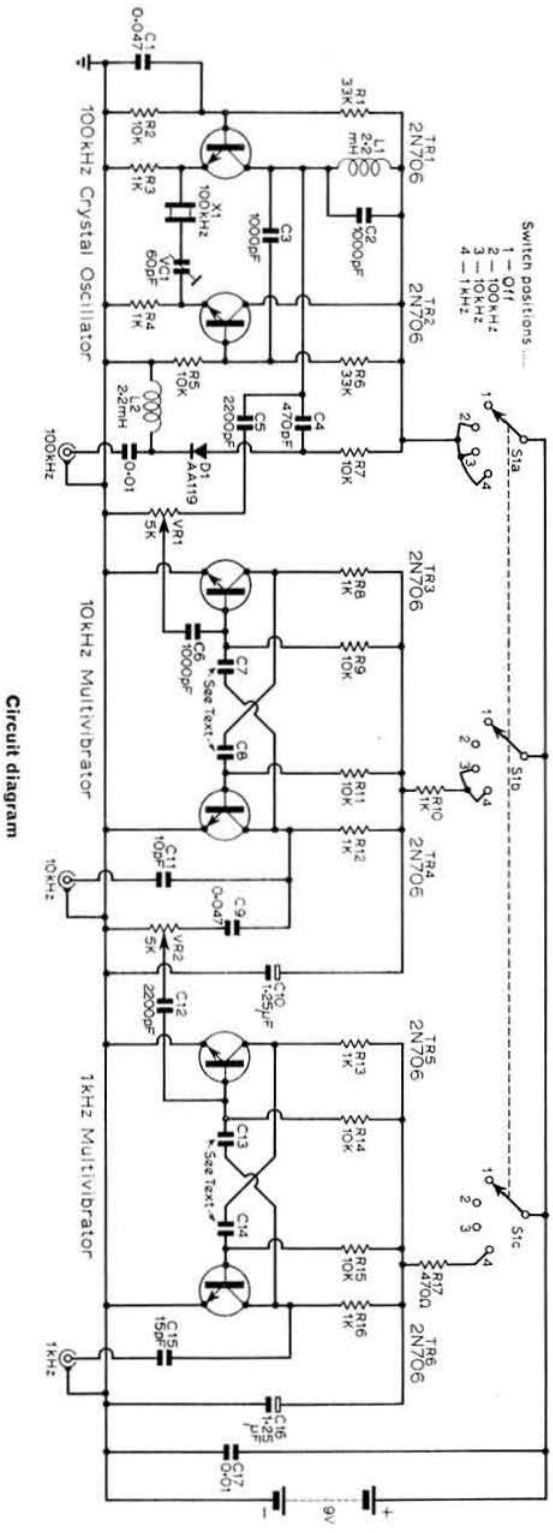
(1) Check for logical dc voltages on all transistors, and set RV1, RV2 initially to zero.

(2) Set the 100kHz oscillator on frequency by trimming VC1. This is preferably done by measuring with a frequency counter, permitting adjustment to better than 1Hz.

Alternatively, the output can be zero-beated against MSF, or WWV, using an hf receiver.

* 175 Coulsdon Road, Old Coulsdon, Coulsdon, Surrey.

Circuit diagram



The procedure is as follows:

(*a*) Tune communication receiver to standard frequency signal with bfo off.

(*b*) Inject weak signal from 100kHz crystal oscillator and adjust frequency of latter to centre of zero beat with standard frequency signal.

(*c*) Set bfo to give any convenient audio note, and vary crystal oscillator tuning *very* gradually until slow beats are heard, ie the strength of the hetrodyne between bfo and station varies in strength. It may be necessary to adjust the injection from the 100kHz oscillator for best results. The S-meter may be used as indicator if desired.

(*d*) Continue to adjust crystal frequency until beats are as slow as possible to achieve. With a good crystal and really stable oscillator circuit it should be possible to achieve more than one second per beat at 5MHz, ie 1 part in 5 million. The accuracy of the fundamental (100kHz) will, of course, be the same.

Examination of the waveform on TR1 collector should show a clean sine-wave.

(3) With RV1 at zero, check the frequency of the 10kHz divider. This should be less than 10kHz. Next turn RV1 until the output locks at 10kHz, (Period 100μs) either with an accurate oscilloscope, or by checking on a receiver, and counting the number of pips between the 100kHz checkpoints. (There should be nine.) In between the locking points on RV1 the divider will free-run, producing a rasping note.

(4) In a similar manner, adjust the 1kHz multivibrator, until the output is 1kHz. (Period 1ms.) If this adjustment is made using a receiver, the selectivity will need to be better than 1kHz.

This completes the alignment of the calibrator. In use, the unit has given reliable pips up to and including 28MHz.

Components list

R1	33kΩ 0·1W	C1	0·047μF disc
R2	10kΩ 0·1W	C2	1,000pF disc
R3	1kΩ 0·1W	C3	1,000pF disc
R4	1kΩ 0·1W	C4	470pF disc
R5	10kΩ 0·1W	C5	2,200pF disc
R6	33kΩ 0·1W	C6	1,000pF disc
R7	10kΩ	C7, C8	see text
R8	1kΩ		
R9	10kΩ	C9	0·047μF disc
R10	1kΩ	C10	1·25μF electrolytic
R11	10kΩ 0·1W	C11	10pF tubular
R12	1kΩ 0·1W	C12	2,200pF disc
R13	1kΩ 0·1W	C13, C14	see text
R14	10kΩ 0·1W		
R15	10kΩ 0·1W	C15	15pF tubular
R16	1kΩ 0·1W	C16	1·25μF elco
R17	470Ω 0·1W	C17	0·01μF
RV1	5kΩ preset 0·1W	VC1	60pF trimmer
RV2	5kΩ preset 0·1W		
		L1	2·2mH
D1	AA119	L2	2·2mH
TR1—TR6	2N706	S	3-pole 4-way switch
X1	100kHz		

Obtaining deviation

by B. D. A. ARMSTRONG, G3EDD Pye Telecommunications Ltd.

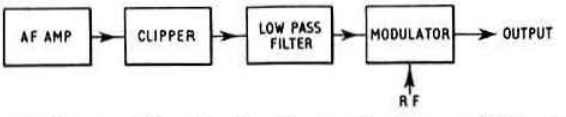
ANY frequency or phase modulation system on the amateur bands must comprise four essential circuits:

1 Audio gain,
2 Clipper,
3 Low-pass filter,
4 Phase or frequency modulator.

1 and 4 are self-explanatory, but 2 and 3 are unfortunately often omitted. A clipper is essential to ensure that under no condition of speech intensity or gain control setting will the deviation exceed a predetermined amount. A low-pass filter is essential to remove harmonics produced in the clipper, otherwise gross overdeviation can occur due to these harmonics. The block diagram of the modulation system is shown in Fig 1.

FM or PM

There are two forms of modulation, frequency or phase. Both produce similar effects and at the risk of treading on the toes of the purist the only essential difference is that whereas a frequency modulator produces deviation in proportion to audio amplitude, a phase modulator produces deviation in proportion to both amplitude and audio frequency. A phase modulator, for constant audio level input, will produce twice the deviation at 2kHz to that produced at 1kHz. For reasons of "talk power" and overall system signal/noise ratio, it is best to make use of maximum allowable deviation at the predominant speech frequencies, ie 800-1,000Hz. If the maximum allowable deviation is, say, 2·5kHz, this will normally only occur at the upper speech frequencies around 3kHz with an uncorrected phase modulator. In order to correct the dependence of the phase modulator on audio frequency, it is preferable to put a frequency compensating network after the low-pass filter. Since the phase modulator audio frequency deviation characteristic is 6dB/octave pre-emphasis (rising characteristic), the correction network can consist simply of a resistor and a capacitor in series, with the input across both, and output across the capacitor. This network will give 6dB/octave de-emphasis



ig 1. The amplifier circuit will normally be preceded by a microphone amplifier which would include a gain control

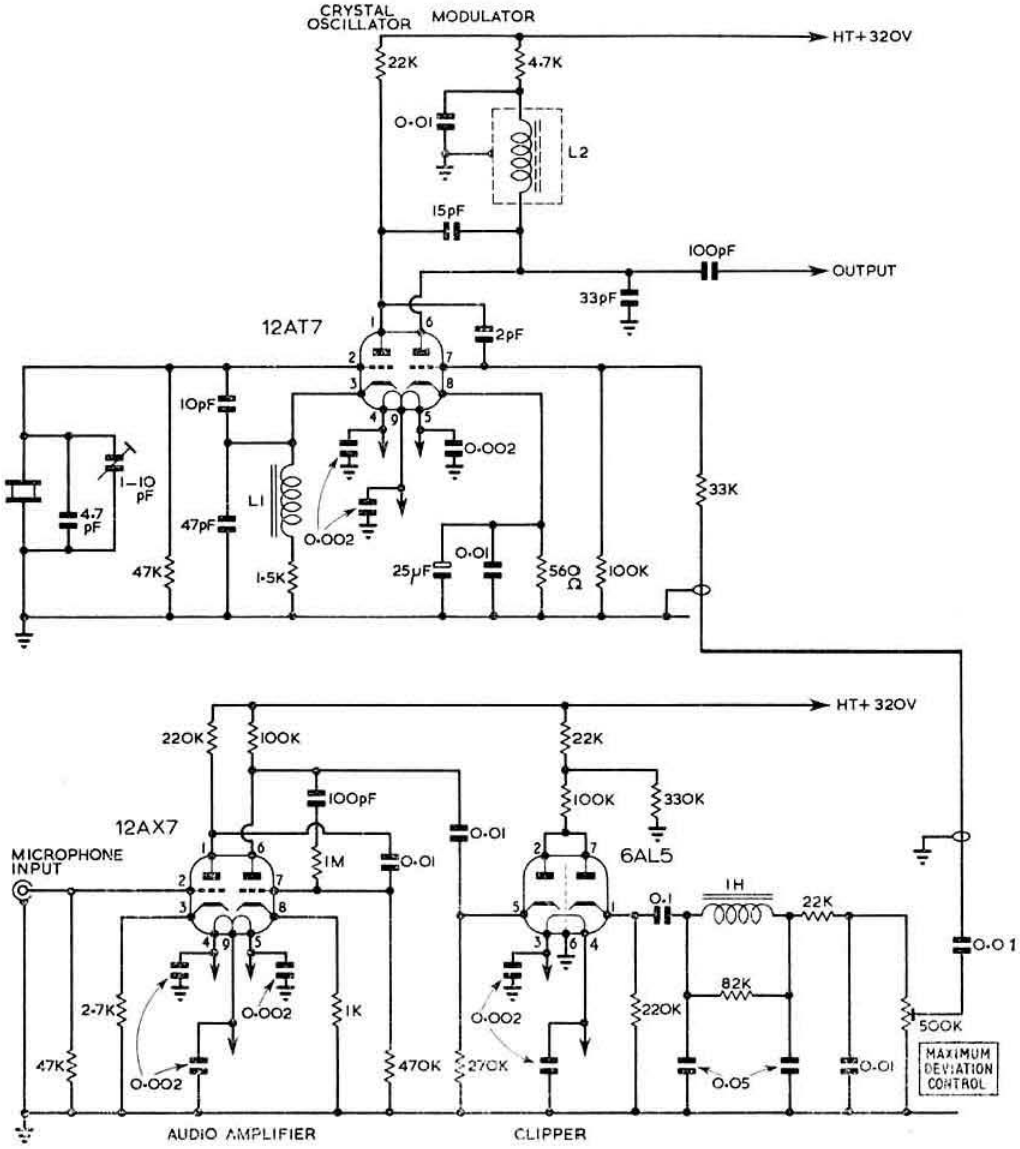


Fig2. Valve phase modulation system for crystals in the 4 to 6MHz range. Higher crystal frequencies may want slight adjustment of C14, 16 and 18. 20mV of audio can give up to 15kHz deviation. L1 100μH choke. L2 originally 113 turns 20/48 litz 0·2in wide on 4·1mm dia. ferrite rod, 100μH

(falling characteristic) above the frequency at which the capacitive and resistive impedances are equal.

Modulation circuits

Figs 2 and 3 are valve and transistor examples of a complete phase modulation system, the 22k/0·01μF combination immediately after the low-pass filter is the response correction network to give a flat overall response. In setting up the deviation of a transmitter, it is important to appreciate the functions of *audio gain* and *set deviation* controls, both of which adjust the overall gain of the audio stages. The *set deviation* control is after the clipper, and the maximum input to it is set by the clipper. Thus adjustment of this control sets the maximum deviation by fixing the maximum audio drive to the phase modulator.

The *audio gain* control controls the level of audio going into the clipper. With constant speech level into the audio amplifier the gain control can be adjusted so that the transmitted audio is hard into clipping, with consequent distortion (but still not over-deviated), or under-deviated, or of course any point between the limits. Normally in order to improve "talk power" some degree of clipping is desirable due to the

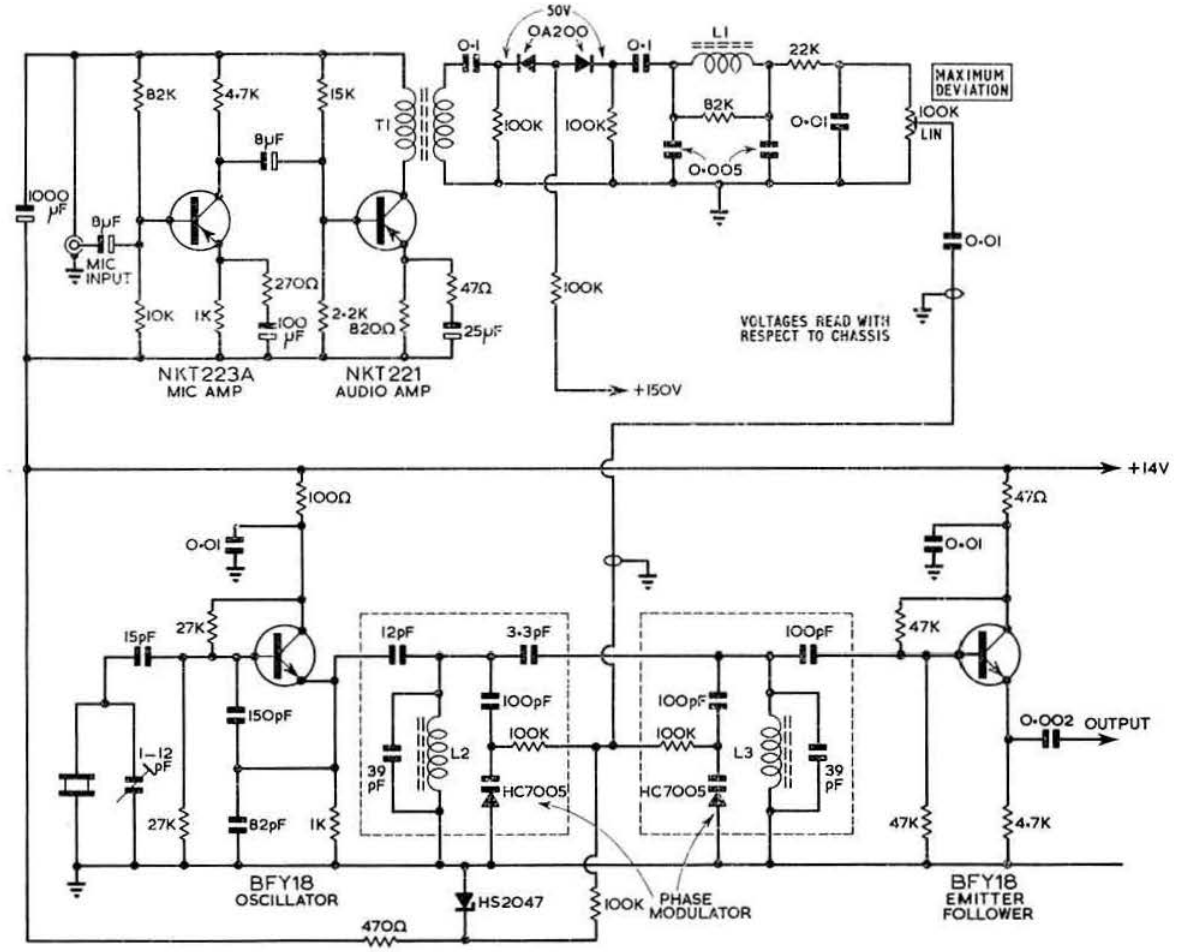


Fig 3. Transistor phase modulation system for crystals in the 12MHz range. T1 is a small transformer 2k to 10k. L1 195 turns 36swg on ferroxcube pot core FX2238, 80mH. L2 and L3, 15 turns 30swg on $\frac{1}{4}$in former, winding length $\frac{3}{8}$in fitted with ferrite core. 20mV of audio can give up to 5kHz deviation

15 to 20dB difference between peak and mean speech level. With peaks clipped by 6dB, the mean speech level will be 6dB higher than in the unclipped condition and the resultant distortion will be hardly noticeable.

Setting up procedure

The procedure for setting deviation is as follows:

1. There is no real substitute for a deviation meter with an oscilloscope connected across its audio output terminals. The deviation meter will read accurately under steady tone modulation conditions but will be inaccurate under speech conditions, hence the oscilloscope. An fm receiver with good limiting characteristics can be used as a transfer standard by setting the audio gain for a certain receiver audio power output with a known 2·5kHz deviation from a signal generator or transmitter. The audio output of the receiver will then indicate relative deviation. With this method care has to be taken to allow for the audio response of the receiver.

As an absolute last resort use should be made of an understanding local station.

2. Feed in audio tone (whistle if you must!) of about 1kHz to the audio input with both audio gain and maximum deviation controls at maximum. Adjust the level of the audio tone to give 50 per cent deviation. Then increase the tone input level by 12dB (four times) and turn down the *set deviation* control until the correct deviation is obtained. The RSGB Technical Committee recommends 2·5kHz maximum deviation.

3. With an oscilloscope connected across the *set deviation* control, speak into the microphone in a normal voice and adjust the *audio gain* control so that speech peaks are clipped by about 6dB. This exercise calls for a certain amount of discretion since once in clipping one has to estimate on the oscilloscope where speech peaks would have been if they had not been clipped. If no oscilloscope is available it is quite acceptable to adjust the audio gain either by local monitoring or with the co-operation of another station, but the best way is with an oscilloscope.

FLARE-SPOT

A radio-detective story in three parts by Rev P. W. Sollom, OSB, BSc(Eng), PhD, G3BGL*

PART 1. CRIME WAVE

Chapter 1. In which the crimes are committed and two suspects are observed

Beautiful day, not a cloud to be seen. Switched on the rig before lunch to give the oscillators time to get over their warm-up drift. Got the tape cued-up at zero ready to go. Loaded a film into the Leica and snapped in the 135mm Long-Tom lens. Went for lunch.

Back to the shack. Quick time check from MSF to synchronize watch. Put 5μV from signal generator at 174·1 MHz into the nuvistor converter, and adjusted tuning of the AR88 around 29MHz, the first i.f. to get a signal in the middle of the passband of the ssb filter. Heterodyne level adjusted to full recording level on the tape deck, and a bit of this recorded for reference. Connected the coaxial from the $\lambda/2$ dipole to the converter, and the sound channel of Lille TV, 285km away, put in a good microvolt or so. Opened the shack window and aimed the loudspeaker monitor outdoors: monotonous heterodyne!

1345gmt, all systems go. Started the tape. Started the stop-clock and took it outside. Pencil and notebook to hand, camera at the ready. Admired the view. Skylarks putting in S7 signals from nearby field, with faint background QRM from the hum of Easter holiday traffic on the A4 a mile away . . . and Lille's heterodyne.

1356—all peaceful outside, but there is some excitement in the shack, heterodyne getting louder and a tremulo wobble growls down to a waa-waa chuff-chuff-chuff, stops briefly, and starts off again.

1357, all excitement over. Thought these steam-train phenomena were supposed to be due to aircraft! Nothing to be heard or seen. Perfect visibility. Clear site. Not much hope of catching the culprit responsible for that ghost train. Call it event "A".

1358. More excitement in the shack. Same steam train sequence—died away around 1359. Still nothing to be seen or heard outside. Another one that got away! Call it event "B". 1403 now, heterodyne sounds different—two distinct discordant notes. And, yes! Spotted something. Faint con-trail of an aircraft approaching from the east, say 30km away. 1404, discord of heterodynes changing rapidly now, surely nothing to do with the aircraft so far to the east. Dead right! There is another faint con-trail coming up behind from the west.

Get facts on film. Get con-trails in view in relation to ground objects that will enable aircraft position in azimuth and elevation to be deduced from the photos. Note time of photos from the stop-clock. Snap a couple of shots. Two possible culprits, must keep tabs on them now. Looks from here as though they are on a collision course! Long-Tom at the ready, 1405½ snap them as they pass each other. One must be somewhat higher and further away or surely they would have had to take evasive action! Estimate they passed at Woodley, but at about 20km range that could be a bit out. Wish the author's aircraft recognition was better—could not say for sure what type they were, but one had engines on the wings, the other did not.

The east-bound one now turning south-east in a gentle curve, and the west-bound one at its nearest position to the north looks about 12km away. More snaps, noting time. Enormous steam train commotion on Lille signal, 1405–1406. Event "C". The aircraft now fleeing south-east looks like crossing directly between observation position and Lille in a minute. 1407½, it does so. Another huge commotion on the Lille signal, event "D". More snaps.

Two discordant heterodynes again, 1408. The west-bound aircraft still leaving a clear con-trail far away to the west, somewhere towards Lyneham; the south-bound one now disappearing behind trees over Midhurst . . . 1409, all peace and quiet again . . . for five minutes. 1415, another chuff-chuffing with nothing around in the sky to be seen or heard. Call it event "E". 1418, end of tape.

Chapter 2. Long-Tom's evidence

The aim of the detective is to pin the crime on to a particular suspect and obtain completely convincing evidence that will ensure a conviction. But a person must be considered innocent until proved guilty, and in the less serious matter of convicting an aircraft of causing a particular steam train phenomenon, it is equally important not to jump to conclusions . . . one can be so wrong! Usually there is one crime and a number of suspects to be eliminated. Here there are far too many crimes of steam train interference for the few visible suspects. So the reader, as a member of the jury in this case, is asked to be impartial and detached from preconceived ideas and to read the whole case through before giving his verdict.

The fact that two aircraft crossed over Woodley at about 30,000ft at 1405½ was reported to the Board of Trade (responsible for the National Air Traffic Control Services) with a request for information about the flights concerned. In due course the following reply came from the Centre Superintendent, London Air Traffic Control Centre: "Scrutiny of our records shows only two flights which conform to the details quoted:

(a) A DC-8 with a true air speed of 478 knots, en route from Rome to New York at Flight Level 310 (approximately 31,000ft). This aircraft routed via Lydd, Biggin, Epsom, Woodley and then Upper Green One west-bound, reporting over Woodley at 1405gmt.

* Douai Abbey, Upper Woolhampton, Reading, RG7 5TH

(b) A VC-10 with a climbing speed of 380 knots, and 483 knots at cruising level, en route from Brize Norton to Bahrain. This aircraft estimated Lyneham beacon at 1400gmt, passed over Woodley at 1406gmt climbing to Flight Level 330 (33,000ft) and was at FL330 when it reported over Midhurst at 1410gmt."

Simple deductions which can be made from the photos taken with the Long-Tom telephoto lens agree completely with these flight descriptions. The direction in which the photos were taken show the aircraft to have been in appropriate positions on their routes, according to their speeds, reckoning from their times at Woodley. The elevation angles agree with the range and height of the aircraft to a convincing order of accuracy. The image sizes of the aircraft in the photos correspond with the dimensions of the DC-8 and VC-10 at the slant ranges concerned, and enough can be seen on the photos to confirm the aircraft types. The oblique directions of the con-trails seen against the sky background in the photos are consistent with the directions of the aircraft heading along the routes quoted. The photos will not reproduce clearly enough in print. On Long-Tom's evidence, the two suspects were the DC-8 and VC-10 of the official records, and they will be referred to now by these names.

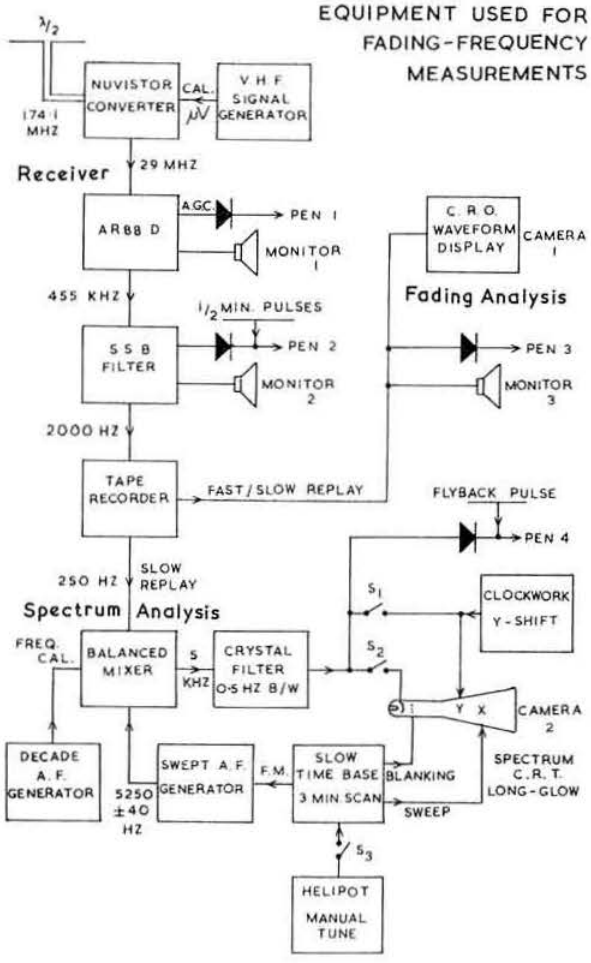


Fig 1. Equipment used for fading-frequency measurements.
Pen 1 is used for statistical analysis (not the present subject).
Pen 2 is for recording time marks during the original recording.
Pen 3 is for detailed analysis with slow speed replay of the tape.
Pen 4 records the scans of spectrum analysis.
Monitor 1 is used to identify the Lille transmission.
Monitor 2 is used when adjusting the heterodyne frequency.
Monitor 3 is for recognizing the effects of programme transients.
In spectrum analysis,
S1 is closed for amplitude/frequency display on crt,
S2 is closed for brightness/frequency display,
S3 over-rides the electronic scan for amplitude/time recording of any frequency manually tuned and followed, using Pen 4.
A photograph taken by Camera 2 has to be turned on its side to interchange X and Y axes for a frequency/time graph

Chapter 3. Fingerprints on the tape

The 2000Hz (approx) heterodyne is recorded on tape at 7½in/s. On replay, the ac voltage is rectified, and the resultant dc is used to deflect a pen which records the voltage on a moving paper chart. The speed of the paper can be geared between 1in/h and 12in/min. The pen has a slow response, reproducing variations quite accurately at less than 1Hz, but dropping off rapidly above this. However, the tape recorder can be replayed at slower speeds, and ⅛ speed has been used to obtain a good pen response up to about 10Hz in the original dc waveform (ac envelope). At this speed the heterodyne reproduces at 250Hz—well within the working range of the tape deck.

The converter and modified AR88 operate at fixed gain, and so the ac heterodyne voltage from the ssb filter/product detector output (which is an outboard addition to the AR88) is linearly proportional to the rf voltage at the aerial. Fading of the vhf signal is, therefore, reproduced faithfully as an amplitude variation of the heterodyne. A block diagram of the whole set-up is given in Fig 1. The filtering and product detection process suppresses a lot of the amplitude modulation of the tv programme, and if one listens to the monitor speaker it is obvious that modulation contributes nothing significant to the fading waveform, and its transients can be recognized easily.

A replay of the tape into the pen recorder is reproduced in Fig 2. It is quite a typical record of a vhf signal as received well beyond the radio-horizon under fine weather conditions. The signal strength fluctuates or scintillates continuously, and at random times some prominent peaks occur. When the fluctuations are rapid, a lot of ink is left on the chart, and at this paper speed the fluctuations fill in and a solid inked area is formed. The major peaks on this recording coincide with the steam train events "A" to "E", and have been labelled accordingly. Other smaller peaks and filled-in areas are labelled "F" to "L" for reference.

Now to start looking for fingerprints! Get out the magnifying glass (literally!) and examine the chart. Increase the paper speed to expand the time scale and replay the tape slowly. As an example of what this reveals, look at steam train "C" in Fig 3. Pronounced oscillations of field strength occur at a frequency which gets less towards the centre and then increases again. Each dip in the oscillation occurs at a time of the audible "chuff" because of the relative increase in background noise at that point.

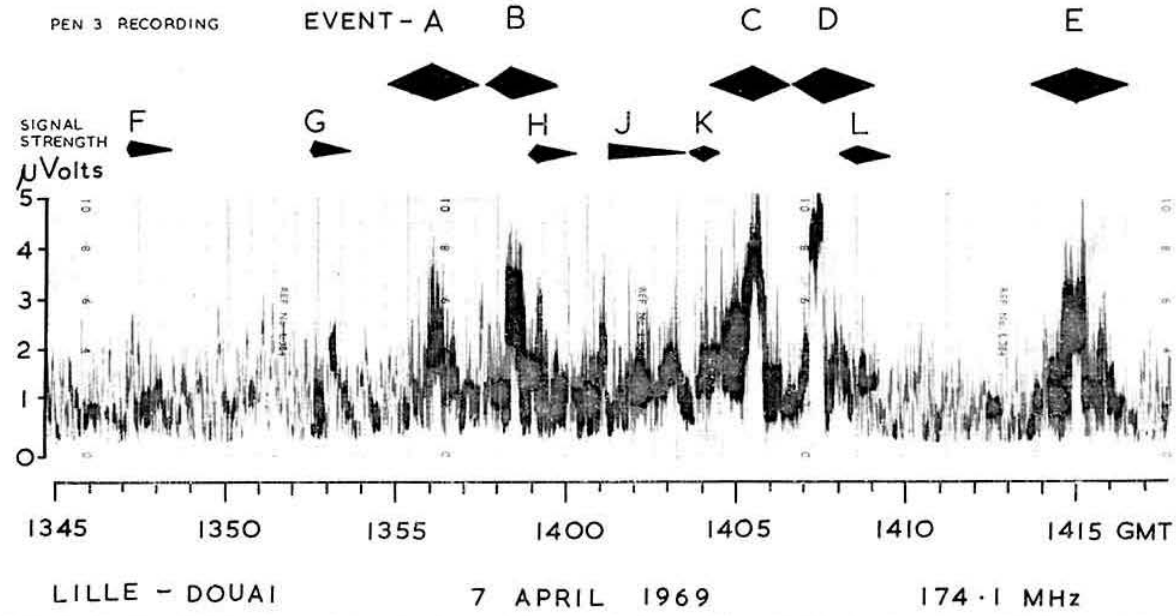


Fig 2. The typical trans-horizon vhf signal under normal tropospheric conditions is characterized by rapid fading and sharp peaks. Major events "A" to "E", and minor events "F" to "L" are the subject of this analysis. The diamond marks indicate the duration of each event. Douai Abbey is 10 miles west of Reading, Berkshire

Count the number of cycles out from the central zero-beat point, in each direction, and plot a graph of the total number of cycles against the time (distance along the chart) from the centre. A remarkably smooth curve is obtained: Fig 4. Now take one-second intervals of time at different points along the chart and so estimate (by counting cycles in the one-second interval) the fading frequency at various times. Plot a graph of frequency in hertz against the time, and an excellent straight line is obtained, passing through zero beat (0Hz) at the centre. The characteristic of this graph is its slope: 0·15Hz/s (cycles-per-second per second, the rate of change of frequency). Each steam train has its own characteristic

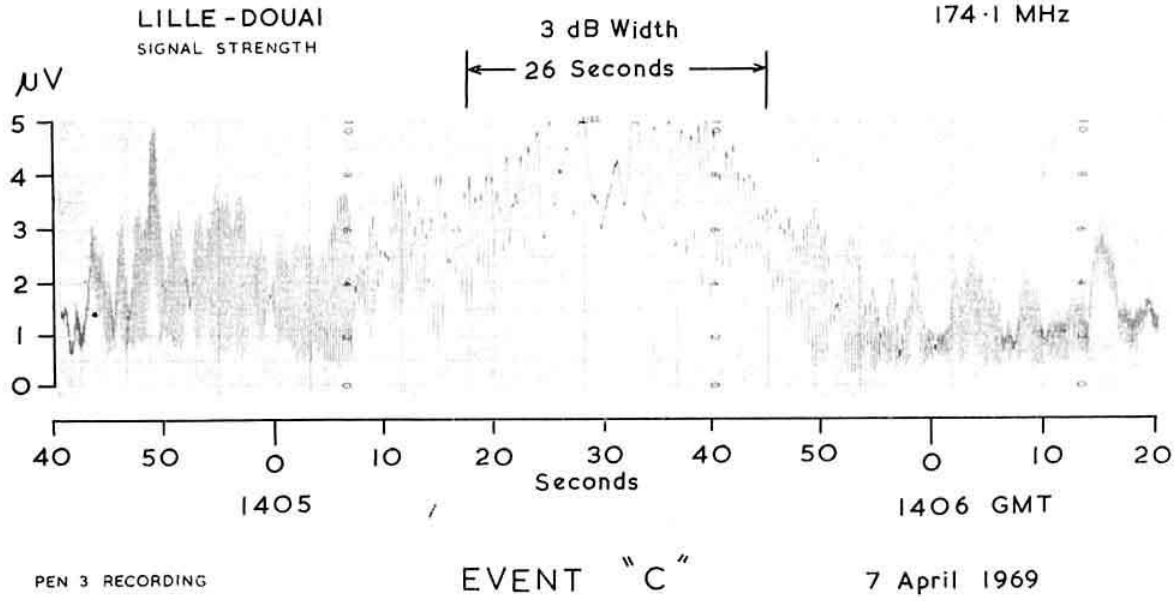


Fig 3. The detail of a major signal-peak reveals cyclic fading of varying frequency and amplitude. The frequency has a zero-beat point in every event except J

number of Hz/s in the region of zero beat—like a fingerprint. But this is only one detail of the fingerprint. The rest of it depends upon what happens to the straight line beyond the ends of the period examined so far.

When the pen recording for the whole tape is examined in this way other steam train events become obvious, though without any major peak of signal level coincident with them. These are the events labelled "F" to "L" in Fig 2.

Scrutiny of the pen recordings with a magnifying glass reveals the existence of ripple frequencies up to about 40–50Hz if there is sufficient amplitude to make the pen shiver, but the ideal way to observe such frequencies in the waveform of the signal strength record is to examine the envelope of the 2,000Hz "carrier" on an oscilloscope. Since the envelope-frequency is continuously varying, the time base cannot be synchronized satisfactorily, but photographs can be taken of individual scans.

Two examples of such envelope patterns are given in Fig 5. They were taken at times each side of the peak of event "D". In the first, the time scale is 40ms long, and the 2,000Hz heterodyne carrier waveform is clearly seen with an envelope "modulation" of 200Hz. But the troughs are not round-bottomed as for sinusoidal modulation—they are characteristic of two almost equal amplitude sine waves beating together. On the monitor at this time two discordant heterodynes were heard, and the tv programme was not responsible! In the second oscillogram, with 160ms time scale, an envelope-frequency of 175Hz is superimposed on a prominent component of 18Hz. By tracing the movements of frequency at successive times, these frequencies can be associated with the zero-beats of events "D" and "H".

In this way extensive case-histories were obtained of each steam train far beyond the region of audible "chuff-chuffing," and so unique fingerprints for each were obtained. Each fingerprint is smeared over a considerable period of the tape recording, and can be detected, given sufficient patience, even in the presence of other overlapping and more prominent effects. This follows, of course, from the principle of superposition of waves whereby they cannot destroy each other, but their combined effect at any point is obtained by adding together their individual instantaneous values.

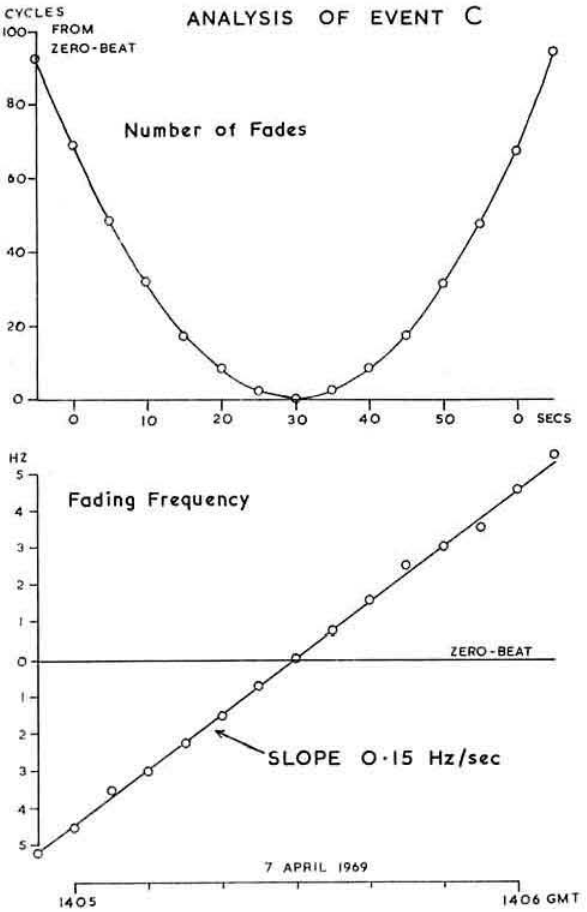


Fig 4. The number of fades counted from zero-beat usually follows a very precise mathematical square-law curve, and the corresponding frequency/time graph is a straight line. The rate of change of frequency (slope) is, therefore, constant near zero-beat. The constant may have a wide range of values

Chapter 4. Cracking the code

The frequencies obtained from the pen recordings and from the envelopes of oscillograms are beat frequencies. If they were amplitude modulation frequencies they would be both positive and negative with respect to the carrier (upper and lower sidebands), but in this case one of the two signals beating together must be taken as a reference and the other is then either above or below it. Deciphering the sign language is like trying to crack some secret code. Even if the sign can be determined, there is still the uncertainty as to whether the amplitude of the beat frequency should be attributed to one frequency or the other. All that is known is that at the peak both signals are adding, and at the minimum they are subtracting.

The answers to these questions lie hidden in the tape. If two frequencies are beating together to provide the fading of the signal, they must be present on the tape as two frequencies, and their beat is only observed if they are simultaneously applied to the Y-plates or the rectifier feeding the pen. The detective has the job of tuning in to each frequency separately if he wishes to know all the answers. In the present case a tunable receiver is required capable of tuning across a small part of the audio spectrum around 2,000Hz (or around 250Hz on slow replay). The bandwidth needs to be narrow enough to separate frequencies only a few cycles apart.

An exceptionally lucky purchase of a quartz crystal cut for 5,000Hz from a junk-man who thought it was an obsolete valve provided the basis for the apparatus for spectrum analysis which is included in the block diagram of Fig 1. With a Q of about 20,000 it provides a bandwidth of 0·5Hz at 5kHz. It would be nice to use this bandwidth directly on the 2,000Hz carrier, but the rate of change of beat frequency is too high for any useful response, and excessive ringing occurs. At slow replay the equivalent bandwidth is 4Hz, and frequencies of 2,000Hz and 2,010Hz recorded simultaneously on tape can be resolved. An up-converter to the filter frequency uses a balanced mixer to minimize oscillator breakthrough, and a tunable audio oscillator of bfo pattern. One

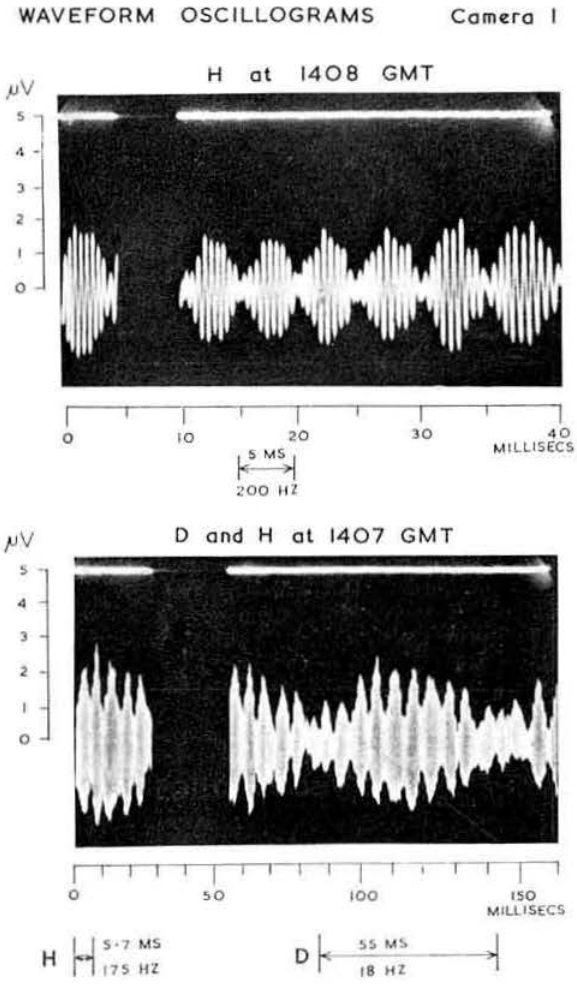


Fig 5. Oscillograms reveal fading frequencies up to several hundred hertz. The "carrier" frequency of 2,000Hz is a heterodyne produced by three-stage conversion from vhf. The camera shutter was not synchronized with the time base so a gap occurs

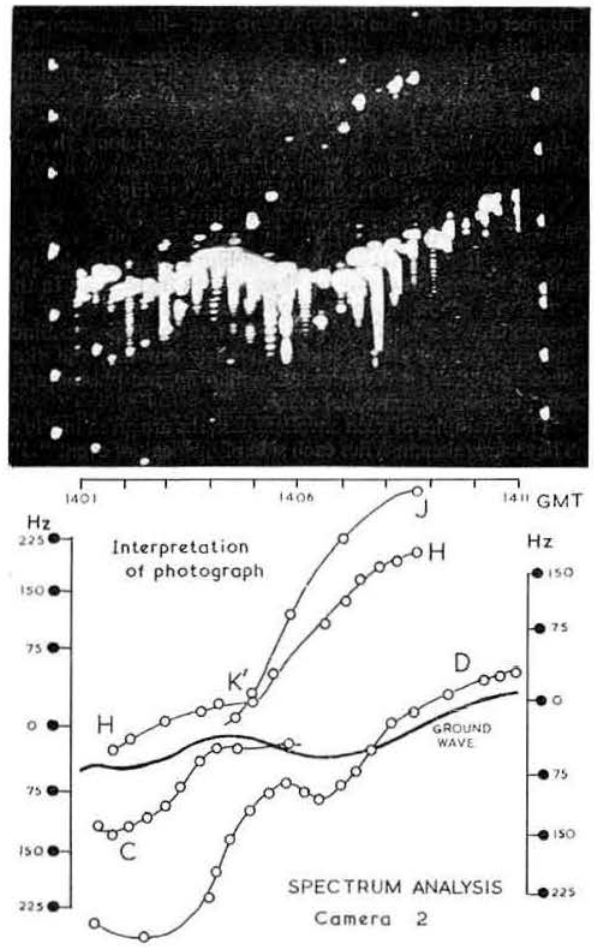


Fig 6. A frequency/time display in which bright spots plot the points where large amplitude components appear in the spectrum. The ground wave frequency varies with the net drift of the oscillators in the conversion chain. Spurious responses due to programme modulation transients are recognized when listening to Monitor 3

rf oscillator in this bfo was provided with a reactance modulator for electronic tuning, or for manual tuning by a control voltage.

The ground wave from Lille is present at some detectable level at all times and so provides a permanent reference frequency somewhere on the tuning scale. The tuning position is not quite constant due to random drifts of the oscillators in the conversion chain, but these drifts are easily distinguished from the systematic changes which are associated with the steam trains. When the tuning is electronically controlled by a timebase the output of the filter as recorded by Pen 4 is proportional to the amplitude of any signal at the time the tuning crosses its frequency. An example will be given later in Fig 10.

For the moment let us concentrate on the frequencies which can be resolved by this apparatus, and show how they vary with time. A photograph taken with Camera 2 is given in Fig 6 together with an interpretation. It was an 80min time exposure made in the dark behind locked doors! In Fig 1, S1 was open for this photograph so that only the clockwork shift was applied to the Y-plates giving a scan in the vertical direction of 80min. The X-timebase scanned at once/3min (a frequency of about five *milli*hertz) and in so doing tuned the up-conversion oscillator over the band 5,210-5,290Hz for the nominal 250Hz carrier. Switch 2 was closed to brighten the trace on the crt whenever a signal was tuned-in, the brilliance being biased off by a preset control. The resulting photograph is to be viewed on its side to make the X-axis (proportional to frequency) vertical and so give the desired frequency/time graph which is plotted out as a chain of bright dots. Each chain of dots is the "fingerprint" of one of the events.

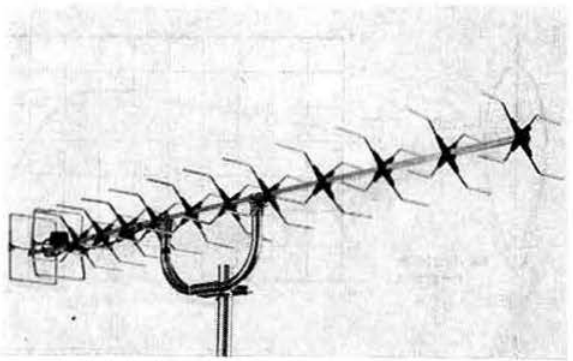
The arrangement of the various conversion oscillators results in the "negative" sign being given to frequencies which were originally above the 174·1MHz carrier received via ground wave. The general trend of the fingerprints is the same as in Fig 4. The detail in the vicinity of zero beat can be filled in by reference to oscillograms and pen recordings, using Fig 6 to determine whether any particular frequency should be plotted as positive or negative.

Sets of fingerprints have now been obtained corresponding to each event marked on Fig 2. At this stage it must be admitted that they belong to "a person or persons unknown". The "crimes" are those of interfering with the ground wave signal over considerable periods of time during which a steam train event occurs at some point. In the 10min period covered by Fig 6, four fingerprints have been shown but only two of these cross the ground wave, at the times of zero beat in events "C" and "D". Two more steam trains show up on the chart paper in this period at "K" and "L". Two suspects have been named as a DC-8 and a VC-10. These may or may not be the ring leaders of the gang responsible for all the events, but there would seem to be many more members of the gang to be rounded up. The two suspects should be remanded in custody pending further investigation!

(To be continued).

Multibeam on 70cm

The J-Beam aerial on trial



by J. N. H. CARTER, G3OWB*

WHAT does the amateur require from an aerial system? We all know that gain is an important factor in winkling out weak signals on receive and getting the best possible signal out. On the face of it, it appears a simple matter to make a high-gain aerial, connect a cable to it and fire away on the air, but in practice it is not so elementary.

Looking at the field of domestic television which, in the matter of aerials for fringe reception, has always tended to run parallel with vhf and uhf amateur requirements; European practice, where high gain is required, is to incorporate in uhf aerials a more sophisticated director element shape, as shown in the illustration of a Continental aerial in Fig 1. These element shapes are designed to simulate the effect of a four-square stacked array, the horizontal portions of the directors being in the approximate position that would be occupied by the individual directors of four separate aerials.

It is thus possible to obtain, from a single boom, a performance approaching that of four separate sets of director elements. The immediate advantage of this system, of course, is the elimination of all the complications of the mounting systems necessary for multiple arrays.

With this type of array the problem has always been the method of feed required to excite these multiple director elements efficiently. In theory four separate dipoles are required, and the consequent complication has tended to nullify the inherent simplicity of the system.

Work in the J-Beam laboratories, aimed at producing the simple compact high-gain array using the multiple director principle, has shown that the Parabeam type of radiator and reflector is quite suitable for the excitation of multiple directors.

For the first test a Parabeam 12-element aerial was set up on the aerial test range, where bandwidth, match and gain

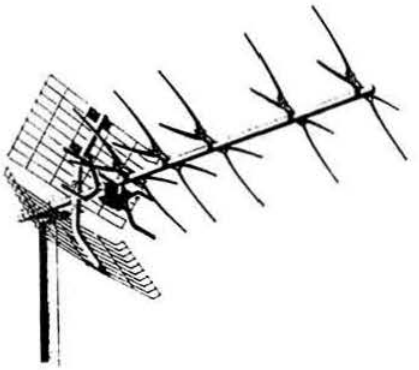


Fig 1. Typical of the Continental trend referred to: the Fuba, model XC23

*37 Highfield Avenue, Cambridge.

figures were confirmed and recorded. The 10 director elements of the Parabeam 12 were then removed and 10 multiple directors substituted. Since each multiple director unit consisted of four directors, the original 12-element model was now a 42-element, still with the original back mounting.

Normally the first problem that arises with a test of this kind is that the matching efficiency of the original aerial is lost, and therefore the increased gain caused by the greater number of elements is nullified. In this case, however, the Parabeam radiator with an inverse balun was being used to provide the match to the coaxial cable.

The main feature of the inverse balun, apart from the obvious advantage of converting a balanced aerial to match an unbalanced cable, is that there is considerable reactance compensation, and the whole system becomes a very broad band device indeed. Compare the gain and vswr curves of the Yagi, Fig 2(a), with those of the J-Beam Multibeam, Fig 2(b).

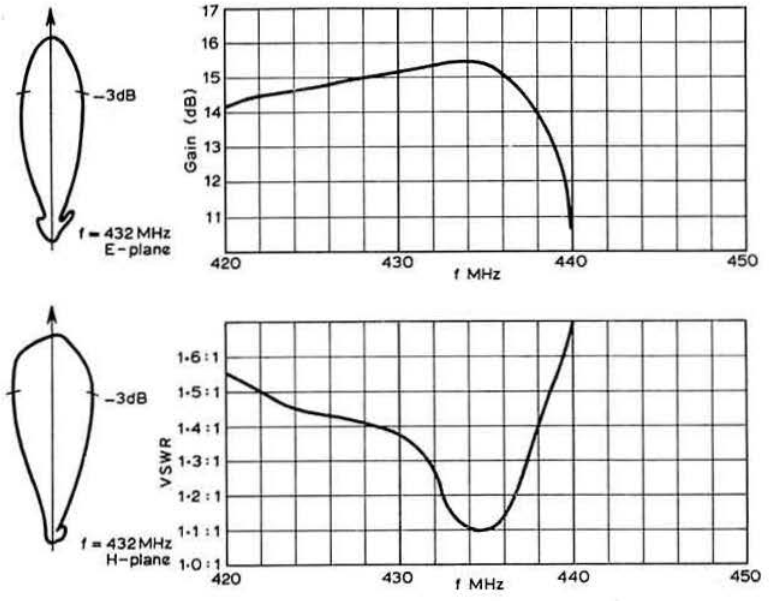


Fig 2(a). Performance of 70 14/Y aerial (Yagi). f = 420 — 450MHz. Z = 75

A check on the test instruments to confirm matching, indicated that there was no deterioration whatever as a result of the increase to 42 elements, and a check on gain showed an increase of nearly 5dB with no reduction in bandwidth characteristics. This order of gain increase means a performance equivalent to a standard side-by-side stack of two 15-element arrays.

First thoughts may be that 42 elements are now required to do the work of 30 elements, but it must be borne in mind that the two 15-element arrays are mechanically much more elaborate. They require two cross booms, elaborate support and mounting systems, and a separate matching harness. The multi-director 42-element array on the other hand is still a single boom, simply mounted with the original simple radiator system and coaxial connections.

Immediately the J-Beam Multibeam aerial was introduced it proved its value to BBC 2 viewers in remote parts, who found that even the Parabeam was not able to give them good pictures. Since those first days the Multibeam for 70cm has arrived and has become popular among 70cm enthusiasts (and of course some enterprising aerial constructors have tried scaling it for other bands). However, only the 70cm model has been used at the author's Kent QTH and it is disappointing that a recent move to Cambridge seriously interrupted the full evaluation of the aerial. Nevertheless it is interesting to reflect on the operating principles of this aerial and to record a few practical results, comparing it to some extent with its predecessor, the Parabeam.

Taking nothing for granted, the Multibeam was well tested; it was found that the polar diagram given by J-Beam was substantially correct for the aerial at G3OWB and that it was one of the particularly useful features for amateur radio use. As can be seen from the illustration there is a useful pickup area of fairly constant gain all round with one large forward lobe (about 15° wide). There are, in fact, as far as one can tell, no dead spots at all, which was certainly not the case with the Parabeam, when it often happened that stations could not be heard with the aerial pointing in certain directions. With the Multibeam almost any signal could be detected no matter where the aerial was pointing so that it was not necessary to sweep with both aerial and tuning; at least only for the really weakest signals, and stations did not get missed due to "holes" in the polar diagram. G8AOL comments that after using the Parabeam with its banana type polar diagram, the lack of any significant side lobes on the Multibeam gives the impression of no gain, although there is no doubt when you come on to the main lobe. For this reason he finds the Multibeam superior in this respect. You are sure that you are on the correct beam heading with the Multibeam and not on a side lobe as is so easy with the Parabeam.

The forward gain for this aerial on 432MHz was found to be 18dB, but it is only fair to state that quite simple measuring equipment was used on these tests, and an error of a few decibels either way is more than probable. Harping back to Continental practice, a search through a German catalogue of high gain aerials of world-wide repute showed 18dB as the maximum gain claimed for even their most advanced designs, which appeared to be both more complicated and more expensive than the Multibeam in some cases. Anyone care to offer an explanation?

One problem with the matching was that standing waves on the feeder could not be eliminated, although the same feed system was used as had previously been employed, with complete success, to feed the Parabeam.

There is a compact built-in balun in the connector box of the Multibeam aerial and so, of course, the coaxial line "transformer" supplied with the Parabeam was dispensed with. However, in spite of many experiments made with the aerial matching at the transmitter, the fact remains that a satisfactory balance-to-unbalance connection was not obtained on this occasion. A new balun was sent from the factory and preliminary tests would seem to indicate that there was a fault in the one used on the first series; it is important to read the evaluation of the aerial in the light of this knowledge. SWR at G8AOL is better than 1·5 : 1 at 433MHz measured at the bottom of the feeder on his present Multibeam installation using the built-in balun.

Half power (3dB) points were exactly as claimed, and a 30° vertical polar diagram showed that the closing in of the front in this plane was quite considerable when compared with the Parabeam at some 42°.

The first aerial received was completely assembled but it is understood that this is not standard practice. Considering the vast size of the box required—it looked like a long, low cardboard wall—this is hardly surprising! The boom became slightly bent in transit and the elements, which on this model were pushed in and bent over in the central insulating support section, were mostly bent out of shape a little but were easily straightened. Subsequent transport in the box, when the aerial suffered some rough treatment, also resulted in bent elements but again they were easily straightened without any dire results.

As the photograph shows, a sub-boom with two fixing points supports the boom of the aerial and, once erected and in the air, its mechanical strength is quite adequate for all normal conditions. It is surprisingly light and has low windage, but if left free it points head to wind.

For those with really big ideas, stacking configuration has caused a lot of controversy, but at Cambridge it is intended to mount two side-by-side. It is hoped by this means to maintain a good all-round pickup, a long lobe of about 10° width and not to restrict the vertical pick-up angle to less than 30°. Were this angle reduced, it might be necessary to have adjustable beam tilting, which would introduce unwelcome mechanical complications. G8ARM, however, has two stacked vertically and gets what he expected.

To summarize, the Multibeam appears to be almost ideal for amateur radio use. Its all-round pick-up and lack of spurious lobes and dead spots makes it superior to the Parabeam, which has generally held pride of place in the 70cm field hitherto. The Multibeam is easy to mount in conjunction with other aerials. The superiority of the integral inverse balun is not proven to the author's satisfaction, except inasmuch as it is extremely neat, and a separate balun carefully matched would, in the original tests, have further reduced feeder losses and spurious radiation.

A further evaluation of the latest balun will, it is hoped, be reported on later.

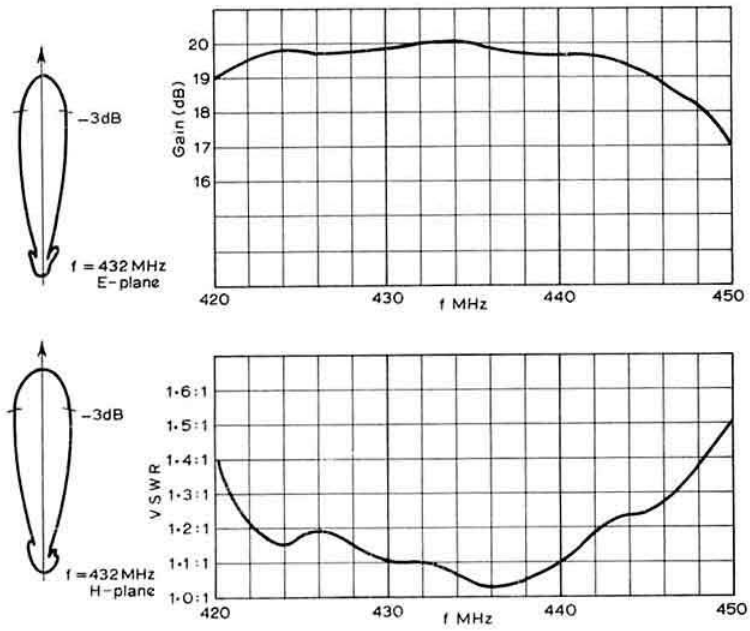
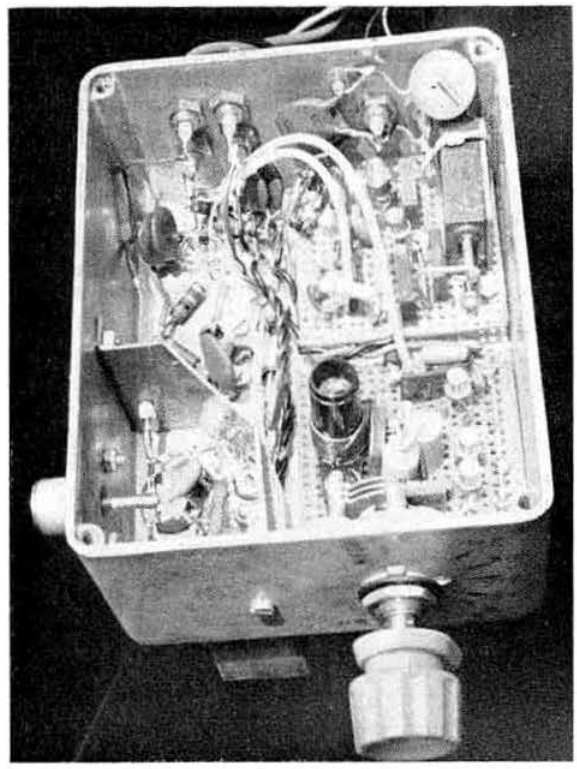


Fig 2(b). Performance of 70/MBM46 aerial (Multibeam). f = 420—450MHz, Z = 75

A stable vfo for 70cm and 23cm bands

by R. H. WADIE, CEng, MIEE, G8AOD*



Underside view

Introduction

Following several years of crystal-controlled operation on 70cm, during which time there were frequent occasions when contest operation was limited due to QRM from co-channel stations, the author decided that something should be done to find the elusive clear spaces between other rock-bound stations. Since third overtone crystals were in use, only limited pulling was possible (± 20ppm), which was insufficient to get clear of QRM in a few cases.

A vfo was therefore designed which could replace the crystal oscillator stage in the original of the low power 70cm transmitter, now included in the *Radio Communication Handbook*. The resulting hybrid unit is described, and some indication of the stability is also given by means of measured drift.

Stability

Since frequency shift is multiplied up by the same factor as that of the wanted frequency, near crystal stability is required, so that a receiving station would not be required to retune either during or at the restart of an over. Also, since the author is active on 23cm, the frequency shift should still be tolerable when multiplied by a further factor of three times.

Frequency shift 2ppm at 24MHz = 864Hz at 432MHz, or = 2·592kHz at 1296MHz. Ideally, this drift should take place in not less than 10 minutes.

Normal care was taken in the construction of the transistorized oscillators, with minimum length leads and all components firmly anchored to the circuit boards. Components are all standard commercial items.

Circuit description

Crystal oscillator

A 6·444MHz FT243 crystal without holder was wired into a transistorized Colpitts oscillator (TR1), the collector tuned circuit of which resonates at the third harmonic of 19·6MHz approximately. The output is RC coupled to an untuned buffer stage (TR2), the collector of which is fed to the suppressor grid of the mixer valve V1 by means of a short length of coaxial cable. The component layout is shown in Fig 2.

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Variable frequency oscillator

TR3 and TR4 form a super-alpha pair Colpitts oscillator tuned to 4·4MHz approximately, and variable over some 64kHz. The emitter of TR4 is dc coupled to an untuned buffer stage TR5, the output of which is coupled to the control grid of mixer V1 by means of coaxial cable.

The L/C ratio of the tuned circuit was kept deliberately low and temperature compensation is by means of silvered mica, polystyrene and ceramic capacitors of suitable values. The inductor is wound on an Aladdin F804 former, and band setting is by means of the coil core (type 900, grey), which is held by means of silicone core locking compound. The component layout is shown in Fig 3.

Mixer

A pentode valve (6AS6) is employed as the mixer stage. This valve has a high value of suppressor grid gm, which makes it particularly suitable for this mode of operation. The configuration used gives the highest value of conversion gain for the stage.

The anode circuit comprises a loosely-coupled tuned transformer, tuned to 24MHz. The inductors are wound at the top and bottom of a long Aladdin former, and tuning is by means of type 910 (purple) cores, in both windings, and to minimize coupling the outer tuning position is used in each case. The band setting silvered mica capacitors are fitted in the can across each winding.

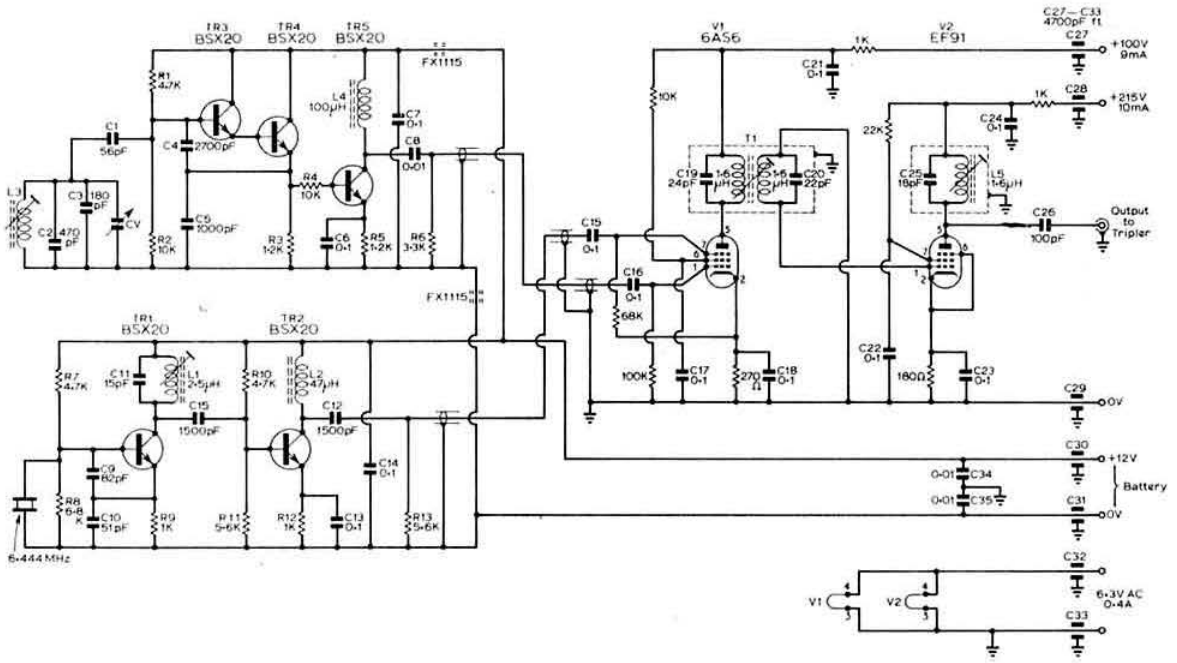


Fig 1. Circuit diagram. Capacitor C15 in suppressor grid of V1 should be C36. The value of L5 should be 1·5μH

Buffer amplifier

The output stage comprises an EF91 pentode, in normal configuration, with a close-fitting earthed screen across the valve base to prevent any tendency for self-oscillation. The secondary of the tuned transformer is coupled to the control grid, and a 100pF capacitor couples the tuned anode circuit to the control grid of the pentode section of the ECF82 stage in the transmitter. The input capacitance of this stage forms part of the tuning capacitance of the amplifier anode circuit.

Construction

The vfo is built into a die-cast box 4½in by 3½in by 1½in deep. The two oscillators are built on separate pieces of Veroboard, which together occupy half the lengthwise "floor" space of the box and are supported firmly by means of ⅜in 6BA spacers. The variable capacitor is wired on the oscillator board, and the shaft is taken through one end plate of the box and secured by the ¼in nut. Single-point earthing is employed on each oscillator.

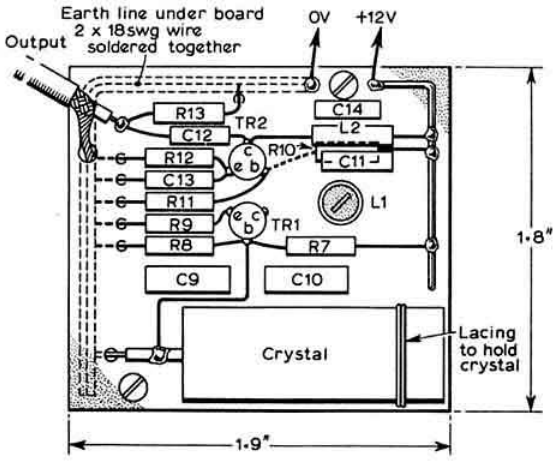


Fig 2. Crystal oscillator layout

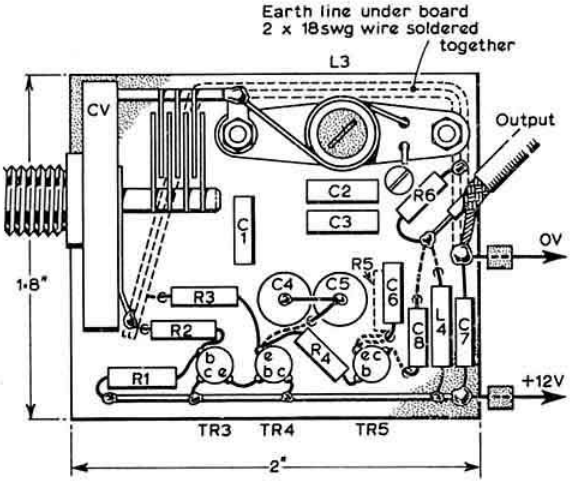


Fig 3. Variable frequency oscillator layout

C

All the supplies are taken through 4,700pF screw-in feedthrough capacitors to prevent ingress of uhf energy, and the heater and ht returns are connected to the chassis inside the box. All transistors are mounted on Harwin pins.

Alignment

Check by means of a receiver or gdo that the two oscillators are operating at their correct frequencies and then remove the oscillator ht. Simulate the input capacitance of the 24–72MHz tripler by means of a suitable capacitor (5pF) across the anode circuit of V2. Apply the output from a signal generator tuned to 24MHz to the control grid of V1 and peak the tuned transformer and output tuned circuits.

Couple the variable oscillator output to the control grid of V1 and the crystal oscillator output to the suppressor grid. Switch on the supplies and check that a clean output at 24MHz is present at the output coaxial socket.

Note. Do not forget to remove the external capacitor across the output circuit before coupling into the tripler stage.

Results

Measurements were made using a frequency counter and spectrum analyser over a period of several hours continuous operation. In order to produce worst case conditions of heating, the oscillator box was completely covered by a layer of cloth.

Results were obtained as follows:

Frequency range—24·006–24·070MHz (for 15pF capacitor swing).

Output level—25·5V rms, flat to 1dB over frequency range.

Harmonics—second, 46dB down on fundamental; third, 56dB down on fundamental.

Spurious output (fo+400kHz)—76dB down on fundamental.

Frequency stability—measured from 15 minutes after switch on:

(a) For oscillator ht change of 1V, frequency change = 100Hz (ie 1·8kHz at 432MHz).

(b) Frequency/time characteristic for worst case conditions: box temperature rise 25°C above ambient. Frequency shift = +162Hz in 190 minutes (ie +2·916kHz at 432MHz). This is shown graphically in Fig 4.

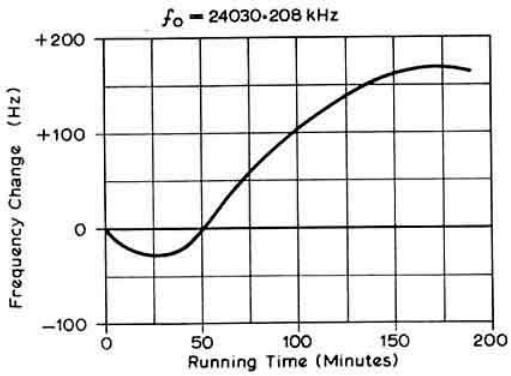


Fig 4. Frequency change/time

It is recommended that the oscillator supply, 12V at 25mA, should be derived either from a battery (with 400μF across the terminals to reduce the internal impedance) or from a highly stable fullwave bridge supply. Ripple voltage of 10mV p-p is sufficient to cause a T8 beat note due to incidental fm when listening on 432MHz!

Conclusion

Signal reports received during contacts made using this vfo have indicated that any drift on 70cm is minimal and that no retuning has been necessary at the receiving end at the restart of an over. No difficulty has been experienced at the receiving station during the several 23cm contacts made since this vfo has been in operation.

Components list

TR1, TR2, TR3, TR4, TR5—BSX20.
V1—6AS6.
V2—EF91.

Capacitors

C1—56pF silvered mica, J & M or LEMCO, ±1pF.
C2—470pF ceramic Erie style AD, N750.
C3—180pF silvered mica, J & M or LEMCO, ±1pF.
C4—2·7nF, C5—1·0nF } Polystyrene, Mullard C.295.
CV—15pF swing, air-spaced.
C6, C7, C13, C14, C16, C17, C18, C21, C22, C23, C24, C36 } 0·1μF Foil type, Mullard C.280.
C8—10nF, Hi-K ceramic. FEC.
C12, C15—1·5nF, Hi-K ceramic. FEC.
C9—82pF, C10—51pF, C11—15pF, C19—24pF, C20—22pF, C25—18pF, C26—100pF } Silvered mica, J & M or LEMCO ±1pF.
C27, C28, C29, C30, C31, C32, C33—4,700pF screw-in feedthrough.
C34, C35—2 by 4,700pF ceramic discs in parallel.

Inductors

L1—2·5μH, 23 turns of 36swg enamelled "F", closewound on ⅜in diam former with core.
L2—47μH, Painton C11. RF choke.
L3—1μH, 11½ turns of 22swg closewound on Aladdin F804 former with core.
L4—100μH, Painton C12. RF choke.
L5—1·5μH, 14 turns of 22swg enamelled "F", closewound on Aladdin small former.
T1—Primary 1·6μH, Secondary 1·6μH } 15 turns of 22swg enamelled "F", closewound on Aladdin long former. Spaced ⅜in between windings.

Resistors

All values are 0·25W 10 per cent types. Dubilier BTT, or Philips/Mullard CR25.
R1, R7, R10. } 4·7kΩ.
R2, R4, R16. } 10kΩ.
R3, R5—1·2kΩ.
R6—3·3kΩ.
R8—6·8kΩ.
R9, R12, R18, R21 } 1kΩ.
R11, R13—5·6kΩ.
R14—68kΩ.
R15—100kΩ.
R17—270Ω.
R19—22kΩ.
R20—180Ω.

Notes on the Trio 9R-59DE

by PETER RICHARDSON, A6658

WHEN reviewing a piece of communications equipment, it is often difficult to decide on the emphasis that the article should take. This review sets out mainly to give a general impression of the Trio 9R–59DE.

General appearance

The receiver comes complete with box and a well-laid-out and informative handbook. It weighs 18·8lb and measures 7in high by 15in wide by 10in deep. The front panel has a smart plastic-on-metal finish, and the case consists of perforated metal on three faces, providing good ventilation while giving reasonable protection from dust.

Controls on the front panel are conveniently spaced. They consist of: USB/LSB variable sideband selector, function (OFF, AM, AM–ANL, SEND, SSB–CW), main tuning and bandspread, band selector, rf gain, af gain, and aerial trim. The S meter is large and easy to read—in this respect differing from that of its elder brother the JR–500SE. The tuning drive, although light, is very easy to use, and backlash is non-existent. Calibrated electrical bandspread is provided on the 80, 40, 20, 15 and 10m bands.

As well as a headphone socket, there is a choice of loudspeaker output—4 or 8Ω. Facilities for remote control operation with the TX–88D, SM–5D or similar transmitter are also provided. The receiver can be operated on 115/240V ac (50/60Hz), and a blocked switch at the back of the receiver selects the required voltage.

On-the-air performance

The first noticeable feature of operation is the considerable warm-up drift. This continues up to 15min after switch-on, necessitating continual correction on ssb and cw signals. The drift is from hf to lf. However, after this initial period, operation gradually becomes stable and drift is negligible even when switching from SEND to SSB–CW on the function switch. The claimed sensitivity is less than 6dB (for 10dB s/n ratio) on the 550–1,600kHz, 1·6–4·8MHz, 4·8–14·5MHz bands, and less than 18dB on the 10·5–30MHz band. The receiver also has good selectivity, which is very useful on the crowded 14MHz band at night, when trying to sort out the dx from the EU QRM.

In terms of reception of actual signals, the results are extremely encouraging:

3·5MHz: PY1BHW (56, 2200), ZS1MH (56, 2200), 5Z4KL (54, 2000).
7MHz: LU7AAC (57, 2200), PY7BIH (58, 2200), PY0AD (58, 2200).
14MHz: HP8C (58, 0900), KH6IJ (57, 1000), K6UNT/KL7 (58, 1100).
21MHz: 9Q5, ZS, 9J2, CR6–7, KH6, KR6, etc. 58–9.
28MHz: 9J2DT (59, 1000), ZSs, CR6s 57–8.

It must be remembered that these signals were received during the summer months—17 July to 6 August, to be precise.

The automatic noise limiter functions only fairly well, although it is useful when listening to 160m a.m. phone stations. However, on some stations it has the extraordinary effect of distorting them slightly—the only "oddie" observed in the receiver's performance. The S meter gives only a rough guide to signal strength, over-estimating slightly on the 3·5, 7, and 14MHz bands, but severely under-estimating on the 21 and 28MHz bands.

Accessories

Available with the 9R–59DE are the SP–5D speaker and the HS–4 headphones. A voltage regulator tube and a calibrator circuit may be added to the receiver.

Summary

At its price*, the Trio 9R–59DE is a very good all-purpose receiver, although primarily intended for amateur use. It compares extremely favourably with the Trio JR–500SE (more expensive), which the author had the pleasure to operate for a short time, and he is extremely satisfied with it.

*When purchased in mid-summer 1970, the author's set cost £42 from G. W. Smith & Co Ltd, the SP-5D speaker was £4 7s and the HS-4 headphones were £5 19s 6d or £3 15s if purchased with the set.

BOOK REVIEW

Single Sideband for the Radio Amateur (Fifth edition: 1970). Published by the ARRL. 255 pages in *QST* format, with 287 illustrations. Obtainable from RSGB Publications, 35 Doughty Street, London WC1N 2AE. Price 37s, postage paid.

Previous editions of this well-known digest of authoritative articles on amateur single sideband have been welcomed as helpful in a subject which is not really very easy for non-technical people. The present edition carries 60 per cent of new material, and a great deal of it is concerned with solid-state devices.

The articles fall into nine groups: principles, exciters, transceivers, linear amplifiers, amplifier construction, adjustment and testing, receivers, vhf techniques, and accessories.

There are 31 practical construction projects, ranging from an easy-to-build electronic T-R aerial switch with a gain of 20dB on all bands, with low or no tvi potentialities, to a sophisticated, totally solid-state, amateur bands receiver. Though this receiver has single conversion, it is said to have the stability and bandspread advantages of a dual- or triple-conversion receiver having a crystal-controlled first oscillator and a tunable first i.f. This is the result of using a frequency-synthesis technique in the high-frequency oscillator which is phase-locked to a lower-frequency linear master oscillator. Another interesting receiver, described in experimental form, is a direct-conversion type for 14MHz, and there is a very useful article on solid-state product detectors.

Adjustment and testing is well covered in a simple but attractively practical way in five articles, and perhaps a careful study of this section would, if translated into action, result in a great improvement in the practice of amateur ssb.

There are four very sound articles on the principles of linear amplifiers, and six articles on amplifier construction: one of these is for a GG amplifier for 200W, but the others are for high power.

The largest section of the book, 48 pages, is devoted to transceivers, and carries eight articles . . . one of these describes a transceiving converter for "160". It is a three-valve set and produces an input power of about 35W p.e.p.

Phasing and crystal-filter ssb exciters are well covered and an appendix gives linear-amplifier valve-operation data for many types of valves.

This well-produced book is strongly recommended, especially to those who appreciate sound technical treatment with a minimum of mathematics.

T.P.A.

TECHNICAL TOPICS

A monthly feature by PAT HAWKER, G3VA

IN another place (*A Guide to Amateur Radio*) we are on record as pointing out that the future progress of amateur radio lies in the hands of those who shortly will be sending their first CQ calls and experiencing the thrill of hearing their brand new G4—or G8—calls repeated back to them from afar. But what, one wonders, will these newcomers make of amateur radio? Will amateur operating privileges increasingly come to be taken for granted, with licences the means whereby the holders join a "club" in which the aims and activities seem to be polarizing more and more towards enjoyable, but basically often rather pointless dx-chasing or local "nattering"; a world of dxpeditions and QSL managers, "cliques", commercial rigs or (for the daring do-it-yourself-types) kit assembly, all with occasional seven-day-wonders to keep the hobby in the news media.

If indeed this alone were to be the future, then it would represent a depressing prospect. For eventually there would be no more unlikely islands to be briefly invaded; no more weekends left to fill with contests; no more combinations on which to base awards and certificates; no more interest in buying expensive black boxes that might just as well be colour television sets for all the personal involvement they represent; no more wish to pay the "ransom" of international reply-coupons increasingly demanded for the extraction of rare QSL cards; no more pleasure in fleeting contacts on bands from which procedural disciplines and normal courtesies may well have vanished.

Fortunately, these pessimistic forebodings are almost certainly painted (deliberately) in over-black terms. But one must recognize that our bands today do contain at least some elements of all these nightmares. The tragedy—and this is something that may not be appreciated by newcomers—is that all these activities have been introduced in good faith over the years by enthusiasts as useful adjuncts to a hobby solidly based on a genuine interest in radio communication. And many of these peripheral activities are still entirely laudable—but only for so long as we recognize that the real heart of the amateur service is the possibility of carrying out technical investigations and self-training. This does not mean that we need to take ourselves and our hobby too seriously, but rather is it a plea that the more dubious elements of current amateur practice should not be allowed to undermine the basic elements of what remains a unique hobby. If we make everything too packaged, too commercial, too entertaining, too price-tagged, too easy—then in the end the new generations of amateurs will find themselves left with an ichabod: a purely frivolous and unsatisfying hobby.

All of us, newcomers and old-timers, should surely be concerned to treat "the amateur service" as something worthy of respect; working for the preservation of its best features and its further development. We might, for example, begin a useful clean-up of some of the operating malpractices to be heard almost any day on the bands, trying to bring influence to bear on the amateurs of those countries which seem to disregard the unwritten laws of amateur operating. And follow this up by ensuring that our own activities, at least for some part of the time, remain in accordance with the fundamental aim of advancing the art of radio communication—not as a pompous claim but in so far as this falls within the scope of amateur enthusiasts.

K2QBW multi-band vertical

Many times in *TT*, the point has been made that while it is extremely helpful to know the theoretically ideal way of doings things, in amateur practice what is often needed is a working compromise that provides acceptable results. Particularly is this true of aerials where most of us are usually faced with the problem of choosing an aerial to fit a far from ideal site, rather than being able to seek out a site which would be capable of giving the optimum results.

A couple of years ago (*CQ*, October 1968) in W2AEF's *Q & A* column, Raphael Soifer, K2QBW, provided some details of an ingeniously simple multi-band vertical. It was made clear that the aerial was not proposed to replace, for example, a ground-mounted vertical system using two dozen radials under irrigated peat moss, but rather "because it does work and takes up virtually no space". Basically, the idea is to operate a trap-vertical (in K2QBW's case a three-band Hy-Gain 12AVQ) against a series of downward vertical monopoles. In effect, it is a combination of the "paralleled dipoles" technique and trapped quarter-wave verticals.

K2QBW's interest was sufficiently aroused by the discussion on the vertical-tee and bobtail type verticals (*TT*, July 1970) to feel that readers would be interested in his arrangement—and his reasoning behind its adoption. In fact, these views have relevance well beyond the question of this particular system, and seem well worth quoting in some detail. He writes:

"There has persisted for many years a canard about the $\frac{1}{2}\lambda$ vertical radiator operated at some distance above ground and without a ground connection. This maintains that such an aerial will never function properly owing to cancellation effects stemming from ground reflection. Having operated a special version of such an aerial since March 1968, I am convinced that this statement must have been originally perpetrated by someone living entirely in a world of perfectly reflecting grounds and unobstructed terrain. Although there are, of course, several qualifications, such an aerial can be a very practical dx-chaser under many unfavourable conditions.

"Operating independently of an earth system means that one must pay a price in efficiency owing to absorption effects. Depending upon the particular location, P. H. Lee, W3JM, ("Vertical antennas part XI" *CQ*, April 1969) estimates that between 40 and 80 per cent of the radiated energy from such

an aerial is so lost. Putting this another way, the radiation resistance of a $\frac{1}{2}\lambda$ radiator may be taken as 73Ω, and taking these efficiency ratings in the form of effective earth resistance, the earth resistance exhibited by this "non-ground" ranges from 45Ω (60 per cent efficiency) to about 285Ω (20 per cent efficiency).

"These figures are obviously discouraging when compared with an extensive earth system. However, they are not at all discouraging when compared with the so-called "grounds" which many amateurs actually use. For example, Ray Hills, G3HRH, ("The ground beneath us", *RSGB Bulletin*, June 1966) observes that the common "ground plane" ($\frac{1}{4}\lambda$ radiator plus four $\frac{1}{4}\lambda$ horizontal radials) often exhibits an effective earth resistance of 100Ω. When the radiation resistance of 35Ω is taken into account, the resulting efficiency is only about 27 per cent! Where a simple ground rod is substituted for the four radials, the earth resistance often reaches 200Ω, only 13½ per cent efficiency!

"The K2QBW antenna consists of a three-band trap vertical for 28, 21 and 14MHz, operated against a series of downward vertical monopoles, one for each band and each $\frac{1}{4}\lambda$ long. These are cut from four-conductor rotor cable as indicated in Fig 1. The aerial is centre fed with 52Ω coaxial cable, and is mounted on a 10ft mast above the chimney. The centre-point of the $\frac{1}{2}\lambda$ radiator is thus always about 40ft above ground, regardless of band.

"In preparing the aerial, the rotor cable is shorted together at the top and fastened (soldered) to the usual ground terminal of the 12AVQ. Each conductor is cut to a $\frac{1}{4}\lambda$ at one of the bands covered by the aerial, so that a series of parallel monopoles are formed. The cable thus prepared is run straight down the mast and chimney supporting the 12AVQ, using stand-off insulators. Both balanced and unbalanced feed has been tried, the better results being obtained with unbalanced feed, the centre conductor going to the trap vertical and the braid to the lower paralleled monopoles.

"This aerial naturally exhibits a current loop at the feed point. The fact that this is quite high above surrounding obstructions in my opinion gives this aerial a major advantage over a ground-mounted vertical, whose lower-angle radiation is often shielded by buildings, hills or other obstructions. Typically, at K2QBW, this relative freedom of the high-mounted aerial from obstructions more than makes up for the probable loss of radiation below about 10° resulting from the absence of an extensive ground system. Better a good lobe at 20° than a beautiful lobe at 5° elevation smack into a steel building!

"Although it could be argued that a horizontal dipole with the same feed-point height would give a lower radiation angle, this presupposes that a site is available with fairly uniformly level ground over the aerial's length. Again, in urban areas, often not realized in practice. In my own case, I have not even the room for a dipole, let alone the unobstructed site!

"Experience since March 1968 suggests this aerial to be a consistent dx performer. Well over 200 countries have been worked, including all 40 WAZ zones, BCRTA and DUF-4 certificates using a Collins KWM-2 running 180W cw and 200W p.e.p. ssb. Although performance may well not have been that of a grounded vertical above salt water or a four-element quad up 100ft, it has certainly succeeded in putting a workable signal into every area of the world from an otherwise difficult site."

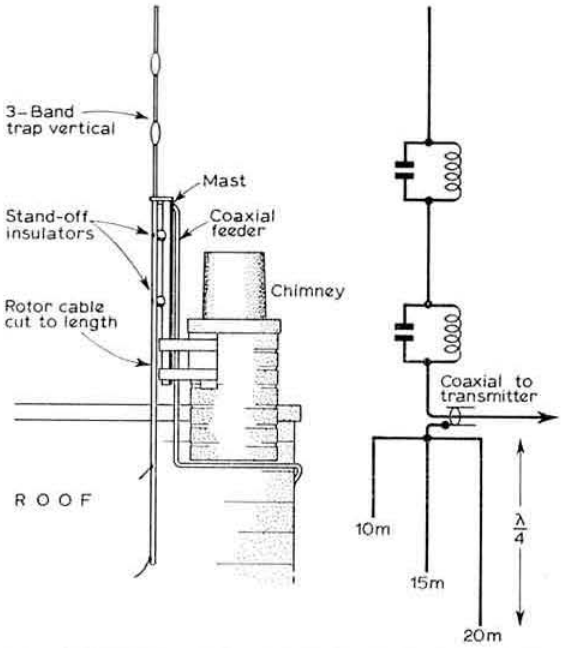


Fig 1. The K2QBW multi-band vertical using a trap vertical in conjunction with parallel monopoles

Base-fed verticals

My own experiences with the simple vertical-tee have similarly convinced me that these various forms of $\frac{1}{4}\lambda$ verticals, raised ground-planes and the like can be extremely useful in overcoming site problems, despite the theoretical advantages of base-fed and elevated-feed verticals (see *ART* 2 & 3). However, for those blessed with suitable sites and space for good ground systems, interest will not unnaturally be directed towards the base-fed vertical.

A recent two-part article on this subject has appeared in *QST* (August/September, 1970) by Dr Yardley Beers, W0JF (who, if my memory serves me right, used to contribute occasional notes on the American amateur scene in the "Bull" over 35 years ago). In discussing short vertical aerials for the lower frequencies, he points out: "Experiments suggest that it is more important to have a large number of short radials than a smaller number of resonant ones." In practice, for near-ideal low-angle radiation, it is necessary for the earth screen to extend, in the target sector, out to almost 15λ—though few hf amateurs could hope to achieve such a massive system. However, W0JF also includes in his article a useful summary of matching techniques for single-band operation of base-fed verticals of various lengths. Fig 2 will serve as a reminder.

Loft loop aerial

Some time ago (*TT*, July 1968 and *ART* 3, p 180) we noted the "G2PL Special" which was virtually a quad aerial turned over on its side resting just above ground. This possibility of using a full-wave loop (ie as in the basic quad) as a loft aerial was mentioned briefly by GM4QK in his recent survey (*Radio Communication*, October 1970), and turns up again, in

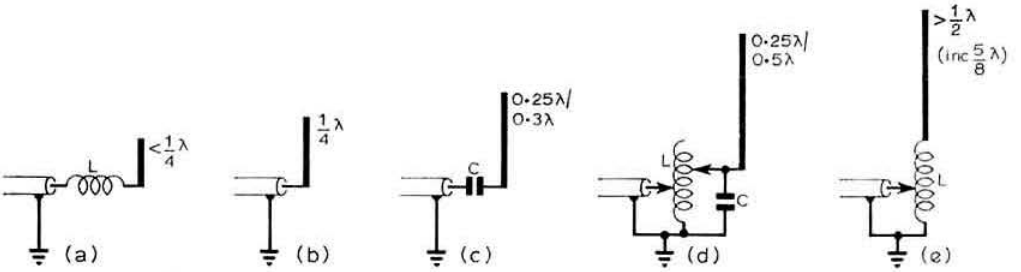


Fig 2. A summary of matching techniques for single-band base-fed verticals as suggested by W0JF. In the case of (d) and (e) these networks can be used with shorter aerials than those indicated where it is intended to match resistance as well as reactance

rather more detail, in *CQ* (September, 1970) by Malcolm Bibby, GW3NJY/W8, as "an efficient multiband loop antenna". He notes that if one takes one quad-type element, turns it horizontally, fed at the mid-point of one side with coaxial cable then this produces a simple aerial with "real and effective gain over a dipole". The aerial is horizontally polarized and GW3NJY/W8 manages to squeeze a 33ft by 33ft element into his roof space, fed with RG58/U coaxial cable, and this has provided him with many useful dx contacts on 7MHz. He provides detailed polar diagrams but, as someone who has occasionally made use of loft aerials, I would agree with GM4QK's remark that "directivity is largely determined by the house structure and not by the radiating system". However, since working a BV1 station, and some other useful dx, with a loft dipole, I have not been inclined to scoff at indoor transmitting aerials. But the GW3NJY work further implies that the full-wave loop and the "G2PL Special" are useful aerials to try either indoors or outside.

Sites—how much do they differ?

Earlier notes on radiation angles, and how really low-angle radiation can be achieved only in favourable circumstances, provoked John Goodacre, G6GO, to pose some pretty deep questions—many of them probably unanswerable with the present state of knowledge. For G6GO notes, as many others have done, the considerable differences in dx contacts from different sites. Some of these differences can be explained in terms of ground conductivity, site height, local screening, height of aerials, operating expertise and the like. But even when all these factors have been taken into account, there still tend to be curious differences in results. Old "X" up the road may consistently work Japan on 7MHz yet seldom hear Australian stations—whereas "Y" may find the reverse. Then there is the operator who finds he can easily pull in certain stations on a simple mobile whip aerial which can be worked only with difficulty from the home location. And there seem to be conditions (as suggested by some amateurs in the 'thirties) when high-angle radiation appears to do better than low-angle signals. Some of the professional research projects by Villard, Utlaut, Epstein, Stein and others have taken away some of the mysteries from this subject, but most of these are based on statistical investigations which tend to disregard the occasional way-out conditions and do not rule out the possibility of further unexpected discoveries yet to come. Those with most experience of hf or vhf bands tend to be the least dogmatic, and to become less and less certain that anyone really understands all the modes of propagation of electromagnetic waves.

It is also true that electrical noise levels at different sites tend to be more varied than many realize. Urban pollution of the spectrum spreads out many miles to sites which the owners may think to be well removed from sources of electrical interference. Some recent measurements (noise in decibels relative to 1μV/m in bandwidth of 1kHz at 5MHz) in Australia may not be at all typical of the UK but do underline the problem. They show a difference of well over 20dB in noise levels; ranging from −24dB at a naval communications station to −42dB in a quiet site some 15 to 17km from Darwin, and −46dB in a really isolated site at Tumbling Waters. It is also noted that where a number of high-power transmitters operate in close proximity there are likely to be many hundreds of intermodulation products of the order of 1μV, sufficient in some cases to have the appearance of a high noise level distributed throughout a large part of the hf spectrum. I remember G6CJ pointing out that when he was working from Stoke Poges, a beam aerial could readily identify the "noise" represented by electrical interference originating some miles away in Slough. So this factor can make quite a difference in sites—but there are probably still other differences that have not yet been pinned down.

Solid-state superhet ideas

Last month we surveyed some ideas for the development of direct-conversion receivers. It is thus only fair to point out this month that recent developments allow the building of good superhets without undue complexity. This is particularly true of receivers using integrated circuits to provide most of the gain, while retaining FETs and dual-gate FETs for the front-ends and some other purposes. A good example of this type of approach can be found in *QST* (September, 1970) where Gilbert Addis, W2NH, describes a receiver developed primarily for cw contest operation (but suitable also for ssb) using only five transistors (plus another one as a voltage-variable-capacitance diode) and two integrated circuits. This is a single-conversion model, i.f. 4·5MHz with two-crystal half-lattice filter, using two bipolar transistors as Vackar hf and bfo oscillators. A dual-gate 3N140 rf amplifier, 3N140 mixer with 2N1177 hf oscillator is followed by the crystal filter and then a CA3020 i.f. amplifier, 3N140 product detector with 2N1177 bfo and CA3020 af amplifier. The whole receiver takes about 67mA at 12V. Plug-in coil packs mounted on printed circuit boards are used to simplify the tuned circuit department. Remote tuning of the bfo for cw and ssb reception is accomplished by varactor (voltage variable capacitance) techniques using the collector-base

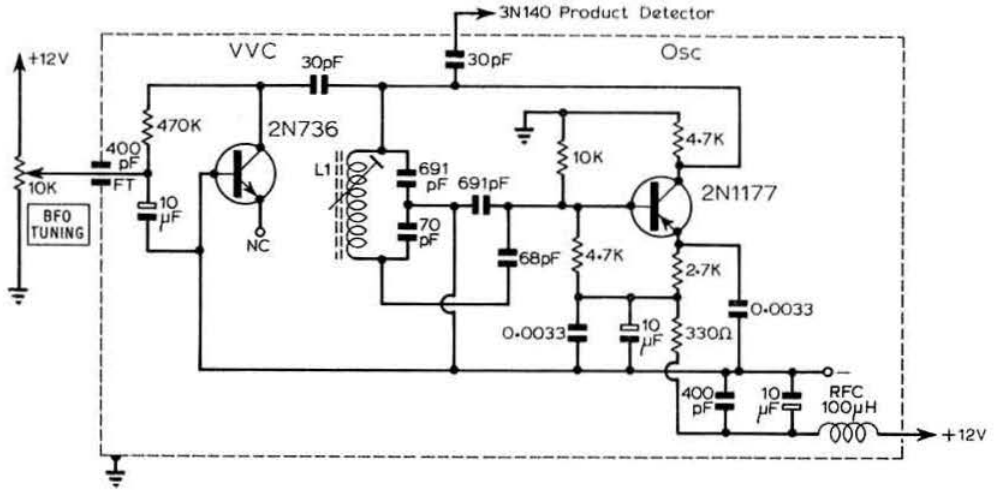


Fig 3. The bfo arrangements used on the W2NH solid-state contest receiver. L1 is a toroid 9·5 to 10·5µH, 45 turns for an intermediate frequency of 4·5-MHz

junction of a 2N736 silicon transistor: Fig 3. This allows the bfo to be tuned from the front panel with dc only leads, yet the shielded bfo can be placed close to the product detector, and connected to it by a short coaxial lead. The 2N736 provides a capacitance change more than required for the 4·5MHz bfo, so a 2pF capacitor is connected in series with the diode to provide an effective capacitance change of about 0·5pF.

Another useful looking idea used in the construction of this receiver could well have other applications: this is a method of achieving up to about 10 per cent inductance variation with toroid cores as shown in Fig 4.

Two-stub notch filters for tvi

Barry Priestley, G3JGO, has sent along some useful information on a technique which appears to offer an extremely effective means of producing filters providing a deep notch at a specific frequency. This system is an extension of the established use of single coaxial stubs, but using two stubs. Information on this technique, published in the Swiss journal *Old Man* was passed to G3JGO by Geoff Stone, G3FZL, and translated by J. H. Hill, G3JIP, who carried out a number of tests which confirmed the original claims; these results were subsequently confirmed by G3JGO and R. K. Hemmings, G3VCT. About this time, further information was provided by W. Burton, G8ANQ, in this case using short-circuited half-wave stubs rather than the open-circuited quarter-wave versions; he showed how the stubs could be "tuned" by using a pin to provide an easily variable short-circuiting device. Both versions are shown in Fig 5.

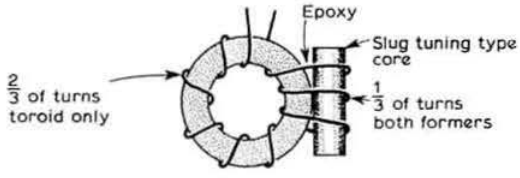


Fig 4. The tunable toroid technique used by W2NH in receiver construction. About 10 per cent variation in inductance can be obtained

As a result of all this combined effort, G3JGO draws the following conclusions on this promising technique: the notch can be made 70 to 80dB deep when using good-quality ¼in coaxial cable; this compares with roughly 30dB for a single stub. The notch is also narrower, as might be expected from the use of two high-Q circuits. The possibility of using three stubs in order to develop either a very narrow notch or alternatively using stagger-tuning to provide a shaped response curve also exists, although these ideas have not been tried. The spacing of the stubs is not critical—G8ANQ suggests 9in at 145MHz, but has used 3in successfully. The lengths of the stubs are very critical; unfortunately bench alignment with a signal generator (as described in the G3SL article mentioned below) is difficult due to pulling of the

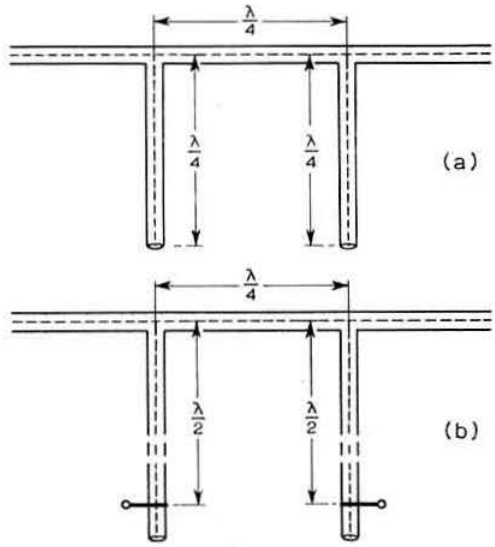


Fig 5. Two stub filters capable of providing a notch of about 70 or 80dB at centre frequency. (a) is the open-circuited quarter-wave stubs; (b) the G8ANQ version using short-circuited half-wave stubs with moveable "pin" short-circuiting device

generator. Capacitive tuning of open stubs, or the pin as a movable short circuit has proved useful.

G3JGO considers that there is no reason why the open circuit version should not be used on a transmitter to notch out, for example, transmitter harmonics in Band 1. This particular application has not been tried although it would seem a logical extension of the techniques discussed many years ago by T. N. Lloyd, G3SL, "Curing tvi with coaxial stubs" (*RSGB Bulletin*, March 1958). Either form of resonant stub could be used in various filter applications. The G3SL article provided a great deal of practical information on making and using single coaxial stubs designed around the characteristics of a number of standard cables. Typically he used 3ft 7in of Uniradio 70 (BICC T3022) cable having a velocity constant of 0·67 to form an open-circuited quarter-wave stub to attenuate 43MHz harmonic output of his transmitter; he suggested starting with about 5ft cable and snipping bits off until the notch was at 43MHz, using a signal generator and valve voltmeter alignment techniques.

RF power transistors and broadband amplifiers

Comments in recent *TT* may have indicated that some of us have reservations about the use, except for portable and mobile applications, of transistor power amplifiers. The low watts/£ ratio of these devices when compared with valves, the ease with which they can all too often be destroyed and some of their other foibles all tend to limit their value except for special applications and for experimentation, despite the many advantages of using transistors for other than the final stage. Nevertheless, it is only fair to report that progress continues to be made in this area and that many of the earlier problems are gradually being overcome.

Currently, commercially-available transistors are capable of providing *outputs* of up to about 80W at 144MHz and about 5W at 3,000MHz—and remember this is for *single* devices. At hf, modular blocks are available which can be combined to provide up to about a kilowatt output—though it will not be a cheap kilowatt!

Recently, important progress has been made in overcoming some of the difficult forms of parasitic reactances that often lead to device destruction. One recent technique is the development of *broadband integrated power amplifiers*. These are microelectronic units generally incorporating within the device package thin-film components deposited on ceramic or glass substrates; in some cases the resulting package is little bigger than a power transistor; in others the package is about the size and shape of an integrated circuit flat-pack.

Some indication of the capabilities and advantages of these broadband amplifiers was outlined in *Electronics Weekly* (October 28) in an "Aspect" article "RF transistor technology; doubling of frequency and power in the next five years", by A. E. Hilling (RCA). He suggests that "the broadband integrated amplifier concept, although in its infancy, undoubtedly indicates the area of future progress in rf transistors. As an example of current limits, he cites units delivering 16W output with 1dB variation from 225 to 400MHz with 50Ω input and output impedances.

One of the companies which have long specialised in the supply of advanced rf transistors in the UK is MCP Electronics Ltd (Station Wharf Works, Alperton, Wembley, Middlesex HA0 4BR) who market the TRW units. Terry Roeves, G3RKF, of MCP has recently sent along useful information on its new series of microelectronic broadband uhf amplifiers. These are the MX1·5, MX2·5 and MX7·5 which logically supply outputs of up to 1·5, 2·5 and 7·5W, respectively, over a number of uhf bands including 440–470 MHz. This output can be obtained with 12·6V rails, and with an extremely useful 21dB gain even the MX7·5 needs only 50mW drive. All are in flat packs 2·5in by 0·82in by 0·3in and have an efficiency of 40 per cent or better; they are stated to be stable under all conditions of supply voltage from 0 to 16V for a wide range of drive (eg MX7·5, 5 to 50mW) and have input and output impedances of 50Ω and harmonic content 30dB minimum below carrier.

In other words, these new broadband integrated amplifiers could form the basis of uhf transmitters of useful power rating and should avoid most of the problems we associate with transistor power amplification. There is (as you may have guessed) the snag of price, at present they are not cheap: the MX7·5 as a one-off unit currently retails at £37 10s—but then, semiconductor devices have a useful habit of coming down in price.

This is clearly a significant advance in semiconductor techniques, providing improved and more reproducible performance; the thin-film "lumped" components are only a small fraction of a wavelength long, helping to eliminate the problem of distributed reactances. Batch fabricated integrated amplifiers have already been reported for up to 20W output at uhf and 5W at 2·3GHz. The high gains possible mean that the designer can avoid the long succession of stages which tend to be needed with conventional discrete component transmitters.

G3RKF also draws attention to hf power transistors types 2N5707, 2N5708 and 2N5709; the 2N5707 for example is rated at 20W ssb and 30W cw output up to 30MHz, while the 2N5709 has a hefty 80W ssb and 100W cw rating. The company can supply circuit details of broadband hf linear amplifiers using these devices. It is also worth noting that G3RKF has published a most informative (and largely non-mathematical) article on "ensuring transistor stability in rf power amplifiers". This appears in the MCP journal *Electronics World* Vol 2, No 3 (do not confuse this with the American periodical of the same name). This issue, incidentally, contains a list of available rf application notes and circuit diagrams likely to be of interest to anyone seriously working in this field.

More on audio filters

There are several reasons for the increased interest recently in audio filters. One is the application to direct-conversion receivers; another is the desire of ssb transceiver operators to sharpen up selectivity for cw without the expense of inserting a narrow-band crystal filter. Several extremely simple arrangements are described in *Ham Radio* (October, 1970) based on the popular 88mH toroids which are often available at surplus prices. For example, J. Donator,

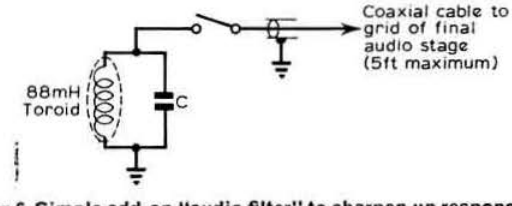


Fig 6 Simple add-on "audio filter" to sharpen up response for cw reception

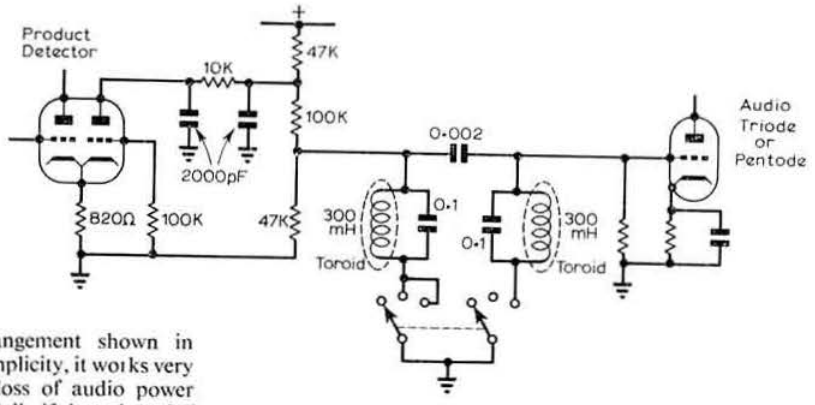


Fig 7. ZS6BT's audio filter arrangements using more than one resonant circuit

VE3BWD, commenting on the arrangement shown in Fig 6, says: "Don't be misled by the simplicity, it works very well." It results, of course, in some loss of audio power (in some cases up to about 20dB) especially if the value of C is increased beyond 0·5μF, but most receivers/transceivers usually have audio to spare. He lists the following value for C for approximate filter frequencies: 0·1μF 1,700Hz; 0·33μF 1,000Hz; 0·5μF 750Hz; 1μF 550Hz. In the same issue, E. Dusina, W4NVK, provides further information on filters based on 44mH and 88mH toroids, noting that frequency selection can easily be incorporated by switching between values of fixed capacitors. He also shows an idea which I have not seen described before—a sharply resonant filter provided by a resonant toroid with low-impedance input and output by winding about six turns in two coils on opposite sides of a non-potted toroid, over the existing windings.

It is worth emphasizing, once again, that optimum results can only be achieved from audio filters if all stages up to the filter are reasonably linear; for this reason their use with product detectors should prove more rewarding than with envelope detectors. And the operator who can tune his ears most effectively gains the least from an audio filter.

On this subject comes a further note from Ted Cook, ZS6BT, who contributed some comments on audio filters in 1969. He mentions that his receiver has remained unchanged for several months—"proof that I have at last solved *my* audio filter problem". A 50Hz nose, 15dB down 200Hz off, and an insertion *gain* of 15dB for full filter. The filter has three sections, with insertion gain uniformly progressive at 5dB per section. He uses L/C tuned circuits with ferrite toroids of 300mH wound with 24 gauge wire, and with dc resistance below 1Ω. In place of his former 3kHz peak (which was generally felt by other readers to be too high) he is now using about 1kHz. At 1,000Hz the inductive reactance is nearly 1,500Ω, and he claims his unloaded *Q* at more than 1,500.

With a three-stage valve af amplifier (6SN7/6K6) his original approach was to use three tuned grid circuits, but he soon found that where two adjacent grid circuits are so tuned, the result tends to be a tptg oscillator. For some time he used two tuned circuits: one in the first 6SN7 stage and another in the 6K6 grid; for most purposes he considers this more than adequate.

His definitive arrangement was intended partly to allow the use of three tuned circuits, but underlying this was a wish to be able to put two tuned circuits into receivers with only two audio stages; the end result allows the use of two circuits even when only a single audio stage is used. He uses the well-known *Radio Communication Handbook* twin-triode product detector and finds that he can now filter this output directly without any trace of instability. In his own arrangement he now has tuned circuits at the product detector output, first audio grid and output audio grid, with switching for none, one, two or three tuned circuits in use. Fig 7 is the simplified two-circuit arrangement. It is important to ensure that the toroids are resonant to exactly the same frequency, and this usually means some cut-and-try with the parallel capacitance (to about 0·0001μF using miniature 50V capacitors). Note the low coupling capacitance between the circuits.

Simple linear time-base

Sven Weber, G8ACC, passes along some interesting information about a very simple and extremely linear time-base using a uni-junction transistor in conjunction with a field effect transistor to form a combination of saw-tooth oscillator and current source in the timing circuit. There is little need for any detailed description other than a few notes on the timing capacitors. With an *Idss* (zero-gate-voltage drain current) of the current source fet of 3mA the frequency coverage is approximately from 25Hz to 30kHz in three ranges using 1μF, 0·1μF and 0·01μF capacitors. These capacitors, G8ACC points out, must have a high insulation resistance and this must not alter with varying voltage across them; this is the reason also for using a fet source follower rather than a bipolar emitter follower.

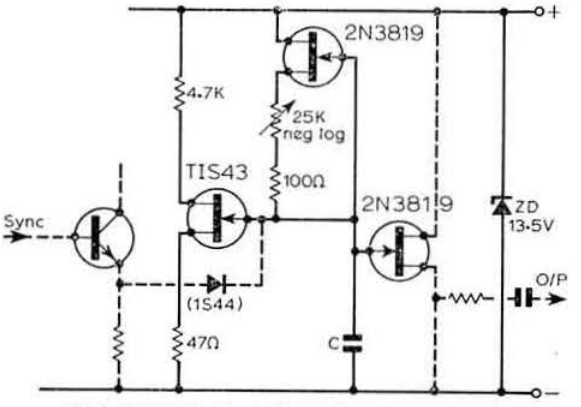


Fig 8. G8ACC's simple linear time-base generator

MICROWAVES–1,000MHz and up

by Dr D. S. EVANS, G3RPE*

A microwave survey

At the recent Radiocom 70 Exhibition, visitors were invited to complete a questionnaire detailing their microwave interests. For each of the amateur bands they were asked to indicate if they were operational, actively interested in the sense of building equipment, or just plain interested: if active, which modes, eg crystal-controlled or pulse, they employed. Space was also left for any other comments.

The objects of the exercise are obvious. There is without doubt much more microwave activity and latent interest than generally realized. An unfortunate consequence of this is that many amateurs are reluctant to build equipment only because they are unaware of other amateurs in a similar position in their locality. This is a real factor because of the restricted range of microwave equipment in general. The first objective, therefore, was to compile for publication a list of interested people. A second was to get an idea of the range of modes to use as a guide in planning articles: a third was to find people who could be persuaded to write such articles!

The results of the survey were both encouraging and interesting. The number of replies received was slightly dented by the efforts of an exhibition organizer who borrowed the "Are you interested in microwaves?" notice designed to attract attention to the questionnaire to sell vast quantities (no doubt) of the *VHF/UHF Manual*. Surprising features were the absence of replies from GW, GM and GI stations, completed questionnaires from PA0 and HB9, and the high proportion of early G8---s which reflects the thinking originally behind the Class B licences.

The bands of greatest interest were 23cm, 13cm and 3cm, in that order. Little activity on 9cm and 6cm was reported and QRM on 1·5cm is non-existent. In view of limitations on space, it does not appear worthwhile to detail the results for 23cm at this stage. There is sufficient information contained in contest reports and *Four Metres and Down* to enable both the general and local level of activity to be easily assessed. Operation on this band appears to be crystal-controlled entirely.

The geographical distribution of stations on 13cm and 3cm as known to the writer are given in Figs 1 and 2, stations being distinguished as either active (operational or building) or as just interested. Their concentration in the southern half of the country must surely be more a reflection of lack of information than lack of activity, and naturally the writer would welcome any news from other parts so that a more accurate picture can be given.

On 13cm the bulk of the equipment is crystal controlled, although the interest in pulse-modulated broad-band equipment is significant. On 3cm most equipment employs small klystrons or Gunn diodes modulated F2/A2 or F3/A3, although the value of pulse modulation has been shown by G3BNL/G3EEZ.

The activity on 9cm and 6cm seems to be limited to the latter two stations, although there are at least 20 people interested in getting on these bands.

In the comments section, the main points made were:

(*a*) The almost desperate need for design information in sufficient detail;
(*b*) references to suitable books for background information; and
(*c*) suppliers of microwave components (in particular waveguidery)—in amateur quantities and at amateur prices, of course.

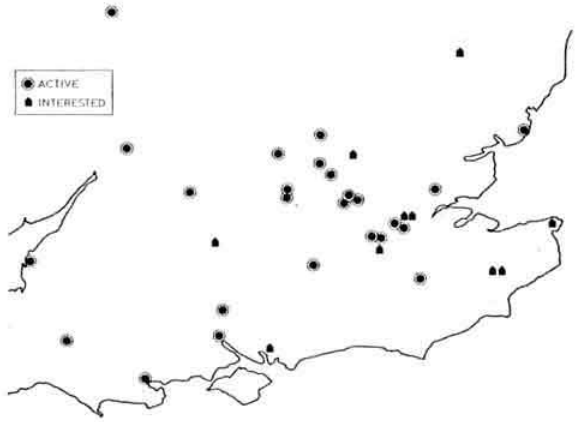


Fig 1. Current activity on 13cm

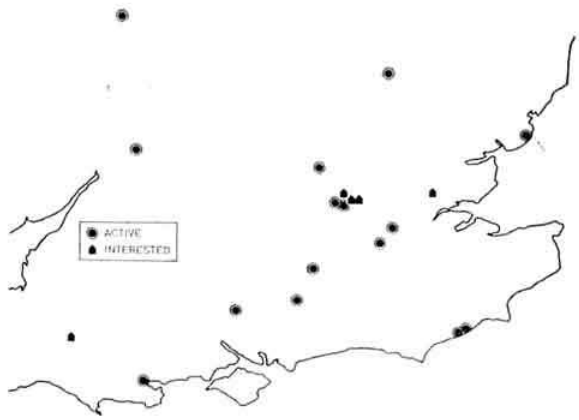


Fig 2. Current activity on 3cm

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

Microwave equipment review

There is, believe it or not, a great deal of information available on amateur microwave equipment. Much is tucked away in journals that are difficult to get hold of; some is very old but still relevant today. A lot is built into equipment now in use on the bands. Indeed, an estimate of the material potentially available for publication suggests that it would overload the pages allocated by even the most benevolent of editors.

Accepting the urgent need to get design information into print, the problem is how best to do this. Single full-length articles dealing with specific topics do not appear to be the answer: even at a rate of one per month, such articles would provide only a "bitty" picture.

Better results might be achieved by a series of review articles dealing with each of the microwave bands in turn. In addition to their intrinsic value as sources of references, such articles would form a background against which future developments could be judged. Each could consist of a number of sections, perhaps as follows:

(*a*) Introduction, giving the general characteristics of the band, a broad picture of the type of equipment necessary, the modes used, and the results to be expected;
(*b*) references to design information that is readily available;
(*c*) notes on equipment described in less accessible places;
(*d*) details of equipment currently being developed; and
(*e*) future trends.

Obviously this is a major undertaking, especially that for 23cm, but it would satisfy a long felt need. Equally obviously it cannot be done by a person working in isolation. The writer would like to hear of readers' reactions to this suggestion, and especially from those who could contribute information locked up in less familiar journals, and from those who are prepared to supply details of their equipment. All contributions will of course be duly acknowledged.

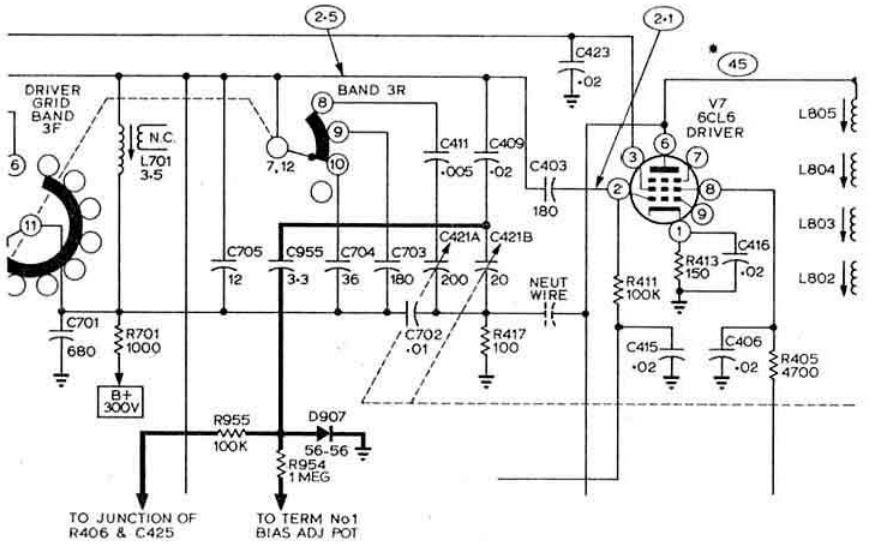
Modifications to the HW-100, SB-100 and SB-101

A circuit modification has been introduced by Heath (Gloucester) Ltd (Heathkit) for units of the above types. In these the anode tank circuit of V6, the second transmitter mixer, is used in the receive mode as the anode circuit of V10, rf amplifier. Due to valve Miller effects, additional capacitance is required when receiving to permit the driver preselector to peak at the same dial setting in both transmit and receive modes. The modification uses automatic diode switching to add the required compensating capacitance.

The method of operation is that a negative voltage is always applied to the anode of D907 from the *bias adjust* control through resistor R954. When receiving, a higher positive voltage is applied to the anode of D907 from the screen circuit of V11 through resistor R955. As its anode is now positive the diode conducts and acts as a closed switch to supply an earth to C955. This action places the capacitor in parallel with C421B and adds capacitance to the anode tuned circuit.

In the transmit mode the positive voltage is removed by the opening of contacts 3 and 11 of RL2. The remaining negative voltage prevents D907 from conducting and it consequently acts as an open switch, removing the earth from C955. The capacitance of C955 is therefore removed from the anode circuit of V6.

The circuit designations used are those of the original Heathkit manual. Modification kits model SBM-102-1 are obtainable from Heath (Gloucester) Ltd, Gloucester GL2 6EE, without charge.



Circuit diagram of the modification introduced by Heathkit for certain of their transceiver equipment

FOUR METRES AND DOWN

A monthly account of vhf activities and news compiled by JACK HUM, G5UM*

"Can you acknowledge receipt?"

It has been a good year for dx on the metre wavelengths. Majestic anticyclones enveloping much of western Europe produced the predictable extensions of range (the "warm weather effect") that bring joy to the amateur and dismay to the professional. In such conditions even the newer comers to 2m found that they could work quite quickly the requisite five-plus-thirty to gain them the RSGB Four Metres and Down Operating Award.

Getting the QSLs in seems not to have been such a problem during 1970 as it was in previous years. Not to send the other fellow an acknowledgment-of-QSO when you get his may be to deny him the chance to apply for the FMD Certificate: the fact is now widely appreciated, and cards have been flowing more freely than ever before.

For example, young Colin Baker of Brookmans Park in Hertfordshire (he is A5032) says: "I obtained the necessary QSL cards for the FMD claim within five months. By enclosing SAEs I secured an 87 per cent rate of return, and I wish to thank all the stations who co-operated."

* * *

Troponomalies were one of the dx producing media of 1970. Sporadic-E was another, and a less predictable one. It happened frequently on "Four," less so on two metres but with dramatic extensions of range well in excess of tropo when it did. To catch it means being in the radio room at the right time, which is nice for the retired gents but less possible for the rest.

Then there was meteor scatter. Watching the meteor shower predictions gives a clue when to try for super dx by this medium, but only if you are equipped with high power, high gain aerials and means for sending telegraphy at machine gun speed. In this context it is worth mentioning that almost every one of the contacts made by Jim Davidson, GM3UAG, to gain him the 4m award listed in the table was either by meteor scatter or Aurora. To most operators on "Four" he represents the ultimate in dx, readily workable as soon as notes go Tone A to indicate that Ar is imminent.

* * *

"It's tough at the top": let us give credit also to the members who have secured Senior FMD Awards during 1970. Comparison of the table printed this month with last February's shows A5032 (already mentioned) joining Ron Ham in the hitherto exclusive province of "144MHz Senior Receiving" (and "432MHz Receiving" as well, as it happens). In the transmitting brackets there are two new holders of the 70MHz Senior, eight for the 144 Senior and a couple for the 432MHz Senior. This last named is a specially hard nut to crack: proof of contact with nine countries and 40 counties is required.

One section which records "No change" is that for 1,296MHz. Here Bill Hawthorne continues to reign in solitary state as the only holder of the 23cm Award (three countries and 20 counties). Maybe some of the 23 centimetric portable operators who worked so much during the field days earlier this year will have the cards to show during 1971. These cards may well provide the opportunity to apply for the Supreme Award if two Seniors are already held, and to give G3MCS some company at the top of the tree.

* * *

Still higher than 23cm, the 13cm band now rates a Four Metres and Down Award. Work three countries and 15 counties on 2,304MHz and the claim may be made. This is not said lightly: there is a deal of activity on 13cm that may produce the requisite three-plus-fifteen during the course of portable expeditions next year.

As for the rules in general, a copy may be had by sending a large sae to G5UM. No sae is required with cards submitted: all are returned by recorded delivery.

* * *

Finally, a request or two to claimants from the vhf certificates manager and his yf-helper who assists with much of the checking:

Ensure that the address for the return of cards appears somewhere on the claim sheet, arrange cards and list in county order, not in callsign order; and check especially

"Mister VHF"

We called him "Mister VHF". In his own quiet way he stated the case for the metre wavelengths when their cause was not so well appreciated as it is today.

He was a pioneer in that pioneering organisation, the London UHF Group, prototype of similar fraternal gatherings now nation-wide. He conducted *Four Metres and Down* for many years. He operated a fine station from a poor Thames side location. He was a superb telegraphist.

Above all, he was a metre-wave internationalist, in office for years on end as Europe's IARU VHF Secretary, persona grata everywhere both for his command of languages and for his genial personality.

When death claimed G2AIW on 26 October the world above 50MHz lost a devoted protagonist. He will be long remembered—but especially and appropriately in his own West Middlesex town of Whitton, where our annual VHF Conventions are held. Next year's can hardly be the same without him. J.H.

* Houghton-on-the-Hill, Leicester LE7 9JJ.

that date of QSO and frequency appear on every card submitted. Obvious? It should be: but believe it or not, one famous expeditionary failed to state on QSLs sent out by the hundred *which band the team were working on.*

"Categories cannot be mixed" seems to be well enough known, and it is unusual for a claimant to submit a card for his /P activities among cards submitted for home station operation. But it still happens, probably quite accidentally, on occasion. So turn in one claim for the home station and a separate one for portable operation. Remember that G8LM is one station and G(C,D,I,M,W)8LM/P quite another.

Intermode contacts

From Hastings come some thoughtful comments from John Ridd, G8BQX, triggered off by last month's observations here about the desirability or otherwise for a.m. stations to call sideband stations on 145.41MHz. What are they to do if they want to work a sideband station who has been sending CQ repeatedly on the calling channel with no effect? The shortcomings of many sideband rigs that do not tune the entire 2m band mean that "if you want to work 'em you have to sit on 'em", as another operator remarked to us the other day.

G8BQX offers the reminder that 145·41 is a *calling* frequency. So whether one is equipped for sideband, a.m. or cw, why not, as 'BQX puts it, "call, make contact and then QSY into your own zone"?

Many members have remarked to us that to regard 145·41 as a sideband *operating* area rather than a *calling* channel is to segregate the ssb men in an undesirable way; surely, it is argued, they should be capable of moving anywhere within the two megs of 2m. Sideband men in turn assert that if they call an a.m. station on his own frequency he fails to understand what is happening, and the bfo is not switched on.

These considerations apply on "Two". On 70cm where ssb is rare they are not yet arguable. On "Four" an almost Elysian state of affairs prevails where a.m., cw and sidebanders mingle modes with the greatest of ease. If anyone wishes to hear how it really should be done, a couple of Sunday mornings listening on 4m will be salutary.

* * *

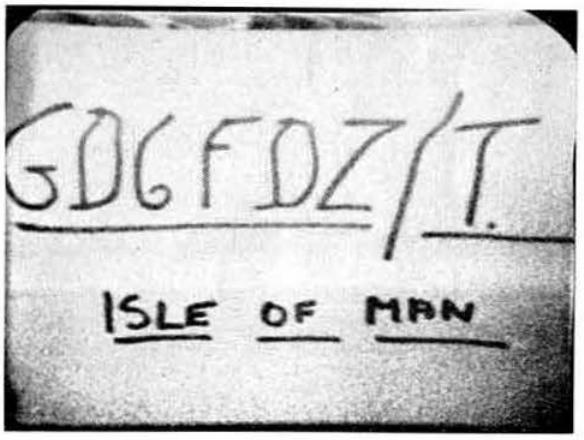
Just a final point from G8BQX: does sideband in practice have much advantage over a.m? "People don't realise that vhf signals drop out at about the same range in given conditions, no matter what mode is used," he declares. A suitable subject for debate at the next vhf group meeting!

"This is Seventy" (again)

Noting the enormous 432MHz signal coming out of G8BBY —and noting the ON4HN comments about it on this page last month—"seventy centimentalists" will be interested in knowing how it is done. The answer is by the use of a superbly engineered 150W transmitter (Cyril Hayward and his neighbour G8BTN of Daventry have built identical designs), p'us 108 elements of aerial up very high indeed.

During his first two months of operating with this equipment G8BBY notched no fewer than 275 contacts with UK stations, 59 outside, spread over eight countries and 35 counties. And another rebuild is almost finished!

The excellence of the signal which GW6JGA/T put across the 79 mile path to the Isle of Man to GD6FDZ/T is shown by this picture taken at the Laxey end of 'JGA himself in vision. At the Prestatyn end 'JGA photographed the GD6FDZ/T caption card at great clarity (picture below). This contact on 15 September was the believed first by video between the Isle of Man and Wales. (Full story last month).



Without any question, the informal 70cm contest organized by G8AWS and G8APZ properly caught the enthusiasm of the 70cm fraternity. "Yes, I'll be on tomorrow evening to work a few more for the log" was the sentiment to be heard expressed on the band throughout October and November. The great thing now is for this high level of occupancy to be sustained in the months ahead, which is not too much to expect now that so many operators have acquired the habit of taking a little look around the 432–434 area most mid-evenings.

Contest news

Somebody was heard in Italy on 2m during VHF National Field Day—but one cannot be sure whom! In a report received from Ir14732 (Italian equivalent of our BRS) a portable with a callsign something like G3MH with a /P suffix was heard at 1630gmt on Sunday 6 September at RS53 with QSB, believed working an EI portable, and giving

a ZM38 locator. Another job for "Jakey" : G3JKY has had this one passed to him to devil out from the pile of VHF NFD logsheets. If he succeeds he will bring happiness to Silvio of Turin.

* * *

Support for the G2WS criticisms of all-night contests (this page last time) comes from G3VNQ. Malcolm Pritchard makes the point that a contest for single-operator entries and lasting from 2200 to 0800 "puts an unreasonable strain on the majority of people by cutting across normal sleeping hours. Because of this a low entry is guaranteed, and anyone brave enough to enter is disappointed by the low activity . . . there are plenty of alternative times to hold a contest (how about weekday evenings, for instance?) which would not inconvenience most people."

Noting the great success of the short ssb Monday evening contests on "Two" he certainly has a point there.

* * *

The unique 144/432MHz contest for telegraphists over 7–8 November attracted a big entry on "Two" but predictably fewer on 70cm. The technique seemed to be to invite 2m communicants to QSY to "Seventy"—and it was surprising how many did not have 432MHz cw equipment to hand for a contest like this. Triple points were lost as a result. None-the-less, it is true to say that never before has there been so much cw activity on 70cm. The A1 first-ever on the two bands was certainly A One!

Spot markers

The widespread interest which already exists in the possibilities of transequatorial propagation will be sharpened by the news that SARL have just commissioned a 6m beacon on a 5,800ft point in the Transvaal. Quoting from the latest issue of the South African journal *Radio ZS*, G3LZN tells us that this beacon, using the call sign ZS6VHF, is on 50·10MHz and has a ground plane aerial system.

It seems to us that "our members along the Med," meaning particularly those in Gibraltar and Malta, who may be equipped with 6m converters stand a better chance than we in the UK do of hearing ZS6VHF. Reports of any reception will be greatly appreciated by the Highveld Branch of the SARL, PO Box 117, Edenvale, Transvaal, South Africa—with a copy to *Four Metres and Down* to tell us that it has happened, because from a scientific point of view it will be important if it does.

* * *

Nearer home, Ron Ham, BRS15744, gives praise to the GB3DM spot marker on 145·975MHz and 270 miles north of his Sussex site. Normally it is missing. At the after-dawn period of notably good dx it comes up to S8 if a barometric recession has just occurred. This point is always worth watching for: a high pressure system of itself does not invariably open up the vhf wavebands, but a droop in the barometer reading does. And the more distant RSGB beacons are reliable indicators of these phenomena.

* * *

Another 6m beacon is VE8YT on 50·098MHz located in 70N 67W and reported RST579 on 15 October by the ever-watchful TF3EA. The QRB is 1,200 miles. Thanks, G3CCH, for this news.

BEACON STATIONS

Callsign	Location	Nominal frequency	Emission	Aerial direction
GB3ANG	Angus	145·95MHz	A1	SSE
GB3CTC	Redruth, Cornwall	144·13MHz	A1	ENE
GB3DM	Burnhope, Co Durham	145·975MHz	F1	N/S
GB3GW	Swansea	144·25MHz	A1	ENE
GB3GM	Thurso	70·305MHz	A1	N/S
GB3GM	Thurso	145·995MHz	A1	N/S
GB3GEC	W. London	433·45MHz	F1	N/W
GB3SC	Sutton Coldfield	433·50MHz	F1	N/S
GB3SU	Sheffield (temporary location)	70·695MHz	A1/F1*	Omni
GB3SX	Crowborough Sussex	28·185MHz	A1	E/Omni
GB3SX	Crowborough	70·699MHz	A1	Omni
GB3VHF	Wrotham, Kent	144·500MHz	F1	NW

* Callsign on F1 continuously, on A1 once a minute. When on A1, F1 is suppressed

Extra-terrestrial

December is traditionally the month when members equipped for meteor scatter propagation look forward to the biggest bonus of the year. The Geminids, due to appear 9–14 December, give a count per hour of 70, which is the best of any of the eight which may be expected to give a radio return during the course of a year. They may well be visible between 1930 and 0930gmt around the peak dates of 12–13 December.

Geminids transit times are: north to south, 2000–2100gmt and 0500–0600; NW–SE, 0300–0500; SW–NE, 2100–2300. These are optimum for a range of 750 miles—but to work that order of dx on 2m or 4m will demand plenty of erp, telegraphy expertise, and patience.

Later in December the Ursids occur on 20–22 December, and despite an anticipated poor return (the count is only 13) might produce some scatter signals between 0200 and 1400gmt.

Although the Orionids on 19–24 October offer only 30 per hour, Ron Ham, BRS15744, observing the fm station at Gdansk in our 4m band recorded pings as high as 550 per hour on 21 October. And as for his regular monitoring of solar activity via vhf, he remarks: "The October sun was hidden by cloud for a large part of the month, but on 136MHz it shone very brightly on 24 out of the 31 days."

A fascinating side effect of these daily plottings of solar noise is that as the sun passes through the beam of the fixed aerial system at Storrington, it outlines the latter's polar diagram on the chart.

"Bonny Dundee . . ."

The reputation of the Scottish VHF Conventions of earlier years is enough to ensure the success of subsequent ones. Even so, the organizers must always harbour a few reservations on the size of the attendance likely to result when so many members have so far to travel over the vast area between Muckle Flugga and Gretna Green—and there are RSGB members quite close to both of those spots.

To have 112 people crowding into the lecture room at the Queen's Hotel, Dundee, on 11 October was its own reward to the organizers of this year's Scottish VHF Convention, and at the same time a significant indication of the enthusi-

asm for vhf which exists in GM-land. Among the dx present were G3FZL from London, G3BA from the Birmingham area and EI6AS, who had done the arduous drive from Dublin via the Irish Sea car ferry in order to be there.

There was great variety in the lecture programme. The Society's vhf manager, G3FZL, billed to talk on "The latest developments at vhf" painted on a broad politico-technical canvas, and also discussed nbfm techniques in detail. GM3HAT and GM3AEL were heard on the very different but inter-related subjects of "Transistor design for vhf cascode amplifiers" and "Space flight communications".

Finding something to occupy the womenfolk was not difficult: Dundee has a fine new Ninewells Hospital (it cost £28 million), and the afternoon was too short to show the ladies all of the magnificent equipment and facilities which have been provided there.

That evening 96 people sat down to dinner. The big moment was the presentation by G3FZL of the coveted Jock Kyle Trophy to GM3UAG, a well deserved award for Jim Davidson's consistent 4m dx work from way up in Banffshire. The next big moment was a long drawn out one: the suspense of wondering if *your* callsign would come up in the raffle.

As always, there were not enough man-hours to go round. As late as 11pm, long after the dinner had finished, a technical dissertation could be heard going on in the hotel hall, with G3BA in the middle of the throng.

Tech corner

From G3FZL and G3OOU (Geoff Stone and Bob Burns of South London).

A number of members who have been to the lectures on nbfm techniques given in various centres by G3FZL and G3OOU have asked for further details of the nbfm adaptor for "buttoning on" to an existing a.m. receiver. The circuit diagram, due to G3OOU, is shown below.

Input to the unit is taken from the receiver i.f. via a 50pF capacitor and a length of screened cable as shown in the small inset diagram, and applied across the base of the first transistor, a BC107. This is followed by an integrated circuit device, an RCA CA3013 or CA3014. The transformer T1 must be suitable for the intermediate frequency chosen, which can be anywhere in the frequency range 100kHz to 50MHz.

With the link in position 1, a de-emphasis of −6dB per octave will be applied for phase modulation. In position 2, attenuation is introduced but with a flat frequency response so that output levels are similar for fm or pm.

Specification: Input 300μV rms to commence limiting, 100μV −7dB, 300μV −1½dB, 1mV is 0dB and 1V is 0dB.

Output is in excess of 100mV rms for 5kHz deviation.

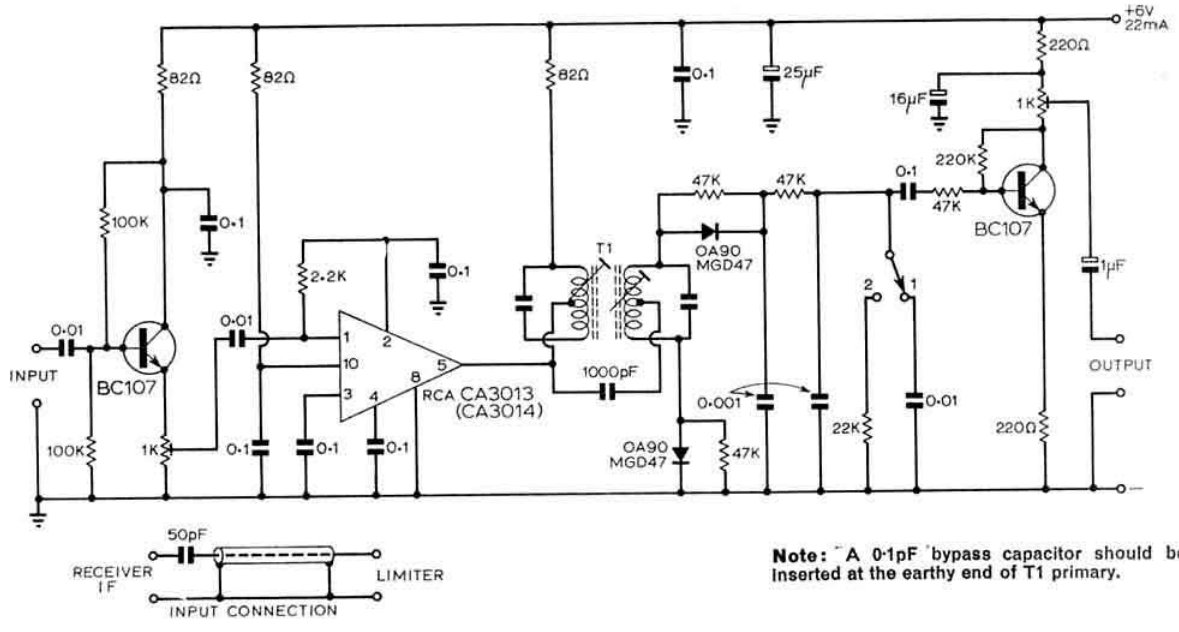
* * *

From G3VNQ (Malcolm Pritchard of Southport)

Is there a reasonable alternative to the halo for 2m mobile/portable work? An aerial which is rather less noticeable is the ⅝-wave vertical. This aerial has a medium impedance when fed at the base against earth, and matching to coaxial is achieved by tapping about one turn up the coil of a tuned circuit (the feed details are taken from the ARRL publication *Hints and Kinks*).

The coil can be five turns of 16swg copper, space wound on a ⅜in polystyrene former. The capacitor used in the prototype consisted of a pair of pvc-insulated wires twisted together. A few inches should be enough to resonate the system. The whip was made of piano wire; this will bend over when one is driving into the garage.

The aerial was adjusted using an swr bridge. The capacitor was varied until reflected power was at a minimum. Then the tap on the coil was moved to give a final swr of about 1·2 to 1. Finally, the coil and capacitor were protected from the weather by slipping a plastic pill box over them.



Note: A 0·1pF bypass capacitor should be inserted at the earthy end of T1 primary.

Four Metres and Down Certificates

70MHz Transmitting Section

G3EHY; 2 G3PJK; 3 G2AIH; 4 G3OHH; 5 G3KEU/P; 6 G3NUE; 7 GI3IUD; 8 G6NB; 9 G8PD/A; 10 G5FK; 11 G3NDF; 12 G3IMV; 13 GI3HXV/P; 14 G3SKR; 15 G3OUF; 16 G3BNL; 17 G3PMJ; 18 G3PHG; 19 GC3OBM; 20 G3TLA/P; 21 GI3HXV; 22 G5UM; 23 G3OJE; 24 G3SEK; 25 G3RWM/P; 26 G3FDW/P; 27 G3PPG; 28 G3FIJ; 29 G3GGL; 30 G3RDQ; 31 G3NJF/P; 32 G3RWM/P; 33 G3NUE/P; 34 G3AZI; 35 G3PDW; 36 GI3HCG; 37 G3LAS; 38 G3HRH; 39 GM2UU; 40 GI3PGG; 41 G3VPK; 42 G3RLE; 43 G3UFS; 44 ZB2VHF; 45 G3OUL; 46 G3UUT; 47 G5NU; 48 G3OZJ; 49 GI3HCG/P; 50 GI3PGG/P; 51 G3UBX; 52 G3VSA; 53 G3NKL; 54 G3THQ/P; 55 G3JHM/A; 56 GI3VJS/P; 57 G3EKP; 58 G3JHM; 59 G3VOF; 60 ZB2BO; 61 G3JHM/P; 62 G3NNO; 63 G3WQP; 64 G3OXD/A; 65 GI3WEL; 66 G3OHC; 67 G2WS/P; 68 G3JEQ; 69 G3RZK; 70 G8LY; 71 G3TDH; 72 G3GZJ; 73 G3XLH/P; 74 G3HBG; 75 G3VNQ; 76 G3VPF/P; 77 G2WS; 78 G3VJR; 79 GW3OXD/P; 80 G5UM/P; 81 GM3UAG; 82 GW3UCB/P; 83 G5UM (new QTH).

70MHz Senior Transmitting Section

1 G3SKR; 2 G3RWM/P; 3 G3FDW; 4 G3TCT; 5 G5NU; 6 G6HD; 7 G3OHH; 8 G3VSA.

70MHz Receiving Section

1 BRS15744; 2 BRS15822.

144MHz Transmitting Section

1 G3HBW; 2 G3BLP; 3 G3MTI; 4 G5YV; 5 G3BNL; 6 G3MCS; 7 G3LAR; 8 G3CO; 9 G3BA; 10 GW3MFY; 11 G3DFL; 12 G3NAQ; 13 G3NNG; 14 G3OJY; 15 G3KPT; 16 G3JYP; 17 G3KMT; 18 G3OHD; 19 G3BBR/A; 20 G3HRH; 21 GM3EGW; 22 GI3OFT; 23 G3OBD/P; 24 G2HIF; 25 G3JDN; 26 G8VZ; 27 G2AXI; 28 G3JYT; 29 G5UM; 30 G3EJO; 31 G3PBV; 32 G3FDG; 33 G3OSA; 34 G3JLA; 35 GC2FZC; 36 G3BOC; 37 G3MTI/M; 38 G3OJY (new QTH); 39 G3JWQ; 40 G3NOH; 41 G3PSL; 42 G3LBA; 43 G3FUR; 44 G2BJY; 45 G3MRA; 46 G3AGN; 47 G3MDH/P; 48 G3GMY; 49 G3GGK; 50 G3MDH; 51 G3NLR; 52 GM3LDU; 53 G3CKQ; 54 G5HZ; 55 G3NNK; 56 G6GN; 57 G5ZT; 58 G2PL; 59 G3FZL; 60 G3SAR; 61 G3NUE; 62 PA0EZ; 63 G3AHB; 64 G3PTM; 65 G3LAS; 66 G3RMJ; 67 G2CDX; 68 G3ORL; 69 G2DHV/P; 70 G3FIJ; 71 G3CXM; 72 G3HRH/P; 73 G3BDS; 74 G3FNM; 75 G3IMV; 76 G2BQ; 77 G3KHA; 78 G3OHC; 79 G3SHZ; 80 G3PKT; 81 G3UFA; 82 G3RST; 83 G5NU; 84 G2BHN; 85 G3OZP; 86 GW3KYT; 87 G3ICO; 88 G3ETH; 89 G2WS; 90 G3NJF/P; 91 GW3CBY; 92 G3TLA/P; 93 G3JFO; 94 G3TDR; 95 G5UM/P; 96 GM2UU; 97 G3UUT; 98 G3BNC; 99 G3SZX; 100 G3UKV; 101 GC3OBM; 102 G3FVC; 103 G3BJD; 104 G3PWJ; 105 G2ATM; 106 GI3ISX; 107 G3USF; 108 G3OUL; 109 G3UIK; 110 G3GZJ; 111 G3EJA; 112 G3JHM/A; 113 G8AAZ; 114 G3EHR; 115 G8ATK; 116 G3WW; 117 G8APZ; 118 G3TR; 119 G3WZT; 120 G2WS/P; 121 G3EHM; 122 G3WSN; 123 G3RZK; 124 G3ILO; 125 G3RQI; 126 G3OXD/P; 127 G3WQG; 128 G8APO/P; 129 G8BQX; 130 G8BJK; 131 G6LK; 132 G8AYN; 133 GI5ALP; 134 G8BHI; 135 G8ATK (new QTH); 136 G3UQK; 137 G8BSH; 138 G8BWW; 139 G8AUN; 140 G8AEJ; 141 G3WDG; 142 G8BCP; 143 G8ABA; 144 G3WUW; 145 G3YUA; 146 G8VN; 147 G8BCA; 148 G3OHC/P; 149 G8BEO; 150 G3WUW/P; 151 G8BQX/P; 152 G8BPY; 153 G8CMB/P; 154 G5UM (new QTH); 155 G8AEL; 156 G8CKG; 157 G3HCW; 158 G8CJV; 159 G8CKV; 160 G8CEZ; 161 G3SFV/P; 162 G8CEA/P; 163 G8BEW; 164 G3OHC/M; 165 G8CXM/A; 166 G8CMU; 167 G3YRH; 168 G3YDY; 169 G3BKP; 170 G8CVK; 171 G3PKV; 172 G6FI; 173 G8CUO; 174 GW3OXD/P; 175 GW3OXD/A; 176 G8DBB; 177 G8CCE; 178 G3ENY; 179 G8BQH; 180 G8BUJ; 181 G8ADP/A; 182 G8CVS; 183 G8BXX; 184 G8BGE; 185 G8CUT; 186 G8DLZ; 187 G8DBA-G3ZNW; 188 G8DJF; 189 G8DLP; 190 G8BCI/P; 191 GW3UCB/P; 192 G8APO; 193 G8DKV; 194 G8CBZ; 195 G8BXJ.

144MHz Senior Transmitting Section

1 G3CCH; 2 G3FAN; 3 G5MA; 4 G3BLP; 5 G3CO; 6 G3BA; 7 G6NB; 8 G3EDD; 9 G3HRH; 10 G8GP; 11 G3LAS; 12 G3IMV; 13 G3PTM; 14 G5NU; 15 G6GN; 16 G3KHA; 17 G3AOS; 18 G3MRA; 19 G3BHW; 20 GW3MFY; 21 G3DAH; 22 G3JEQ; 23 G6RH; 24 G3MCS; 25 G3GIM; 26 G2PL; 27 G2NH; 28 G3USB; 29 G6TA; 30 G3GZJ; 31 G3COJ.

144MHz Receiving Section

1 BRS22550; 2 BRS22322; 3 BRS15822; 4 BRS15744; 5 NL687; 6 BRS20108; 7 A3470; 8 A4048; 9 BRS21667; 10 A4871; 11 BRS23140; 12 BRS7323; 13 A3942/P; 14 A3942; 15 BRS 24550; 16 BRS30552; 17 A5032; 18 A6812; 19 BRS31172.

144MHz Senior Receiving Section

1 BRS15744; 2 A5032.

432MHz Transmitting Section

1 G3NNG; 2 G3KPT; 3 G3LHA; 4 G3BNL; 5 G3MCS; 6 G8AAZ; 7 G8ABP; 8 G3AHB; 9 G5UM; 10 G8ACQ; 11 GW8ACG; 12 GW8ACG/P; 13 G8AHQ; 14 G8AEJ; 15 G8AGG; 16 G8AGU/P; 17 G3PTM; 18 G8AAY/A; 19 G8AGQ/A; 20 G3HRH; 21 G8AJU; 22 G8ARM; 23 G8ADP/P; 24 G8AUE; 25 G6GN; 26 G8AQA; 27 G8AWO; 28 G8AXP; 29 G8AHE/P; 30 G8AOD; 31 G8AWW; 32 G8AKT; 33 G8ANS; 34 G8ARD; 35 G8AIE; 36 G3PKT; 37 G9ATK; 38 G8ACP; 39 G8AQZ; 40 G8ARC; 41 G8AVL; 42 G8ART; 43 G5NU; 44 G3FIJ; 45 G3XEB; 46 GW8AHI; 47 G8AVX; 48 G8AKQ/P; 49 G8ABB; 50 G8ADC; 51 G8ADC/P; 52 G8ATL; 53 G3UBX; 54 G8AZO; 55 G2WS; 56 G8ALM 57 G8AYN; 58 G8BGQ; 59 G8AWS; 60 G8AWS/P; 61 G8BYV; 62 G3UQK; 63 G8BAK; 64 G8BCA; 65 G8BIL; 66 G8APZ; 67 G8CKX; 68 G8AMU; 69 G3EHM; 70 G8DLP; 71 G3RZG/P; 72 G5UM (new QTH)

432MHz Receiving Section

1 BRS15744; 2 A5032.

432MHz Senior Transmitting Section

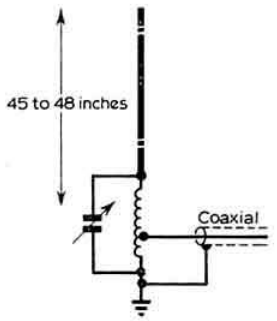
1 G3MCS; 2 G8AKE; 3 G3KEQ; 4 G2XV; 5 G8AWS/P; 6 G8AUE; 7 G8ACQ.

1,296MHz Transmitting Section

1 G3MCS.

Supreme Award

1 G3MCS.



Mounting such an aerial is a matter for individual preference. I used an old car-radio aerial of the gutter mounting type with the coil former pushed into the hole where the telescopic element normally fits. The whip was fitted by heating the end and pushing it into the top of the former.

Here and there

"Remind people to listen on the 145·00MHz mobile calling/working frequency. Many mobiles are now operating crystal controlled transmit *and* receive on this frequency"—G3VNQ.

* * *

"Down in this part of the world more and more of us are checking our own channels on 2m before searching the band. Once tried never forgotten! It brings good results from the Continent, particularly. On another subject, many old-timers are reactionary about using QRA. I have worked one such chap in the last four a.m. contests and he *still* has not made any effort to get his QRA Locator organized"—G8BQX of Hastings.

* * *

There has been no comment (none in print at any rate) about the G8BBE proposal to use 1,297·5MHz as the 23cm calling frequency, thus obviating the need to set-up on "Seventy" first. See page 614, September—and state your views.

* * *

Bill Jarvis will be perigrinating again over Christmas. Look for GM8APX/M near Glasgow just before Christmas and from the Wigtown coast just after. He will be at the Science Masters' Conference at Brighton 29 December to 1 January, then back home to Rannoch in Perthshire on 1–2 January, He will be on "Two" nbfm throughout these journeyings.

* * *

Some thoughts on submitting a claim for the Senior 70MHz Award: "It has taken 3½ years to amass the total of six-plus-60 on 'Four' and I've enjoyed every minute of it . . . my sincere thanks to my many friends on the band who by their unstinting portable efforts have done so much to activate the rarer counties. Without their assistance this claim could never have seen daylight!—G3VSA, Manchester."

* * *

Impressed by the big signal coming from GB3ANG, many people have asked for a pinpoint for the beacon's new site. The answer: N.G.R. NO395408, which has Tealing in the southern part of Angus as the nearest place of any size.

* * *

"An amusing incident during VHF National Field Day . . . we heard a distant 70cm station calling a West Country station's third harmonic. The latter station must have been told about it in due course because later on he sent 'CQ two-metre contest' instead of just 'CQ contest'. Some harmonic!" —G3LPB. (Perhaps by now the third-harmonicker has read September's article on a stripline filter for 144MHz—G5UM.)

VHF Personalities—No 17

G8AQZ (H. E. Nicholls of Bristol)

Not many radio amateurs are able to say that they have lived through the three reigns of spark, valve and transistor, and through the reigns of six British sovereigns. When H. E. Nicholls, G8AQZ, was born in 1893 the Victorian age was on its way out, the spark age was on its way in, the Atlantic had not been spanned by wireless and the bright emitter valve was a dim glow on the horizon.

"Nick" was 17 when he chanced to read some articles on wireless in the old *English Mechanic and World of Science*. These fired him to wind a vast inductor on a wooden towel roller, to experiment with an array of detectors (crystal and otherwise), and to rewind an old landline earpiece with many turns of 42swg silk-covered wire to the required high resistance needed for the receivers of those days. In 1912 Nick submitted his construction to one of Bristol's few men vested "with authority for experimental wireless telegraphy" and to his intense delight heard the time signals from FL, Eiffel Tower, on 2,000m.

The outbreak of the first world war resulted in his receiving a now yellowing much prized paper which reads: *Received the following articles: 1 tuning inductive coil, 1 dector (minus crystal), 1 variable condenser, 1 rec. watch, 1 rec. bell, 1 motor cycle ignition coil, portions of a rotary make and break spark gap. Signed: E. Mountjoy for GPO.* (Dector was a spelling error. The GPO representative knew nothing about wireless). In 1921 the GPO released Nick's by then useless equipment—useless because valves had come in and spark was on its way out, though it took a long time to die.

In November 1922 he was granted an official GPO licence "for receiving wireless telegraphy signals"—and this is now another yellowing document of great sentimental and not a little historical value. Family objections had to be overcome before a huge twin-aerial could be hoisted aloft in the Bristol garden. Result: much speculation among neighbours as to the purpose of this "elevated clothes line", but much less speculation about the results it provided —PCGG's concerts from The Hague, 2MT Writtle, and Croydon Aerodrome on 900m.

And so through the "acc charging and ebonite" era to the birth and growth of the BBC. With the decline of interest in dx hunting on the medium waves came the new excitements of the short waves, and Nick's wholehearted involvement with the developing amateur radio movement, especially through Bristol's always enthusiastic transmitting club, though as yet he was still a non-transmitting member.

Following the "close-down" of the second world war, Nick recalls: "In the post-war period it was not until I was approaching the age of retirement from business that interest in amateur radio revived. In 1958 I applied for membership of the RSGB and became BRS21913 in July of that year. Since then I have regularly attended the Bristol Group meetings and taken a minor part in the activities of this branch of the national society, a branch whose record is indeed a proud one.

"Through all these long years I had never taken any steps to obtain a transmitting licence. However, something stirred in me, and in July 1966 at the age of 73 I obtained the Sound Licence B with the callsign G8AQZ.

"I must rather ashamedly confess that so far I have shirked the morse test. Through years of lack of practice my speed had dropped to 8 wpm from about 18-20wpm 30 years ago. Nevertheless, I have enjoyed many rewarding and, at times, exciting QSOs on 70cm, including confirmed contacts with ON4HN and ON4HC. In March 1968 I succeeded in obtaining RSGB Four Metres and Down Certificate No 39 for work done on the 70cm band, the only other Bristol recipient being my redoubtable friend and vhf expert, G6GN."

Although very active on the 2m band since it became available to the Class B men, G8AQZ continues to pay special attention to 70cm and is a regular participant in the extended links which are set up on this band by stations on both sides of the Bristol Channel. To one as active and enthusiastic as Nick, now rising 77, the overwhelming wish of all his correspondents on the air is: May he long be spared to enliven the 70cm scene in the south-west.

The metre-wave man's code

When operating his station the vhf and uhf metre-wave man:

1. **Before transmitting, senses the band for conditions, level of activity and occupancy of his intended channel;**
2. **When sending CQ announces his location (if he is a newcomer his callsign may not be in the book, if he is an old hand he will not be egotistical enough to assume everyone knows where he is). He will also state beam-heading and intended direction of tuning for cw, using the accepted abbreviations (LH, ML, LF and so on);**
3. **When engaging in a QSO will give the other man's callsign first followed by his own; in net operation will call stations in "Callbook order";**
4. **Will keep within his geographic-frequency area unless calling a station on the latter's own frequency;**
5. **Remembers never to use phone in cw areas, though resorts to cw in any area when communication is difficult;**
6. **Observes gentlemanly microphone manners by avoiding irrelevant back-chat, refusing to allow "funny men" near the microphone (especially during contests), and abjuring all facetious callsign phonetics, having noted the recommendations written into the licence;**
7. **Avoids the pitfalls of duplex operation by announcing his and his correspondent's callsigns often, together with frequencies in use, not allowing the intimacy of the mode to tempt him to transgress 6 above;**
8. **At all times is considerate of others, especially the man in the next street or town, by avoiding over-modulation, key-clicks or single sideband overspill;**
9. **At the end of QSO always pronounces his callsign distinctly for the benefit of distant listeners; and**
10. **Takes a last look round before closing in case others are calling him. If they are and time is short he suggests times for subsequent meetings.**

THE MONTH ON THE AIR

A monthly feature by JOHN ALLAWAY, G3FKM*

ALTHOUGH this column is being written late in October it will be read in the early part of December when preparations for Christmas will be well under way, and your scribe would like to take the opportunity of sending all readers the very best of wishes for Christmas and the New Year. Very sincere thanks are due to all those who have supported *MOTA* during the past year, both in this country and overseas. One of the features which appears regularly, *Propagation Predictions*, is prepared from information which is supplied by Dr G. Lange-Hesse, DJ2BC, of the Lindau Ionospheric Institute, and our special thanks are due to him.

A cheerful note, appropriate for the season and apropos QSL cards, comes from WA3HUP via BRS17567. In her position as QSL manager to several stations, Mary says, "All cards received here are answered providing I have the log info. Some take a little longer than others. I honour all SWLs—you fellows are every bit as important as any ham operator . . ."

Please note that the QSL Bureau of the Irish Radio Transmitters Society has changed its address and may now be reached at PO Box 462, Stella Avenue, Dublin, Eire. Cards arriving at 24 Wicklow Street during the next two years will be forwarded to this address.

G3RFX reports that his callsign is being pirated—he is at present in Germany. Another unlicensed operator is the "G3YJS" active on 160m—the legal G3YJS has no equipment for the band.

Please note that in the November *QTH Corner* the postal code of G3ZBA (MP4TDJ QSL manager) should have been LS17 7DW.

Top Band news

A number of 160m dx enthusiasts have started a net "to promote activity from the rarer countries on 160 by guaranteeing that there will be dx activity from Europe once a week and by having certain times when we will QSX certain frequencies for dx signals". The net will meet on 1,829 + or − 1kHz every Friday at 2200. From 2200 to 2228, European stations will be worked; at 2228 the MC will call "CQ DX" and listen on 1829 at 2230. At 2243 another "CQ DX" will be put out followed by listening at the low end of the band for replies. All breakers will be acknowledged, and reports and QTH only exchanged—please, *useful* information and no rambling! Countries which should be active include W, PY, 4U1, ZB2, ZC4, 5N2, TA2, OH, and VS6DO (who has a 160ft vertical aerial). Further details may be obtained from G3YMP, 42 Southwall Road, Deal, Kent, or from G3XDV. Reports from stations and listeners more than 1,500 miles distant would be welcome.

ZD9BM has been listening on the band and has heard several signals from the UK. He is looking for European contacts on Friday and Saturday nights between 2230 and 2400 in the 1,821 to 1,833kHz portion of the band. Roy has already worked PY2BJH and PY2BKO.

W1BB's *160 Metre DX Bulletin* mentions the possibility of operation from San Andres Is (HK0) by W9UCW during the CQ 160 DX Contest on 30–31 January. Stew also reports that EI9J ran skeds with VK6NK last summer and heard his signal at RST569 one evening in June.

G3VPS reports that 9H1BL has received a letter from the authorities telling him that no more 160m operation is allowed from Malta.

G3IGW has supplied details of this winter's **Europe/Australia Tests.** He says that the peak time during mid-December to VK3 is 1900 and to VK6 it is 2045. VK stations will transmit between 1,802 and 1,804kHz, and Europeans between 1,825 and 1,830kHz. The calling cycle is of 30 minutes duration starting on the hour and half hour. Australians call first for three minutes, then listen for Europeans for three minutes and so on. One VK2, seven VK3, two VK5 and four VK6 stations are known to be active and enthusiasm is high, there will also be listener monitoring in VK and ZS3.

News from overseas

The latest information on amateur activity in Gibraltar has been provided in a letter from ZB2A. The following calls are still on the Rock—ZB2A, ZB2AV, ZB2U, ZB2SS, ZB2BY, ZB2VHF, ZB2BV and ZB2BU. Calls that are no longer there but have forwarding QSL addresses are ZB2BC (via G3PWK), ZB2BL (via GW3WEJ), ZB2BO (via G3TWG) and ZB2CH (via G3HAB). Gordon reports the receipt of many cards for callsigns which have never existed —eg ZB2XP/MM, ZB2CW, ZB2WA, ZB2BBW and ZB2BAT. All Gibraltarian calls are issued in rotation, the most up to date being ZB2CA. The sole exceptions to this rule have been ZB2SS and ZB2VHF. A lot of old calls (such as ZB2I and ZB2O) are being pirated. The QSL situation at the ZB2A club itself has been unsatisfactory but a new supply is to hand and they will be sent out soon; however, a lot of cards received do not check against the log and pirate activity must be blamed. ZB2AU is always looking for UK contacts on cw and may be found around 7,030, 14,030, 21,030 or 28,030kHz between 0400 and 1000 every Sunday.

John Dark, MP4BFO, reports the formation of the Amateur Radio Association of Bahrain (ARAB). Besides

* 10 Knightlow Road, Birmingham B17 8QB.

safeguarding the interests of Bahrain amateurs the association will also, as far as it is able, represent all amateurs in the Arabian Gulf and Peninsular who have no national society of their own. The QSL manager remains as before—Ian Cable, MP4BBW, Box 425, Awali, Bahrain. The chairman of the committee is Reg Scarrow, MP4BHM (ex ZD3A), who may be reached at International Aeradio Ltd, Box 144, Bahrain. First President is Josh Wort, MP4BIR, who has also held the calls G3AIR, VO6F etc.

"Greg"—G3XHE, MP4BGX etc, expects to be returning to the Middle East about now, possibly to the MP4 area. This time he will have 400W available and hopes to be able to erect suitable aerials for 40m and 80m operation. Greg regrets that he still has 500 QSLs to send out for his MP4BGX contacts—a long list of outstanding cards was mislaid without his knowledge and only came to light recently during one of his ten-yearly turn outs!

Hal, KL7MF, is receiving QSL cards for a station which signed as "HV1SL" for a period centred around 5 September 1969, worked a multitude of stations throughout the world, and quoted him as QSL manager. He has no knowledge of such a station who was clearly a pirate.

Those awaiting QSL cards from the recent expeditionary activities by Gus Browning, W4BPD, will be pleased to learn that all cards for Agalega, Chagos and Farquhar Is contacts have been made out. Work is proceeding on those for Geyser and Blenheim Reefs. FH0VP will be the last to be dealt with as, although logs were mailed first of all, they were the last to arrive in the USA. About 26,000 cards in all will have to be mailed. Expenses for the expedition totalled some $10,500 and so far only half of this has been covered. When sending for cards please mark the Gus callsign on the upper left corner of the envelope and send cards for one operation only per envelope.

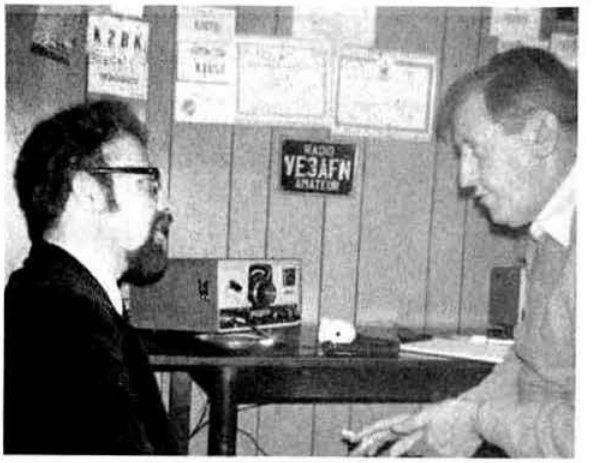
G3UGX has received his QSL for a contact with HS1ABC back from PO Box 200, Bangkok, with a note saying that this station is a pirate. The contact took place on 20 September. The writer believes that the same callsign has been used by a legitimate station in the past.

VP8JR is now in Germany and is licensed as DA2XW. His new address will be found in *QTH Corner*. Another recent move was by G2BW who now lives in Malta and has just received the call 9H1CH.

Joseph Jones Jr, W5OJ/K4FG, informs us that he was one of the operators of KG1BB at Thule in Greenland during 1959–60. He still has logs and QSL cards and would be happy to supply confirmations to those who worked him and never received one. Please note, however, that he can only confirm his own contacts from the club station and that he used the name Dan. His address is 12116 Chicamauga Trail, Huntsville, Ala, 35803, USA.

RAF Akrotiri fete

This event, held on 10 October, was the first occasion on which some of the members of the RAF Akrotiri Club (ZC4AK) and Limassol ARC (ZC4LC) had the opportunity to operate a special station. The callsign was ZC4RAF and two stations were on the air for about three hours and made about 100 contacts in spite of difficulties with some of the equipment. Operators included ZC4s IK, JW, MT, RS and UA and special QSLs will be sent to all who were worked. Direct reply may be obtained by sending an sae to PO Box 216, Famagusta, Cyprus.



During a recent business trip to Canada, BRS29722 (left) was entertained by Jack, VE3AFN, who is a blind operator. Equipment is rented to "white stick" operators by the Radio Society of Ontario and the CNIB for $20 per annum, and volunteer sponsors maintain the sets

World Radio Club (BBC)

From Thursday 5 November the first edition of this feature has been broadcast on Thursdays at 1245 with repeats on Fridays at 2345 and Sundays at 0815. In other words, there is no change in transmission times but in future the first edition will be on Thursdays.

Dxpeditions

Gambia, Dahomey, Upper Volta, Mali, Togo and **Madeira.** DJ1QP and DJ6QT were planning to depart for these areas early in November, but may possibly still be in Africa when this reaches readers. They have applied for licences to operate from Fernando Po and Annobon Is, but nothing is known about the outcome of their enquiries. A list of frequencies mentions 3,504, 7,003, 14,035, 21,035 and 28,035kHz on cw, and 3,785, 7,085, 14,185, 21,285 and 28,585kHz on ssb.

Iraq. The possibility of operation by OH2BH or SP9VU mentioned in last month's *MOTA* seems to have receded for the present on account of the political situation in the area. However, attempts may be made later.

Bhutan. The IDXA have announced that Gus Browning, W4BPD, already has his AC5 licence and will be starting operations from this country about 15 March. Tibet and Sikkim will be secondary targets and the feasibility of going to other countries in the area is being studied.

Peter I Island. According to the *DXers Magazine* this island, which is located in approximately 91W and 68S off the coast of Antarctica, is likely to be counted as a "country" by ARRL in the event of activity taking place.

Juan Fernandez and **San Felix Is.** W4BPD says that the sponsor of this trip is in Europe and has not been heard from for several months.

Laccadive Is. K2IXP has almost abandoned hope of obtaining permission to operate there himself but hopes that his efforts may result in it being granted to others later.

G3VBH, Bath, uses this fine array of equipment on all bands 10 to 160m. The transmitter above the Eddystone receiver is the one described in the *Amateur Radio Handbook* using a TT11 in the final stage

DX news

Jacky, VQ9SM, has a sked with his QSL manager JA0CUV/1 almost daily at 1500 on 14,233kHz. He has also been heard on 14,130kHz and his old cw crystal frequency of 14,028kHz. Operation is expected to continue until September 1971. QSLs are expected to be rather slow on account of the poor mail service from Chagos to Japan.

The latest *DXpedition of the Month Bulletin* says that Peter Dodd (G3PBD etc) is now in Australia and should be on the air soon. Cards for his GD3PBD, OE1ZBW, OE1ZBW/1 and YA1PBD contacts will be despatched when logs are received. All YV0A1 QSLs have been sent out, but some CR5SP logs are still missing. New callsigns for whom *DOTM* acts as QSL manager include CR7FR and FM7WF (the latter through W4OPM).

JD1ABO is commanding officer of the Maintenance Defence Force on Minami Torishima Is. His transmitter has an input of 100W p.e.p. and his aerial consists of a dipole only 9ft above ground. Dick's stay on the island will last until July 1971. The only other station on the island is the club station JD1YAA.

In future, foreign military stations in Germany will be issued with callsigns with DA prefixes. G3XIN operates from RAF Gatow as DA1RAF (see *QTH Corner*).

BV2A, who appears to be the only station on the air on the island of Taiwan, is being heard often on Fridays between 1500 and 1600 on his crystal frequency of 14,022kHz.

WA3HUP has a sked with the genuine M1B at 1400 on Saturdays (and also Sundays occasionally) on 21,380kHz.

HB9YZ, one-time owner of the callsign 4W1B, says that he knows nothing about the "4W1B" activity which took place during the All Asia DX Contest. It is not known whether the call has been re-issued.

G3RWL expects to be on the air from Antigua during mid-January. He will be there for about two years and operation will be cw only at first, but ssb may be available later. He intends to keep a blacklist of persistently ignorant callers and will send it to your scribe for publication.

Stephen Gibbs, formerly 3B8CC/VQ8CC, is now back in Scotland using his GM3MBS call (see *QTH Corner*).

Several stations are now reported on the air from Jordan. VS9MB/JY is a member of the Red Cross team and has been active on 14MHz ssb. QSLs for John may be sent via G3KDB. Other calls heard include JY1/A and JY1/B. G3UML has a daily sked with JY1 and offers to help anyone needing a QSO.

Dr Andres Goens, YS1AG, is now in the UK and awaiting the arrival of a GM5 call. He has a supply of YS1AG QSL cards and his log, and will be happy to deal with requests to the address in *QTH Corner* or via G2MI.

FR7ZU/G on Glorieuse Is is often to be found between 1530 and 1800 on the lower end of the 14MHz phone band. He will be there for four months and will QSL on his return to Reunion.

Rumour has it that F2QQ will shortly leave for Yemen to work with the Red Cross as a radio operator. He will possibly be on the air with a 4W1 call. LA8YB/4W1 has been worked on 3·5 and 14MHz ssb and asks for QSLs via NRAL.

Unfamiliar prefixes heard during the CQ WW DX Contest included 9C9 (used by EPs), CW (= CX) and 4B (= XE). Not in the contest but on during the month were 8Z4A, reputed to be in the Iraq/Saudi Arabia Neutral Zone, and 8Z3A in the Kuwait/Saudi Arabia Neutral Zone.

VR2FT reports the presence of a new station in Nauru. This is C21AA, who was formerly VK2ASZ. Bob will be on the island for four years and is at present using a Drake TR3 with a dipole. Beams for 15 and 20m and also equipment for 6 and 2m are on the way to him by sea. 1Z4NG is alleged to be on the island of Norhday "between Cocos and Clipperton Is" and is giving WA5UHR as his QSL manager. This one sounds decidedly fishy to your scribe! There are no legal prefixes in the 1AA-1ZZ series.

USA amateurs in Iceland appear to have lost their TF calls and are now using their home calls /TF, eg TF2WMA is now WA5ZGR/TF.

Jamboree on the Air

Due to an unfortunate misunderstanding, participants were asked to send reports on their activity to Geneva in last month's *MOTA*. They should of course have been sent to the UK organiser—Mr L. R. Mitchell, 28 Darwell Drive, Ascot, Berks. Les reports that over 200 stations in the UK took part in this year's event and that they contacted Scout stations in at least 36 overseas countries.

Contests

The CQ WW DX 160 Contest

0000 30 January to 1500 31 January

CW only. Exchanges consist of RST plus serial number of QSO (starting from 001). W/VE stations will also indicate their state or province. Contacts count two points with stations in one's own country, five points with other countries, and 10 points with W/VE/VO. A multiplier of one is counted for each DXCC country, USA state or Canadian province worked. Final score is total QSO points

times multiplier. Duplicate contacts in excess of three per cent will result in disqualification unless they are discredited for scoring in the log. Log sheets may be obtained from CQ 160 Contest, 14 Vanderventer Avenue, Port Washington, LI, NY, 11050, USA, to which address logs should be posted before 28 February 1971. It should be noted that W and VE are not counted as multipliers as well as their states and provinces.

Results of the **1970 ARRL DX Competition** have now been received and UK scores are as follows:

Phone Section

G2QT	**623,328**	points	G3KMA	217,200	points
GW3NWV	**611,886**	,,	G3MMH (multi-op)	76,347	,,
G3YXR (multi-op)	**388,260**	,,	G3YBH	69,090	,,
GM5AME (multi-op)	**347,160**	,,	**GD5APJ**	**30,132**	,,
G3FVA/A (multi-op)	290,043	,,	G2AJB	2,337	,,

CW Section

G3FXB	**2,174,784**	points	G3HZL	263,655	points
G2RO	2,144,730	,,	G2DC	250,509	,,
GD5APJ	**2,084,358**	,,	G2AJB	127,544	,,
G3TXF	1,702,065	,,	GI3JEX	108,990	,,
GW3JI	**1,009,113**	,,	G3KSH	90,496	,,
G3KMA	828,036	,,	G3JKY	64,320	,,
G3ESF	688,416	,,	GM3SKX	63,720	,,
G2QT	556,686	,,	G8RZ	29,859	,,
G3APN	437,076	,,	G3CWL	4,650	,,
GI3OLJ	**332,520**	,,	G3WP	1,386	,,
GM5APK	**273,776**	,,			

G3FXB, G2RO and **GD5APJ** came eighth, ninth and tenth, respectively, in the Top Ten of World (non-USA) scores—a very creditable performance. Congratulations to all winners (listed in bold type). Rules for the 1971 event will appear in January *MOTA*—a large supply of log forms and summary sheets has been sent to G3FKM by courtesy of W1YYM and these may be obtained in exchange for a sae.

Awards

The Bay of Plenty Award

ZL1AH, Welcome Bay, RD5, Tauranga, New Zealand

For working five stations in the Bay of Plenty area—Opotiki, Rotorua, Tauranga and Whakatane counties. Applications should consist of check list showing stations worked, dates and bands (QSLs not required) and eight IRCs.

The Pretoria Award

The Award Custodian, SARL Pretoria Branch, PO Box 1259, Pretoria, Republic of South Africa

For contacting five stations which are located either in Pretoria, Lyttelton, Verwoerdburg, Irene, Silverton, Bapsfontein or Bronkhorstspruit (all ZS6) or belong to members of the Pretoria Branch members of SARL. A log extract certified by two licensed amateurs or an official of a recognized radio society plus 8s 6d or seven IRCs should be sent to the address above.

The SWL Chapter 3 Award

Bernard Hughes, 65 Flag Meadow Walk, Worcester, Worcs.

For confirmed contacts/reception reports with different countries whose initials spell out SWL CHAPTER 3 using the first letter of prefix—five points are gained for each country worked, 10 if the station worked is a CHC, FHC or SWL Chapter 3 member. It is not necessary to work every letter—ie if 10 countries whose prefixes begin with the letter H are worked this is 10 × 5 points. Different classes are A, 1,000 points; B, 850; C, 700; D, 550; E, 450; F, 350; G, 250; H, 150; I, 100 and J, 50.

Vlad, UA1CK, and Alex, UA1BX, in July 1970, discussing plans for a forthcoming expedition to Franz Josef Land

The ERB Award

East Rand Branch of SARL.

For working four members. Log data to Awards Manager, PO Box 4031, Brencania, Brakpan, Tvl, Republic of South Africa, from whom membership list may be obtained (sae and one irc please). The cost is seven IRCs but the award is free to handicapped applicants. It is available to listeners.

G3GJQ reports the arrival of his Greek **"Europe SSB Diploma"** after a considerable wait and says that it is a very attractive certificate. Details were given on page 878 December 1969 *MOTA*.

"DX News Sheet"

Information concerning forthcoming dxpeditions is frequently not available sufficiently in advance of the time of their taking place for information to appear in a monthly column such as *MOTA*. Anyone who is interested in dx of any kind would be well advised to become a subscriber to this most excellent news sheet, produced by Geoff Watts, 62 Belmore Road, Norwich, NOR.72.T. It is produced weekly and subscriptions cost £2 for 48 issues (first-class mail) or 53 issues (second-class) to readers in the UK. To Europe surface mail costs the same, while air mail is £3 for about one year. £2 (or $5) covers 40 issues by air to USA and most other parts of the world, and 36 issues to the Far East and Oceania. Payment may be made by banknote, money order, cheque, or IRCs (£1 = 27 IRCs).

Band reports

Reasonably good conditions on a number of bands during the recent spate of contests have resulted in increased scores for many reporters. As usual, many dx would-be participants in the Society's 7MHz DX Contest were obliterated by strong signals from Europe and it seems desirable that some way of making this a true dx contest should be considered.

Propagation Predictions

Because of the relatively high sunspot activity during 1970 the propagation conditions for December 1970 will not differ much from those of December 1969. Conditions usually deteriorate at this time of the year compared to the previous months, and winter conditions will reach their peak.

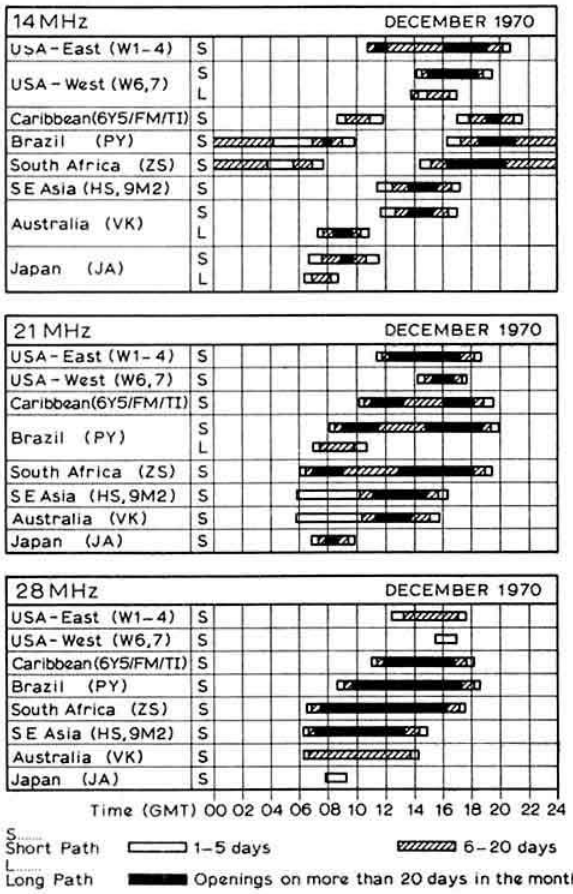
On **28MHz** Eastern North America will only be reached on favourable days, ie those with above average F2 MUFs. Western North America and East Asia will only be heard under exceptional conditions, and chances will be better in Southern Europe than in countries further North.

All continents should be workable on **21MHz** with certainty. The mid-winter conditions will also enable contacts to be made with various zones via the long path, especially with South America and East Asia.

Various zones should be workable via the long path on **14MHz**, especially South America and East Asia, also Western North America. In the latter half of the night this band will only remain open for dx traffic on favourable days.

7 and **3·5MHz** will take over as the main dx bands during the long winter nights, QRM permitting. Local traffic on **3·5MHz** may be interrupted by the dead zone, especially in the period before sunrise.

The provisional sunspot number for October 1970 was 85 with the period of greatest solar activity occurring during the last week of the month. The predicted smoothed sunspot numbers from the Swiss Federal Observatory for February, March and April 1971 are 86, 84 and 82, respectively.



1970 Countries Table

	1·8MHz	3·5MHz	7MHz	14MHz	21MHz	28MHz	Total
G3VBL	—	—	30	100	126	49	305
G3JVJ	4	75	45	48	37	29	238
G3VPS	11	13	15	54	29	36	158
G8VG	4	21	30	37	76	55	223
G3SWX	—	17	18	48	29	59	171
G3ZOQ	—	8	36	29	13	28	114
A6265	5	99	100	228	185	163	778
BRS25429	3	111	93	154	162	125	648
A6248	9	63	71	166	149	118	576
A7006	18	32	28	183	183	138	582
ORS31427	—	14	18	193	125	123	473
A6992	—	—	2	201	—	48	251
A6904	10	36	47	149	145	95	483
BRS27880	6	59	52	142	122	85	466
A7054	8	115	43	139	163	64	532
A6278	4	53	47	112	90	43	349
A5489	—	76	21	95	83	123	398
A6023	5	38	39	78	37	19	216
BRS30694	6	24	29	70	61	44	234
A6553	6	24	30	58	102	57	277
A6148	5	84	19	49	46	68	271
A7065	2	7	4	44	—	40	97
A6242	2	19	7	38	26	29	121
A6098	4	21	12	26	37	25	125

(This month's table is in order of 7 plus 14MHz totals).

The 28MHz Contest weekend was rewarded with quite good conditions and some entrants made over 1,000 QSOs.

Criticism has been received concerning the lack of a.m. stations reported in this section. Your scribe would like to point out that the callsigns listed are normally chosen because they are in some way dx or unusual and that it is a true but maybe unfortunate fact that very few stations in either of these categories these days appear to be using that mode.

Many thanks to all correspondents, and especially to the following for information and dx loggings: G2HKU, GW3AX, G3AAE, G3GVV, G3SWX, G3UKH, G3UYM, G3VPS, G3YWX, G3ZBA, G3ZOQ, G5JL, G6GH, G8VG, BRS2098, BRS17567, BRS30231, BRS31301, A6248, A6265, A6992, A7054 and A7065. Stations listed in italics were on cw, others on ssb unless stated otherwise.

1·8MHz. 0100 OH5SM. **1100** PA0PN. **2000** HB9ZE. **2100** HB0XKZ.

3·5MHz. 0400 VP2EE. **0500** LU7AAC, PJ1AA/9AF, VP2VP. **0600** HC4BS, HH9DL, OA4ABE, TI0RC, VP1WMU, YN1ZZ (QSL via DL3OH), W1–W5, W8–W0. **0700** ZLs. **1800** KL7DTH/KG6. **2000** *FB8XX*, FR7ZW, MP4BFO, 9F3USA. **2100** VS6DO, 9X5PB. **2200** VE8YL, VU2BEO, 4S7AB, LA8TB/4W. **2300** 9G1DY, 9V1QE.

7MHz. 0000 VU2LE (on a.m.). **0100** HK6BRK. **0300** VP1WMU. **0500** *HH9DL, HP1XHG, OA3Y, ZC4CB.* **0600** *EA8FF, KH6GS*, HC8AA, *VE8RA.* **0700** WA5KPL/HR1, *KL7ENA*, OA4NFD, *PJ8AR.* **1900** JA6s DZA, HBQ, *JW7UH, TA1KT.* **2000** KL7DTH/KG6, YA1HD, 9V1QE, **2100** *UA1KAE* (Antarctica). **2200** *JA9BE*, VS6DO.

14MHz. 0000 ZD9BM. **0500** KC4s USL/USP, KJ6CF. **0600** FO8AA. **0800** AX2APX/LH, *VK9RH* (Norfolk Is), VR2CC, ZK1MA. **1600** FB8XX. **1700** VS9MB/JY. **1800** FH8CG, VP2MF (QSL via VE3GCO). **1900** UA1KAE. **2000** FL8LM, TR8JM. **2100** *PY0AD*, VP8AM. **2200** JY1.

21MHz. 0800 *FL8PK*, JAs, *KH6DR.* **1000** VR4EE. **1100** AX2APX/LH, VP2EE, 9C9WB. **1300** *5H3MB, 6W8GE.* **1400** M1D (QSL via I1MKN), VP9MI (= G2MI/VP9), *XW8BP.* **1500** *7X3PC.* **1600** *CT3AS*, FB8XX, JY1B, *TG4SR.* **1800** FP8CS, *HH9DL.* **1900** VP8IA. **2100** HC8AA,

28MHz. **0700** AX6s, CR5SP. **0800** AXs, JAs, TR8DG, VU2OLK. **0900** EA9AI, KG6AAY, XT2AA. **1000** TJ1AZ, **1200** CR4BV, OA8V, TA3HC/1, VP8HZ. **1300** FR7ZN, UA1KAE, YA1GNT, ZB2BY, 3B8CW, 3V8AH, *5R8AB*. **1400** HC8AA, HR2HHP, VP1WMU, VP2EE, ZP9AC. **1500** *JW5NM*, JY1, PJ9JR, G3LZQ/ZS4, 5R8AS. **1600** CE8AO, 5N2ABG, 5L1B (Liberia). **1700** W coast USA/Canada, KL7AHB, VP2VP, 5VZJS. **1800** W6/7. **1900** OA8V, PJ1AA, W7/VE7.

Gratitude is expressed to all correspondents, and especially to the following for information obtained from their publications: **On the Air** (*ON4AD*), the **West Coast DX Bulletin** (*WA6AUD*), the **EX-G Radio Club Bulletin** (*W3HQO*), **DX'press** (*PA0TO*), **DX News Sheet** (*Geoff Watts*), **International Communications** (*Euradio*), **QUAX** (*G3DME*), the **DX'ers Magazine** (*W4BPD*), **Florida DX Report** (*W4FRO*), the **DX'er** (*K6YGS*), **NARS Newsletter** (*5N2AAF*) and **Long Skip** (*VE3DID*). Please send all items for **January** issue **to reach G3FKM no later than 10 December** and for **February** issue by **11 January.**

QTH Corner

C21AA	Radio Technician, c/o Radio Station, Nauru Is, Central Pacific.
CR8AG	Adriano Gominho, PO Box 28, Fohorem, Portuguese Timor.
DA1RAF	Sgt T. J. Harris, RAF Gatow, BFPO 45.
DA2XW	R. H. Williams, 5 Koln/Raderthal, Eckdorferstrasse 1, W. Germany.
DK0WA	via DK2BI, Bergstrasse 57, 55 Trier, W. Germany.
FL8MB	61 Rue Sully, 78 Rosny sur Seine, France.
FM7WF	via DOTM, Box 7388, Newark, NJ, 07107, USA.
FR7AE/E	Roger Augugliaro, Melee Chaudron, BP4, Sainte Clotilde, Reunion.
HC8AA	(see HC8RF).
HC8GS	via W5GTW, 14503 Kellywood Lane, Houston, Texas, 77024, USA.
HC8RF	PO Box 289, Quito, Ecuador.
HH9DL	(Contest group operation only) via W6WLH, 1400 St Albans Rd, San Marino, Cal, 91108, USA.
JD1ABH	Chichi Jima Weather Stn, Ogasawara, 700R27, Tokyo, Japan.
JY1/B	via WA3HUP, 105 June Drive, Camp Hill, Pa, 17011, USA.
KC6RK	R. Kenney, USCT Activities Code 1, POB 76, FPO San Francisco, Cal, 96637, USA.
KG6SF	Lowell Duval, Box 342, Saipan, Mariana Is, 96950.
OA3Y	via SM0FO, Anders Ekblom, Forshagagatan 28, Farsta, Sweden.
PJ1AA	Box 383, Willemstad, Curacao, Netherlands Antilles.
PJ8AR	(Eu QSOs) via GW3DZJ, F. Pardy, 27 Rae Parc St, St Asaph, Flints.
VP1WMU	via W5WMU, 305 Silverbelle Parkway, Lafayette, La, 70501, USA.
ex-VQ8CC	S. Gibbs, 11 Rowland Avenue, Giffnock, Glasgow.
VQ9SM	via Tack Kumagi, c/o Koken-ryo, 6-38-8 Shinkawa Mitaka, Tokyo, Japan.
YJ8JS	c/o Aeradio, Vila, New Hebrides.
YS1AG	Dr A Goens, c/o EFTHIMIOU, 26 Carrington St, Glasgow C4.

RSGB QSL Bureau, G2MI, Bromley, Kent, BR27 NH.

RSGB Scottish Mobile Rally and Zonal Conference

The RSGB Scottish Mobile Rally this year was organized by the Mid-Lanark RSGB Group with Mr T. Sorbie, GM3MXN, in charge, and took place on 19 September at the David Livingstone Memorial Park in Blantyre.

Prior to that date the weather had been rather mixed and very wet at times. It is thought that as the event took place on hallowed ground, the Almighty must have looked on it in favour since the Saturday dawned with a clear blue sky and ample sunshine which lasted all day.

The event, with between 250 and 300 visitors booking in, presented a variety of mobiles entered for the /M equipment contest, a first-class action display by the Motherwell Aeromodelling Club, the usual bring and buy stall, and an excellent variety of new equipment by J. B. Lowe, Derwent Radio, and Daystrom Limited. The judging of the mobile installations was performed by the zonal manager, Mr A. F. Hunter, GM3LTW, the winner being Mr A. Campbell, GM3NKG/M, of Shotts. Mr D. Mentieth, GM3IWU, conducted the final proceedings for the large draw of lucky programmes, and it was observed that several of the better prizes managed to find their way south of the border.

Among the visitors to the rally there was quite a splash of Society representation, including Mr A. W. Smith, RR Region 12, Mr N. G. Cox, RR Region 14, and various other ARS and ASRS from all over Scotland. The reason for this was two-fold since after the rally the second Zone G Conference was due to take place.

The Zone G Conference commenced at 6pm and was well attended, with several new members being welcomed by the zonal manager. These included representatives from the recently re-constituted Falkirk Club and the newly formed West of Scotland Club. The agenda, which included the RSGB New Scheme of Representation, the 1970 and 1971 Scottish Mobile Rallies, the 1970 and 1971 Scottish VHF/UHF Conventions, the awarding of the Jack Wyllie and Jock Kyle Trophies, and several other subjects presented by the various area and club representatives, provided some very lively discussion during the course of the evening.

A complete record of the conference discussions and decisions will be available in due course to all ARS and ASRS for presentation to their members. The zonal manager would like to point out that for any particular club, group or society to play an active part in the new scheme of representation in Scotland, it is essential that they have a representative present at the zonal conferences, provided that representative has been accepted by the membership either on a permanent or temporary basis.

The Jack Wyllie Trophy, the premier GM trophy, was awarded to Mr W. Bruce, GM3KGJ, of the Ayrshire ARG, for his untiring and unselfish aid to the younger members of the Society in the West of Scotland, and the Jock Kyle Trophy, the GM vhf/uhf trophy, was awarded to Mr J. Davidson, GM3UAG, of the Moray Firth ARS, for his excellent work on the vhf and uhf bands. Congratulations are extended to both these winners.

Thanks are also extended to the Mid-Lanark RSGB Group for organizing the rally and attending to the local conference arrangements, as well as to the caretaker and staff of the Memorial Park who did so much to ensure that everything ran as smoothly as possible.

By the comments heard on the Saturday and later over the air, the organizers are satisfied that their pre-event labours were not in vain, and they would like to extend their thanks to all members who made the event such a success.

Looking ahead

4 December—RSGB AGM.
11 December—RSGB Dinner Club, Kingsley Hotel, London WC1.
15 January 1971—Presidential Installation, Bonnington Hotel, Southampton Way, London WC1.
21 January—RSGB Lecture at IEE.

RSGB Scottish VHF/UHF Convention

The 1970 RSGB Scottish VHF/UHF Convention held at the Queen's Hotel, Dundee, on Sunday 11 October was a resounding success. One hundred and twelve attended the afternoon session to enjoy talks by G3FZL, GM3HAT and GM3AEL on *Latest developments at vhf; HF transistor amplifier design techniques for receivers and early stages of transmitters* and *Space flight communications*—during which time the womenfolk were taken on a tour of the magnificent new Ninewells Hospital, Dundee.

Ninety-six people sat down to dinner after grace was said by the Rev Ian McHardy, GM3JFG. During the dinner session G3FZL presented GM3UAG with the Jock Kyle Trophy, 'UAG replying most suitably. This was followed by speeches from G3FZL and G3BA. The evening concluded with the distribution of raffle prizes.

A particularly pleasing aspect was the wide representation from the far corners of a very large region and the support given by the presence of members from Edinburgh, Glasgow, England and Ireland.

Geoff Stone must be congratulated on a fine job on behalf of the Society, and congratulations to the organizers, all those who assisted in various ways (including donors of raffle prizes)—and to all who participated, as without participation there would be no success!

Time of course is the great enemy! But this did not deter a number of diehard vhf enthusiasts! At 11pm some were still in the hotel hall discussing the various aspects of vhf under the most able direction of Tom Douglas, G3BA, a fitting finish to a FB day!

OBITUARIES

F. G. Lambeth, G2AIW
Fred Lambeth, G2AIW, a Vice-President of the RSGB, died after several years of indifferent health on 26 October. Fred had been a stalwart of vhf, serving the Society as its first vhf manager from 1955 to 1962, and was contributor for over 10 years of the vhf column "Two (later Four) Metres and Down". He made a special contribution in promoting international co-operation at vhf in IARU Region 1 being the secretary of the VHF Working Group of the region until his death.

He was also well known for his work in promoting the early RSGB International VHF Conventions which are now the highly successful events held annually at Whitton, which was his home. In the past year or so he had been active on 2m, using cw with low-power solid-state equipment, and his enthusiasm for vhf was undiminished until the end of his life. He will be sadly missed both in this country and by his many friends in Europe, especially the vhf managers of IARU Region 1. The Society extends its sympathy to his widow and family, and to his son, G3LIM, who shares his father's interest for vhf in particular. G.M.C.S.

R. H. Bland, G3JOM
Mr Robert (Bob) Bland of Darley, Near Harrogate, has died shortly after retirement from work as an engineer. He was well known to the amateurs of Ripon, his former QTH.

N. H. Hodgson, G2ABK
Mr Norman Hodgson died on 20 September. He was the originator of the Skegness Group junk sale and the profits from that event on 16 October were donated to RAIBC as a tribute to him.

W. H. Martin, MA, BSc, GI5HV
Mr W. H. Martin died at the age of 81 on 22 September. He was an Honorary Vice-President of the RSGB and QSL manager for GI for 30 years. A retired headmaster, he pioneered 5m work in Ireland, and he will be greatly missed, especially by vintage amateurs.

We are also advised of the deaths of:
Mr J. S. A. Alderton, G8AEB, on 8 May;
Mr L. E. Brain, G3PJO, on 30 August;
Mr P. Dwyer, G2BLT;
Mr T. A. Maguire, G4TM, on 28 September.
Mr S. C. Wheeler, BRS31592;
Mr C. Wood, BRS31641, on 10 August aged 64.

JOTA 1970 reports

West Lothian

The callsign GM3POK/A was used again this year to represent the 21st West Lothian Scout Troop. The station was set up in the conference room of Hewlett-Packard Ltd, and used a SWAN 350 transceiver. The trap dipole was slung between the roof of the building and a crane. All bands were operated. Approximately 30 Scouts and visitors attended the two-day event.

Best contacts on: 28MHz, 9J2DT; 21MHz, Ws; 14MHz, VE8RCS, AX6SH (Scout HQ Perth) AXs and numerous JOTA stations in Europe; 3·5 and 7MHz, inter G with GB and /A stations.

Welling

G3WVP and G8DUD operated G3WVP/A on behalf of the 1st Welling Scouts. Equipment consisted of a KW Viceroy and linear amplifier with 300W p.e.p. output, an Eddystone 888A, 80m dipole at 6ft and a Mosley TA33jr three-element beam at 30ft. Bands used were 80m and 20m.

Few stations heard on 20m but 80m very crowded with much QRM. Forty-one JOTA stations and seven non-JOTA stations worked. Best JOTA dx: OK1AWQ, OZ1BSR, LX1ZAG and LX1JAE, all on 80m.

Hale Barns

GB3HBS was operated for 1st Hale Barns Scout Group by Geoff Barnes, G3AOS, and Peter Swann, G3WWX, for 40 out of the 48 hours.

Some 250 contacts in 50 countries were made although conditions were not as good as last year. The most outstanding contacts were with VU2JOA, the Indian jamboree station, and 5R9AP at Tananavre, Madagascar.

Bahrain

Just six days after the hatching of the idea, Josh Wort, MP4BIR, the first president of newly-formed ARAB (Amateur Radio Association Bahrain), and several members formed up in convoy to depart on the first stage of our scheme to put the Bahrain Scouts on the air for JOTA 1970.

Time had been short, each amateur scrounging gear on his own —and successfully. We moved off with three generators, five drums of three-core, two 48 and 30ft masts, and enough feeder to have stayed home in the shack! Cadging prize to Josh, whose popularity with erstwhile friends now vy QSB.

At the camp of 1st Manama Scout Group in Bahrain's stony desert, atop a small bare hill, wind gusted to 35 knots as seven struggled to hold down the operating tent while Scouts socked steel pegs into unyielding rocky ground. At 85°F with sandblasted bodies and dust-filled eyes we realized how practically the Bedouin dress.

"MP4 Bahrain scouts testing" produced OZ7 at S8 and the pile-up began. Scout-erected Marconi for 40, multiband dipole and TA33sr were all used to good effect during the next 33 hours of continuous operating, the gp proving its worth under contest conditions when given a good sky-hook and clear take-off. MP4BFO's Sommerkamp FT250—so handy for this kind of work, was joined next day by Tom's (MP4BHH) complete MP4QBK expedition kit and an RA17.

Helped by frantically-logging and QSL-writing Scouts, we worked 75 countries, and 86 of the 400 QSOs were with other Scout stations.

Next year we will complete the 48 hours, so look for "ARAB works DXCC".

John Dark, MP4BEO, Hon Sec, ARAB.

SOCIETY AFFAIRS

A brief report of the Council meeting held at Society HQ on 5 October 1970.

Present: *Mr J. W. Swinnerton (Immediate Past President, in the Chair) Dr E. J. Allaway, Messrs R. J. Hughes, A. Hunter, E. G. Ingram, G. R. Jessop, A. C. Morris, C. Parsons, J. R. Petty, W. Scarr, R. F. Stevens, G. M. C. Stone, F. C. Ward, E. W. Yeomanson (members of the Council), R. G. B. Vaughan (general manager) and A. W. Hutchinson (editor).*

Apologies for absence were received from Dr J. A. Saxton, Messrs B. Armstrong, L. E. Newnham and J. O. Brown.

As agreed at the previous meeting, Mr J. W. Swinnerton took the chair in the absence of Dr Saxton in America.

Radio Amateurs' Examination Manual

Mr Stevens reported that the manuscript for the new edition of the *Radio Amateur's Examination Manual* had been received from the author, Mr Benbow.

Scottish Mobile Rally and Zonal Conference

Mr Hunter reported that the rally and zonal conference had taken place as scheduled. The attendance had been most satisfactory.

Presidential Installation

Mr Scarr raised the question of a Presidential Address to be given at the time of or subsequent to the Presidential Installation. Mr Ward said that he had given this matter thought and felt that it might be possible to give such an address. He would report to a later meeting of Council.

ORMs and other provincial meetings

Messrs Petty and Ward reported that they had attended the Region 1 ORM and that a large number of members had been present.

Council noted the excellent organization at the Region 10 ORM, and passed a formal vote of thanks to Mr Parsons, who asked that his appreciation of Mr Stevens' participation in the ORM should also be recorded.

Mr Stevens reported that he had attended a meeting of the Cornish Amateur Radio Club at Camborne and had been made most welcome.

Mr Hughes reported that he had attended club meetings at Cray Valley and at Sutton and Cheam.

Membership and affiliation

It was resolved:

(i) to elect 105 corporate members and 44 associates;
(ii) to grant corporate membership to 12 associates;
(iii) to waive the subscriptions of four members due to blindness or other disability;
(iv) to grant affiliation to the West of Scotland Amateur Radio Society; Lowestoft College of Further Education Amateur Radio Society; The Limassol Amateur Radio Club, Cyprus; Carlisle & District Amateur Radio Society; Inverness Radio Society; Malaysian Amateur Radio Transmitters' Society, and Winchester Amateur Radio Club.

Exhibition at Geneva during Space Conference

Mr Stevens tabled a plan of the proposed exhibition and said that in his view it was necessary to provide displays, on a theme to be agreed, which could be sent from Region 1 countries to Geneva. After discussion, it was agreed that Mr Stevens should discuss the proposed exhibit with the IARU Region 1 Executive at an early opportunity and report back to Council.

Council agreed in principle to RSGB participation, and it was suggested that professional assistance might well be necessary in connection with the proposed exhibit.

Scrutineers for Council ballot

Council agreed to appoint Messrs J. Alderton, G8AEB; R. A. Bailey, BRS30664; A. Gordon, G3XOI; E. N. Hurle, G3RZN; and D. Thom, G3NKS, as scrutineers in connection with the Council ballot.

Trophies

Council approved the award of the Braaten Trophy to A. Slater, G3FXB, and the Milne Trophy to R. Belcourt, GD5APJ, on the results of the ARRL DX Telegraphy Contest published in *QST* for October.

YOUR OPINION

The Editor
Radio Communication

Sir—We have just attended a wake: this being the latest and, we hope, the last Radio-Comm Exhibition.

Isn't it about time the RSGB Council and others concerned had a radical rethink on the present concept, as offered at this and the previous three shows?

It is apparent, having regard to the peripheral exhibitors, strung widely and haphazardly together (in order to fill otherwise empty space), that there is not the support forthcoming from the bona-fide amateur trade at its present venue.

Would it not be preferable to hold this event in conjunction with established mobile rallies, making it three two- or three-day events strategically placed throughout the country? We would suggest Longleat, Woburn and Harewood.

The commercial boys could be invited to take on one or two large marquees for themselves exclusively, the cost would be considerably less than at present, and a wider market assured. Catering and bar could be subject to tender, and the RSGB might even make a profit; after making provision for the local organizing clubs.

Yours faithfully,
B. S. Sutherland, G3IES
A. L. Browning, G8TK
A. E. Robbins, G3YNX

The Editor
Radio Communication

Sir—In the October issue of *Wireless World* there was an article about the 1970 RSGB Exhibition, entitled "RSGB Exhibition. Where have all the experimenters gone? Seduced by sales talk every one!" The article says that there were only seven entries for the home-built equipment competition. In my opinion the lack of entries is due to the RSGB policy of vetting the equipment to decide if it is worthy of showing or not. Also, the policy adopted by the RSGB of insisting that equipment on display must be constructed from articles appearing in the previous year's issues of *Radio Communication* or that a constructional article must be published in *Radio Communication* within a year of the exhibition.

Some people, although having the skill to design and construct equipment, may not have the ability or the time to write a technical article, so do not bother to enter the competition. I would like to see these rules dropped for a trial period of say two years. Let anybody send in equipment for exhibition, including the under-16-ye ar-olds, and then see how many entries there are.

One last point, I would like to see the exhibition stations using home-built equipment only, instead of looking like advertisements for commercial equipment.

Yours faithfully,
J. R. Hooper, G3PCA

The Editor
Radio Communication

Sir—It is surely time that something was done about the pretentiously-named "International Radio Engineering and Communications Exhibition". We have again been disappointed with the exhibition which seems to decline more each year.

First of all, let it be admitted that the exhibition can never live up to its present name. It is an amateur radio show and in particular it is the RSGB Show. The present exhibition format does not succeed even on this more limited level. The visitor to the exhibition who, while in the communications field, does not have much direct knowledge of amateur radio, would surely come away with the view

that radio amateurs put little effort into their hobby and make no contribution to the art of communication. Amateur radio is having to fight hard to retain its present privileges. Our representative body is the RSGB and its reputation must be good if it is to successfully represent us. It is imperative, therefore, that, if there is to be an amateur radio show closely involving the RSGB, the show really promotes the cause of amateur radio. At the very least it should avoid reflecting detrimentally on our movement and on the RSGB.

The impression gained after attending the Annual General Meetings of the RSGB in recent years is that the Society has been little interested in the content of the exhibition provided that they could make a profit out of the sale of publications at the exhibition. This is a depressingly restricted view of an exhibition to which the Society lends its name. A much broader and more positive outlook is needed. This said, the question arises—if not the present exhibition, then what? No easy answer comes, but the following suggestions are offered.

It was interesting to note that on two days of the exhibition, lectures on mobile equipment and ssb receivers were given as an additional feature. This information appears in *Wireless World* (for *September*)! but not a word appears in *Radio Communication*, The idea of lectures is a good one but why not do it and publicize it properly.

As one suggestion, make the amateur radio show part of a convention having a properly arranged programme of lectures, discussions, demonstrations etc on various aspects of amateur radio and preferably covering a period of two or, at most, three days. At the same time cannot an effort be made to really display amateur radio in the show itself?

At present there is a section of the exhibition devoted to home-constructed equipment which was rather uninspiring this year. This is not a reflection on what was displayed but on the lack of entries. There is much interesting, and sometimes original, work done by amateurs. Many would hesitate to show their achievements on the basis that the construction does not come up to standard. This is especially true where many feel they are being compared with the "professional" amateur and the advantages he enjoys. It would be better to place more emphasis on putting across ideas even if their practical realization is less than perfect.

Even if this last point is accepted, there remains the problem of actually getting the individual to take the trouble to show his project, assuming the necessary space and facilities are made available. It is here that affiliated societies could play a part. There are many clubs who have ambitious club projects which could be displayed. Also the clubs could act as a valuable link between the individual and the otherwise remote show organization to take over the task of getting the individual project to the show.

It is hoped that this letter may act to stimulate discussion and suggestions as to how the present situation can be improved.

Yours faithfully,
E. H. Godfrey, G3GC
J. W. Bluff, G3SJE

The Editor
Radio Communication

Sir—We, of the Ilford Group, RSGB, wish to propose that for an experimental period the Exhibition Committee revert back to the original outlook as far as amateur-built equipment is concerned for the Society stand. This used to be a most interesting section that one could browse through, rather than admire and pass the few shining semi-professional items on view; but by all means keep these in also.

We feel that those who have the ability and art of good construction, rather than the experience to provide the text and diagrams required by the present terms of entry, should be allowed to compete. Also, why not have home-constructed equipment to provide the exhibition station; there must be lots of suitable stations around still.

Yours faithfully,
F. G. Jarvis, G3HIW, hon sec

The Editor
Radio Communication

Sir—I propose you cancel that event you call the RSGB Exhibition. In my own view it is not a success by any standard.

We need an annual convention not an exhibition of commercial products or sale of junk—certainly they add some interest but take them away and you have nothing! And these items can be seen and heard at regional mobile rallies or club meetings.

A convention should last two days and be held at a weekend during the late autumn or early spring. Its location should be in London with its added attractions and where it would be convenient for overseas visitors.

A place where a decent meal and drink can be obtained, informal meetings held, and lectures or debates of interest could be arranged.

I know the cost could be high, but I believe you only get what you pay for.

Yours faithfully,
C. W. Smith, G3CSE

The Editor
Radio Communication

Sir—Whatever happened to the Radio Hobbies Exhibition? All the periodicals including your own are bemoaning the fate of the Amateur Radio Exhibition (as it is now called).

Many years ago we used to have a stand there, it was always packed both the stand and the exhibition and it was great fun, then it moved to Seymour Hall and it was even bigger and better (we could then, I regret to say, only be spectators). Then came the decline. I thought last year's exhibition so poor that I never imagined another would be attempted. This, in spite of the fact that based on our yearly figures, the electronics hobby is growing at a tremendous rate. It seems a pity that this exhibition should disappear, and I would like to make the following suggestions:

(1) Widen the scope to include something for *everyone* whose hobby is electronics, (even include some hi-fi). When we had a stand at the exhibition we displayed electronic components generally and certainly did not confine ourselves just to the items that would interest the "Ham" fraternity. We even had crystal sets for schoolboys.

(2) Hold it every other year.

(3) Hold it later in the year, say October or November.

(4) Could it not be sponsored by all the leading journals, ie *Wireless World, Radio Constructor, Practical Wireless, Practical Electronics, Radio Communication* and *Short Wave Magazine*. Even if each journal just gave some free publicity that would guarantee success!

How about it, Mr Thorogood?

Yours faithfully,
A. Sproxton, director,
Home Radio Components Ltd.

The above letters are all rather critical of the RSGB Exhibition in its present form. As with many aspects of Society activity we only get the brickbats—dare we hope that the other 17,000 members are actually content with the exhibition?

A word of explanation about the present arrangements may not come amiss. For many years the RSGB ran the exhibition at the Royal Hotel, until it outgrew the available space. With the expansion of the exhibition and the necessary move to larger premises, the Society was not able to accept the financial risk or provide the necessary staff and facilities. At that time, professional exhibition organizer Phil Thorogood G4KD, offered to organize the exhibition on a commercial basis, and make a payment to the RSGB in recognition of the Society's sponsorship. Since then the exhibition has survived many larger contemporaries in other fields and achieved a good deal in presenting amateur radio to the public and the radio amateur. The RSGB has always been a primary exhibitor, taking stand space at the regular rates, but with the advantage of considerable voluntary help. Indeed, without voluntary helpers the Society could not have hoped to participate at all. The economics of running an exhibition in London (or anywhere else) do not favour the small operator—in fact, from the Society's point of view the amount of voluntary effort required would make it difficult to go outside London.

It may be diffcult for some to appreciate the many difficulties, both economic and practical, which face the organizer and the Society. Nevertheless it would be wrong to disregard any reaction from the membership, and foolish to imagine that all is perfect. Of the criticisms made, may we reply briefly to two of them.

(1) Content of Exhibition. *The old proverb which begins, "You can lead a horse to water . . ." is appropriate here. The exhibition is a commercial enterprise requiring that exhibitors justify the expense of their attendance—we cannot make people exhibit.*

(2) Lack of home-constructed equipment on display. *People often complain about the lack of home-constructed equipment shown, but we are mindful of the reply given by the late C. H. L. Edwards, G8TL, who, when presented with this complaint at an exhibition in the early 'sixties, enquired, "And where is your piece of equipment?"*

Exhibition Committee

The Editor
Radio Communication
Sir—I would like to add my voice to GM4QK's on home-constructed equipment: indeed I have known amateurs who concentrate on the looks of the equipment so much that an inferior electrical performance results!

Also, I know I am not alone in modifying my commercial transceiver to improve its performance; capacitors have been added to improve the carrier balance to get the carrier crystals spot on frequency, wiring has been modified to keep hum out of the vox and a new agc circuit added.

Pity the 100 per cent plug-in appliance operator who believes a commercial station is perfect! And as for the editorial suggestion in *Practical Wireless* that commercial rigs are popular as a cure for tvi—this would be screamingly funny if some people didn't believe it!

In other words, when spare time is at a premium a commercial rig is a good start, but to get first-class performance from it you have to be a home constructor.

Yours faithfully,

B. Priestley, BSc, G3JGO

The Editor
Radio Communication
Sir—I was very interested in the article "Loft Aerials" in the October issue of *Radio Communication*.

From February to October I operated on 20, 15 and 10 ssb with a TA33Jr three-element beam in the roof space of a house 21ft by 21ft on the south bank of the River Forth with a clear take off in the general direction of the USA. When the bands were open no difficulty was experienced in working right across to W6 and W7.

The ends of the elements were turned back at right angles parallel to the ground a few inches past the traps. This appeared to have no ill effects on radiation, although I worked a VU off the back on 10 on one occasion.

Also in the roof space I had a half-wave on 40 which was quite good, as countless WAB followers will agree when working NS98. This aerial was also very effective on 15 on its third harmonic, with contacts with Beirut and Singapore.

For those amateurs who have aerial problems don't forget the roof space. A good prefix comes in useful, as I found when operating as GM8RY during the recent 10m RSGB Contest.

Yours faithfully,

F. E. Wyer, G8RY

The Editor
Radio Communication
Sir—Although Mr Blanchard, in his letter, makes quite a good case for restricting ssb to certain sections of bands, I wonder if, in fact, his priorities are right. To open up holes in the middle of certain bands in the hope that someone will come along and fill them with amateur a.m. seems to be optimistic and possibly ill-advised in view of the present pressure on frequency space.

In the case of 80m, if the a.m. was actually there in quantity, trying to find a home, his comments might be acceptable. The co-existence of a.m. and ssb on Top Band seems to speak for itself in the number of cross-mode QSOs that take place. Would not the segregation of ssb bring about the situation I encounter on 2m and 4m in that my ssb signal appears to identify an outsider that not many people on a.m. want to talk to?

May I, therefore, augment G3JKV's basically sound arguments by suggesting that beginners make greater use of 10m. For some reason ssb operation here voluntarily crams itself into a segment of about 200kHz, and apart from the Russians, the phone section appears sparsely occupied. There is the room for your a.m.! It seems to me that an allocation could be made above 29MHz for a novice service on the lines of that which exists in the USA. This I feel would do more to encourage the real newcomer and ensure continued band occupancy. Hands up those who have operated above 29MHz lately!

I would really take G3JKV to task regarding the Citizens Band. This, surely, is "box-operating" at its worst. Comments in American periodicals indicate that the FCC realizes the magnitude of its mistake and the very shambles of the CB service will be legion to all, ensuring the non-introduction of a similar service in this country.

Yours faithfully,

R. A. E. German, G3OZT

The Editor
Radio Communication
Sir—The dilemma of the amateur is only an extension of what faces all humans as a whole, and I've had it in mind to enlarge upon it for some time, but I had decided not "to plough the sands". But now that I have read Mr Blanchard's letter in the October issue I feel that I have at least one kindred soul to support me.

This is not strictly true, for Pat Hawker, G3VA, and Barry Priestley G3JGO, have hinted at the situation which has arisen since amateurs have taken up ssb and commercialism has captured the market. Hasn't it been noticed how components have disappeared off the market? Where is the self-education angle now?

We've actually created a whole generation which never thinks of going on the air between 1800 and 2400 . . . at least on the hf bands, from 80m to 10m. We have also created a generation of amateurs who do not know how their apparatus works and many of them rely completely upon commercial services to keep them on the air.

Of all types of transmission, ssb is by far the most likely to produce tvi, cw comes next, then compressed a.m. followed by normal a.m. The least likely to do so is nbfm which should give only a blip at switch-on and switch-off. The reason, which anyone who has passed the RAE should know, is that all inductive circuits react violently against change. Most of us are surrounded by inductive circuits—tvi is caused more by breakthrough than harmonics, if a lpf is fitted.

Now ssb is nothing but violent change, whereas with nbfm there is no change on modulation. If there are criticisms of nbfm it is that the carrier carries no information, but if ssb is all information and no carrier but violent tvi, surely in the interest of being on the air nbfm is preferable. Incidentally fm is as effective as any a.m. of comparable power and is receivable on any receiver except one designed for ssb only; few would detect the difference from a.m. unless experienced, whereas ssb requires a special receiver.

Add just two small valves to a normal cw transmitter and you're in business; vfo is preferable but even crystal stages can be used. Simple! But of course the Jones' haven't got it, and neither would they have had ssb if dx hadn't taken it out with them so as to smash their way through the band population.

On 10m, now unfortunately going down, very low power (a local works all the dx on 10W) is as effective as any. There's still a.m. and nbfm on that band and some of the others.

It appears to be suicidal to increase rather than decrease power and to go ssb with tv sets so susceptible to interference. Our proximity to our neighbours is our biggest trouble; in America, Canada and Australia there is more space available around its inhabitants, and in most other places there is less tv.

If anyone still cares, you have been warned by G2BVN—"Use or Lose". There is every reason with the increasing population of our bands, (and for most, as it now is, there is little time to operate), that time, which is the equivalent of space, should be used—ie 1800–2400. The Americans have lost their 11m band and are fighting hard to hold on to the 10m, *verb sap.*

Yours faithfully,

W. H. Matthews, G2CD

Contests calendar

1971
9–10 January—AFS (Rules in this issue)
30–31 January—REF Contest (cw)
30–31 January—CQ WW 160m DX Contest
6–7 February—ARRL DX Contest (phone)
13–14 February—1st 1·8MHz (Rules in January 1971 issue)
20–21 February—ARRL DX Contest (cw)
27–28 February—REF Contest (phone)
6–7 March—ARRL DX Contest (phone)
13–14 March—BERU
20–21 March—ARRL DX Contest (cw)
27–28 March—WPX SSB Contest
4 April—LP 80m
21–23 May—YL ISSB QSO Party
5–6 June—NFD
3–4 July—Summer 1·8MHz
10–11 July—HP FD
12 September—80m FD
9–10 October—21/28MHz
23–24 October—7MHz cw
6–7 November—7MHz (phone)
13–14 November—2nd 1·8MHz

VHF National Field Day 1970

Overall winners

Mid-Essex VHF-UHF Contest Group

Overall runners-up

GB2GD Expedition Group

Band winners

70MHz GB2GD Expedition Group
144MHz GB2GD Expedition Group
432MHz Chester Radio Society
1,296MHz Mid-Essex VHF-UHF Contest Group

Country winners

England Mid-Essex VHF-UHF Contest Group
Scotland Albright & Wilson Amateur Radio Society
Wales Midland Amateur Radio Society
N. Ireland Mid-Ulster RSGB Group
Isle of Man GB2GD Expedition Group
Channel Islands GC3WMR

At 1800gmt on the evening of 5 September, the 70, 144 and 432MHz bands burst into frenzied activity as the ninth VHF National Field Day got under way. The 1,296MHz band also came in for more use than it had for most of the year. At some stations proven equipment in the hands of experienced operators showed its worth. At other sites new gear got its first airing and newcomers to the vhf bands had their first taste of portable operation. In addition to all the portable activity, a handful of fixed station operators taking part in the IARU Region 1 VHF/UHF Contest added their voices to those of the people who had come on the air to chase counties and countries or simply to "hand out a few points". Some of the operating was a little too frenzied (as the table of garbles shows), and the chief operator of one group was horrified to discover that one of his team had omitted to log any QTHs as he did not think they were required!

The Mid-Essex VHF/UHF Contest Group held first place for the third successive year and finished 16th, 4th, 2nd and 1st on the four bands. Runner-up, the GB2GD Expedition Group, reversed the order of things by finishing 1st on both 70 and 144MHz, 10th on 432 and 22nd on 1,296. A lot of familiar calls appear near the top of the table but Southdown ARS came up from 40th to squeeze into the top 10, without using 1,296MHz. Westmorland VHF Group did well to achieve 11th place with only two bands.

All UK prefix areas were represented, with nine GW entries, six GM, two GI and one each GC and GD. Quite a large number of GM calls appeared in the logs and some portables that are known to have been active have not sent in entries. One group gave its name as the "Scottish Residential Non-Pre-Arranged Contacts Contest Group—Moray Firth Division" but this would not fit into the results table!

Thanks go to the following for their checklogs: G2BQ, G3ASR (Edgware & District ARS), G3IAR, G3MNL, G3ROG, G3SZS, G3WDS, GM3EOJ, G5FK, G6HD, G8LY, G8ARM and G8DYC. Receiving entries are acknowledged from A5032, A6111, A6585, BRS28005, BRS30692 and BRS31172. These will be credited to the Listeners' Championship or passed on to the IARU Listeners' Contest as requested.

The increase in the entry for the IARU Region 1 VHF/UHF Contest was most gratifying. Thirty-one 144MHz, 15 432MHz and 23 1,296MHz logs have been passed on to SRAL. Checked scores will be published next month with the results of the IARU UHF/SHF Contest.

70MHz

Seven out of the 10 leading groups on this band are from last year's "Top ten". Last year's winner, Blackpool & Fylde ARS, slid down to number 31, having found its chosen site in Scotland already occupied. The other "drop-outs" were Mid-Severn Valley Raynet which was not on 70MHz this year and the Ysbyty Ystwyth Group which as EI2VDE operated from a site near Shillaghle which they wisely refrained from giving as a QTH for the contest exchange!

However, the top spot remained in the Isle of Man with the GB2GD Group coming up from fifth place. Runner-up was Westmorland VHF Group. Pennine VHF Group retained third place and appears to have worked almost everybody on the band, with 165 QSOs, 30 more than Guildford which had the second highest bag but only made 18th position due to the relatively high number of one and three point contacts.

As there are only a very few stations outside the British Isles on this band, there appears to be less need for high-gain aerial systems as all that might be gained is a few contacts with poorly-sited fixed stations. A more important factor is that rather neglected item, the tunable i.f. or main receiver. All the work on the converter is wasted if weak signals cannot be copied due to insufficient selectivity or spurious responses caused by the converter output overloading the main receiver. G3FVG reports using the aerial more to reduce interference on receive than to ensure the best outgoing signal. The understatement of the contest came from GM3OFT, "Some evidence of QRM in the south."

144MHz

The GB2GD Expedition Group retains the top spot on this band, and it is surprising to note that this result was achieved without any assistance from the Continental contacts that did so much to swell the scores of many stations. Runner-up Mid-Severn Raynet Group only claimed 2,273 points which would have given it 44th place had not the adjudicator spotted the omission of the multiplier from its score!

Opinion on conditions varied. (It always does!) Comments stretched from an enthusiastic "Wonderful, good EU bag" via "Curate's egg" to a disconsolate "Abominable by any standard". Several HB stations were worked but there was nothing to be heard from Scandinavia. The usual F, ON, PA and DL calls figured in many logs and a DJ/LX station also put in an appearance.

Dunstable Downs RC suggests that 144MHz ssb is as good as an extra band while Clifton reports 45 per cent of its contacts on this mode. Verulam points out that hf operators helping out on VHF NFD are more at home with the single frequency working that usually goes with ssb and are able to surprise the vhf types with their rate of scoring!

The standard of log-keeping on this band was rather poor and the adjudicator is forced to agree with Stourbridge which asks, "Will people please not give 5/9 reports and then ask for repeats." An honest report of, say, 3/5 conveys the fact that repeats are desirable and that care should be taken in giving the contest exchange.

432MHz

The top score on this band was again made by G8AWS/P, this time representing Chester RS. With one less QSO than in 1969, the score before multiplication was only down by two! More than half of the contacts were within 100km, which says a lot for the level of activity in the Midlands and North. In second place, Mid-Essex operating G3LTF/P equalled its 1969 bag of 83 QSOs. Thirty-seven were within the 100km ring.

Most operators were agreed that conditions were poor except for a lift on the Sunday morning .GD3WMS described the band as varying from "not too hot" to "terrible", while GW3HAZ mentioned very heavy QSB.

Harmonics from 144MHz stations came in for some criticism in several entries. Surrey Radio Contact Club (G2RD/P) could hear several of its neighbouring groups' harmonics at better strength than that from G3ODY/P their own 2m station! AERE Harwell Club reported a superb signal on 432 from a GW 144MHz station. This all seems to show that it is not as hard to get on 70cm as some of the 2m fraternity might think. On the other hand, 144MHz stations around High Wycombe were treated (?) to an S9 signal from one of the 432MHz entries, which, falling in the cw part of the band, may have affected the score of one of the GM stations on a nearby channel. All operators are urged to let "offenders" know about this sort of interference as soon as possible, as no points are deducted unless the interfering station has been informed and taken no action.

It was noticed that most stations tended to congregate below 432·5MHz, causing unnecessary QRM. This was presumably partly for convenience in transferring to 1,296MHz and partly due to so many stations tuning "low to high." If all the stations not equipped for 1,296 had tuned "433·5 down" a more even distribution might have been achieved.

1,296MHz

Although the number of logs submitted this year was the same as last, there were three more scoring logs. The overall picture seems to be as for 1969, despite conditions being slightly worse; best QSO being between G2RD/P and G8DBY/P at a distance of 249km.

The scoring system for 1,296MHz met with approval from all but GD3WMS/P. Other comments on the rules appertaining to this section were almost non-existent.

The band leader was once again G3LTF/P with a margin of 657 points and five QSOs over the runner-up, G2RD/P. The equipment used by G3LTF/P consisted of a 4ft dish 20ft above ground, a 1N4386 varactor producing 7·5W rf into the dish and a receiving system using a KD5000 transistor rf stage followed by an MA416E mixer giving an overall noise figure of 5·5dB.

Equipment used by other entrants seemed almost identical to last year's. Fifteen 2C39As were in use with five varactors and two DET24s, and on the receiver side all used crystal mixers, three stations using transistor rf stages.

In all, on the 1,296MHz band there seems to be little progress from last year.

The rules

Most criticism of the rules was aimed at the timing, many groups suggesting that the close-down should be brought forward to give adequate time for packing up before nightfall. Last year, the RSGB event was two hours shorter than the IARU Region 1 Contest but it was decided to revert to 24 hours so as not to handicap British entrants in the latter. It may be that the sudden removal of much of the QRM for the last two hours might have been more helpful! At least one of our European neighbours ran a shorter contest.

A few groups proposed that the exchange of QTH should be dropped or that county codes should be substituted. However, as G3UKV points out, there are still a lot of wrong QRA locators being given. One group correctly sent their locator in ZK but changed it to ZL on the cover sheet. To add to the confusion, they worked a station near Oxford in ZL and failing to copy the QTH, guessed it as Southampton which is in ZK! There have been several articles on the QRA locator system, the most recent in the March 1969 *Radio Communication*.

Mid-Severn Valley Raynet Group want Rule 15 amended to make telephony operation in the cw sub-bands an automatic disqualification. Several reports have been received of this, and where more than one report has been received the stations concerned have lost points. So if your score is much less than expected, check your "low end" crystals!

Three groups, Blackpool & Fylde, Shefford, and Verulam, feel that it may soon be necessary to "register" sites before the event, as is done for the HF NFD in June.

One operator objected to having to put the logs through the typewriter twice to enter the IARU contest, time being at a premium. The VHF Contests Committee resisted the temptation to write a four-letter word on the receipt postcard, and contented themselves with sticking pins in his QSL card in the odd moments between checking the logs!

A surprising number of operators applied the band multipliers to each individual contact instead of simply multiplying the total. This is apt to confuse the adjudicator who is not accustomed to finding a page full of 30-pointers!

One group queried the seven day rule (Rule 9). This was introduced to ensure that all competitors started out with an equal chance of equipment troubles, local interference or other snags. In recent years some stations operated from their field day sites for a period before the contest and thus had time to sort out any such difficulties, although it is assumed that they dismantled and re-erected their equipment within the period allowed in the old rules.

Adventures and misadventures

The first log to arrive came from GI8AYZ, who claims to have posted it three hours before the end of the contest! He had to repair his receiver on arrival at the site, no mean feat in the front of a "Mini". Finnagle's Law struck a second time when an hour after he had erected the aerial (single-handed) in a howling gale, a flat calm descended!

G3OTD requests a cure for QRM from cows. In his case, the 160m whip was chewed off the car so he is temporarily QRT on top band! The operators at G3VVV/P (Nailsworth) suffered somewhat smaller intruders when their lights attracted every insect for miles around.

Reigate submitted a tale of woe almost as long as its log, having moved its station at short notice and then found that one of its receivers was duff. As if that was not enough, an 18-element Parabeam was broken, causing the club funds to sink to an all-time low!

Burnham Beeches found itself 40ft from a fun-fair, with six generators dishing out something like 100kW not far away! Other stations, notably the GB2GD Group, suffered from trouble with their own generators. A burnt-out exhaust valve put GD3VXK/P off the air as far as 144MHz ssb was concerned and must have cost it a lot of points.

The AERE Harwell club which in the small hours of the morning of a 144 Open some years ago announced their location as "Ten km west of Watney's", this time mention that "Somebody brought some beer, but we were only here for the contest!"

Quickies

"The new transmitter seemed to be on 288MHz!"—(Name and QTH supplied)
"Order same wx for next year."—Shefford.
"Stations sitting at lf or hf end calling CQ should be castigated."—Verulam.
"We think the rules are reasonable at last."—Bournemouth-Poole.
"Managed to contact three stations on 23 without linking up on 70, much to the surprise of the other operators."—Wessex.
"Contest highlighted by lack of the overmodulation usually encountered."—Harlow.
"Perhaps a fund could be set up to supply a QRA to those lacking it."—Southdown.
"One local insisted his locator was TQ69B."—Southend.
"I could do with a good night's sleep."—G2AXI, 144MHz checker.

Garbles

QTH given	Copied as
Oakham	Oakhampton
St Helier	St Helens
Wrotham	Wrotherham
Wrotham	Luton
Wrotham	Witham
Kirby Lonsdale	Carbyfordsdale
Kirby Lonsdale	Kirby Cambsdale
Winchester	Westminster
Creetown	Wigtown

Comparison of entries

Band (MHz)	1968	1969	1970
70	63	74	76
144	83	103	134
432	44	56	68
1,296	20	24	24
Overall entries	91	118	138

OVERALL RESULTS

Posn	Group	Callsigns 70MHz	144MHz	432MHz	1,296MHz	Total score
1	Mid-Essex VHF-UHF Contest Group	G3VPK	G3SKT	G3LTF	G3LTF	16,848
2	GB2GD Expedition Group	GD3PSH	GD3VXK	GD3WMS	GD3WMS	16,650
3	Pennine VHF Group	G3RIK	G3PUO	G3XAD	G3XAD	14,639
4	Midland ARS	GW3BA	GW3MAR	GW3HAZ	GW3HAZ	13,914
5	Surrey Radio Contact Club	G8TB	G3ODY	G2RD	G2RD	13,374
6	Crawley ARC	G3TR	G3WSC	G3FRV	G3FRV	12,371
7	Bournemouth-Poole VHF Group	G3UZD	G3PFM	G3OBD	G3OBD	12,088
8	AERE Harwell ARC	G3PIA	G3NNG	G3JKX	G3JKX	11,483
9	Radio Society of Harrow	G3TUX	G3EFX	G3HBR	G3HBR	11,465
10	Southdown ARS	G3XUS	G8BQX	G8CFZ		11,129
11	Westmorland VHF Group	G3FDW	G3EBR			10,504
12	RAF Sealand ARC	GW3ITZ	GW3NTI	GW3LAI	GW3LAI	10,258
13	March & District ARS	G3REH	G3PMH	G8BBB		10,160
14	Wirral ARS	GW3NWR	GW2AMV	GW3VQT		9,500
15	Chester ARS		G3GIZ	G8AWS		9,291
16	Cumberland VHF Group	G3WIN	G3RHE	G3BJD		9,288
17	Mid-Herts ARS	G3AAZ	G3PKV	G3WGC	G3WGC	9,232
18	Southgate RC with Hadleigh Contest Group	G3TDM	G3SFG	G3FD	G3FD	9,179
19	Dunstable Downs RC	G3WBC	G8DDC	G3VZV	G3VZV	9,077
20	Cornish VHF Group	G3XFL	G3XC	G2BHW		8,982
21	Albright & Wilson ARS	GM3YRJ	GM3OXD	GM3NZS	GM3NZS	8,877
22	Derby & District ARS	G2DJ	G3ERD	G8DBY	G8DBY	8,441
23	South Dorset RS	G3VPF	G3SDS	G3RZG	G3RZG	8,087
24	Northern Heights ARS VHF Group	G3UGF	G2SU	G8BCL		7,975
25	Caesaromagus VHF/UHF Group	G3ZHH	G3SLJ	G8BIM		7,876
26	Echelford ARS	G3TDR	G3UES	G2HDJ		7,742
27	Grimsby ARS	G3NJF	G3XDY	G8DEN		7,437
28	Stockport RS	G3NUQ	G6UQ	G8BCG		6,876
29	Clifton ARS VHF-UHF Group	G3GHN	G8APV	G3JKY	G3JKY	6,842
30	Mid-Norfolk VHF Group	G3JQI	G3JIE	G3XPT	G3XPT	6,730
31	Stourbridge & District ARS		GW6OI	GW3KZG	GW3EEZ	6,697
32	Ealing & District ARS	G3WMQ	G3UUP	G3THQ	G3THQ	6,687
33	Mid-Severn Valley Raynet Group		GW3NUE			6,666
34	Leicester RS and Leicestershire VHF/ UHF Group	G5UM	G3LRS	G5UM		6,504
35	Mexborough & District ARS	G3VJR	G8BKQ	G3WHC		6,369
36	Cray Valley RS	G3TAA	G3YGR	G3RCV		6,209
37	Verulam ARC of St Albans	G3NOH	G3VER	G3OFH		6,182
38	City & County of Bristol RSGB Group	G3XFS	G6YB	G3TWT		5,897
39	Guildford & District RS	G3VIR	G3HTP	G3TLM	G3TLM	5,745
40	Stean Group	G3WTF	G3ZJY	G3NPO		5,505
41	Cambridge & District ARC	G3VCV	G2XV	G8CKU		5,380
42	The Borders Contest Group	GW3SNN	GW8BNJ			5,326
43	Shefford & District ARS	G3FJE	G8CTB	G8AKT		5,301
44	Norfolk ARC	G3YIR	G8AUN	G8AWZ		4,979
45	Reigate ATS	G3NKS	G3REI			4,849
46	G3TXR/G8BHY Team		GW8BHY			4,755
47	Luton VHF Group	GW3TDH	GW8CDL	GW3TUI		4,692
48	G3EMU/G8AJC		G3EMJ	G8AJC		4,659
49	Worthing & District ARC	G3WOR	G8BDJ			4,536
50	Salop ARS		G3SRT			4,530
51	Wessex ARG	G3WJJ	G3YWG	G3NIL	G3NIL	4,138
52	Ainsdale RC	G3XIM	G2CUZ	G3VNQ		4,112
53	Yorvik VHF Group	G3JFO	G3UUT			3,986
54	Crystal Palace & District RC	G3IIR	G3XFT	G3VCP		3,829
55	Yeovil ARC		G3CMH	G8AFA	G8AFA	3,644
56	Wulfrun Group		G3ONP	G8ANX		3,627
57	Coventry ARS	G3RIR	G2ASF			3,566
58	Mid-Ulster RSGB Group	GI3CVH	GI3ILV			3,442
59	North Riding ARG	G3PEJ	G3GJY	G3WTX		3,400
60	Sutton Coldfield RS	G3XZR	G3RSC	G8AVH		3,298
61	Gloucester Group	G3MA	G8DKR			3,279
62	Purley & District RC	G3SJX	G3VKI	G3WRR		3,228
63	Jersey Solo		GC3WMR			3,117
64	Ysbyty Ystwyth Contest Group	EI2VDE	EI2VDH			3,011
65	Oatlands Scout ARG		GW8DXO	GW8CKT		2,805
66	Pontypool ARC	GW3VXC	GW8BOQ	GW3UUS		2,803
67	Minehead Area ARC		G8BCI			2,673
68	Woodmansterne Group	G3KTA	G8CCK			2,656
69	G8CMB		G8CMB			2,609
70	G3KSU	G3KSU				2,596
71	Southampton RSGB Group		G3SOU			2,520
72	Maidenhead & District ARC	G3WKX	G3FVC	G3VCT		2,452
73	Oxford & District ARS	G3UJO	G3UJO	G8PX	G8PX	2,435
74	Paddington & District ARS		G3PAD	G8AQO		2,427
75	Salisbury & District SW Club	G3PWK	G3FKF			2,385
76	Stockingford/Hinkley Group		G8CVD			2,339
77	Cardiff RSGB Group	GW3MSY	GW3GHC			2,310
78	Skegness & District Group	G3THX	G3OTD			2,268
79	Hartlepool ARC		G3IDV	G3NWU		2,259
80	Colchester Group	G5YK	G3SJO			2,247
81	Blackpool & Fylde ARS	G3NJN				2,224
82	RNARS with Fareham RC	G3BZU	G3VEF	G8BLW		2,153
83	G8BGR/G8DKK/G3ZFR		G8BGR			2,148
84	Mid-Sussex ARS	G3RXJ	G3ZMS			2,139
85	Swindon & District ARC		G8BGA	G8AVG		2,127
86	Mid-Cheshire ARS	G3JWK	G8CFY			2,105
87	Kidderminster & D VHF/UHF Group		G8AKX			2,061
88	South Birmingham RS VHF Group		G8BQB			2,046
89	Wakefield & District RS	G3WWF	G3WRS			2,012
90	G3OTK		G3OTK			1,914
91	Vange ARS		G8BPS	G8DAV		1,854
92	Moray Firth ARS	GM3TKV	GM8AGU	GM8AZS		1,784
93	Spalding & District ARS		G3VPR			1,722
94	West of Scotland VHF Group & Glasgow University RC	GM3OFT	GM6ZV	GM3YND		1,687
95	Hull District ARC		G3AMW			1,656
96	Southend & District ARS		G5QK			1,638
97	G8CKC		G8CKC			1,558
98	Pudsey & District RC	G3XUD	G3XEP			1,529
99	Tyneside ARS		G3OZP			1,497
100	Solihull ARS		GW3GEI			1,488
101	GI8AYZ		GI8AYZ	GI8AYZ		1,464
102	Mid-Warwickshire ARS	G3EHA	G3UDN			1,442
103	G2WS	G2WS		G2WS		1,308
104	Goadby/Elliott Group		G8BZN			1,269
105	Ebor Group	G3YZR	G8BNE			1,192
106	South-East Kent ARC	G3YMD	G8CUB	G8DOH		1,154
107	Lincoln SW Club		G3IXH			1,137
108	G3KFN/G3YBK VHF Contest Group		G3KFN			1,083
109	Swansea Telephone Area RS		GW3ZGK	GW3CBY		1,014
110	Chippenham & District ARC		G3UFW	G3UFW		963
111	G3BPM		G3BPM			936
112	Ipswich RC		G8CJL			852
113	G8AFN		G8AFN			795
114	Hull Group		G3WWD			775
115	Border ARS	GM3KML	GM8BDX			689
116	G3TLK		G3TLK			678
117	Ilford Group	G3XRT	G3XRT			623
118	GM3OXX		GM3OXX			486
119	G8CEA/GM		GM8CEA			42

Disqualified entries

Rule	Group	Callsigns 70MHz	144MHz	432MHz	Claimed score
12b	Gravesend ARS		G3GRS		496
20a	Bury & Rossendale RS	G3SUI	G3BRS	G3SUI	3,337
20b	Barry C.O.F.E. RS		GW3VKL		3,558
20c/d	N. Buckinghamshire ARS		G8AAT		537

70MHz BAND RESULTS

Posn	Callsign	Score	Best dx	Km	QSOs	County code
1	GD3PSH	5,196	G3DAH	505	118	IM
2	G3FDW	4,924	G3XFC/P	525	120	WD
3	G3RIK	4,760	GM3TKV/P	—	165	SE
4	GW3ITZ	4,000	G3XFL/P	362	124	DB
5	GM3YRJ	3,964	—	—	92	KB
6	G3WIN	3,744	G3NKS/P	461	98	CD
7	G3NJF	3,324	—	—	106	LN
8	GW3NWR	3,284	G3XFL/P	338	121	FL
9	GW3BA	3,100	G3DAH	342	107	MG
10	G3XUS	3,092	GI3CVH/P	585	116	SX
11	G3MRA	3,088	GI3CVH/P	479	120	HE
12	GW3TDH	3,048	GM3YRJ/P	372	100	MH
13	G3VPF	3,032	GM3YRJ/P	466	99	DT
14	GW3SNN	3,010	GM3TKV/P	475	106	MG
15	G3TUX	2,992	GI3CVH/P	604	120	—
16	G3VPK	2,984	GI3CVH/P	538	125	SX
17	G3XFL	2,976	—	—	76	—
18	G3VIR	2,760	GI3CVH/P	528	135	SY
19	G3VJR	2,700	—	—	98	YS
20	G3TR	2,612	GI3CVH/P	540	119	—
21	GI3CVH	2,608	G3NKS/P	608	68	—
22	G3KSU	2,596	—	—	101	HE
23	G2DJ	2,404	G3WKF/P	365	93	DY
24	G3PIA	2,396	GI3CVH/P	513	101	BE
25	G3NKS	2,368	—	—	96	SX
26	G8TB	2,320	GM3YRJ/P	526	99	SX
27	G3TAA	2,304	—	—	105	KT
28	G3TDM	2,248	GM3YRJ/P	410	121	BS
29	G3WOR	2,236	—	—	100	—
30	G3TDR	2,228	GI3CVH/P	510	106	HF
31	G3NJN	2,224	G3NKS/P	440	62	LE
32	G3XFS	2,180	—	—	86	ST
33	G3UGF	2,150	—	—	73	YS
34	G3UZD	2,125	GM3YRJ/P	460	81	WE
35	G3YIR	2,060	GM3YRJ/P	410	65	NK
36	G3XIM	2,048	G8TB/P	400	65	WD
37	G5UM	2,040	—	—	87	LR
38	G3REH	2,036	G3XFL/P	418	77	CB
39	EI2VDE	1,944	G3XUS/P	520	44	—
40	G3MA	1,932	—	—	84	GR
41	G4JW	1,912	—	—	68	—
42	G3JFO	1,895	EI2VDE/P	412	59	YS
43	G3TCR	1,860	—	—	86	BE
44	G3WTF	1,848	EI2VDE/P	413	63	YS
45	G3RIR	1,816	—	—	77	WK
46	G3AAZ	1,756	—	—	86	HR
47	G3WKF	1,732	GM3YRJ/P	510	47	CL
48	G3WMQ	1,704	GM3YRJ/P	387	83	OX
49	G3KTA	1,696	GM3YRJ/P	510	86	—
50	G3JQI	1,688	—	—	62	NK
51	G3NOH	1,664	—	—	73	—
52	G3EEO	1,624	—	—	66	—
53	G3FJE	1,572	—	—	77	BD
54	G3XZR	1,516	—	—	65	—
55	G3SJX	1,500	GD3PSH/P	430	85	SY
56	G3GHN	1,468	—	—	72	SX
57	GW3VXC	1,460	G3FDW/P	330	55	MH
58	G3ZHH	1,432	G3FDW/P	440	57	—
59	G3IIR	1,384	—	—	80	SY
60	G3WBC	1,378	—	—	88	BS
61	G3WWF	1,304	G3XFL/P	472	48	YS
62	G3THX	1,288	—	—	41	—
63	G3BZU	1,196	—	—	63	HE
64	G3PWK	1,172	G3FDW/P	422	52	HE
65	G5YK	1,152	G3WIN/P	418	41	—
66	G3VCV	1,084	—	—	50	CE
67	G3MGS	928	G3FDW/P	438	39	DT
68	G3PEJ	856	G3VPK/P	375	33	YS
69	GM3OFT	832	G5UM	407	31	RW
70	G3WJJ	816	—	—	54	DT
71	G3RXJ	804	—	—	50	SX
72	G3JWK	704	—	—	46	CH
73	G3WKX	652	GW3NWR/P	215	49	—
74	GW3MSY	588	G3JQX/P	266	24	MN
75	GM3TKV	500	G3RIK/P	516	11	KN
76	G3UJO	420	—	—	27	OX
77	G2WS	348	G3NJF/P	282	20	ST
78	G3YZR	316	GW3SNN/P	270	22	YS
79	G3XRT	308	—	—	25	—
80	G3YMD	272	G3MRA/P	180	20	—
81	G3XUD	268	G3XUS/P	360	13	KT
82	G3EHA	164	G3TR/P	140	10	WK
83	G3NUQ	125	—	—	12	SD
84	GM3KML	20	GM3TKV/P	125	1	BW

432MHz BAND RESULTS

Posn	Callsign	Score	QSOs	County code	Ops	RF stage	Aerial
1	G8AWS	6,612	109	DY	1	TIXM101	46 ele M.b.
2	G3LTF	5,928	83	SX	2	K5000	48 ele stack
3	G8BCG	5,280	90	SD	2	BF180	18 ele P.b.
4	GW3HAZ	4,992	68	MG	7	TIS34	14/14 Yagis
5	G3JKX	4,764	84	BE	4	BF180	32 ele stack
6	G3OBD	4,692	71	WE	3	AF239	48 ele stack
7	G2RD	4,332	65	SX	4	AF139	P.b.
	G8BBB	4,332	63	CB	2	BF180	P.b.
9	G3HBR	4,212	60	—	2	BF180	2 × 46 ele M.b.
10	GD3WMS	4,068	31	IM	1	BFY90	14/14
11	G3XAD	4,056	66	SE	3	BF180	—
12	G8CFZ	3,912	51	SX	5	BF180	M.b.
13	G3FRV	3,648	59	—	4	BF180	18 ele P.b.
14	G3WGC	3,540	67	HF	5	AF186	14 ele
15	G2HDJ	3,408	60	HF	2	BFY90	14 ele S.b.
16	G3NPO	3,228	40	YS	4	AF139	2 × P.b.
17	G3VZV	3,096	65	BS	3	BF180	26 M.b.
18	G3FD	3,084	65	BS	4	GM0290	M.b.
19	G3XPT	2,952	38	NK	3	GM0290	—
20	GW3VQT	2,940	45	FL	7	GM0290A	—
21	G8BCL	2,652	39	YS	4	AF239	—
22	G8DBY	2,640	55	DY	3	AF239	M.b.
23	G2BHW	2,556	19	—	2	AF239	—
24	G3RZG	2,508	39	DT	3	AF186	46 ele M.b.
25	G3NIL	2,364	39	DT	4	BF180	—
26	G8CKU	2,196	38	CE	3	BF180	18 ele P.b.
27	G3THQ	2,160	48	OX	2	A2521	18 ele P.b.
28	G8AKT	2,136	41	BD	4	AF139	—
	G3RCV	2,136	44	KT	5	BF180	18 ele P.b.
30	GW3LAI	2,100	39	DB	3	AF239	2 × 14 ele P.b.
31	G5UM	1,932	46	LR	9	AF186	—
32	GW3KZG	1,896	32	DB	3	AF239	11 ele Yagi
33	G3TLM	1,740	44	SY	3	BF180	8/8
34	G3VCP	1,692	49	—	5	TIS88	46 ele M.b.
35	G8AFA	1,584	36	WE	3	AF139	24 ele Yagi
36	G8ANX	1,476	35	SD	2	AF279	18 ele P.b.
	G3WHL	1,476	30	YS	3	BF180	—
38	G3JKY	1,392	28	SX	2	2N1742	Corner Ref.
	GM3NZS	1,392	13	KB	10	FET	—
40	G8BIM	1,332	33	—	4	FET	2 × M.b.
41	GW8CKT	1,164	14	BR	1	BF180	M.b.
	G3TWT	1,164	31	ST	2	A2521	—
43	G3WRR	1,152	31	SY	3	BF180	8/8 Slot
44	G3BJD	1,128	18	CD	6	TIS88	13 ele Yagi
45	G3VNQ	1,080	19	WD	2	BF180	7 or 14 ele
	G8DEN	1,080	19	LN	3	AFZ12	48 ele stack
47	G8PX	1,008	28	OX	3	GM0290	8/8 Slot
48	G8AQO	996	29	BS	6	JXK	14 ele S.b.
49	G3NWU	984	19	—	3	GM0290	—
50	G2WS	960	23	ST	1	BF180	11 ele Yagi
	G8AWZ	960	12	NK	2	BF180	M.b.
52	GW3TUI	876	23	MH	3	AF139	18 ele Yagi
53	G3OFH	864	21	—	4	JXK	—
54	G8AVG	780	23	WE	2	BF180	—
55	G3VCT	732	25	—	4	2N5245	18 ele
56	GW3UUS	648	22	MH	2	2N3819	8/8
57	G3WTX	528	9	YS	—	BF180	22 ele M.b.
58	GW3CBY	336	5	GN	2	GM0378	14 ele Yagi
59	G8NN	324	13	—	2	Tstr	—
60	GI8AYZ	276	4	AM	1	GM0290	18 ele P.b.
61	G3UFW	250	14	—	5	FET	—
62	G8AVH	228	11	—	2	FET	18 ele P.b.
63	G8DAV	166	7	AL	1	A2521	M.b.
64	GM3YND	132	5	RW	3	GM0290A	18 ele P.b.
	G8BLW	132	7	HE	1	6CW4	—
	GM8AZS	132	3	KN	—	2N3819	18 ele P.b.
67	G8DOH	108	3	KT	2	6CW4	8 ele Yagi
68	G8AJC	72	2	KT	2	BF180	18 ele P.b.

144MHz BAND RESULTS

Posn	Callsign	Score	Best dx	Km	QSOs	County code
1	GD3VXK	7,188	G3EMU/P	523	220	IM
2	GW3NUE	6,666	F1SA	840	280	BR
3	G3EBR	5,580	F1AEX/P	575	194	WD
4	G3SKT	5,436	HB9AEN/P	710	195	SX
5	GW3MAR	5,316	ON5EW/A	660	246	MG
6	G3SLJ	5,112	DL8KV/P	640	202	HE
7	G3PUO	5,043	DC8DC/P	830	219	SE
8	G3ODY	4,879	F5PL/M	832	205	SX
9	GW8BHY	4,755	ON5EW/A	670	257	DB
10	G3EMU	4,587	F6ADZ/P	613	168	KT
11	G3WSC	4,539	DK1NS/P	705	175	SX
12	G3RHE	4,416	G3EMU/P	467	156	CD
13	GW6OI	4,149	ON4RY	560	202	DB
14	G8BQX	4,125	HB9AEN/P	615	176	SX
15	G3PFM	4,107	F6ADZ/P	703	174	WE
16	G3SRT	4,053	DC8DC/P	815	203	SE
17	G3PMH	3,792	GM8AGJ/P	515	183	CE
18	G8APV	3,777	HB9AMH/P	647	142	SX
19	G8DDC	3,741	DC8DC/P	728	205	BD
20	G3VER	3,654	HB9ALG/P	730	159	EX
21	G3EFX	3,569	GI8AYZ/P	591	194	SX
22	GM3OXD	3,521	G3SLJ/P	505	121	KB
23	GW3NTI	3,489	ON4RY	558	169	DB
24	G3XC	3,450	G3EBR/P	505	109	CL
25	GW2AMV	3,276	F9NJ	496	168	FT
26	G2SU	3,173	F2TU/M	852	139	YS
27	GC3WMR	3,117	GW2AMV/P	415	110	JY
28	G3XDY	3,033	EI2VDH/P	425	140	LN
29	G3NNG	3,011	DJ9DL	606	187	BE
30	G3SFG	2,931	GI8AYZ/P	475	188	BS
31	G3GIZ	2,679	ON4RY	504	149	DY
32	G8BCI	2,673	F6ADZ/P	757	139	ST
33	G8CMB	2,609	F1JJ/P	390	154	YS
34	G3PKV	2,597	GM8AGU/P	555	135	HD
35	G6YB	2,553	GM3OXD/P	392	140	ST
36	G3LRS	2,532	ON4RY	410	177	LR
37	G3TWO	2,523	F6ADZ/P	740	137	ST
38	G3SOU	2,520	PA0CML	410	162	HE
39	G3REI	2,481	DK1NS/P	562	117	SX
40	G8CVD	2,339	GI8AYZ/P	386	168	LR
41	G3SDS	2,325	F6ADZ/P	695	119	DT
42	GW8BNJ	2,316	F1ABU/P	425	124	MG
43	G8BDJ	2,300	GM3OXD/P	525	138	SX
44	G8BKQ	2,193	F9NJ	430	118	YS
45	G3ONP	2,151	F1JZ/P	390	145	SD
46	G8BGR	2,148	GD3VXK/P	455	161	KT
47	G3UES	2,106	HB9AEN/P	715	161	HF
48	G2XV	2,100	DL8AT	525	109	CE
49	G3UUT	2,091	G3XC/P	492	97	YS
50	G8AKX	2,061	G3EMU/P	290	151	SE
51	G8BQB	2,046	ON5EW/P	588	161	WR
52	G3GJY	2,016	G3TLK/P	470	93	YS
53	G3JIE	1,983	GD3VXK/P	405	91	NK
54	G3ERD	1,974	G3XC/P	492	127	DY
55	G8AUN	1,959	GD3VXK/P	400	87	NK
56	G3OTK	1,914	F6ADZ/P	730	107	ST
57	G3YGR	1,769	F1AUQ/P	515	130	KT
58	G3UUP	1,725	EI2VDH/P	375	131	OX
59	GW3GHC	1,722	F1ARR	349	121	MH
	G3VPR	1,722	ON4PB	415	112	RD
61	G8BPS	1,698	G3EBR/P	380	153	EX
62	GW8CXI	1,668	F6KCG	410	80	GN
63	G3AMW	1,656	EI2VDH/P	410	95	YS
64	G2ASF	1,650	GM3OXD/P	345	120	WK
65	G8BXC	1,641	GD3VXK/P	418	123	EX
	G8CKN	1,641	GD3VXK/P	370	127	BE
67	G5QK	1,638	GD3VXK/P	445	142	EX
68	G8CTB	1,593	GD3VXK/P	395	110	BD
69	G8CKC	1,558	F6ADZ/P	720	81	ST
70	G3RSC	1,554	F9NJ	390	121	WK
71	GW8DXO	1,535	ON4RY	525	73	BR
72	G3OZP	1,497	G3WSC/P	482	70	ND
73	GW3GEI	1,488	F1ARR	415	129	RN
74	G6UQ	1,476	PA0CML	450	103	SD
75	G3PAD	1,431	GI8AYZ/P	470	93	BS
76	G8CFY	1,401	G3XC/P	325	121	CH
77	G8BGA	1,347	G3EBR/P	356	102	WE
78	G8DKR	1,344	F1GG/P	376	94	GR
79	G3ZMS	1,335	GW3NTI/P	310	94	SX
80	G8BZG	1,305	GD3VXK/P	360	103	BS
81	G6UT	1,293	GD3VXK/P	395	110	HF
82	G3UDN	1,278	G3EBR/P	280	100	WK
83	G3IDV	1,275	PA0CML	475	73	YS
84	G8BZN	1,269	F9NJ	360	80	LR
85	G3XEP	1,261	G3EMU/P	365	81	YS
86	G3FKF	1,213	ON5FF	425	89	HE
87	GI8AYZ	1,188	G3EFX/P	591	36	AM
88	G3KWK	1,164	F1JJ/P	310	103	WR
89	G3CMH	1,155	ON4RY	432	84	WE
90	GM8AGU	1,152	G3MCS	575	52	KN
91	G3IXH	1,137	GI8AYZ/P	380	91	LN
92	G3SJO	1,095	GD3VXK/P	475	63	EX
93	G3KFN	1,083	G3PMH/P	342	63	DN
94	G3FVC	1,068	F1JJ/P	241	98	BS
95	EI2VDH	1,067	G3PMH/P	460	38	—
96	G3HTP	1,050	GD3VXK/P	422	83	SY
97	G8BRT	999	G3EMU/P	285	62	YS
98	G3OTD	980	F9NJ	348	60	LN
99	G2CUZ	972	G3EFX/P	410	49	WD
100	G8CCK	960	G3EBR/P	425	113	SY
101	G8CUO	956	EI9ONE/P	400	71	LN
102	G8BPM	936	G3EBR/P	405	53	SY
103	G8BNE	876	G3TWO/P	390	57	YS
104	G8CJL	852	G3PRT/P	360	41	SF
105	G3WIR	849	G3RHE/P	347	97	BS
106	GI3ILV	834	G3ODY/P	580	35	AR
107	G3VEF	825	G3RHE/P	390	58	HE
108	G8AFN	795	GD3VXK/P	451	62	EX
109	G3WWD	775	G8BQX/P	322	61	YS
110	G8CUB	774	F6ARC	305	51	KT
111	GW8CDL	768	F1ARR	326	65	MH
112	G3ZBI	753	GM3OXD/P	290	80	DY
	G3XFT	753	G2SU/P	295	84	SY
114	G3UJO	726	G3EBR/P	315	60	OX
115	GM6ZV	723	G3XDY/P	367	47	RW
116	G3UFW	713	F6ADZ/P	700	58	WE
117	G3WRS	708	G3XC/P	472	32	YS
118	GW8BOQ	687	F1BCI/P	335	56	MH
119	GW3ZGK	678	GI3ILV/P	350	55	GN
	G3TLK	678	G3GJY/P	475	36	DN
121	GM8BDX	669	G8CFY/P	407	47	BW
122	G3VKI	576	GW3NTI/P	280	67	SY
123	GM3OXX	486	GW2AMV/P	285	46	SK
124	G3WDH	429	G3SRT/P	213	35	LE
	G3ZJY	429	G8DIQ/P	208	46	YS
126	G3VVV	396	GD3VXK/P	250	43	GR
127	G3YWG	351	F1ABU	255	31	DT
128	G3XRT	315	G3TLK/P	300	50	EX
129	GM8CEA	42	GM3JFG	132	8	AN

1,296MHz BAND RESULTS

Posn	Callsign	Score	QSOs	County code	Best QSO station	Km	Aerial
1	G3LTF	2,500	21	SX	G8AUE	245	4 ft dish
2	G2RD	1,843	16	SX	G8DBY/P	249	3 ft dish
3	G3FRV	1,572	14	—	G8AUE	241	18 ele P.b.
4	G8DBY	1,423	10	DY	G2RD/P	249	5½ ft dish
5	G3WGC	1,339	13	HR	G8AUE	153	4 ft dish
6	G3JKX	1,312	15	BE	G2RD/P	129	—
7	G3OBD	1,164	12	WE	G2RD/P	140	4 ft dish
8	G3THQ	1,098	13	OX	G8AUE	142	4 ft dish
9	G3FD	916	11	BS	G2RD/P	108	3 ft dish
10	G8AFA	905	10	WE	G3VZV/P	95	6 ft dish
11	G3VZV	862	12	BS	G3BNL/P	101	23 ele P.b.
12	G3XAD	810					
13	G3HBR	692	8	—	F1BQ/P	150	4 ft dish
14	GW3LAI	669	7	DB	GD3WMS/P	160	3 ft dish
15	GW3EEZ	652	7	DB	G3BNL/P	141	6 ft dish
16	G3NIL	607	7	DT	G3LTF/P	110	—
17	GW3HAZ	506	6	MG	G8DBY/P	115	Trough ref
18	G8PX	281	5	OX	G3BNL/P	48	8/8
19	G3RZG	222	3	DT	G8AFA/P	95	3 ft dish
20	G3JKY	205	4	SX	G3FRV/P	60	Corner ref
21	G3TLM	193	3	SY	G3FD/P	57	8/8
22	GD3WMS	162	1	IM	GW3LAI/P	160	4 ft dish
23	G3XPT	107	1	NK	G3WGC/P	87	—
24	GM3NZS	0	0				

— = Information not given on cover sheet

BERU 1971

Radio amateurs and short-wave listeners throughout the British Commonwealth are invited to take part in the 34th BERU Contest to be held on 13-14 March 1971.

The attention of all entrants is drawn to the requirements for separate log sheets for each band and the overall check sheet showing the call areas worked or heard (as applicable).

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

Rules—Transmitting Section

1. **The General Rules for RSGB HF Contests** as published in the January 1970 issue of *Radio Communication* will apply.
2. **When.** From 0001gmt on Saturday 13 March 1971 to 2359gmt on Sunday 14 March 1971.
3. **Eligible entrants.** Members of the RSGB resident in the UK, and radio amateurs licensed to operate within the British Commonwealth and British Mandated Territories.
4. **Contacts.** CW (A1) only, in the 3·5, 7, 14, 21 and 28MHz bands. Contacts may be made with any station using a British Commonwealth callsign, except those within the entrant's own call area. UK stations may not work each other for points.
5. **Scoring.** Each completed contact will count 5 points. In addition a bonus of 20 points may be claimed for the first, second and third contacts with each new Commonwealth call area (as listed in the accompanying table) on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as only one call area.
6. **Logs.** A separate log is required for each band. Logs must be set out as shown in the General Rules for RSGB HF Contests, on ONE SIDE ONLY of foolscap or A4 log sheets. A check list showing the call areas worked on each band must also be included.
7. **Entries.**
   (a) Each entry will consist of the log and check sheets together with a signed declaration that the entrant has operated his station strictly in accordance with the rules and spirit of the contest and within the terms and conditions of his amateur licence.
   (b) Entries must be addressed to BERU, HF Contests Committee, c/o Mr J. C. Graham, G3TR, "The Willows", Church Road, Lowfield Heath, Crawley, Sussex, England. Entries must be mailed so as to arrive not later than Monday 17 May 1971. Any entry received after this date will be excluded from the contest.
8. **Awards.** To the winner The BERU Senior Rose Bowl. To the runner-up The BERU Junior Rose Bowl. To the leading UK station The Col. Thomas Rose Bowl.

Rules—Receiving Section

1. **When.** Times and dates as for Transmitting Section.
2. **Eligible entrants.** Members of the RSGB resident in the UK, and to all short-wave listeners resident within the British Commonwealth and British Mandated Territories. Only the entrant may operate his receiving station for the duration of the contest. Holders of amateur transmitting licences are not eligible to take part.
3. **Scoring.** To count for points a station outside the entrant's own call area must be heard in a contest contact. CQ or test calls will *not* count for points. A station may be logged only once on each band for the purpose of scoring. Where both stations in a contact are heard they should be logged separately and points can be claimed for both entries, provided that the stations are outside the entrant's own call area.
   Each complete log entry will score 5 points. In addition a bonus of 20 may be claimed for the first, second and third stations heard in each new Commonwealth call area on each band. All British Isles stations (G, GB, GC, GD, GI, GM and GW) count as one call area.
4. **Logs.** A separate log is required for each band. Logs must show the following details in columns headed: (i) Date/time gmt, (ii) Callsign of station heard, (iii) Report and serial number sent by station heard, (iv) Callsign of station being worked, (v) Points claimed, (vi) Bonus points claimed. Each log sheet must be set-out on ONE SIDE ONLY of foolscap or A4 log sheets and must show the band to which the log sheet refers. A check list showing the call areas heard on each band must also be included.
5. **Entries.**
   (a) Each entry will consist of the log sheets, check list and a signed declaration stating that the receiving station was operated in accordance with the rules and spirit of the contest and that the entrant does not hold an amateur transmitting licence.
   (b) Entries should be addressed as shown in Rule 7(b), Transmitting Section. Any entry received after Monday 17 May 1971 will be excluded from the contest.
6. **Awards.** The BERU Receiving Rose Bowl to the winner. Certificates of Merit to the leading entrant in each IARU continent.

Commonwealth Call Areas

The following call areas are recognized for the purposes of scoring in the 1971 BERU Contest.

A2	
AC3	
AP	East Pakistan
AP	West Pakistan
C2	
G/GB/GC/GD/GI/GM/GW	
MP4	Bahrain
MP4	Muscat and Oman
MP4	Qatar
MP4	Trucial Oman
VE1	
VE2	
VE3	
VE4	
VE5	
VE6	
VE7	
VE8	
VK0	Australian Antarctic Territory
VK0	Heard Is
VK0	Macquarie Is
VK1	
VK2	
VK2	Lord Howe Is
VK3	
VK4	
VK4	Willis Is
VK5	
VK6	
VK7	
VK8	
VK9	Christmas Is
VK9	Cocos-Keeling Is
VK9	New Guinea (inc Bismarck and Admiralty Is)
VK9	Norfolk Is
VK9	Papua
VO	
VP1	
VP2	Anguilla
VP2	Antigua and Barbuda
VP2	British Virgin Is
VP2	Montserrat
VP2	St Kitts, Nevis
VP2	Dominica
VP2	Grenada and dependencies
VP2	St Lucia
VP2	St Vincent
VP5	
VP7	
VP8	Falkland Is
VP8	Sandwich Group
VP8	South Georgia
VP8	South Orkney
VP8	South Shetlands
VP8	Grahamland
VP9	
VQ8	Agalaga and St Brandon
VQ8	Rodriguez Is
VQ9	Aldabra Is
VQ9	Chagos Archipelago
VQ9	Des Roches
VQ9	Farquar
VQ9	Seychelles
VR1	British Phoenix Is
VR1	Gilbert and Ellice and Ocean Is
VR2	
VR3	
VR4	
VR5	
VR6	
VS5	
VS6	
VS9	Gan
VU2	India
VU	Andaman and Nicobar Is
VU4	Laccadive Is
YJ8	
ZB2	
ZC4/5B4	
ZD3	
ZD5	
ZD7	
ZD8	
ZD9	
ZF1	
ZK1	Cook Is
ZK1	Manihiki Group
ZK2	
ZL	Auckland and Campbell Is
ZL1	
ZL1	Kermadec Group
ZL2	
ZL3	
ZL3	Chatham Is
ZL4	
ZL5	
ZM7	
3B8	Mauritius
4S7	
5H3	
5N2	
5W1	
5X5	
5Z4	
6Y5	
7P	
7Q7	
8P6	
8R	
9G1	
9H1	
9J2	
9K2	
9L1	
9M2/9M4	West Malaysia
9M6/9M8	East Malaysia
9V1	
9Y4	

RADIO AMATEURS' EMERGENCY NETWORK

by S. W. LAW, G3PAZ*

OVER the years our language grows, technical terms apart, and the actual meaning of a word may change. As an example, the word "suffer" which originally meant "to permit". Similarly the term "amateur" has unfortunately become degraded from the original sense of a person who loves and diligently pursues a subject without thought of pecuniary gain or reward in acquiring a thorough knowledge of and expertise in it. Today the majority define the word in the sense of incompetent dabbling in something better left to the salaried specialist.

Thus it is that the RAEN Committee has decided after much discussion to make the small but significant alteration to our title which you will note in the heading of this column. Too often have we encounted the attitude which insists that the term "amateur" infers incompetence in the service that we have to offer. This despite the fact that some of the great advances which we now enjoy in the arts and sciences are due to the untiring work of dedicated amateurs in the past. No doubt you would like to express your views on the subject and the RAEN Committee will be pleased to receive them.

Whispers down a well?

As this is written we hear that another "railway crash" exercise is to be set up in Essex by courtesy of British Rail for the benefit of all our user services and the indefatigable ladies of the WRVS (who do a great job in many spheres). The Essex RAEN Group will be taking part in this exercise and will provide communications between hospitals, the "accident" site and county police headquarters in Chelmsford,

Members will no doubt remember a similar exercise in Norfolk some time ago, when we were accorded a certain amount of recognition, and we still have some Anglia TV film to prove it. But like the legendary Duke of Plaza Toro we say, "It is not enough!" Hence we again ask all RAEN members to spare no effort to improve the image of Raynet in all quarters on every possible occasion.

RAEN Committee

The attendence at the RAEN Committee meeting on 24 October was enlarged by the welcome visit of three representatives of the Mid-Severn Valley Group, G3NUE (controller), G8ASO (assistant controller) and G8BVP. It was soon apparent that the long journey was considered well worth while by the visitors, who entered wholeheartedly into the varied discussions that arose.

The honorary registrations secretary announced that 10 new registrations and 65 re-registrations had been dealt with since September, so a satisfactory rate of growth is being maintained. This is further shown by the announcement that the *RAEN Manual* is once again out of print. The possibility of a new issue in a more convenient format was discussed at some length and we hope to pass on the details in due course.

The Mid-Severn Group (which now has 50 members) reported that its user services have made a request for a teleprinter link to be made available if possible (we believe this constitutes a "first" in this sphere). The committee was in session for 5 hours.

It only remains to wish all members everywhere the best 73s for the approaching Festive Season.

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

Honorary secretary, RAEN Committee: **Mr. E. R. L. Bassett, 57 Upper St Helens Road, Hedge End, Southampton, SO3 4LG. Tel Botley 4462**

* 130 Alexandra Road, Croydon, Surrey CRO 6EW.

RAEN Group of the Month

by P. Balestrini, G3BPT, (Chairman, RAEN Committee)

The Glasgow Group

Group controller: Terry Darke, GM3VQJ, 52 Rowan Drive, Bearsden, Glasgow. Tel 041-942 4930.
Group channels: 70·26 and 70·375MHz.

The Glasgow Group was inaugurated in February 1969 under the original leadership of Colin Weston, GM3VAP; the good work having since been maintained by GM3VQJ. The group has now grown to some 16 active members. A regular newsletter is issued and GM3UDL is to be congratulated on the production of an excellent members handbook with procedure notes.

User service contact has been made with the Renfrewshire and Bute Constabulary and the local branch of the British Red Cross. Since amateur traffic is very low on 70·26MHz in the Glasgow area this channel is used as a primary calling channel with 70·375MHz as a secondary channel.

Much of the general upsurge of interest in RAEN in the Scottish area is due to the spadework of Alex Hunter, GM3LTW, Council member and member of the RAEN Committee. The development of RAEN in the more sparsely populated areas of Scotland could fulfil a real need for an emergency communications system in this part of the country.

CONTEST NEWS

Affiliated Societies' Contest 1971

The General Rules for RSGB HF Contests, as published in the January 1971 *Radio Communication*, will apply.

When. From 1800gmt to 2200 gmt on Saturday 9 January 1971, and from 1800gmt to 2200gmt on Sunday 10 January 1971.

Eligible entrants. All fully paid-up affiliated societies.

(*a*) As the contest is to encourage club activity, it is not in the spirit of the contest that a competing station should be operated by only one operator for all, or nearly all, of the time. Entries which indicate this method of operation may be disallowed.

(*b*) All entries will be classed as multi-operator.

(*c*) Entries will only be accepted from stations operating within a ten-mile radius of the normal meeting place or HQ of the affiliated society.

(*d*) Callsigns which have been issued to affiliated societies must be used.

(*e*) More than one entry will be accepted from an affiliated society, providing that where a club callsign has been issued, that callsign is used by the "A" station.

Contacts. CW (A1) only in the 1·8-2·0MHz band.

Competing stations only (as defined in Rule 3) must send AFS to identify themselves after the report-serial number group, eg 579012 AFS. Repeat contacts may be made during the second session.

Scoring. 15 points for each contact with an AFS station, and one point for other stations.

Logs. Column (5) must be headed "Enter AFS if received". Entries must be addressed to: HF Contests Committee, c/o R. G. B. Vaughan, G3FRV, 5 Filbert Crescent, Gossops Green, Crawley, Sussex.

Trophy. The Edgware Trophy will be awarded to the affiliated society submitting the highest checked score.

RSGB SLOW MORSE PRACTICE TRANSMISSIONS

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

Clock time	Callsign	MHz	Town
Sundays			
1000	G3WNR	1·920	South Shields, Co Durham
0930	G3HZL	1·940	Isleworth, Middlesex
0945	G3YRO	1·860	Fareham, Hants
0945	G3USK	1·975	Mablethorpe, Lincs
1000	G2FXA	437·000 to north	Stockton-on-Tees
1015	G3CGD	1·875	Cheltenham
1030	G2FXA	437·000 to south	Stockton-on-Tees
1030	G3NPB	1·875	St Ives, Cornwall
1030	G3ZNW	144·520 to east	West Molesey, Surrey
1030 †	G3YPG / G3XOQ	1·965	Horley, Surrey / Redhill, Surrey
1100	G2FXA	1·900	Stockton-on-Tees
1100	GW3UMB	1·850	Colwyn Bay
1130	G3KKU	1·940	Liverpool
1130	GW3VPL	1·918	Porthcawl, Glam
1130	G3VVP	1·880	Plymouth, Devon
1200	G3HVI	1·890	Stoke-on-Trent
1200	G8GNS	1·910	Weston-super-Mare
1330	G3FWW	1·880	Burnham-on-Sea, Soms
1330	G3XDV	1·910	Canterbury, Kent
1400	G3XGJ	1·830	Huddersfield, Yorks
1930	G3YFO	144·19 to south	Burnham, Bucks
† Alternately			
Mondays			
1800	G3SWR	1·980	Birmingham
1830	G3NCZ	1·920	Blackburn, Lancs
1830	G3RXH	1·910	Skipton, Yorks
1900	G3WGU	1·880	Bispham, Lancs
1900	GC2FMV	3·600	Jersey, CI
1900	G3YJA	1·920	Coventry, Warks
1900 †	G3WFY / G3YEI	1·850	Thornton Cleveleys / Fleetwood, Lancs
1930	G2ABC	144·060 omni-directional	Woodford, Essex
2000	G3KAN	1·990	Northampton
2000	G3IBJ	1·910	Southampton, Hants
2000 †	G3WDW / G8VTY	1·915	Leeds, Yorks
2000	G13JEX	1·855	Belfast
2015	G3YMH	1·845	Wraysbury, Middlesex
2030	G8YEB	1·915	Harlow, Essex
2030	G3JHM	70·050	Worthing, Sussex
† Alternately			
Tuesdays			
1800	G3XDV	1·910	Canterbury, Kent
1900 †	G3UFO / G3XAM	1·980	Wirral, Cheshire
1930	G3SWP	1·850	Doncaster, Yorks
1930	G3WGU	433·500 to south-east	Bispham, Lancs
1930	G3ZUM	144·144 to south	Iver Heath, Bucks
2000	G3UPA	1·850	Meriden, Warks
2000 †	G3FAU / G3KSS / G3OVT	1·980	Stevenage, Herts
2000	G3FWW	1·880	Burnham-on-Sea, Soms
2000	G3WGD	1·860	Leicester
2000	GM3PIP	3·590	Mintlaw, Aberdeen
2030	G3HZL	1·845	Isleworth, Middlesex
2030	G3PRN	1·915	Harlow, Essex
2030	G3RB	1·975	Whitley Bay, Nth'land
2100	G4RS	1·865	Blandford, Dorset
2200	G3HZM	1·925	Manchester
†Alternately			
Wednesdays			
1830	G2FXA	1·900	Stockton-on-Tees
1900	G3YPZ	28·700	Harlow, Essex
1930	G3VVP	1·880	Plymouth, Devon
1930	G3WGU	433·500 to south-east	Bispham, Lancs
1930	G3YFO	144·19 to north	Burnham, Bucks
1930	G3UJD	1·825	Farnborough, Hants
2000 †	G3AJX / G3TWP / G3YSK	1·925	Winchester, Hants
2000	G8QU	1·970	London, N22
2000	G3JHM	70·050	Worthing, Sussex
2000	G3XGY	144.054	Weston-super-Mare
2015	G3UNV	1·845	Ashford, Middlesex
2030	G3KGU	1·915	Theydon Bois, Essex
2100	G3HVI	1·890	Stoke-on-Trent
† Alternately			
Thursdays			
1800	G3SWR	1·980	Birmingham
1830	GW3VBP	3·590	Barry, Glam
1830	GW3UMB	1·880	Colwyn Bay
1830	G3NC	1·968	Swindon, Wilts
1900 †	G3WFY / G3YEI	1·850	Thornton Cleveleys, Fleetwood, Lancs
1900	G3WGU	1·880	Bispham, Lancs
1930	G3GNS	1·910	Weston-super-Mare
1930	G2ABC	144·060 omni-directional	Woodford, Essex
1930	G3ZNW	144·520 to north	West Molesey, Surrey
2000	G3WDS	1·975	Carlisle
2000	GI3JEX	3·590	Belfast
2030 †	G3SJE / G3GC	1·875	Harrow, Middlesex
2030 †	G3ROE / G3RSF / G3YMJ / G3YFC	1·915	Harlow, Essex
2100	G4RS	1·865	Blandford, Dorset
2100	GW3XNI	1·930	Crosskeys, Mon
† Alternately			
Fridays			
1800	G3XDV	1·910	Canterbury, Kent
1830	G3NCZ	1·920	Blackburn, Lancs
1900	G3NPB	1·875	St Ives, Cornwall
1930	G3PQF	1·825	Farnborough, Hants
1930	G3ZUM	144·144 to south	Iver Heath, Bucks
2000	G3EEL	1·980	Peterborough
2000	G3WGD	1·860	Leicester
2000 †	G3KEP / G3UCZ / G3WTF	1·910	Bingley, Yorks / Pudsey, Yorks / Bradford, Yorks
2015	G3SAZ	1·845	Ashford, Middlesex
2030	G3JHM	70·050	Worthing, Sussex
2030	G3ZEV	1.930	Harlow, Essex
† Alternately			
Saturdays			
0930	G3UNV	1·935	Ashford, Middlesex
0930	G3YZZ	3·590	Maidenhead, Berks
1000	G3PLE	1·820	Stourbridge, Worcs
1300	G2FXA	1·900	Stockton-on-Tees
1400	GC2FMV	3·600	Jersey, CI
1730	G3TNF	1·980	Gateshead
1800	G3ZCC	1·915	Chingford, Essex
2000	G3KPO	1·980	Peterborough
† Alternately			

Members might like to be reminded that the Royal Naval Amateur Radio Society, using their call-sign G3BZU, transmits cw as a proficiency test at 1900gmt on the first Tuesday of each month. Frequencies used are 1·875MHz for practice only, and 3·520 MHz for speed proficiency tests. Certificates are issued against correct copy submitted to: The Royal Naval Amateur Radio Society, HMS Mercury, Leydene, Hants. A small charge is made to cover costs.

CLUB NEWS

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

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

REGION 1 **RR B. O'Brien, G2AMV**

Lecture report

Over 150 people gathered at the headquarters of the North Western Gas Board at Altrincham, Cheshire, on 23 October for the lecture given by Mr T. P. Douglas, G3BA, entitled "Why VHF?"

The speaker was introduced by Mr B. O'Brien, G2AMV, Region 1 representative, who in his opening remarks expressed his delight at such a large gathering. He outlined the object of the Regional Lectures and expressed a special word of thanks to the secretary of the North Western Gas Board, Mr J.Wadsworth, for the use of the Board's sumptuous lecture theatre with all its facilities. He expressed his thanks to the deputy RR, G3SMM, and to G3YKJ who between them had made the arrangements for the event.

Mr Douglas, who is very well known for his interest in vhf activities, gave a very lucid explanation about the approach to vhf and followed this with a more detailed examination of some of the intricacies of vhf practices with particular reference to vfo and vxo control for a.m., nbfm and ssb.

Types of aerials and converters were discussed in some detail and the talk terminated with a few words about operating generally, with particular reference to portable operation for which the speaker and G3BHT are very well known.

Mr Douglas expanded his belief that operation (and not only on vhf) should be along the lines of rapid and easy communication. He stated his dislike of long-winded "overs" and suggested that amateur contacts should be conducted as much as possible on the lines of a telephone conversation.

At the end of the lecture there was an opportunity for questions and the evening closed with a vote of thanks proposed by Mr W. L. Seddon, G3VIW. A special word of thanks was also expressed to Mesdames G2AMV, G3FNM, G3SMM and G3YKJ for attending and preparing and dispensing coffee and biscuits after the meeting—appreciation also to G3BHT who accompanied the speaker.

On an analysis of the signing-in book it is apparent that all parts of the region were represented in the audience, Naturally enough there were many from the Greater Manchester area, in particular members of the affiliated bodies, the Manchester & District Radio Society, Stockport Radio Society and the South Manchester Radio Club. Contingents were present from the Wirral, Liverpool and the Southport and Ainsdale areas as well as visitors from Bury, Macclesfield, Blackburn and Warrington; also a sprinkling from outside the region.

G3SMM

Special regional event:

9 May—1971 Belle Vue Convention

Merseyside Luncheon Club—First Monday each month, 12.30 for 12.45, HMS *Landfall*. Please advise G3VQT or G2AMV beforehand if you wish to attend.

Ainsdale ARC—9, 23 December, 8pm, Morris Dancers, Scarisbrick.

Allerton (Liverpool) Scout Amateur Radio Society North-West Region—Thursdays, 8pm, Allerton Group Headquarters, Aigburth Vale, Liverpool 17. All Scouts interested in amateur radio are welcome.

Blackburn (East Lancs ARC)—First Thursday of each month—AGM, December, 7.30pm, Edinburgh House, Shearbank Road, Blackburn. Further details from G4JS.

Blackpool (B & FARS)—Mondays, 8pm, Pontins Holiday Camp, Squires Gate. Morse tuition at 7.30pm.

Bury (B & RRS)—Second Tuesday of each month with an informal meeting on the fourth Tuesday. 8pm, the George Hotel (private room), Market Street, Bury. Secretary: G3VVG, 411 Holcombe Road, Greenmount, Bury.

Carlisle (C & DARS)—7 December (Surplus equipment sale), 14 December "Communication with a difference", by L. Quayle), 21 December (Open night), 28 December (No meeting). 7.30pm, Currock House, Lediard Avenue, Currock. Secretary: A. Harper. 23 Romany Way, Stanwix, Carlisle.

Cheshire (Mid Cheshire ARC)—Wednesdays, 7pm, Technical Activities Centre, Winsford Verdin Grammar School, Grange Lane, Winsford. All meetings begin with a morse class, main feature is at 8pm.

Chester (C & DARS)—Tuesdays, except the first Tuesday in the month which is net night. 8pm, YMCA Chester.

Crewe—Local members continue to meet at the QTH of R. Owen, 10 Circle Avenue, Willaston, Nantwich, from whom further details may be obtained.

Douglas (D & DARS)—Second and fourth Wednesdays in each month, 7pm, 19 Rosemount, Douglas. Further details from W. J. McEvoy of that address. Telephone Douglas 6146.

Eccles (E & DRC)—Tuesdays, 8pm, Bridgewater School,Worsley, Lancs. Thursdays—Club top band net, 2030gmt.

Leyland Hundred Amateur Radio Group—Net nights: Thursdays, 2000gmt, 1,915kHz; Saturdays, 1900gmt, 145·8MHz.

Liverpool (L & DARS)—Tuesdays, 8pm, Conservative Association Rooms, Church Road, Wavertree. Secretary: G3WCS, 90 Childwell Valley Road, Liverpool 16.

Liverpool (NLRC)—4, 18 December; 1, 15, 29 January, 8pm Labour Party Headquarters, 13 Crosby Road South, Liverpool 22.

Manchester (M & DARS)—Wednesdays, 7.30pm, 203 Droylesden Road, Newton Heath, Manchester 10.

Manchester (SMRC)—4 December ("Starting up on 2m", by G8DMJ), 11 December (Operation of Sommerkamp FL200B, FR100B gear), 18 December (Christmas party). Club closed on 25 December and 1 January. Meetings are on Fridays at the Conservative Divisional Office, 449 Patatine Road, Northenden, Manchester 22, 8pm. Vhf section, G3UHF, meets on Mondays at 8pm. Club Shack, "Greeba", Shady Lane, Manchester 23. Secretary: G3WFT.

Preston (PARS)—10, 24 December, 7 January, 7.30pm, Windsor Castle (private room), St Paul's Square. Secretary: G. Windsor, 26 St Gregory's Road, Preston.

Salford (Dial House Radio Society)—A society of MPT engineers. Wednesdays, 6pm, 8th floor (river end) Dial House, Chapel Street, Salford 3. Further details from secretary at the above address.

Stockport (SRS)—Second and fourth Wednesdays, 8pm, the Blossoms Hotel, Wellington Road South, Stockport. Further details from secretary, G8BCG.

Thornton Cleveleys (TCARS)—9, 23 December, 6 January, 8pm, St John Ambulance Brigade Hall, Fleetwood Road North, Thornton, Blackpool. Secretary: G3YWH.

Warrington (Culcheth ARC)—Fridays,7.30pm, Chat Moss Hotel, Glazebury. All visitors are most welcome. Secretary: K. Bulgess, 32 Hendon Street, Leigh.

Westmorland—Fridays, 7.30pm, 24 Park Road, Milnthorpe. All visitors welcome. Secretary: J. Forrester, 44 New Street, Carnforth.

Windscale—Cumberland (WAR & ES)—Fridays, 7pm, c/o Falcon Club, Falcon Field, Egremont. Further details from N. Ramsden. G3RHE.

Wirral (WARS)—First and third Wednesdays of each month, 7.45pm, Scouts' Headquarters, Harding House, Park Road West,

Clangton, Birkenhead. Secretary: G3WSD, 34 Glenmore Road, Oxton, Birkenhead.

Wirral (Wirral DX Association)—Last Thursday in each month at members' homes, except in December when there will be the Christmas Dinner. January at G3XJZ for the AGM. Secretary: J. Share, G3OKA.

REGION 2 — RR K. Sketheway, BRS20185

Bradford (BRS)—1 December ("Radio Amateur Emergency Network", by C. Weston, G3VAP), 15 December (Informal supper), 7.30pm, 10 Southbrook Terrace, Great Horton Road, Bradford 7. Morse practice prior to the meeting, by arrangement. *G3HJP.*

Durham (DCARS)—3 December (Special event), 17 December (Christmas informal meeting at Three Tuns Hotel), 31 December (No meeting), 7pm, Room 146, Durham University's Elvet Riverside Arts Block, New Elvet, Durham City.

Fulford (York) (FARS)—Tuesdays, 7.30pm, Scout HQ, 31 George Street, York. *G5KC.*

Halifax (NHARS)—9 December (Open), 16 December (Ragchew), 30 December (Morse practice), 6 January (Annual dinner), 7.45pm, Peat Pitts Inn, Ogden, Nr Halifax.

One important announcement is that the annual dinner booked for 9 December has been transferred to 6 January 1971.

Past events have included taking part in the annual JOTA event along with the Keighley Scout Group. *G3MDW.*

Hull (H & DARS)—4 December (Construction night), 11 December ("Trials of a G8", by G8EAH), 18 December ("Meteorology", by G3PQY), 25 December (No meeting), 1 January (Construction night), 7.45pm, 592 Hessle Road, Hull.

The annual dinner will be held at the Beverley Arms Hotel, Beverley, on Friday 8 January 1971. Tickets, at 34s each, will be available shortly. Slow morse classes on Tuesday and Friday, 7.30pm; RAE classes every Friday at 9.30pm. *M. Longson.*

Mexborough (MARS)—Meets every Friday at 7pm, in the Church Hall, Mexborough.

Club has just supplied free power supply unit for ZB2VHF in Gibraltar. Station should now be on the air very soon. Secretary: Ian Abel, 9 Grove Terrace, Maltby, Rotherham. *G3ZHI.*

Mexborough (Mexborough Technical College ARS)—This club and the Mexborough Premier Radio Club participated in JOTA as joint event at the college. Score was 250 contacts of which 75 were actual Scout groups.

On 19 October Mr J. R. Petty, G3JW, zonal representative, spoke on the Society etc, to members of the Mexborough Technical College ARS, Mexborough Premier RC and Rotherham ARC.

North Riding (NRARG)—Group meets in the back room of the Ship Inn, Falsgrave, Scarborough, alternative Tuesdays and Thursdays fortnightly. Details from secretary Jeff Jones, G3VLM, Bingley Private Hotel, Albermarle Crescent, Scarborough. *G3VLM.*

Scarborough (SARS)—Thursdays, 7.30pm, c/o RAF Association, Fulbeck House, 3 Westover Road, Scarborough.

South Shields (SS & DARC)—Fridays, 8pm, Trinity House Social Centre, Laygate, South Shields.

Spen Valley (SVARS)—3 December ("Audio amplifier", by A. Petts, G3PXF), 10 December (Film show), 7.30pm, The Grammar School, High Street, Heckmondwike.

Leeds (SSWC)—The Star Shortwave Club was first formed 7 October 1970. Meetings every Wednesday at 8pm, at Star & Garter Hotel, Bramley Town Street, Leeds. Active every Wednesday on 2m and 160m from club. CW tuition every Wednesday and a vast constructional programme just starting. This is a new club with new ideas. All correspondence to the secretary, T. Leeman, G8BUU, c/o above club, 115 Asket Drive, Seacroft, Leeds, LS14 1HX. *G8BUU.*

Sunderland (SARS)—Meetings on the first and third Tuesday of each month, 7.30pm at Sunderland Polytechnic. *G3XID.*

REGION 3 — RR R. W. Fisher, G3PWJ

Birmingham (MARS)—15 December (Oldtimers get together, everyone welcome, coffee and biscuits provided), 7.45pm, Midland Institute, Margaret Street, Birmingham 3. *G8AMD.*

(Slade)—4 December (QRU? Slade's informal digest), 18 December (Film night), Church House, High Street, Erdington, Birmingham 23.

(South)—2 December (Christmas party and surplus equipment sale), 8pm, Hampstead House, Fairfax Road, Birmingham 30. At the AGM in October the following were elected: Chairman, J. Clements, G3YKQ; hon secretary, R. Thompson; treasurer, D. Green, G8BQB. *G8BHE.*

Cannock (CCARS)—Meetings monthly, first Thursday in each month, but a natter night every Thursday, 8pm, Bridgtown Social Club, Walsall Road, Bridgtown, Cannock.

Coventry (CARS)—4 December (South African trip, lecture by G3RIR), 11 December (Night on the air), 18 December (Club annual dinner), 8pm, City of Coventry Scout HQ, 121 St Nicholas Street, Radford.

Dudley (DARC)—1, 15 December, 8pm, Central Library, St James' Road. 29 December, 8pm, Club Station, The Windmill, Vale Street. *G3PWJ.*

Hereford (HARS)—Every Friday, Civil Defence HQ, Goal Street, Hereford.

Lichfield (LARS)—First Monday and third Tuesday of each month, the Swan Hotel, Lichfield. *G8CNB.*

Rugby (R & DAR & EC)—First Tuesday in the month. December ("A conducted tour of ARRL HQ", tape lecture). *G3YQC.*

Shrewbury (SARS)—Every Thursday, 7.30pm, Harlescott Youth Centre, 218 Sundorne Road, Shrewsbury. *G3UDA.*

Solihull (SARS)—15 December ("Direction finding", by G3RPJ), 7.30pm, The Manor House, High Street, Solihull. 5 January (Informal evening), The Malt Shovel, High Street, Solihull. Secretary: G8BYM.

Stoke on Trent (NSARS)—Every Monday, 7.30pm, Harold Clowes Community Association Centre, Bentilee.

(S-o-TARS)—Every Thursday, 7.30pm, 2a Race Course Road, Oakhill, Stoke.

Stourbridge (STARS)—1 December (Junk sale), 8pm, Scout HQ, 12 December (Visit to ITV transmitter station, Lichfield). *G8CVK.*

Stratford (SoDARC)—11 December (Christmas party), location to be announced. *G3RPJ.*

Telford (WARS)—Every Wednesday evening, 8pm, Ketley Bank Youth Club, Main Road, Ketley Bank, Telford, Salop. *G3YEW.*

Worcester (W & DARC)—No meeting December. For further details of club activities contact G8ASO.

REGION 4 — RR T. Darn, G3FGY

Chesterfield (CADRS)—The following officials were elected at the recent AGM: President, Jack Tweedy, G3ZY; chairman, J. Nixon, G3CLP; vice-chairman, D. McDiarmid, G3FMU; hon treasurer, J. D. Webster, G3YOO; hon secretary, R. Nelson, G3ZLF; contest organizer, E. A. Bond, G3PHV. It was also proposed and carried that the future annual subscription should be £1 10s for adult members and 10s for members under 18 or over 65. Second and fourth Wednesday in each month. Hunloke Adult Education Centre. *G3ZLF.*

Derby (DADARS)—9 December (Constructors' contest for the Founder Members Trophy), 13 December (Contest for the G5YY trophy), 16 December ("Modern commercial radio practice", by P. Fay, G3AKG), 23 December (Annual Christmas party), 30 December (The year in retrospect, members slides and films), 6 January (Surplus sale), 7.30pm, Society's Clubroom, Room 4, 119 Green Lane, Derby.

There will not be a vhf/uhf meeting during December but these will re-commence in January. Monday night is now devoted to getting equipment ready for the Diamond Jubilee Exhibition which is to be held in March 1971. Members are requested to bring along small tools and servicing equipment on these evenings. Visitors are always welcome.

Derby (NHCAARG)—4 December (Quiz night), 11 December (The year in retrospect), 18 December (Entertainment films), 25 December (Net on 160m throughout Christmas day). 7.30pm,, Nunsfield House Community Centre, Boulton Lane, Alvaston Derby.

Grimsby (GARS)—10 December (Book sale), 7 January (AFS organization). At the recent AGM the following officials were elected: Chairman, J. Cummings, G3YZI; vice-chairman, J. Carter; hon secretary, R.J. Foulger, G8DEN; hon treasurer, Mrs J. Crossley; committee member, P. Crossley. *G8DEN.*

Lincoln (LSWC)—8 December (Members' social night out), 15 December (Film night), 22 December (Operating night), 29 December (Open evening). Morse classes are held every Tuesday evening and visitors to the club are always welcome.

Melton Mowbray (MMARS)—18 December ("Hi-fi", by Reeves), 7.30pm, St John Ambulance Hall, Ashfordby Hill, Melton Mowbray.

REGION 5 — RR S. J. Granfield, G5BQ

Bedford (B & DARC)—3 December ("Light beam transmitter", by G3LYO), 4 December—please note it's a Friday (Club dinner at Tudor House, Shakespeare Road, Bedford, 7.30pm for 8pm), 10 December (Zones, regions, and awards, G3UQR), 17 December (Tape lecture), 24 December (No meeting), 27 December (Holiday net at 10.30am on 3·710MHz), 31 December (Informal). All meetings at "The Dolphin", Broadway, Bedford.

Cambridge (C & DARC)—Club meetings held on Fridays at 7.30 pm., Club headquarters, Corporation Yard, Victoria Road, Cambridge.

Luton (The George Kent R & ES)—This newly-formed society hopes to arrange monthly meetings. Roy Crowley, G3TLE, is chairman and J. S. Allen, G3DOT, is hon secretary. There is plenty of space for aerials and it is hoped that the company will make a grant for the purchase of equipment.

Shefford (S & DRS)—Thursdays 3 December (Annual dinner review—how much do we owe?), 10 December (Review of club films, Claude, G3DPQ), 17 December (Short lectures, any subject, club members), 24 and 31 December (No meetings), Club meets at 8pm, Church Hall, Ampthill Road, Shefford. Morse practice at 7.45 pm.

REGION 6 — RR L. W. Lewis, G8ML

Cheltenham (RSGB Group)—First Thursday, 8pm, Great Western Hotel, Clarence Street, Cheltenham.

Gloucester (GRS)—Second and fourth Thursdays each month, RAFA Club, 6 Spa Road, Gloucester. A newsletter is now being circulated.

South Bucks VHF Club—2 January 1971 (Film show), 8pm, Bassetbury Manor, High Wycombe.

North Buckinghamshire Amateur Radio Society—Second and fourth Wednesdays at the Wolverton Youth Club. RAE class at Wolverton College of Further Education. G3ZNY, 11 Kingston Avenue, Stony Stratford.

REGION 7 — RR P. A. Thorogood, G4KD

Club equipment disposals not sold locally can be listed and sent to other societies in London area if list sent to me requesting assistance. This also includes donations of anything for Bedfast Club. Merry Christmas, all.

Acton, Brentford & Chiswick (ABCRC)—15 December (The station of VK2WX illustrated with slides), 7.30pm, Chiswick Trades and Social Club, 66 High Road, Chiswick.

Addiscombe (AARC)—Second and fourth Tuesdays, 7.30pm, Toc H Hall, 158 Lower Addiscombe Road.

Ashford, Echelford (ARS)—Second Monday and last Thursday of month, 7.30pm, St Martin's Court, Kingston Crescent, Ashford, Middlesex.

Barking (B & DARC)—Tuesdays and Thursdays, 7.30pm, Gascoigne Recreation Centre, Gascoigne School, Morley Road, Barking.

Bexleyheath (NKRS)—10 December (Christmas meeting), 7.30pm Congregational Church Hall, Chapel Road, Bexleyheath.

A. Beaton, G3WRP, takes over as secretary from G3WZJ. The exhibition station at Greenwich Show had a wet time, it rained from morning to evening. Request for a better club net: from Sunday 7pm.

Cheshunt (CDRS)—First Friday of Month, 7.30pm, Methodist Church Hall, opp Theobalds Station, Cheshunt.

Chingford (RSGB Group)—Fridays, 7.30pm, Telephone 01-524 0308.

Chingford (SRC)—Fridays, 7.30pm, Friday Hill House, Simmons Lane, Chingford E4.

Civil Service (CSRS)—First and third Tuesdays, 6.30pm, Civil Service Recreation Centre, Monck Street, Westminster.

Croydon (SRCC)—Third Tuesdays, 7.30pm, Swan & Sugarloaf, South Croydon.

Crystal Palace (CP & DRC)—4 December (AGM), 19 December (Grand junk sale and Christmas party), 8pm, Emmanuel Church Hall, Barry Road, SE22.

Dorking (DR & DRS)—8 December (Informal meeting at 8pm) "Wheatshaft", 14 December (Christmas dinner at "Stephen Langton", Friday Street. Further details from secretary, G3BLA).

Ealing (E & DARS)—Tuesdays, 7.30pm, Northfields Community Centre, Northcroft Road, W13.

East London—20 December (AGM and junk sale, 2.30 for 3pm Wanstead House, The Green, Wanstead, E11 (200 yards Wanstead Station, Central Line).

Edgware & Hendon (E & DRS)—7, 21 December, 8pm, St George's Hall, Flower Lane, Mill Hill, NW7.

Farnham, Bucks (Burnham Beeches RC)—Fortnightly on Mondays, Farnham Common, Village Hall, Victoria Road.

Gravesend (GRS)—Thursdays, 8pm, Northfleet Recreation Centre Springfield Road, Northfleet.

Guildford (G & DRS)—Second and fourth Fridays. 23 January (Annual dinner, Wooden Bridge Hotel. Bring all your friends). Club meets at the Guildford Engineering Society, Stoke Park.

Hampton Court (TVARTS)—First Wednesday, 7.30pm, The Three Pigeons, Portsmouth Road, Surbiton.

Harlow (DRS)—Tuesdays (General); Thursdays (CW practice); Fridays (Junior). 7.30pm, Mark Hall Barn, First Avenue.

Harrow (RSH)—Every Friday. 4 December ("The spectrum analyser show" or how clean is your tx), 11 December (Practical), 18 December (Christmas party), 25 December (No meeting), 1 January (Junk sale), 8pm, Harrow County School for Boys, Sheepcote Road.

Havering (H & DARC)—Fortnightly, 8pm, British Legion House, Western Road, Romford.

Hemel Hempstead (HH & DARS)—First and third Fridays, 7.30pm, "Addmult" Sports Club, Hemel Hempstead.

Holloway (GRS)—Mondays, RAE, 7pm; Wednesdays, Morse, 7.30pm; Fridays, Club, 7.30pm, Archway School Annexe, Wellington School, Highgate Hill, N19.

Ilford—Every Thursday, 8pm, 50 Mortlake Road, (off Ilford Lane), Ilford. Secretary, F. G. Jarvis.

Ten members at last meeting listened to talk on allied radio and audio subjects and frequency measurements by Lissajous figures.

Kingston (K & DARS)—Second Wednesday in month. 9 December ("Currency developments in frequency standards", by C. Cordwell of the National Physical Laboratory, Teddington), 8pm Penguin Lounge, 37 Brighton Road, Surbiton.

London (UHF Group)—First Thursday in month, 7.30pm, Whitehall Hotel, Bloomsbury Square, Holborn, WC1.

Loughton—Fortnightly on Fridays, Loughton Hall, Rectory Lane, (Nr Debden station).

New Cross (Clifton ARS)—Second and fourth Fridays, 8pm, 225 New Cross Road, SE14.

Paddington (P & DARS)—Thursdays, 7.30pm, Beaucamp Lodge, 2 Warwick Crescent, W2.

Peterborough (P & DARS)—First Friday in each month, 7.30pm, Lecture Hall of the Engineering Block in Peterborough Technical College, Eastfield Road, Peterborough. Other Fridays, 7.30pm, the Old Windmill, London Road. RAE classes, Tuesdays, 7pm, at the College. Details of programme from G3KPO.

Purley (P & DRS)—First and third Fridays, 8pm, Railwaymans Hall, Side Entrance, 58 Whytecliffe Road, Purley.

Reigate (RATS)—First Wednesday in month 7.45pm, George and Dragon, Cromwell Road, Redhill.

Romford (R & DARS)—Tuesdays, 8.15pm, RAFTA House, 18 Carlton Road.

Scouts (ARS)—Third Thursdays of month. 17 December (Christmas social), 7.30pm, Baden Powell House, Queensgate, South Kensington, SW7.

Sidcup (CVRS)—3 December ("The Joystick antenna", by E. H. Chaudri, G3DCS), 17 December (Natter nite), Congregational Church Hall, Court Road, Eltham, SE9.

Southgate (SRC)—Second Thursday of month, 7.30pm, Civil Defence Hut, Bowes Road, N11.

St Albans (Verulam ARC)—9 December (Annual general meeting followed by "seasonal refreshments" and a film show). Town Hall, St Peter's Street, St Albans.

The tenth anniversary dinner was very successful; 47 members were present and certificates commemorating 10 years' membership were presented.

Sutton & Cheam (SCRS)—Third Tuesday in month. 16 December (Talk by John Brodzky, G3HQX, on ITA tv networks), 8pm, The Harrow Inn, High Street, Cheam.

Welwyn (Mid Herts ARS)—Second Thursday of month, 8pm, Welwyn Civic Centre, Welwyn.

New secretary is R. Thornton, G3FKV. Meetings as usual. December lecture will be "VHF transistor receivers and transmitters", by G3NNG.

Wimbledon (W & DRS)—Second and last Fridays in month, 8pm, St John Hall, 124 Kingston Road, South Wimbledon, SW19.

Wembley (GECARS)—Thursdays, 7pm, Sports Club, St Augustin Avenue, North Wembley. (This club is open to non-GEC employees by invitation. Telephone 904 1262 for details). Dain Evans, G3RPE.

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

Canterbury (EKRS)—17 December ("Mobile", by A. W. Ellis, G3WAW), 21 January ("Entertaining maths for the radio amateur", by K. L. Smith, G3JIX).
Thanet (TRS)—4 December ("RSGB affairs", by D. N. T. Williams, G3MDO, regional representative).
Worthing (W & DARC)—8 December (Christmas competition). Meetings held every Tuesday, 8pm, Rose Wilmot Youth Centre, Littlehampton Road, Worthing. Full details from G6KFH/T.
Maidstone (M YMCA ARS)—Meetings held every Friday, 8pm, at 'Y' Sports Centre, Melrose Close, Loose, Maidstone.
Brighton (BTCARC)—Meetings held in the club shack, 7.30pm, Full details from G3KUS.
Eastbourne (SARS)—Meetings held first Monday in the month at Victoria Hotel, Latimer Road, Eastbourne.
Dover (SEK YMCA ARC)—Meetings held every Thursday, 7.30pm. YMCA, Leybourne Road, Dover.
Mid Sussex (MSARS)—All meetings and club station at Marle Place, Leylands Road, Burgess Hill.

REGION 9 — RR J. Thorn, G3PQE

A very merry Christmas to all in Region 9. An appeal for information for this diary: this month only two notices were received for inclusion. Clubs, it is in your own interest to keep your name in front of others, as well as reminding your own members of future meetings etc.

Bristol, City & County (BARC)—Every Tuesday and Thursday, Club HQ, G3TAD, 41 Ducie Road, Barton Hill, Bristol 5. *G3SXY.*
(RSGB)—14 December (Meeting of the year, when those responsible for running your society affairs report on their work. Help them by encouraging them at this meeting), 7.30pm, Beckett Hill, St Thomas Street, Bristol 1. *G3ULJ.*
(Shirehampton)—Every Friday, Twyford House. *G3YIQ.*
(University)—Every Saturday afternoon, Dept of Physics, Royal Fort, Woodland Road, Bristol 8. *G8ADP.*
Cornwall (CRAC)—Meetings at SWEB Social Club Room, Pool, Camborne. *G3UCQ.*
(Falmouth)—*G3OJN.*
(Newquay)—*G3THT.*
Exeter (EARS)—8 December (Natter night). Noted from "other sources", a change of secretary from G3HMY who served the Exeter club exceedingly well for many years. G3TXG is now acting secretary until the AGM. New venue also. Community Centre, 17 St David's Hill, Exeter.
North Devon (NDARC)—9 December (Technical talk), 23 December (Christmas spirits). Both at "Grinnis", High Wall, Sticklepath, Barnstaple. *G4CG.*
Plymouth (PRC)—1 December ("Emphasis on transistors and their application in transmitting", by Ron Daw, G3OIQ), 15 December (Open meeting, to hear your suggestions, and what's wrong). Meetings at Virginia House, Bretonside, Plymouth.
The annual dinner with its usual social content went very successfully on 14 November. *G3SPI.*
Saltash (S & SDARC)—3, 17 December. Meetings at Burraton Toc H Hall. *G3XWA.*
South Dorset (SDRS)—4 December (Talk by G3COV), 7.30pm, Technical College. *G3EAT.*
Taunton (T & DARC)—Every Friday at new Control Centre, SEVO, County Hall, Taunton. *G3CWD.*
Torbay (TARS)—Every Tuesday and Friday, 14 December (Christmas Party). Club HQ, G3NJA, Bath Lane, Rear of 94 Belgrave Road, Torquay. *G3NQD.*
Weston-Super-Mare (WSMARS)—4 December ("Microwave working", presented by D. Young of EMI Electronics, Wells. The lecture of the year). 8 January (Parts 2 and 3 of the new "Aerials" film will be shown), 7.30pm, New Technical College, Small Lecture Theatre, Ground Floor. *G3GNS.*
Yeovil (YARS)—Wednesdays, the Park Lodge, Yeovil. *G3NOF.*

REGION 10 — RR D. M. Thomas, GW3RWX

Blackwood (ARC)—Fridays, 7pm, Blanche Cottage, off High Street, Blackwood, Monmouth. This club has suffered continuous misfortune through vandalism. Members are to be congratulated for the manner in which they have persevered to keep the club in being. *G6BK.*
Barry College of Further Education (ARS)—Thursdays, 7pm, Barry College of Further Education, Colcot Road, Barry, Glam. *GW3VPB.*
Cardiff (RSGB Group)—Monday 14 December (Annual Christmas social), 7.30pm, TA Centre, Park Street, Cardiff. *GW3GHC.*
East Glamorgan Raynet Group—Meetings irregular at the moment. Full details of activities can be obtained from GW3ZFG, Cardiff 62411.
Hoover (ARC)—Mondays, 7.30pm, Hoover Social Club, Hoover Works, Pentrebach, Nr Merthyr, Glam. Secretary: Mr F. E. Tribe.
Port Talbot (ARC)—Meetings second Tuesday of month, 7.30pm, Trefelin Club & Institute, Port Talbot, Glam. *GW5VX.*
Pontypool (ARC)—Tuesdays, 7pm, Educational Settlement, Rockhill Road, Pontypool, Mon. *GW3JBH.*
Pembroke (ARC)—Last Friday in each month, 7.30pm, Defensible Barracks, Pembroke Dock. *GW3LXI.*
Rhondda (ARS)—Meetings at Rhondda Transport Employees Club & Institute, Porth, Rhondda, Glam. *GW3PHH.*
Sully & District Short-wave Club—Tuesdays, 7pm, The Annexe, Sully Bowls & Social Club, 59 South Road, Sully, Glam. Secretary: Mr Gyn Maggs, 3 Thorley Close, Cyncoed. Cardiff.
Swansea Telephone Area (ARS)—Tuesdays, 7.30pm, Telephone Engineering Centre, Gors Road, Swansea. Club callsign is GW3XTK. Secretary: Mr D. E. Connor, 7 Glanmon Park Road, Sketty, Swansea, Glam.
University College, Cardiff (ARS)—Details of meetings from the secretary, c/o Students' Union, Dumfries Place, Cardiff. Callsign GW3UWC.
University College, Swansea (ARS)—Details of activities from the secretary, c/o Students' Union, University College, Singleton Park, Swansea.

REGION 11 — RR P. H. Hudson, GW3IEQ

Conway Valley (CVARS)—11 December (Annual Christmas dinner), 17 December (Junk sale and raffles), the Parade Hotel, Llandudno.
There was an alteration in the November talk. This being given by D. J. Walker, G3OLM, on "Aerials, with demonstrations".
Rhyl (R & DARC)—8 December (Talk on transceivers by B. Clark, GW3HGL), the Mona Hotel, Rhyl.
At the meeting held on 13 October a large audience heard a very good talk on amateur television by John Lawrence, GW6JGA/T. The annual junk sale held on 10 November was also very well supported.
UCNW ARS, Bangor—Meetings held on alternate Thursdays. 3 December ("Radio Aurora", by C. E. Newton, G2FKZ), 5.15pm, The Small Lecture Theatre of the Engineering Dept, Dean Street, Bangor. Anyone interested in radio and coming to the University for an interview, is invited to contact the secretary, G3UUT.

REGION 12 — RR A. W. Smith, GM3AEL

Those who have not seen the 24pp Region 12 Newsletter can obtain it from the following persons in the areas shown:

Aberdeen and Kincardine	GM3HGA and GM3PIP
Angus	GM3KYI
Caithness and Sutherland	GM3SFH
Hebrides	M. L. Crosfil, 5 Lewis Street Stornoway.
Inverness-shire	W. M. Begg, Planefield Road, Inverness.
Moray and Nairn and Banffshire	GM3UKG
Orkney	GM3CCK
Perthshire	GM3WFJ
Ross and Cromarty	GM3JFG
Shetland	GM3HTH and GM3SJA

Aberdeen (AARS)—Fridays, 7.45pm, 6 Blenheim Lane, Aberdeen. *GM3HGA.* Telephone Aberdeen 33838.

Dundee (DARS)—Thursdays, 8pm, 3 Magdalen Place (off Roseangle), Dundee. *GM3KYI.*

Inverness (IRS)—Thursdays, 7.30pm, 4 Falcon Square, (nr Railway Station), Inverness.

Lerwick (LRC)—Tuesdays and Thursdays, 8pm, Annsbrae House, Lerwick. *GM3XPQ.* Telephone 249.

Llanbryde (MFARS)—Wednesdays, 7.30pm, St Andrew's School, Llanbryde, by Elgin, Morayshire. *GM3UKG.* Telephone Clochan 225.

Thurso (CARS)—Second Tuesday in each month, 7.30pm, Thurso Technical College. *GM3JUD.*

REGION 13 **RR V. W. Stewart, GM3OWU**

Greenlaw (BARS)—First Sunday in each month, 3pm, Cross Keys Hotel. Details from G. Shankie, GM3WIG, 8 Attrick Terrace, Hawick, Roxburghshire.

Glenrothes (GDARC)—First Sunday in each month. Weekly meetings every Wednesday, both at 7.30pm, Old Nursery Buildings, Leslie, Fife. Details from K. Horne, GM3YBQ, 14 Lin Way, Kirkcaldy, or from E. H. Ross, GM3LWS, 24 Ettrick Way, Glenrothes.

Lothians Radio Society (LRS)—10 December (Constructing techniques), next meeting not till 14 January, 7.30pm, 66 Hanover Street, Edinburgh 2.

REGION 14 **RR N. G. Cox, GM3MUY**

Ayrshire (AARG)—6, 20 December, 7.30pm, YMCA Howard Street, Kilmarnock.

Ayrshire (Ardeer Recreation ARC)—1, 3, 8, 10, 15, 17, 22, 24, 29 December, 7.30pm, Ardeer Recreation Club, Amateur Radio Section, Stevenston, Ayrshire. Details from J. F. McCreight, GM3DJS, 10 Auchenharvie Road, Stevenston, Ayrshire.

Falkirk & District RSGB Group—18 December, 7.30pm, Temperance Cafe, Lint Riggs, Falkirk.

Glasgow University (GURC)—11 December, 7.30pm, George Service House, University Gardens, Glasgow, W2.

Greenock (G & DARC)—4, 11, 18, 25 December, 7.30pm, Watt Library, Union Street, Greenock.

Mid-Lanark RSGB Group—18 December, 7.30pm, YMCA Brandon Street, Motherwell.

West of Scotland ARS—4, 11, 18, 25 December, 7.30pm, Royal Signals, 21 Jardine Street, Glasgow, NW.

REGION 15 **RR J. Thompson, GI3ILV**

City of Belfast YMCA Radio Club—Mondays, morse practice; Wednesdays and Saturdays, club nights; 2 December (Film show and social evening), 8pm, City YMCA (3rd floor), 12 Wellington Place, Belfast, BT1 6GE. Information from YMCA General Office.

REGION 16 **RR W. J. Green, G3FBA**

Basildon (VARS)—Thursdays, 7.30pm, The Scout Hall, Fairview Road, Vange, Basildon. *G3VOP.*

Chelmsford (CARS)—First Tuesday in each month, 7.30pm, Marconi College, Arbour Lane, Chelmsford. *G3VCF.*

Clacton (CDRC)—This club has been re-formed and meets on the second and fourth Tuesday of each month at the Martello Tower, Marine Parade West, Clacton on Sea, Essex. Chairman, G4GA; treasurer, G3CEB. Full details may be obtained from the secretary, G3YAI, 122A Chilburn Road, Burrsville Park, Clacton on Sea, Essex.

Colchester (CARS)—Wednesdays, 7pm, NE Essex Technical College, Colchester. *G3VAG.*

Gt Yarmouth (GYRES)—Fortnightly, 7.30pm, 98 South Market Road, Gt Yarmouth. *G3HPR.*

Ipswich (IRC)—Last Wednesday in each month, 7.45pm, at the Gippeswyk Hall. Secretary is Mr P. J. Hubert, G3YWM, 575 Bramord Lane.

Norwich (NARC)—Mondays, 7 December (Business meeting), 14 December (Informal), 21 December (Social evening, details yet to be announced), 28 December (No meeting). 7.30pm, Brickmakers Arms, Sprowston Road, Norwich. Secretary: G. Purcell. Tel Drayton 459.

REGION 17 **RR C. Sharpe, G2HIF**

Basingstoke (BARC)—5 December (Constructor's evening), 19 December (Film Show), 7pm, Chineham House, Popley Way, Basingstoke. Visitors and new members always welcome. *G3CBU.*

Chippenham (CDARC)—Meetings on every Tuesday in month, 7.30pm, Boys High School, Hardenhuish Lane, Chippenham.

In December a special Christmas social at the local hostelry is being planned. Further details from the club secretary. *G3UTO.*

Fareham (FDARS)—6 December ("Using test equipment", by G3VLY), 13 December (RSGB tape/slide lecture—"World at their fingertips"), 18 December (Film night—"GPO, ship to shore"), 19 December (Christmas social). No meeting on 27 December. 7.30pm. Porchester Community Centre, Porchester, Hants. *G3XIV.*

Farnborough (FDARS)—8 December (A visit from Racal ARC), 7.30pm, Railway Enthusiasts' Club, 310 Farnborough Road, Farnborough, Hants. No meeting on 22 December. *G8BVM.*

Maidenhead (MDARC)—Meetings on 7, 15 December, 7.20pm, Victory Hall, Cox Green Lane, Maidenhead, Berks. *G3VMR.*

N. Berks (AERE, Harwell, ARC)—15 December (AGM followed by the usual Christmas time adjournment to the social club bar). Informal meeting and junk sales every Friday lunchtime. Social Club, AERE, Harwell, Didcot, Berks. *G3NNG.*

Reading (RDARC)—8 December (AGM), 22 December (No meeting, but there will be a Christmas party), 7.30pm, Victory Public House, Meadway, Tilehurst, Reading. *G3NBU.*

Swindon (SDARC)—2 December ("Test equipment", lecture), 16 December (Ladies' night and open night), 7.30pm, Penhill Junior School, Penhill, Swindon, Wilts. *G3JAP.*

MEMBERS' ADS

These advertisements are accepted free of charge as a service to members of RSGB. They must be submitted on the Members' Ads order form printed on the penultimate page of each issue of *Radio Communication*, or on a postcard similarly laid out. Each must be accompanied by a **recent** *Radio Communication* wrapper addressed to the advertiser, as proof of membership.

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

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

The closing date for each issue is the 7th of the preceding month, but no guarantee of inclusion in a specific issue can be given. No correspondence concerning this free service can be entered into.

See the current order form for further details.

FOR SALE

Property of late BRS31641: new Trio 9R59DE, ldspkr, head-phones, meter, Joystick ant and this year's Call Book. Offers to Mrs F. M. Fensom, 66 First Avenue, Mortlake, London, SW14. Tel 01-878 1855.

Cannonball ssb tx, new and unused, 80m, £22 or exchange for 3in refractor or large OG. G3OGD, 20 Bevan Avenue, Talke Pitts, Stoke on Trent.

Hammarlund HQ100A, gen cov with amateur bandspread, Q mult, ex cond, £50 ono or exch amateur bands only rx with cash adjustment. GW3YSA, 35 Pen-y-Waun, Efail Isaf, Nr Pontypridd, Glam, S. Wales. Tel Newtown Llantwit 3809.

Incomplete hambands rx composed of QP166 front end, 250V psu, MR38 S meter, 400, 1300, 3000Hz audio filt, £10 10s. Transistorized 455kHz i.f. strip incorporating anl and passband filt, 30s. Coghill, 81 Kingston Road, Bishopston, Renfrewshire, Scotland.

KW2000 plus ac psu, good cond, £130. G3VMY, 3 Stanlake Park Cottages, Twyford, Nr Reading, Berks. Tel Twyford 5621 (weekends).

200W radar tx (T3636), contains two VT908-80, 10E/97B, low volt transfmr (15 amp), pulse transfmr (2803), cooling fan. Ideal for QRO rig, will consider splitting. Offers. Carriage extra. G8DWW, 68 Grand Avenue, Worthing, Sussex.

Hi-band Hudson FM208, £25. 3 trnsfmrs 18-0-18V at 40A, £5 ea. Meters: 1 new 100μA, 3in centre zero scaled phase, £3 10s; 1 2in 0-10, £2 10s. Wanted: leak sandwich spkr. G3KLK, QTHR. Tel 01-579 0324.

Hudson AM108 radio telephones, 5W rf, boot mounted, comp with xtals, control unit, mic, cables. Convertible for 2 or 4m, pos or neg earth, £7. Positive earth, £6. G3TPO, QTHR. Tel 01-699 9660.

SB200, £100. OS2 scope, £25. Both as new. KW antenna switches, 2 unused. Allot, 25 South Street, Portslade, Sussex.

Small top band trnscvr, ac/dc psu, £15. Mosley tri-band vertical, £6. G3PHS, QTHR. Tel Caterham 46692.

KW Viceroy with ac psu, fb tx, £50. KW Vanguard 160-10m, very good cond, £30. AR88LF with product detector, £30. G3YBR, 8 The Green, Lolworth, Cambridge.

Mini clipper, one valve battery shortwave rx, two coils 25-175m, £1. Untested xtals, 21·6, 22·9, 24·2MHz, 1/6d ea. Tested xtals 6·275, 6·125, 5·75MHz, 2s ea. Last three FT243. Wells, 1 Middcotts, Hartley Bottom Road, Longfield, Nr Dartford, Kent.

Eddystone EC10 rx with matching hdphns in exc cond, £39 10s ono. Clayton, Davy Hall, Oaklands Road, Salford, M7 OPX. Tel 061-792 1709 (after 5pm weekdays).

Eddystone EC10 No 3099 with mains psu, £35. Park Air 15SS vhf aircraft band rx, 118-136MHz, as new, £35. Weeks, 5 Redhill Crescent, Moordown, Bournemouth. Tel Bournemouth 57344.

Eddystone 680X, late swl rx, offers. GM3PSJ, QTHR. Tel Selkirk 3641.

Racal RA17. Murphy AP100335, Class D No 2 wavemeter. AP W2508 wavemeter. 2m convtr, plus numerous oddments. All in ex wkg cond, £160 the lot or will sell separate. Thorogood, 30 Grange Gardens, Southend on Sea, Essex. Tel 612211 9am-5pm only.

ICs, resistors, capacitors, diodes, all new, genuine bargains. Sae for full details. Also brand new QQVO7/50, will swap for any efficient two metre convtr i.f., 2-30MHz. G8DLT, 17 Cadnam Close, Strood, Rochester, Kent. Tel Medway 77405.

2m tx, fm, 18W, comp with 3 xtals and psu, £15. Heath GR64E rx in good cond, £18. Command rx covering 6-9MHz, wkg, £3. Wanted: good ssb rx. Bacon, The Grange, Copsewood, Binley Road, Coventry, CV3 1HS.

Radon 404 stereo system: 8+8W amplifier, SP25 Mk2 turntable, matching spkrs, £50 or exch for Trio 500SE. Stewart 2 West Road, West Drayton, Middlesex. Tel West Drayton 6818.

250kHz mechanical usb filter with crystal, £5. Vidicon, new, first grade, £4. Geloso G209R rx, £35. 931A photomultiplier, £1. UM2, £2. G8AWM. 1023A Finchley Road, London NW11.

Nova-Tech Pilot Pal direction finder rx, good cond, £15 ono or exch beam rotator. Cash adjustment if necessary. Buyer coll. G8CVI, QTHR.

Sommerkamp FR100B, top band, all 10m, WWV, as new, £70. BC221 with charts, mains supply built in. Codar Q mult, £4 10s. G3VSW, QTHR. Tel Beaconsfield 2077.

Collins 75S3B, no offers, £250. G3RHM, QTHR. Tel 422 5810.

Transistorized portable tape recorder suitable for mobile log, 75s. Swinnerton, 29 Beacon Way, Rickmansworth, Herts WD3 2PF. Tel 76864.

BC221 tuning capacitor and dial, less vernier ring, 22/6d. UM1 mod trnsfmr, 30s. SCR522 mod and driver trnsfmrs, 17/6d, post inc. G3HB, 81 Anglesmede Crescent, Pinner, Middx.

HRO 5T, 160-10m, six bandspread amateur bands, otherwise standard, £20. Two HRO coils 3·5-3·8MHz, £3 ea. Two scope eht trnsfmrs, 2·5kV and filaments. R209 front end, BC453 2nd i.f. Darkin, 4 Ash Drive, Catshill, Bromsgrove, Worcs.

G2DAF rx, £40. Marconi bridge TF868, £20. Marconi generator TF801/A, £30. Advance generators E2, Q1, P1, £10 ea. Valve voltmeter CT38, £20. 8mm cine projector. £20. Philips cassette recorde, and car mounting unit, £15. G3NKN, "Pippins," St Mabyn, Bodminr Cornwall.

Drake 2B with 2BQ, £75. KW Vespa Mk1, mint ac psu, £75. R209, £10 ono. Details to GW3GHC, QTHR.

G2DAF Mk1 tx, 160-15m, grade one components, gd cond, pref local sale or exch for cw only tx well screened and filtered. GM8CH, QTHR.

160m phone/cw tx, 5 valve 160m rx (trf), various valves, trnsfmrs, meters, cabinets etc, suit young experimenter, £18 the lot. Regret collect pse. G3AVQ, QTHR.

Choke swinging 9-60H, 400mA, 30s. HRO spare dial, 15s. Dynomotor unused, 12/350V dc, 180mA, £1. Valves 807 (7) 1625 (1), £25s the lot. Buyer coll. G3JNM, QTHR. Tel Macclesfield 2668.

HW32A trnscvr with ac psu and dc psu. Connecting cable required for dc supply, £50 the lot or take exch 2m /M gear or HW17 trnscvr. GM3LIB QTHR, Tel 031-337 7017.

Electroniques GC166 coil pack, £5. 3 speed tape recorder—studio deck, £15. 2007 hi band Ranger, £6. Valve uhf tv convtr, £2. BCC

400E base station, £15. G3HSC morse record, 10s. G3ZNW, 341 Walton Road, West Molesey, Surrey. Tel 01-432 2239.

Transformers, 500-0-500V at 340mA, 10s. 400-0-400V at 200mA and lt, 15s. 50W isolating, brand new, £1. Post extra for above items. Wanted: 50-100W amp suitable for group use, will coll 50 miles. G8DJQ, 5 Onslow Gardens, Ongar, Essex. Tel Ongar 2103.

HRO (modified) 900kHz-30MHz, gen cov, bs 80 and 20m, 230V psu, sell or swap. Even silly offers considered. Wanted: any gen on vhf freq meter BC906D. Tilcock, 10 Blenheim Crescent, South Croydon, Surrey. Tel 01-686 3280.

143 *QST*s 1951-1963, best offer. 160m tx, 3 xtals + external vfo, 6L6 pa, two 6L6 mod, self powered, £5. 430MHz convertor, 3 × GM0290, 2 × OC171, i.f. 27-31MHz, £7 10s. Buyer coll. G3EJA, QTHR.

Pye Reporter, good cond, internal mains and battery psu, no handset or xtals but otherwise comp. Switched channels, suit RAEN types, £9 ono. Hutchings, 100 Crockenhill Road, St Mary Cray, Orpington, Kent. Tel Orpington 37380.

HRO 5T, gc coils, 1-30 MHz, matching psu, immac cond, no mods, £18. Numerous extra coils available. Collins, 33 Elm Close, Laverstock, Salisbury, Wilts.

R1392 rx, 100-150MHz modified, tunable, £3. G3MEJ, QTHR.

Mains trnsfmr, sec 350-0-350V + lt, 10s. 3 gang 500pF per section vari capacitor, 7/6d ideal for 160m tx. Also R1155 and B36 marine rx for junk, 10s for pair. Can deliver 40 miles. G3XYF, QTHR. Tel Nafferton 295.

Tape recorder, £5. Geiger counter, £3. Coach amplifier, £4. Mini-analog computer, £2 10s. Canadian walkie-talkie, £4. Mini-dynomotor, £3. Carr extra, sae for enquiries pse. Talmage, 33 Atherton Crescent, Hungerford, Berks.

Complete mobile installation. Codar AT5, T28, 12RC, 12MS, mic, ldspkr etc, £35. G3NPY, QTHR. Tel Skegness 4185.

0-12-U scope, £11. B44 Mk2, 2N3055 psu, mic, 6W rf, £8. 70·26 xtals, £2. 2 × QY4-400, 1 × 4-400A, £6 ea. Two bases, 10s ea. Fan, £2. Trnsfmrs, 2kV at 400 mA, £6 10s. 5V 14A, £2. G3VFO, QTHR. Tel B'ton 684 659.

Heathkit Mohican GC1U, little used and in good order, £12 inc manual. Will despatch, carr extra. Manfield, Corries, Green Lane, Churt, Nr Farnham, Surrey. Tel Headley Down 3326.

DX100U and SB10U, both perf wkg and as new cond, together with manuals, £70. Buyer coll. G3RUN, "Red Gables", Gt Mongeham, Nr Deal, Kent. Tel Deal 4276 evenings.

Q5er BC453B, brand new unused in orginal packing, 190-550kHz, £7 10s ono plus post unless local. Barnes, 105 Godstow Road, Wolvercote, Oxford. Tel Oxford 57697 (after 7pm).

470kHz ceramic ladder filter, 8kHz bandwidth, swop for hf filter, eg 9 or 10·7MHz or £5. G8AKA, 29 Rectory Avenue, Corfe Mullen, Wimborne, Dorset. Tel Broadstone 5297.

Commercial 4m /M by Murphy, modified for variable tuning on rx. Exchange for 8mm projector. G6YP, 18 Ashton Heights, Horniman Drive, London SE23. Tel 01-690 8652.

Eagle Minilab testmeter, £4 10s ono. Wanted: any data on vhf R77-ARC3 rx. Buy or borrow manual on Pye transistor 2007 dash ranger. Elms, 110 Arundel Road, Walton, Peterborough, PE4 6JH.

HRO original hndbk, £2. Class D wavemeter hndbk, 15s. *Radio Amateurs Handbook*, 3rd edition, 15s. Add postage. G2UZ, QTHR.

DX100U tx, new meter, valves etc, good cond, all wkg, £35 ono. G3VJF, QTHR. Tel Chesterfield 2872.

Codar CR70A, just checked by makers, with spkr, £16. Harp, 1 Linnell Close, Hampstead, London NW11. Tel 01-458 3937.

AR88, scruffy. Fit only for rebuilding or spares, £5. G3BYY, 37 Staines Road, Wraysbury, Staines, Middx. Tel Wraysbury 2007.

Mullard 4W hi-fi amps, new with stereo pre-amp tone control circuit, £2 ea, £3 15s. pair. Heathkit gdo GD1U, excellent, £8. Pair made traps for multiband dipole, £1. Wyndsor 30A scope, wkg, £4 (collect). Brown, 242 Little Wakering Road, Wakering, Southend. Tel Great Wakering 646.

CR100, gd wrkg order, £12 ono. Buyer collects. GM3BGW, QTHR.

2m and 4m xtals. Also 60 other xtal freqs. Wearipe "P" and Weyrad coils, 6V vibrator, psu. G3NNO QTHR.

CR100 rx with hndbk, £12 10s. Marconi valve voltmeter RF428, high freq probe, hndbk, £1 10s. Buyer coll. Cooper, 45 Nightingale Crescent, Harmans Water, Bracknell, Berks. Tel Bracknell 4168.

AR88D, orig S meter, hndbk, realigned, £40. TS174M freq meter (vhf BC221) 20-280MHz, with ac psu. Metrix 230 wobuloscope 5-220MHz, sweep width up to 20MHz, spare tube, manual. Offers. G3NGK, QTHR. Tel Beaconsfield 3109.

HRO with bs coils, £20. 70cm JXK convtr, £8. Varactor tripler, £7, and wavemeter, £4. 2m convtr, £6. Valve tester, £3. Audio power meter, £2. FT243 i.f. xtals, £2. Morse records, 30s. Kerry, 47 Cottenham Road, London. E17.

SB10U, £25. 640 S-meter Codar pre-amp, £22. Taylor 90A meter, £5. Xtal calibrator, 1MHz-100kHz, £4 10s. *Radio Communication Handbook* and *Basic Electronics*, both new. Other books, sae list. Callers after 7pm. G3HMY, QTHR.

FT243 xtals, swops not considered. 12·06666, 12·044, 8·100, 8·095, 8·073, 8·040, 8·013, 6·050. Part built 70cm tx, needs 6V and mod ht. GM8APX, QTHR. Tel Kinloch Rannoch 379.

Pye 2m base station. Rx 3302V, tx 3004V, rx tunable, tx 3 switched channels, comp with mic and circuit/align data, £20 ono + carr. GM3VXR, 70 Leven Street, Motherwell, Lanarkshire. Tel M/Well 66597.

Panda Cub, £20. HRO rx, home-brew psu and coils, £12. CR100 in gd wkg order, £8. Offers to G3JFF, QTHR.

Model 8 Avometer, brand new bargain, £21 ono. G8AUM, QTHR.

Ssb trnscvr, 80-20-15m, 100W, 5MHz xtal filt, xtal calib, home bult mobile/fixed rig, boot mounting with remote vfo and control unit, includes 12V dc psu only, £30 buyer coll. G3CYY, QTHR. Tel Tarvin 787.

CR100 rx, gd cond, revalved, £15. R1155 rx, modified 160m, no psu. £2. 6ft lengths 50 core cable, multi coloured, multi stranded, ideal for breaking up for use as sep wires, 10s ea. Newman, 264 Collier Row Lane, Romford, Essex. Tel 70 63970.

2m Ranger, mobile or fixed, tunable first osc, new halo and 404 ant coax, 12V batteries, £28. BCC221, mains psu, £15. Buyer Coll or delivery arranged. G3MLP, QTHR. Tel 09334 2469.

Boat owners: Sale/exch Navionics Co-pilot including twin needle electronic compass, compass tx and psu, Knott indicator, echo sounder with transducer, all fittings and manual. Also small echo sounder, both unused. G3IUS, 30 Longleaze, Wootton Bassett, Swindon. Tel Wootton Bassett 2501.

Integrated circuits used but as new. Top grade 7400, 6s; 7420, 6s; 7450, 6s; few 7474, 9s; 7430, 6s; circuits monostable bistable multi vib decade divider references outline data, 2s all, plus sae. G2HCJ, QTHR.

Comp stations consisting of SB101, SB200, mic, psu/spkr, TH3, TR44, all hndbks. All ex cond, as new, £350. Pref buyer inspect and collect. May consider split. Ring for appointment pse. G3YHB, 86 Max Road, Liverpool, Lancs. L14 4BJ. Tel 051-228 1321.

R209 Mk2, spare valves, Mk1 circuit diagram, £12 10s. Buyer arrange carr. GW3VLU, QTHR.

Eddystone EC10 Mk2, new April, £60 ono. G4HU, 34 Birch Avenue, Romiley, Stockport, Cheshire.

Codar T28, mains psu, spkr. Homebrew 160m tx, variometer, £15. G3WSV, 25B Beeches Close, Saffron Walden. Tel Saffron Walden 2573 (evenings only).

Trio 9R59DE, air tested only, calibrator fitted, £35. Wanted: Mark Heliwhips for 10 and 15m. Also HA14 linear. G3UAC, QTHR. Tel 01-688 2111.

Swan 350, gd cond, comp with ac psu. Also remote vfo and spare rx and tx valves, £150. Buyer to coll, evenings only. G8JM, QTHR. Tel 01-524 0308.

Mint Heathkit Mohican for exch with Trio 9R59DE in sim cond. Dew, 82 Seymour Road, Luton, Beds. Tel Harpenden 61251 (office hours).

B41 lf rx, 700kHz-15kHz in gd wkg cond offers to G3VPT, QTHR. Tel St Faiths 715.

3N70 70cm convtr, 12-14MHz, £9 10s. Hf band 800W linear in case with psu, £16 10s. 2m 6-40A linear with psu, £10. 14in studio monitor, £10. G3VZV, QTHR. Tel Toddington 2470.

Creed 7B teleprinter, 7TR/3 reperf desk and spares. G3LDI, QTHR. Tel Wymondham 34631.

B40C rx, miniature valves, gd cond, £22 10s ono, comp with circ diagram and trimming tools. Hamgear PM M42 preselector, new, exc cond, £5. Keslett, Tel Chesham 5557.

Communications rx, Jenneh Trio JR101 band spread tuning on ham bands, Q mult, ssb, bfo, etc. Range 0·550 through 30MHz, nice cond, £25 ono. G3FSJ. QTHR. Tel Woodbury 637.

160-80m tx and psu, a.m. and cw, £12. Sae for details. G5RS 20 Hedgeway, Guildford. Tel Guildford 61786.

Ekco ratemeter 1037A. Dynatron scaler 1009E. Dynatron op-amp 1430A. Many kilos. Fine valve gear each. Collect for peanuts owing to remote location. GM8APX, QTHR. Tel Kinloch Rannoch 379.

Compact tx, xtal control, 25W a.m. Companion rx, tunable 160-80m, 24V psu, vgc. Offers around £20. Delivery by arrangement. GM3DXJ, QTHR. Tel 449 4533.

An exc Philips 4 track, 3 speed tape recorder. Cossor model CR1601 with moving coil microphone and recording lead plus instruction book, £20. G2AVR, QTHR.

BC312E xtal filt. Elizabethan cw tx, 10-80m. Wanted: RG1 or HA600 must be good cond. Bruce. 437 Helmshore Road, Rossendale, Lancs. Tel Rossendale 4620.

Eddystone model EA12, as new, 40hrs use only, £125 or exch for stamp collection. De Havilland, 39 Bawnmore Road, Bilton, Rugby. Tel Rugby 3997.

Codar AT5, mobile psu and control unit, £18. Set of print-boards for 2m rx, double conversion ex-Pye, with circ, £5. B44, rx tunable, slight fault on tx, £5. Camm, 25 Sunnyhurst Lane, Darwen, Lancs. Tel Darwen 71690 after 6.30pm.

Codar mains psu, 250V, £5. 250V psu, £2. Both good cond. G3WEV, 207 Stockwood Lane, Bristol, BS14 8NF.

Stereo cassette recorder, Philips EL3312, used six hours only, stereo mic, twelve C90 cassettes, cassette caddies, spare leads, no speakers, £30. G8BNJ, QTHR.

Wireless set CDN No 58 Mk1 (tx and rx), 6-9MHz, with vibrator psu, new cond, offers. Hills, 32 Langley Drive, Langley Green, Crawley, Sussex.

Rolls of white parchment paper tape ⅜in wide by approx 1,000ft. Weight about 1½lbs, 3s ea. Packs of 20 at £2. All packing and carr extra. Sae for sample. GW3UBY, 33 St Martins Park, Haverfordwest, Pembs. Tel 2409.

9R59DE comp with phones, Electroniques QP166 ham-band convtr, 10-160m, built into home-brew chassis with pre-selector and self powered, £30 ono. Buyer coll. Rhodes, 53 Redhill Avenue, West Ardsley, Tingley, near Wakefield, Yorkshire. Tel Morley 4217.

Eddystone 840C rx, 480kHz to 30MHz, bfo, ex cond throughout, £40 ono. Eden, 31A Morin Road, Preston, Paignton, S Devon. Tel 0803 58454.

Hallicrafters SX101A, ham bands only, £60. G3MFE, QTHR.

Marconi CR150 1·8-60MHz, built in psu. Also HW30. Offers. G3XSF, QTHR. Tel Halifax 60438.

Eddystone 700R, 19-265MHz, fm a.m. cw, gd cond, £75. G3OJR, QTHR. Tel 43353.

813, 30s. 4CX250B, 30s. Astatic D105 type mic, £2. Audio matching trnsfmr 600Ω line into valve grid. Wanted: Coaxial changeover relay. G3KH, 133 Station Road, Cropston, Leics. LG7 7HH.

Empty 2oz tobacco tins, 9d ea post paid. G3UNU, QTHR.

T28, £12. G whip, £7. 12MS, £9 10s. 12RC, £1 10s. CV323 3cm klystron, 30s. G3WGF, QTHR.

Trio 9R59DS, new model, immac cond, £36. G5ZT, 3 Bircham View, Austineres, Eggbuckland, Plymouth. Tel 76552.

Katsumi el-bug, £9 10s. LCR bridge, transistorized, £11 10s. G3WQP, 22 Muswell Road, London N10.

Mullard v/v, 15kV, £5. Cossor scope, db, 1052, £15. Solartron scope sb, D300, £10. Solartron vari-pack SRS153, £5. Transistor gdo TE15, £9. Marconi sig gen TF144G, £15. Trnsfmr: 620-0-620V at 200mA, 375-0-375V at 250 mA, 5V at 3A, 5V at 3A. Buyer coll. G3OUX, QTHR. Tel Crawley 23890.

KW Atlanta, little used, ex cond, £160. American 2m convtr, £14. HW12A with power pack and Heathkit special spkr, £50 the lot. Shure stand model mic, £4 10s. Must be sold. G3YQE, Dagenham Wholesale Supplies, Selinas Lane, Dagenham, Essex. Tel 01-592 7800.

4 × 2N3055, £1. 4 × 5A 800V avalanche rectifiers, £1. 5 × 500Ω reed operating coils, 10s. μA709 op amp ic, 15s. £3 the lot. Wanted: CA3020, CA3048. Will swop. G8CHC, QTHR.

Codar AT5 tx with psu, £13 10s comp. Wanted: 80-10m tx, will pay up to £25. Fisher, 27 Newstead Road, Southbourne, Hants.

KW2000A, mint, £150. Sommerkamp FRDX500 mint cond with all xtals and 2m convtr, £100. G3WPX, QTHR.

Creed 75 teleprinter, perf cond, £45. Model 54, £45. 6S6, £22. 6S6M, £25. 6S5, £20. All have mains motors and guaranteed perf. G8BMQ, 2A Convent Hill, London SE19. Tel 01-653 8489.

Codar CR70A, PR30 preselector, spkr and phones, all in fb cond. Less than one year old, £17. Can deliver 25 miles. Webb, 123B Lower Cappenham Lane, Slough, Bucks.

£5 each: Grundig Club recorder; Philips 12V transistorized car radio; Bendix TA12C tx; 80-10m double conversion rx; 1930 Osram music magnet 4; lo-band Reporter. All plus carriage. GW3EJR, Mayfield, Cardigan, W. Wales.

EC10 Mk1, new August, hardly used, £50. Sentinel 2m convtr, £11. 3 ele 2m beam, 30s plus post. Hawkins, 249 Herries Road, Sheffield S5 7AX. Tel 0742 386574.

AR88LF with switched a.m./fm/prod detectors, fast/slow agc, realigned, white enamel front panel, good cond, £27 10s ono. G8CEC, QTHR. Tel 021-236 8901 daytime.

Marconi Mercury rx, 15kHz-4MHz with 889A psu, £14. Buyer coll. G6AB, 44 Preston Road, Holland on Sea, Essex. Tel HoS 3356.

HRO-MX, rewired, resprayed, noise limiter, 10 coils, £24 ono. 2 Valve sw rx, £3 ono. RSGB publication *Short Wave Antennas*, 5s. 21yds and 19yds 300 ohm feeder, 7/6d ea. Upstone, 76 Cleevelands Avenue, Cheltenham, Glos GL50 4PS.

Collins 51S-1 and 55G-1 preselector, gen cov 0·2-30MHz, professional rx. New price over £1,000, superb specification, laboratory standards, digital readout, accept £650. East, 41 Avenue Close, London NW8. Tel 01-722 7040.

BC221-AF, as new cond, correct charts, stabilised psu, perf cond, £30 ono. Pref buyer insp and coll. G8CEC, QTHR. Tel 021-236 8901 daytime.

CR100, gd cond, S meter, £12. Buyer coll. G3KJU, QTHR.

4X150B's, new, £2. Garex 2m convtr 27-29MHz, £5. 3-20 bases, ptfe, 5s. CR150-4 with diversity equipment, £25. 2m 3/10 pa tx, mod, metered, cased invertor, £12. HRO with bandspread coils, requires attention, £7. G8DL, QTHR. Tel Northampton 52842.

Rtty: Creed model 75 teleprinter with perforator, £45. Model 54, £45. Auto tx 6S6, £22 10s. 6S5, £20. All exc cond. G8BMQ, QTHR. Tel 01-653 8489 evenings.

KW77, ex cond, £60. G3PU, QTHR. Tel Weymouth 6484 evenings or weekend.

SB101, comp with psu, £185. SB200, £100. OS-2 scope, £25. 2 antenna switches, £4. Abbott, 9GIGD, Sheppey Cottage, Telscombe Cliffs, Nr Brighton, Sussex.

Lafayette HA350, cal xtal, spkr, as new, £35. Varactor tripler, 144-432MHz, with coax relay, £12. Voxiphone intercom, new, 45s. 2m fet convtr 28-30MHz i.f., £5. Transistor tester, homebrew, 15s. G8AWV, QTHR. Tel 01-794 9934.

160m mobile tx/rx, 12V psu, £8. All components and valves to make 500W linear amp and psu, £6. 30ft sectional mast, whip, guys, etc, 25s. G2DAF rx tuning capacitor, coils, (new), 20s. G2HCV, QTHR. Tel 01-954 2960.

KW Vanguard 10-160m tx, £29, with mic and relay controlled. Wanted: Panda atu. Channel-Master ant rotator. G2FUU, QTHR. Tel Nazeing 2274.

Cossor 339 double beam scope, £12 ono. Pref buyer coll. Will deliver Birmingham area. G3XCW, QTHR. Tel Wythall 6036.

T1015 Rx 400-470 MHz, £16 ono, B41 rx, 15-700kHz, £10 ono. Buyer coll. Also valve 2m convtr, i.f. 6·1-8·1MHz + 6CW4 to make pre amp, £4. Crayton, 47 Lye Copse Avenue, Hawley, Farnborough, Hants. Tel Camberley 5201 Ext 41 office hours only.

Xtals (see Sept *Radio Communication*) except 12·1125. Rx's: Lafayette, HE30, £20. Part built G2DAF new xtals, £20. Clearing shack, very cheap/give away for callers. Also speedboat for sale or exchange for radio gear. G3VUT, QTHR. Tel 01-550 9300.

Psu: 0-300V, 0-30V, 100mA, 150V stab, £5. Sub Hull motors rx/tx valve, £5. 1966-67-68 *Radio Constructors*, £2. Gates, 158 Robertson Street, Clapham, London SW8.

455kHz mech filt with carrier xtal. Ex shape factor. Offers. G3MEH, QTHR. Tel 01-660 6263.

Cossor 1601 tape recorder made by Philips. Top grade machine, 4 track with moving coil mic and manual, £20. G2AVR, 90 Darvel Down, Netherfield, Battle, Sussex.

2m Pye base station, rx 3302V, tx 3004V. Rx tuneable, tx 3 switched channels. Mains operation. Comp with mic, circ and tuning data, £20 ono inc carr. GM3VYR, 70 Leven Street, Motherwell, Lanarkshire, Scotland. Tel Minell 66597.

Trio JR101, ex cond, immac, with S meter, 18mths old. Little used due to illness. £30 ono. Delivery arranged reasonable distance. Bawden, 232 Exwick Road, Exeter, Devon.

KW2000A and ac psu, 3yrs old but little used, £120, will deliver 50 miles. Newman, 5 Arthur Street, Cambridge. Tel Cambridge 65983 evenings.

Mobile psu, Galaxy G1000DC for up to 500W. 12V neg earth input, output 800V, 325V, 12V and 100V neg. Unused, £42 10s. ono. G3KPO, QTHR.

Trio 9R59DE rx, few hours of use only, in original packing case, comp with manual. As new cond, £36. Would deliver to 25 miles. G3MSL, 11 Coombe Drive, Fleet, Hants. Tel Fleet 21446.

AR88D, gd cond, £30. HRO, psu, 5 coils with bs 40 and 15m, £15. Minimitter 150W 5 band a.m. cw tx, £20. Minimitter 5 band atu, £5. Must sell, need space. G3UBZ, QTHR.

Electroniques transistor hamband Qoilpax HB166T with i.f. amp IFA/1·6/SSB Mk2, pots, 0-1mA meter and two extra filter xtals, £20 ono. Harrop, 20 Downland Road, Brighton BN2 6DJ.

KW77 rx and matching ldspkr, factory aligned, gd cond, £65 ono. Also CR66 with PR30 preselector and RQ10 Q mult, £22. Carr extra. GW3ZHQ, 10 Soberton Ave, Cardiff. Tel Cardiff 25906.

ASB8, £5. ART13, £5. TCS12 tx, £8. Test set 16APN, £2. B & H camera DA70, £40. Carr extra. Wanted: KW2000A. GW8AIB, QTHR. Tel Caersws 288.

Pye PTC2007 Ranger, transistor psu and mod, transistor rf pre-amp, tunable rx wkg on 2m, £15. 2m 4/4 skeleton slot, £1. 26ft mast with wall brackets and ball bearing, £5. Buyer coll. G8BWO, QTHR. Tel 021-556 1875.

Cossor 1049 scope, wkg order, offers over £20. Heathkit OS2, new, offers over £29. (Both include instruction book and carriage.) Wanted: B40 instruction book to buy or to borrow for copying. Watts, 16 North Common Road, Uxbridge, Middx. Tel Uxbridge 31101.

BC221, mains operated, modulated, £15. Advance sig gen model B4 100kHz, 70MHz, £20. Modec BC3, 100kHz-30MHz, £10. All first class order. G6JQ, QTHR. Tel Gaddesby 365.

Class D wavemeter convtrd to ac with hndbk and transit case. Buyer coll, £6. G3JGO, QTHR.

Radio-TV Servicing 1959-60 and 1962-65 inc. Heathkit SB-10U. Wanted: skilled constructor to supply complete Wireless World wobbulator. G8SP, QTHR. Tel Silchester 513.

12AVQ, £8. KW E-Z Match, £8. KW ant switch, £2. Green & Davis 2m nuvistor convtr with psu, £5. £20 the lot. All as new. GI3ZSC, "Tielsa", Portelenone Road, Randalstown, Co Antrim, N. Ireland. Tel Randalstown 378.

WANTED

Pye AM10D high band. G3ISQ, QTHR.

Pye Bantam, a.m. or fm, any band. Hndbk for Cossor scope 1035 Mk3. Info on 2C39 cavity ref 400-LRU-13SJ believed to be made by STC. G3TTV, QTHR.

Heathkit scope OS-2, service-scope minor, TO-3, CT52, or similar. Mint cond only. G3XKR, QTHR. Tel Woking 3620.

CR100 or 300. Need not be wkg, state price and condition. G3PEY, 19 Dorset Road, Tunbridge Wells, Kent.

HX50 Hammarlund tx, ssb or similar, must be mint and reasonable price for cash. G3APH, Fleet Trailer Park, Appleton, Roebuck, York.

SWM 5/56, 10/57, 8/60, 7/61, 9/61, 12/61, 6/62, 8/65. G8IX, QTHR. Tel 0782 24941.

69·992MHz xtal suitable for G3HBW mosfet convtr. G8CDP, QTHR.

2m beam with rotator, swr bridge and 1970 *Callbook*. G3MYY QTHR. Tel Farmland 2841.

Plug in coils for R1448 AA, CC, DD, For sale: PCR3 communications receiver, £7 ono. Griggs, 5 Collingwood Avenue, Muswell Hill, London N10. Tel 01-883 3474.

Marriott tape heads, type R/RP 1 and R/E 1. HC6U, Xtals 8·425-8·490MHz. HC18U 6·720MHz. Fletcher, Holmdale, Martin, Lincoln.

Linear amp, 80-10m, 1200W input, built in psu. For sale: HW30 2m trnscvr professionally built, unused £20. Harrisson, 47 Hargrave Road, Maidenhead, Berks. Tel Maidenhead 20399.

B40 model C or D, no mods, can collect up to 50 miles. Fenwick, 28 Gimble Way, Pembury, Tunbridge Wells, Kent. Tel 2836.

Oscilloscope, any make, one requiring attention would do. GM3UTH, 22 Langholm Crescent, Glenrothes, Fife.

Preselector, Codar or similar. GM2HCZ QTHR. Tel Moniaive 345.

QST for April and May 1967, will buy. G3AVQ, QTHR.

Aerial rotator, 6 or 10 ele beam for 2m, 14 or 18 ele beam for 70cm. G8BSS, QTHR.

UM1 modulation trnsfmr. Reply letters only pse. Lamb, Flat 1, "Newlands", Newlands Drive, Maidenhead, SL6 4LQ.

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Circuit diagram for B44, Mk 2, will photocopy and return. G3RWW, QTHR.

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AR88D S meter, 5mA rh zero, state price and condition. G8DOI, 13 Stockingate, South Kirkby, Pontefract, Yorks.

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Manuals, circuits or any info on Marconi CR150. Will buy or borrow for copying. McDermid, c/o Wycliffe College ARS, Schoolhouse, Wycliffe College, Stonehouse, Glos. Tel Stonehouse 2793.

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Marconigraph, 1911-13 (Vols 1 and 2); *Wireless World*, 1915-22 (Vols 3-10); *Experimental Wireless*, 1925 volume; copies *Radio Times* and *World Radio*, 1923-45; BBC Handbooks, 1940-46. G3IDG, 96 George Street, Basingstoke, Hants.

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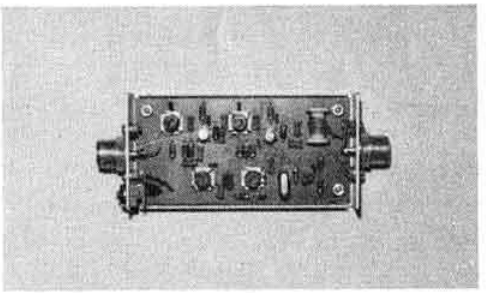

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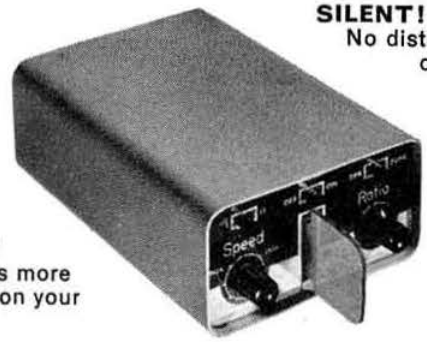

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Radio Society of Great Britain

FOUNDED 1913
INCORPORATED 1926

PATRON H.R.H. THE PRINCE PHILIP
DUKE OF EDINBURGH, KG

APPLICATION FOR CORPORATE* OR ASSOCIATE* MEMBERSHIP

RADIO SOCIETY OF GREAT BRITAIN,
35 DOUGHTY STREET,
LONDON WC1N 2AE
Tel 01-837 8688
Giro A/C No 533 5256

* I hereby apply for election as a Corporate Member of the Society and enclose a remittance for £2/10/- being the amount of my first annual subscription.‡

* Being under 21 years of age and not holding a current Amateur Radio Transmitting Licence I hereby apply for election as a Non-Corporate (Associate) Member of the Society and enclose herewith a remittance of £1/5/- being the amount of my first annual subscription.‡

I, the undersigned, agree that in the event of my election to Membership of the Radio Society of Great Britain, I will be governed by the Memorandum and Articles of Association of the Society and the rules and regulations thereof as they now are or as they may hereafter be altered; and that I will advance the objects of the Society as far as may be in my power; providing that whenever I shall signify in writing to the Society addressed to the Secretary that I am desirous of withdrawing from the Society I shall at the end of one year thereafter after the payment of any arrears which may be due by me at that period to be free from my undertaking to contribute to the assets of the Society in accordance with Clause 8 of the Memorandum of Association of the Society.

Date _____

Signed _____

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* Please delete where inapplicable.

† If the applicant is not acquainted with a Corporate Member willing to propose him for election he may submit a suitable reference in writing as to his interest in Amateur Radio.

‡Subscriptions will be increased to £4 for corporate members and £2 for associate members from 1 January 1971.

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