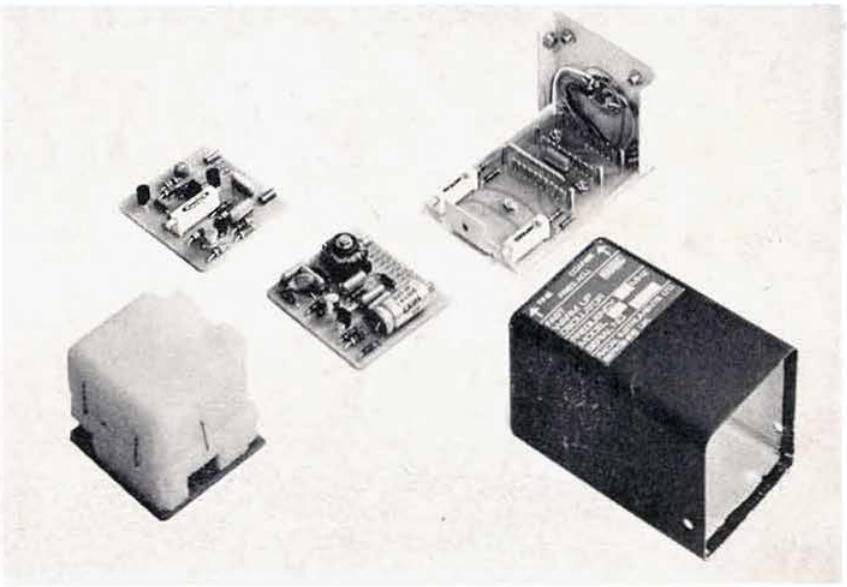
MARCH 1969

RADIO COMMUNICATION



AS STEADY AS A ROCK

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PORTABLE ON SLIEVE DONARD

page 164

A SSB TRANSVERTER FOR 144 — 146 MHz

page 165

Journal of the Radio Society of Great Britain

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500 watts PEP, 10-80 metres; SSB, AM, CW. Built-in 100KHz crystal calibrator.

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180 watt PEP, 10-160 metres, complete AC psu, VOX, P.T.T.

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MARCH 1969
VOLUME 45 No. 3

HEATHKIT Amateur Radio Equipment

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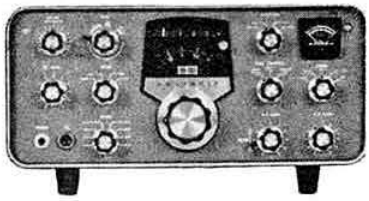

SB-101 80 Through 10 Metre SSB Transceiver . . . 180 watts input PEP SSB, 170 watts CW (the practical power level for fixed/mobile operation). Features USB/LSB on all bands, PTT & VOX. CW side-tone and more. Unmatched engineering and design.
Kit K/SB-101, 23 lbs., **£185 . 12 . 0.** P.P. 9/-.
Ready to use **A/SB-101, £225 . 12 . 0.** P.P. 9/-.

HW-100 5 Band SSB-CW Transceiver . . . Solid-State (FET) VFO covers 80-10 metre bands. Switch selector USB LSB or CW. 180 watts input PEP SSB, 170 watts input C.W. Crystal filter.
Kit HW/100 18lbs **£125** P. & P. 9/- Ready-to-use **£165** P. & P. 9/-.

SB-610E Signal Monitor Scope . . operates with transmitters on 160 through 6 metres at power levels from 15 watts through 1 kw. Shows transmitted envelope. Operates with receiver IF's up to 6 MHz, showing received signal waveforms. Spots over-modulation, etc.
Kit K/SB-610E, 14 lbs. **£41 . 14 . 0.** P.P. 10/6.
Ready to use **A/SB-610E, £51 14 . 0.** P.P. 10/6.

SB-620 "SCANALYZER ' Radio Spectrum Monitor and Analyzer. New narrow sweep widths with crystal filter for single channel analysis. 10 kHz. 50 kHz. Variable width to 500 kHz. Styled as SB series.
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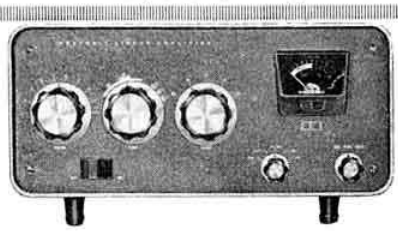
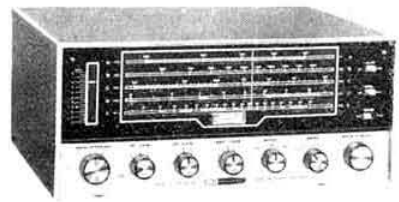
Ready to use **A/SB-620, £77 . 4 . 0.** P.P. 10/6.

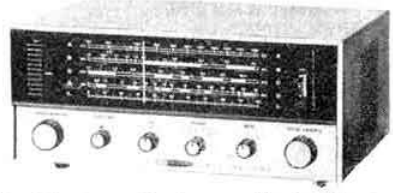


SB-200 KW SSB linear Amplifier . . . 1200 watts PEP input SSB, 1000 watts CW on 80 through 10 metres. Built-in antenna relay, SWR meter, and power supply. Can be driven by most popular SSB transmitters (100 watts nominal output).
Kit K/SB-200, 41 lbs., **£120 . 18 . 0.** P.P. 10/6.
Ready to use **A/SB-200, £145 . 18 . 0.** P.P. 10/6.



GR-54 5 Band Shortwave Receiver . . . for AM, SSB, CW. Product det. for SSB . . . 3 shortwave bands cover 2 MHz to 30 MHz plus 550 kHz to 1550 kHz AM broadcast band and 180 kHz to 420 kHz aeronautical and radio navigation band. Built-in AM antenna.
Kit K/GR-54 **£50.0.0** P.P. 9/-. Ready to use A/GR-54 **£63.6.0** P.P. 9/-

HP-13 Mobile and HP-23 Fixed Power Supplies . . . For the HW-100, SB-101 and "Single Banders". Provides all necessary operating voltages with excellent dynamic regulation.
Kit K/HP-13, 7 lbs., **£37 . 2 . 0.** P.P. 6/-.
Ready to use **A/HP-13E, £44 . 2 . 0.** P.P. 6/-.
Kit K/HP-23E, 19 lbs., **£30 . 18 . 0.** P.P. 9/-.
Ready to use **A/HP-23E, £36 . 8 . 0.** P.P. 9/-.



GR-64 4 Band Shortwave Receiver . . . 4 bands—3 shortwave bands cover 1 MHz to 30 MHz plus 550 kHz to 1620 kHz. AM broadcast band. Variable BFO control for code and SSB transmissions. Built-in AM antenna.
Kit K/GR-64 **£22.8.0** P.P. 9/-. Ready to use **£29.8.0** P.P. 9/-.

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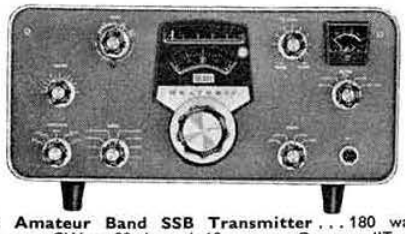
SB-301E Amateur Band Receiver . . . SSB, AM, CW and RTTY reception on 80 through 10 metres + 15 MHz WWV reception. Tunes 2 metres with SBA-300-4 plug-in converter.
Kit K/SB-301E, 23 lbs., (less speaker) **£140 . 12 . 0.** P.P. 9/-.
Ready to use **A/SB-301E, £170 . 12 . 0.** P.P. 9/-.

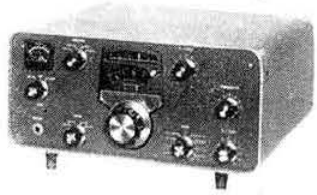


SB-401E Amateur Band SSB Transmitter . . . 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates "Transceive" with SB-301—requires SBA-404-1 crystal pack for independent operation.
Kit K/SB-401E, 34 lbs., **£157 . 10 . 0.** P.P. 10/6.
Ready to use **£192 . 10 . 0.** P.P. 10/6.
SBA-401-1 crystal pack, 1 lb., **£17 . 3 . 0.**

MODELS
HW-12A
(80m.)

HW-32A
(20m.)

HW-12A and HW-32A Filter-Type SSB Transceivers . . . 100 watts PEP input TX. 1μV sensitivity RX. PC Board. Pre-aligned circuits. Power required: 800v. D.C. at 250 mA., 250v D.C. at 100 mA. —125v. D.C. at 5 mA., 12v A.C. or D.C. at 3·75A.
Kit, either model, **£60 . 3 . 0.** P.P. 10/6.
Ready to use **£74 . 13 . 0.** P.P. 10/6.
GH-12 Push Talk Microphone Ready to use **£4 . 3 . 0.**



SB-310 10 Band Professional SW Receiver . . . Covers six SW broadcast bands (49, 41, 31, 25, 19 and 16 metres, plus 80, 40 and 20 metre amateur bands and 11 metre CB 15 kHz xtal filter incl. for AM, SSB and CW listening. Many special features.
Kit K/SB-310 (less speaker) **£138.12.0** P.P. 9/-. Ready to use
Optional CW and 88 filter available as extras. **£168.12.0** P.P. 9/-.

RA-1 Amateur Bands Receiver . . . Covers 10-160m. Half-lattice crystal filter at 1·6 MHz. Switched USB and LSB or SSB. Provision for fixed, portable or mobile users.
Kit K/RA-1 £39 . 16 . 0. P.P. 9/-.
Ready to use **A/RA-1, £53 . 0 . 0** P.P. 9/-.

GC-1U "Mohican" General Coverage Receiver . . . 10 transistors, 5 diode circuit. Tunes 580-1550 kHz and 1·69-30 MHz. in 5 bands. 6" × 4" speaker.
Kit K/GC-1U. £38.8.0. P.P. 10/6. Ready to use **A/GC-1U £46.8.0.**

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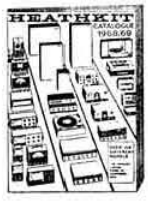

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SOMMERKAMP

I have been working out a few "Spiv Factors" or "Coefficients of Robbery". Assuming that you have copies of the Japanese C.Q. magazine you take the price of an article in Japan in thousands of Yen and divide it into the English price in pounds. This gives you some idea of whether an article is a good buy or not. A Spiv Factor of 2·0-2·2 seems about average for competitive goods, although some things are around 2·5 and somebody, somewhere, is making a nice little killing. I was rather shaken to find that the stuff I import and flog generally runs around 1·8, which is pretty good. Maybe I should put my prices up to bring my Spiv Factor in line! Anyway, like I've been trying to tell you, what I flog I honestly reckon to be the best value for money on the market and actually the Spiv Factor merely confirms what I already know. Nothing very clever about it really—just a result of importing most of it directly from Japan and flogging straight to you.

NEW:

Sommerkamp, Star and Inoue of course. Sorry to say though, that my stock of SR-200's has all gone and it will be a month ot two before I get any more. Sorry lads, but I did warn you. However, deliveries of Inoue (pronounced like phooey!) have improved and I've got a fair stock. The Rx at £85.0.0 represents extremely good value. All transistor (bags of FET's), Amateur Band only, top quality 9 mc/s xtal filter with very steep sided. This Rx has a very impressive performance—very quiet and free of annoying images and sundry birdies and yet very sensitive. 12V d.c. or 240V a.c. supplies built-in For the chap prepared to pay a bit more cash for a lot more performance—the Inoue IC-700-R takes some beating. For an extra £95.0.0 you get the companion Tx and p.s.u. which makes it the cheapest rig on the market. The performance though, is up with rigs costing very much more. Actually I've boobed badly on this Inoue stuff—the low price puts people off. They think, "It can't be much good at that price". Make no mistake, Gentlemen, it most certainly **is** good.

Star—one or two 700 series left, but these won't last long. so not much point in pushing 'em. The Spiv Factor (1·7) **must** be the lowest in the country.

Sommerkamp—Almost invariably ex stock. Again, not much point pushing because they're so well known and praised.

Secondhand receivers:

TCS12	£12. 0. 0.	**BC348,** mint	£18. 10. 0.
RA1	£32. 10. 0.	**RME4350**	£45. 0. 0.
KW201, mint	£90. 0. 0.	**LAFAYETTE HA350**	£60. 0. 0.
SOMMERKAMP		**HRO**	£20. 0. 0.
FR-100-B	£90. 0. 0.	**NC190,** mint	£55. 0. 0.
STAR SR-600, mint	£50. 0. 0.	**BC348,** A1	£15. 0. 0.

The tip top AR88D's (rewired pvc, "S" meter, spot on) are going like hot cakes. If you want one, don't linger, £45.0.0.

Secondhand transmitters:

KW VALIANT £20. 0. 0.

New CODAR AT5's and psu's now in stock.

COMPLETE HEATHKIT SSB STATION: HX20, HRO20 and HP20 p.s.u. 80-10(28-29·5) 90W p.e.p. Tx and matching Rx and p.s.u. (115V, sorry!) However, not to worry, a very nice rig, immaculate and suitable for either fixed station, or with a suitable mobile psu, mobile use. Complete with all connecting cables and microphone, ready to go . . . . . **£120.0.0.**

Test Gear:

MARCONI CT-218 sig. gen. 85 kc/s-30 mc/s, A1.	£65. 0. 0.
SOLARTRON CD523S, DC to 10 mc/s 'scope, mint.	£45. 0. 0.
MARCONI TF885A, video oscillator, mint.	£45. 0. 0.
Industrial Electronic 2300 'scope, tiny thing.	£15. 0. 0.

STAR

INOUE

Sundries:

Teisco DM-501 dynamic microphone, high impedence	£2. 15. 0.
Plain morse keys, polished brass with ball bearing pivots	18. 6.
C.W. Practice sets, key plus buzzer	15. 0.
G.D.O.'s Tech TE18, 240V A.C. 300 kHz- 22 mHz	£11. 10. 0.
S.W.R. Bridges Hansen SWR3, 50 or 75 ohm	£3. 10. 0.
Bug keys	£4. 0. 0.
Electronic keyers DA1	£16. 0. 0.
Katsumi C.W. Monitors, high speed relay, built-in with spare contacts for break in CW	£7. 15. 0.
Headsets, low impedance, padded	£2. 2. 6.
AR88 manual reprints	15. 0.
VHF/UHF 50 ohm dummy loads	£2. 10. 0.
COLLINS 5 cycle VFO's one or two left	£35. 0. 0.

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TANTALUMS:

4/20v, 4/38v, 10/12v—all at 1/6d each. Believe it or not lads, these are normally around the 12/6 mark!

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·01/500v 6d each, 5/- doz.; ·001/500v 4d each, 3/6 doz.; 50 volt types, ·002, ·005, ·01 3d each, 2/6 a doz.; ·02, ·05 4d each, 3/6 doz.

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DPDT slide switches with centre off 2/-.

KNOBS:

2¾" dia fluted 2/-. AR88 type 1⅜" 1/6, 1$\frac{1}{16}$" 1/3.
Crystal holders HC6/U 1/- each, 10/- doz.
75 or 300 ohm twin feeder, good for 200W, 6d a yard.

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"Expert"—dual heat 100/140W	£3. 12. 6.
"Expert"—kit with solder, spare tips, soldering aid, brush and spanner in strong carrying case	£4. 17. 6.
"Marksman"—25W	£1. 11. 6.
"Marksman"—25W kit with solder, 2 spare tips and soldering aid	£2. 1. 6.

Converters, 21 or 28 mc/s. These are hot stuff-twin triode cascode r.f. amp. 12AT7 low noise mixer/xtal osc. and 6AU6 I.F. out. The output is 5-5·5 mc/s, (21 mc/s) and 5-7 mc/s, (28 mc/s). They require 6·3v A.C. and 150-200v D.C. and are excellent value at £7.10.0 We also have a 2m version of these with an IF of 28-30 mc/s. At £10.0.0 it represents extremely good value.

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12v DC in. 390v DC 200ma out.: or 160v at 145 ma. Built on chassis 8 in. × 5 in. × 2½ in. with Toroidal transformer (2⅞ in. h. × 2½ in. w. × 2½ in.) and large heat sink mounted on top of chassis. Postage 6/6 **£8 18 6**

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12v DC in. 400v DC 200ma out plus 250v at 150ma; or 200v only, on relay version. Built on aluminium chassis 8 in. × 5 in. × 2½ in. with Toroidal transformer (3¼ in. h × 2¾ in. w. × 2½ in.) and heat sink mounted on top of chassis. Postage 6/6 **£11 15 0**

All above available with inputs and outputs relay controlled at 37/6 extra. All units are fully fused. Transformers are completely potted. Negative or positive earth without change, complete and working with 3 months Guarantee. Delivery 21 days. Outputs are measured with mobile vehicles. With static vehicle they will be a little lower.

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2 metre converter AFZ 12 1st RF amp. AFZ 12 2nd RF amp: AFZ 12 osc-multiplier GEX 66 mixer: or equivalent transistors of equal performance. Built on printed circuit. Will operate from 8 to 14 volt neg. or pos. earth. Space inside case (5 in. × 2 in. × 6 in.) to take battery for portable use. IF adjustable from 12 to 29 MHz. Crystal supplied is in this band, but cannot be specified at this price. Low noise figure. Guaranteed for 3 months. Delivery 14 days. Postage 3/6 **£8 17 6**
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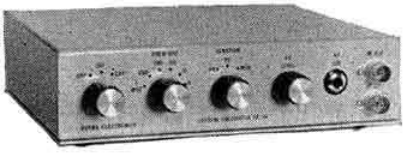

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QTC

Weekend RAE Courses
Classified Ad Increase
Headquarters Fund

Importation of Transmitting Equipment into the UK

An order made in January 1968 under Section 7 of the Wireless Telegraphy Act 1967 requires importers and manufacturers to seek the authority of the PMG to import certain types of apparatus capable of transmitting between 26·1 and 29·7 MHz and 88 to 108 MHz. The usual multi-band transmitting equipment invariably covers part of the first mentioned band and at the time that the Order was made it was specifically stated that amateur equipment would be exempted from any restriction.

Following the experience of an amateur visiting the UK it is recommended that where the apparatus is capable of transmitting between 26·1 and 29·7 MHz (i.e. including the 10-metre band) an Authority issuable by the Postmaster General should be requested *to enable the apparatus to be imported into Britain.* This Authority should be requested *as well as the licence*, and visitors are strongly recommended to have this "Authority" mailed to their home address before departure so that it can be shown to the Customs officials on entry into the United Kingdom.

Applications for both the licence and the Authority should be made at least 30 days before they are required. The address of the Radio and Broadcasting Department of the GPO is now Waterloo Bridge House, Waterloo Road, London, SE1.

"Meet the President" Week

During the week 13–19 April inclusive, the Society's President, John Swinnerton G2YS, will be active on all bands 1·8 to 28 MHz, cw and ssb and will be pleased to make contacts with members of the Society. All contacts will be confirmed later by a special QSL Card sent through the Society's QSL Bureau.

Weekend RAE Course

The Education Committee are proposing to run a residential course over a weekend for RAE candidates. The purpose of the course is to revise certain topics which frequently occur in questions, to deal with individual difficulties and to give advice in examination techniques. It must, of course, be emphasized that the intention is to assist candidates who are already receiving instruction or who are working alone.

It is hoped that this will be held in February or March of 1970. Its duration will be from Friday evening until Sunday afternoon. To gauge possible support for such a scheme, interested members are requested to write to the Chairman of the Education Committee, R. J. Hughes, G3GVV, Farleigh, 102 Harlands Road, Haywards Heath, Sussex.

Deputy Region 13 RR

The new Deputy Regional Representative for Region 13 is G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburgh.

Scout Camp for Electronics Enthusiasts

On 2, 3 and 4 May, 1969 a camp will be held at Polyapes Camp Site, Oxshott for all members of the Scout movement who have an interest in any branch of electronics.

The programme has yet to be finalised but it is hoped to include demonstrations talks and discussions on the following topics: hi-fi equipment, recording, model control, short wave listening and amateur radio. In addition it is hoped to have experienced people with test equipment facilities to help the enthusiast with his home constructed projects. For further details, groups or individuals are invited to send a foolscap sae to J. A. Carter, Baden-Powell House, Queensgate, London, SW7.

The End of TVI?

Well, not exactly but things are looking a bit brighter for those plagued with interference on vhf television transmissions. That means almost everyone reading this.

The BBC Engineering Department tell us that complete uhf duplication of BBC-1 transmissions is to commence at the end of this year, probably around mid-November. Colour is to follow on BBC-1 soon after. First BBC-1 transmissions on uhf will be from Crystal Palace, Sutton Coldfield, Emley Moor, Winter Hill, Black Hill, Rowbridge and Dover. BBC expect coverage on uhf to be around 75 per cent of that presently on vhf by 1972.

Regrettably it seems that vhf tv will be with us in some form until 1980 or even 1984! The future for bands 1 and 3 is obscure after that but it seems unlikely that further television will be broadcast there, except, possibly educational programmes.

ITA's programme is very similar, with the seven transmitters above operative by the end of this year. They intend introducing colour immediately on around half of their programmes on uhf. ITA hope to have about 80 per cent of the population covered on uhf by the end of 1971.

Many of the major television manufacturers are already producing single standard uhf 625 line models. However, there can be no great migration to uhf until the country is well covered by transmitters.

Few, if any, operators have TVI problems on uhf tv, so emancipation, at least on the bands below two metres, could happen towards the end of next decade, or even by about 1973 for those in more populous areas.

Classified Advertisements

Since Classified Advertisements were introduced in the RSGB BULLETIN many years ago, the costs of production have risen considerably. It has therefore been found necessary to introduce a small increase. With effect from the next issue of *Radio Communication* the Classified Ad rate will be 6d per word, minimum order 10s. *Radio Communication* now has a circulation well in excess of 16,000. Your Amateur Radio equipment ad will be read by radio amateurs in the largest amateur radio periodical in Europe.

Ripley Fire

Many readers will have seen the TV news pictures of the large blaze at Ripley in Surrey during the middle of last month. We regret to have to report that Charlie Nokes, G2AOP, lost his complete radio station through this fire. Fortunately, G2AOP's main property was undamaged and his family suffered no injury.

BARTG

An RTTY message from G2FUD via G8LT indirectly requests clarification of some aspects of the British Amateur Radio Teleprinter Group. Contrary to reports, BARTG is still very much in existence although we note the familiar groan that all the work keeps falling on the same person, despite the fact that RTTY is very popular in the UK.

BARTG is a society affiliated to the RSGB with the object of representing RTTY in the United Kingdom. It is suggested that interested people contact L. A. Crane, G3PED, 10 Crescent Road, Tollesbury, Maldon, Essex, for further details.

Radio Amateur Mayor

J. Tomlinson, G3MGX, has been elected mayor of Worksop.

US Magazines

Owing to a dock strike on the East Coast of the USA there has been a hold-up in the despatch and receipt of surface mail. At the time of writing there are signs that the strike may shortly be over but *Ham Radio* magazine advise that the January and February issues have not yet been posted. They also mention that 250 copies of the *Radio Communication Handbook* have been in a ship in Boston harbour for a considerable period.

Still coming in

The Headquarters Appeal Fund, stimulated by the *Harrow Challenge*, continues to attract contributions. At the time of going to press the total had reached £254 11s 1d. and we are grateful to the following for their donations—in some cases adding to an already impressive total. Well done!

Crystal Palace Group	£4
Crawley ARC	£1 5s.
Echelford ARS	£8 4s.
Edgware & District RS	£9
Radio Society of Harrow	£19 6s.
Sutton & Cheam RS	£15 15s.
Verulam ARC	£5 1s. 2d.

Never at a loss in showing enterprise, the Harrow members "sold" their services to the Edgware club as lecturers at 2s. per minute, and the above total represents a "no flannel" team effort for which the Edgware members stumped up gladly. Harrow's final total for the year stands at £70 7s. 10d. representing 12s. 4d. per head. Crawley's effort totals £28 14s. 1d. (8s. 3d. per head), while the Verulam total of £11 8s 2d. was prised out of a "Piggy Bank"—some porker!

Donations are still welcome, and will be acknowledged individually, but as the year of the Harrow Challenge ends we pay tribute to the wonderful effort of that Society, backed up by its handsome donation. Thank you!

TVI

It is believed that a number of Affiliated Societies would like to include on their programme a talk on various aspects of Television Interference. To enable the GPO Liaison Committee to know the extent of the demand would Club Secretaries please indicate their interest by a note to R. F. Stevens, G2BVN, c/o RSGB Headquarters. In due course a further announcement will be made in *Radio Communication.*

GB3GM

The recent gales in Northern Scotland managed to remove, amongst many other things, the aerial system at GB3GM, the RSGB Thurso beacon station. Thus GB3GM will be off the air until further notice.

Silent Keys

It is with sorrow that we have to record the passing of the following:

Jack Wozencroft, GW3GIN of Cardiff.
Tom Stewart, W2PRG of Merchantville, New Jersey, USA.
Arthur Drakeford, G3AGD of Cheltenham, Gloucestershire.
Bill Flintoff, G3UJ of Darlington, Co. Durham.
Leslie Rimmington, G2DVD of Wisborough Green, Sussex.
John Ferguson, G6FS of Oxted, Surrey.
W. G. Hayman, VK6GH of Nedlands, Western Australia.
Dr H. E. Christian, GD5XD of Andreas, Isle of Man.
H. H. Mills, G3AJB of Whitby, Yorks.

(Continued on page 184)

RSGB Lecture Meeting

DX- AURORA or SPORADIC-E?

By C. E. Newton, G2FKZ. D. T. Hayter, G3JHM, and R. G. Flavell, G3LTP.

Members of the RSGB Scientific Studies Committee.

Friday, 28 March, 1969

INSTITUTE OF ELECTRICAL ENGINEERS, SAVOY PLACE, LONDON, WC2

Buffet tea 6 pm. *Lecture 6.30 pm.*

Tickets may be obtained from Society Headquarters

Portable on Slieve Donard

By W. G. HARBINSON, GI3VJS*

IT had long been hoped that a GI station would win or be well placed in a 4m contest. Being in Northern Ireland sets several problems. Few GIs are outside a 100 km radius, maximum activity being within 50 km of Belfast. This leads to a very low score unless G or GM and GW can be worked.

To collect a large score it is necessary to work long distances i.e., over 300 km. The obvious solution is to take the gear to a high vantage point.

This, in fact, was done, and the gear taken to the highest point in Northern Ireland—Slieve Donard Mountain, 2796 ft asl. All earlier attempts to use this QTH had failed owing to its steep slopes and poor weather. We had tried to use this QTH for the third 4m contest of 1967. We failed, not due to man power or weather, but owing to an equipment fault.

We were using a 12 volt generator across a 12 volt accumulator. The ht supply was obtained from semiconductor inverters, which, unfortunately could not cope with the increase in voltage when the lead to the accumulator accidentally came off.

This year a 240 volt 50 Hz supply was considered, and a Honda generator was purchased by GI3VJS. An aerial system, somewhat new to this band, was "devised" by GI3UPG. It consisted of a bank of four two element cubical quads.

The gear was tested prior to the contest, some difficulties arising from the phasing of the quads were eventually ironed out, giving us reasonable gain and a very good back to front ratio.

We set out on the Saturday morning of the contest, and with the aid of a Land Rover driven by Geoff McCrea we reached a suitable access point on the lower slopes of the mountain.

From here it was simply sweat and stamina to the top. All the time we were enveloped in a thick mist with visibility about 20 yards. The top was reached at 1400 GMT after a two hour hard climb with kit and gear. We arrived at the top footsore and weary only to find a force 8/9+ wind blowing. As few tents will remain in one piece in these conditions, we built a stone windbreak out of rocks, of which there was an abundance (see photograph).

The tents were pitched and J. G. R. Brown and the others erected the aerials. The gear was operational at 1600 GMT. The first contact was GI3ILV/M at RS59, quickly followed by two more GIs, and then G3EKP at RS59+. We then closed down to prepare for the contest.

The gear consisted of a transmitter running 50 watts on cw, 35 W on phone to a QQV03-20A with a transistorized modulator. The receiving gear consisted of a Heathkit RAI, with associated *Q* multiplier and TW converter. A B44 was half way down the mountain, should any gear fail.

At 1700 we were off to a good start. The tenth contact was G3VPK at RS55. Activity was steady with many new stations appearing after TV hours. About this time we heard dozens of carriers only a few of which were readable on am, but would have been Q5 on cw!!! Our continuous cw calling raised but a few of them.

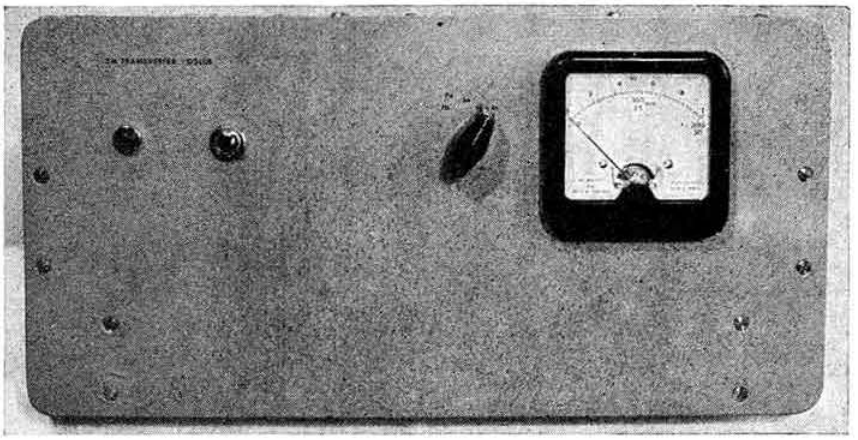
At 0330 conditions were quiet and the operators were glad to grab a few hours sleep. At 0600 the station was ready to continue but few others appeared to be, and contacts were slow to come. We plodded on slowly.

By 1700 we had reached 082 of which 30 were Gs in 26 counties, 5 GWs, 4 EI's, 1 GM and 42 GIs.

The gear was packed and the aerials "felled" in record time and taken to the lower access point where the Land Rover was awaiting.

GI3VJS and GI3UPG would like to thank all those who gave assistance in making this contest a success. The party consisted of: R. McKimm, GI3UPG, G. Harbinson, GI3VJS J. G. R. Brown, R. McLoughlin, B. Anderson, J. Magill, D. White, M. McKimm.

* 10 Deramore Park, Belfast, BT 95 JT, NI.



A Single Sideband Transverter for 144-146 MHz

By D. R BOWMAN, AMInstE, G3LUB*

OVER the last few years the author has kept regular skeds with G6TA and, even during a short stay abroad as VS9PDR, a reliable circuit was maintained using the 20m band. On returning to the United Kingdom even the 80m band has proved unreliable over the new short path of about 30 miles. G6TA made the suggestion that the 2m band might provide a considerably better service, and the author is indebted to him for considerable help and encouragement in the construction of the unit to be described.

As the author was already in possession of a home-built multiband 160–10m ssb transceiver, it seemed that the simplest and quickest way to commence operation on 2m would be to use this unit in conjunction with a 144–146 MHz linear transverter. [1]

Even on 2m single sideband seems to have advantages over amplitude modulation. The reliable range is in excess of 40 miles even during poor propagation conditions. An added advantage of the majority of single sideband systems is the ability to net rather than to use separate spot frequencies for transmit and receive.

An amateur possessing only a low frequency am station could equally well make use of the transverter, although the drive to the unit would have to be reduced, so as not to exceed the maximum limit of about 50 watts dc input.

The transverter to be described is capable of delivering 35 watts pep of 145 MHz ssb to an aerial, for about two watts of 10m drive, derived, in the author's case, from a home constructed all band ssb transceiver.

The unit works well both barefoot and as a driver for a high power linear amplifier. The bandwidth of the transmitter section is at least 1 MHz and by centering the alignment on the ssb 2m frequency of 145·41 MHz no external tuning controls are necessary. The receiver converter section, in conjunction with a transceiver having a fairly good noise figure, is capable of attaining an overall noise figure better than 5dB. The converter has an adequate bandwidth to cover 2m without tuning adjustment.

Throughout the unit thermionic valves are used, as at the time of construction semiconductors with reasonable power output suitable for 145 MHz operation were not readily available.

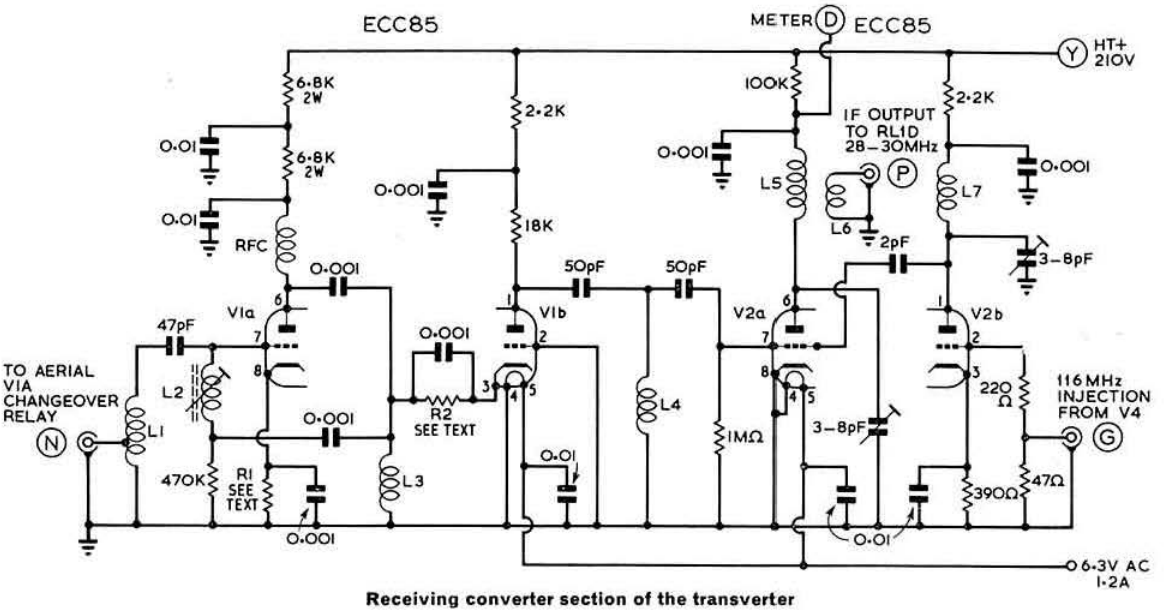
The Receiver Section

The receiver section consists of a cascode rf amplifier feeding a double triode mixer which is also fed with a 116 MHz crystal controlled voltage. The intermediate frequency output covering a band from 28 to 30 MHz is fed to the main station transceiver.

The rf amplifier consists of a neutralized cascode-connected double triode. The author has tried both E88CC and ECC85 valves types, and although the former is found to exhibit a lower noise figure, it is doubtful whether the increase in price is warranted. The neutralizing of this stage is most important and has a considerable effect on the noise performance. Throughout the construction of this unit all vhf coils are made self-supporting using 18 swg tinned copper wire and are tuned during the alignment process by either spreading or compressing turns.

It is most important that the physical layout of the rf amplifier is copied faithfully from the diagram. Throughout the unit, test points are located to simplify the alignment,

* 32 Lynton Road, Chesham, Bucks.



Receiving converter section of the transverter

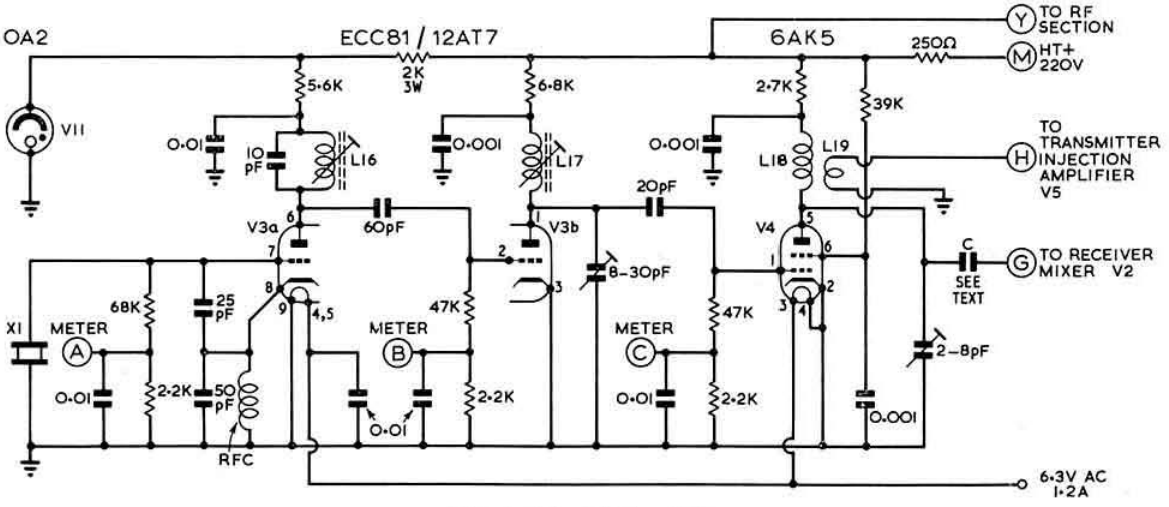
with ptfe feedthrough insulators mounted in such a manner that they show on top of the chassis. By connecting a milliammeter from any one point to ground, the grid current in the appropriate stage can be measured. This is important, as removing screening covers alters the tuning point of some circuits. For minimum noise performance the value of the two cathode resistors R1 and R2 of V1 should be carefully selected. For a valve type ECC85 about 180 ohms and for an E88CC a 68 ohm resistor is of the right order of value.

V2a operates as a mixer with control grid injection at 116 MHz from V2b, an oscillator voltage amplifier. Situated in the anode circuit of the mixer is a fairly low *Q* i.f. transformer centred on 29 MHz. The bandwidth of this circuit is 2 MHz centred on 29 MHz and a low impedance link via the changeover relay couples the 10m output of the transverter receiver to the main station transceiver.

Crystal Oscillator Chain

As has already been explained, the mixer requires a stable supply of 116 MHz rf voltage. To resolve ssb this oscillator must have a short term stability of better than 50 Hz. A free running oscillator is far too unstable. This leaves only two other systems, the first being a low frequency crystal oscillator followed by a frequency multiplier chain and the second a phase locked oscillator. As this was the author's first experience of vhf construction, it was decided to use the first system as it would require less development.

During early development an overtone oscillator giving an



The crystal oscillator chain

output on 19·33 MHz was tried. This circuit proved rather erratic in operation, sometimes becoming unlocked from the crystal and at other times jumping in frequency. The author decided to use a fundamental crystal oscillator, V3a on 6·444 MHz, with an anode tuned circuit at 19·33 MHz which proved to be simple to align and reliable in operation.

The next stage in the multiplier chain is the second half of the double triode V3b acting as a straightforward frequency doubler with an output at 38·6 MHz. V4, a type 6AK5 pentode, completes the multiplier chain acting as a frequency trebler with its output in turn at the required frequency of 116 MHz. This output is coupled via a very small value capacitor made from two pieces of plastic insulated wire twisted together for about 1 in. The 116 MHz signal is also fed to V5 the injection amplifier for the transmitter balanced mixer.

The Transmitter Mixer and Oscillator Injection Amplifier

The oscillator injection amplifier V5 is operated in class A using a 5763 valve the grid circuit of which should be adjusted by alternatively compressing or stretching L9 for maximum mixer current indication. The injection voltage developed across the anode coil of this stage is link coupled to the grid circuit of the transmitter balanced mixer: V6 and V7.

The use of a balanced, rather than conventional single ended, mixer is advantageous because considerable rejection of the 10m signal and especially its fifth harmonic, which could appear within the 2m band, can be attained in this circuit.

Special care must be taken to avoid resonating the linear amplifier to 116 MHz instead of 145 MHz as this is one of the pitfalls present in the alignment procedure.

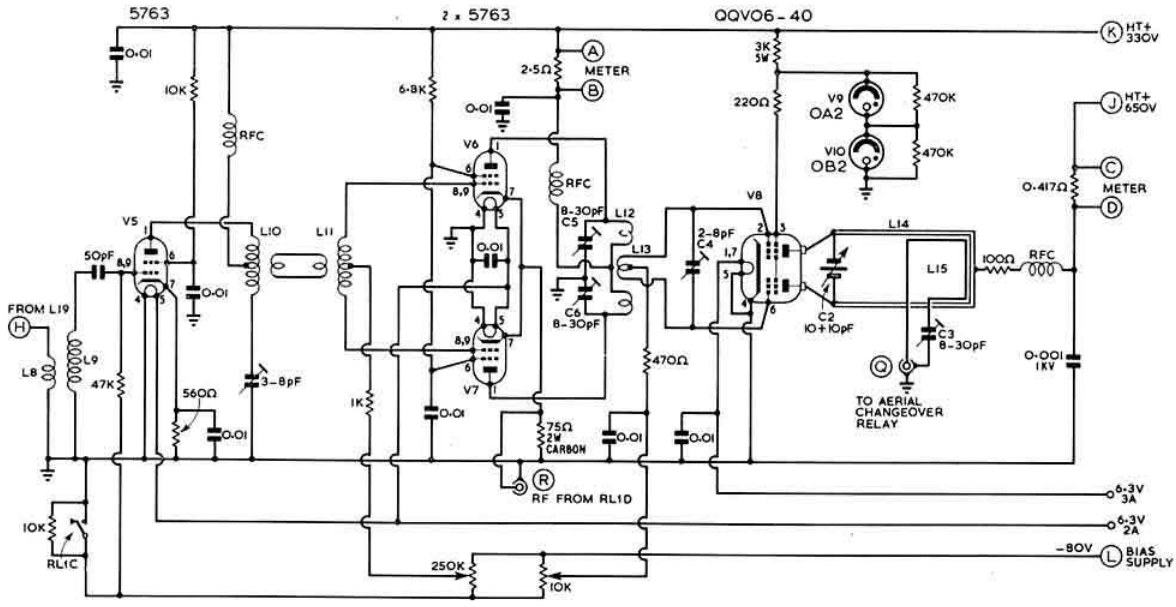
The balanced mixer used by the author requires two separate valves. A 5763 is used in preference to a QQV03-10 double tetrode, as the former is considerably cheaper. The 116 MHz injection voltage is fed push-pull to the control grids of the mixer while the cathode electrodes are connected and driven with the 28 MHz ssb signal generated by the main station equipment. The addition of these two signals appears as a 2m ssb envelope developed across the balanced anode circuit and is coupled to the final push-pull linear amplifier. In the circuit diagram this coil is tuned by a balanced butterfly type capacitor. In the author's case there was little space and two beehive trim capacitors were substituted. Care was taken when aligning L12 to ensure that the two capacitors were the same number of turns from closed, thus maintaining the balance about the artificial earth point.

Linear Amplifier

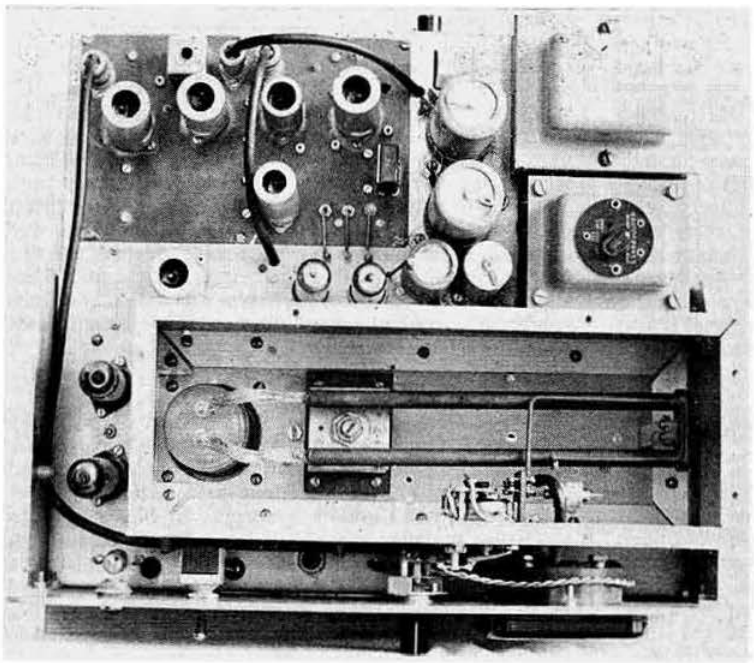
The 144 MHz ssb power output from the balanced mixer is measured in milliwatts and therefore requires considerable power amplification. The output amplifier using a Mullard double tetrode QQV06-40A must have a linear transfer characteristic and therefore is operated in class AB1. This valve type has been specially designed for use in push-pull configuration and has its own internal neutralizing circuits.

The output tank circuit consists of two parallel lines tuned by an unearthed butterfly capacitor positioned a short distance along from the anode connections. The output is taken from a short loop positioned near the shorted end of the lines. A 8–30 pF Philips beehive capacitor is connected in series with the shorter leg of the pick-up loop and in conjunction with the relative positions of the lines and pick-up loop, controls aerial loading.

Conventionally wound coils inevitably have a low Q factor at 144 MHz and must therefore not be used in the pa anode



Transmitter section of the transverter



Chassis view of the transverter

circuit where they are likely to reduce the efficiency of the linear amplifier.

Mechanical Layout

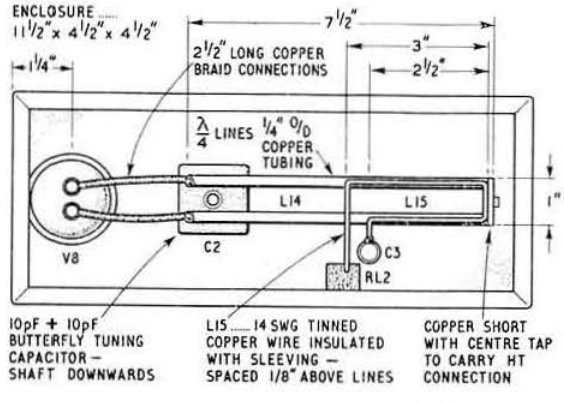
Careful mechanical layout of vhf equipment is most important as even short lengths of wire or strip have enough reactance to appear as anything but a short circuit at 145 MHz.

The receiver converter and oscillator chain is built on a sub-chassis as the author constructed this section first and later incorporated it into the completed transverter. This sub-chassis is built on a 7 in × 4 in sheet of 22 swg aluminium. The position of the screen across the valve holder V1 is important and should be copied as closely as possible. It should be constructed from a small piece of tin plate 1½ in × 4 in soldered across the centre spigot of the valveholder. The neutralizing coil should be mounted on the screen as shown in the diagram and all components associated with V1 and requring an earth connection soldered directly to this screen. All bypass capacitors are disc ceramics and of any convenient value between 0·001 μF and 0·01 μF.

The mechanical layout of the final mixer and power amplifier is dictated by the need to keep all leads carrying rf to a minimum length. The best layout is to arrange the mixer, pa and pa tank circuit box in a line across the full width of the chassis, as shown in the photographs. The author's chassis width of 14 in is about the minimum which allows this. The arrangement allows the mixer anode circuit to be constructed adjacent to the pa valve socket and the tank circuit box to enclose the pa valve and tuned lines. The injection voltage is link coupled to the mixer from V5, the 116 MHz amplifier.

The pa tank circuit already described is mounted in a screened box 11½ in × 4½ in × 4½ in with either no lid or a mesh sheet lid to provide adequate ventilation for the QQV06-40A output valve. The aerial changeover relay RL2 is mounted on the inside front wall of this box at a convenient point near to the aerial pick-up loop.

The butterfly tuning capacitor as well as the QQV06-40A valve holder were both removed from a government surplus unit type SCR522. If difficulty is experienced in obtaining a suitable alternative tuning capacitor, it should be possible to construct a preset capacitor of the type described in the *RSGB Radio Communication Handbook* [2]. The author found that this capacitor once set to a resonant frequency of 145·2 MHz required no adjustment as the pa output remained substantially constant over a large section of the 2m band.



Constructional details of the pa anode circuit

Alignment

As this unit was the author's first attempt at vhf construction, it was decided to align the receiver converter first. The subchassis fitted into an Eddystone diecast box and was used as a receiver converter during the construction period of the transmitter sections.

The author experienced some difficulty in the alignment of the oscillator chain and found that it was all to easy to tune the various circuits to incorrect harmonic frequencies. Any would-be constructor is advised to enlist the help of a local amateur with 2m experience or failing this align as follows.

The ht and heater supplies should be applied to the converter section, with valves V3 and V2 in circuit with the appropriate crystal inserted and a 500 μA FSD meter connected from test point A to earth. About 80 μA of grid current should be measured indicating that the crystal oscillator is running correctly. The test meter should now be transferred to test point B and the core of L16 adjusted for maximum third harmonic output. It is recommended that this frequency be monitored on a general coverage receiver to ensure that the maximum meter reading coincides with the peak third harmonic output at 19·5 MHz.

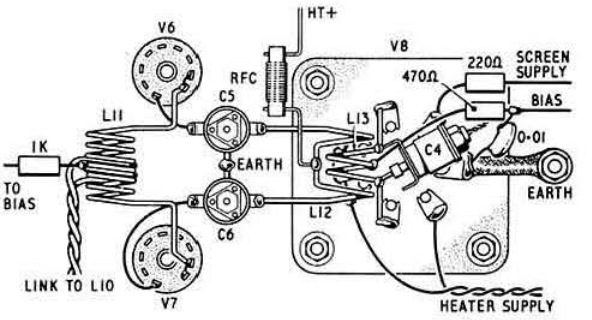
Next insert V4 into its appropriate socket and transfer the test meter to test point C. By carefully adjusting the beehive trimmer connected from the anode of V3b to ground a peak meter reading can be found, giving an output on the second harmonic, 38·6 MHz. Remember that L17 is at a potential of 150 volts and switch off for safety before each adjustment. If the constructor has access to a gdo or receiver covering 38·6 MHz, one or other of these should be used to monitor the output and confirm that the correct harmonic has been selected.

With valves V1 and V2 in circuit, the anode voltage of V2a measured with a valve voltmeter should be of the order of 55 volts. By adjusting L18 and the 3–8 pF trimmer associated with L7, this voltage should rise about 10 per cent to say 60 volts. V2a acts as a bottom bend mixer and it was found that the rather large decoupling 100 K ohm resistor gave the best noise figure. L18 and L7 should now be tuned to the third harmonic, 116 MHz. Only increase the coupling of L18 and L19 sufficiently to produce the anode voltage rise quoted, as excessive mixer injection will increase the overall noise factor of the converter. This completes the alignment of the crystal oscillator and multiplier chain of the receiver section.

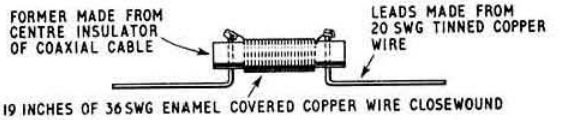
To complete the converter it is only necessary to align the rf circuits of V1 and V2 as follows.

The resonant frequencies of L1 and L4 should be checked with a gdo if available, and adjusted until they resonate at 145 MHz. Alternatively, connect an aerial to the converter, and the converter in turn to the main station receiver, which should be switched to the 10m band, and tune in a local station on or around 145 MHz. Peak L1 and L4 by spreading or compressing the individual turns. Also peak the tuning of L5 with the 3–8 pF trimmer. The signal line from L6, the 28 MHz coupling winding to the main receiver, should be made in coax cable to reduce the chances of i.f. breakthrough. The tuning of L3 will be found to be very flat, as it is heavily loaded by the cathode circuit of V1b.

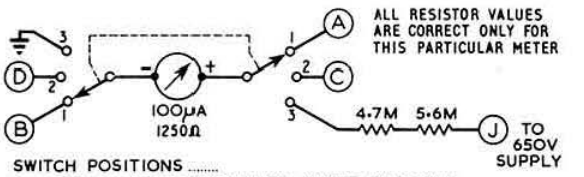
Attention should now be turned to the neutralization of V1a by adjustment to the core of L2, mounted on the tin-plate-screen across V1. With the receiver tuned to a very



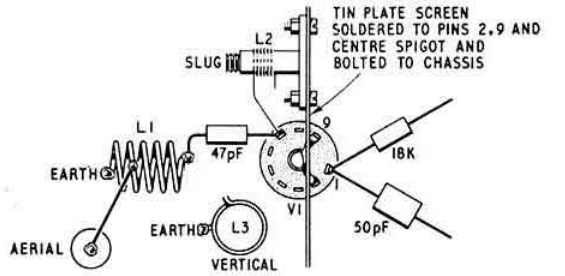
Layout of the balanced mixer and the power amplifier



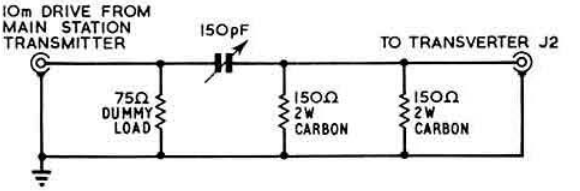
Constructional details of the rf chokes



Metering circuit



Underchassis view of the base for V1



The rf attentuator used between the ssb driver transmitter and the transverter.

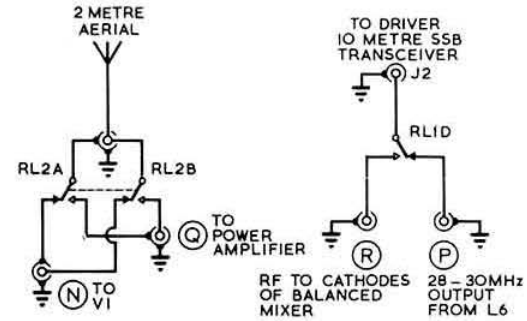
strong signal of at least S9+ on 145 MHz, temporarily disconnect the top end of the 6·8 K ohm resistor chain supplying ht to V1a. Now adjust the tuning slug of L2 for minimum signal which should be 30–40dB down on the previous signal reading. Reconnect the 6·8 K ohm resistor chain to the ht supply.

The converter alignment is now complete and the author spent many hours listening to the ssb net on 145·41 MHz most evenings after 21.00 GMT.

The alignment of the transmitter section should proceed as follows. With all valves except V8, inserted into their appropriate sockets, and power supplies connected, the 116 MHz drive circuits to the balanced mixer L9 and L10 should be adjusted for a maximum mixer current indication. This current should be of the order of 30 mA. The transmit-receive relay must be held in the transmit position by the insertion into socket J1 of a shorted jack plug. The transverter output must be terminated with a 75 ohm dummy load.

The metering switch on the author's transverter is arranged to monitor mixer current, pa current as well as pa ht voltage by switching a 100 μA meter across various resistors which are situated in their appropriate circuits. This is very useful as it allows quick monitoring of the transverter's performance and there is no reason why this switch should not be extended to measure various grid current readings already available at the previously described test points.

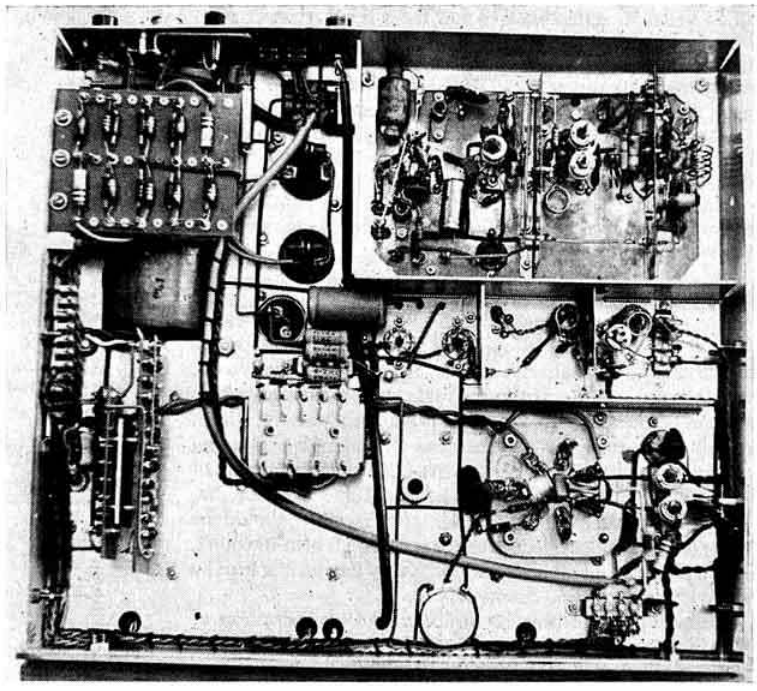
The main station transmitter is now required and should be tuned to deliver a 10m upper sideband signal at a frequency of around 29·3 MHz. This signal should be fed to the input socket J2 on the transverter and used to drive the cathode circuit of the balanced mixer. As most commercial transceivers have considerable power output, it will be necessary to connect the attenuator in this line to avoid the



Relay contact details. RL1A for the control of other external circuits if required. RL1B supplies 250V ac to operate aerial c/o relay RL2. RL1C controls bias to V5, 6, 7 and 8. Relays coil circuits are shown on the power supply diagram.

risk of over-driving the mixer. A suitable attenuator is shown in the circuit diagram. With a drive signal of about four watts peak, the mixer anode current will show very small fluctuations on speech peaks. Care must be exercised not to over-drive this stage, as considerable distortion is liable to be produced. The local oscillator drive should set the mixer anode current to between 30–40 mA. With no oscillator drive the mixer grid bias potentiometer should be adjusted until anode current begins to flow, about 2 mA.

The next step is to insert the power amplifier valve V8, but only after a quick check of the voltages appearing on the various socket pins has been made. With a stabilized screen grid potential of 250 volts, the control grid bias potentiometer should be adjusted until the standing anode current is about 33 mA. Considerable care should be taken with the



Under chassis view of the transverter

Table of Meter Readings

A SANWA 360 YTR multimeter was used to make all current readings.

All voltage measurements were made using a Heathkit valve voltmeter V-7 AU and an rf probe when required.

Circuit Function	Test Point	Indication
Grid current of V3a	A	80 μA
Grid current of V3b	B	250 μA
Grid current of V3b	C	250 μA
Anode voltage of V2a with no injection	D	55 V
Anode voltage of V2a with injection	D	60 V
Mixer anode current without oscillator drive		2–5 mA
Mixer anode current with oscillator drive		30–40 mA
PA standing anode current		33 mA
PA max anode current		130 mA

The 10m signal required to drive the power amplifier to 60 watts dc input is 12·5V rms.

Therefore pep drive $= \frac{12{\cdot}5^2}{75} = 2{\cdot}1$ watts.

The 145 MHz output voltage when terminated in a 75 ohm dummy load is 47·5 V rms.

Thus pep output $= \frac{47{\cdot}5^2}{75} = 30$ watts.

Efficiency $\eta = \frac{\text{pep output} \times 100}{\text{dc power input}} = \frac{30 \times 100}{60} = 50$ per cent.

The maximum power input = 130 mA × 600 V = 80W.
Assuming an efficiency of 50 per cent then pep power out = 40 W.

When measured across the dummy load the 116 MHz content of the output amounted to less than 0·3 V p–p.

That is $\frac{0{\cdot}1^2}{75} = \frac{0{\cdot}01}{75} = 0{\cdot}1$ mW

The author considers the radiation of out of band frequencies must be avoided at all costs, but does feel that 0·1 mW is a negligible radiation. The aerial is likely to reduce this signal further to well below 10 μW.

Crystal Table

Fundamental Crystal Frequency	Tunable i.f. Frequency Range	Section of 2m Band covered
6·472 MHz	Includes the ssb section of 10m (28·5–29 MHz)	Includes the ssb section of 2m 145·0–145·5 MHz
6·5 MHz	28·0–28·5 MHz	145·0–145·5 MHz
6·444 MHz	28·0–30 MHz	144·0–146·0 MHz

Crystals should be of the 30 pF parallel operation type

Coil Table

L1 5 turns 16 swg tapped 1½ turns from earthed end ¼ in i.d. and ⅜ in long
L2 7 turns 22 swg on ¼ in slug tuned former mounted on screen
L3 3 turns 18 swg ¼ in i.d. ⅜ in long
L4 3 turns 18 swg ¼ in i.d. long
L5 ¼ in Aladdin former wound to resonate at 29 MHz. 4·2 μH 26 turns 28 swg, slug tuned.
L6 2 turns of plastic covered wire wound on the ht connected end of L5
L7 3 turns 18 swg ¼ in i.d. ⅜ in long.
L8 2 turn link of plastic covered wire wound over L9.
L9 5 turns 16 swg ¼ in i.d. ½ in. long.
L10 8 turns centre tapped 16 swg ¼ in i.d. 1 in long with 2 turn link of plastic covered wire wound over L10.
L11 6 turns centre tapped 16 swg ¼ in i.d. ⅜ in long with 2 turn link of plastic covered wire wound over L11.
L12 2 turns centre tapped of sleeving covered 16 swg wire wound to interleave with L13 ⅜ in dia.
L13 2 turns with centre tap 16 swg ¼ in dia tuned with 3-8 pF trimmer
L14 2 pieces of ¼ in dia copper tube 7½ in long with 1 in copper shorting strap at one end and 2½ in copper braid anode connecting leads at the other end. (Braid removed from ¼ in dia coax).
L15 9 in length of 14 swg insulated with sleeving and formed as shown in diagram. (See page 168).
L16 24 turns 22 swg close wound on a slug tuned ¼ in former.
L17 8 turns 22 swg close wound on a slug tuned ¼ in former.
L18 3 turns 16 swg ¼ in i.d. ⅜ in long.
L19 1 turn of plastic covered wire ¼ in i.d. placed very close to L18.

Valve Table

	Circuit Function	Type	Possible Alternative
V1	Cascode rf amplifier	ECC85	E88CC (see text)
V2	Receiver, mixer and injection amplifier	ECC85	
V3	Crystal oscillator and harmonic amplifier	ECC81/12AT7	
V4	Harmonic amplifier	6AK5	6AM6 with pin connections changed
V5	Injection amplifier	5763	
V6, V7	Balanced mixer	5763	
V8	Linear power amplifier	QQV06–40	
V9, V11	150V stabilizer	OA2	VR150
V10	100V stabilizer	OB2	VR105

Silicon Diode Rectifiers

	Voltage Rating	Current rating
D1 to D21	21 off 400V piv	250 mA
D22	1 off 1000V piv	250 mA
	or 2 off 400V piv	250 mA
D23	1 off 50V piv	250 mA

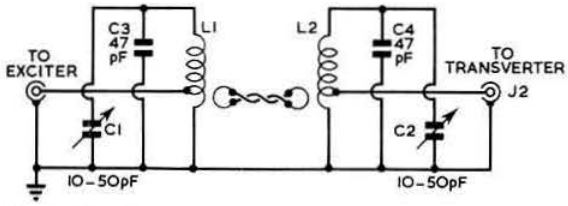
alignment of this stage, as the anode supply has a lethal potential in excess of 650 volts.

If the transceiver has facilities for carrier insertion, it should be adjusted to generate a small 10m output. The application of this signal to the transveter should increase the pa anode current, and by careful adjustment of the grid circuit L12 and L13 this current can be maximized, care being taken to reduce the drive so that the pa anode current does not exceed about 60–70 mA. The author used two beehive trimmer capacitors in series to tune L12 as the only available butterfly capacitor was physically rather large. The beehive capacitors should be adjusted keeping them symmetrical about earth for maximum drive to the power amplifier.

The final stage in the alignment procedure is the adjustment of the parallel tuned lines and aerial loading. It is of considerable help if some kind of output amplitude indicating instrument is available. The author used a *Heathkit V-7AU* valve voltmeter with an rf probe connected across the transverter output which was terminated with a 75 ohm dummy load. The probe has a rather limited rf voltage rating, and to increase this rating the author replaced the single crystal diode by two similar diodes connected in series.

It will be found that the adjustment of C2, C3 and the coupling of L15 are interdependent. All adjustments will therefore need to be repeated until the maximum output is obtained. In the author's case C3 was about half maximum capacity when feeding an aerial. When the power amplifier is loaded correctly the anode current will dip about 5 per cent when C2 is tuned through resonance. If the anode current dip is greater than this, the amplifier is loaded too lightly and the efficiency will be low. Light loading is also likely to degrade the amplifier's linearity, causing excess distortion and should be avoided.

It will be noted that on the circuit diagram are shown two relays RL1 and RL2. RL2 acts as the aerial changeover relay and has a 250 volt ac coil but almost any other small relay could be substituted as long as a suitable coil supply is made available. The supply to RL2 is applied via one set of con-



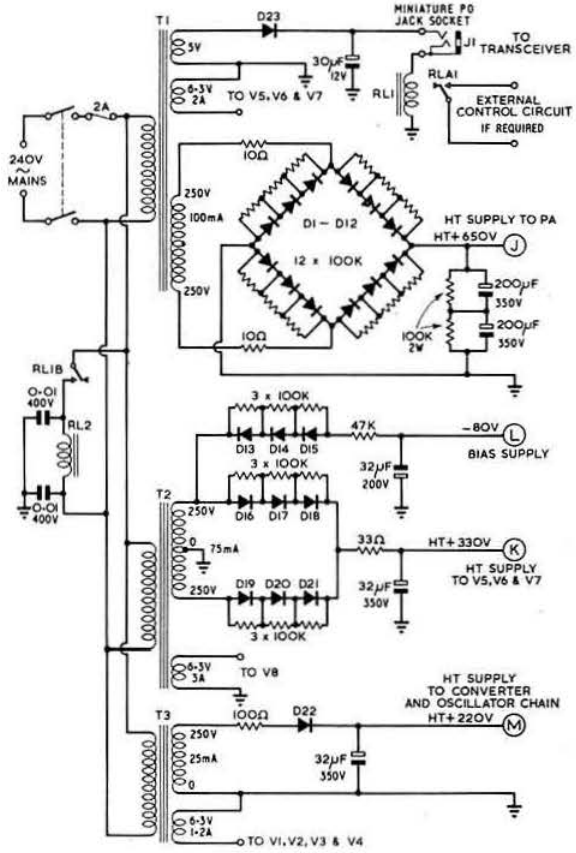
The 28 MHz filter. L1 8 turns 20 swg, enam., self supporting, ¼ in dia, ½ in long. L2 8 turns, as L1. The taps on both L1 and L2 should be at one turn from the earthed end of the coils. The coupling link is one turn of 20 swg, enam. placed in each of L1 and L2.
C1, C2 10-50 pF variable C3, C4, 47 pF

tacts on relay RL1 whose coil supply circuit is made in turn by a lead from the author's 10m transceiver. All that is required is one set of make to transmit contacts on the transceiver's transmit-receiver relay which can be wired across jack socket J1. RL1 happens to be a small 12 volt dc relay, but once again if suitable supplies are available any other type of small relay could be substituted.

Conclusions

The problem of spurious emissions, which can be particularly damaging when using a vhf transverter, has been thoroughly investigated. It is essential that the local oscillator frequency chain is copied exactly and it is most important that the second multiplier does in fact double to 38·6 MHz and not treble. The 116 MHz local oscillator signal passes through no less than four resonant circuits before reaching the transmitter mixer. This reduces considerably the spurii content of the high level mixer output. No transverter, or for that matter transmitter, output can be clear of all spurii, but the aim has been to reduce them to the very lowest level possible. It is also important not to overdrive the unit. When the transverter is in operation it is essential not to exceed 75 mA pa anode current with ordinary speech peaks and 125 mA, with a continuous tone. These conditions having been met the spurii present in the output will be of the order of −80dB, relative to the required signal. This is best illustrated by saying that all spurii would be inaudible with a main signal having a strength of up to S9 plus 25dB. Up to this point it has been assumed that the drive 28 MHz signal is completely clean. The ideal exciter for use with the transveter would be a unit generating its sideband with an hf filter, but of course as yet few amateurs are the lucky possessors of such equipment. To avoid any possibility of spurious frequencies being radiated outside the 2m band, the following unit should be constructed and inserted in the coaxial cable connecting the exciter and the transverter. The transverter should not in its own right radiate outside the band, but as the design of the exciter, is outside the control of the author it is strongly recommended that this filter unit be always in circuit.

The circuit diagram, above, shows two inductively coupled parallel tuned circuits. It is necessary to check the operation of the completed transverter, before switching the filter unit into circuit, with a continuous output from the exciter (carrier inserted or af tone into the audio amplifier). The two tuning capacitors C1 and C2 should be adjusted while the transverter's pa anode current is monitored. It will be possible to adjust the tuning until the anode current indication is almost the same as without the filter. This completes



Power supply details.

the adjustment and it will only be necessary to make further adjustments if the operating frequency is altered more than about 200 kHz.

This transverter has given good reliable service over the past two years. No faults have developed and the transverter has allowed the author to keep weekly skeds with G6TA. The stability has proved to be so good that the driver transceiver can be adjusted to a predetermined frequency and every week G6TA is heard on frequency well within the 2·5 kHz bandwidth of the author's transceiver. As with all 2m installations a good QTH and aerial are most important if good results are to be expected. At the author's QTH an 8 element antenna is installed about 6 ft above the house roof. As the author's house is on the side of a hill screened to the west, the aerial is pointed due east towards Europe. During a recent 2m opening little difficulty was experienced in working several continental countries.

References

[2] Introducing the VHF Transverter by G3BA, RSGB Bulletin June, 1964, p. 373.
[2] *RSGB Radio Communication Handbook* 4th ed, p. 7.26.
[Ed: to further reduce the likelihood of spurious emissions it is recommended that an overtone crystal oscillator operating directly on 38 MHz be used instead of the arrangement proposed. This can in some circumstances generate unwanted signals owing to high order beats from the harmonics of the 6 MHz crystal.]

REGULAR FEATURE

TECHNICAL TOPICS

By PAT HAWKER, G3VA

THIS month we start again with TVI suppression. Since raising this thorny question, almost by accident, it has come as something of a shock to be made aware of the extent to which this subject still dominates the thoughts, and activities, of so many British amateurs. One senses that those operating in peak television hours do so with a little of the trepidation of wartime "underground" radio operators, constantly glancing over the shoulder for the first sign of a cruising detector van, the ringing of a telephone, or the heart-chilling knock at the door, any of which may foreshadow a sudden cessation of activities.

One point should be emphasized. There is nothing discreditable about finding that one is causing TVI, unless in reckless disregard of accepted transmitter practice—only perhaps in then doing nothing about it. This is a malady that can strike down anybody: newcomer or old-timer, gen-man or the nonest non-expert. Because of the number of variables, TVI is not a problem that always responds to a purely theoretical approach; empirical persistence is often every bit as important. And while the "professional" may often be in a better position to design and measure his filter component values, he is as likely as anyone else to pursue an unrewarding approach, perhaps due to basing his efforts on the mistaken premise that his feeders are matched at all frequencies and that all his loads are resistive, and what they are supposed to be, when in reality there will often be all sorts of odd reactances and stray couplings to upset the apple cart.

So this is a field in which few can claim to be invariably right, or in any real position to lay down lofty guidance to others (certainly not this contributor who has had his share of TVI and BCI troubles).

The Problem

But it seems worth reviewing some basic facts and figures. The field strength of local television signals varies enormously. Some viewers watch pictures from signals of under 100 μV/m (or $<$ 40dB above one microvolt) on Band I; on the other hand the minimum Band IV-V signal is considered as roughly 3160 μV/m [70dB (μV)]. At the other extreme, vhf signals may be as high as say 100dB (μV). Thus, the amateur in the strong signal strength area may easily have a bonus of about 50-60dB in harmonic suppression compared with his fringe-area colleague. And that is a very useful bonus!

Now, what signal/interference ratio must be exceeded if the TV pictures are to be completely clear of patterning? Adopting international CCIR figures, this might appear to be of the order of 50dB at the more critical beat frequencies. It is worth remembering that the patterning resulting from an interfering carrier at about 1 MHz or so from the vision carrier frequency is considerably more noticeable than say a 3 MHz beat. In colour reception, the higher frequencies (particularly around the 4·43 MHz sub-carrier) are more important—but then, in the UK, colour is confined to uhf for the foreseeable future.

Again, in practice, a signal/interference ratio appreciably lower than 50dB would be tolerable, though it is usually accepted that any signal more than about one-hundredth of the TV signal will show up on the screen. All this means that, at least in TV fringe areas, almost any potential source of harmonic radiation is important and a complete cure is likely to come only from attention to a considerable number of factors.

Then, if all television receivers had perfectly matched and balanced aerial systems, the rejection of signals other than at the TV frequencies would be very much higher than it usually is in practice. Rf enters the average television chassis along the coax cable (on which there are often high standing waves and unbalanced common mode effects) and along the mains lead. In the past, the importance of pick-up by and radiation from the outer screens of coax feeders seems to have been under-estimated (possibly because European TV aerial practice differs from that in North America); such devices as the double-Faraday loop and the various forms of ferrite transformers and baluns seem to have a real place in the fight against TVI. One difficulty is that these devices usually involve insertion losses which may be unacceptable to viewers in fringe areas (see later).

A Check Dozen

To review the present situation, we have attempted to set down a check list on TVI, though it is realized that this list is far from exhaustive. It is always worth looking for the unexpected. Keying a high power transmitter at the end of a local supply line can cause mains voltage variations that may affect a picture. Once we came across a case of so-called BCI where a persistent complaint of "key clicks" turned out to be the actual noise of manipulating the key, transmitted through a ceiling into a lower flat. But here goes:

1. *Avoiding transmitter vhf/hf parasitics:* a question of stability of the pa under all conditions of drive, load and anode and screen voltages. Devices include parasitic suppres-

sors, decoupling, neutralising, voltage regulation, etc (subject well covered in *Radio Communication Handbook*).

2. *Keeping harmonic generation low:* traps, efficient decoupling, class B rather than class C; transformer or pi interstage coupling; traps in driver as well as pa; pi-network output tank into low-impedance matched line—or better still a pi-L network (*ART*). Note that transistor pa stages often have bad waveforms that generate excessive harmonics.

3. *Keeping harmonic power inside transmitter:* Good basic shielding of transmitter (double shielding, particularly of tank networks, better than single screening); mesh over all louvres, meter or dial apertures, plenty of screws to secure screening, etc (see *Amateur Radio Techniques*, p. 86); use of effective filtering of all emerging leads, noting differences in capacitor types, use of screened wires and multiple filters inside transmitter enclosure (see *ART*, p. 86); avoid crowding components at high rf close to edges of screens—in general leave plenty of space between components and shields (other than for decoupling capacitors and other filter components).

4. *Minimizing radiation of harmonics:* use of efficient aerial tuning/matching unit, preferably with Faraday screen or Faraday coax loop between atu and transmitter; use of low pass filter (note development of absorptive filters, *TT*, February) or band-pass filter (eg "Harmonikers", *ART*); choice of aerial to give low radiation on polarization of local TV channels, noting dangers of long-wire and other multi-band designs; value of good aerial balance and symmetry to ground; notch filter (stubs or bridged-T).

5. *Reducing pick-up on TV aerial system:* value of physical separation (inverse *square* law); take advantage of the orthogonal polarization (e.g. horizontally polarized transmitting aerial in areas of vertically polarized TV and vice versa); baluns on TV and transmitter aerials; possibility of relocation of aerials; recognize that many TV aerials also act as T-aerials with pick-up on feeder; reminder that pick-up on uhf aerial system may be cause of TVI on vhf channels.

6. *Keeping fundamental and harmonic rf out of TV set:* high-pass filter (PO type 38A and many published designs); lossy ferrite balun (*TT*, November 1968, and G2BVN, February 1969); wideband ferrite transformers (G3JGO and *TT*, January 1969) or double Faraday loop (*TT*, January); mains filter (*RCH* and see below); recognize that a coax high-pass filter does not stop rf on outer coax; in some cases compact TV set-top aerial may improve matters due to less pick-up of fundamental on feeder; notch filters (stubs or bridged-T).

7. *Reducing effects of rf on TV receiver:* this may be matter of recognizing problems of cross-modulation, intermodulation, breakthrough at if, video or af; influence of mean-level agc systems and TV receiver techniques; possibility of increasing TV signal/interference ratio by better TV aerial, or conversely of reducing effects of non-linearities by fitting attenuator in TV feeder; possibility of phasing-out interference (see below).

8. *External non-linear harmonic generation:* the so-called "rusty bolt" and other "natural" diodes (see *RCH*, etc). Difficulty of distinguishing this from some other mechanisms; benefit of re-locating aerials.

9. *Systems and modes:* note differences between cw, am, ssb, nbfm and fsk, and the benefits of fm techniques. Note influence of clicks and thumps on cw (click filters and better voltage regulation); recognize differences between American and European TV practices when taking guidance from American publications (for example positive video modulation of 405-line system more prone to some forms of interference than negative modulation, American use of 300-ohm balanced aerial feeder, UK-only channel 1, American TV horizontal polarization, etc.).

10. *Half a loaf:* Recognize that in difficult cases it is usually much easier to cure TVI for some bands (or even some parts of bands), with some modes and power levels, than to achieve a complete clear bill of health. A partial cure at least allows some activity.

11. *Public relations:* Viewers are seldom anti-amateur at the outset—but can rapidly become so if they feel that nothing is being done about complaints. Try and keep matters on a co-operative basis. The viewer has his "rights" and so has the amateur—but better still if both can pursue their interests without insisting on these "rights" or engaging in mutual recriminations.

12. *Other mechanisms:* Recognize that this list is quite likely not to include the cause or procedure for *your* trouble. The final word has not been written, and probably never will be, on this subject. But with approaching single-standard uhf TV, the worst is probably over.

Tuned Ferrite Transformer

To come at last to a few firm suggestions, two useful-looking anti-TVI ideas come from Brian Booth, G3SYC.

The importance of breaking the physical connection between the outer braid of the TV aerial feeder and the TV

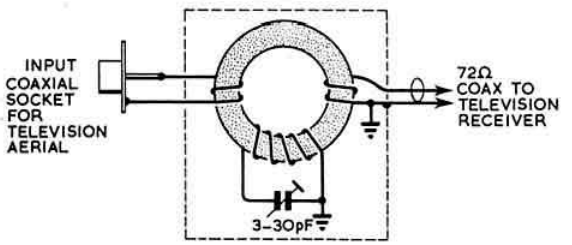


Fig. 1 The G3SYC tuned ferrite transformer to reduce insertion losses.

set, to cope with outer-braid pick-up of fundamental or harmonic radiation from the transmitter, has already been stressed in *TT*. But some of the wideband transformer techniques already described introduce insertion losses which may not be acceptable in weak-signal areas. Fig. 1 shows a tuned ferrite transformer, forming a simple band-pass filter. Although tuned for channel 2 of Band I, G3SYC reports that the filter does not affect picture or sound on the ITA Band III transmitter. The resonant circuit is trimmed for best compromise between sound and vision on the Band I channel. In his model, G3SYC used a ferrite ring from the variometer of a 19 set, but feels that there are almost certainly better components available. Note that it is important to isolate the body of the coax input socket as well as the centre conductor from the tin box enclosure. There is still the possibility of stray capacitative coupling between input and output, and this may account for the Band III results.

Bifilar Mains Filter

The use of a mains filter in the lead to a TV set has been found by G3SYC to be a "real winner" in tackling 3·5 MHz TVI on his own TV set when used in conjunction with a double Faraday loop (*TT*, January). The filter was made up in a tin box and mounted inside the TV set as near as possible

Fig. 2 Bifilar mains choke for use with television receiver. Choke 33 double turns, 22 swg pvc covered closewound on ex transistor radio rod aerial, 8 mm diameter (winding length about 8·5 cm)

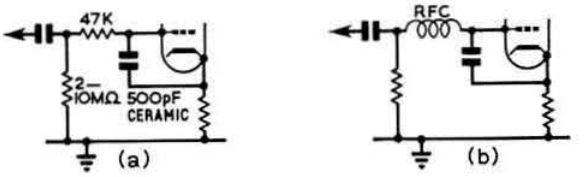


Fig. 3 Filters to eliminate stray receiver rectification in high-slope audio stages. In most cases the 47 K resistor will be found satisfactory.

to the point where the mains cable disappears into the chassis.

The mains choke (Fig. 2) consists of 33 double turns of 22 swg pvc covered wire closewound (to a winding length of about 8·5 cm) on an ex-transistor-radio ferrite rod aerial of 8 mm diameter. Note the use of 800 volt ac-working capacitors.

There is one point which must always be stressed in regard to any main filters (and especially any loaned to other viewers). It is absolutely essential that such units should be so constructed as to be safe over their lifetimes, with good construction and components of adequate ac rating. Because of legal/moral consequences resulting from possible difficulties arising from a filter failure or shock, it is almost certainly inadvisable to put homebuilt mains filters into other people's homes unless you really understand and follow all safety precautions.

Phasing-out Interference

Some years ago (reprinted *TTfiRA* and *ART*) we referred to the technique of phasing out interfering signals and/or local electrical interference on mf, hf and vhf, by introducing signals adjusted to be 180° out of phase and of equal amplitude. These anti-interference signals may be picked up on a special "noise aerial". Over the years this technique has formed the basis of some TV interference filters intended to overcome co-channel and tropospheric interference, and at one time for the so-called "universal" form of Band III converters in the days of Band I-only sets. There was also a very sophisticated commercial system for broadcast and communications applications developed by GC5ZC and produced in the States.

Like all ideas which depend on precise phase and amplitude adjustments, this technique presents some operational problems for everyday use, and is never likely to be widely used as a cure for amateur TVI. However a letter in *Wireless World* (February 1969) reports its successful use to cure TVI from a nearby TV transmitter, and the idea may well be worth keeping in mind for occasions where there is just one affected TV receiver.

AF Breakthrough

Bill Matthews, G2CD, is puzzled by the belief that quad aerials can cause more TVI than Yagi beams—if this really is the case, it could be due to lower polarization discrimination, resulting from the quad having both vertical and horizontal sections. Or it may be just a myth.

Seedy also reminds us that stray rectification in the audio stages of TV sets, broadcast receivers and speech amplifiers can still give trouble. He recalls a simple but effective cure advocated in various editions of the *Radio Handbook*: see Fig. 3. These filters comprise just a 47 k resistor or rf choke in the grid of the offending high-slope af amplifier, with a 500 pF ceramic by-pass capacitor to the valve cathode terminal (not to chassis). This prevents grid and cathode being at different rf potentials, so that rectification does not take place. "In my experience, it's simple, dead certain, and in no way deleterious to the valve's function" he writes.

Transistor Frequency Divider

Barry Priestley, G3JGO, has unearthed a 1960 report on a practical locked-oscillator frequency divider which appears to be pretty reliable at ratios of up to at least 1 : 4. Frequency dividers have a number of uses to the amateur and the circuit of a locked frequency-divider power oscillator for 1·8 MHz synchronized by a 3·6 MHz transmitter was included in *TT* some years ago (*ART*, p. 97).

G3JGO has used this transistor circuit (Fig. 4) to obtain 3·1 MHz when the only available crystal was 6·2 MHz; he has also found it works for the division by four of an 80 MHz drive, with scaled component values and a 2N2369 transistor. It must be noted that when the correct synchronizing drive is not applied, the circuit acts as a free running oscillator.

The divider, originally described by Peter Sulzer of Sulzer Laboratories, consists of a grounded-base oscillator, with synchronizing drive applied between base and earth. For reliable performance, the transistor should have good hf characteristics. The circuit has dc stabilization and the impedance of the synchronizing drive source should not exceed 1000 ohms. Optimum input is given as 0·7 volts rms, but variation from 0·5 to 1·2 volts should have little effect. With a 20-volt power source, output is about 2 volts rms to a 1000 ohms load. Dividers of this type can be readily cascaded, with each stage driven from a tap on the emitter resistor of

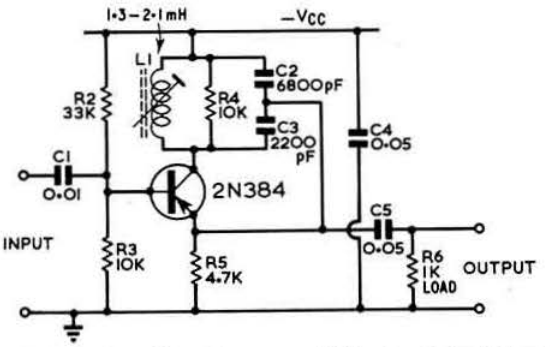


Fig. 4 Locked oscillator frequency divider. In original, L1 was wound on Miller Nr 4414 former.

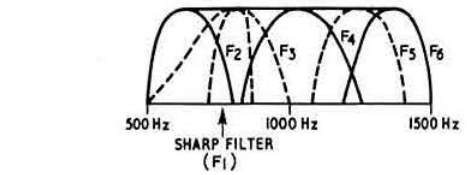
the previous stage. The report shows that the lock-in bandwidth is better than ± 5 per cent at frequency ratios of 1 : 2, 1 : 3 and 1 : 4 over a wide supply voltage range, but becomes a good deal more critical (as does supply voltage) at ratios of 1 : 5, 1 : 6 and 1 : 7.

Audio Filter Miscellany

The various *TT* items on narrow bandwidth cw reception continue to bring in a flow of practical comments and ideas. Arnold Mynett, G3HBW feels that the value of the ear as a tunable audio filter, (*TT*, October, 1968) should not be overlooked and believes that, at least for contest and similar cw operation, a considerable degree of adjacent channel interference is acceptable, reducing the need for filters, or for complex adjustments to the receiver controls. This is true, though it applies much less to longer contacts where a good signal/interference ratio is desirable, and where one may have more time to tune accurately for those very weak signals that might be ignored in contests. He feels we should not be in too much of a hurry to throw away the basic advantage of simple detection for cw—though here again I feel this applies less to separate add-on signal-processing adaptors following a really linear detector, since these can be switched out when not required. He is also a little puzzled that ZS6BT should advocate a note as high as 3000 Hz, despite its advantage for removing the audio image. I must admit that 3 KHz does seem unusually high, and most of us prefer a much lower note.

The ultimate facility would be a fully tunable filter with selectable or adjustable bandwidth characteristics and incorporating also good limiting of signals. As we shall show later, GM3UMW has been aiming pretty closely at this target. It is perhaps worth reminding members that a simple bridged-T type feedback filter, tuned by a single potentiometer between 540 and 3600 Hz, and using an EF86, was described by R. G. Christian, G3GKS in the *Bulletin* of May, 1966. The maximum Q was a good deal lower than ideal, though 'GKS did make some suggestions on how this could be improved.

A much more complex arrangement (indeed possibly too complex for general use) has been developed by Alex Gartshore, GM3UMW for ssb/cw working with a KW2000A. Basically, this consists of an ssb type speech compressor on transmit, using a 20 kHz high-grade bandpass filter, and providing variable bandpass tuning on receive, using the same filter and moving the unit's oscillator across the filter: Fig. 5 outlines the system in the receive mode. With the 17–20 kHz filter having a 2·1 shape factor at 70dB the operator can tune accurately across the bandpass without touching the main receiver control, and the limiter ensures that any cw signal above about the threshold of the receiver should be copiable. This type of "up-conversion" of audio signals is, we believe, widely used in pop recording and electronic sound effects, and is often done using double balanced ring



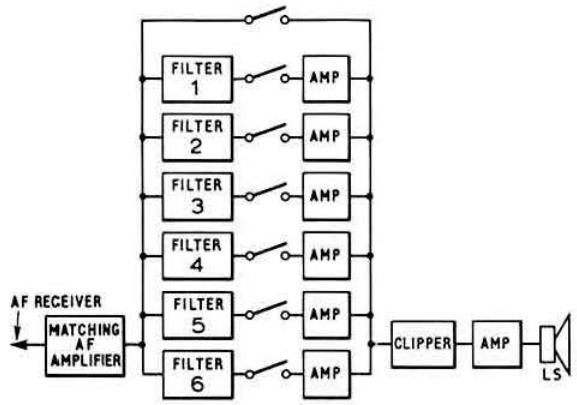


Fig. 6 Outline of push-button af filter selection system by GM3UMW

mixers. I am afraid this is only a very brief outline of what is clearly an interesting and ingenious transceiver signal processing add-on unit.

But GM3UMW has also developed (as part of a cw/nbfm project) another outboard unit in which ten push-buttons immediately select almost any combination of six resonant af filters. These are spread over a bandwidth of about 900 Hz and are centred on 600, 750, 875, 1000, 1150 and 1300 Hz. The 875 Hz filter has an appreciably better shape factor than the others, being measured (after the clipper) as about ± 30 Hz at 6dB down and ± 120 Hz at 40dB down. The series tuned filters are made from Vinkors and silver-mica capacitors, shunted with resistors to give the required bandwidths. 'UMW says the whole project "cost shillings."

Operationally, after familiarization, one can rapidly punch up the appropriate filter combination, again without touching the main receiver. This largely removes the objection to filters for contest operation, where one needs to cope with the off-net station without having to retune the receiver proper. Here again, from considerations of space, an interesting description has been cut to the bare bones, but it is hoped that these brief notes have conveyed some idea of the possibilities in this area—and also to suggest that some of GM3UMW's projects deserve full-length articles to do them justice.

Yet a further note on af filters comes from sunny Jamaica

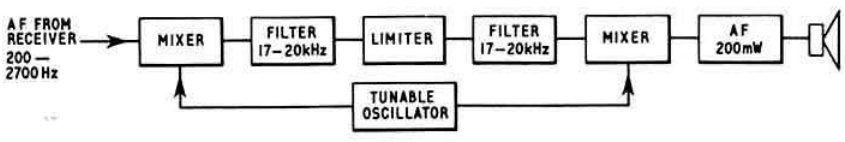


Fig. 5 Outline of system developed by GM3UMW for ssb/cw transceiver operation providing tuning through bandpass of filter, limiting and speech compression. Diagram shows receive mode only. With sharp af filter technique could provide equivalent of fully tunable filter.

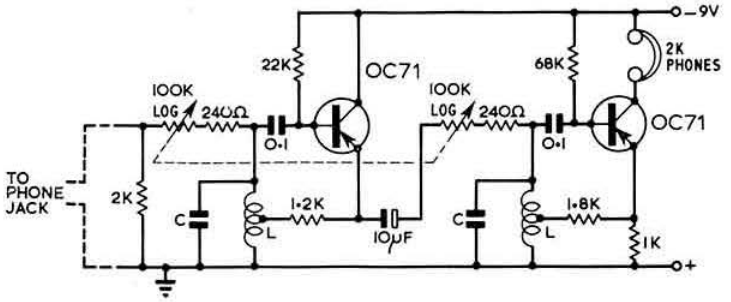


Fig. 7 Variable bandwidth af filter used by 6Y5SR to determine minimum usable bandwidths for cw operation. L is 150 turns of 24 swg. on Mullard Vinkor LA2103. C value chosen to tune to desired frequency (about 1·25 μF for 1 kHz).

in a letter from Ron Skelton, 6Y5SR/G3IHP. He provides the circuit of a fixed tuned filter having a 3dB bandwidth readily adjustable from about 250 Hz right down to about 2 Hz: see Fig. 7. The filter was originally built to find out just how near to the theoretical minimum bandwidth one could go in practice. 'SR finds that for 12 wpm morse it is possible to operate under some conditions (generally when there is low QRN) at around 30 Hz bandwidth. Any further reduction results in loss of information due to merging of dots and dashes. Generally 50 Hz is about the minimum, he reports.

The filter can be adjusted using a very stable beat note at the desired frequency, for instance obtained from a broadcast station as signal source. For most amateur purposes it is not necessary to calibrate the response.

He also draws attention to reasonably-priced headphones made by Danavox having a response of 100 to 2400 Hz with a 10dB peak at 1 kHz, and suggests that the Danavox booklet on their products is well worth writing for: my *Trader Year Book* gives the UK address as Danavox (GB) Ltd., Lloyds Bank Chambers, 186 Wardour Street, London W1 (01-734 1414).

Jim Lyons, VE2DGS/GM3GUJ wonders if there is any hope of starting a "narrow-bandwidth cw movement" around spot frequencies in 7 and 14 MHz—possibly using simple direct-conversion transceiver techniques (*TT*, February), with a VXO to take care of stability problems.

High-gain JFET Voltmeter

In *TT* (March 1968 and *ART*) the design of a very simple FET/bipolar voltmeter was discussed, and this circuit has proved popular for general purpose use with ranges between 0·5 and 50 volts. B. Bracewell, G3GED has been doing a good deal of work in adapting this basic circuit for a much wider range unit, his model having 11 ranges from 10 mV to 1000 volts, by the addition of roughly 34dB gain.

Fig. 8 shows his "Mark II" version which, when checked against an AVO Model 9, was found to give good linearity, and appears to have good thermal characteristics (these might be further improved by the use of the differential amplifier—i.e. long tail pair—configuration). 'GED is in fact now well satisfied with this inexpensive but useful unit. The overall maximum sensitivity is about 5 mV for fsd. To simplify controls, a three-way, four-pole switch is used marked "off-set-read". The idea of the circuit is simplicity with sensitivity, without worrying overmuch about the accuracy or stability. Short-term the controls take care of these problems. Some variation in resistor values may be necessary between models, but these should be easy to derive. The JFET is a Union Carbide UC734 but other types could be used; similarly transistor types are not critical. Only the input divider chain uses close tolerance resistors, and no high stability types were used.

Altogether this looks like a useful high impedance voltmeter to have around the shack.

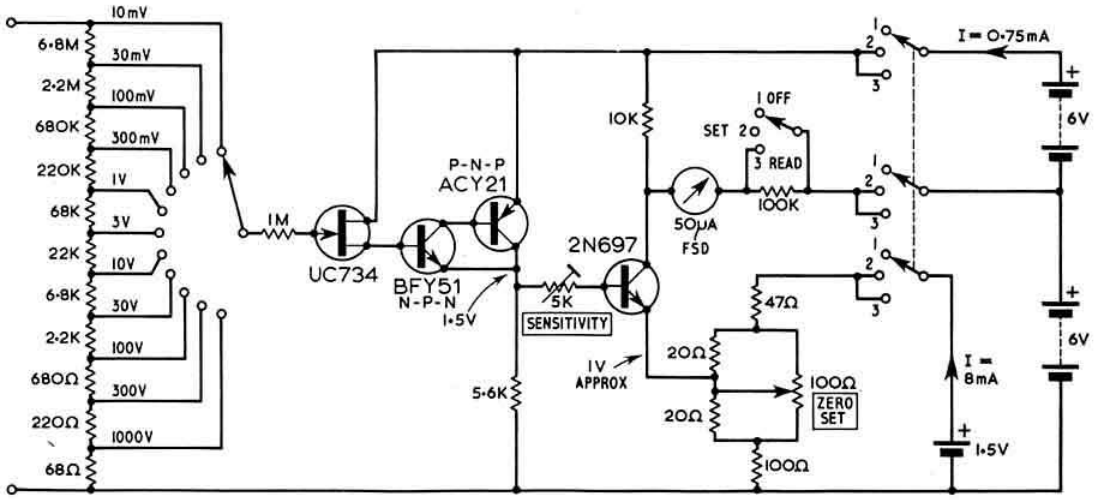


Fig. 8 The G3GED JFET voltmeter

Using the QRA Locator

By A. J. GOULD*

THE QRA locator is a system used in Europe for the rapid exchange of location information between vhf stations. The use of the QRA system has been described before in the RSGB BULLETIN by G3LTP in August 1962 and by G3HRH in March 1965. However, there still seems to be some confusion regarding the system by the older stations while newer licensees know little about it apart from seeing the maps. This article has thus been prepared to give a simple method of calculating one's own QRA locator from Latitude and Longitude, which does not necessarily require the possession of a QRA map. All that is required is the correct latitude and longitude which can be established accurately from Ordnance Survey maps.

The sequence of steps to find one's QRA locator is as follows:

1. Obtain the latitude and longitude of your location from the scales at the edges of the Ordnance Survey maps.
2. Subtract from the longitude the largest number in Table 1 or Table 6 which will leave a positive remainder. The letter corresponding to this number is the first letter of the QRA Locator.
3. Subtract from the latitude the largest number in Table 2 or Table 7 which will leave a positive remainder. The letter corresponding to this number is the second letter of the QRA Locator.
4. Subtract from the remainder of (2) the largest number in Table 3 or Table 8 which will leave a positive remainder. Note the corresponding number.
5. Subtract from the remainder of (3) the largest number in Table 4 or Table 9 which will leave a positive remainder. Add the corresponding number to that obtained in (4). This gives the number of the QRA Locator.
6. From inspection of Table 5 or Table 10, decide the combination of numbers which, when subtracted from the remainders of (4) and (5), would give the smallest positive remainders. The letter corresponding to this combination of numbers is the last letter of the QRA Locator.

Example

Latitude and Longitude	2° 31′ 15″ W	52° 18″ 52″N	
From Tables 1 and 2, subtract	2° W	52° N	= YM
Remainders	31′ 15″W	18′ 52″ N	
From Tables 3 and 4, subtract	24′ W	15′ N	= 08+50=58
Remainders	7′ 15W	3′ 52″ N	
From Table 5	4′ W	2′ 30″ N	= J

The QRA Locator is YM58J

The procedure is similar for stations East of the Greenwich Meridian but Tables 6–10 must be used.

Interpretation of QRA Locators

The QRA Locator Map is divided into rectangles, each covering 2° of Longitude and 1° of Latitude. The first two letters of the QRA Locator identify the rectangle. Fig 1 shows the designation of the rectangles covering the British Isles.

Each rectangle is sub-divided into 80 smaller rectangles numbered as shown in Fig 2. These are the smallest sub-divisions given on most QRA Locator maps.

The numbered rectangles are further sub-divided to obtain the last letter of the QRA Locator. The sub-divisions are shown in Fig 3.

Scales of QRA Maps

A scale of 1 : 1,000,000 means that 10cm represents 100 km. A scale of 1 : 2,500,000 means that 4cm represents 100 km.

* 60 Merlin Grove, Beckenham, Kent.

Table 1
First Letter (Longitude)
0° W = Z
2° W = Y
4° W = X
6° W = W

Table 2
Second Letter (Latitude)
50° N = K
51° N = L
52° N = M
53° N = N
54° N = O

Table 3
Number (Longitude)
0′ W = 10
12′ W = 09
24′ W = 08
36′ W = 07
48′ W = 06
1° 0′ W = 05
1° 12′ W = 04
1° 24′ W = 03
1° 36′ W = 02
1° 48′ W = 01

Table 4
Number (Latitude)
0′ 0″ N = 70
7′ 30″ N = 60
15′ 0″ N = 50
22′ 30″ N = 40
30′ 0″ N = 30
37′ 30″ N = 20
45′ 0″ N = 10
52′ 30″ N = 0

Table 5
Last Letter (Lat. and Long.)
4′ W & 5′ 0″ N = A
0′ W & 5′ 0″ N = B
0′ W & 2′ 30″ N = C
0′ W & 0′ 0″ N = D
4′ W & 0′ 0″ N = E
8′ W & 0′ 0″ N = F
8′ W & 2′ 30″ N = G
8′ W & 5′ 0″ N = H
4′ W & 2′ 30″ N = J

Table 6
First Letter (Longitude)
0° E = A
2° E = B
4° E = C
6° E = D

Table 7
Second Letter (Latitude)
50° N = K
51° N = L
52° N = M
53° N = N
54° N = O

Table 8
Number (Longitude)
0′ E = 01
12′ E = 02
24′ E = 03
36′ E = 04
48′ E = 05
1° 0′ E = 06
1° 12′ E = 07
1° 24′ E = 08
1° 36′ E = 09
1° 48′ E = 10

Table 9
Number (Latitude)
0′ 0″ N = 70
7′ 30″ N = 60
15′ 0″ N = 50
22′ 30″ N = 40
30′ 0″ N = 30
37′ 30″ N = 20
45′ 0″ N = 10
52′ 30″ N = 0

Table 10
Last Letter (Lat. and Long.)
4′ E & 5′ 0″ N = A
8′ E & 5′ 0″ N = B
8′ E & 2′ 30″ N = C
8′ E & 0′ 0″ N = D
4′ E & 0′ 0″ N = E
0′ E & 0′ 0″ N = F
0′ E & 2′ 30″ N = G
0′ E & 5′ 0″ N = H
4′ E & 2′ 30″ N = J

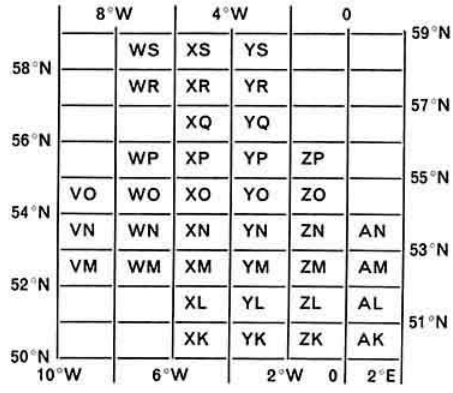


Fig 1

01	02	03	04	05	06	07	08	09	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80

Fig 2

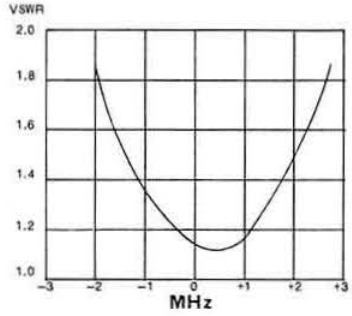
H	A	B
G	J	C
F	E	D

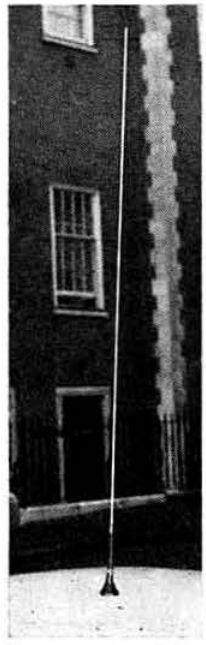
Fig 3

New Products

Shelf Units

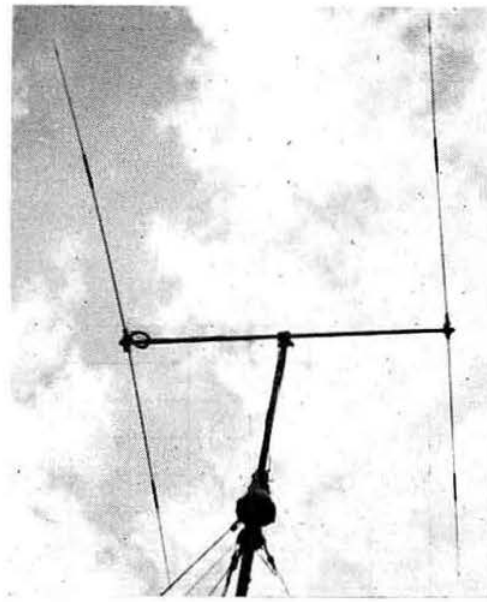
In order to make the best use of available operating desk space it is frequently advisable to place ancillary equipment such as aerial tuning units, swr bridges and speakers above the main transmitting and receiving units. A convenient way of achieving a suitable layout with the minimum of outlay and trouble is afforded by the shelf units manufactured by Storemore Products Ltd. These units are constructed from strong welded wire coated in white plastic and, with the aid of the clips provided, can be fixed side by side or stacked one above the other. As will be seen from the illustration of a typical layout the largest size of the units accommodate modern equipment and allow ready access and ventilation. The size of the units shown is 14" × 14" × 8" and the cost, including clips and postage, is 39/3d. for four units. Full information is given in the catalogue obtainable from Storemore Products Ltd., 153 Hightown Road, Luton, Beds.





Bantex 144 MHz $\frac{5}{8}$ Wave Vertical

A new 2m mobile aerial is announced from Bantex Ltd. The aerial is a base loaded $\frac{5}{8}$ wave fibreglass vertical which has been designed specifically for the amateur market. The feed impedance is 50 ohms and improved performance over a $\frac{1}{4}$ wave whip is claimed. The aerial has a hinged (stainless steel) mounting which allows installation on the front or rear wing as well as the normal roof position. An interesting feature of this aerial is the special and most ingenious " offset " mounting system which allows installation on the roof with almost no need to remove the roof lining. The locking of the aerial to the roof or wing is made from the top of the mounting section as opposed to the normal method whereby one has to do up the locking nut from underneath the aerial mount. A $\frac{3}{8}$ in dia hole is required for mounting. The aerial is supplied cut to 145 MHz; the vswr curve at this frequency is shown above. In view of the most satisfactory results that have been achieved on the 4 m band by mobiles using vertical polarization it would seem that similar results could be obtained on 2m! From the aesthetic point of view this vertical aerial has a lot to recommend it! The BGA/2m $\frac{5}{8}$ wave aerial is priced at £5. Bantex also manufacture a fibreglass 4m $\frac{1}{4}$ wave whip (BT/4m), with similar mountings to the 2m aerial, for 45s. Both aerials are obtainable from Bantex Ltd, 186 Walmer Road, London W11.



" 15m G-Beam "

A deviation from the " G-Whip " mobile range but employing similar techniques in construction is this 2 Element Minibeam. Called the " 15m G-Beam " it is half size and employs a Director/Driven element configuration with four loading coils to achieve improved Front to Back ratio with Gain. Extremely lightweight it is a little larger than the conventional channel 1 Television aerial and requires a turning radius of only 6 ft 9 in. Designed to fill the need for an unobtrusive outdoor beam it can also be used within a roof space or serve a portable or /A location. G-Whips, 27 Roe Parc, St Asaph, Flintshire.

As Steady As A Rock?

By B. PRIESTLEY, BSc, G3JGO*

WHEN crystal control was introduced to amateur radio the standard receiver was the trf and ht supplies generally had a considerable ac content. By these standards any crystal oscillator had practically perfect frequency stability. In 1968, a frequency drift of 50 Hz is easily detected, and thus the inclusion of a crystal does not guarantee acceptable stability. It is hoped that the following notes will help in understanding the limitations of stability and will result in more stable signals in the hf and vhf bands.

The Crystal Unit

If the equivalent circuit of a crystal unit is drawn out as Fig. 1, it is clear that the ratio C/Co determines the degree of coupling to the resonant circuit. The older type of crystal holder (FT243, 10X etc.) had a high value of Co (which is why they are reluctant to oscillate on overtones unless Co is tuned out with a coil) but modern plated crystals have much lower Co/C, making them very "active," but also more easily detuned by the maintaining circuit. Consequently they can yield worse stability if used in the wrong circuit.

Modern processing has also reduced ageing in crystals. Manufacturers found that lapping caused damage to the crystal structure, resulting in a frequency drift. Modern crystals are invariably etched to their final frequency, so the damaged quartz is dissolved, and this source of ageing removed. This leaves ageing owing to chemical contamination of the quartz. This can be reduced by the use of glass holders carefully cleaned and filled with dry nitrogen, and also by using overtone units in critical applications, since these have proportionally less surface area to contaminate.

Ageing Rates

Case	Mount	Cut	per day	per year	price
Metal	wire	DT 5	3×10^{-6}	1×10^{-4}	25s
Glass	wire	GT well aged	3×10^{-10}	1×10^{-7}	£75
Metal	edge	AT style D	1×10^{-6}	1×10^{-5}	25s
Glass	edge	AT/BT style D	1×10^{-8}	1×10^{-6}	£3–£30
Glass	precision	well aged	3×10^{-12}	1×10^{-9}	£20–£60

It is well known that the resonant frequency of a crystal is affected by its temperature, with the popular AT cut having the shape characteristic of Fig. 2a. This can be modified by varying the angle of cut very slightly. The result may have a limited frequency error over a wide temperature range suitable for an unovened general purpose application, or a particularly low excursion over a narrow range of oven temperature (Fig. 2b). When the effects of temperature changes are likely to be serious, it is important to choose the correct crystal type and oven. A crystal designed for a 0·001 per cent error over the temperature range +80°C to +90°C may be a worse performer out of its oven than a 0·005 per cent unit designed for use over the range −55°C to +90°C even though it costs more! Appendix I gives some data from which the temperature range and application of surplus crystals may be found.

The Maintaining Circuit

The best way to make a stable crystal oscillator is to build it like a Vfo! High g_m valves or better still transistors have sufficient gain to allow loose coupling to the crystal and still give a useful output. With high sensitivity pa valves and cheap high gain driving valves like the EF91 there is no need for more than a few micro watts of output.

Voltage regulation, silver mica capacitors and mechanical stability are all desirable, particularly if the oscillator is to be multiplied up for the 432 MHz band.

In the early days of transistors, several oscillator circuits were invented which depended on transistor internal phase

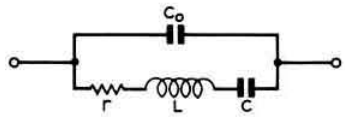


Fig 1. Equivalent circuit of a quartz crystal.

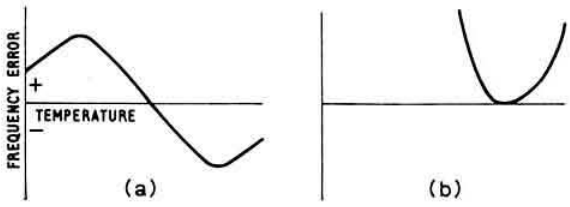


Fig 2. Temperature characteristics.

* 43 Raymond Road, Langley, Slough, Bucks.

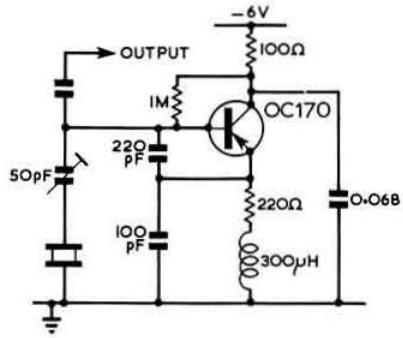


Fig 3. Colpitts oscillator.

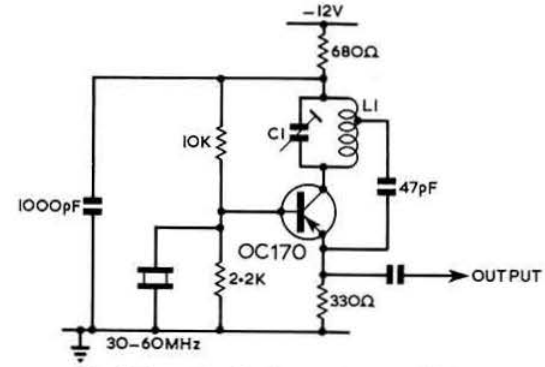


Fig 4. Transistor Squier overtone oscillator.

shift. This does not make for a stable or reliable oscillator! The Colpitts (Fig. 3) is a reliable fundamental oscillator whilst the Squier (Fig. 4) is a good overtone oscillator. In a valve Squier, putting the crystal in series with the high grid impedance has given overtone operation an entirely undeserved reputation for unreliability and instability. It is infinitely better to put it in series with the cathode (Fig. 5). This is true but to a much lesser degree with transistors if for "grid" and "cathode" one understands "base" and "emitter."

The Miller oscillator (Fig. 6) depends on internal feedback in the valve/transistor and the tank L/C ratio is fairly critical. It is not recommended for critical applications, although undoubtedly it can give useful results. The Butler oscillator (Fig. 7) can also be recommended both as a fundamental or overtone oscillator for valves or transistors. Owing to their much higher g_m, transistors produce some remarkable waveforms, so the oscillator/multiplier system is more efficient. [1]

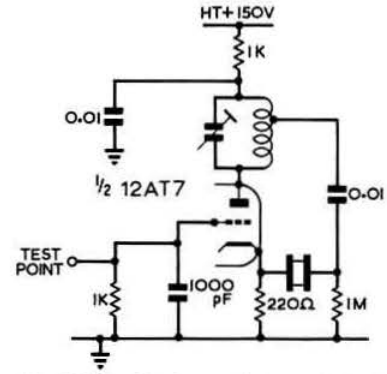


Fig 5. Valve Squier overtone oscillator.

The Limits of Stability

For some purposes the 5/- rock is adequate, as for example a stable bfo for ssb at 465 KHz. In this case many of the precautions mentioned above are not necessary. However for the master clock of a navigational aid, or for a frequency standard, triple ovened oscillators with emergency battery supplies run 24 hours per day, and the drifts of say 1 in 10^{10} (equivalent to 0·13 Hz at 1296 MHz!) must be regularly corrected. Table 1 shows the sort of stability which may be expected from oscillators of various degrees of complexity and cost.

Table 1

Effect of −10°C to +60°C on various crystal oscillators.

Unovened	1×10^{-4}
Thermostat cheap crystal	1×10^{-6}
Proportional control good crystal	1×10^{-8}
Double oven precision crystal	$0{\cdot}5 \times 10^{-9}$

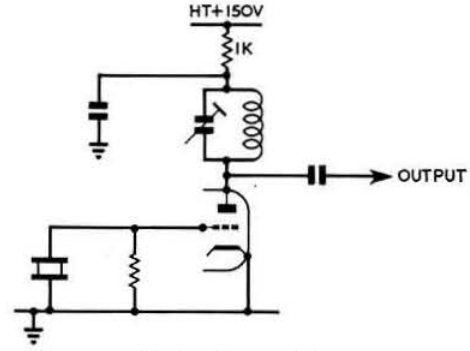


Fig 6. Miller oscillator.

Now what about the good old amateur approach trading time and ingenuity for money? The constancy of temperature six feet or so underground, and of melting ice, has been used [2, 3] as a relatively stable oven, and an amateur version of the phase locked Droitwich receiver has recently been published [4]. The Racal 840 Fast Warm up oscillator (Fig. 8) is an interesting idea. This oscillator warms up to within 1 part in 10^6 of its final frequency in one minute and 1 in 10^7 in three minutes. The oven consists simply of two blocks of polyurethane foam with the crystal assembly complete with heater winding resting in the cavity between them. Making such an oven is well within the capabilities of an amateur; obtaining the foam and a suitable thermistor would be the most difficult part.

The body temperature crystal, with a turn over temperature of 98·4 F. [5] does not seem to have any amateur applications; the feverish activity of a contest would almost certainly send it off frequency!

Having a stable crystal frequency, the professional

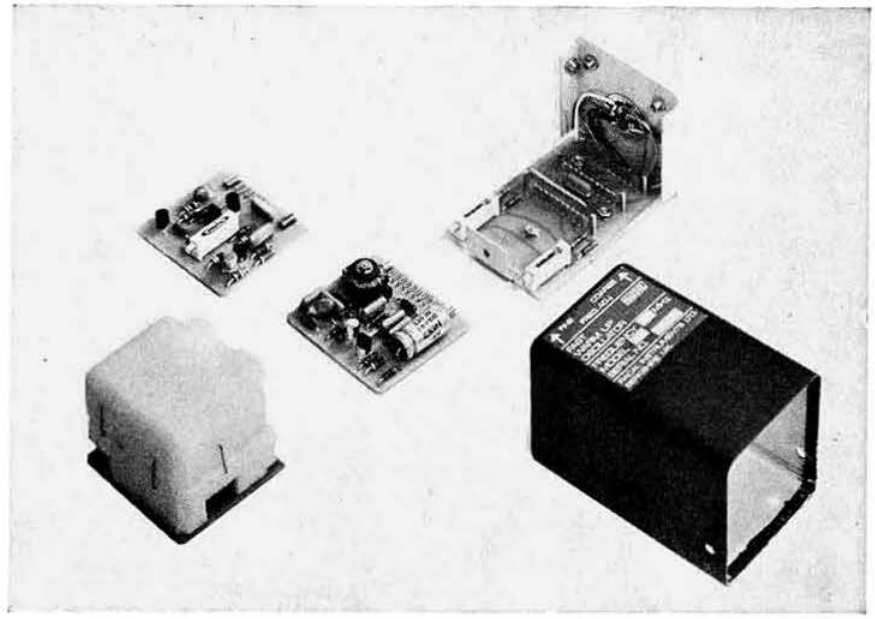


Fig. 8. The Racal Fast Warm Up Crystal Oscillator.

proceeds to make a synthesizer locked to it and get many frequencies. Doing this and removing the spurious signals is a complicated and expensive business not within many amateurs' capabilities. Also the result may not be too convenient for amateur use—imagine QSYing from 28999·9 kHz to 29001·0 by setting a 10-position switch for each figure!

However, for many ssb transceivers a vfo tunes a range of 500 kHz—often 5·000 to 5·500 MHz. Replacing this vfo with a synthesizer is possible as shown by G2DAF [6]. The expensive mechanical filter could be eliminated by the system shown in Fig. 9. A reasonably stable vfo is normally tuned to the desired frequency, and is then phase locked on to the nearest of a series of harmonics of 2·5 kHz, derived from a crystal. The crystal can be pulled sufficiently for a 2·5 kHz shift at the operating frequency.

This same technique could equally well be applied over any other narrow range of frequency, say 70·1 to 70·7 MHz, provided the vfo's natural rate of drift didn't cause it to jump to the next harmonic during one over. At vhf a pulled crystal could be rather unstable, but 10 kHz channels seem possible and if we all locked on Droitwich, netting would be no problem, except between 02·00 and 05.30 BST!

Continued overleaf

References

[1] RSGB Bulletin March 1966 p 167.
[2] RSGB Bulletin January 1960 p 302.
[3] 73 *Magazine* October 1964 p 64.
[4] *Wireless World* February 1968 p 666.
[5] *RCA Review* March 1966.
[6] RSGB Bulletin November 1963 p 293.

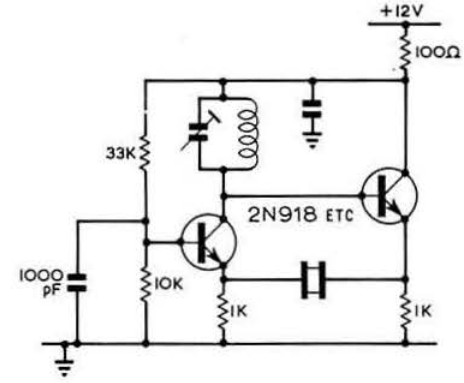


Fig. 7. Butler oscillator. Two bias resistors are omitted from TR2. These should be a 33k and 10k connected as TR1. A ·01 decoupling capacitor between TR1 and TR2 is also omitted.

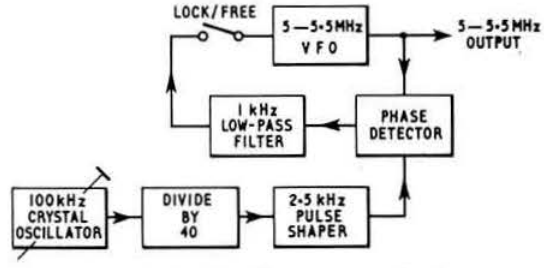


Fig. 9. A simplified frequency synthesizer.

Appendix I

US Military Crystal Units

CR	per cent Tol.	Temp C	Op. cond.	O/T
15	0·01	−40 +70	32 pF	
16	0·01	−40 +70	R	
18	0·005	−55 +90	32 pF	
19	0·005	−55 +90	R	
23	0·005	−55 +90	R	3 or 5
24	0·005	−55 +90	R	
25	0·01	−40 +70	R	
26	0·002	+70 +80	R	
27	0·002	+70 +80	32 pF	
28	0·002	+70 +80	R	
29	0·002	+70 +80	32 pF	
30	0·002	+70 +80	R	
32	0·002	+70 +80	R	3 or 5
33	0·005	−55 +90	12 pF	3
35	0·002	+80 +90	R	
36	0·002	+80 +90	32 pF	
37	0·02	−40 +70	20 pF	
38	0·012	−40 +70	20 pF	
39	0·007	−55 +75	R	
40	0·003	+65 +75	R	
42	0·003	+70 +80	32 pF	
43	0·01	−30 +75	45 pF	
44	0·002	+80 +90	32 pF	
45	0·02	−40 +90	R	
46	0·01	−40 +70	20 pF	
48	0·0075	−55 +90	32 pF	
50	0·012	−40 +70	R	
51	0·005	−55 +90	R	3
52	0·005	−55 +90	R	3
53	0·005	−55 +90	R	5
54	0·005	−55 +90	R	5
55	0·005	−55 +105	R	3
56	0·005	−55 +105	R	5
57	0·001	+80 +90	32 pF	
58	0·005	−55 +90	R	
59	0·002	+80 +90	R	5
60	0·005	−55 +105	R	
61	0·002	+80 +90	R	
62	0·001	+70 +80	32 pF	
63	0·01	−40 +70	20 pF	
64	0·005	−55 +105	30 pF	
65	0·001	+70 +80	R	3
66	0·002	−55 +90	30 pF	
67	0·0025	−55 +90	R	3
68	0·002	+70 +80	32 pF	
69	0·002	−55 +90	30 pF	
70	0·01	−40 +70	R	
72	0·005	−55 +105	R	3
73	0·003	−55 +105	R	3
75	0·001	+70 +80	R	5

"R" indicates that a crystal is calibrated for use at its series resonance, while "20 pF", "32 pF" etc. are the standard US capacitances for Colpitts type oscillators. The number in the O/T column indicates the number of the overtone for such types.

Appendix II

Crystal ordering information

When ordering new crystals it is important to provide the manufacturer with sufficient information. If his catalogue is available this will say exactly what he requires to know, but the following is an indication:

Type of holder?	FT243, HC6/U etc.
Frequency?	
Frequency tolerance?	± 0·02% and −20 C to +70 C will be
Temperature Range?	adequate for most amateur applications
Series resonant?	
or Circuit capacity?	British standard is 30 pF and will be supplied automatically if not specified.
Overtone or Fundamental?	Fundamental crystals available to 20 MHz.

QTC *continued from page 163*

Solar Eclipse Monitoring

Members who took part in the monitoring survey announced on page 574 of the September 1968 issue of *Radio Communication* will be interested in comments on the survey contained in a recent press release.

"Low key research on a shoestring with the aid of a network of radio listeners stretching from Eastern Europe to the Cook Islands is paying off for a University of Virginia astronomer studying solar eclipses. At a time when many scientific research projects require vast sums of money Dr David Meisel's major expense is postage money in his quest for data about recent eclipses of the sun. He has found that under favourable conditions even ordinary short wave receivers can be used to detect x-ray sources or hot spots on the solar disc as the hot spots are covered by the moon.

"Presently Dr Meisel is evaluating material gathered during the eclipse of 22 September 1968 when a worldwide network of radio listeners helped him monitor the eclipse."

Affiliated Societies

The following societies are now affiliated to RSGB:

WINSCALE AMATEUR RADIO AND ELECTRONIC SOCIETY.
Secretary: R. B. Casson, G8CBN, 42 Wasdale Park, Seascale, Cumberland.

AMATEUR RADIO SOCIETY OF THE GUILD OF STUDENTS (Aston University).
Secretary: S. M. Atkinson, Guild of Students Amateur Radio Society, The Union, University of Aston in Birmingham, Gosta Green, Birmingham 4.

VANGE AMATEUR RADIO SOCIETY.
Secretary: M. R. Lee, G3VYF, 11 Sturrocks, Vange, Basildon, Essex.

BRIGHTON TECHNICAL COLLEGE AMATEUR RADIO CLUB.
Secretary: R. A. Bravery, G3SKI, Brighton Technical College ARC, Richmond Terrace, Brighton, BN2 2SZ.

NUNSFIELD HOUSE COMMUNITY ASSOCIATION AMATEUR RADIO GROUP.
Secretary: N. Gregory, G3LCV, Boulton Lane, Alvaston, Derby. DE2 OFD.

RADIO-CLUB JEUNESSE ET LOISIRS, 26 Rue d'Estienne d'Orves, 92 Bois-Colombes, France.

Affiliated Society Representatives

The following Affiliated Society Representatives have been appointed for 1969:

SOUTH SHIELDS AND DISTRICT AMATEUR RADIO CLUB, Frank Harrison, G3SFL, 42 Woodlands Road, Cleadon, Sunderland, Co. Durham.

STOCKPORT RADIO SOCIETY, S. Revell, G3PMJ, 154 Abbey Hey Lane, Abbey Hey, Gorton, Manchester 18.

TORBAY AMATEUR RADIO SOCIETY, B. E. Symond, G3LKJ has had to resign his position due to ill-health. Our thanks to Mr Symond for his service in the past and we wish him a speedy recovery.

NORTH BERKSHIRE, C. Desborough, G3NNG, 22 Westland Road, Faringdon, Berks.

GLOUCESTER, E. Perkins, G3MA, 40 Carlton Road, Gloucester.

Area Representatives Correction

The address of the new Area Representative for Bexley was given incorrectly in the January *Radio Communication*. It should be R. Holland, 35 Blendindon Drive, Bexley, Kent.

REGULAR FEATURE

THE MONTH ON THE AIR

By JOHN ALLAWAY, G3FKM*

DR JOHN ATTAWAY, K4IIF, DX Editor of *CQ* magazine raises a point of considerable importance to all of us who are even occasionally interested in awards, certificates or contests. Should there not be one internationally agreed list of "countries" used by all organizations throughout the world? No doubt a considerable amount of difficulty would be experienced in trying to sort out certain areas of the world whose ownership is currently under dispute, but it would certainly be a great advantage to all if at least the world's major national societies could sort out one common list—possibly through the good offices of IARU.

A number of QSL cards are already being circulated for contacts which have taken place since 1 January, 1969, bearing the incorrect year on them! It seems to be a great pity to go to the expense and trouble of completing and sending out confirmations which may be invalid for certain awards (e.g. the new 5BDXCC) just because of a small slip in filling them in. It is, of course, most important to mention clearly (with *absolutely no alteration*) the call-sign of the station worked, the mode on which the contact took place (if two way ssb this should be clearly indicated), and the date of the QSO. Cards have even been seen which do not mention a contact having taken place and could very easily have been listener reports. Much disappointment could be avoided if we all resolve to be more careful in dealing with our QSL completion.

Apologies for an error in last month's *MOTA*. In the *News from Overseas* section the location of MP4MBJ was incorrectly given as the island of Sharjah. This should of course have been the island of Masirah. MP4MBJ's full address is: Cpl Addison, GRSF, RAF, Masirah, BFPO 65, although Norman has asked for his cards to be routed via his G3POA QTH.

It has been pointed out in connection with the reference in February *MOTA* to CHC nets that the Italian Chapter has in fact abandoned its 80m net for the time being, and that the Scandinavian net is not yet operative.

The dock strike on the E Coast of the USA is causing severe delays to surface mail between Europe and the USA and a virtual standstill of delivery of all US publications sent by this route is in effect. Readers are asked to be patient if American publications are delayed—for once this is not due to our own GPO!

G3SKI wishes to point out that he did *not* operate as GC3SKI/A from Sark on 4 January. The person using his call-sign is invited to send an sae to 7 Copse Hill, Brighton to collect the incoming cards!

Top Band News

W1BB's February *160 Metre DX Bulletin* reports that conditions this winter have been better than expected, with increased interest due to the numbers of new countries being activated. On the 15 December " first timer's " night 54 G's are said to have been participating. However Stew bemoans the apparent lack of co-operation from stations on his side of the Atlantic in observing silence during these tests, and also an apparent lack of interest by the W/VE gang in their own special nights. DL9KRA paid another visit to Chile early in January and contacted a number of W's from CE3CZ. The only two Europeans he heard were G3PQA and ZB2AY although no contacts were made. A point concerning the sending of callsigns under adverse conditions is raised by W1BB. Many stations sending very slowly may find that their callsign is unidentified by the DX station due to fading or static before their call is completed. Sending at a reasonable speed with constant repetition of the sender's callsign is a better procedure, with maybe 10 repeats of the caller's callsign to one of the station being called.

The extended US frequency allocation on the band does appear to be causing difficulties on the other side of the Atlantic and it is very sincerely requested that whenever possible the section between 1825 and 1830 kHz be avoided by non-DXer's during the comparatively few hours that DX working is possible.

As mentioned in a previous *MOTA*, Gus, W4BPD, has a 300W top band transmitter and will be taking it with him on his forthcoming expedition. A possible frequency to watch will be 1827 kHz. It may be remembered that VQ8CBR managed several QSO's from Rodrigues Is, due mostly to the excellent aerial facilities available there.

Roger, ZB2AY (alias G3UPK) will again be operating from Gibraltar for five weeks commencing 21 March. This is his eighth visit to the Rock, and unfortunately will be his last. He found his last trip most enjoyable, and wishes to thank G3LYW for spending many hours ably guiding G's and other Europeans to his frequency. Roger also wishes to thank Herb, KV4FZ and friends in the Caribbean for the many unexpected QSO's—he was greatly surprised when he received a report of S9 plus on his ssb signals from Herb! All QSL's go via K3RLY (see *QTH Corner*).

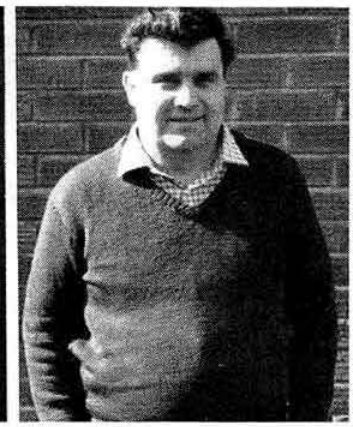
A last minute flash from W1BB reports that both his 160m aerials were brought down by the blizzard of 9 February. His home aerial has been up since 1940 and cannot be repaired until the weather warms up.

G3WFW and a party of others will be using the callsign GB2GM from Wigtownshire, Bute, Inverness, and Aberdeen between 3 and 12 April. They will use both 160m and 2m.

Rotary of Amateur Radio

The net on 3690 kHz on Sundays at 08.00 under the control of G8ON is still very active and the circle of Rotarian amateurs has grown considerably. At least 12 stations now

* 10 Knightlow Road, Birmingham 17. Closing date for the April issue is 11 March, for the May issue 15 April and for the June issue 12 May.



Brian Edwards, G3RJB is presently active on 40, 20, 15 and 10m ssb and cw using a KW2000 to dipole aerials. Brian has been married eight years and has two children, Karen aged four and Stephen 15 months. His DXCC score is 160 countries with 151 confirmed.

Photo by G3RJB

check in between 08.00 and 11.00. Those disliking big nets are invited to make a quick entrance, exchange reports and greetings, and then leave. Round Table members will also be very welcome to join G3YBI in the net. Between 07.00 and 08.00 Norwegian Rotarians call in and exchange news, and LA6YL expects to raise a substantial gathering before long.

Perhaps the most successful Rotary DX is the regular W/G net that takes place at 12.00 each Sunday on 21,400 kHz, with K1UIL in charge. This has been 100 per cent successful so far this year. Conditions appear to have been ideal with at least six UK stations and an LA maintaining contact for at least an hour. Several PY's and CE's are interested and hoping to join in soon.

News From Overseas

A letter from CR6GO, who is a member of the Society, gives the news that there has been some trouble amongst our colleagues in Angola. It appears that during the recent disturbances a number of licences have been issued to people situated in remote parts of the country, largely as a means of providing emergency communications with the capital in the event of disorder. These have been issued to applicants with a very basic knowledge of the morse code and no knowledge of radio theory. Unfortunately applications along these lines have been accepted from the main towns and the overall standard of CR6 operators has degenerated. The sad sequel to this is that CR6GO, together with CR6's BX, CA, DA, DB, DK, DX, EA, FY, HL, IK and JV put forward a proposal to LARA (the Angolan society) that a kind of incentive licensing should be introduced, and for their pains have now been " requested " by the telecommunications authorities to temporarily suspend their transmissions. It is to be hoped that good sense will prevail very soon and that the 12 well known CR6's will once again be heard on the bands. In the meantime it is requested that all QSL's for them be sent to PO Box 10408, Luanda, Angola, and not via LARA as this organization appears to be returning all QSL's bearing their call-signs.

The latest issue of *NARS News* lists some 42 members as of January this year. No new licences are being issued at present but there are quite a number of applications lodged with the authorities, and it is hoped that these will receive favourable consideration as soon as things return to normal in Nigeria. Eric Lomax, 5N2ABG, and Mike Dransfield, 5N2AAF, the society's President and Secretary respectively are to be congratulated on keeping NARS functioning effectively during all the present difficulties.

Bubbles Timlick, VE4ST, would like to draw readers' attention to the fact that there are two Canadian YL clubs who would welcome " check-ins " from UK or other European stations. The first of these is the Ontario Trilliums YL Amateur Radio Club which was the first Canadian YL club and has at present 43 members. A former member of the club was G2YL. Their net meets on Saturdays at 17.00 on 14,140 kHz except on the last Saturday of the month when the frequency used is 14,210 kHz, for the benefit of US members. The second club is the Canadian Ladies Amateur Radio Association which includes members in all VE call areas. The CLARA net meets on Tuesdays at 14.00 and again at 00.00 on 14,160 kHz. The former club issues the Trillium Award which is described in the *Awards* section.

Awards

A **DX Awards Log** has been produced by The McMahon Company (W6IZE) of 1055 Co. Oak Knoll, Pasadena, Calif. 91106, USA. This 150 page log book is intended to enable DX'ers to keep an organized log of contacts and confirmations for many of the DX awards now available. Full details of the various awards are given and individual logs are provided enabling a complete record to be kept. The cost of the DX Awards Log is $4·95 (approx. 42s. in sterling) postpaid from the address given above.

A letter has been received from VS6DL (Awards Manager, HKARTS) pointing out that applicants for the Hong Kong Firecracker Award need not send anything more elaborate than a letter listing the VS6 stations worked and the dates of the contacts.

The **Hong Kong Firecracker Award** is issued by:

The QSL Manager, HKARTS, PO Box 541, Hong Kong.

Applicants in Zones 18, 19, 24, 25, 26, 27 and 28 must have worked eight VS6 stations since 1 January, 1964, those elsewhere need only four. Certificates will be issued for all cw, all phone, or mixed modes, and applications should be sent to the address above together with five IRC's.

A number of certificates are issued by the Japan Amateur Radio League. They include the:

All Japanese Districts Award (AJD) for QSO's for all JA call areas JA1-0.

The **WAJA Award** for QSO's with 46 Japanese prefectures.

The **Japan Century Cities** (JCC) Award for contacts with 100 cities.

The **Heard All Continents** (HAC) for SWL's with six continents confirmed.

Contacts may have been on any band or mode (but not cross band) and must have been since 30 July, 1952. Applicants should send a list showing date, time, mode, frequency, report and QTH of stations worked together with full IRC's for the HAC or 10 IRC's for any of the other awards to:

Awards Manager, JARL, PO Box 377, Tokyo, Japan.

In connection with the above certificates Mas Takata, K6PIH, 721 N.20th St., San Jose, Calif., USA 95112, offers to send by air mail (two IRC's please) lists of prefectures and cities for those interested.

The Amateur Radio Club of Western Labrador, PO Box 368, Wabush, Labrador, Canada, is awarding a certificate to all who contact four VO2 stations during the periods 20.00, 22 March to 04.00, 23 March and 16.00 to 23.59, 23 March.

The **Trillium Award** is issued by:

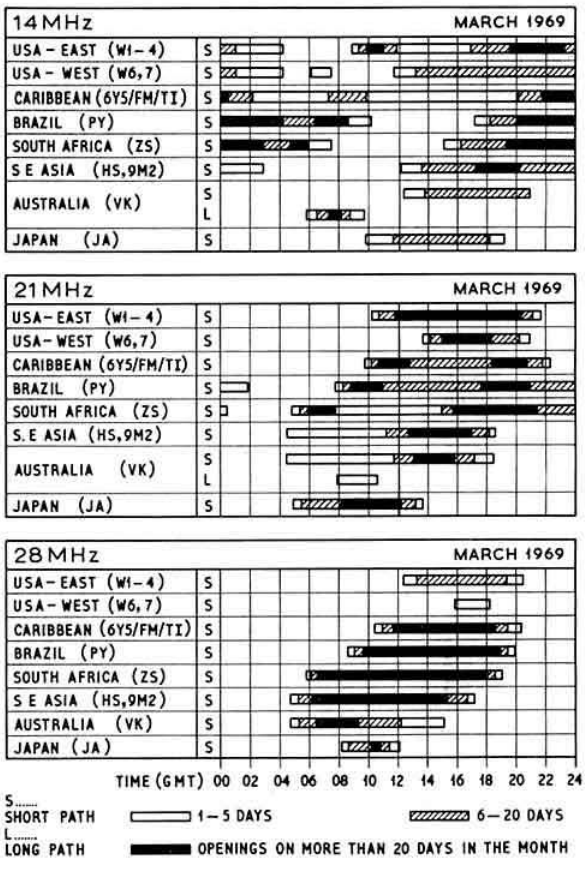
The Ontario Trilliums YL ARC.

W/VE stations need six " points," DX only three.

Contacts with each member count 1 point, with club station VE3TOT 2 points.

QSL's must be in applicant's possession but GCR list suffices for application, a fee of 10 IRC's plus full log data should be sent to Mrs Marion Course, Oxford Road Ranch, RR1, Welland, Ont., Canada. Members are: VE1's AKO, AKR, AML, AMS, MY, TK, YX. VE3's ASZ, AYL, BBO, BEQ, BII, BVJ, CBS, CLP, CLT, CCO, DGG, DNW, DTH, DXZ, ENJ, EUV, EVA, EZI, FCM, FIX, FRN, FUR, FXM, GJH, GNG, GNO, GSW, IB, GTI, BEI, VE4ST, VE6ABP, VE7ADR and WA8OYO. Listeners

Propagation Predictions



At present we are already in the declining phase of the sunspot cycle, but the decrease of activity is slow. The propagation conditions for this month are slightly poorer than those of March 1968. During March the F2 muf's slowly begin to fall as the summer season approaches. This disadvantage will show up mainly on the **28 MHz** band. Usually, therefore, North America will not come through reliably on this band during the whole month. This is an unwelcome prospect in view of the forthcoming ARRL contest. Other continents will, however, come through reliably, even if only for short periods.

Propagation conditions on **21 MHz** will not yet be affected by the seasonal fall in the F2 muf. The lengthening days will mean that this band, as well as 28 MHz, will remain open longer in the evenings than in the previous month.

On **14 MHz** the Spring season will mean that more DX will be possible in the later half of the night than in the previous two months. This band will not become a real night time DX-band probably until some time in April. During the present period of the equinox there will be little opportunity on 14 MHz (or 21 MHz) for working DX via the long path. One exception will be the long path to Australia which will be more favourable than the direct path. Favourable times for traffic to Alaska and Hawaii during good conditions on 14 MHz will be from 08.00-10.30 BST and from 18.00-20.00 BST. As the great circle passes through the auroral zone, contacts will be frequently interrupted by disturbances there.

7 MHz will continue to offer useful DX possibilities, when the greater part of the transmission path lies in darkness. The East Coast of North America will, therefore, come through on this band about 23.00 BST and remain audible until shortly after sunrise. There will be opportunities for working Western North America between 04.30 to 07.30 BST and when conditions are very favourable, Alaska and Hawaii from about 05.30 to 07.30 BST.

On **3·5 MHz** the East Coast of the USA will probably be heard from about 01.00 to 06.30 BST. In the latter half of the night on this band consideration must still be given to the occasional interruption of local traffic by the dead zone.

The provisional sunspot number for January 1969 was 104·5 with the period of greatest activity lying between the 5 and 16 January. The predicted smoothed monthly sunspot numbers for May, June and July are 93, 91 and 90.

may apply for this award, and band/mode endorsements are available.

Ted Trowell, G2HKU, is the only active amateur on the Isle of Sheppey and will be happy to arrange skeds with anyone wishing to contact him for credit for the IOTA Award. His QTH is: " Hamlyn," Saxon Avenue, Minster, Sheppey, Kent.

QRP News

Apologies for two errors in the section referring to G6XN's activities in December *MOTA*. It seems that the aerial was an inverted vee and that the ground was sloping, not the aerial, the success of the experiment being considered to be due to the ground slope. In addition the skeds with VK were successful every day.

9H1AX (ex-G3KSK) reports that his signals were received by G3's ALW and UGT on 27 October when he was running 200 milliwatts input to a Tokai " walkie talkie " on 28·5 MHz! This was on A3, and he peaked at S4. His aerial was a half wave dipole resonant at 28·5 MHz, 50 ft above ground and running E–W. The feeder to this consisted of five half waves (electrical) of twin electrical flex this being joined to the transmitter through a ferrite 1:1 balun and 1 half wavelength (electrical) of 75 ohm coax connected to the collapsed whip of the transmitter (the braid of this was not connected at the transmitter end). This seems to your scribe to be real QRP DX and represents some 7500 miles per watt. 9H1AX is justifiably wondering whether this is a record on 28 MHz?

Expeditions

Mike Rowlands, G3NKR/W2, together with W2STM, will be making a trip around the Caribbean area between 6 and 17 April. They hope to operate from **Grenada, St. Vincent** and **Anguilla,** and also possibly from **St. Kitts** and **Antigua.** There seems to be some difficulty concerning the licensing situation in Anguilla since the island declared itself independent from St Kitts-Nevis but it is hoped that the problem will be solved to the satisfaction of ARRL for DXCC purposes. Equipment will consist of TR3 and SB101 transceivers and inverted vee aerials. Calls are not yet known but QSL's will be handled by W2STM.

It is rumoured that Rubin, WA6AHF, is hoping to visit **Serrana Bank** (KS4) for a four to six day stay sometime during June or July.

SV0WN and SV0WI will be active from **Rhodes** during Easter week. They will do both cw and ssb operation on 10, 15 and 20m and a fair amount of cw is promised. Although ssb activity from this island has been fairly plentiful recently there has been very little sign of A1 transmissions.

GW3XRM will shortly be setting forth with the Cardiff University Trans-Africa Expedition (see December 1968 *MOTA*). He hopes to work a large amount of DX whilst on the trip. Callsigns issued so far include F0MA, GW3XRM/M/ZS, GW3XRM/M/ZE, 7Q7DD and 9J2XR/M, and others are awaited. All QSL's should be sent via G2MI, or to Mr Mervin Dunn, 4 Rodley Square, Lydney, Glos.

The Indian Ocean DXpedition, Bulletin No 2 from VQ8CC gives the news that Gus (W4BPD) will accompany Steve to **St Brandon** and **Rodrigues Is.** It seems that St Brandon (VQ8CCB) is likely to be visited at least two weeks before Rodrigues, and that the operation will take place from the rest house at the fishing settlement on Raphael Is. Transport to Rodrigues (VQ8CCR) will be undertaken on

The station of Arland Ussher, GD3TIU, at Crosby, Isle of Man. The equipment includes an HT41, HT32 and a 75A4. The aerial system consists of five Vee beams each leg being 344 ft long. Arland also holds the call ZS6Z and was the President of the South African Radio League between 1938 and 1950.

Rafiq, AP2MR, may be found quite regularly on all bands 80 to 10m ssb and has given many UK stations their first contact with Pakistan.

From Yokohama, Japan, we recently received this picture of Hiro, JA1PFU who is active on most hf bands.

QTH Corner

A2CAU (After 1/1/69) (see JX2BH).
CR6BX etc (see text) PO Box 10408, Luanda, Angola.
DX1AAV L. Eisler, c/o US Embassy, APO San Francisco, Calif., USA 96528.
GM5AHS c/o WA2DHF, Stephen Mendelsohn, 6 Camp Road, Amityville, NY, USA 11701.
FW8DY Ed De Young, Box 762, Kaunakakai, Hawaii, 96748.
HK0TU via HK3RQ, W. Elasmar B., Apto Aereo 4468, Bogota, Colombia.
JX2BH (After 1/1/69) via VE1ASJ, PO Box 41, E. Riverside, Kings, NB, Canada.
MP4TAF, **MP4TCM** via DL6AA, Heinz Fleer, 4791 Ostenland Wittendorf, Nr. 496, Germany.
MP4TCJ via G3EIY, 32 Naunton Lane, Cheltenham, Glos.
OA8AW Clyde Peters, Casia 206, Pucallpa, Peru.
PJ6AA/PJ8AA (see VP2DAQ).
PY0EP via PY1MB, Mandel Borio, R. Catapo 16, Lins Vasoconcelos, Rio, GB, Brazil.
SU1MA 46 Omar Ebnelkhattab St, Heliopolis, Cairo, Egypt.
TY6ATE BP107, Natitingou, Dahomey.
YA1HD via DJ9DH, Rainer Proescholdt, Wolfsfeld 23, 565 Solingen, Germany.
VK0 (Heard Is expedition) c/o USCG "South Wind," c/o FPO, NYC, NY, USA 09501.
VP2DAP KV4AM, H. McBirney, Sugar Mill Estates-Box 717, Christiansted, St Croix, US Virgin Is 00820.
VP2DAQ K7TMK, R. McBirney, 11350 Franklin Road, Boise, Idaho, USA 83705.
VP2DAR (see 9Y4PHO).
VP2GRN, **VP2GSM** via W4YHB, PO Box 1909, Hendersonville, NC, USA 28739.
VP7NH PO Box 86, Nassau, Bahamas, (**not** via bureau please).
VQ9A/A etc —all W4BPD's expedition via W4ECI (see text).
ZB2AY via K3RLY, Bud Kellam, 35 Allview Drive, Elliott City, Md, USA.
ZF1JF via W1IIM, 94 Concord Road, Wayland, Mass, USA.
ZS3AW via DJ3KR, Max Planck Institut Fuer Jonosphaeren Physik, 4311 Lindau, Germany.
5H3LV via VE3ODX, PO Box 717, Station "Q," Toronto, 7, Ont, Canada.
5V4's AP, EG, JL (After 1/1/69) via VE3DLC, 30 Zenith Drive, Scarborough, Ont, Canada.
6Y5SR R. Skelton, c/o Jamaica Telephone Co Ltd, 47 Halfway Tree Road, Kingston 5, Jamaica.
9X5GG via DOTM, Box 7388, Newark, NJ, USA 07107.
9Y4PHO W. Bennett, 18549 Normandy Tce. SW, Seattle, Wash. USA.

RSGB QSL Bureau, G2MI, Bromley, Kent.

FINAL 1969 COUNTRIES TABLE

	1·8 MHz	3·5 MHz	7 MHz	14 MHz	21 MHz	28 MHz	Total
G3HDA	—	75	78	44	50	92	339
G3HCT	—	59	58	36	42	86	281
G3UML	—	48	15	54	12	8	137
G3JVJ	12	26	5	17	6	1	67
G8VG	2	18	18	19	27	23	107
G3XBY	1	18	23	19	20	6	87
G3VPS	2	15	3	23	7	—	50
G3LNS	—	14	80	23	16	61	194
G3TZU	1	12	9	26	44	84	176
G3KS	1	8	3	30	22	19	83
G3PEJ	—	1	6	11	15	8	41
G3VJG	—	—	9	—	4	29	42
G3VLM	—	—	2	15	—	5	22
A5662	18	25	24	69	66	44	246
BRS25429	4	39	39	79	48	30	239
BRS27806	2	34	19	51	48	37	195
A5154	2	30	6	72	51	36	198
A5390	8	21	40	87	84	74	314
BRS28198	2	27	31	1	—	5	66
A4253	1	2	2	10	4	3	22

This month's table is in order of 1·8 plus 3·5 MHz totals.

the 2000 ton *MV Mauritius*, due to visit the island 12-17 April. As with all previous operations from the island the cable station at Mount Venus with its five 70 ft towers (with top platforms) will be used. Unfortunately no direct Mauritius–Chagos sailings are due in the near future so it seems that a visit to this group at this stage of the expedition is unlikely. Gus will probably leave Mauritius on the *MV Mauritius* in time to arrive at Mahe, Seychelles, on 25 April. Frequencies to be used are as follows (in the event of QRM the first clear channel below will be used): CW 1827 (or as arranged by schedule), 3525, 7025, 14,025, 21,025, and 28,025 kHz—listening 10 kHz up or as announced: SSB 3795, 7095, 14,195, 21,245, 28,495 kHz—listening as announced. Some transceive operation will take place on 21,395 and 28,605 kHz for the USA—apart from this Gus says that he will **never** work anyone on his own frequency. QSL's for contacts with Gus go via W4ECI, but Steve asks that contacts with him are not QSL'd. All contacts will be QSL'd via the bureaux within a few days of his return home and everyone is asked to wait six months for cards from QSO date. If they have not arrived by this date QSO details should be sent to VQ8CC, Box 14, Curepipe, Mauritius. Steve says "As with all my operations from DX locations I will be personally responsible for QSLing contacts made with my call-sign. I am hoping that the procedure of arranging for cards to be sent through the bureaux soon after the operation will greatly simplify matters for all concerned, and will demonstrate to all the value of our often criticized bureau system." Amen!

Latest information on the projected expeditionary activity from **Heard Is.** gives the date as 12-13 March for a period of 6 to 10 days. It is also said that activity will be restricted to 14 MHz cw and ssb—14,080 and 14,125 kHz are given as likely frequencies. QSL's should be sent c/o USCG Cutter "South Wind" c/o FPO, New York City, NY, USA 09501. No callsign is known at the time of writing, but KC4USF/VK0 is possible.

The Calgary-Pacific DXpedition consisting of VE6AJT and KH6GLU came on the air from **Wallis Is.** using the call FW8DY in early February. This was followed by a short spell in 5W1 and both amateurs have now returned to Hawaii where VE6AJT is hoping to obtain employment until the trip to **Manihiki** and **Tokelau** is possible in April. All QSL's for the VR1P operation should have been mailed by 14 January, those for the VR5AE activity (where up to 5000 QSO's were made) were then to be dealt with. VE6AO asks for patience to be exercised for their arrival.

K6KA embarked on a tour of the Pacific on 15 February and intended to operate from existing stations wherever possible. He hopes to be VR2AP on 15/16 March and also holds a licence for **Norfolk Is.** (VK9AK) but may not use this in view of the other activity pending by W4WS and W6BPO. QSL's for all Bill's contacts (except for when he is at FO8AA) should go to his home address at 402 Oliveta Place—Box 1, La Canada, Calif., USA, 91011. FO8AA QSL's go to FO8AA.

Gus, W4BPD (see earlier paragraph) will leave for Dakar by air from the US on 17 February. He will then travel across Africa and operate from a number of countries on his way to Mombasa before leaving for Mauritius where he is scheduled to arrive on 15 March. He has been issued with the callsign VQ9A/A and will presumably suitably modify this when operating from British territories outside the VQ9 call area. His frequencies will be as mentioned

under the Indian Ocean DXpedition heading, and his movements following this are not yet fixed. They will largely depend on the state of his finances and contributions would be very welcome. They may be sent to the World Radio Propagation Study Association, c/o Everett C. Atkerson (W4ECI), 1161 Shades Crest Road, Birmingham 9, Ala., USA and may be arranged by readers in the Stirling area through their bankers. Gus hopes that it will be possible to visit most of the British and French islands in the Indian Ocean area, possibly with the assistance of Harvey, VQ9V. Later movements may include another visit to Bhutan (AC5).

Contests

The **1969 (18th) "OZ–CCA" Contest.**

12.00, 3 May to 24.00, 4 May.

All bands 3·5 to 28 MHz.

Exchanges consist of RST plus serial QSO number starting from 001. One point is earned by receiving a report and two for receiving the serial number. QSO's with OX, OY, and OZ stations count double. Every country worked counts as a multiplier, in W, VE, PY, LU, VK and ZL call areas are counted for this purpose as countries. Final multiplier is the sum of all countries worked on all bands. Entries may be single or multi-op and a declaration " I certify on my honour that I have observed all the rules and regulations established for amateur radio in this country, and for the present contest, and that I will agree with the decisions taken by the EDR Contest Committee." This should be signed, and posted by 15 June.

Logs to EDR Contest Committee, Post 0, PO Box 335, Aalborg, Denmark.

In the 1968 event top non-Scandinavian was YU1NPV (103,641 points) and leading **GG3OXI** (67,000 points). Other UK entrants were G2DC (57,780 points) and G3NSY (28,616 points). G3OXI and G2DC were 8th and 10th respectively in the non-Scandinavian listings.

Details were received of a contest run by the Quelimane branch of Liga dos Radio-Emissores de Mozambique (in January) but unfortunately they did not arrive until after the end of the competition. Apologies are extended to LREM for G3FKM's inability to publicise the event.

The **CQ World Wide WPX SSB Contest.**

00.00, 12 April to 24.00, 13 April.

All bands 3·5 to 28 MHz, ssb only.

Exchange RS plus serial number of QSO, starting from 001.

Contacts with stations in the same continent but not in one's own country count one point. With stations in other continents three points. Stations in one's own country may be worked for multiplier credits only, and no QSO points may be claimed. Final score is total QSO points multiplied by the number of different prefixes worked. There are single operator, single or multi-band, and multi-operator single or multi-transmitter (one signal per band) categories. Single operators may only operate for 30 of the 48 hours, the 18 free hours may be taken in up to five periods which must be clearly indicated in the log. It should be noted that (1) Multi-transmitter stations use separate numbers for each band. (2) A " prefix " is considered to be the two or three letter/number combination which forms the first part of the call (e.g. W1, G3, 8R1, etc.). (3) A station may be worked on each band for QSO credit. Certificates will be awarded to the highest scorer in each country and also trophies to top world single operator single band, single operator all band, multi-operator single and also multi-operator multi-transmitter entrants. Separate log sheets should be used for each band, they should follow the pattern of those used for the CQ WW DX Contests (40 QSO's per page) and may be home made. Summary sheets are available from G3FKM. There are no printed rule sheets. Entries should be posted before 15 May to: CQ WPX SSB Contest Committee, 14 Vanderventer Avenue, Port Washington, LI, NY, USA 11050. Violation of the regulations in the entrant's country, or the taking of credit for incorrect QSO's or prefixes, or more than 3 per cent of duplicate QSO's will result in disqualification.

DX Briefs

Les Graves, VP8KO, is now on the air from the **South Orkney Is.** and putting a good signal into the UK. According to BRS26222 (his QSL manager) Les will be looking for UK contacts on 28,595 kHz at 14.00, on 21,300 kHz at 17.00 and on 14,190/195 at 19.30.

Current activity on **Jan Mayen Is.** seems to be at a high level. JX2BH has a vertical aerial and puts out an excellent signal, he will be there for another six months or so. JX1OM and JX3NM are also there for six more months and both favour ssb operation and are multi-band operators. JX3P and JX3DH are also to be found on all bands, JX5CI apparently favours cw operations on 7-28 MHz.

There are now three stations on the air in **Portugese Timor**—CR8AG, who has 25 watts of am, CR8AH who has a Swan 350 transceiver and quad aerial for 21 MHz, and CR8AI who currently has only a diplole but hopes to have a TH3 beam for 21 and 14 MHz use soon. CR8AI has been having some equipment troubles but should by now be found on ssb between 21,260 and 21,300 kHz on Saturdays, and between 13.00 and 16.00 on the 14,250–14,300 kHz segment of 14 MHz on other days.

Another station is now on the air from **Tanganyika.** 5H3LV, who was formerly VE3EUP, is a pilot with the Wildlife Division of the Department of Agriculture and will be there for two years. He promises to be most active on Fridays and Saturdays.

The DX prefix is now being used for licences issued to foreigners in the Philippine Is, nationals will retain the DU prefix. W4AAV is now DX1AAV and DU1AT expects to become DX1AW.

VQ8CDC is active once more from **Chagos Is** and has been worked from the UK on 14 MHz cw. He asks for QSL's via his VQ8CD address.

G3FGP is now in **St Lucia** using the call-sign VP2LK and is often to be found on 28,600 kHz between 11.00 and 12.00. He is using an NC200 and three element beam.

ZL1TU reports that another operator will soon be on from **Chatham Is** and will be there for six months.

Permission has been granted to Jamaican amateurs to use the 6Y0 prefix during the ARRL DX contest. It is not known whether this procedure may be repeated for other contests.

Band Reports

The last month has produced the expected increase in interest on all the DX bands with a great deal of activity taking place on 3·5 and 28 MHz. The sudden increase in the number of stations looking for contacts on the former band has had disastrous results with almost nightly disputes on the

frequencies of the increasing number of ssb DX stations being heard. This is a difficult situation and your scribe has found it much more restful to try to work the DX on cw! An *ideal* solution does not immediately come to mind. As far as 28 MHz is concerned at least one UK station is known to have worked more than 100 countries this year already, which just shows that a great deal of the apparently poor conditions on this band have been due to inactivity.

Very many thanks to the following for sending in logs: G2BOZ, G2BW, G2HKU, G3AAE, GW3AX, G3HCT, G3HDA, G3JVJ, G3LNS, G3RFB, G3TMB, G3TZU, GM3UCI, G3UML, G3URX, G3UYM, G3VJG, G3VPS, G3WKJ, G3XBY, GM5AHS, G8JM, G8VG, BRS25429, BRS27806, BRS28198, BRS30386, A4253, A5135, A5390, A5637, A5662, A5812 and A6124. Call-signs in italics signify cw, others ssb unless otherwise stated.

1·8 MHz 01.00 *W1BB, VO1FB* **02.15** *TA2E* **05.30-07.30** *KV4FZ* **23.00** ZB2AY.

3·5 MHz 00.00 EL8J, OD5CG, OX3WX, PJ7JC, VP2MK, ZD8Z, *9G1HM*. **01.00** *OY2H, TA2E* **04.00** *PJ2VD*, 6Y5CC, 8P6AH, *8R1J*. **05.00** HP1JC, KP4CL, OD5BA, *PY5QE*, TG9EP, VP9BO, XE1KB, *9Y4PHO*. **06.00** CO2DC, HI8RAZ, YV1LF/2, *ZB2BO*, ZF1CG, 5N2's AAX, ABG. **07.00** HK3AIS, *TF5TP*, ZL2BCG. **08.00** ZL's 3RB, *4BO*. **19.00** CT2AS, *UA9WJ*. **20.00** *VK2EO, VK5KO*. **21.00** HB0LL, HV3SJ, TA3CC, VS6DO, *5Z4KL*. **22.00** AP's 2MR, 5HQ. *CR6AI*, EA6BG. UF6CR, 4X4VB, *5H3KJ, 9H1BL*, 9M2KD. **23.00** PJ7JC, *PY7LAK, TA2SC, UL7KBK, 9J2MX*, ZC4TK.

7 MHz 00.00 OD5CG, *ZD5X, 6W8BL, 6Y5SR, 9V1LK*. **01.00** ET3USA. **03.00** *VP2DAP, 8R1J*. **06.00** CM2DC, CR4BB, HK3AIS, TY6ATE. **07.00** HR1KAS, *KZ5NC*, OX3KM, XE1WS, ZD8Z, 5U7AK, 6W8DY, 9Y4TA. **08.00** YN2RAC, *ZL's, ZL2AFZ/C*. **18.00** *AP5HQ, JX2BH*, UL7FA, UM8FM, ZS3AW, ZS5XA, *4S7DA*. **19.00** MP4BEU, MP4TCE, VS6DR, 5Z4IS. **20.00** JA2BTV, *ZS5QU, 5Z4KO, 9Q5AB*. **21.00** KR6BL, VK2AVA, *VP2MK, 5A1TA, 5H3KJ*, 9J2VX, 9Y4KR. **22.00** CO's 2DR, 6PP. CR6's AI, GA, *PJ2VD, TA2SC*, 6W8DY, 9K2CF. **23.00** VP2KF, *6Y5RA*.

14 MHz 00.00 KC4USQ. **04.00** KH6GLY. **05.00** ZL1DS/C. **06.00** ZL2AFZ/C. **07.00** *TA2WM*, TL8GL, VK's, ZL's. **09.00** FO8CG, JX3P, VR5AE, ZL1DS/C. **11.00** JX3DH. **12.00** VR4EL (a.m.). **14.00** VK9RA (Christmas Is), VK0KJ. **16.00** *FB8WW, FB8YY, VE7QH* (ex-G3GX), *9V1LK*. **17.00** *KH6COB*, VK0IA, VR1P. **18.00** *A2CAU*, FR7ZG, FW8DY, KL7EG, VP2MK, VQ8BZ. **20.00** CR4BK, *FL8MB*, ZL1TU/C. **21.00** HK0BMO, *HP1IE, OA6W, PZ1AV, 8P6BU*. **22.00** CR5SP, FY7YR, *PY0EP* (Trinidade Is). **23.00** *CE3RY*, KV4FZ, VP2GLE.

21 MHz 09.00 *HM1DE*, JA's, *ZS3AW*. **10.00** MP4TCE, 5T5AD. **11.00** *FY7YN*, ZL1DS/C. **12.00** *FG7XX*, HP1AD, *UJ8AJ*. **16.00** *FB8WW*. **17.00** HK0AI, *VP2MK, 3V8VA, 5H3LV*. **18.00** HK0AI, VQ9GA, 8R1G. **19.00** YS3FH, VP2GBL. **20.00** *CE1AA*, HI7JMP.

28 MHz 08.00 EP2JP. **09.00** *FL8MB*, KG6AQY, *TJ1AJ, YA1ZC*. **10.00** AP2MR, HS3DR, *TA3EFA, UA0BX, UM8BB, VK8HA*, XW8BP, 9M2DQ, 9V1PB (G3NAC), 9N1MM. **11.00** CR4BB, *JW5BE*, VP2LX, VQ8's CC, CS, *VS6FX*, VU2JM, YA1HD, YV7AV, ZD8JC, ZD9BE, 9L1JP (a.m.). **12.00** EP2JP, *PJ2VD, 4S7DA*, 8P6CT. **13.00** VP2MK, VP8KL, *5H3LV, G3VJI/8R1*. **14.00** HK0BMO, *OD5LX, 6Y5SR*. **15.00** CT2AS, *TA2EK, VQ8CC*. **16.00** *CT3AS, CX4CO*, CE3RC, HC1WZ, *YN1AA, YS1O*. **17.00** W6's and 7's. **18.00** CE2TK, *HH9DL*.

Many thanks to all correspondents, and particularly to the following for permission to use material from their publications: **Long Skip** (*VE3HJ*), **QUAX** (*SM4DXL*), the **DX'er** (*K6CQF*), **DX News Sheet** (*Geoff Watts*), the **Ex-G Radio Club Bulletin** (*W3HQO*), the **DX'ers Magazine** (*W4BPD*), the **Florida DX Report** (*W4BRS*), **CQ DX** (*ARI*), and **NARS Newsletter** (*5N2AAF*).

Please send all correspondence **to reach G3FKM** no later than **11 March** for **April** issue, **15 April** for **May** issue, and **12 May** for the **June** issue.

R8GB QSL Bureau Sub-Managers

G2:	J. W. Russell, G2ZR, 45 Shakespeare Avenue, Bath.
G3, 4 and 5 two-letter calls and GC:	E. G. Allen, G3DRN, 65a Melbury Gardens, London, SW20.
G6 and G8:	A. J. Mathews, G6QM, 62 Ashlands Road, Hesters Way Estate, Cheltenham.
G3AAA-DZZ:	C. A. Bradbury, BRS1066, 13 Salisbury Avenue, Cheltenham.
G3EAA-HZZ:	W. J. Green, G3FBA, "Meadway," Links Avenue, Brundall, Norfolk, NOR 86Z.
G3IAA-KZZ, BRS: and A numbers:	G. L. V. Butler, G2BUL, 9 The Heath, Chaldon, Caterham, Surrey.
G3LAA-NZZ:	F. Bliss, G3IFB, Coppalex, North Road The Reddings, Cheltenham, Glos.
G3OAA-PZZ:	J. H. Brazzill, G3WP, 43 Forest Drive, Chelmsford, Essex.
G3RAA-RZZ:	K. Walden, G3OLN, 250 Gloucester Road, Cheltenham, Gloucestershire.
G3SAA-TZZ:	E. G. Allen, G3DRN, 65a Melbury Gardens, London, SW20.
G3UAA-VZZ:	P. R. Cox, G3RYV, 20 Allenby Road, Maidenhead, Berks.
G3WAA-G3XZZ:	R. W. Martin G3RWM, 76 St Paul's Crescent, Coleshill, Warks.
G3YAA series:	P. R. Cheesman, G3KDE, 10 Nursery Road, Hook End, Brentwood, Essex.
G5AAA series, all prefixes:	E. G. Allen, G3DRN, 65a Melbury Gardens London, SW20.
GD:	T. R. Moore, GD3ENK, "Glyn Moar," St John's, Isle of Man.
GI:	R. R. Parsons, GI3HXV, 45 Erinvale Avenue, Finaghy, Belfast.
GM:	D. Macadie, GM6MD, 154 Kingsacre Road, Glasgow, S4.
GW:	J. L. Reid, GW3ANU, 28 Waterston Road, Gabalfa, Cardiff.

The address of the QSL Bureau Manager (Mr A. O. Milne, G2MI) is 29 Kechill Gardens, Bromley, Kent.

Cards must be sent to G2MI but envelopes may be sent to the appropriate Sub-Manager or to G2MI. Printed, gummed labels are obtainable from G2MI by sending an sae.

REGULAR FEATURE

FOUR METRES AND DOWN

By JACK HUM, G5UM*

Convention '69

LAST year's VHF Committee established the framework for the 1969 VHF/UHF Convention: this year's began to fill it in when they held their first meeting in mid-January.

The date first: Saturday, 26 April. The place once again will be the " Winning Post " Hotel on the Chertsey Road at Whitton near Twickenham in Middlesex.

While past years' format of afternoon lecture session and evening banquet will be preserved, a major change is to be made at this " Fifteenth Annual " by running lectures concurrently in separate rooms instead of consecutively in the main hall.

This plan, tried with great success at earlier Midland VHF Conventions at Wolverhampton, had been put forward by several members as something well worth adopting at the London event. This will now be done. Two additional rooms have been booked at the " Winning Post " for the purpose, and here will be given a range of lectures designed to appeal to the advanced vhf worker at one end of the scale, and, at the other, to the man in search of advice on how to get started on the vhf bands.

No fewer than eight lectures are now being considered by the VHF Committee, and it is expected that these will be reduced to five or six for The Day. Although one or two may still take place in part of the main hall, the intention is that this area shall remain open for most of the afternoon for informal conversation (" ragchewing " if you like—though this word does little justice to what usually turns out to be a highly informative technical discussion session).

From this redeployment of the afternoon lecture programme will flow a further advantage: that more time will be available for individual lectures and subsequent question-and-answer periods, not always possible in the past when a tight timetable had to be observed.

Hiring the extra lecture rooms plus a small increase in the cost of the dinner has put the Convention ticket price up marginally. A Whole Day ticket will cost 32s 6d, a Convention-only ticket 5s, and a Dinner-only ticket 27s 6d—this last for the increasing number of ladyfolk who each year like to come to the evening session.

Tickets will be available by the end of this month from Convention Secretary, Frank Green, G3GMY, 48 Borough Way, Potters Bar, Herts—and early applicants will guarantee themselves a seat.

Full details about the Fifteenth Annual International VHF/UHF Convention will be printed here next time—but there are two reminders which need to be given *now:* these are, first, to put the finishing touches to your exhibit for the Constructors' Exhibition (*somebody* has got to win that " 1962 VHF Committee Trophy "), and secondly to sort out unwanted equipment for the Bring and Buy sale. This when instituted last year was an enormous success, and will undoubtedly be so again.

" Tone A " Again—With Speech

Catching an auroral opening on the metre wavelengths means being in the right place at the right time, and knowing how to recognise the symptoms. For Dewi Davies, GW3FSP, of Pencoed in Glamorganshire, the right place was on the hf bands, where he happened to be engaged in an FOC Marathon as the 2 February aurora was beginning to develop. The peculiar conditions at hf suggested to him that something might be afoot at vhf, and a check on 144 MHz showed that it certainly was. From a CQA came his first SM on " Two "—SM7BUN, who gave 56A and was himself 57A.

Lack of activity seemed to be one reason why more contacts did not mature during this particular opening, and the only other stations worked were GW2HIY at Holyhead and G3UUT at York, both with pronounced " Tone A " notes, though G3LTF was heard at Pencoed, and G3BA seemed to be going great guns: he succeeded in bouncing single sideband off the auroral curtain to secure a contact with GM3EOJ of Aberdeen.

Maximum signal at GW3FSP was received when the beam was as much as 40 degrees east of north.

The Sunday manifestation encouraged several other cw operators on to the lf end of " Two " in the succeeding days, and a small number of northabout contacts were notched. The fleeting nature of the aurora was evident from the fact that GB3VHF was exhibiting its customary pdc note unmodulated by any " reflection burble " There have been auroral occasions when both its direct and " A " signals have coincided.

* * *

" Being in the right place at the right time—recognizing the symptoms:" this doesn't necessarily mean being on the air. It *could* mean reading the evening newspaper on the way home in the train and spotting a paragraph to the effect that there had been what the press love to call a " radio blackout," meaning that international telecommunications had suffered a Dellinger, or something like it. This is the news that sends the percipient vhf man to the operating desk over the next 48 hours to note if an aurora has resulted.

For Ron Ham, BRS15744, of Storrington in Sussex " the right place " is his own back garden where his 136 MHz radio telescope sits. A week before the above-mentioned auroral conditions he was startled to find after a seven day period with nothing on the output charts that solar activity on Sunday 26 January had developed into " a troubled, boiling inferno." After some hours the Sun had passed out of the beam width of the sky-orientated 136 MHz aerials, and monitoring of the solar noise was continued on the 2m and

* Houghton-on-the-Hill, Leicester LE7 9JJ. Send reports for the April issue by 11 March, and for the May issue by 15 April.

4m beams—which of course are not aimed at the Sun at all but nevertheless gathered in an immense amount of noise from it.

As always from BRS15744 observations there were practical end products: tape recordings of the solar noise related to familiar datum signals from GB3VHF, these recordings to go off to the RSGB Scientific Studies Committee; and early-warning telephone calls to G3JHM of the South Coast VHF Group to alert him and his fellow members to the possibility that anomalous propagation might develop.

* * *

On the 70 MHz band the aurora gave continuous DX reception from 7 pm to midnight on 3 February, with GM3LTW and GM3UAG working many stations in the south, beams all orientated north. The GI triumvirate of 3RXV, 3TLT and 3HCG put in a welcome appearance, and G5NU at Reading worked them all. But as he says: "After an hour or two everyone had worked everyone else, and by about 11 pm it was the same sad old 4m auroral tale—a lovely signal from GB3GM in an otherwise dead band."

This prompts reiteration of the thought that if more long haul cw schedules could be set up on the 4m band such that every night there was someone on, say, in Southern England and in GI/GM, a surprising number of anomalous propagation incidents would be caught. It is unreasonable to expect a handful of operators to bear the brunt of guaranteeing to be on every night: yet if enough declared their interest it should be possible to work out a rota that would put pairs of DX-separated operators on to the band most evenings. Other locals could be alerted by landline if the band opened up.

Which brings us on to—

M-S on " Four "

Because there are plenty of DX minded 2m operators in most of the countries of Europe it is possible to set up many more meteor scatter circuits there than on 4m, which is denied to almost every country except the UK, ZB2 and TF. This has in no way disheartened the 4m men in this country, and some magnificent work has been done, especially by members of the South Coast VHF Group.

In paying tribute to their efforts Bill Lord, G5NU, feels that M-S schedules would be of great interest to many more of the 4m fraternity, and offers the reminder that several of the meteor showers due to occur this Summer could be the means of providing some super-DX along the north-south path. He consistently monitors the band at potential M-S times, and although there have been several near misses—as is characteristic of M-S working—he was particularly pleased to be able to complete a contact with GI3HCG by this mode. He goes on to say:

" There is a minimum distance effect on M-S, so what is really needed now is some genuine enthusiasm on the part of operators 400 to 600 miles away from the south of England, *i.e.*, in GM. The only equipment needed is a good 4m transmitter and receiver, the ability to read 5-second bursts of morse at 15 wpm, plus a fair measure of patience. Any GM or northern England station with these attributes would get a ready response from down here."

G5NU invites all interested to write to him at Linden Mews, The Mount, Christchurch Road, Reading, Berks, or to drop a line to G3JVL, one of the leading South Coast long haul propagation investigators, with whom G5NU co-operates: he is M. H. Walters, 26 Fernhurst Close, Hayling Island, Hampshire.

Into the Microwaves

Has anyone penetrated beyond the now almost popular 23cm band down through the up-and-coming 13cm band to the almost unknown 9cm band? It would be interesting to know: for the Nottingham University Radio Society while making no undue claims in this respect believe that the transmitter and receiver they have for the 3·4 to 3·475 GHz band may well be the only such equipment at present operational in the UK.

With this the Society has plans for initiating a study of the propagation characteristics of the 9cm band. Recognizing that this wavelength is very close to the mean separation of the larger atmospheric particles such as raindrops, snowflakes, sleet and hail, members intend to look at the attenuation of a radio beam at these frequencies under varying weather conditions. To this end they propose to set up a semi-permanent radio link over a path of several miles across Nottingham for a fairly lengthy period, and simply monitor signal conditions as a function of weather.

Other properties of 9cm will be studied, such as:

(1) Investigation of diffraction effects on radiation passing over the brow of a hill;
(2) Investigation of Lloyd's mirror interference in a communications link passing over water;
(3) Measurement of reflecting properties of buildings, trees, and even of clouds;
(4) Experiments with long-distance line-of-sight communications.

To some extent, the four shorter projects will assist in the setting up of the long-term experiment, and will consequently be carried out first.

Eight members have already been named for this work. Others interested could usefully get in touch with one of their number in the Electrical Engineering Department at Nottingham University, Mr D. H. Forgan.

The BNL/EEZ Tests Continue

The methodical tests which have been going on between G3EEZ/P and G3BNL/P to open up the 13cm band have continued, mainly with a view to improving equipment,

BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3ANG	Craigowl Hill, Dundee*	145·950 MHz	A1	S
GB3CTC	Redruth, Cornwall	144·13 MHz	A1	NE
GB3GW	Swansea	144·250 MHz	A1	ENE
GB3GM	Thurso	144·995 MHz	A1	N/S
GB3GM	Thurso*	70·305 MHz	A1	N/S
GB3GM	Thurso*	29·005 MHz	A1	Omni
GB3GEC	W. London	434·000 MHz	F1	N/W
GB3SX	Crowborough,Sussex*	28·185 MHz	A1	E/Omni
GB3VHF	Wrotham, Kent	144·500 MHz	F1	North-West

* Not operational

GB3VHF

The Society's vhf beacon transmitter frequency at Wrotham, Kent, measured by the BBC Frequency Checking Station (nominal frequency 144·50 MHz):

Date	Time	Error
15 January	1105	170 Hz high
23 January	1025	150 Hz high
28 January	1515	1120 Hz high
5 February	1415	1240 Hz high
11 February	1523	1310 Hz high

and undeterred by operating " Stroke P " at the height of the UK Winter.

When as has been previously reported attempts were made to establish contact over a 68 mile path from Cannock Chase to the Cotswolds, success was registered at an S9 signal level. However, subsequent tests over this path were less successful, and in consequence G3EEZ/P moved a little farther south to a site 4 miles north of Kidderminster, or 50 miles from G3BNL/P. Over this path " the strongest-signals-ever " were reported both ways, and the opportunity was taken to make a number of modifications to two receivers which had been taken along for evaluation.

Tests were also made during the course of this QSO to determine the reliability of reflected-signal communication. Both stations turned their dish aerials on to the Malvern Hills, which could be seen by both of them, and both received signals via the reflected path as strongly as those on the direct path. At the Cotswold end G3BNL/P received a strong signal from G3EEZ/P while beaming *east*, almost 90 degrees off the line of shoot, and believed bounced off a neighbouring Cotswold height.

This kind of intelligent use of terrain to optimize signal levels gives a clue to the possible development of the 13cm band in the future. The reflective properties of the ultra highs are well known, and indeed many 70cm operators in what look like impossible locations achieve a fair measure of success by making the best possible use of local obstructions to bounce signals to more distant points. By plotting field strengths realized from different stations over a period of time a chart may be prepared for keeping at the operating position to indicate where to beam for whom. Especially on 23cm and 13cm this might well have the effect of suggesting that Sheffield was east of Derby, say, instead of north of it. And this is important if you want to put a signal there.

* * *

It would be valuable to have information from other operators or groups who are tackling the problem of opening up the 13cm band. What equipment is used, and what path distances are consistently covered? Certainly a great deal has already been reported here, but Bill Scarr, G2WS, has a notion that there is a deal more that hasn't, and should be.

" Is there not a great need for more publicity about 23 and possible " up " conditions at vhf. Another skyward-directed array is under construction for 432 MHz.

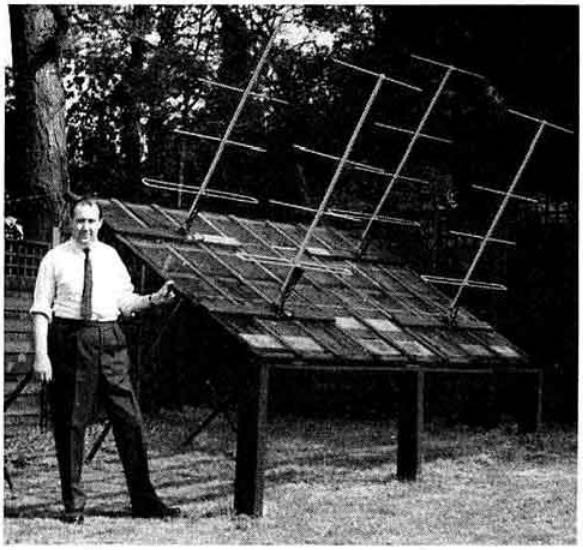
BRS15744 would like to see increasing co-operation between the amateur radio transmitting men and amateur radio astronomers. " Amateur built telescopes can do useful work and alert vhf operators at the right time " he says.

Ron Ham who is in his late thirties is a partner in a radio and electrical business in Storrington.

It was in recognition of the work done at Storrington over a considerable period of time that the Society's VHF Committee decided to award to BRS15744 " The G5RV Amateur Space Communication Trophy," and it was with a great deal of surprise and pleasure that Ron Ham opened a letter from Headquarters a few weeks ago informing him " that by recommendation of the VHF Committee, Council has awarded you the G5RV trophy for your contribution to the technique of Amateur Space Communication by your consistent and meticulous recording of your observations."

VHF Personalities: No. 7

Ron Ham, BRS15744



Across the top of the printed notepaper used by Ron Ham of Storrington in Sussex runs the line: " VHF-UHF Receiving Station on the north face of the South Downs 200 ft ASL." Below in big letters " BRS15744 " and below that again another line in smaller type: " Member British Astronomical Association and Society for Amateur Radio Astronomers."

These two dozen words are the briefest of summaries of the diverse activities of the best known vhf " receiving member " in this country.

" Strange why he doesn't get himself a transmitting licence " has been said of Ron Ham often enough. It can be reasonably assumed that if he *had* done he would have had less time to devote to the vhf and uhf propagation studies which have both won him national repute and unearthed much important scientific data.

It is the scientific side of radio reception that appeals to BRS15744 more than anything else: activities such as collecting proficiency awards he takes more or less in his stride, and when reminded that the three " Four Metres and Down " certificates he holds for 4m, 2m and 70cm reception are all annotated " No 1 " he comments that perhaps there wasn't much competition in the years when he earned them. There is much more competition now of course: it was Ron Ham's example that prompted many more of the Society's BRS and " A " members to take up vhf/uhf and have a tilt at the " VHF Listeners' Championships."

Ron's scientifically based reception techniques are familiar to all vhf/uhf operators who have had a report from him, not always by QSL card, sometimes indeed by tape recording, which is a facility on permanent tap in the shack upstairs in Ron's sylvan situated cottage at Storrington (appropriately named " Faraday " on the gate). The scientific approach expresses itself also in his interest in radio astronomy. Daily observations are made on the Sun with the big home-constructed multi-element array on 136 MHz shown in our illustration, the output taken to a continuous paper trace affording valuable advance information on solar activity and

13cm work? " he asks: " Workers on these bands seem very reluctant to submit details . . . but if they did it should be possible to prepare composite articles for *Radio Communications* covering the salient features of the various pieces of equipment used, and so obtaining a valuable pool of ideas for the benefit of all."

To which we only need add that space will of course be provided on this page for any such contributions.

Coventry Expatriates

The City of Coventry has always been noted for a high level of metre-wave enthusiasm. So when a couple of its members decided to seek their fortunes overseas it was quite in the nature of things that they should carry some of this enthusiasm with them.

In the case of Tom Fishpool, once G3KEF now VK4KE, this has just had a very satisfying result: he has been instrumental in hoisting the Australian 23cm record to 112 miles (subject to ratification by the WIA). Here's how it happened:

On 29 December, 1968, VK4KE/P operating at Mt Mowbullan in the Bunya Mountains succeeded in working VK4ZT, Neil Sandford, who was operating on the roof of his house at Toowoomba, 53 miles away. This itself was believed to be a VK record for " 23". Signal strengths: RS59 both ways.

On 5 January VK4KE/P operating from the same site succeeded in working VK4ZT/P on Mt Magnus, 112 miles to the south, upping the record still further. Signals strengths RST559 on cw, RS44 on am and nbfm.

Being neighbours in Toowoomba the two had co-operated closely in the construction of K6AXN type converters using a solid state local oscillator and MPF102 head amplifiers (FET). Each converter returned a noise figure of 10dB from a gas tube noise generator.

Both transmitters had a 2m drive source feeding a varactor tripler to 432 MHz and a further varactor to 1296 MHz. And friends back in G-land who remember the fine signal G3KEF customarily put out " Stroke M " on his way to rallies and such like will be interested to know that the good old mobile rig with its 12 watts to a Three-ten is now incorporated in the 23 cm transmitter in Queensland.

Aerials in use were a 5 ft parabola at VK4ZT and a corner reflector at VK4KE, the latter's limitations prompting the building of a 6 ft dish with even greater mileages on 1296 MHz in mind.

* * *

Well known in Coventry as G3NBQ, Peter Burt found himself in Mauritius a year or two back, blessed with an ideal vhf site and nobody on the island to work, although as VQ8CG he was much in demand on the hf bands.

Just to keep his hand in he completed a 100 watt transmitter for 2m and a transistor converter; then, as if to justify his faith, he learned that a number of cheap kits had been imported into the island and that there was indeed a 2m short wave listener only 150 yards from his QTH!

Perhaps the first VQ8-to-VQ8 contact on " Two " won't be long in coming!

Tapping Talent for the SSC

Much of the work of the Society's Scientific Studies Group is devoted to propagation investigation on the very highs and ultra highs. Helped by a nation wide chain of observers to detect and record such things as auroral or transequatorial manifestations—to name only two—this work has yielded important results over the last few years.

It would yield more if there were more observers. Members who would like to help with systematic long term observations should write to the SSC care of Headquarters—and inclusion of a stamped addressed envelope will bring a copy of the Committee's bulletin. Members interested might also like to see a copy of an auroral log sheet for observers which has been prepared by G2FKZ.

Expeditionaries

Three well prepared and ambitious 2m expeditions to Wales and Scotland which are to be mounted during the Summer should give many operators who are short of rare counties for their " Four Metres and Down " certificate the chance to net them. There are large numbers of Class B operators in particular who get stuck at about 24 or so counties and who could do with the remainder in order to be able to put in their certificate claims to G3GMY—in fact, they could do with *rather more* than the remainder, *i.e.*, 36 or so, to allow for the fact that several of the counties they work will not produce QSL's. So if you QSL 36 of them you might with luck get back the 30 required for the 2m award. And as has been said before, an sae is a common courtesy.

Now for the expeditions. One to Wales is being organized by Verulam Radio Club whose callsign GW3VER/P will be employed. It is planned to have 200 watts pep on 145·42 MHz, and telegraphy at the low end as and when required. Arrangements are being left completely flexible in the sense that GW3VER/P will appear in those counties where 2m operators would like to hear it from! A note to Dick Wells, G8BNR, 279 Hatfield Road, St Albans, Herts, should tell him which counties you want and whether a schedule is required and when. Let him have an sae to send back the info to you well ahead of time (which is August).

* * *

Rather earlier than this Tom Douglas, G3BA, and Brian Meaden, G3BHT, will be on their way to Scotland during the Spring holiday at the end of May, staying for the eight days thereafter. They too will have plenty of rf going out from a 10 element Skybeam excited by rigs that will be alternator driven and conveyed in the now well known Volkswagen of G3BHT's.

Sideband, A3 and cw will be used, and the first day will be spent exercising the systems in the county of Westmorland before making for the Border. Says G3BA:

" The counties visited will not be revealed prior to the tour (*i.e.*, the same as we did on the EI/GI trip). This keeps the interest going and leaves us a free hand to decide on the spot what is best to do."

Requests for schedules should be sent with an sae to G3BHT, 14 Aulton Road, Sutton Coldfield, or to G3BA at 141 Russell Bank Road, Four Oaks, Sutton Coldfield.

* * *

In the light of comments (sometimes caustic) about portable operations from mountain tops " with enough power to run a factory," the plans which six Class B licensees have laid for an expedition to Mount Snowdon have a decided touch of novelty about them. Those plans are:

(1) To participate in the 5–6 July 2m contest with equipment using less than 1 watt input to the pa;

(2) To observe how such equipment will perform from such an elevated site;

(3) To enter the contest with a truly portable station: all equipment to be carried to the site in one journey.

The callsign will be GW8AZU/P. But another completely self contained station, GW8APZ/P, will be operating from the same site on 6 July between 9–11 am and 2–3 pm, again with QRP. Schedules on 70cm will be welcomed; state preferred times within the above limits, and send an sae to S. R. Lucas, G8APZ, 64 Beresford Gardens, Hounslow, Middlesex.

March of Time

If there are any who feel a desire to take up vhf because it is new, modern, fashionable or " being with it " (whatever " it " may be), then we hope they will think again. Certain aspects of vhf are older than amateur radio itself. Eighty years ago the classic experiments of Hertz were performed with a radiator a few metres long; the Yagi aerial and the magnetron were known and publicized in the Twenties, though much developed since. And in the early Thirties there was flourishing amateur activity on metre wavelengths in many countries of the world.

The above thoughts were triggered off (ha! another vhf term 30 years old, deriving from early radar transponder techniques) by the receipt of a letter from George Bloomfield, G2NR, which he was prompted to write upon seeing the evocative little comment last month by G5BB about the late G6JI. It will be recalled that G6JI with another pioneer, the late G5VY, did much to open up the metre wavebands in the Thirties.

Says G2NR: " The first entry in my log reads ' Jan 22, 1933: Worked G5VY 56 Mc/s band 1100–1200 R5 but buzzer modulation poor.' " Earlier than this BRS430 (George Bloomfield!) had often logged G5VY on a super-regen receiver. " Super regens, modulated cw with the aid of a buzzer, and self excited push pull transmitters hoisted up a mast to overcome feeder problems were common tactics in those days."

To which it is worth adding that co-axial feeder as we know it today was non-existent then. Bell flex and cab tyre cable were the best that could be managed; their losses when they were damp from rain made mast top installations of the type described by G2NR rather to be preferred.

Other notable events of the early Thirties remembered by G2NR include the Crystal Palace tests of 21 May 1933, when G6QB, using the unheard input of 18 watts (never forget that many of the transmitting valves of the day were 2 volt receiving types with their bases removed to reduce the losses) was in touch with G5VY of North London; this was real DX on " Five." Later came the airborne tests organized by G5CV from a light aircraft flying over London. George Bloomfield was very proud to receive a report of "Strength Nine " from him.

Although most of the activity was in the 5m band, there were attempts to put the crude equipment of the time to work as high as 112 MHz, and G5VY had a link with G6JI on this band across six miles of suburban north east London.

In this reminiscent key let G2NR strike the final chord: " Perhaps all this sounds trivial in 1969 against a background of satellites, moonbounce and Apollo. But it all started somewhere."

German Sideband Contest

The third vhf/uhf single sideband contest to be organized by the Cologne-Aachen District of the DARC is scheduled to take place next month. It will be divided into two sections, the first lasting from 19.00 GMT on Saturday 19 April until 0100 GMT on Sunday 20 April, and the second from 1500 GMT on Sunday 20 April until 1100 on 20 April—which sounds like a very civilized arrangement, giving a four hour break for rest and refreshment.

All licensed operators in Europe are invited to participate, say DARC, adding that power levels used must conform to national regulations. And only sideband-to-sideband contacts will count for points. Here are the scoring details:

2m to 2m, one point per kilometre.
70cm to 70cm, 3 points per kilometre.
23cm to 23cm, 5 points per kilometre.
13 cm to 13cm, 11 points per kilometre.

Arrangements have been made to take in crossband working, and here the rules say: " When working crossband you must score the arithmetical mean of the points you would get for each of the two bands being used (*e.g.*, a 2m to 23cm QSO would be scored 1 plus 5 divided by 2, which equals 3 points per kilometre distance). The same station may be worked only once on each band." And any contacts via ARTOB balloons or other exotic media will score as if they were normal contacts.

Contest Exchange: During each QSO a ten figure group must be exchanged, giving report, serial number and QRA Locator, as follows: " 59001ZM35B."

Logs: These should clearly state band in use and should give operator's full name and address. They should reach Jakob Becker, DL6OZ, 5000 Koln-Roggendorf, Walter Dodde Weg 5, by 4 May.

Awards: Certificates will be sent to the overall highest scorer and to the top man in each country and each DARC district.

Quartz Corner

It's " Quartz Corner " this month instead of " Xtal Xchange," as there's rather more to it than that.

Noting last month's comment that impecunity may prevent the purchase of in-zone crystals in some cases, Bill Scarr, G2WS, writes:

" I have quite a collection of reliable crystals in the 8 MHz range which multiply to the 144·1 to 144·25 segment, and if anyone in the south west zone is really in difficulty I'll part with them for 10s each, or exchange them for crystals which multiply into the cw section. And if any of the ' younger newcomers to the band ' are still in difficulty I shall be happy to send or lend them a suitable crystal with my compliments. I shall be amply rewarded as I contentedly comb the cw section for weak cw signals!" All we need add is the G2WS QTH, which is 2 Fairway Close, Worlebury, Weston-super-Mare, Somerset.

* * *

G8BUR, 33 Brookbridge Lane, Datchworth, Knebworth,

Three Cumulatives to Go

Keep 8 pm to 10 pm this coming Saturday free for the fourth leg of this Winter's 70cm Cumulative Contest. After that the last two will take place on 22 March and 5 April. Help fill up the band on each occasion! Rules in January *RC*, pages 54 and 56.

Remember also that Monday Nights are 70cm activity nights. If the band seems dead put out a CQ. Someone may be waiting for it.

Herts, offers 7440 kHz and 7106·667 kHz FT243 in exchange for any crystal to multiply into 144·7 to 145·1 MHz.

G3LTT, 267 New Parks Boulevard, Leicester, wants a crystal at 12·886 kHz. Can anyone help?

Seven more Parchments

At its January meeting the Society's VHF Committee cleared another seven applications for the "Four Metres and Down" Operating Certificate. Here are the details:

70 MHz Transmitting, G3NNO (Certificate No. 62)
144 MHz Transmitting, G8APZ, no. 117
G3TR, no. 118
G3WZT, no. 119
G2WS/P, no. 120
432 MHz Transmitting, G8AKQ/P, no. 48
G8ABB, no. 49.

Page 48 of the January number of *Radio Communication* carried the details of how to apply for a "Four Metres and Down" certificate, and listed the QSL qualifications needed.

Tech Corner

From G3COJ (Brian Bower of High Wycombe):

Some measurements were made recently to find the amount of 2m signal reaching my television set. A field strength measurement receiver was connected in place of the TV, and fed from the television aerial, which is at one end of the house thirty feet away from the 2m 8-over-8 at the other end. The 2m signal with the 8-over-8 facing the TV aerial was 100 millivolts! The TV set is trying to get a picture from 500 microvolts.

With the 2m beam sideways on the signal dropped to 75 millivolts, not much down on the direct signal—perhaps the radiation was from the vertical section of the skeleton slot into the vertical TV aerial.

Ferrite devices such as a 1:1 transformer and filter similar to that shown in the February *Radio Communication*, page 109, made matters slightly worse, though the effect of all filters varied somewhat as they were moved about. The measuring receiver was a screened, co-ax fed device, so rf on the outer downlead should not have affected it.

I conclude: a stub is the most effective single remedy (more stubs had negligibly more effect); an attenuator also helps providing it does not lose too much of the TV signal as well. The experiments may be tabulated as follows:

Signal source	Voltage at TV co-ax downlead	Effect on TV
Ch 1 TV	500 μV	
Ch 9 TV	400 μV	
144 MHz (No filters at RX)	100,000 μV	Sever TVI
144 MHz (single shorted half wave stub)	5,000 μV	Slight TVI on Ch 9 on mod pks
144 MHz (4 stubs)	2,000 to 4,000 μV depending on posn of stubs	Slight TVI on Ch 9 on mod pks
144 MHz (4 stubs and ferrite 1:1 transformer and toroidal filter)	6000 μV	TVI Ch 9

With a single stub the TVI could be eliminated by a 12dB attenuator in the TV aerial lead at the expense of a slightly noisy picture.

From G8AXC (Laurie O'Loughlin of Scarborough):

In his note in "Tech Corner" in February G8AWO offers praise for the "unknown" designer of the twin trough 70cm preamp he is using. I believe the device is due to B. H. Green, G8AAA. It has been in use at G8AXC with encouraging results, substituting an AF239 for the BF180 originally specified. Another bipolar which it is hoped to try in this position shortly is the Siemens AFY42, which may further improve the gain.

I can endorse the G8AWO comments about the efficacy of the Gazeley 70cm converter, having used one for some time, again substituting an AF239 for the GMO290.

From G3JGO (Barry Priestley, of Langley, Bucks).

The diagram herewith is an attempt to show why Rheinfelder advocates holding the gain between aerial and mixer in a typical vhf converter to no more than 10db by tapping the rf stage collector down the tuned circuit in order to decrease gain and increase the *Q*.

The figures given have been worked out in respect of an rf stage noise factor of 3dB at a noise factor of 6dB for the rest of the receiver, which seems reasonably representative of a 70 MHz converter. The figures show that beyond about 12db, increasing the gain only serves to make the mixer overload that much more easily.

The figures in the formula are all in power ratios, not decibels, which is one reason for choosing simple things like 3db and 6db!

The very idea of suggesting that some people use too much rf stage gain may sound like heresy in some quarters, but is something to which further thought could usefully be given.

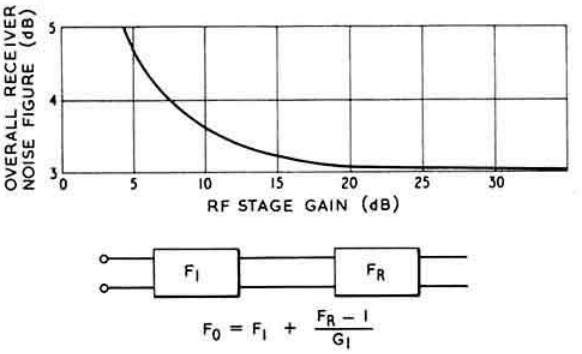


Fig. 1 The curve supplied by G3JGO showing overall receiver noise factor versus rf stage gain.

G1	Fo	
5dB	4·70dB	Fl = 3dB
10dB	3·62dB	Fr = 6dB
15dB	3·21dB	
20dB	3·075dB	
25dB	3·03dB	

Here and There

Readers of this page who have items of news to contribute to GB2RS (examples are expeditions, special event stations, local VHF Group dates) should write them in the form in which they would like to hear them broadcast, and send them to HQ to arrive not later than first post on the Thursday before. This for safety means: Get them in the local letter box by the previous Monday.

* * *

"Expect me on any time as F0MF from the Paris area. I get over there in the course of business and will be on 2m. The French issued me the license without any bother"—G8ANQ.

SOCIETY AFFAIRS AND NEWS SUPPLEMENT

A brief report of the RSGB Council Meeting held on 10 January, 1969.

Present: The President J. W. Swinnerton (in the chair); Messrs B. Armstrong, N. Caws, J. C. Graham, R. J. Hughes, A. F. Hunter, E. G. Ingram, G. R. Jessop, H. E. McNally, L. E. Newnham, J. Petty, R. F. Stevens, G. M. Stone, D. M. Thomas, E. W. Yeomanson, F. C. Ward, (Members of Council). C. P. Pope (Secretary), A. E. Dowdeswell (General Manager), and J. Adey (Editorial Staff).

An apology for absence was received from Mr G. Twist. The President welcomed the new Council Members: Messrs Jessop and Ward and presented them with their badges of office.

Executive Vice-President

Mr E. W. Yeomanson was elected to fill the office of Executive Vice-President.

Council Vacancy

In accordance with Article 28, and following the election of Mr J. W. Swinnerton to the office of President, Mr J. Etherington was appointed for a period of one year to fill the casual vacancy on Council.

Membership

It was resolved:

(i) to elect 143 Corporate Members and 48 Associate members;

(ii) to grant Corporate Membership to 17 Associate members.

Council granted the waiver of the Subscriptions of eight members owing to blindness or other disability.

Applications for Affiliation

The following applications for affiliation were presented and approved by Council:

Windscale Amateur Radio and Electronic Society, Secretary R. B. Casson, G8CBN, Seascale, Cumberland. Amateur Radio Society of the Guild of Students, Secretary S. M. Atkinson, Gosta Green, Birmingham 4. Vange Amateur Radio Society, Secretary M. R. Lee, G3VYF, Basildon, Essex. Brighton Technical College Amateur Radio Club, Secretary R. A. Bravery, G3SKI, Richmond Terrace, Brighton. Nunsfield House Community Association Amateur Radio Group. Secretary N. Gregory, G3LCV, Alvaston, Derby. Radio Club—" Jeunesse et Loisirs " 26 Rue d'Estienne d'Orves, 92 Bois-Colombes, France.

Constitution of Committees

The Members of Committees for 1969 were appointed by Council and names will be published in *Radio Communication* (see page 199).

Representation

Council approved the nomination of Mr R. W. Fisher G3PWJ as Regional Representative for Region 3.

Council also approved the nomination of:

(i) Mr E. A. Perkins G3MA as Area Representative for Gloucester.

(ii) Mr C. Desborough G3NNG, as Area Representative for North Berkshire.

Publications

Council approved the reprinting of

(1) 10,000 copies of *Radio Communication Handbook*,

(2) 3000 copies of the *Standard RSGB Logbook* at a retail price of 7s. 6d.

Minutes of Committee Meetings

Council approved the Minutes of the following Committees: Finance and Staff (4/11/68 and 22/11/68); Education Committee (23/11/68); Technical Committee (25/11/68); VHF Contests Committee (26/11/68); VHF Committee (29/11/68); Exhibition Committee (29/11/68); HF Contests Committee (12/12/68); Finance and Staff Committee (20/12/68).

Any other Business

Mr Hughes stated that approximately 300 young people had attended the two Christmas Lectures held recently at the Science Museum.

Mr Ward enquired, from the Chairman of the Exhibition Committee, why the Exhibition had closed one hour earlier than advertised on the last day. Mr Yeomanson stated that the proprietors had given him about one hour's notice that the Hall was required for another Exhibition due to start on Monday morning.

Council thanked Mr R. J. C. Broadbent G3AAJ for the voluntary and arduous work he was carrying out at Headquarters.

Council was in session for 4½ hours.

A welcome visitor from Scandinavia, Berndt Thisell, SM5AWD, active from Stockholm, called in at Headquarters on 13 February. Berndt, who is Managing Director of a Swedish Telecommunications Company, is seen with Eric Dowdeswell, G4AR, RSGB General Manager.

Committees of Council 1969

The following members have been invited to serve on the Committees of the Council during 1969.

Contests HF: *Council Members:* J. C. Graham, G3TR, R. J. Hughes, G3GVV. *Non-Council Members:* M. Harrington, BRS20249, R. G. B. Vaughan, G3FRV, D. Thom, G3NKS, A. E. Dowdeswell, G4AR, R. S. Biggs, G2FLG, R. L. Glaisher, G6LX.

Contests VHF: *Council Members:* B. Armstrong, G3EDD, G. M. C. Stone, G3FZL, *Non-Council Members:* A. J. Gould, G3JKY, J. Butcher, G3LAS, R. Baker, G3USB, C. Sharp, G2HIF, G. Jeapes, G2XV.

Education: *Council Members:* L. E. Newham, G6NZ, R. J. Hughes, G3GVV. *Non-Council Members:* D. M. Pratt, G3KEP, R. Wallwork, G3JNK.

Exhibition: *Council Members:* L. E. Newnham, G6NZ, E. W. Yeomanson, G3IIR. *Non-Council Members:* G. W. Norris, G3ICI, P. A. Thorogood, G4KD, R. G. B. Vaughan, G3FRV, P. Balestrini, G3BPT, A. J. Gibbs, G3PHG, R. J. C. Broadbent, G3AAJ, W. R. Andrews, G3LRE, M. G. Wallace, G8AXA.

Finance and Staff: *All Council Members:* N. Caws, G3BVG L. E. Newnham, G6NZ, E. W. Yeomanson, G3IIR, R. F. Stevens, G2BVN, H. E. McNally, GI3SXG, B. Armstrong, G3EDD, J. C. Graham, G3TR.

GPO Liaison & TVI: *Council Members:* L. E. Newnham, G6NZ, E. W. Yeomanson, G3IIR, R. F. Stevens, G2BVN, J. Etherington, G5UG, D. M. Thomas, GW3RWX.

Membership & Representation: *Council Members:* G. Twist, G3LWH, N. Caws, G3BVG, J. Etherington, G5UG, J. R. Petty, G4JW, H. E. McNally, GI3SXG, F. Ward, G2CVV, A. H. Hunter, GM3LTW, D. M. Thomas, GW3RWX, R. J. Hughes, G3GVV.

Mobile Committee: *Council Members:* E. W. Yeomanson, G3IIR, J. R. Petty, G4JW, A. F. Hunter, GM3LTW. *Non-Council Members:* N. O. Miller, G3MVV, K. F. Eastty, G3LVP, J. M. Stuart, G3TUM, P. J. Simpson, G3GGK.

RAEN: *Council Members:* L. E. Newnham, G6NZ, E. W. Yeomanson, G3IIR, A. F. Hunter, GM3LTW. *Non-Council Members:* P. Balestrini, G3BPT, E. R. L. Bassett, BRS16075, R. Ferguson, G4VF, Dr A. C. Gee, G2UK, J. D. Kingston, G3VK, R. A. Ledgerton, G2ABC, S. W. Law, G3PAZ, S. J. Scarborough, G3MBQ.

Scientific Studies: *Council Members:* G. M. C. Stone, G3FZL, R. F. Stevens, G2BVN. *Non-Council Members:* C.E. Newton, G2FKZ, G. Mills, G3EDM, R. G. Flavell, GM3LTP, D. T. Hayter, G3JHM. *Corresponding Members:* A. Low, GM3GUI, A. J. Oliphant, GM3SFH, Prof. Martin Harrison, G3USF, R. J. C. Broadbent, G3AAJ, I. W. Sheffield, GM3VEI, A. Taylor, G3DME.

Technical: *Council Members:* G. M. C. Stone, G3FZL, R. F. Stevens, G3BVN, B. Armstrong, G3EDD, D. M. Thomas, GW3RWX, G. R. Jessop, G6JP. *Non-Council Members:* W. H. Allen, G2UJ, D. N. Corfield, G5CD, G. C. Fox, G3AEX, J. W. Mathews, G6LL, G. D. Roe, G3NGS, T. L. Herdman, G6HD.

VHF: *Council Members:* N. Caws, G3BVG, G. M. C. Stone, G3FZL, E. G. Ingram, GM6IZ, A. F. Hunter, GM3LTW. *Non-Council Members:* W. H. Allen, G2UJ, P. Balestrini, G3BPT, F. E. A. Green, G3GMY, F. A. Griffiths, G3MED, J. H. Hum, G5UM, A. L. Mynett, G3HBW, M. G. Wallace, G8AXA, D. T. Hayter, G3JHM.

IARU Working Group: *All Council Members:* N. Caws, G3BVG, E. G. Ingram, GM6IZ, L. E. Newnham, G6NZ, R. F. Stevens, G2BVN, G. M. C. Stone, G3FZL, E. W. Yeomanson, G3IIR, J. G. Graham, G3TR, R. J. Hughes, G3GVV.

Obituaries

O. Read, G2FP

It is with regret that we report that O. (Ossie) Read, G2FP of Exeter passed away in his shack last December. Ossie was first licensed in 1933 and was very active as an experimenter and transmitting amateur until the outbreak of World War II. He was called to the Colours and served with the RAF as a Flight Sergeant until 1945. Ossie applied for his licence as soon as they were released after the war and was quite active on all bands until the untimely passing of his wife. For some time he left Amateur Radio but eventually he returned to his hobby which gave him many years of pleasure right to the end.

Ossie was an active member of the RSGB for many years and was also a Member of Exeter Amateur Radio Society.

The cremation took place on 27 December at Exeter, among those attending were G3HMY (also representing Exeter Amateur Radio Society), G3NFT, G3HTA (also representing G3JW and G3TJW), G5QA (representing the old GX- call signs), G3SKL (representing G5IP and G3LYB) and T. Conway (representing Short Wave Listeners).

E.G.W.

Jack Wozencroft FPS, PhC, GW3GIN

On 21 January, at the age of 51, the death occurred at Cardiff Royal Infirmary of Jack Wozencroft, GW3GIN. He had followed his profession of pharmacist at this hospital for many years. Quiet, almost to the point of retiring, much of his life had been spent against a background of indifferent health, yet despite this his achievements and outlook would need a pen more gifted than that of the writer to adequately record. Active on all bands from top to two metres, his conduct on the air was a model and an inspiration, especially to younger members, who could always be sure of help and encouragement from him.

During later years, Jack had taken an increasing interest in the international aspect of amateur radio, and in pursuance of this made a number of visits to IARC meetings at Geneva. During these he operated mobile and thus made a number of new friends on the Continent. He was a familiar figure at most of the mobile rallies in this country.

Jack's loss will be felt deeply by members of the Cardiff RSGB Group, which he had supported consistently for over twenty years. They join the Region in offering sincere sympathy to his widow Beryl and son John.

C. H. P.

John Ferguson, G6FS

John Ferguson, G6FS, of Oxted, Surrey passed away on 25 December, 1968. He was well known on the DX bands and he kept many regular schedules with his home country, New Zealand.

Our condolences to his family.

K. B.

Presidential Installation 1969

This years event, one of the most popular in recent times was held on Friday, 10 January at a new venue, the Bonnington Hotel, Southampton Row, London, WC1. Well over 100 members and guests heard our Immediate Past President, John Graham, G3TR welcome John Swinnerton, G2YS and wish him luck in his forthcoming year of office. Members wishing to contact the President over the air are invited to look out for the call G2YS during a " Meet the President Week " to be held between 13-19 April, when John will be active on all bands 1·8 to 28 MHz cw and ssb.

Obituaries

Leslie Rimmington, G2DVD

It is with deepest sorrow that we have to record the passing of Leslie Rimmington, on 25 December, 1968. Les was a true "amateur" in all respects, always helpful to newcomers and a friend to all who knew him. His passing, after a short illness of some three months, was indeed a shock to all who knew him, especially those in the West Sussex and Surrey areas. Reverend John Penney, G3JEP was kind enough to officiate at the cremation service and among many friends present were G3HCU, G3KWU, G3LHZ and G3UDR. It was also fitting that G3JEP should take the memorial service, which was his suggestion, in his church at Wisborough Green on the evening of 8 January when many of Les' local friends, including G8OS, G3ABJ, G3HCU, G3KWU and G3PUX were present. G3KWU was in fact the organist.
Our condolences to G2DVD's family.

A. E. W.

Tom Stewart, W2PRG

We regret to have to inform his many English friends of the death of Tom Stewart, W2PRG of Merchantville, New Jersey on 27 December, 1968.
Tom was a wonderful friend and one of the real gentlemen of the amateur fraternity. His passing will be deeply regretted by the many amateurs who so enjoyed his friendly rag-chews, his disarming modesty and his dry sense of humour. He leaves a widow, Ginny and a son and daughter, both married, to whom the very deepest sympathy is extended.

C. N. P.

Stan Howson, BRS19251

We regret to have to record the death of Stan G. C. Howson, BRS19251, owing to a heart condition, on 9 December, 1968. Stan died at his new bungalow at Hellesdon, Norwich aged 60 years. Stan first started listening in 1946 and was initially very keen on reporting signals in the two metre band. Of late, he had been logging DX on all amateur bands and sending out many valuable reception reports during his period of illness.
In 1966 he commenced classes to enable him to take the RAE and GPO Morse tests but the onset of his illness terminated his studies. Stan was very active and had recently joined RAIBC. He was in fact listening two hours prior to his death.
Stan's passing will be mourned by many amateurs. Our deep sympathy to his wife Ada, his daughter Ann and son Andrew, the latter who will be continuing the BRS19251 tradition.

Book Review

THE AMATEUR RADIO DX HANDBOOK, by Don Miller, W9WNV. A Cowan Publishing Corporation Operating Guide. 199 Pages. Illustrations include 18 Major Awards, 56 Charts and Tables. 42s post paid, from RSGB Publications Department.

This is the first edition and should prove popular in Europe as well as the States. Despite the transitory nature of most DX publications, this one contains much information which is going to remain useful for years to come.

Amateur Bands in Canada, the United States and the UK are given together with a chapter on propagation. There is a comprehensive guide to 160 metre operation. International Regulations are adequately covered and third party traffic dealt with in some detail. Reciprocal licensing arrangements are tabled.

Advice on DX operation is both copious and excellent. There is a guide to cw operation which includes practice lessons in addition to abbreviations, the *Q*-code and procedure. Useful phonetics are given and 'phone operation should be possible in French, Portuguese, Spanish, and Russian with this book as a guide. Nor is RTTY forgotten, but has three pages to itself.

It is unlikely that so much information on QSL cards has been brought together before. Examples are well illustrated. A sizeable table of QSL managers for major DX stations is included. Yet another table gives QSL bureaux throughout the world. Advice, hints and tips on contest operating in one chapter should be useful no matter where you operate.

Many of the major awards are illustrated. This is only a tiny slice of those which are available, but information on how and where to apply is given. DX Clubs and Associations are listed. The book concludes with a massive table of great circle bearings which can be used throughout the world. A concise and well-planned index is provided.

At first glance, such a book seems much overpriced in view of its slimness. However, on detailed examination it will be seen to provide very good value in terms of information.

G3WKJ

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, M. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Clock Time	Call-sign	MHz	Town
Sundays			
09.30	†G3KZZ / G3TNF	1·920	South Shields, Co. Durham / Gateshead
09.30	G3HZL	1·940	Isleworth, Middlesex
09.45	G3USK	1·975	Mablethorpe, Lincs.
10.00	G2FXA	437·000 to North	Stockton-on-Tees
10.00	G3TTK	1·860	Coalville, Leics.
10.00	GM3PIP	3·590	Mintlaw, Aberdeen
10.15	G3CGD	1·875	Cheltenham
10.30	G3SJE	28·100	Harrow, Middlx.
10.30	G2FXA	437·000 to South	Stockton-on-Tees
10.30	G3NPB	1·875	St. Ives, Cornwall
11.00	G2FXA	1·900	Stockton-on-Tees
11.00	GW3UMB	1·880	Colwyn Bay
11.30	G3KKU	1·940	Liverpool
12.00	G3HVI	1·890	Stoke-on-Trent
12.00	G3GNS	1·910	Weston-super-Mare
12.30	G3FWW	1·880	Burnham-on-Sea, Soms.
14.00	G3XGJ	1·830	Huddersfield, Yorks.
17.30	G3TNF	1·920	Gateshead
Mondays			
17.30	G3TNF	1·920	Gateshead
18.00	G3SWR	1·980	Birmingham
18·30	G3NCZ	1·920	Blackburn, Lancs.
18.30	G3RXH	1·910	Skipton, Yorks.
19.00	G3WGU	1·880	Bispham, Lancs.
19.00	†GC4LI / GC2FMV	3·600	Jersey, C.I.
20.00	G3USK	1·975	Mablethorpe, Lincs.
20.00	G3KAN	1·990	Northampton
20.00	G3IBJ	1·910	Southampton, Hants.
20.00	GI3JEX	1·860	Belfast
20.00	†G3WDW / G3VTY	1·915	Leeds, Yorks.
20.15	G3SAZ	1·845	Ashford, Middlesex
20.30	G3YEB	1·915	Harlow, Essex

† Alternately

Clock Time	Call-sign	MHz	Town
Tuesdays			
17·30	G3TNF	1·920	Gateshead
19.00	†G3UFO / G3XAM	1·980	Wirral, Cheshire
19.30	G3SWP	1·850	Doncaster, Yorks.
19.30	G3WGU	433·500 to South-East	Bispham, Lancs.
20.00	G3UPA	1·850	Meriden, Warks.
20.00	†G3FAU / G3KSS / G3OVT	1·980	Stevenage, Herts.
20.00	G3FWW	1·880	Burnham-on-Sea, Soms.
20.00	G3TPV	1·910	Hythe, Hants.
20.00	GM3UWX	144·045	Bishopton, Renfrewshire
20.30	G3UNV	1·845	Ashford, Middlx.
20.30	G2ABC	1·915	Woodford, Essex
21.00	G4RS	1·865	Blandford, Dorset
21.30	G2ABC	144·750	Woodford, Essex
22.00	G3HZM	1·925	Manchester

Clock Time	Call-sign	MHz	Town
Wednesdays			
17.30	G3TNF	1·920	Gateshead
18.30	G2FXA	1·900	Stockton-on-Tees
19.00	G3HT	1·930	Tiptree, Essex
19.30	G3WGU	433·500 to South-East	Bispham, Lancs.
19.30	G3UJD	1·825	Farnborough, Hants.
20.00	G8QU	1·970	London, N22
20.00	GM3PIP	3·590	Mintlaw, Aberdeen
20.30	G3HZL	1·845	Isleworth, Middlx.
20.30	G3KGU	1·915	Theydon Bois, Essex
21.00	G3HVI	1·890	Stoke-on-Trent
21.00	G3LQI	1·990	Lancing, Sussex

† Alternately

Clock Time	Call-sign	MHz	Town
Thursdays			
17.30	G3TNF	1·920	Gateshead
18.00	G3SWR	1·980	Birmingham
18.30	GW3VBP	3·590	Barry, Glam.
18.30	GW3UMB	1·880	Colwyn Bay
18.30	G3NC	1·968	Swindon, Wilts.
19.00	G3WGU	1·880	Bispham, Lancs.
19.30	G3GNS	1·910	Weston-super-Mare
20.00	GI3JEX	1·860	Belfast
20.30	G3SJE	1·875	Harrow, Middlx.
20.30	†G3ROE / G3RSF / G3TIQ	1·915	Harlow, Essex
21.00	G4RS	1·865	Blandford, Dorset
21.00	GW3XNI	1·930	Crosskeys, Mon.
Fridays			
17.30	G3TNF	1·920	Gateshead
18.30	G3NCZ	1·920	Blackburn, Lancs.
19.00	G3NPB	1·875	St Ives, Cornwall
19.30	G3PQF	1·825	Farnborough, Hants.
20.00	†G3WGW / G3WIX	1·915	Pudsey, Yorks. / Bradford, Yorks.
20.00	G3EEL	1·980	Peterborough
20.15	G3SAZ	1·845	Ashford, Middlesex
Saturdays			
09·30	G3UNV	1·940	Ashford, Middlesex
10.00	G3PLE	1·820	Stourbridge, Worcs.
13·00	G2FXA	1·900	Stockton-on-Tees
14.00	†GC4LI / GC2FMV	3·600	Jersey, C.I.
17.30	G3TNF	1·980	Gateshead
17.30	G3EFS	1·913	Bromley, Kent
20.00	G3KPO	1·980	Peterborough
20.00	G3WPR	1·915	Ilford, Essex
21.00	G3TTK	1·823	Coalville, Leics.

† Alternately

Members might like to be reminded that the Royal Naval Amateur Radio Society using their call-sign G3BZU, transmits c.w. as a proficiency test at 19.00 GMT on the first Tuesday of each month. Frequencies used are 1·875 MHz 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.

Listeners: These slow Morse practice transmissions are promoted specifically to help you, and unless you play your part it will become increasingly difficult to keep the service going. If you benefit from any of these transmissions you owe it to the operator concerned to let him know you listen. This service is a call upon the operator's leisure time, and he is more likely to sacrifice it to help you, if he knows he has an audience.

CONTEST NEWS

Second 1·8 MHz Contest 1968

A total of 65 logs were received for this five hour contest held between 16–17 November. Conditions were rated as good, to excellent by most competitors, and their comments are endorsed by the high signal strength reports which appear in the logs.

The leading station was G3KMI, operated by E. F. Taylor, G3SQX, who will receive the Victor Desmond Trophy subject to Council approval. Certificates of Merit will go to M. Whitaker, G3IGW, the runner-up, and R. J. Parsons, G3RBP, who was placed third.

G3KMI made 136 scoring contacts—nine of which were worth three points—and used an inverted vee dipole with the apex at 140 ft agl. The transmitter was a vfo-bfr-bfr-pa arrangement running 10 watts to an 807, while the receiver was an AR88D. G3IGW had 132 QSOs—including four three pointers—using his 250 ft end fed semi-vertical aerial with the far end at 147 ft. The transmitter ran 10 watts to a 5763 pa and the receiver was an EA12. G3RBP used a modified CR150 receiver, a transmitter with a transistorized exciter driving a 5763 pa to 7 watts input, and a 300 ft end fed inverted vee 85 ft high at the apex. Surely there can be no doubt that the success which these leading stations enjoyed was largely due to their excellent aerial systems.

The leading Scottish station was GM3FXM/A who is some 50 points ahead of his nearest rivals, GM3UKG and GM3KHH, in the first leg of the competition for the Maitland Trophy.

The first GC station to appear in the table of results for some considerable time achieved a notable tenth place, and was operated by Fred Curtis G3SVK, who surely needs no introduction to regular users of 160m.

Comments from competitors—"My 30th RSGB 160m contest," G3IGW. "I like the scoring system," G3RBP. "Much prefer these 'short' contests to those all-night slogs," G3OLB. "Wasn't until the last hour that I discovered the aerial wasn't connected to the receiver!" G3TEL. "Please change the code for Banffshire. I'm never sure whether I'm receiving a county code or a comment on my operating!" G3JKY. "I expect to be in a prominent position!" G3PKV.

Comments from HF Contests Committee—A few competitors appear to be under the impression that this contest is open to clubs and societies; this is not so. The two winter 160m contests are run for individual entrants only. Nevertheless the Committee has no objection to a member operating a club station providing that he receives *no assistance whatsoever* during the course of the contest (see General Rule 5). But in this case, the Committee prefers that the operator obtains the permission necessary to use his own call-sign, rather than use the club call-sign.

Check logs from G3GJX, G3XTL, GW3UCB/A and OK2HZ are gratefully acknowledged.

Listeners' Section

Only two entries were received for the listeners' contest, which was rather disappointing after the success of last year's event. The Certificate of Merit goes, once again, to A. A. Goacher, A3942 of Storrington, Sussex with a score of 468. The runner-up was R.W. Thomas, BRS15822 from Clapton, London E5, with 330 points.

RESULTS

Position	Call-sign	County	Points
1	G3KMI (Op G3SQX)	HE	781
2	G3IGW	YS	772
3	G3RBP	BE	769
4	G3BMY	SE	753
5	G3SSO (Op G3FXA)	GR	750
6	G3VMW	YS	749
7	G3OLB	GR	732
	G3PEK	CH	732
9	G3SVW	LE	717
10	GC3SVK	GY	692
11	GM3FXM/A	FE	681
12	G6BQ	KT	636
13	G3BDQ	SX	633
14	GM3UKG	BF	627
15	GM3KHH	BF	615
	G3GVA	WK	615
17	G3OKA	CH	588
18	G3TIR	SX	561
19	GW3NJW	GN	558
20	G3LHJ	DN	555
21	GM3KMR	MN	540
22	G3ORY/A	SF	534
23	G3TEL	BE	507
24	G3XAR	CH	490
25	G3VMO/A	LD	486
26	G3TAA	LD	484
27	G3WPO	SX	474
28	GI3JXS	AM	465
29	G3ILO	GR	462
30	G3HZL	MX	450
31	G3VIP	LN	432
32	G3JVJ	WK	420
33	G3TIE	LD	405
34	GM3EOJ	KE	394
	G3PDL	LN	394
36	G3ULO	EX	376
37	GI3XRQ (Op GI3OLJ)	DW	372
38	G3WRR/A	SY	357
39	G3SKC	MX	348
40	GM2HCZ	DF	330
41	G3KPU	NM	312
42	G3PHG	SX	306
	G3WSN	EX	306
44	G3VJP	WK	300
45	G3UJX	CH	294
46	G3JKY	KT	288
47	G3XDY	LN	276
48	GI3JEX	DW	270
49	G3XQD (Op G3WDS)	CD	264
50	G3TLF	EX	261
51	G3WZR	SY	244
52	G2XP	SY	238
53	G3RPJ	WK	234
54	G3TPJ	EX	228
55	G3UHO	WE	222
56	G3GDW	DN	212
57	G3XRX	LD	210
58	G8RZ	CD	204
59	G3UFW	WE	192
60	G5DZ	HE	186
61	G3JSK	WE	184
	G3VLX	KT	184
63	G3VGZ	DH	180
64	G3PKV	HF	154
65	G6OO	LN	66

High Power HF Field Day 1969

1. The General Rules for RSGB HF Contests, as published in the January 1969 *Radio Communication*, will apply.
2. When from 17.00 GMT on Saturday, 12 July 1969 to 17.00 GMT on Sunday, 13 July 1969.
3. Eligible Entrants any group of RSGB Members resident in the British Isles, or any Affiliated Society either in the British Isles or overseas.
4. Stations each group may operate one *portable* station on any, or all, of the 3·5, 7, 14, 21, or 28 MHz bands. Simultaneous operation on two or more bands is *not* allowed.
5. Power the dc power input to the final stage(s) of the transmitter must not exceed 150 watts.
6. Contacts Cw (A1) only.
7. Scoring three points may be claimed for each contact with a fixed station, and six points for each contact with a portable station.
8. Entries must be addressed to HF Contests Committee c/o R. Biggs, G2FLG, 29 Lord Avenue, Clayhall, Ilford, Essex.

Second 70 MHz (Open) Contest 1969

1. Date and Time: 13 April from 09.00 to 17.00 GMT.
2. All entries must be sent to the adjudicator at: VHF Contests Committee, 165 Cambridge Road, Great Shelford, Cambridge.
In addition the following **General Rules** as published in the January issue of *Radio Communication* will apply: 3a, 4a, 5a, 6a, 7a, 8a, 9b, 10a, 11-25, 27 and 28.

Listeners 70 MHz Contest

Non-licensed members of the RSGB are invited to take part in this contest which will be held between 09.00 and 17.00 GMT on 13 April, to coincide with the 70 MHz Open Contest. The rules of the 1969 VHF-UHF Listeners' Championship, published in the January issue, will apply. At the discretion of Council, Certificates of Merit will be awarded to the winner and runner-up.

First 144 MHz (SSB) Contest

Call-sign	Pos	Points	QSOs	Best QSO Call-sign	km	QTH	pep input	Aerial
G3BA	1	212	34	PA0NAP	387	WK	600W	10 ele
G3DAH	2	195	28	G3EGK	355	KT	200	10 ele
G3PWJ	3	146	24	G3GZJ	320	SD	150	6/6 slot
G8BBB	4	142	25	PA0EZ	335	CE	180	10 ele
G3LAS	5	135	25	G3GZJ	390	HF	200	10 ele
PA0NAP†	–	126	13	G3BA	390	—	180	9 ele
G3GZJ	6	122	10	G3NEO	435	CL	125	6/6 slot
G3NEO	7	87	18	G3GZJ	435	YS	150	2 × 5 ele
G3COJ	8	76	15	G3GZJ	345	BS	150	8/8 slot
G3EGK	9	67	12	G3GZJ	395	CH	70(O/P)	10 ele
G3TCG	10	63	16	PA0HVA	295	EX	150	6/6 slot
G3XAC	11	27	6	G3LQR	295	LE	90	4 ele
G3LNP*	—	—	19	PA0NAP	—	HF	70	10 ele

* No score claimed.
† No cover sheet submitted.

Late entry G3AWK

The contest, which took place on the evening of 13 January, was held in extremely poor conditions, even by contest standards: the pressure over parts of the country was 968 mb which is almost an all-time low. Entrants were almost unanimous in their poor opinion of conditions, but despite this the best DX worked by each station compares favourably with that worked in other contests. The best distance worked was between G3GZJ in Redruth and G3NEO near Sheffield at 435 km.

The winner was Tom Douglas G3BA with a score of 212 points. The runner-up was "Mike" Dormer G3DAH with a score of 195 points: Congratulations to both, who are top operators in more than one sense. Apart from G3BA, who was running the legal power limit, all the other stations used around 180 watts pep input, mainly to a QQV06-40A pa. As is often found in 144 MHz contests, four out of the first six stations used the 10 element yagi. It is a pity that more entries were not received since there were nearly 40 stations active including 4 PA0 stations.

Comments received included: "Conditions during the contest were the worst I have ever experienced in 2 Metre ssb operation"—G3EGK. "You are doing a nice job with these contests"—PA0NAP. "I would like repeat QSO's (two perhaps) and include cw/am/fm stations to be worked"—G3BA. "I like the scoring system very much"—G3TCG.

Listeners' VHF/UHF Championship 1968

Although there were nearly as many entrants for the Championship as last year, the number of logs fell from 61 to 44. This is partly due to some of last year's entrants having obtained transmitting licences and partly due to the loss of entries from some of the "regulars." Ron Ham, BRS15744, has turned his attention to Radio Astronomy as those who have seen the film "Radio News of 1968" will know. Ewen MacDuff, BRS26234, moved his home during the year and was thus absent from several of the contests. His new QTH is "at sea level" on an air sea rescue launch at Shoreham, Sussex.

Once again the Hanson trophy goes to Sussex, with Terence Cooper, BRS28005, the leading operator. Most of his operating was from portable stations located on the South Downs, as was that of the runner-up, A. Goacher, A3942. The winner used an EC10 receiver with various converters while the runner-up, who confined his activities to 144 MHz, used an AFZ12 converter into a Mohican receiver. Both used 6 element aerials.

A very welcome entry was that of ORS27426 from The Hook of Holland. His log for 144 MHz in VHF NFD shows 41 DLs, 28 Gs, 24 PAs, 12 Fs, six ONs and one LX. The VHF contest committee has recommended to Council that he be awarded a Certificate of Merit for this excellent performance. It would be interesting to see a 70 MHz log from the Netherlands but on this showing, ORS 27426 may be hard to catch up with on 144 MHz in the 1969 event.

Comments: "Operating was in general very good, although two or three stations had signals that drifted badly."—A3942.

"Wish my aerial had been better"—A5394, using a 70 MHz dipole.

"Not a very good log as I was putting the aerial up and down all morning. The rotator was only fixed at 9 am"—A6020.

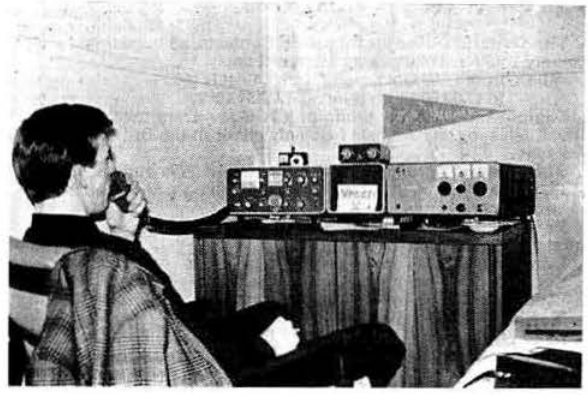
"Two operators gabbled so fast as to be absolutely unintelligible"—BRS26234.

Entrants are reminded that it is not necessary to listen throughout a contest to make a worthwhile score. A few dozen points from a short listening period may make all the difference in the final results. The final score is made up from the scores of the two best UHF logs plus the scores from any other four contests.

Congratulations go to the winners and to past entrants in the Championship who have now moved on to the transmitting field: D. Poulter, G3WHK, R. Whitbread G8AYN and A. Grove G8BJG.

Posn.	Entrant		1st 144 MHz	2nd 144 MHz	1st 70 MHz	3rd 144 MHz	2nd 70 MHz	1st 432 MHz	4th 144 MHz	2nd 432 MHz	5th 144 MHz	July 144 MHz	3rd 70 MHz	6th 144 MHz	NFD VHF	NFD UHF	3rd 432 MHz	Total MHz
1	T. Cooper	BRS28005			116	165	184	138	115	80		204	121	324	549		196	1606
2	A. Goacher	A3942		125		297			138			455			312			1202
3	C. Baker	A5032	102		91	189			118	62	127			242	394	116		1130
4	E. MacDuff	BRS26234				189		150						220	395			954
5	M. Hoeven	ORS27426													590			590
6	R. Thomas	BRS15822		82		88	85		64					131				388
7	M. Toms	A5662										83		71	179	38		371
8	E. Double	BRS18456												68	117			185
9	N. Sears	A6020												67				67
10	A. Grove	A5124				43												43
11	C. Johnson	A5394			23													23

28 MHz Telephony Contest 1968



This contest was virtually a new one in the calendar, with a fresh scoring system and on one band only. Therefore it is difficult to draw comparisons with previous 21–28 MHz contests. The total number of entries was actually up on last year's 21–28 MHz event, though when under analysis the home entrants were up by over 50 per cent and the overseas down by about eight per cent.

Conditions no doubt created this turn-about. The almost complete lack of European short skip and a very strong N-S path for Africa inspired more G stations to compete and submit logs.

The winner of this contest and the Whitworth Trophy is Hal Perkins, G3NMH, winner of previous 21/28 MHz contests, with 7064 points. Three stations competed very closely for second place. Ultimately L. Margolis, G3UML, narrowly beat A. Thurlow G3WBN, by 30 points to take the certificate for runner-up.

M. Dransfield 5N2AAF wins the certificate for the leading overseas entrant with 4835 points, followed nearly 400 points behind by J. Colegate 9J2VX, Third place goes to R. Macfarlane, 7Q7RM, over 900 points behind 5N2AAF.

Conditions were mixed on both days, with very little heard from VK/ZL, JA and Pacific areas. Africa, Middle East and Western Asia were heard and worked easily. The USA was good but not like the previous year in the 21–28 MHz when conditions were outstanding. VE's were rare but some useful Central and South American countries were worked including several VP8 stations.

The standard of logs submitted were generally good but one or two failed rather miserably to come up to this level. One in particular from a G, lost over 450 points mainly through carelessness in copying reports and duplicate contacts. It does not take so long to check your log before posting, but multiplied over a hundred or more logs it works out at an awful lot of committee time.

Comments from competitors are very sparse indeed. One or two prefer the two-band contest while one or two more like the one-band event. A few more criticised the scoring system, but the remainder made little comment either way.

The receiving section, as popular as ever, has been won by J. Skidmore BRS26431, who, in a very closely contested section, beat, by a mere nine points, M. G. Toms, A5662. As a result of this BRS26431 takes the Melcalfe Trophy and A5662 the runner-up certificate.

The disappointment in this section was the very small number of entries from overseas. Again comments were scarce, but one or two receiving stations prefer the two-band event due to long periods of hearing nothing but the same few stations. The reverse side of this comment is that G3NMH made over 460 contacts and BRS26431 heard more than 250. This criticism and others, for and against, will be considered for the 1969 event.

The HF Contests Committee wish to record their thanks to the following for their always useful check-logs: G3FVA/A, G3JVJ, OH6RH, UA3AET, UA3KQB, YO6AW, ZS1SP.

RESULTS TABLE

UK Entries—Transmitting Section

Position	Call-sign		Points
1	G3NMH	†*	7064
2	G3UML	*	6429
3	G3WBN		6399
4	G3MTF		6277
5	G3TR		5765
6	G3SME		5675
7	G3RRJ		5602
8	G3OZF		5155
9	G3TZU		4950
10	G3UQR		4910
11	G3KFT		4830
12	G3HS		4600
13	G3WJN		4590
14	G6LK		4520
15	G3KMA		4492
16	G3OHP		4325
17	G3NAS		4060
18	G3LHJ		3975
19	G6PD		3940
20	G3PMX		3525
21	G3PVL		3285
22	GW3NWV	*	3185
23	GW3SFC		3090
24	G2QT		2805
25	G2NH		2790
26	G3SLH		2752
27	G3TGL		2720
28	G2HMG		2717
29	G3WRA		2610
30	G3KWH		2565
31	G3XKV		2365
32	G3ILO		2320
33	G3NXT		2185
34	G3VLM		2165
35	GW2HFR		1997
36	GW3BOC		1937
37	G2AJB		1655
38	GM3TBV	*	1330
39	G3XFW		1290
40	G3COJ		1240
41	GM3RFR		1150
42	G3UMV		1080
43	G3LDI		920
44	GM3VTB		510
45	GW5ALY/A		390
—	G8JQ		+

† Trophy Winner

* Certificate Winners

+ Disqualified (Rule 5) (No serial numbers)

Overseas Entries—Transmitting Section

Position	Call-sign		Points
1	5N2AAF	*	4835
2	9J2VX	*	4460
3	7Q7RM	*	3930
4	9J2BC		3795
5	UB5FG		3555
6	K5MDX		3385
7	UO5BZ		3292
8	MP4BHA		3182
9	ZC4TK		3099
10	ZD9BE		3080
11	IT1FTT		2980
12	MP4BGX		2805
13	VP8KF		2775
14	CR6LF		2750
15	UV3CC		2685
16	IT1GAI		2640
17	UW3EH		2555
18	ZS5OA		2517
19	ZS5OB		2510
20	PY4KL		2460
21	YO3AID		2440
22	PY3AHJ		2395
23	ZS6ACK		2355
24	UY5HB		2350
25	9L1KZ		2330
26	UW6MA		2280
27	ZS6AKO		2140
28	OD5BA		2120
29	I1YRK		2040
30	UB5GEN		2000
31	PY2DSQ		1850
32	YA5RG		1725
33	K4DSN		1705
34	K1YZW		1692
35	9H1BE		1650
36	YV5CIL		1595
37	UA3UJR		1580
38	YV5BPG		1555
39	UA6CT		1530
40	UW4NH		1525
41	VK6XX		1485
42	CX2CN		1342
43	CR7IC		1290
44	W4LVV		1220
45	4X4SO		1180
46	UY5EM		1100
47	W3BYX		1097
48	W4HOS		1050
49	VE3BMB		1030
50	WA2IFS		917
51	UB5WE		900
52	WA4QPB		870
53	K8CFU		840
54	UA3APB		820
55	W9LKI		817
56	CR6KT		570
57	CE3ZW		565
58	UA9AD		557
59	UB5DRG		507
60	W4WSF		385
61	UV9PI		365
	VK3QV		365
63	OH2BAD		355
64	W0MGI		335
65	CR7FR		320
66	W9VNG		195

* Certificate winners

UK and Overseas Entries—Receiving Section

Position	Identification		Points
1	BRS26431	†*	5315
2	A5662	*	5306
3	BRS24957		5182
4	R. G. Poppi		5060
5	A3942		4915
6	BRS30094		4680
7	BRS19682		4270
8	BRS30258		4145
9	A5950		4140
10	BRS27205		3970
11	BRS28198		3895
12	BRS29641		3760
13	BRS26407		3690
14	BRS29473		3475
15	A5032		3230
16	A5962		3160
	BRS29749		3160
18	BRS27683		3140
19	A4460		3115
20	BRS27806		3100
21	A6003		3045
22	BRS25429		2995
23	A5680		2780
24	BRS30628		2430
25	BRS 28201		2420
26	BRS26298		2395
27	BRS27662		2360
28	A5462		2285
29	G6903		2235
30	BRS29812		2105
31	A5644		1905
32	BRS27575		1465
33	A6023		1320
34	A5412		1270
35	BRS28005		1190
36	A4253		880
37	A5789		685

OVERSEAS ENTRIES

Position	Identification	Points
1*	UB5-070-9	2580
2*	WPE8JLL	1400

† Trophy winner
* Certificate winner

Grafton Top Band Contest

When: AM Saturday, 15 March, 21.30 to 24.00 GMT.
CW Saturday, 22 March, 21.30 to 24.00 GMT.
SSB Saturday, 29 March, 21.30 to 24.00 GMT.

Contestants may enter the cw section and one only of the phone sections. The exchange is the RS or RST plus a serial number commencing with 001, running consecutively through the contest.

Scoring is one point per contact, the final score being the sum of the score for the contacts in the cw section and one of the phone sections. There is no multiplier. Entrants should call, as applicable, CQ Grafton AM Contest, CQ GRS, or CQ Grafton SSB Contest.

Certificates of merit will be awarded to the stations placed overall first and second plus the leading stations in each individual section.

Logs should be sent to the Grafton Contests Hon. Secretary, C. E. Heywood, G3KEB, 23 Richmond House, East Street, Walworth, London, SE17 to be received not later than Wednesday, 9 April, 1969. Copies of the rules and official log sheets may also be obtained from this address.

ARMS Mobile Meeting at Lydd Airport

The Amateur Radio Mobile Society is holding a mobile meeting in conjunction with the Lydd Airport Open Weekend over the Easter Weekend of 4, 5, 6 and 7 April. This will not be a full rally but a focal point for mobile radio visitors to the Lydd Open Weekend. This attracted 30,000 people last year and this year features will include hovercraft rides, aeroplane trips in Austers and larger aircraft, parachute jumping and an air display. ARMS will possibly arrange a visit to the nearby nuclear power station at Dungeness. Camping and caravaning will be permitted on the airport over the weekend and there will be a special parking area for mobiles adjacent to the camping area, complete with toilet facilities. There will be stations active on 2 and 160 metres and on ssb on the hf bands using the call GB2BAF. Lydd can be reached by following the A2070 south from Ashford to New Romney and then the airport is well signed. There are also coast roads from Hastings and Folkestone. The main ARMS activity will be on Sunday, 6 April, but visitors can arrive at any time and the airport is open from 10 a.m. For airborne amateurs, fly-in facilities should be arranged with the SATCO office at Lydd.

YOUR OPINION

Security Risk

From: Louis Varney, G5RV, Burgess Hill, Sussex.

I was glad to read "Current Comment" in the February 1969 issue of *Radio Communication* and wish to congratulate you on having so succinctly stated the main points so far as Amateur Radio is concerned in the Britten case.

There is, in my opinion, a most important point that should be brought out and given all possible publicity. That is, the sheer common sense fact that no one but a fool would try to use amateur radio facilities to pass espionage information for the following reasons:

(*a*) Obtaining a radio amateur licence obliges the individual to register, with the appropriate Government Authority, personal information which enables the Authority to exercise surveillance.

(*b*) In the UK alone, there are now some 13,000 licensed radio amateurs. Assuming that only a small fraction of these would be active and operating on the band used at any given time by a spy trying to pass espionage information, it is none the less certain that, if any suspicious transmissions were overheard, at least some of these radio amateurs would inform the Authority of the fact. The transmission of coded or cypher messages, apart from being an infringement of the amateur licence conditions, would immediately arouse suspicion. Cleverly disguised "plain language" messages could deceive, of course, but their use for conveying the type of information a spy would want to pass would be severely limited and, one would think, impractical in view of much less complicated methods easily available —e.g. the normal, un-censored, mail.

(*c*) It is clearly much easier, and safer, for a spy to set up a clandestine radio station—for which no licence is required!

Notwithstanding the above arguments, the most important thing, from our point of view, is the implication that licensed radio amateurs are, as a body, suspect. That this is an unwarranted slur on a group of citizens who have in many ways, and not the least by loyal and devoted specialist service to the nation in World War II, demonstrated their collective patriotism and integrity, should be clearly conveyed to the public by a determined publicity campaign in the national Press.

While appropriate representations to the "Authority" may be made, I fear that the Britten case has resurrected the "bogey" that, for many years, stood in the way of reciprocal licensing—and, indeed, of radio amateur licensing at all in certain countries. However, all but a very small minority of such countries have, in recent years, come to see this "bogey" in its true proportions and import—that is, negligible in view of the alternative and much less risky methods available to a spy for the passing of espionage information

Dummy Loads

From : E. Shackleton, G6SN, Harrogate, Yorkshire.

In the January 1969 issue of *Radio Communication* G3BLE appears to be concerned about "... a method ... to reduce the output power of (ssb) transceivers and transmitters by means of an oil filled dummy load...." Some notes written by me appeared in "Four Metres and Down" in October 1968 (pages 678 and 679) describing the construction of a simple oil filled dummy load and it would apear that this is the article to which G3BLE takes exception.

May I reassure G3BLE that there is no danger whatever and that the waste in power is negligible. This load does not have to absorb anything like 90/180 watts which is the *Peak* Effective Power and NOT the heating power." Before I made my dummy load I connected a VTM across a 75 ohm resistor (eleven 820 ohm two watt resistors). With normal speech to a KW2000 the maximum voltage was 15/20 volts, which is about 5·5 watts. Even shouting into the microphone (which no self-respecting ssb amateur would do) only increased the wattage to 22 watts. Further, the transmission time is intermittent, rarely lasting more than 60 seconds; long winded gentlemen find themselves "wasting their sweetness on the desert air." Hence the average power to be absorbed over a period is not likely to exceed 3 watts. Even with a 180/200 watt transceiver this figure is not likely to exceed 6 to 8 watts. This is borne out by some temperature tests I carried out recently. Using two identical thermometers one in air and the other near the top of the oil in the dummy load the difference was only about 1° Fahrenheit after QSOs lasting 1½ hours.

Incidentally the Heathkit people rate their "Cantenna" at 1 kW.

Regarding the pressure vent, drill a small hole in the lid by all means, but it is quite unnecessary. I prefer to leave the can air tight as it avoids the chance of any oil being spilled.

The third paragraph of G3BLE's letter suggests taking the output from the driver stage, but few owners would wish to drill the chassis of their £200 set. Further, the output stage of the transmitter assists in reducing the spurious signals from the driver stage.

I haven't yet heard G3BLE on 2m ssb and if his thoughts are turning that way I can assure him that I shall be delighted if he will join me any Monday evening from say 2000 GMT to midnight.

Finally, if G3BLE wants to "get his feet wet" and is held up for a driver stage, this could be constructed with a 9 MHz crystal filter and a stable 5·0–5·5 MHz vfo. Band-pass coupling and plenty of HiQ breaks should help to reduce spurious emissions.

Operating Standards

From: W. A. Scarr, G2WS, Worlebury, Weston-super-Mare

May I be permitted to draw attention to a serious malpractice which is apparently growing apace "on the air" and which concerns chiefly those numerous young operators who have only recently received transmitting permits.

I refer to the disregard of the licence condition which states clearly that the call-sign of the station shall be announced at the beginning and the end of each period of transmission.

One has only to listen to the excitable chatter which goes on both on the VHF and HF bands continually, to find plentiful examples of serious departure from the licence requirement in this respect. Transmissions often begin with such phases as "OK, Jack" without any reference to callsign and a frequent termination of an "over" is "GO."

Recently I listened to a station which during a long QSO was in such a hurry that he could only find time to announce the concluding letters of his call-sign whenever he signed off. Such operators seem oblivious to the fact that their transmissions are being heard by many other people—some doubtless in positions of authority.

The amateur movement's reputation depends on good practice on the air more than anything else and great harm can come to it by the thoughtless behaviour of those with limited experience. Not only this, but the facilities granted to amateurs will always depend ultimately on the way they use those they already possess and I would appeal to the newcomers to our ranks to remember in the excitement of the moment the seriousness of their new responsibility.

Crystal—Caution

From: R. E. Piper, G3MEH, Coulsdon, Surrey

Having read G3RNL's article in *Radio Communication* January, I feel I must point out that a little care should be taken when soldering to the pins of plug-in crystals with plated electrodes, such as type HC6-U, as it is possible to damage the crystal owing to heat conduction. I suggest that the pins should be pre-tinned using a heat shunt, and then soldered into position with a short application of a hot iron.

May I congratulate Mr Watling on the simplicity of his design and hope it will encourage those who, like myself, have been reluctant to equip themselves for ssb because of the poor performance of the station receiver, high cost of commercial gear and complexity of most previously published designs to "have a go." I hope he will submit the design of the matching transmitter for publication.

RADIO AMATEUR EMERGENCY NETWORK

By S. W. LAW, G3PAZ*

THE tag from our grandparents about "The March wind doth blow. . . ." has lost much of its impact with the report in early February of a record gust during sub-zero conditions of 136 mph registered at a weather station in the Orkneys. From this item one could formulate an argument in favour of the more extensive use of fibre-glass whip aerials on our mobiles were it not for a somewhat disturbing tip-off from one of our London members. It appears that his very tough whip was wrenched off in his absence—bad enough, but it would seem that further investigations reveal that it was not necessarily pure sabotage that may have prompted this apparently wanton act. Regrettably some of the nasty types have found that a fibre-glass rod serves as a handy and easily concealed weapon for their nefarious activities. So, for those who may frequently have to park their mobiles in known trouble spots, may we suggest that some thought be given to aerials which can be easily removed and hidden when the car is parked?

Red Cross Transmissions

For those with suitable receivers, here are details of the International Red Cross transmissions for March. These will take place on 24, 26 and 28 March on a frequency of 7210 kHz for one hour from 06.00, 11.30, 17.00 and 23.00 hours GMT. The next series will be in May.

All Members de Hon. Chairman

The Hon. Chairman and RAEN Committee wish to extend their thanks to all Controllers and members for their work during 1968. The committee express their appreciation of the excellent field work that has been done and assure members that their work is bearing fruit as the formation of new Groups (e.g. in Kent and Sussex) will prove.

Screw Loose?

We are sure that all of our mobile members are extremely safety-conscious but we might take warning from a news cutting which turned up recently which shows that even the professionals are not immune from trouble owing to lack of servicing. It appears that an accident occurred which it was alleged was caused by the two-way radio becoming detached from its mounting and falling on to the driver's feet, the cables then catching round the pedals. After the Magistrates had inspected a similar car equipped with identical apparatus the defendants were found guilty and fined for the insecure equipment. Don't let it happen to you, if not for your own sake for the good name of Amateur Radio and RAEN in particular!

West Side Story

Too long has elapsed since we made mention of our Westerly Groups and we hasten to rectify the omission. Wales, we know, has now a good structure and steady work is going on in that delightful, if dangerous, terrain. Cornwall are keeping quiet about their activities but after their mammoth effort with the "oil slick" troubles we have no need to worry about their state of preparedness. As yet we have nothing to report of activity in the Devon/Somerset area, but hope that something is brewing around there. Nearer into the centre we have a first class development around the Severn, where the Mid-Severn group are going from strength to strength. Under the able hand of Controller G3FKO this Group has now not only a large membership but also a very active one. In fact one might say they are devils for punishment, for one of their exercises last November was held in snow at the appropriate low temperature! Some of the VHF work in this exercise is worthy of note for it included direct communication between G3NUE/P on North Hill, Minehead over a 100 mile path to G8ASO/P in Herefordshire. Not only does this speak volumes for the efficiency of the /P stations in this Group but it opens out great possibilities in the realms of inter-group liaison should the need arise. They should certainly have little trouble in getting through to the Welsh Groups or to G3WPJ and his 30 lads in Somerset! Meanwhile the Mid-Severn Group are keeping in touch with certain other organizations with whom we hope to have the opportunity to co-operate at some time in the future.

The Facts of Life

RAEN has, since its inception some 15 years ago, had its loud detractors. One of their cries has been "What could they do in the case of nuclear war?" The obvious answer, as things stand at the moment, is "Nothing." Since, by the terms of our licence, all amateur activity ceases on the declaration of a state of war this is true. Yet we know that approaches have been made to certain of us on the lines that we might care to render ourselves familiar with certain methods with a view to our participation in some form of wartime communications. Now we feel that this is dangerous ground, and we do urge any of our members who might be so approached to emphasize strongly that, as amateurs giving our services voluntarily for the purpose of providing emergency communications for the relief of suffering in times of civil disaster, we can accept no quasi-official liaison with any such activity in our capacity as members of the Radio Amateur Emergency Network. However, we may also point out that nothing in the foregoing is intended as a criticism of any amateurs' personal views nor activities outside the framework of the RAEN.

Controversial Point

All are agreed that apathy in any organization is a bad sign. It must therefore follow that controversy is the mark of life. A point that has arisen therefore will stand a little airing. It is written in our application forms that membership of RAEN is not restricted to members or associates of the RSGB, and so far nobody has queried this point or put forward a proposal that any change be made. Now we have a query which concerns the appointment of Controllers and the approval of such appointments by the RAEN Committee. To recap; the normal procedure for the formation of a new Group is for five registered members to put forward the name of a registered member as a suggested Controller for the proposed new Group for the approval of the RAEN Committee. The Committee will then normally ratify the appointment together with the suggested title of the new Group. An amicable agreement is reached on the title (in order to avoid duplication and to identify the area satisfactorily) and the Group is in being. So far it has been taken as a matter of course that any Controller so appointed is an RSGB member. Since the RAEN Committee is a part of the RSGB structure and RAEN itself was originated by the RSGB in conference with the authorities who agreed to write it into the licence (admittedly without a specific reference to the title) the above procedure has hitherto been unquestioned. You may feel strongly one way or the other on the point raised or indeed on any other facet of the present set-up. If so, why not air your views, either to the RAEN Committee direct or in the correspondence column of *Radio Communication*?

Membership Count

At the end of January 1969 registered members in the British Isles numbered 757. Space will not permit a full breakdown of this figure but we can assure you that there are some interesting points. Regrettably there are still over 250 ex-members who have not re-registered, but things are certainly improving.

* 11 Chisholm Road, Croydon, Surrey, CRO 6UQ.

Honorary Registrations Secretary: **Mr R. A. Ledgerton, G2ABC, 1 Latchingdon Gardens, Woodford Bridge, Essex.**

Honorary Secretary, RAEN Committee: **Mr E. R. L. Bassett, BRS16075, 57 Upper St. Helens Road, Hedge End, Southampton, SO3 4LG.**

CLUB NEWS

Please send all information direct to Regional Representatives, giving full details of future meetings, and any snippets of activities which would be interesting in print. When listing meetings, please be sure to include the date and time, the meeting place, the lecturer's full name and the call-sign to whom prospective members can refer. The last day on which Regional Representatives can accept letters for inclusion is the first of the previous month.

REGION 1

Merseyside Luncheon Club—meets on the first Monday in every month on the HMS *Landfall* 12.30 for 12.45 lunch. The attendance on 3 February was 25—even more than the inaugural session in January. If you propose to attend please advise G3VQT or G2AMV beforehand.

Ainsdale (ARC)—12 and 26 March, 8 pm, "Morris Dancers," Scarisbrick.

Allerton (Liverpool)—The organisation previously reporting under the title "Scout Radio Hobbies Society" has changed its name to "Scout Amateur Radio Society, North West Region" Allerton will now be the only branch with meetings on the first and third Thursdays of each month at 8 pm, Liverpool County Scout Association Headquarters, Richmond Street, Liverpool. It is hoped that other meetings will shortly be arranged for Warrington, Wavertree and Barnston.

Ashton Under Lyne (AUL & DARS)—Fridays, 7.30 pm. 6 Stamford Street, Stalybridge.

Blackburn (ELARC)—6 March [Film Show (Members only) "Motor Racing" by R. Anderson of Carreras Rothmans], 10 April ("Raenet" by S. J. Scarborough, G3MBQ), 7.30 pm, Edinburgh House, Shearbank Road, Blackburn. Please note new address—further details from G4JS.

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

Bury (B & RRS)—11 March (Lecture and Demonstration by Vero Electronics) 8 pm, George Hotel (Private room) Market Street, Bury. Club Secretary G3VVQ 411 Holcombe Road, Greenmount, Bury.

Cheshire (Mid Cheshire ARC)—Club nights every Wednesday 7 pm to 9.30 pm. Instruction nights every Thursday 7 pm to 9.00 pm. The latter includes theoretical work for the RAE exam, practical construction and morse practice. Further details from G3JWK. Technical Activities Centre, Winsford Verdin Grammar School, Winsford, Cheshire.

Chester (C & DARS)—Tuesdays 8 pm, YMCA.

Crewe & District—No meetings will be held for the time being as no accommodation is available. However, the Area Representative Mr R. Owen of 10 Circle Avenue, Willaston, Nantwich, will welcome visitors at his home.

Douglas (D & DARS)—2nd and 4th Wednesday each month 7 pm, 19 Rosemount, Douglas. 12 March (Constructional Evening), 26 March (Film Show). Further information from W. T. McEvoy, 19 Rosemount, Douglas. Tel Douglas 6146.

Eccles (E & DRC)—Tuesdays 8 pm. Please note new address which is Bridgewater School, Worsley, Lancs. Every Thursday Club Top Band net 2030 hours.

Leyland Hundred Amateur Radio Group—The Thursday night net at 2000 hours GMT on 1·915 MHz.

Liverpool (L & DARS)—Tuesdays 8 pm, Conservative Association Rooms, Church Road, Wavertree, Club Secretary Philip Storey, 29 Chalfont Road, Liverpool 18.

Liverpool (NLRC)—14 and 28 March 8 pm, Landsbury House, 13 Crosby Road South, Liverpool 22. Secretary R. Simmons, G3PNS, 62 Daneville Road, Liverpool, L4 2RG.

Macclesfield (M & DARS)—11 and 25 March 8 pm, The George Hotel, Jordangate.

Manchester (M & DARS)—Wednesdays 7.30 pm, 203 Droylsden Road, Newton Heath, Manchester, 10. Hon. Secretary, G. Tillson G3TJX 95 Kelverlow Street, Oldham, Lancs.

Manchester (SMRC)—Fridays 8 pm, Conservative Association Divisional Office, 449 Palatine Road, Northenden, Manchester 22.

North West VHF Group—11 March 8 pm, at 50 Great Ancoats Street, Manchester. The move into new Headquarters has not yet taken place because structural alterations have been necessary. Matters for discussion at the next meeting will include plans for summer uhf and vhf contests and the Belle Vue Convention. There are many newly licensed amateurs in the area interested in vhf and they are invited to attend the next meeting. Further details from the Club Secretary G3FNM, 141 Norris Road, Sale. Tel 061 973 1472.

Preston (PARS)—6 and 20 March, 3 April 7.30 pm, (Private Room) "Windsor Castle," St Paul's Square.

St Helens (SES)—Meetings temporarily discontinued. Local enthusiasts should keep in touch with B. Hardy, 198 Knowsley Road, St Helens, Lancs.

Southport (SRS)—Wednesdays 8 pm and Sundays 2.30 pm. The Esplanade, Secretary S. Miller, 72 Station Rd, Banks, Southport.

Southport (73 SSB Society)—Please note change in meeting day which is now Thursdays at 8 pm. (All commencing with a talk on part of RAE Syllabus), 73 Avondale Road North, Southport.

Stockport (SRS)—5 and 19 March, 2 April, 8 pm, Royal Oak Hotel, Castle Street, Edgley: new members are always welcome. Further details from G3FYE.

Warrington Culcheth (CARC)—Fridays, 7.30 pm, Chat Moss Hotel, Glazebury. All visitors will be welcome. Secretary, K. Bulgess 32 Hendon Street, Leigh.

Westmorland—Fridays, 7.30 pm, 24 Park Road, Milnthorpe. Additionally there is an RAE class on Mondays and Thursdays at the same time.

Wirral (WARS)—1st and 3rd Wednesdays each month 8 pm. Former Civil Defence Headquarters; Upton Road, Bidston, Birkenhead. Secretary—G3FOO.

REGION 2

Middlesbrough (TARS)—1st and 3rd Fridays each month, 8 pm, Settlement House, 132 Newport Road, Middlesbrough. *G3JMO.*

Northern Heights—12 March (Sale of Surplus Equipment conducted by G8CB), 28 March ("Something New" by J. Davison, G3JKD), 7.45 pm, Sportsman Inn, Ogden, Near Halifax. *G3MDW.*

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

South Shields (SS & DARC)—14 March (Judging of Constructional competition by Pete Martin, Secretary of Durham Club), Meetings Fridays, 8 pm, Trinity House Social Centre, Laygate, South Shields. *G3SFL.*

Spen Valley (SVARS)—6 March ("Design of Laboratory Instruments" by A. Lamming, BSc), 20 March ("Oscilloscopes" by L. M. Dougherty, MSc FRAS), 7.30 pm, The Grammar School, Heckmondwike. 13 March will be a visit to BBC Studios, Leeds and 27 March will be a visit to Yeadon Airport both of these visits being limited to 12. *G8BSC.*

Teeside—Second Saturday every month, Social Evening, 8 pm, The Crown Hotel, Yarm. *G3JMO.*

REGION 3

Birmingham (MARS)—11 March ("Birmingham GPO Tower," an illustrated talk by Mr Tipple 28 March (Visit to the Birmingham GPO Tower). Midland Institute, Margaret Street, Birmingham 3.

(Solihull)—18 March (Talk on G3UFE's gdo). At the January meeting an excellent talk was given by G3NZL on "Aeronautical Communication Techniques," highlighting modern df equipment used

by civil aviation. The new venue for meetings will be the third Tuesday in each month at the Old Manor House, 126 High St, Solihull. Visitors are always welcome. *G3VXV*.

Bromsgrove (B & DARC)—14 March (AGM), 8 pm, Co-op Hall.

Dudley (DARC)—11 March, 25 March, 8 pm, Central Library, St James's Rd, Dudley.

Hereford (HARS)—First and third Friday, Trinity House, Whitecross Rd, Hereford. The club now has its own callsign, G3YDD. The second Social evening was a pleasant success with about 24 people present. *G3RJB*.

Mid Warwickshire (MWARS)—10 March (RAEN Talk by R. Caxton, G3IKL), 17 March (Radio Aurora, RSGB Tape Lecture), 24 March (VHF Equipment, Mr Glenn Ross), 31 March (USA Trip, Mr Palmer, G5PP), 28 Hamilton Terrace, Leamington Spa.

Salop (SARS)—13 March (Mobile by Terry Russell, G3JFH), 27 March (DXpedition by Flt. Lt. Roy Handley, G3GJQ), 7.30 pm to 10 pm, Signals Hut, Shrewsbury School.

Sutton Coldfield (SCRS)—10 March (Film Show), 24 March (Natter and Projects Evening), Hq SCTFC Clubhouse, Cloes Lane, Sutton Coldfield.

Wolverhampton (WARS)—3 March (Amateur TV Demonstration by Mr Sparrow, G6KQJ/T, Neachells Cottage, Stockwell Rd, Tettenhall.

Worcester (W & DARC)—Meetings are held on Wednesday and Saturday at 7.45 pm in the Club Hq at 35 Perdiswell Park, Droitwich Rd, Worcs.

REGION 4

Burton upon Trent (B-u-T ARS)—12 March (Film Show), 7.30 pm, Club Rooms, Stapenhill Institute, Burton on Trent.

Derby (D & DARS)—5 March (Surplus Sale), 12 March ("My World Journey, Part II" by W. A. Roberts G2RO—Ladies Evening), 19 March (Cathodic Protection—Illustrated Lecture by D. Fisher), 26 March (RSGB Tape Recorded Lecture—A History of Radio by Norman Burton), 7.30 pm Room No 4, 119 Green Lane, Derby. It was reported at the Annual General Meeting held on 5 February last that the fully paid membership for the year ended 31 December, 68 amounted to 210 exactly half being licensed. The Committee elected to serve for the ensuing year was Mr T. Darn, G3FGY, Chairman; Mr R. E. F. Street, Vice Chairman; Mr F. C. Ward, G2CVV, Hon. Sec/Treas; Mr D. Bosworth, G8BAV, Contest Secretary; Messrs J. Anthony, G3KQF, K. J. Pegg, G3FSH, R. Chambers, G3RTG, R. Lax, G3BGX, T. Beamond, G3VLF, M. Shardlow, G3SZJ, I. Sneap, G8AUE and D. Cliff, G3UQV, Management. *G2CVV*.

(NHCAARG)—The Derby Short Wave Experimental Society has been reformed as part of the Alvaston Community Centre and will in future be known as The Nunsfield House Community Centre Amateur Radio Group. Meetings are held on Friday evenings when the Group's KW2000A is "on the air." Further details of the Group's future activities and programmes can be obtained from *G3LCV*.

Grimsby (GARS)—Thursday, 8 pm, North Lincs Photographic Society's Rooms, back of 50 Welholme Road, Grimsby. *G3RSD*.

Heanor (TSEDRS)—Tuesdays, 7.30 pm, The South East Derbyshire College of Further Education, Ilkeston Road, Heanor. *G3LGK*.

Leicester (LRS)—Mondays 7.30 pm, Sundays 10.30 am, The Club Room, Gilroes Estate Cottage, Groby Road, Leicester. *G3UQX*.

Loughborough (LARC)—7 March (Slide show of Annual Dinner and general radio interest), 21 March (Proposed Visit to Rugby Radio Station), 7.30 pm, Club Rooms, Old Bleach Yard, Wards End, Loughborough. *G3RAL*.

Lincoln (LSWC)—Tuesdays 7.30 pm, No 2 Guardroom, Sobroan Barracks, Breedon Drive, Lincoln. *G8BSS*.

Mansfield (MARS)—First Friday in each month, 7.45 pm, New Inn Westgate, Mansfield. *G8HX*.

Newark (NSWC)—Mondays, Thursdays, 7.30 pm, Guildhall, Guildhall Street, Newark. *G3TWV*.

Nottingham (ARCN)—Tuesdays, Thursdays, 7.30 pm, Room No 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham. *G3SRX*.

Peterborough (P & DARS)—First Friday in month, Lecture or demonstration in the Electronics Section at Peterborough Technical College, Eastfield Road, 7.30 pm. Other Fridays meet at the Club HQ in The Old Windmill, behind The Peacock Inn, London Road, 8 pm, onwards. *G3KPO*.

Worksop (NNARS)—Tuesdays, Thursdays, 7.30 pm, Club Room, 13 Gateford Road, Worksop, Notts. *G8ON*.

REGION 5

Bedford (B & DARC)—Club meets on Thursdays at the Dolphin Inn, Broadway, Bedford, at 8 pm (Morse Class at 7.30 pm).

Bishop's Stortford (BS & DARC)—Meetings on third Monday of each month at 8 pm, British Legion Club, Windhill, Bishop's Stortford, Hertfordshire.

Cambridge (C & DARC)—Meetings on Fridays at 7.30 pm, Club Headquarters, Corporation Yard, Victoria Road, Cambridge.

Cambridge University (CUWS)—Meets in the Psychology Department Lecture Rooms, Downing Site on Tuesdays at 8.15 during University Term.

Dunstable Downs (DDRC)—Fridays, at Chew's House, High Street South (Opposite Police Station), Dunstable, Bedfordshire.

Luton (Vauxhall Motors)—Bill Stedman and his son Graham, both employed at Vauxhall Motors, have recently passed their RAE, and have the call-sign G3XWS. They would now like to form an Amateur Radio section within the Works Recreation Club. Will those interested ring Bill on 4063, or contact him at 10 Wychwood Avenue, Luton.

Shefford (S & DARC)—Thursdays. 8 pm, Church Hall, High Street, Shefford, Bedfordshire.

Stevenage (S & DARS)—Meetings on First and Third Tuesdays, 8 pm, Hawker-Siddeley Dynamics Ltd, Gunnels Wood Road, Stevenage, Hertfordshire.

REGION 6

Cheltenham (RSGB Group)—First Thursday, 8 pm, Great Western Hotel, Clarence St, Cheltenham. *G3TVW*.

Chiltern (CARC)—Last Thursday, 8 pm, British Legion, St. Mary's St, High Wycombe, Bucks.

Gloucester (GRC)—Second and fourth Tuesdays, 7.30 pm, Lamb Inn, Market Parade, Gloucester.

Nailsworth (N & DARC)—Tuesdays, 7.30 pm, Nailsworth Boys Club, Nailsworth, Glos. Visitors and new members are welcome and details can be obtained from the Secretary, *G8BEL*, F. J. D. Hills, 1 Oxleaze Close, Tetbury, Glos. GL8 8JS.

REGION 7

Acton, Brentford & Chiswick (ABCRC)—18 March (Club Aerial Tests). At the AGM on 21 January Club officers were elected. Chairman, G3OJX; Vice-Chairman, G5ZA; Secretary/Treasurer, G3GEH; Auditors, G2FRI, G3PZK; Committee: G2FRI, G3IGM, G3PZK, G5ZA. Chiswick Trades and Social Club, 66 High Road, Chiswick.

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

Ashford, Echelford (ARS)—17 March and 27 March (AGM). In recognition of his joining as the 100th member, G3BIA was presented with his subscription back by the Club President G3DXA. St Martins Court, Kingston Crescent, Ashford, Middlesex.

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

Bexleyheath (NKRS)—13 March (The Other Man's Hobby, G3IQG rally driver), 27 March (Aerials for the amateur, G3ISX), 14 March (Annual Dinner), 7.30 pm, Congregational Church Hall, Chapel Road, Bexleyheath.

Chingford (RSGB Group)—Fridays, 8 pm. Tel 01-524 0308.

Cheshunt (C & DRC)—Fridays, 8 pm, 7 March (AGM), 5 Bois Moor Road, Chesham.

Chingford (SRC)—Fridays, 8 pm. Friday Hill House, Simmons Lane, Chingford, E4.

Civil Service (CSRS)—10 March (Visit to National Computer Centre), 18 March (G2MI's talk on his USA visit). The CSRS is a National group and on Fridays on 3625 kHz at 6.30 pm G3CSR is on the lookout for members. The cheese in the December cheese and wine party was lost in a traffic jam but no-one seemed to mind! Civil Service Recreation Centre, Monck Street, Westminster.

Croydon (SRCC)—18 March, 8 pm. Swan and Sugarloaf, South Croydon.

Crystal Palace (CP & DRC)—15 March (G2MI presents a slide account of his USA visit). G3XDL achieved a club award as the first member to gain his GPO licence in the club year. The 1952 Committee Cup was awarded to Rex Lawson for his services to the club. Emmanuel Church Hall, Barry Road, SE22.

Dorking (DR & DRS)—11 and 25 March, 8 pm. Star and Garter, Dorking.

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

East London—Third Sunday, 2.30 pm. At the AGM the following officers were appointed. Chairman: G3SKV, Treasurer: G2ABC, Secretary: G3WKG. Wanstead House, The Green, E11.

Edgware & Hendon (E & DRS)—10 and 24 March, 8 pm. St Georges School, Flower Lane, Mill Hill, NW7.

Gravesend (GRS)—Third Wednesday, 8 pm. RAFTA Club, Overcliff Road.
Guildford (G & DRS)—11 March (Surrey University), 28 March (Natter Night), 8 pm. Guildford Engineering Society, Stoke Park.
Hampton Court (TVARTS)—First Wednesday, 7.30 pm. Cardinal Wolsey, Hampton Court.
Harlow (DRS)—Tuesdays (General and cw practice), Fridays (Junior Meetings), 18 March (Lecture and demonstration on "The Amateurs' use of the Oscilloscope" by G3VTR), 8 pm. This year's rally will be at Harlow Town Show, 30–31 August. Mark Hall Barn, First Avenue.
Harrow (RSH)—Fridays, 8 pm. Roxeth Manor School, Eastcote Lane, Harrow.
Havering (H & DARC)—12, 26 March, 8 pm. British Legion House, Western Road, Romford.
Hemel Hempstead (HH & DARS)—First and third Fridays, 8 pm. Rucklers Lane Hall, Kings Langley.
Holloway (GRS)—Mondays (RAE), 7 pm, Wednesdays (Morse), 7.30 pm, Fridays (Club), 7.30 pm. Monten School, Hornsey Road.
Ilford—Thursdays, 8 pm at G3PCA's house until further notice, 50 Mortlake Road (off Ilford Lane), Ilford.
Kingston (K & DARS)—Second Wednesday, 8 pm, 12 March (Surplus Equipment Sale). The programme through to May includes an extensive series of talks on all aspects of receiver design, more details later. Secretary is M. Diprose, 36 Tiverton Way, Chessington, Surrey. Penguin Lounge, 37 Brighton Road, Surbiton.
Leyton & Walthamstow—Tuesdays, 7.30 pm. Leyton Senior Institute, Essex Road, E10.
London (UHF Group)—First Thursday (UHF Tests), 7.30 pm, Whitehall Hotel, Bloomsbury Square, Holborn, WC1.
Loughton—14, 28 March, 8 pm. Following the AGM a new Chairman (David Moore) and Secretary (G3OPA) have been appointed. The club can be reached on buses 167, 254 and 20A. Loughton Hall, Rectory Lane (near Debden Station).
Maidenhead (N & DARC)—Third Tuesday, 7.30 pm. Victoria Hall, Cox Green, Maidenhead.
New Cross—Wednesdays and Fridays, 8 pm. 14 March (Radio Meteorology by G2FKZ), 225 New Cross Road, SE14.
Paddington (P & DARS)—Thursdays, 7.30 pm. Beauchamp Lodge, 2 Warwick Crescent, W2.
Purley (P & DRS)—First and third Fridays, 8 pm. Railwaymans Hall, Side Entrance, 58 Whytecliffe Road, Purley.
Reigate (RATS)—First Wednesday, 7.45 pm. George and Dragon, Cromwell Road, Redhill.
Romford (R & DRS)—Tuesdays, 8.15 pm, RAFTA House, 18 Carlton Road.
Scouts (ARS)—20 March, 17 April (AGM), Baden Powell House, Queensgate, South Kensington, SW7.
Sidcup (CVRS)—20 March (Natter Night), 3 April (AGM), 8 pm. All Saints Church Hall, Bercta Road, New Eltham.
Slough (SDR Group)—First Wednesday, 7.30 pm. United Services Club, Wellington Street.
Southgate (SRC)—Every other Thursday, 8 pm. 13 March (Junk Sale), newcomers welcome. Arnos Hall, Bowes Road, N11 (Near Arnos Grove tube, opposite Arnos Arms).
St Albans (Verulam ARC)—5 March (Test gear and 144 MHz transverter, G8BNR), 19 March ("Certificates and Awards" by C. Emery, G5GH), Cavalier Hall, Watford Road, St Albans.
Sutton and Cheam (SCRS)—17 March, 8 pm, April 12 (Annual Dinner and Ladies Festival, see elsewhere), The Harrow Inn, High St, Cheam.
Welwyn (Mid Herts ARS)—13 March, 8 pm. Welwyn Civic Centre, Welwyn.
Wimbledon (W & DRS)—14 March (GPO Talk), 8 pm. St John Hall, 124 Kingston Road, South Wimbledon, SW19.
Wembley (GECARS)—Thursdays, 7 pm. Sports Club, St Augustin Avenue, North Wembley. This club is open to non GEC employees by invitation. Telephone ARN 1262 for details.

REGION 8

Canterbury (EKRS)—Details from Hon. Sec. *G3MDO QTHR.*
Crawley (CARC)—26 March (Club constructional contest plus RSGB film "Radio News of 1968"), 8 pm. Visitors and especially swl's and newcomers are especially welcomed, Trinity Congregational Church, Ifield, Crawley. 9 May (Annual Dinner at Airport Hotel. Tickets from Hon. Sec.) *G8BQE.*
Eastbourne (SARS)—Meetings held at Victoria Hotel, Latimer Rd, Eastbourne. Details from Hon. Sec. L. E. Tagliferro, 9 Tugwell Rd, Harpden Park, Eastbourne.
Maidstone (MYMCAARS)—Meetings held at YMCA Sports Centre, Melrose Close, Loose, Maidstone. Details from *G3YCN*, Hon. Sec.
Mid-Sussex (MSARS)—13 March (Demonstration by Vero Electronics Ltd), 27 March ("The QSL Bureau" by Arthur Milne, G2MI), 7.45 pm, Marle Place Further Education Centre, Leylands Rd, Burgess Hill. At the AGM the following Club officers were elected. President, G5RV; Chairman, G3BZO; Hon. Sec., G3RXJ; Hon. Treasurer G3WYN; Committee G3VDC, G3VAK, G3WPO.
Thanet (TRS)—7 March (UHF/VHF Group meeting at Canterbury), 14 March (Constructional Contest), 21 March (Talk by Regional Representative G3MDO), 28 March (Visit by G2MI and other visitors to Annual Dinner), 29 March (Annual Dinner at San Clu Hotel, East Cliff, Ramsgate). The Thanet Mobile Rally will be held on 18 May, 1969 and an added attraction will be the SRN-4 hovercraft. *G3RAD.*
Tunbridge Wells (WKARS)—7 March ("Transistors as PA's" and/or RTTY demonstration by Ron Vaughan, G3FRV), 15 March (Visit to Tatsfield), 21 March ("Air Traffic Control" by Mr Peacock), 28 March (Visit to Police Headquarters at Maidstone). (Ed note—we are left in suspense as to where this interesting programme is to be held!).
Worthing (W & DARC)—Meetings held every Tuesday, 8 pm, Rose Wilmot Youth Centre, Littlehampton Road, Worthing.

REGION 9

Bristol (BARC)—Every Monday and Thursday, 7.30 pm, Club HQ (G3TAD), University Settlement, 41 Ducie Road, Barton Hill, Bristol 5. 13 March ("Aerials" by G6CJ, Tape Lecture), 3 April ("Two metres" by G2UJ, Tape Lecture). At the beginning of each month, a newsletter is being published, a copy will be gladly posted to you by depositing a sae with A. Eaglestone at the above address. *G3WLZ.*
(RSGB Group)—24 March ("Working portable on the Continent" by J. Carpenter, G8JQ) 7.30 pm, Becket Hall, St Thomas Street, near Bristol Bridge. Don't forget the surplus sale each month, proceeds help you, and the Group. *G3ULJ.*
Burnham-on-Sea (BOS ARS)—Meet Second Tuesday in each month, 8 pm, Crown Hotel, Burnham-on-Sea, Somerset. *G3GIW.*
Cornish (CRAC)—6 March ("Questions and Answers" session and a talk on "Veroboard and its Applications"), 3 April (AGM and Film on RSGB), South Western Electricity Board Social Centre, Camborne, Pool. *G3NKE.*
(SSB Group)—Second Thursday in each month. *G3OCB.*
(VHF Group)—Third Thursday in each month, 7.30 pm, The People's Palace, Pyder Street, Truro. *G3XC.*
A **Falmouth** Group has now been started in association with the parent Club, the **Newquay** Group is getting active, now joining the RAEN under the control of G3VJB. Newquay meet every Wednesday at Treviglas School. *G3THT.*
Plymouth (PRC)—First and Third Tuesday in each month, 7.30 pm, Virginia House, Bretonside, Plymouth. *G3UQF.*
Saltash (S & DARC)—Alternative Fridays, Burraton Toc H Hall, Warraton Road, Saltash. *G3UBY.*
South Dorset (SDARS)—First Friday in each month, 7.30 pm, Labour Rooms, West Walk, Dorchester. *G3BKV.*
Taunton (TARS)—Every Friday, 7.30 pm, Somerset Emergency Voluntary Organization HQ, Taunton Barracks, The Mount, Taunton. On the left as one enters barracks. *G3WPJ.*
Torquay (Torbay ARS)—Every Tuesday and Friday Club nights, Saturday 29 March (Business meeting) 7.30 pm, Club HQ, Bath Lane, Rear of 94, Belgrave Road, Torquay. *G3VNG.*
Wells (WARS)—Mondays, EMIE Social Club, Chamberlain Street, Wells. *G3MQQ.*
Weston-super-Mare (WSMARS)—7 March, 7.30 pm, Westhaven School, Ellesmere Road, Uphill, WSM.
Yeovil (YARS)—Wednesdays, 7.30 pm, Park Lodge, The Park, Yeovil. *G3NOF.*

REGION 10

Blackwood (ARC)—Fridays 7.30 pm, Blanche Cottage, off High St, Blackwood, Mon. *G6BK.*
Barry College of Further Education (ARS)—Thursdays 7 pm, Barry College of Further Education, Colcot Rd, Barry, Glam.
Cardiff (RSGB Group)—10 March, 7.30 pm, TA Centre, Park St, Cardiff. *GW3GHC.*
Port Talbot (ARC)—4 March (RSGB Tape recording on Mobile Operation), 7.30 pm, Trefelin Club & Institute, Port Talbot. This

club has issued an open invitation to all clubs in Region 10 to its Annual Social on 1 April. Any clubs who may inadvertently have been missed please accept apologies and will all secretaries please notify GW3RVG in advance of the numbers who will attend. *GW3RVG.*

Pontypool (ARC)—Tuesdays 7 pm, Educational Settlement, Rockhill Rd, Pontypool, Mon. *GW3JBH.*

Pembroke (ARC)—Last Friday in each month. 7.30 pm, Defensible Barracks, Pembroke Dock. *GW3LXI.*

Rhondda (ARS)—Tengelli Hotel, Treorchy, Rhondda, Glam. Further details available from Secretary. *GW3PHH.*

University College, Cardiff (ARS)—Students Union, Dumfries Place, Cardiff. This Society is now in possession of a KW2000A and accommodation for operating is available. Further details available from the Secretary. *G3XSQ.*

REGION 11

Rhyl (R & DARC)—Second Tuesday, Rhyl's Silver Band Room, Windsor St, Rhyl. At the recent AGM the following officials were elected. Chairman, A. D. Steinhilber; Hon. Secretary, H. Douglas; Hon. Treasurer, A. Cobb; Auditor, P. Jones; Committee, M. Theaker, B. Brookes, T. Hewitt. The club is applying for its own call-sign and a contest committee consisting of Messrs S. Barnes, B. Brookes and F. Pardy was formed.

REGION 12

Aberdeen (AARS)—Fridays, 7.45 pm, 6 Blenheim Lane, Aberdeen. *GM3HGA.*

Lhanbryde (MFARS)—Mondays, 7.30 pm, St Andrews Church Hall, Lhanbryde, by Elgin. *GM3UKG.*

REGION 13

Border—Members in the Scottish Border area should contact GM3WIG at 8 Ettrick Terrace, Hawick, Roxburghshire.

Edinburgh (LRS)—13 March (Quiz by D. Guest, GM3TFY), 7.30 pm, YMCA, St Andrew St, Edinburgh. 27 March (Visit to Portobello Power Station), 7.30 pm. *GM3VBB.*

REGION 14

Ayrshire (AARG)—9, 23 March, 7.30 pm, ATC Hq, Kilmarnock. *GM3THI.*

Glasgow University (GURC)—14 March, 7.30 pm, Engineering South Building, University of Glasgow.

Greenock (G & DARC)—7, 21 March, 7.30 pm, Arts Guild Campbell Street, Greenock.

Mid-Lanark RSGB Group—21 March, 7.30 pm, YMCA, Brandon Street, Motherwell.

REGION 15

Ballymena (BRC)—Tuesdays, 8 pm, morse and theory classes in progress, Club Rooms, 46A Bridge St, Ballymena. *GI3XDX.*

Belfast (B & D RSGB Group)—Wednesdays, War Memorial Building, Waring St, Belfast. *GI2DZG.*

REGION 16

Great Yarmouth (GYRC)—Fridays, 7.30 pm, 98 South Market Rd, Gt. Yarmouth.

Ipswich (IRC)—26 March, 7.30 pm. British Red Cross Hq Gippeswyk Ave, Ipswich. *G3UJR.*

Norwich (NARC)—Mondays, 7.30 pm, The Clubroom, Brickmakers Arms, Sprowston Rd, Norwich. *G3PTB.*

Southend (SDRS)—21 March, 8 pm, Staff Canteen, E. K. Cole Ltd. *G8BSB.*

REGION 17

Chippenham (C & DARC)—11 March ("The Use of Veroboard' by Mr Leadbetter of Vero Electronics Ltd), 25 March ("Getting Receivers and Equipment for the DF Season" by G3NJG). Meetings each Tuesday at 7.30 pm, Chippenham High School for Boys, Hardenhuish Lane, Chippenham, Wilts. *G3PQG.*

Harwell (AEREARC)—18 March (Novice Night and Question Time), 7.30 pm, Social Club, AERE, Harwell, Berks. G2HIF. RAE and Morse Classes each Wednesday, 7.30 pm. Post Graduate Education Centre, AERE. *G3NNG.*

Portsmouth (P & DRS)—5 March ("Decibels etc." by G3JZV), 12 March (Junk Sale), 19 March (Natter Night), 26 March (Quarterly Business Meeting), 7.30 pm, Room 5, Twyford Avenue Community Centre, Portsmouth, Hants. *G3CNO.*

At the recent AGM, the following officers were elected: President, H. Woodman, G3ORR; Chairman, E. W. Adams; Secretary and Treasurer, A. C. Cake, G3CNO.

Reading (R & DARC)—11, 25 March at the Victory PH, Tilehurst, Reading, Berks. *G3TEB.* At the AGM, a vote of thanks was made to G3LFM for his work as club secretary and on the club construction project. Recent meetings saw a review of the KW2000 and Trio transceivers. Future meetings will include a visit to the Bulmershe TV Studios.

Swindon (S & DARS)—5, 19 March, 7.30 pm, Penhill Junior School, Swindon, Wilts. *G3JAP.*

The club will be exhibiting at the Swindon Further Education Exhibition in the Town Hall, 30 April to 3 May.

RAIBC—This club welcomed two new licenced members plus four SWL's during January. Two receivers have been donated and installed and an Area Representative has been found following a note in QTC. We blush with pride! Details of the Radio Amateur Invalid and Bedfast Club, which exists to help and unite disabled Radio Amateurs and short wave listeners can be obtained from Frances Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs. RAIBC is in constant need of communications and test equipment plus all kinds of books and periodicals concerning radio communication and electronics, in general. Your help would be greatly appreciated. Why not rumage through your workshop and see if you have anything serviceable that you don't need? Someone does need it, and badly.

Northampton Short Wave Radio Club

The Northampton Short Wave Radio Club is exhibiting at an Arts and Crafts Exhibition being held in Northampton from February 15 to March 14, 1969. The exhibition will be given much local publicity and it is hoped that a favourable image of Amateur Radio can be successfully conveyed. Further details are obtainable from the Secretary of the club, G3XJJ.

Sutton and Cheam Dinner and Festival

The Sutton and Cheam Radio Society announce their 21st Annual Dinner and Ladies Festival to be held at the Crown Inn, Morden, Surrey (just by Morden Station at end of the Northern Line tube) on Saturday, 12 April, 1969. The reception is at 6.30 pm.

RSGB President, John Swinnerton, G2YS, has accepted an invitation to be Guest of Honour and it is expected that a number of other well-known personalities in the field of Amateur Radio will be attending.

A really first-class evening, including cabaret, is planned and a heavy demand for tickets is anticipated. Please contact Roy Scott, G2CZH, 140 Seymour Ave., Morden, Surrey as soon as possible for bookings, at 35/- per person and further information.

WHAT'S IN A NAME?

There's something that I'd like to know,
So if you please try
And explain where we get the " ham "
That we are known by.

Perhaps it was a Cockney chap
Who, speaking with a slure;
Said, if we 'ave a bleeding flap
We'll call the hamature.

Or maybe when the BCI
Caused noise both long and big,
The listeners gave the name of " ham,"
(Politely meaning pig).

What e'er the reason, for being
Known by such a word;
If a doctor gave him treatment,
Would a ham be cured?

From " Break-in," Journal of the New Zealand Society, NZART.

LOOKING AHEAD

28 March—RSGB London Lecture Meeting.

13-19 April—Meet the President Week. All bands 1·8–28 MHz, cw and ssb.

18 April—RSGB Dinner Club.

26 April—VHF/UHF Convention. The Winning Post Hotel, Whitton, near Twickenham.

27 April—Bellevue Convention, Manchester.

5–10 May—IARU Region 1 Conference, Brussels.

10-11 May—Radio Amateur Convention, Knokke, Belgium.

21 May—Summer RAE Examination.

13-14 September—IARU Convention, Geneva.

1–4 October—RSGB International Radio Engineering and Communications Exhibition, Royal Horticultural Society's New Hall, Greycoat Street, SW1. 10 am to 9 p.m.

CONTESTS

8–9 March—BERU Contest.

8–9 March—YL-OM Contest (CW) 18.00 Sat–18.00 Sun.

15–16 March—ARRL DX Competition (2nd CW w/e)

30 March—Low Power 3·5 MHz Contest. (Feb p 132).

12-13 April—CQ World Wide WPX SSB Contest.

12-13 April—Second 70 MHz (Open) Contest. (Mar p 203).

3–4 May—Fourth 144 MHz (Portable) Contest.

24–25 May—First 432 MHz (Open) Contest.

24–25 May—First 1296 MHz Contest.

7-8 June—National Field Day. (Feb p 131).

22 June—Third 70 MHz (Portable) Contest.

5–6 July—Summer 1·8 MHz Contest.

5–6 July—Fifth 144 MHz (Open) Contest.

12-13 July—High Power Field Day. (Mar p 203).

20 July—Second 432 MHz (Portable) Contest.

4 August—Sixth 144 MHz (SSB) Contest.

10 August—Third 432 MHz (Open) Contest.

17 August—Fourth 70 MHz (CW) Contest.

6–7 September—VHF National Field Day.

14 September—3·5 MHz Field Day.

21 September—Seventh 144 MHz (CW) Contest.

5 October—Second 1296 MHz (Open) Contest.

11–12 October—28 MHz Telephony Contest.

25–26 October—7 MHz Contest (CW).

3 November—Eighth 144 MHz (SSB) Contest.

8–9 November—7 MHz Contest (Phone).

15–16 November—Second 1·8 MHz Contest.

6–7 December—Tops CW Club 80m Contest.

7 December—Fifth 70 MHz (CW) Contest.

MOBILE RALLIES

6 April—ARMS mobile meeting—Lydd Airport, Kent.

20 April—North Midlands Mobile Rally, Drayton Manor Park, Tamworth, Staffs.

18 May—Northern Mobile Rally.

1 June—ARMS Rally at the home of the Shuttleworth Aircraft Museum, Old Warden Aerodrome, Biggleswade, Beds.

1 June—Maidstone YMCA ARS Rally.

29 June—Longleat Mobile Rally, near Warminster,Wiltshire.

6 July—South Shields Mobile Rally.

13 July—Worcester Mobile Rally.

27 July—Cornish Radio Amateur Club.

10 August—RSGB National Mobile Rally, Woburn Abbey.

17 August—Derby & District Mobile Rally.

24 August—Torbay ARS Mobile Rally.

24 August—ARMS/RSARS Rally, Blandford Camp, Dorset (Mems. only).

24 August—Swindon Mobile Rally organized by the Swindon & District Amateur Radio Society.

22 September—RSGB Scottish Mobile Rally, Cartland Bridge Hotel Lanark.

29 September—Harlow Mobile Rally, Magdalen Laver Village Hall, near Harlow, east of the A11. Open from 10 am. Talk in Station on 160, 4 and 2m. Details from R. A. Sinclair, G3VAD, 244 Stanstead Road, Hoddesdon, Hertfordshire.

MEMBERS' ADS

These advertisements are free to members and limited to 32 words, discounting the name, address and telephone number. Ads must be typed or printed on the form (see p.223), or on a post card similarly laid out. They should be accompanied by a recent Radio Communication wrapper. No trade advertisements can be accepted in this section, although these and others requiring immediate inclusion should be sent to our classified advertisements department.

Owing to the large build-up of Members' Ads, we regret that a few advertisements will not be included this month. Without unbalancing the magazine, we cannot hope to publish everyone's advert.

To help ease this, we are re-arranging the submission procedure for the adverts. There will now be a period of about a week when adverts can be submitted and any coming before or after this time will not be included. Dates for the April, May, June and July issues are given below. Under no circumstances can we guarantee inclusion and unused adverts will not be held over. They should be resubmitted if further inclusion is desired.

Entry period for April .. 5 March to 11 March
Entry period for May .. 4 April to 11 April

Entry period for June .. 5 May to 12 May
Entry period for July .. 4 June to 10 June

134 *SWM*'s 1954 to Oct 1968. 37 *RSGB Bulletins* 1965 to Oct 1968 gd cnd offers. J. Curtis, G3JZR, 10 Albert Road, Portishead, Bristol.

FT243 xtals 7000 7050 7125 7500 also ½ in 1816 3553 3800 5252 5260 7009 7087·5. KW Trap Dipole. Codar Preselector 3·5 and 21 MHz HRO bs coils, first reasonable offers secure. D. Haylock, G3ADZ, Bowyers, Steepmarsh, Petersfield, Hants. Tel Liss 3314.

PCR rx gd wkg ordr, some slight mods, details included £6 pp. A. V. Broomsgrove, 33 Kings Head Lane, Bristol, BS13 70B.

Bandswitched exciter for am tx. Miniature relays for 12 VDC. Pickstone instant heat soldering iron. Gd morse key. Wanted mains tran 100V 50mA sec. Crystal 6·5 MHz overtone wkg. A Parker, G3KH, 133 Station Rd, Cropston, Leicester LE7 7HH.

Eddystone EC10 excellent £28. J. Margolis, 95 Collinwood Gdns, Clayhall, Ilford, Essex. Tel 01-550 0882.

MP33E triband beam £26. TR44 mk 3 rotator £32. TD-2 40/80m dipole £10. Two 2 in 20 ft duralumin scaffold pipes with jointing sleeve and base plate £6. All six months old unused and in orig cartons. Buyer must collect. R. Pragnell, G3WZB, 9 Broadwalk, Heston, Middlesex. Tel 01-570 9909.

Canadian 52 set rx gd cond £4 carriage extra. B. Robertson, 12 Hazel Close, Mildenhall, Suffolk.

Marconi CR150/2 double superhet rx, Minimitter Top-2-7 tx, Class D wavemeter, accessories, spares and assorted junk, complete station £40 ono or split. M. Doig, G3ROA, 73 Keene Way, Galleywood, Chelmsford, Essex. Tel Chelmsford 51459.

Complete station KW Vanguard mk2, Eddystone 840C, preselector, atu, 100/1000 kHz xtal marker, bug key, cw monitor, fsm, mic, phones switch unit, tape recdr, Dexion rack, fb cnd £95 ono buyer collects. A. Bickers, G3TIH, 192 Garrets Green Lane. Birmingham 26. Tel 021-743 5833.

Trio 9R59 rx fb cnd £25. 1155N £8. 1155B £5. Pair transistor tcvrs 500 mW 28·5 MHz £15. VHF QRO tcvr 55 to 95 MHz tunable 240 VAC £22 10s. Donohue, 41 Garway, Woolton, Liverpool, L25 5LP. Tel 051-428 3938.

Codar AT5 £11. Codar 12 V psu £8. Tavasu mobile whip 160, 80 coils £3 or £20 the lot. Buyer collect or pp extra. W. Nilan, G3PRD, 44 Watton Rd,Worksop, Notts.

22 set with psu 12 V 2-8 MHz £3 10s including circuit. SCR 522 tr 100–156 MHz 4 channel with control unit and hb £4. US Army sig gen 100-156 MHz vfo or xtal with hb £3 12s. A Stagles, G3RBY, 2 Blackthorn Close, St Albans, Herts. Tel 56-54009.

CT53 sig gen 8·9–300 MHz without charts but ok. TF987/1 noise gen with hb £10 each. M. Saunders, G3RWV, 31 Mortimer Hill, Tring, Herts. Tel Tring 3128.

Complete hf station HRO with coils (2BS) and psu. 150W cw tx all band with psu plus other bits and pieces £40. Deliver 50 miles or petrol extra. S. Alderton, G3UXV, 2A Goldings Rd, Loughton, Essex. Tel 01-508 3013.

Vanguard Mk 2 160–10 immaculate, nearest £35 cheaper if you collect. G. Shankie, GM3WIG, 8 Ettrick Terrace, Hawick, Roxburgh. Exch HRO Senior, 7 coils 14 and 3·5 bs for 2m gear. Other exchanges considered. B. Cliffe, G8BRT, 16 Moorbank Drive, Sheffield, S10 5TH. Tel 303577.

2000-1500-0-1500-2000V at 1A tran, pair 813s, heater tran to match, 12A rf meter, heavy duty choke (rf), variable inductances, high voltage standoff capacitors, heavy duty relay, fb for linear kit, offers please. R. Furness, G3RUI, 17 Hillingford Ave, Great Barr, Birmingham. Tel 021-357 9474.

40W am/cw 80-10m self contained psu £10. 160-80-40 tx complete modulator, rf atu, psu, mic, hb £10. R1155 £1. Trans 425-0-425 300 mA £1. 500-0-500 500mA £1. R. Cropper, G3XCA, 49 St Marys Close, Hilperton, Trowbridge, Wilts. Tel Trowbridge 3356.

GEC Miniscope, perfect wkg ordr £5. J. Farlow, G3BXI, 49 Mount Pleasant Rd, Chigwell, Essex. Tel 01-500 4546.

Four command rx's, Q5'er, 1·5–3, 3–6, 6–9 MHz, 14 V dynamotor mains psu with 1s and spares, Genemotor, 12 V input, 320 V 160 mA output, lot £16 collected. R. Scott, G3DXI, 41 Sweet Briar, Welwyn Garden City, Herts.

Woden DTF12 tran 2·5 V 10 A for 866 rectifiers as new 15/-. Weight for post 5 lb. D. Herbert, G6RF, Collestick Farm Cottage, Collestick, Truro, Cornwall. Tel. Perranporth 2047.

Napoleon SWR Bridge £3. DM16HL dynamic mic 50/-. Mosely TA31 triband rotary dipole £5. All items as new also FL8A audio filter 10/-. B. Edwards, G3RJB, 5 Powys Walk, Hereford.

70cm station professionally built tx QQV02-6 final built in psu 10 months old. ABP converter parabeam and 8 over 8 slot £42 complete. Would sell tx separately. H. Hadley, G8BEO, 120 Higham Lane, Nuneaton, Warks. Tel. Nuneaton 66976.

KW Trap dipole with 97 ft coax exc cnd £5. Ex-am coax relay type 78A 15/-. Brand new 6146 (2) 6HF5 (2) wanted. Carriage extra. D. Jagger, GW3KAJ, 27 Penmaen Walk, Culverhouse Cross, Cardiff, CF5 4TP. Tel. Wenvoe 454.

Drake R4B ex £200. Drake T4XB tx without psu £200. Both units less than year old and with 160m xtals. C. Carr, G5AKH, Box 581, RAF Croughton, Nr. Brackley, Northants.

Star ST700 ssb tx 200 W pep, vox, ptt, cw, sidetone, 8 months old, as new £100. K. Smith, G3RB, 15 Malcolm Court, West Monkseaton, Whitley Bay, Northumberland. Tel (business) Newcastle-on-Tyne 869811, Ext 417.

Oscilloscope built around USAF indicator unit 5CP1, sep QRO psu, vy hvy duty eht, ht and lt trans, circuit and leads, works well, offers or exch why? Bug key wanted. Buyer collects. B. Tipper, G3WWL, 271 Blackberry Lane, Four Oaks, Sutton Coldfield, Warwks.

RA-1, 50 W homemade tx, am cw, atu, swr bridge, complete station buyer inspects will deliver 50 miles London £45 or exch 4m tx/rx Pye base, TW Communicator or similar. D. Bean, G3TJQ, 51 Heathfield Square, London, SW18. Tel. 01-874 1227.

KW Valiant tx, all bands with aerial switching complete 250 V ac and 12 V dc supplies £25. Wanted 2m walkie talkie any make or power. R. Redding, G3VMR, September House, Cox Green, Maidenhead, Berks. Tel. OMA8 24929.

CR100, nl, s meter, gd cnd £15. McCoy 9 MHz ssb filter with 2 carrier xtals £10. Set new Brooks xtals for if and carrier 8 xtals G2DAF rx £6. 60 FT241 xtals £3. 898 gearbox assembly but not scale wanted. M. Rimmer, G3KDA, 98 The Leys, Bidford on Avon, Alcester, Warks.

Erskin Sope 3 in tube with 465 kHz wobulator £15. BC610 control unit £10. Wire recorder o/p stage pp 6V6 £8. Another not working £3. AR88D hb 25/- 813 30/- R. Whorwell, G3CTR, 65 John Kennedy House, Rotherhithe Old Road, London, SE 16. Tel. 01-237 4604.

MEMBERS' ADS members' ads MEMBERS' ADS members' ads MEMBERS' ADS

SR550 amateur band rx, 160–6m, xtal cal, gd ssb performance, mint cnd and professionally tuned up £40 ono. D. Lovesey, G3ONP, 11 Watson Road, Oxley, Wolverhampton.

Geloso 209R exch 20m tcvr prefer HW32A. H. Bird, G3OUQ, "Green Roofs," 344 Coventry Rd, Hinckley, Leics. Tel 3390.

KW Vanguard 2 yrs old, exc cnd, tvi negligible, am on ten any time £40. Eddystone 888A fine cnd £55 or both £90. Seen working at QTH any day. W. Vann, GM3TBV, 52 Urrdale Rd, Glasgow S1. Tel 041-427 1337.

2m ssb/am/cw tx 100W pep low interference £45. 70cm converter 12-14 MHz valve £9. 4m converter 12 MHz E88CC £8. Scope 13 £15. Modulator for 150 W tx 19 in by 7 in £12. Paper capacitors, psu's, sae details. Offers? P. Nickalls, G8AQA, The Rectory, Church Lane, Nailsea, Bristol, BS19 2NG. Tel Nailsea 3227.

RAE course complete £7. P. Barville, G3XJS, 1 Rathgar Ave, Ealing, London, W13.

Electroniques QP166 with Eddystone dial 898, xtal cal, stab vol Q mult both self powered in black crackle cabinets. Hallicrafters SX140 rx with Codar PR30 xtal cal, psu, spkrs £38. or exch record player etc. J. Edwards, Spring Cottage, Dowlish Wake, Ilminster, Somerset. Tel Ilminster 2679.

3 vhf wavemeters type 4 204–219 MHz 12 in long cavity resonator in each cavity. Adjustable for 2m. Ex-govt but new unused complete with calibration charts. Offers, D. Baker, 80 Edgerton Rd, Whitton Estate, Lowestoft, Suffolk.

Panda PR120V full wkg ordr £20 delivered 50 miles, G6HP scope. condenser down 25/- 20 yds 10 core cable 25/- G2WQ 10 Glebelands Rd, Prestwich, Manchester.

Going transceive KW Viceroy mk 3 £80 ono and Eddystone 888A with matching spkr £50 ono. M. Cooley, G3SKY, 13 Hazely Combe, Arreton, Newport, IoW.

Hallicrafters SX24 needs little attention £5 or exch anything to do with swl'ing. C. Lamb, 70 Dudsbury Rd, Ferndown, nr Wimborne, Dorset.

Pye Reporter 4m mobile. 4m cw tx psu. 20, 80m pa units. Mullard scope £10 the lot. F. Nurse, 10 Wenewell Close, Aston Clinton, nr Aylesbury, Bucks.

Selling wide range of equipment including aerial mast, rotator, scope, BC221, atu, aerial selector relay, meters, components and more. Send for list. E. Cheadle, G3NUG, "Montana," 27 London Rd, Shenley, St Albans, Herts. Tel Radlett 4435.

Selling 1968 SB101, cw filter £180. Psu, coax, switch, load in matching cabinet with spkr £20. 30 ft sectional alloy mast £14. Mastrotator with indicator £14 all ono. Ledger, G3UBL, 9 Rampton Drift, Longstanton, nr Cambridge.

NO36 tx 20-15-10m A1 A3 50W with ptt. mic, plugs, connectors and Eddystone bug key £10. Going ssb. J. Worters, G3XRW, 29 Windmill Lane, Ewell, Surrey. Tel 01-393 8894.

Heathkit RA-1 rx complete with manuals and matching spkr absolutely mint both in and out. £35 inc carriage ono. G. Batten, Uplands, Salisbury Rd, Marlborough, Wilts. Tel Marlborough 2562.

Eddystone 940 mint cnd, plinth spkr £100. J. Butler, G3VWZ, 151 Clarence Gate Gdns, NW1. Tel Hun 4376 after 7 pm.

Heathkit HW32 tcvr £35. TW2 tx with 8050 xtal, power plugs, etc £12. Both little used, gd cond. D. Waller, G3SUL, 109 Merryhills Drive, Enfield, Middlesex. Tel 01-363 0557.

HRO-MX 9 gc coils £15 psu £2 buyer collects or carriage at cost. Exch used Electroniques QP166 for GC166. C. Haddock, G3UZM, 26 Featherbed Lane, Exmouth, Devon.

Codar 70A PR30 preselector, spare valves, instructions, all exc cnd, new Sept 68 £12. H. Wright, 5 Globe Cres, Farnham, Bishops Stortford, Herts.

UHF Precision wavemeter, oscillator and power meter 900–1250 MHz type AN-UPM-4A full of cavities! Comp installation exc cnd delivered at cost £30 ono. D. Wilson, G8APS, 177 Dower Rd, Four Oaks, Sutton Coldfield, Warks. Tel 021-308 3044.

Electroniques hamband front end, 2 valves EF183 ECH81 gd cond £3 10. carriage paid. List £16 16. H. Porton 48 Allison Rd, Brislington, Bristol 4. Tel Bristol 77666.

160-10m mint DX100U with B40 in new cnd £80, or £50 and £30 separately. Deliver 100 miles. Five xtals with tx. C. Mitchell, G3UVS, Kechil Rumah, Green Lane, Yelverton, Devon. Tel Yelverton 2986.

360 W mod tran 550-0-550 390 mA, Mains tran tapped 500 V. Will exch for 9 MHz xtal filter or why. Also few 3 Henry 100 mA chokes, 5/- each. Post extra. K. Hodge, GW8BIP, 121 Porthkerry Rd, Barry Glam.

Stellaphone Cassette Recorder with 3 cassettes, 1 unused £21. Ameco R5 advanced solid state rx with preselector, 0·5–54 MHz, see current US magazines, £28. M. Margolis, G3NMR, 95 Collinwood Gdns, Clayhall, Ilford, Essex. Tel 01-550 0882.

CR150 1·9–60 MHz double superhet with pu £20 10. AR88D s-meter clean case £40 10. Eddystone 940 like new £90. TF144G sig gen £14 19. 517 sig gen £8 19. Philco mobile sw converter £2 10s. All plus carriage and ono. D. Byrne, G3KPO, Jersey House, Eye, Peterborough. Tel Eye 351.

LG300 with psu and mod fb cnd £45 ono. Deliver reasonable distance. B. Mercer, G3KLL, Hilltop House, Delph, nr Oldham. Tel Delph 669.

HRO 5T mint cnd 9 coils psu and manual with Codar PR30 £35 ono. New unused Joystick 3A tuner and 50 ft feeder wire £6 10. N. Miles 34 Hazlemere Rd, Penn, nr High Wycombe, Bucks. Tel Penn 3392.

Minimitter converter 80–10m 12 V or 24 V 1·5 MHz p/o £9. Vibrator 12 V dc to 24 V ac £2. G3XQT, 77 Kent Road, Woods Estate, Wednesbury, Staffs.

Pye Ranger for 2m or 4m mobile complete except xtals. R. Pilkington, G3IAG, "Hamrest," 29 Ely Rd, Littleport, Cmbs. Tel Littleport 487.

Heathkit scope OS2 immaculate £20. Minimitter hamband converter own psu 10–160 perfect £10. Fully stabilized psu Solartron 2HT outputs 3 ac 2c/t unused with manual. Prefer buyer collect. W. Harrison, 25 Wilmount St, Woolwich, London, SE18. Tel 01-855 4437.

BC348 rx with built in power pack £12. Geloso vfo drives 807 pa £3. 813 with base 30/-. Carriage extra. T. Woodcock, G600, 41 Millview Rd, Ruskington, Sleaford, Lincs.

Sony stereo solid state tape rcdr TC260 3¾, 7½ ips separate base, treble, volume controls cost £101 as new price £50 ono. 12 V dc Ardente 10W audio amp £3 with mic. R. Davies, G3CXJ, 13 Lovett Rd, Portsmouth, PO3 5EU.

160–10m tx, 10/50 W, Geloso vhf, built in mod, relay, control, psu, £15. R208 rx needs aligning. Offers W. Bishop, 69 Gayville Rd, Battersea, London, SW11. Tel 228-7488.

£8000 for three band quad plus four bedroomed detached family house (1936) in best road in Bognor Regis 300 yds from sea. J. Taylor, G3RDT, 82 Victoria Drive, Bognor Regis, Sussex. Tel Bognor Regis 5254.

Electroniques amateur band front end QP166 £6. I.f. tran series 1 type DIF/4/1·6, 7/6. Q mult coil type QL2 for 1600 kHz 5/- or will swop for QL4. 34·0 MHz xtal HC6U xtal wanted. J. Hoban, G3EGC, 96 Ashworth Lane, Astley Bridge, Bolton, Lancs. Tel Bolton 51502.

Kokusai 455–10K filter with xtal £7. Olympic loaded Z match £8. New Eddystone 898 dial £3. New boxed 807's 4/- each. 8/8 2m J-beam £3. Green 2m Nuvistor Converter £3. J. Willmott, G3LBG, 59 Green Lane, Eastwood, Leigh-on-Sea, Essex. Tel Southend-on-Sea 621561.

160m am/cw tx built in psu £8. 80–10m am/cw 50 W tx £5. AR88D with product detector gd cnd £22. Lot for £30. Exch for gdo, dummy load, 11 MHz and 11·5 MHz xtals or why carriage or collect. S. Mitchelmore, G3XHC, 51 Clayhill, Booker, nr Marlow, Bucks. Tel (Business hours) High Wycombe 26200 ext 275.

Trio JR60 rx with manual 1 yr old offers. Also TW 2m converter gd cnd £5. C. Kenyon, GW3WSU, 20 Victoria Square, Penarth, Glamorgan. Tel 709171.

R1155 rx for spares. New s/motion drive (works) 25/-, two Tannoy loudspeakers re-entrant type less horns 30/- each. Variable Inductance silver plated conductor ok for atu 15/-. Buyer collects or carriage extra. J. Easton, GM3VXR, 70 Leven St, Motherwell, Lanark.

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Components by weight. Most used all tested no valves. 1 lb 6/-, 3 lb 10/- or 10 lb 20/-. Adjustable thermal delay switches 7/- or 2 for 10/-. All post free. Giro 23 479 0008. M. Mann, G8ABR, 71 Queens Rd, Tewkesbury, Gloucs. GL20 5EL.

Trio 500SE super ham bands rx as new in original carton £49. Surplus due to arrival of new Collins rx. S. Andrews, 34 Rawcliffe Lane, Clifton, Yorks. Tel York 59035.

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Japanese bugkey 50/- Tunable 4m valve converter £1. Codar PR30 preselector £2. 100 W mod tran 30/- Type 46 walkie talkie £1. Band-switched 80–10m push pull tank link-coupled suit QRO linear £1. All ono. S. Turner, G3UJI, 51 Hilton Rd, Harpfields, Stoke-on-Trent, Staffs. Tel Newcastle 46570.

Surplus component bargains for constructors from QRO vhf gear. Mains trans from 4/-, Relays from 1/6. ½ in meters from 9/6. Valves from 1/-. Quality stuff in gd cnd. Stamp for lists. M. Smith, GM3WHT, Schoolhouse, Urafirth, Heylor, Shetland. Tel Hillswick 232.

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Trio JS500S 10–16m amateur bands rx double conversion as new in original packing and little used £49. E. Whitworth, 94 Pine Hill, Epsom, Surrey. Tel Epsom 26016.

RCA AR88D rx in perfect cnd and appearance with hb £35 ono. Deliver if necessary. C. Hanley, G3VAC, 81 New Rd, Chilworth, Guildford, Surrey. Tel Guildford 67613.

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60 *RSGB Bulletins* Jan '64 to Dec '68 inclusive £3. 60 copies *SWM* Jan '64 to Dec '68 inclusive £3. Both plus carriage. 58 copies *Monitor* Dec 1963 onwards, any offers? S. Stephenson, 82 Morris Lane, Leeds 5, Yorks.

Green and Davies 2m Nuvistor converter Mk 3, 28·5 MHz i.f. output with built in psu unused £5 plus carriage. H. Faulkner, 31 Queens Drive, Surbiton, Surrey. Tel 01-399 8196.

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FT243 xtals for 2m zone 2 in range 8006-8014 MHz and zone 4 8028–8039 MHz. E. Aust, G8BRX, 2 Spur Road, Waterlooville, Hants. PO7 7JL. Tel Waterlooville 52345.

RSGB Bulletin, Oct 67 containing Cornishman ssb tx. Would preferably buy copy. J. Shewan, G3UZB, 14 Cleveland St, Saltburn, Yorks.

EC10 or Nova-Tech and 940. J. Lee-Rand, G3UXA, 9 Oakway, Feltham, Middlesex.

Viceroy mk 3 or 4 in gd cond. R. Bantock, G3WNT, 38 Bittell Rd, Barnt Green, nr Birmingham. Tel 021-445 1405.

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Please keep your adverts down to a bare minimum. Anyone who cares will know that a KW2000A is a 180 watt transceiver with a mechanical filter, and an EC10 is a solid state general coverage receiver with a bfo, agc and the trimmings. So don't bother to add this to your advert. Anyone who is interested will know or find out.

We make liberal use of abbreviations, most of which are known. Rx, tx, tcvr, ls, exc wkg ord and so on are all fairly obvious. Best to check in a previous issue if you aren't sure of one.

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Info on rx 1359B made by Hatfield Instrument Ltd of London. Considering mods, anything welcome. R. Barnard, G3WUT, 33 Wallis Rd, Basingstoke, Hants. Tel 5022 day, 4590 eve.

Buy or borrow manual and/or circuit of Hallicrafter S27 (model RBK-8). E. Bovey, 1 Chapel Lane, Dartmouth, Devon.

Valve manual for Avo valve tester later than 1953. R. Hogg, G3VPZ, 26 Church Walk, Leatherhead, Surrey.

Urgent. 2m converter if below 16 MHz in gd wkg order. 2m 6 or 8 el. beam. Details to P. Duvoisin, G8CBM, 16 Holt Drive, Wickham Bishops, Witham, Essex. Tel Wickham Bishops 784.

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FT243 xtals 8·04–8·06 MHz. R. Lock, 9 Forest Rd, Woodford Green, Essex.

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Handbook AR77E rx borrow or buy. I. Wilkinson, G3VWO, 46 Ross Lea, Shiney Row, Co Durham. Tel Fence Houses 2301.

2m tuneable rx with mains psu. J. Challanger, 42 Gibbons Hill Rd, Sedgeley, Dudley, Worcs.

Pye Ranger or small 2m tcvr. J. Bennet, 17 Downs View, Bradford-on-Avon, Wilts. Tel 3450.

SWM Dec 64. A. Cameron, Coombe Cottage, Pitchbombe, Stroud, Glos.

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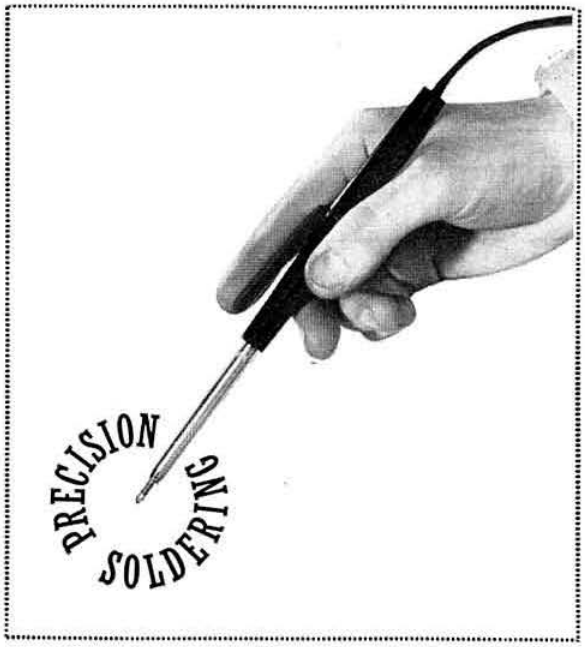

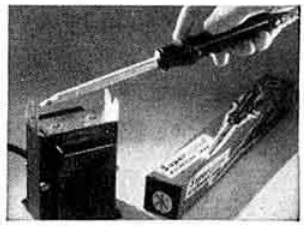

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