MARCH 1968

Radio Communication

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

incorporating RSGB BULLETIN

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Transmitter for all H.F. Bands, 220 watts PEP, SSB, AM CW now in full production complete with PSU.

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KW 1000

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1200 watts PEP complete with built in PSU and SWR indicator.

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KW2000A

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London, EC4
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RADIO COMMUNICATION (INCORPORATING THE RSGB BULLETIN) IS PUBLISHED ON THE FIRST WEDNESDAY IN EACH MONTH BY THE RADIO SOCIETY OF GREAT BRITAIN AS ITS OFFICIAL JOURNAL AND SENT TO ALL MEMBERS.

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MARCH 1968
VOLUME 44 No. 3

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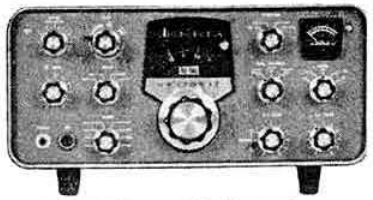
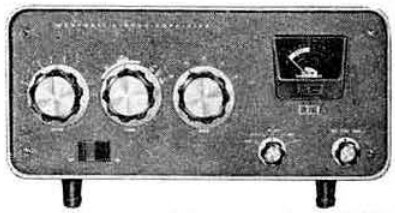


SB-101 80 Through 10 Metre SSB Transceiver . . . 180 watts PEP SSB, 170 watts CW (the practical power level for fixed/mobile operation). Features USB/LSB on all bands, PTT & VOX. CW side-tone, and more. Unmatched engineering and design.

Kit SB-101, 23 lbs., **£185 . 12 . 0** Ready to use **£225 . 12 . 0**



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 SB-200, 41 lbs., **£120 . 18 . 0** Ready to use **£145 . 18 . 0**

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 Mc/s, showing received signal waveforms. Spots over-modulation, etc.

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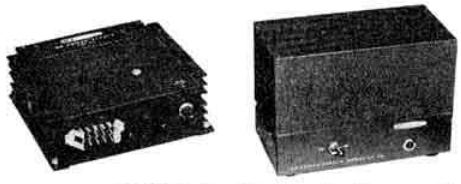
Kit SB-620 £64 . 13 . 0 Ready to use **£77 . 3 . 0**



HP-13 Mobile and HP-23 Fixed Power Supplies . . . For the "Single Banders" and SB-101. Provides all necessary operating voltages with excellent dynamic regulation.

Kit HP-13, 7 lbs., **£37 . 2 . 0** (+ earth available) Ready to use **£44 . 2 . 0**

Kit HP-23E, 19 lbs., **£30 . 18 . 0** Ready to use **£36 . 8 . 0**

MODELS
HW-12A
(80m.)

HW-32A
(20m.)

HW-12A and HW-32A Filter-Type SSB Transceivers . . . 200 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** Ready to use **£74 . 13 . 0**

GH-12 Push Talk Microphone Ready to use **£4 . 3 . 0**

DX-100U Transmitter . . . 120 watts CW, 100 watts Phone. Built-in VFO and all power supplies. Band coverage: 160, 80, 40, 20, 15 and 10 metres

Kit DX-100U £81 . 10 . 0 Ready to use **£106 . 15 . 0**

DX-40U Low-priced Transmitter . . . 75 watts CW, 60 watts peak. Controlled carrier Phone, 80-10 metres.

Kit DX-40U £29 . 19 . 0 Ready to use **£41 . 8 . 0**

RG-1 High Sensitivity General Coverage Receiver . . . High performance at lowest cost. Covers 600 Kc/s. to 1·5 Mc/s., 1·7 Mc/s. to 32 Mc/s. Full specifications available.

Kit RG-1, 18 lbs., **£39 . 16 . 0** Ready to use **£53**

RA-1 Amateur Bands Receiver . . . Covers 10-160m. Half-lattice crystal filter at 1·6 Mc/s. Switched USB and LSB for SSB. Provision for fixed, portable or mobile uses.

Kit RA-1 £39 . 6 . 6 Ready to use **£52 . 10 . 0**

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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 SB-301E, 23 lbs. (less speaker) **£140 . 12 . 0** Ready to use **£170 . 12 . 0**

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.

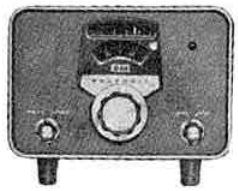
Kit SB-401E, 34 lbs., **£157 . 10 . 0** Ready to use **£192 10 . 0**

SBA-401-1 crystal pack, 1 lb., **£17 . 3 . 0**

HW-30 2 Metre Transceiver . . . For fixed, portable, or mobile. Ideal for local and RAEN purposes. Input 5 watt. CC. Tunable regenerative RX. Size 9¼"w. × 8"h. × 6" deep. (For 230v. operation if required).

Kit HW-30, 6½ lbs., **£26 . 8 . 0** Ready to use **£36 . 8 . 0**

Kit GP-11 (Power Supply 6 or 12v. D.C.) **£10 13s.** Ready to use **£13 13s.**



SB-640 External LMO for SB-101 . . . Provides Linear Master Oscillator frequency control or either of two crystal controlled frequencies for a total of five frequency control options. Power supplied from SB-101 Trans.

Kit SB-640, 9 lbs., **£51 . 6 . 0** Ready to use **£56 . 6 . 0**

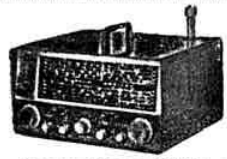
HA-14 The World's Smallest Kilowatt Linear . . . 80-10m. Only 3⅞ × 12¼" × 10" deep.

Kit HA-14 £55 . 13 . 0

Ready to use **£67 . 13 . 0**

HD-10 All Solid-State Electronic Keyer . . . 15 to 60 w.p.m. with 10 to 20 w.p.m. slow speed option.

Kit HD-10, 6 lbs., **£23 12 . 0** Ready to use **£30 . 12 . 0**



GR-64E Short Wave Receiver . . . Covers 1 Mc to 30 Mc/s., plus 550 Kc/s. to 1620 Kc/s. AM band. Many special features for such a modest price. For 115, 230v, 50/60 c/s. A.C. mains operation.

Kit GR-64E £22 . 9 . 0 Ready to use **£29 . 9 . 0**

GC-1U "Mohican" General Coverage Receiver . . . 10 transistors, 5 diode circuit. Tunes 580-1550 Kc/s. and 1·69-30 Mc/s. in 5 bands. 6" × 4" speaker.

Kit GC-1U £37 . 17 . 6 Ready to use **£45 . 17 . 6**

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I imagine that all of you will possess a Bible (I don't mean the ARRL Handbook of course!) so turn to Luke 14, 28 " For which of you, intending to build a tower, Sitteth not down first, and counteth the cost, whether he have sufficient to finish it." Pretty shrewd cookie, old Luke. Another bit I like comes from Shakespeare's Tempest, Act 3, Scene 3—" The isle is full of noises, sounds and sweet airs that give delight and hurt not." Old Caliban must have caught 10m when it was wide open, then he went on to 80 because he goes on to say " Sometimes a thousand twangling instruments will hum about mine ears, and sometimes voices." Tell you what—let's have a contest—I will give free, gratis and for nothing (Bill Lowe giving something away? Must be a catch somewhere!) a brand new dynamic PTT mike to the chap who sends in the best classical quotation appropriate to Amateur Radio. Give full details so that I can check the authenticity, and we'll publish the best of them. Course, it depends what you call " classical " —personally I exclude the works of James Bond, Simon Templer and Modesty Blaise, but then I'm just an old square. My ramblings this month seem to have strayed from the paths of Amateur Radio but I just wanted you to know that in dealing with Bandit Bill you are not dealing with a crook, but with an educated crook! Utterly couth in fact. Incidentally, if ever I hear any of you lot saying " CQ Dog Xray " I will personally make a wax effigy of your rig and stick trimming tools into it. Beware of the dreaded Bandit Curse—your PA will melt, your VFO will jump and S9 images will gibber at you through S1 signals.

NEW STUFF:

SOMMERKAMP

FR-500 Rx—All bands including all of 10 and top band. 500 cycle, 2.1 kc/s and 4 kc/s mechanical filters. notch filter.
100 kc/s calibrator and multivibrator giving calibration points every 100 kc/s or 25 kc/s. Sensitivity, selectivity, stability and general handling right up with the best of 'em.
Price: £130.0.0.

FL-500 Tx—80-10. This actually is virtually the same as the previous FL-200-B model, merely re-styled to match the companion receiver.
Price: £145.0.0.

FT-500 Transceiver—This looks a winner to me, lads. 500W p.e.p. 80-10 (all of 10 in 4 segments). SSB (selectable sidebands, AM & CW. MOX, PTT, VOX. 4 crystal controlled channels by plugging in the appropriate xtal (not supplied) 3 tunable auxiliary bands again by using the appropriate crystals. Noise limiter, slow/fast/off AVC, R.I.T., 1 kc/s readout, 100 kc/s or 25 kc/s xtal marker. P.S.U. built in. All you need is a suitable piece of wire at one end, a speaker and a mike at the other for a complete, and I do mean complete, station.
Price: £250.0.0.

FT-150 Transceiver—120W p.e.p. 80-10 (all of 10 in 4 segments) SSB (selectable sidebands), AM, CW, MOX, PTT, VOX. 4 xtal controlled and 3 auxiliary VFO channels like the FT-500. R.I.T., 1 kc/s readout, 100 kc/s calibrator, all transistor except driver and P.A. Both 12V d.c. and 240V a.c. p.s.u.'s built-in. This midget (7" high × 13¼" wide × 10½" deep) is a little gem.
I honestly don't know how they do it for the money. Everything you want for base station or mobile in such a small package—remarkable. *Price: £215.0.0.*

Paros 22TR transceiver—3 bander. Paros, from the Greek meaning pull the ladder up, Jack, I am aboard. Seriously, look at this:
80, 40 and 20m 80W p.e.p. SSB/AM/CW, 100 kc/s calibrator, 9 mc/s xtal filter, solid state pre-mixed linear V.F.O., transceive vernier (RIT or whatever you want to call it) adjustable noise limiter. VOX, MOX or PTT, grid block keying. 2 r.f. stages. This is a beautiful sounding signal and one of the quietest yet very sensitive (½ microvolt) Rx's on the market. Complete with PSU/speaker.
Price: £120.0.0.
This must surely be the answer for the impecunious—everything you want for the price of a Rx (and I'll bet you won't get as good a Rx either!) Don't forget, lads, there's lots of Dx on 20m. Your present gear will likely cover the HP deposit—so come on in, the water's fine.

OTHER NEW STUFF

DAI electronic keyers—£16.0.0.: Bug keys—£4.10.0: Teisco DM501 dynamic PTT mikes (excellent job) £2.15.0; VT300 Valve Voltmeter—£15.5.0; TE65 valve voltmeter—£16.0.0 100 kc/s xtals—New, not surplus, to Mil. Spec. HC13/U—£2.0.0; 28.5 mc/s walkie talkies—£12.10.0 a *pair* (amateurs only). The Tavasu mobile whip in stock—darned if I can remember the price, but it's jolly good. Lovely sounding name, Tavasu—you wouldn't think they were made by ole George over in Chesterfield! Makes 'em jolly well, too. Sommerkamp Linears—£90.0.0. SPECIAL: AR88D and HRO manuals—reprints beautifully done, 15/-. SP-600-JX manuals. Imported from Hammarlund at enormous cost, so awfully sorry, lads, you have to pay through the nose. £3.10.0. You won't believe me, I know, but I'm selling these at a loss. It breaks my heart, but if I charged you what they cost me, you would have a fit.
" S " meters 1 mA, 1¾" square, 18/6d.
Boom mike/headsets, excellent—£3.0.0.

SECONDHAND

Usual lot of old diehards including HRO's £25.0.0; AR88LF £30.0.0; Eddystone 750 £45.0.0; AR77E £30.0.0; and £25.0.0. NC190 £55.0.0; SB300 with all filters £130.0.0; 75A4 with all filters £250.0.0. 888A £65.0.0; LG300 r.f. deck £20.0.0; KW77 £65.0.0; etc. etc. Note that all these have been checked, serviced and re-aligned.

SUNDRIES

'Scopes: CR52 brand new, £22.10.0; Dartronics £20.0.0. Laboratory audio oscillator, a thing of beauty, £25.0.0. Marconi TF1100 VTVM £25.0.0. Marconi TF390G, 16-150 mc/s £20.0.0. Tuning unit 421B containing amongst other things no less than 3 rotary inductors, 30/- carriage paid. Boom Mikes—at last a comfortable effort. Nice padded low impedance earphone and a nice high output, high impedance mike. Really excellent and only £3.0.0.

COMPONENTS

New: Tubular trimmers either ¼-5pF or 3-15pF 1/- each, 10/- a doz.: Feedthroughs 1000pF screw type 1/- each, 10/- a doz.: Disc ceramics .001, 3/6d. a doz.: .01 5/- doz.: Standard coax sockets 1/- each: Standard coax plugs 1/4d. each: PL259 plugs 5/- each: Alligator clips 6d. each: Plugs (Octal, B7G, B9A) 2/6d. each: 2pF and 3pF ceramics, 3d. each, 2/6d. a doz.
Electrolytics—brand spanking new can types, complete with mounting clips. 10mF 350V, 1/8d.: 20mF 350V 2/3d.: 20mF 450V 2/9d.: 100mF 350V 5/6d.: 100-100mF 350V 6/8d.: 100 mF 450V 7/2d.: 40-40mF 500V 7/3d.: 100mF 500V 7/9d.: 100-100mF 450V 13/2d.
Silicon rectifiers—Current manufacture, NOT surplus, NOT seconds. You can rely on these. SE-05 1000piv 500mA 4/6d.: 1S1066 1000 piv 750mA 8/-.

NEW SURPLUS: Resistors, most values from 2d. each. Capacitors from 2pF to 150mF from 2d. each. Mica trimmers 1000pF 1/-, 2,800 pF solid dielectric variables—ideal top band loading 1/-; Oil filled 8mF at 750V dc 2/-; Pots—from 5 ohms to 1 meg 6d. each. I can make up a useful bunch of 25 for 10/-. The guts of the 19 set variometer 5/- post free.

TRANSFORMERS: All new:

Primary	*Secondary*
Tapped 180-250	300-0-300 50mA 2-0-2 at 2.5A, 6.3 at 1.5A 20/-
Tapped 210-250	250-0-250 100mA 0-4-6.3 at 4A, 0-4-5 at 2.5A 30/-
Tapped 105-250	325-0-325 at 10mA, 6.3 at .6A, 6.3 at .3A 15/-
Tapped 220-250	400-0-400 at 400mA, 80-0-80 at 10mA, 63-0-63 at 6A £6.10.0.
Tapped 110-230	315-0-315 at 60mA 5V2A 6.3V 1A, £1.0.0.
Tapped 230	12V at 0.4A, 12V at 0.4A 15/-
Tapped 230	350-0350 95mA, 5V 3A, 6.3V 3.7A, £1.15.0.
Tapped 240	250-0-250, 6.3, 5V £1.10.0.

Autotransformers 0-110-150-190-230 at 1.6KVA, £3.10.0.

Service Department: Word is getting round—we're still booked pretty solid.

Postage: Except where items are marked " carriage paid " postage is extra. Please remember the days of the penny black are over and something weighing 2 lbs. 1 oz. costs 4/6d. Don't be frightened of sending too much, I'll return any excess. A s.a.e. will get you my latest blurb.

H.P. Certainly—get it now lads before the budget.

73, Bandit Bill,
VE8DP/G3UBO

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NEW POPULAR
12 volt DC input. 300v DC 150ma output, or 175v at 100ma. Alternative output and DC input relay controlled. Built on aluminium chassis 6 in. × 4 in. × 2½ in. with Toroidal transformer (2¼ in. × 2 in. × 1¾ in.) mounted on top of chassis. Postage 4/6 **£6 18 6**

COMPACT
12v DC in. 400v DC 185ma out: or 165v at 160ma. Alternative output and DC input relay controlled. Choke smoothing. Built on aluminium chassis 6 in. × 4 in. × 2½ in. with Toroidal transformer (2⅞h in. × 2 in.w × 2½ in.) mounted on top of chassis. Postage 4/6 **£9 15 0**

EAVY DUTY
12v DC in. 390v DC 200ma out.: or 160v at 145ma. Alternative output and DC input relay controlled. 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**

DE LUXE DUAL OUTPUT
12v DC in. 400v DC 200ma out plus 250v at 150ma: or 400v only. Outputs and input relay controlled. Built on aluminium chassis 8 in. × 5 in. × 2½ in. with Toroidal transformer (3¼ in. h. × 2¾ in. w. × 2¼ in.) and heat sink mounted on top of chassis. Postage 6/6 **£12 12**

All units are fully fused. Transformers are completely potted. Negative or Positive earth without change, complete and working with 3 months Guarantee. Delivery 7 days. Outputs are measured with mobile vehicles. With static vehicle they will be a little lower.

MOBILE SOLID STATE POWER UNIT KITS
Kits are based on ready built units less chassis. All components, Toroidal transformer, relays and circuit supplied.

POPULAR	Postage 4/6	**£3 15 0**
COMPACT	Postage 4/6	**£5 10 0**
HEAVY DUTY	Postage 6/6	**£4 12 0**
DE LUXE DUAL	Postage 6/6	**£8 18 6**

MOBILE SOLID STATE MODULATOR KITS
De Luxe 12 volt input. 15 watts output. Pre-tested wired and dipped printed circuit boards. OC700a and OA81 limiter. NKT 224 emitter follower. NKT223a amplifier. NKT224 emitter follower. NKT404/OC35 driver. Push Pull NKT404/OC35 output. Complete with transformer (includes P.A. winding) to match QQV03-20a. Inc. tailored mike insert 300-3500 Hz. Average *wiring* time 30 minutes. Less chassis. Postage 6/6 **£8 18 6**

Standard Model 12 volts input. 15 watts output. OC71 amp. OC72 amp. on pre-tested wired and dipped, printed circuit board. NKT404/404/OC35 driver. P.P. NKT404/OC35 output. Including transformer to suit QQV03-20a. Inc. tailored mike insert 300-3500 Hz. Less chassis. Postage 6/6 **£5 12 6**

QQV03-10 modulator and audio amplifier dual purpose kit, relay switched. OC 200 mod. compressor, NKT 223 emitter follower, NKT 223a Tx mod. amp and Rx audio amp. NKT 223a emitter follower. NKT 404 Tx and Rx driver. P.P. NKT 404 Mod. and Audio output. Complete with transformers. Pre-tested wired and dipped printed circuit board. Inc. tailored mike insert 300-3500 Hz. Less chassis. Delivery 21 days. Postage 4/6 **£5 17 6**

Garex ABP70. Transistorised 70cm converter. GM0290a grounded base RF amp. GM0290a mixer. Two trough line circuits at 432 Mc/s. Cathodeon VHF crystal. 4½ db. noise figure. Built on copper clad fibre glass laminate and housed in 4½ in. × 3½ in. × 2 in. diecast box. IF 28-30 MHz ex stock; others to order over 20 MHz. 12 volt DC operation. Postage 3/6 **£14 17 6**

Built with selected and tested components from modern radio-telephones. All kits include instructions and circuits. Negative or positive earth. Deliveries ex. stock.

Valves
QQV03-10 **7/6**
QQV03-20a/CI134 **38/6**
QQV06-40a/5894 **39/6**
OB2 new **2/9**
6AQ5 **2/6**

Diodes new **1/-**

Modulation Transformers
6V6/EL84pp to QQV03-20a Postage 4/6 **17 6**
6AQ5pp to QQV03-10 Postage 3/6 **12 6**

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230 volt to 115 volt with 4 other taps. new
Auto 250w shrouded ... ... Postage 4/6 **15 0**
Toroidal transformer for transistor power supplies. With secondary taps up to 390V 200ma 12V. DC input. New 2¾h × 2½ × 2⅞ circuits provided **47 6**

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QQV03-20a/6-40a base tank cct micro adjustable link 2m-4m **10 0**

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All new British manufacture
0-500 microamp 4½ by 4⅞ **35 0**
0-500 microa.p 3⅞ sq. **20 0**
0-100 microamp 3⅞sq. **25 0**
0-100 microamp 3⅜ by 3¾ **37 6**
25-0-25 microamp 3⅜ by 3¾ **25 0**
Edge reading British 100 microamp calibrated in DB's scale slides out. Depth 3 in. overall width 2¾ in. height 1¼ in. **35 0**
Mike kits, press to talk, less case **7 0**

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0.1 350vwkg 1⅞ × ⅞ 3/- per doz
330 pf silva mica 2% box of 500 ... ... **20 0**
.04 150vw packet of 50 ⅝ in. × ¼ in. dia **3 6**
All new

Aerial relay up to 200 mc/s 25 watts 6v or 12v coil **6 6**

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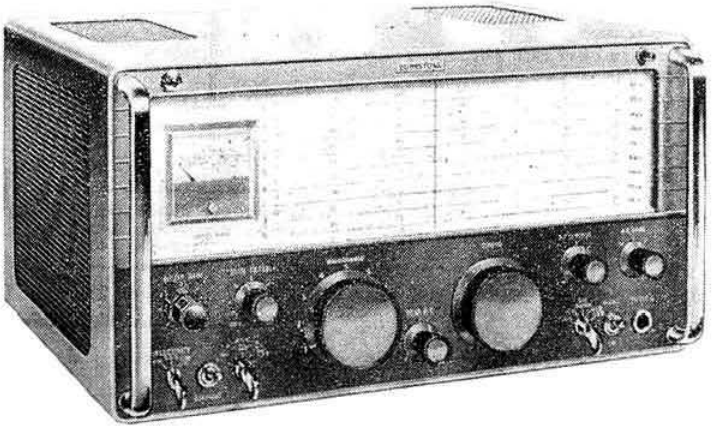
Amateur communications receivers

EA12



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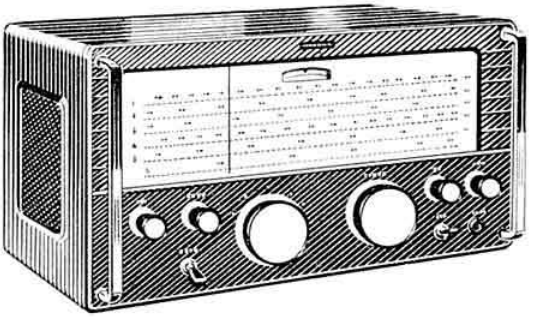

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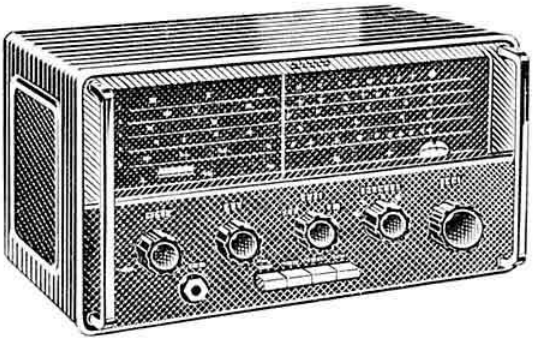

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de G3TR . . .

Mr J. C. Graham, G3TR, was installed as the Society's Thirty-Third President during a social evening at the Kingsley Hotel, London on Friday, 12 January 1968. John Graham (left) is photographed with last year's President, Mr A. D. Patterson, GI3KYP. *(Photo by G3NMR)*

One of the most fundamental aspects of Amateur Radio is communication between one radio amateur and another by means of radio and personal contact at club meetings, but communication between the Council and Headquarters of the RSGB and the membership is almost entirely done by the written word through its monthly publication *Radio Communication*; only by a much lesser extent by personal contact. The latter aspect is vital and it is my view that every effort should be made to avoid letting it become of secondary importance. Members have a right to know what Council is doing in the interests of the Society and also to put forward their views on matters which concern them. It follows, therefore, that in order to get maximum support for our National Society, members and prospective members should be in much closer contact with those elected to Council for the purpose of running the RSGB.

How best can we improve this vital communication? More details of Council's activities and plans could be published in *Radio Communication* but this would take up a lot of valuable space, which the members like to see used for the purpose of disseminating technical information.

It stands to reason that the most effective way is through personal contact, for this has the merit also of letting members and Council members get to know each other on a personal basis. There are Council members in all parts of the United Kingdom who are willing and anxious to meet as many of the members as possible; the most satisfactory way is through conventions, Official Regional Meetings and, most important, at local club meetings. I would suggest that nothing but good could come from Council Members attending local club meetings, but how to achieve this?

A full list of Council Members appears in each issue of *Radio Communication* and I would urge each club secretary to get in touch with the Council member nearest to him and invite him to a club meeting or event.

In addition to this, of course, Council members always attend ORMs and many of the conventions and mobile rallies. In the case of the latter, two organizers should be urged to ask them to attend.

Finally, on this subject of meeting the membership, may I make a personal plea? During my term of office as President it is my earnest hope to visit as many club and other functions as possible and thereby meet a large number of members and potential members. Will club secretaries and organizers who would like me to visit them please write to me at my home address, giving me as much notice as possible?

John Graham, G3TR,

President, RSGB.

THE COVER

Reference has been made on a number of occasions in " Four Metres and Down " to the very active television group which operates in East Anglia and is known as the Fenland Net. During tropo-assisted openings on 70cm some impressive DX-TV contacts are effected by members of this group, and one of them is illustrated on the cover this month. It was while a TV contact was in progress between G6KKD/T of Ely and G6ILD/T in Co. Durham that the screen picture was taken, showing Ian Waters at the Ely end, 165 miles away. The equipment in the background at G6KKD/T is illustrated in more detail in the second picture on the cover, and includes the station control desk and the 70cm television transmitter.

The G3LUB Briefcase Portable 80m S.S.B. Transceiver

PART 1

BY D. R. BOWMAN, G3LUB, A.M.Inst.E.*

DURING a regular 2m s.s.b. contact, G6TA half jokingly suggested that the author should construct a small portable transceiver to take on holiday in order to keep up weekly skeds. Thus the idea was born, and a specification emerged. The requirements were:

(*a*) The transceiver was to be transistorized throughout.
(*b*) The unit had to be self-contained with adequate output for " bare foot " operation.
(*c*) Alternative mains or battery power units had to be available.
(*d*) The only circuits common to transmit and receive should be the l.f. crystal filter and the two oscillator voltages.
(*e*) As simple a front panel layout as possible.
(*f*) 30 watts p.e.p. input to the final amplifier.
(*g*) The transmitter r.f. amplifier had to be broad band, only the receiver r.f. tuned circuits being made to track with the v.f.o.
(*h*) Small size, 7 in. × 8 in. × 3 in. overall.

The Receiver Section

The receiver section is single conversion, with a frequency coverage of the single sideband portion of 80m, i.e., 3·69-3·8 MHz. Adequate image frequency rejection is easily obtained with two tuned circuits ahead of the mixer.

As cross modulation performance is usually poor with bipolar transistors, consideration was given to the use of field effect transistors in the front end. However, this raises problems with gain control, and bearing in mind that sections of the circuit where the signals are relatively small are less susceptible to cross modulation, and as the only FETs available to the amateur are depletion types, it was decided to use a bipolar transistor in the r.f. stage.

Depletion types of FET are devices which most closely resemble thermionic valves. For example, *n* channel types (requiring positive h.t. potential) demand that their gates be biased negative with respect to the source electrodes. Therefore when bipolar transistors are used in the i.f. amplifier and depletion FETs in the r.f. amplifier, two separate a.g.c. lines are required and the author decided that the extra complication was not warranted.

The r.f. amplifier consists of an OC171 operating in the common emitter configuration, and by applying 6dB of negative feedback through using a low value of emitter bypass capacitor, the cross modulation performance is very good. Reverse automatic gain control is applied to this stage and as all bipolar transistor a.g.c. circuits are current controlled, amplified a.g.c. is available at the emitter of TR8. TR8, the first i.f. amplifier, acts as an emitter follower from the a.g.c. point of view and thus amplified current a.g.c. is available for TR1. The 1N916 diode connected between the base and emitter of the r.f. stage prevents base emitter breakdown which could be caused by excessive r.f. pick-up from the transmitter section.

The signals arriving at the gate electrode of the mixer are much greater in magnitude, and it is here that cross modulation is most likely to occur. As a dual gate FET was at hand this was used in this stage. The v.f.o. drive power required by this mixer is extremely small, and the injection is adjusted until the FET source current increases by about 10 per cent.

* 32 Lynton Road, Chesham, Bucks.

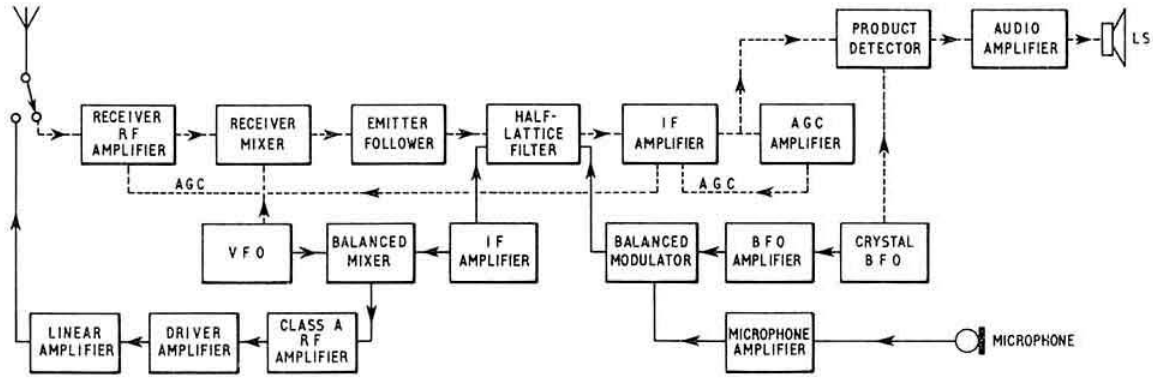
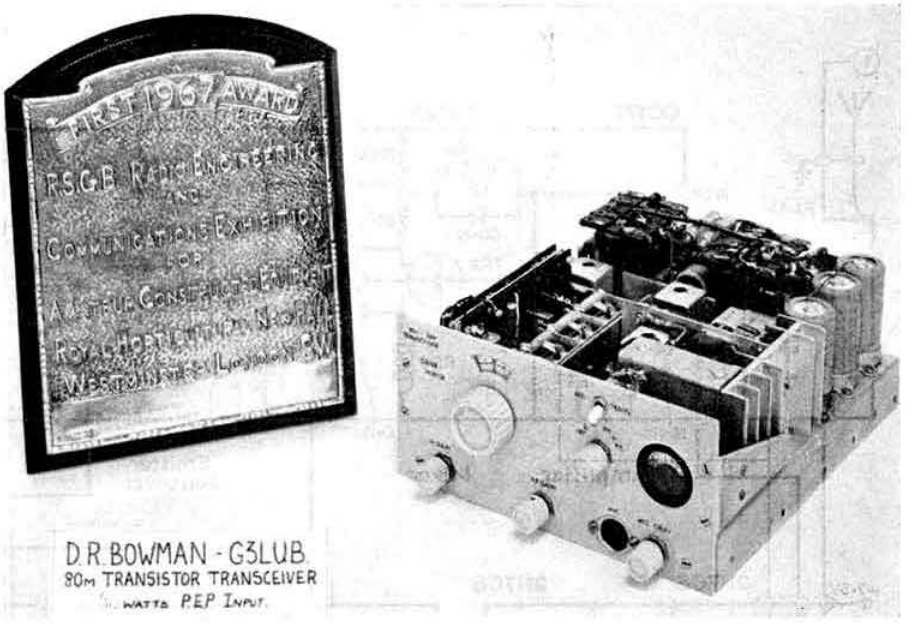


Fig. 1. The block diagram of the G3LUB 80m s.s.b. transceiver, less the power supply which will be described next month.



G3LUB's "briefcase portable" transceiver was entered in the home-construction competition at the RSGB Exhibition last September. As shown by the plaque it achieved first place.

A 1 pF coupling capacitor is adequate. Any reader considering the construction of the receiver could quite easily replace the FET with a conventional bipolar transistor mixer. The mixer feeds the l.f. crystal filter via a drain circuit r.f. choke and emitter follower. The filter is a half-lattice, centred on 455 kHz, using crystals with about 3 kHz spacing.

The filter transformers are made by removing one of the pies from each of two miniature valve type 455 kHz i.f. transformers. Types with parallel capacitance of not more than 100 pF must be used.

In the case of L3 the capacitor is replaced by two capacitors in series of twice the value to produce an artificial centre tap. The low impedance primary on L3, and secondary on L4, consist of 10 turns of 34 s.w.g. enamel covered copper wire wound on top of the remaining pie.

The intermediate frequency amplifier incorporates Brush Clevite TO-01A transfilters, simple because the author considers them neat, and they require no alignment. A.g.c. is applied to the first two amplifier stages.

The amplifier is constructed on Veroboard, all unused copper strip being connected to the earth line. It has been found that the amplifier has excess gain, and at maximum gain can become unstable, but the use of the emitter points for each section's decoupling helps considerably in reducing this instability. The author considers it good practice to use more stages than the absolute minimum, as it is then possible to load the third stage collector circuit with a 22 k ohm resistor and thus produce adequate stable gain. L7 is a conventional transistor i.f. transformer salvaged from a cheap transistor broadcast receiver.

The a.g.c. controls the collector currents of the r.f. stage and first and second i.f. amplifier stages over the range of about 1·2 mA—70 μ A. The a.g.c. amplifier circuit should be self-explanatory. D4 is used to tailor the a.g.c. time constant to fast attack/slow delay for s.s.b. reception.

The product detector is simple and effective and with about 100 mV of b.f.o. drive, the detector load should be adjusted until the collector voltage is between 0·5 and 1V.

A word of warning: the b.f.o. should be built in a screened box, with care taken to keep the r.f. voltage out of the i.f. amplifier. The b.f.o. crystal should be positioned about 20dB down the high frequency side of the filter characteristic.

The audio amplifier circuit is conventional and no explanation is given.

The last remaining section of the receiver is the v.f.o. This is a conventional Colpitt's circuit, using an inexpensive silicon planar transistor type 2N706. The coil is made by winding, in toroid fashion, a 3mm section of a hexagonal centre-holed iron dust core. Twenty turns of 34 s.w.g. enamelled wire should be wound on the core, leaving a loop in one lead to facilitate a grid dip frequency check. It might be easier to use a conventional slug tuned coil, as the inductance of the toroid coil cannot easily be adjusted and therefore the values of parallel capacitance have to be carefully judged. The v.f.o. requires at least 60 pF of negative temperature coefficient capacitance as part of the resonant circuit, to compensate for temperature drift. The v.f.o. range is 3·7-3·8 MHz plus the i.f., which works out at approximately 4·155 MHz-4·255 MHz.

The main tuning capacitor is a surplus unit salvaged from a war-time walkie-talkie. Alternatively, any three gang variable capacitor with about 50 pF swing per section can be used. The supply is stabilized with a shunt-connected Zener diode type OAZ 244.

Transmitter Section

The first stage of the transmitter's audio amplifier is a bootstrap circuit, used to increase the input impedance of TR18 to match a crystal microphone. A high gain audio

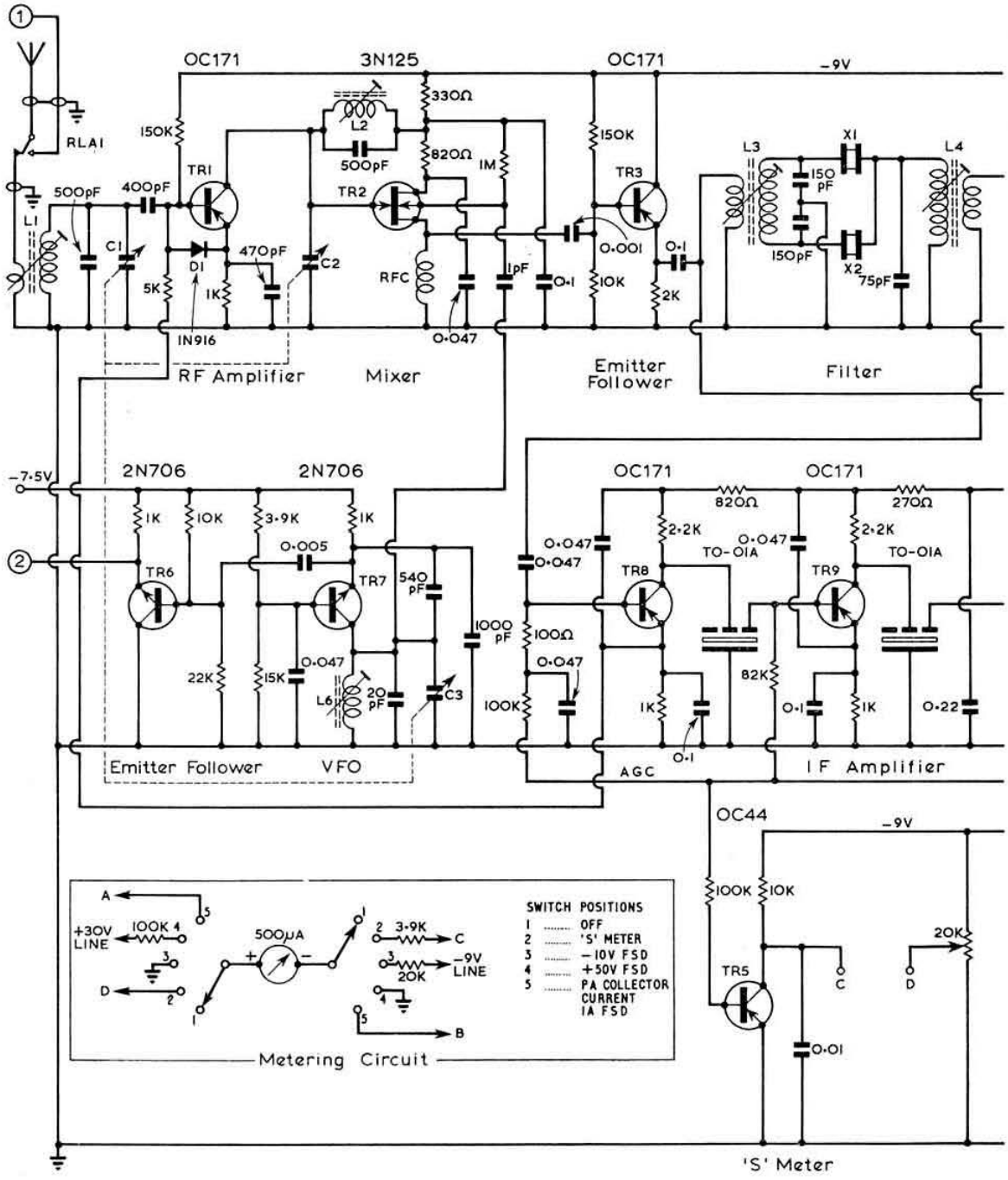
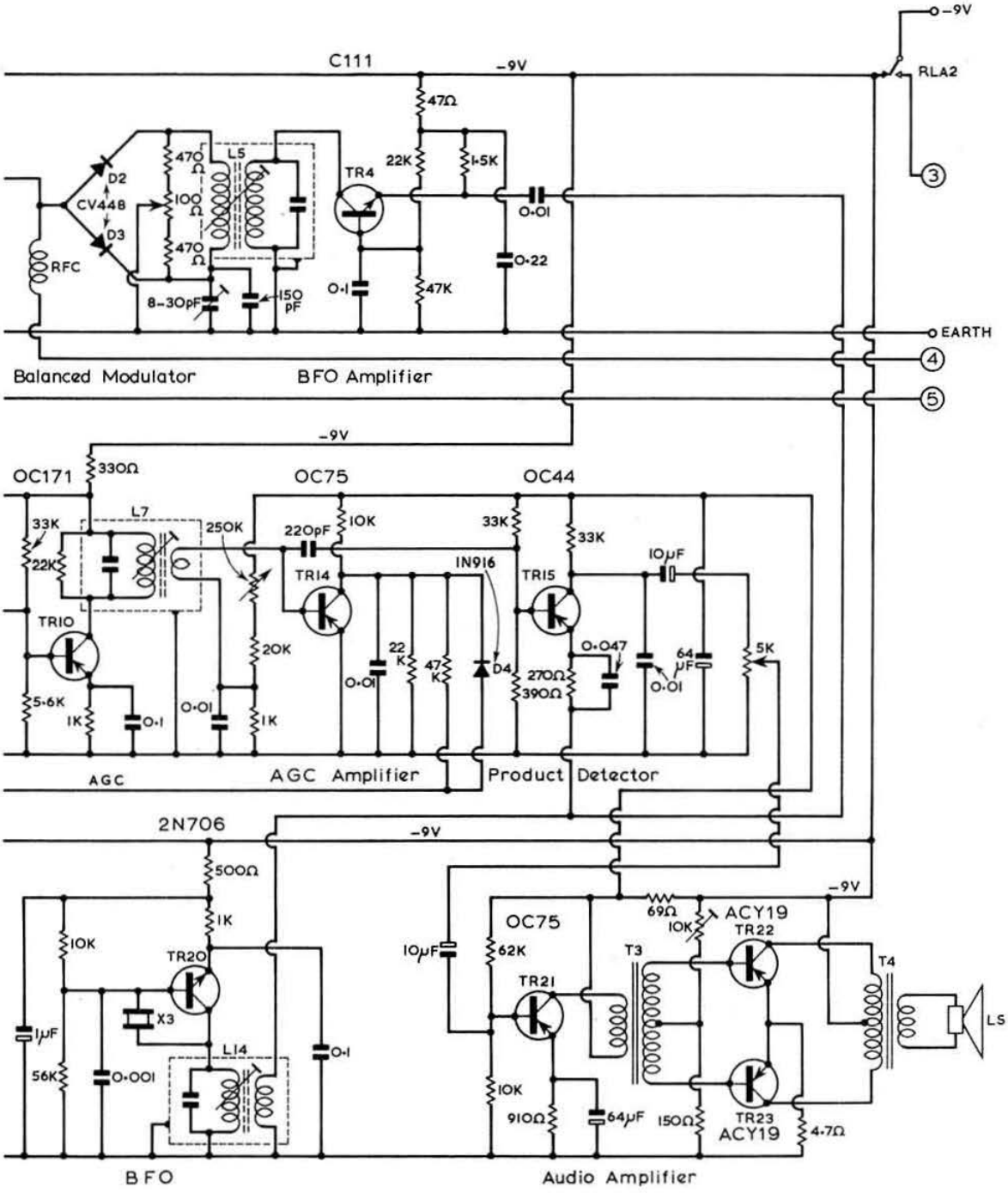


Fig. 2. The complete circuit of G3LUB's transceiver (continued on page 160). Full details of the semiconductors and coils will be provided in the April issue.


-9V
RLA2
3
C111
-9V
47Ω
470Ω
L5
D2
CV448
D3
100Ω
470Ω
RFC
8-30pF
150pF
TR4
22K
1·5K
0·01
0·22
0·1
47K
EARTH
4
5
Balanced Modulator
BFO Amplifier
-9V
OC171
330Ω
OC75
OC44
L7
33K
22K
250K
220pF
10K
33K
33K
10μF
IN916
TR14
TR15
TR10
20K
22K
47K
D4
0·047
64μF
5K
5·6K
1K
0·1
0·01
1K
270Ω
390Ω
0·01
AGC
AGC Amplifier
Product Detector
2N706
-9V
500Ω
1K
10K
TR20
X3
1μF
56K
0·001
L14
0·1
-9V
69Ω
10K
ACY19
TR22
OC75
10μF
62K
T3
T4
LS
TR21
10K
910Ω
64μF
150Ω
TR23
ACY19
4·7Ω
BFO
Audio Amplifier

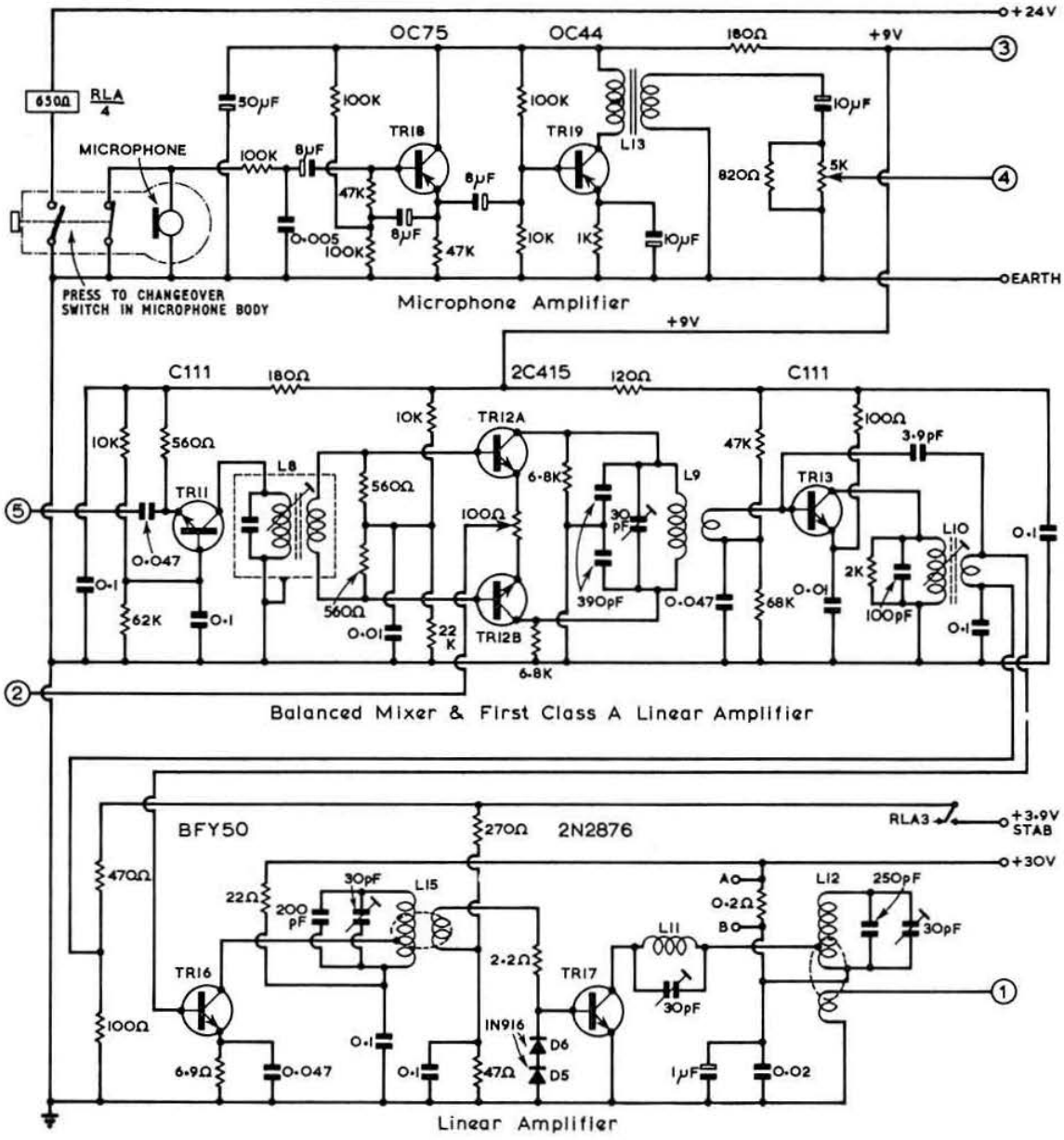


Fig. 2. (continued). Brief details of suitable power transistors are given in the adjacent table.

Type	Manufacturer	Power Dissipation	Material	Collector Voltage Rating (Common Emitter)	Peak Collector	f_T MHz
AUY10	Mullard	4·5W	Germanium	+60V	0·7A	120 MHz
BFY50	Mullard	5W	Silicon	−80V	1A	60 MHz
BFY51	Mullard	5W	Silicon	−60V	1A	50 MHz
BD123	Mullard	45W	Silicon	−60V	5A	85 MHz
BUY10	STC	10W	Silicon	−20V	1·5A	70 MHz
2N2878	RCA	17·5W	Silicon	−60V	2·5A	200 MHz

transistor must be used in the second stage. In the writer's case a selected OC44 was used.

The balanced modulator is conventional in design. A small miniature skeleton carbon trim potentiometer is used to balance the carrier. Capacitive balance is provided by a fixed capacitor of value 150 pF, in parallel with a 3-30 pF beehive trim capacitor connected from one or other side of the secondary of L5 to ground. It is necessary to try the capacitors on one side, and note whether the carrier leakage through the modulator is reduced, for if not then the capacitors need to be on the opposite side of L5 secondary. It will be noted that the value of 150pF is much higher than usually associated with balanced modulators; the considerable capacitive unbalance encountered within standard transistor i.f. transformers necessitates the use of such a high value, and as with careful adjustment 40 dB of carrier suppression can be achieved, the writer decided that it was not worth winding a special balanced transformer.

The double sideband suppressed carrier signal now continues via a conventional half-lattice crystal filter where the unwanted sideband is removed.

From the crystal filter the signal is fed to the balanced mixer via a common base amplifier. As L8 is a conventional broadcast i.f. transformer with no secondary centre tap, an artificial resistive centre tap is necessary. The author used a double transistor, but two Fairchild types C111 or 2N706 would work equally well. The v.f.o. voltage, which leaks through the balanced mixer, should be balanced out with the help of the emitter connected 100 ohm miniature carbon potentiometer. L9, the mixer output coil, must be of symmetrical construction and be tuned by a miniature trim capacitor. The use of slug tuning would unbalance the mixer.

Transistor Linear Amplifier

Very little has been published to help the amateur with the design of solid state single sideband linear amplifiers. The essential requirements of a transistor linear amplifier are:

1. Adequate peak power output.
2. Built-in precaution to protect the output transistor from catastrophic failure, details of which are explained later in the text.
3. Linear amplification with low intermodulation distortion.

A large number of r.f. power transistor characteristics were examined; all had 5-20 watt peak collector dissipation ratings, and at first sight seemed usable, but after further investigation only one or two devices really showed promise. It was decided to run the output stage in class B as this simplified the thermal design considerably, although this does tend to increase the intermodulation distortion when compared with class AB1 operation. If the base bias is set during no drive conditions to, say, 5 mA collector current, then the average collector dissipation is quite low due to the low duty cycle of a speech single sideband waveform. Under these conditions the peak power ratings of some transistors are very much greater than the ratings specified for continuous operation[1]. Furthermore if the transistor is attached to a large heat sink situated well away from other heated components, the 25°C case temperature power ratings may be used. Under these bias conditions it is safe to operate silicon transistors with no external emitter resistance and as long as the stage is only driven with speech there is no chance of thermal runaway[2]. For this reason alone it was decided to reject all Germanium devices which would not be thermally stable. The collector voltage rating is most important, and any transistor type chosen should have a voltage rating in excess of twice the h.t. potential applied to the device. This is because the ringing effect in the collector load circuit replaces the missing half cycle owing to the class B operation of the amplifier. This defines the maximum supply voltage, and the peak power the device can handle is determined by the peak collector current rating.

Intermodulation distortion is mainly due to reduction in current gain at high collector currents and planar devices are much the best in this respect the BFY50 being remarkably good. The bias conditions also have a remarkable effect on the intermodulation distortion of an amplifier. The bias supply must present a low impedance to the transistor and must be adjusted so that between 5-20 mA flow in the collector circuit in the absence of base drive. This is most important and if no bias is applied the distortion is excessive.

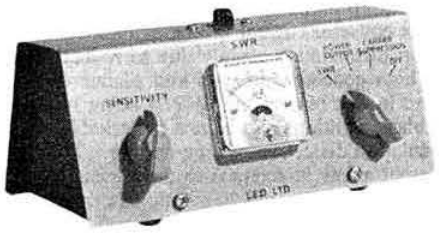
After considerable investigation, the author has come to the conclusion that a large number of catastrophic failures in transistor linear amplifiers are due to reverse base to emitter breakdown. Although most planar devices have a base emitter rating of at least 4 volts, when the base does go negative with respect to the emitter, the transistor is cut off and the base presents a high impedance to the drive circuits. In the present design D5 and D6 are connected across the base emitter junction and these diodes conduct whenever the base attempts to exceed −1·2 volts thus preventing this type of failure.

Quite an amount has been written about secondary breakdown in power transistors and the author was wary of this type of failure in the early design stages of the unit. Secondary breakdown is caused by local hot spots forming in the transistor junction. If a limit on the steady current taken by the output transistor could be incorporated into the power supply without limiting the peak current capability, the chances of this type of failure taking place is much reduced. Most complicated circuits were investigated but a very simple solution emerged. The power unit is built so that it is incapable of supplying excessive continuous current, but considerable reservoir capacitance is included to supply the peak current. This system, though crude, has been very successful and also guards against thermal runaway which might be caused if a single tone were used for test purposes.

Considerable care was exercised during the development of the linear amplifier to reduce the chances of driving the output stage in an unloaded condition and it was for this reason that a rather unconventional tank circuit was used. Under such conditions there is a danger of exceeding the transistor dissipation rating. The tank circuit consists of an STC toroid wound with a tuned primary and 50 ohm secondary. The primary is tapped to match the collector's low output impedance. There is some slight danger of saturation on current peaks occurring with toroids, resulting in harmonic production. The described unit was monitored on a 30 MHz bandwidth oscilloscope and no flat topping of the output waveform was observed. Because of low Q it is most important to follow the ferrite toroid with a low pass filter to reduce the chance of TVI produced by the non linearity of the transfer characteristic of the transistor. Any of the published circuits will work well[3].

Continued next month

P. SIMPSON, G3GGK and B. D. A. ARMSTRONG, G3EDD



Light Electro Developments

IMPEDANCE BRIDGE
S.W.R. BRIDGE
TWO-TONE OSCILLATOR

THE average Amateur Radio operator has very little test equipment in his shack. There is no excuse for this state of affairs for not only are there plenty of circuits available but ready made equipment is available at a very reasonable price.

The three pieces of test gear with which this review deals are an impedance bridge, an s.w.r. indicator and a two tone oscillator. They were submitted by Light Electro-Developments Ltd., of Tattingstone, near Ipswich, Suffolk. The prices are as follows:

Impedance Bridge	£6
S.W.R. Indicator, LED 50 or 70	£6 18s.
Two Tone Oscillator	£5

Post and packing on each unit is 3s. 6d. (UK only).

Mechanical Construction

All three equipments are mounted in identical aluminium cases finished in grey hammertone paint. The appearance is unusual, but nevertheless attractive, in that the case is wedge shaped in section. The size of the case is 7 in. wide × 3 in. deep at the base. The pointer knobs are grey and three small plastic feet are fitted to the base.

IMPEDANCE BRIDGE

This resistive bridge requires an external oscillator to be fed into a small TV style coaxial socket, and the unknown impedance is connected to a similar socket. The panel contains a calibrated potentiometer to show the impedance, a sensitivity control and a small Japanese meter to show balance.

The duplicated instruction sheet suggests that a g.d.o. be used as the external oscillator, but for the tests a signal generator was used. A 1 volt input provided plenty of sensitivity, although it is advisable to use an oscillator with a low source impedance. The bridge can be used for many purposes including measurement of input impedance of receivers, aerial impedance and characteristic impedance of coaxial cable.

There is obviously some limitation and this lies in the impedance range and the amount of reactive impedance. The effective impedance range is 10 to 100 ohms and the result of reactance is to reduce the depth of the null. Tests with various impedances showed that the instrument was surprisingly accurate and very simple to use.

S.W.R. INDICATOR

The S.W.R. Indicator is available in 50 or 75 ohm versions, and the 50 ohm version was submitted for test. The input or output coaxial connecters are TV type.

Five applications are suggested:

1. V.S.W.R.
2. Power Output
3. Carrier Suppression
4. Amplitude modulation depth
5. Field Strength Meter.

The s.w.r. indication is made in the conventional manner by adjusting the meter reading for full scale on forward power and noting the deflection on reverse power. The s.w.r. can be calculated from this ratio or by reference to the chart supplied. The meter scale is not calibrated in s.w.r.

Band (MHz)	Power input for F.S.D. (50 μA) in S.W.R. forward position		Reverse reading with matched load. μA
	Min. sensitivity (watts)	Max. sensitivity (watts)	
1·8	—	13	0
3·5	—	5	2
7	100	2	1
14	37	1	2
21	18	1	2
28	10	1	2

An indication of power output is obtained by switching the detector circuit to a resistive network across the coaxial feed. With the sensitivity control at minimum sensitivity the claimed meter f.s.d. is 500 watts, and reference to a chart gives the actual power. As 500 watts of r.f. power

were not available during the period of test a lower power was measured on an accurate power meter and reference was made to the chart. The following results were obtained:

Frequency	Percentage error of chart
3·5 MHz	36
7 MHz	70
14 MHz	0
21 MHz	35
28 MHz	64

An interesting use is the measurement of carrier suppression of an s.s.b. transmitter. For this, the diode detector is switched directly across the coaxial feed after f.s.d. has been set up with full sideband output and the sideband power source removed. A chart is supplied to interpret the meter reading, and a cross check on an s.s.b. transmitter showed an agreement within 3dB of a spectrum analyser which is very good.

The depth of modulation of an a.m. transmitter can be indicated by setting the meter to read half scale with no modulation, and noting the reading with modulation applied. The actual percentage can either be calculated or read off the chart supplied. This measurement can be very misleading if the mean transmitter power alters during the modulation process as happens if " downward " modulation occurs.

Since the sensitivity of the meter is quite high when switched to carrier suppression, the indicator can also be used for field strength assessment.

TWO TONE OSCILLATOR

This simple unit consists of two transistor oscillators with RC feedback networks. Internal controls equalize the oscillator outputs and the external level knob controls the overall level which has a maximum two tone output of 300 mV peak to peak.

The tone frequencies mentioned on a printed advertisement sheet are approximately 800 and 1700 Hz. The duplicated instruction sheet quotes approximately 500 Hz and 1200 Hz. The actual unit supplied measured 594 and 1010 Hz.

In order to compensate for scatter in transistor gain, preset resistors are fitted in the emitters so that the emitter decoupling capacitors can be tapped up and down the emitter resistors. The adjustment of these resistors has a marked effect on distortion. When first measured, the distortion of one of the two tones was very bad. Readjustment brought the distortion on the 594 Hz tone down to 10·8 per cent. The 1010 Hz distortion was 1·5 per cent which is very good, but the preset resistor was at the limit of its travel and any attempt at adjustment stopped oscillation. The instruction sheet refers to preset resistor component references which are identified on the printed board but on the side next to the case where they cannot be read. No circuit values are printed on the circuit diagram. The 9 volt PP3 battery has no retainer other than sticky tape.

Tone output is provided on an unterminated short screened lead. A useful facility provided is a jack socket for a key which when plugged in cuts one of the tones and keys the other.

Conclusions

All three units perform useful functions. The power output graph for the s.w.r. indicator is hardly worth plotting, but the rest of the facilities are satisfactory. Although the internal wiring of all three units was a little disappointing, it is unfair to be too critical bearing in mind the price bracket which will appeal to all but the shallowest pocket.

New Transistors for U.H.F. Transmitters

Two new, silicon planar, *n-p-n* transistors, developed for use in u.h.f. transmitters are now available from Mullard. Each transistor is encapsulated in an epoxy resin, with a capstan outline, and uses two emitter leads to minimize lead inductance. The transistors, type BLY38 and BLY53, have efficiency ratings of 70 and 80 per cent respectively; a circuit in which a BLY38 is used to drive a BLY53 can have an overall gain of 13dB at an efficiency of 60 per cent. These new transistors also apparently have the advantage of being able to withstand the effects of a considerable mismatch between them and the aerial. Consequently, transmitters in which they are used will not need the conventional protective circuits. The BLY38 and BLY53 will later be included in the Mullard " Practical Planar " range of transistors.

Brief details of the transistors are:

	BLY38	BLY53
V_{CEO}	18V	18V
V_{CBO}	36V	36V
f_T	1300 MHz	700 MHz
P_{otyp} ($V_{CE} = 13{\cdot}8V$, $f = 470$ MHz)	1·8 W	6W
Encapsulation	TO-117	TO-60

GB2RS NEWS BULLETIN SCHEDULE

RSGB News Bulletins are transmitted on Sundays in accordance with the following schedule:

Frequency	Time	Location of Station
3600 kHz	9.30 a.m.	South East England
	10 a.m.	Severn Area
	10.15 a.m.	Belfast
	10.30 a.m.	North Midlands
	11 a.m.	North West England
	11.30 a.m.	South West Scotland
	12 noon	North East Scotland
145·10 MHz	9.30 a.m.	Beaming north from London
	10.00 a.m.	Beaming west from London
145·8 MHz	10.00 a.m.	Beaming north west from Aberdeen
	10.15 a.m.	Beaming south from Belfast
	10.30 a.m.	Beaming south west from Aberdeen
145·30 MHz	10.30 a.m.	Beaming north west from Sutton Coldfield
	11.00 a.m.	Beaming south west from Sutton Coldfield
145·50 MHz	11.30 a.m.	Beaming north from Leeds
	12 noon	Beaming east from Leeds

News items for inclusion in the bulletins should reach Headquarters not later than first post on the Thursday preceding transmission. Reports from affiliated societies and from non-affiliated societies in process of formation will be welcome.

WHICH AERIAL?

B. A. WATLING, G3RNL*

ONE of the biggest problems facing Radio Amateurs, listeners and transmitters alike, is the choice of aerial. With this problem in mind members of the Medway Amateur Receiving and Transmitting Society decided on an attempt to evaluate various aerials. The event took place at the site normally used by the club on NFD, namely Cooling Marshes, Kent. Operation was for 45 hours continuously, beginning at 1900 GMT Friday, 22 September, until 1600 GMT Sunday, 24 September, operating on four bands under the call-sign G3RNL/P. Generally speaking, daylight hours were reserved for 20m and 15m operation while 80m and 40m occupied the hours of darkness. This event was envisaged as the first of a series of similar events, to try as many aerials as possible. The success of this one, plus the experience gained, make all concerned eager to get on with the next evaluation.

It was decided by the organizing committee that the type of aerial to be tried out on this exercise would be single element wire aerials of the type which is used extensively by amateurs and is easy to erect in one's own garden. Both multi-band and single band aerials were tried, in an effort to discover the extent of compromise in a multi-band aerial. In order to reduce the interaction between aerials these, where possible, were erected end-on to each other, this obviously requiring a lot of space.

All of the aerials used were fed with coaxial cable, with the exception of a Joystick. This aerial was included in the tests, against the advice of the manufacturer, purely because many of the club members had heard so many claims and counter claims about it. The manufacturer states, in the sales leaflets, that other aerials and their feeders adversely affect the operation of the Joystick.

After a lengthy discussion at a committee meeting on the use of this aerial, it was decided to include it in the tests for two reasons. Firstly, although other aerials, and their feeders, may well affect the performance, it is unlikely that the ideal conditions could ever be achieved at a normal QTH—unless, of course, things like electric cables, drainpipes, waterpipes, TV aerials and their feeders were completely dismantled from all houses in the immediate vicinity. The second reason was that had the Joystick not been evaluated, a considerable number of club members would have felt that this was defeating part of the objects of the test. The Joystick was therefore included, being fed from the base by a single wire. An aerial matching unit with a pi-configuration was used in conjunction with this aerial.

All other aerials were cut to length and checked for s.w.r. before the event. In all of the tests a " reference " dipole was used. This was made up as an extendable dipole to cover four bands. Initially it was cut for 15m, and then, by means of links, it could be extended to cover 20m, 40m and 80m. A G8KW trap dipole was kindly loaned by KW Electronics for the tests. In addition to this trap dipole, " home brew " traps were made which were used in an inverted-V dipole. A further trap was used in a semi-vertical trap aerial. A G5RV multiband dipole was constructed by club members along with a 15m ground plane and a single element quad for 15m. The station comprised a KW2000 transceiver with a standby Drake 2B receiver in case of split frequency working. Operation was from a tent with a 2 kW petrol-electric generator supplying the power. A rota of bands, times and aerials in use was drawn up and had to be strictly adhered to. The " reference " dipole and at least two, and generally three, other aerials were used for direct comparisons. Operation was mainly on s.s.b., giving club members who do not generally operate sideband the opportunity to " have a go," but in certain cases c.w. contacts were made.

Luckily, the weekend chosen proved to be ideal in terms of weather conditions. The disadvantages were that band conditions left a lot to be desired. In addition, the effect of a contest over the weekend did reduce the number of contacts. Nevertheless, a number of extremely useful QSOs were made on the four bands in use. The contacts were not confined to DX and local European QSOs were also made in order to get as good an all round picture as possible. One thing that was outstandingly obvious was the immense co-operation and interest shown by all of the stations contacted. Each went out of their way to give us accurate and useful reports, within, of course, the terms of their own receiving equipment. It is not claimed that the results obtained are necessarily correct quantitively, but, by the number of almost identical reports, it is felt that the results following can give enough information and food for thought to other amateur stations who are trying to decide which aerial to erect.

The Aerials

THE G8KW TRAP DIPOLE

The G8KW trap dipole was kindly loaned to the club by *KW Electronics Ltd.* This aerial has only one trap in each leg and has an overall length of 109 ft. It is supplied with 96 ft. of low loss semi air-spaced 75 ohm coaxial cable. For use on the site of these tests the coaxial cable was extended slightly to reach the operating position. The extension cable was also of the semi air-spaced type, and did not appear to have any detrimental effect on the s.w.r. Operation from this aerial can be on five bands, 80m to 10m.

THE G5RV MULTIBAND DIPOLE

This aerial was made up according to the lengths given in the *Handbook*, i.e., 102 ft. top, centre fed with a 34 ft. length of 300 ohm feeder and then 75 ohm coaxial cable to the operating position. The feeder used was open wire type and not the 300 ohm ribbon specified, as this was not available at the time. The feeder hung almost vertical, consistent with a reasonable length coaxial run to the operating position and bearing in mind that the lowest point of the feeder could not be too near the ground.

* 137 Barberry Avenue, Chatham, Kent.

The writer operating G3RNL/P during the weekend of the aerial tests.

THE JOYSTICK

This was fed from the base with about 15 ft. of feeder into a pi-network aerial matching unit. This could be, and was, adjusted to give 1 : 1 s.w.r. on the bands used.

THE TRAP INVERTED V DIPOLE

This was a " home brew " type aerial similar to the G8KW trap dipole in length. Details are shown in Fig. 1. The traps comprised 23 turns on 1¼ in. diameter former using 18 s.w.g. copper covered wire. The winding length is approximately 2½ in. and was adjusted, by pushing up or opening out the turns, until the trap resonated at 7100 kHz with a 50 pF capacitor. This aerial also can give operation on five bands, 80m to 10m, and was fed with 75 ohm coaxial cable.

THE SEMI-VERTICAL TRAP AERIAL

This aerial is just one leg of a trap dipole, using just one of the traps as described previously. Fig. 2 details the arrangement used. The aerial was fed at the base with 52 ohm coaxial cable, the outer braiding of this taken to a good earth. The earth conductivity on this site is extremely good, as can be visualized from the name of the site (Cooling Marshes). The earth for this aerial comprised only three copper earth stakes. This then ensured a good s.w.r. on five bands (although only four were used). In cases where this aerial is erected and the earth conductivity is not good, this could result in a fairly high s.w.r. In this instance four radials from the base of the aerial should ensure correct operation.

THE 15M GROUND PLANE

This aerial comprised a quarter wave vertical with four radials, each slightly longer than the vertical element, around it and sloping at an angle of 45°. The aerial was fed with 52 ohm coaxial cable, the inner going to the vertical and the outer braiding connected to the radials, as indicated in Fig. 3.

THE 15M SINGLE ELEMENT QUAD

The aerial comprised a diamond loop, having each side equal to a quarter wave on 15m. The aerial was fed with 75 ohm coaxial cable, as indicated in Fig. 4.

(Continued overleaf)

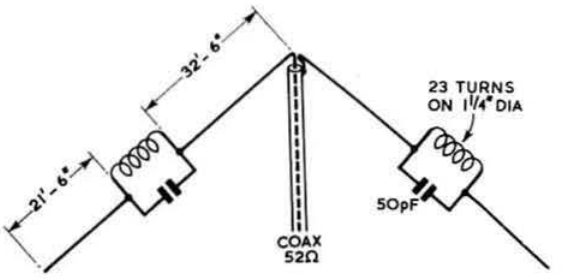


Fig. 1.

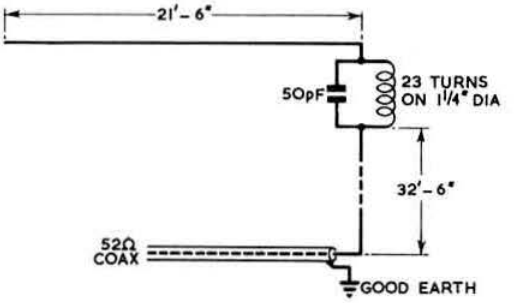


Fig. 2.

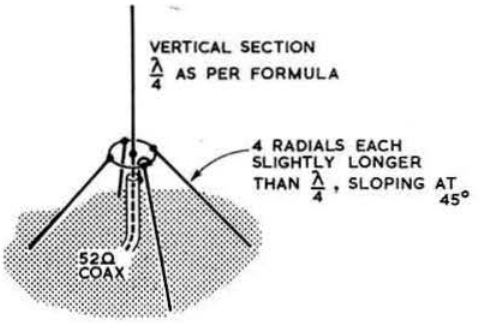


Fig. 3.

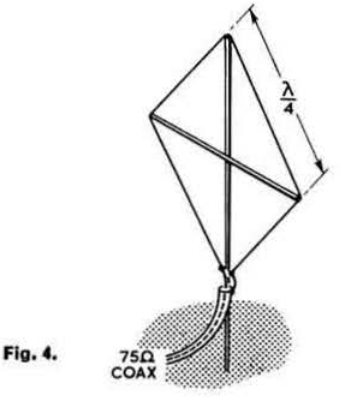
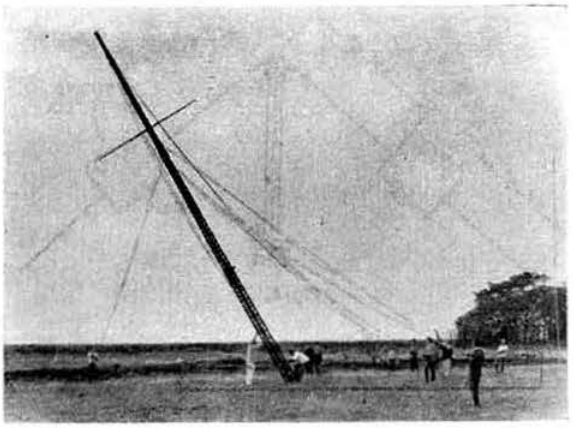


Fig. 4.



The wooden tower carrying the 15m single element quad being hoisted for tests.

Results on the Bands

80 metres

As previously stated in band conditions over the weekend were not very good. One would normally expect VOs and VEs to be in evidence on the band in the late evenings and early mornings but these were not heard at all. Nevertheless, some reasonable DX was worked which included, on c.w., ZL (06.10 GMT 23 September) and on s.s.b., OD5, EP2, along with plenty of G, DL, LA, OH, OK, etc. Without a doubt the best all round aerial was the " Reference " dipole. This produced consistently better reports than any of the other aerials, except in the case of DX. In these cases, except into ZL, the trap semi-vertical was the only aerial which enabled the stations worked to hear G3RNL/P. This was borne out in receiving these stations. They could not be heard on any other aerial. The reports received on the trap semi-vertical were strengths 6 and 7, so the difference was quite marked. In the case of ZL, only the dipole and the trap semi-vertical were effective. The dipole, in this case, was 1 to 2 S-points up on the trap vertical. On European contacts on this band the trap vertical aerial was consistently 1 to 2 S-points down on the dipole.

The G8KW trap dipole proved to be only slightly down on the dipole. This is to be expected, as it is a loaded dipole on 80m. The reports received and given included just under half where no difference could be detected. The others varied between ½ S-point and 2 S-points. Generally speaking then the difference noted was only about ½ S-point. The trap inverted V was tried both end on and broadside. End on, it appeared to be 2 to 3 S-points down on the dipole, while broadside it was only 1 to 2 S-points down. In the case of the G5RV, as with most of the other aerials; what could be worked or heard on the dipole could be worked on the G5RV, except in the case of ZL. However, the reports were consistently 2 to 3 S-points down compared with the dipole. There was a slight indication that it was not quite so far down with medium DX stations. The difference was not very marked though. Reports on the Joystick were consistently about 4 to 5 S-points down on the dipole, and never less than 3 S-points.

40 metres

This band proved to be probably the most interesting of the four worked, and the most difficult in terms of evaluating the results. The band was not in particularly good shape over the weekend, even so some DX was worked which included ZL, W4 and W3, all on c.w., plus CN8, I1, UD6, ZB, etc., on s.s.b., along with the usual Europeans. South Americans were heard in the late evenings and early mornings but only at about S3, and in QSO among themselves. Again, similar to 80m, the " reference " dipole did very well. The G8KW trap dipole proved to be more or less identical in performance to the dipole. There were some discrepancies, but 70 per cent of the stations worked could detect no difference between the trap dipole and the " reference " dipole. The remaining reports varied somewhat; some were slightly down, others slightly up.

The aerial that came out " tops " was the trap semi-vertical. Of the reports logged 30 per cent were the same as the dipole, while the others were up by quite a bit. The European contacts were those giving identical reports on the semi-vertical, while for DX it was well up. In the case of the W4, there was no copy to or from that station on any other aerial. The W3 could be heard on the dipole but was 2 S-points up when using the semi-vertical. In the case of ZL the semi-vertical was 2 S-points up compared with the dipole, RST 579 as compared with 559. Reports on the other aerials from ZL were G8KW:559, G5RV:449, Trap Inverted V:449 (end on), Joystick:559! Similar variations were found on the received signal.

The Trap Inverted-V aerial probably came second in the race on 40m, with the " reference " dipole third. Of the reports logged 25 per cent were down compared with the dipole, 10 per cent were the same, and the remainder were up by amounts averaging 2 to 3 S-points. The reports where the inverted-V was broadside were up about 1 S-point compared with the end on condition, so that all in all the aerial did very well, exhibiting very good all round radiation, but not quite as good as the vertical.

The G5RV results were similar to those logged on 80m, about 2 to 3 S-points down compared with the dipole. Again there was an indication that for medium and long haul DX working this aerial was not so far down; only 1 S-point in the case of ZL.

Not many reports were logged using the Joystick on 40m, mainly because stations that were heard or worked on the dipole were not heard on the Joystick. The one marked exception to this was a 559 from ZL, which was the same as the dipole. Many of the signals worked or heard that were up to S7 on the dipole were not copied on the Joystick.

20 metres

It was soon apparent that 20m was not going to be our best band. Reports, therefore, on this band are mainly European with a couple of VKs thrown in for good measure!

One third of the G8KW trap dipole reports were down compared with the dipole, and the remainder were either up or the same. The largest discrepancies between the two aerials were from the nearest and furthest contacts. The signals were 2 S-points below the dipole into VK5, and the same report was received from about 20 miles away.

The G5RV did not perform as well as expected on this band. The s.w.r. was at its lowest on 20m, but reports were generally about 2 S-points down compared with the dipole. However, in 12 per cent of the logged reports the signal was the same or up by as much as 2 S-points over the dipole.

The Joystick was well down compared with the dipole. Again many stations heard or worked on the dipole could not be raised on the Joystick. In the case of VK5, however, the report was only 1 S-point down compared with the dipole. At the same time the signals were not copied using the G5RV.

The trap inverted-V was a puzzle. Over 30 per cent of the reports gave this aerial a better, or as good a rating, as the dipole. In fact the best report received from VK was using this trap inverted-V. The remaining reports around Europe were between 1 and 2 S-points down on the dipole. The trap semi-vertical gave some interesting results. The most interesting was that 50 per cent of the reports were slightly down (1 S-point or less compared with the dipole) while the remaining 50 per cent were exactly the same. Not one report was received or given where this aerial was better than the dipole.

15 metres

Needless to say this band could have been better, but three continents were worked giving a reasonable indication. All but two of the W call areas were worked, W4 being the most prominent. For this band the trap semi-vertical was taken down and the single band ground plane replaced it. In addition a single element quad was used as a comparison single band aerial.

Reports on the G8KW trap dipole were consistently 1 to 2 S-points down compared with the dipole. The G5RV was a bit further down, about 2 to 3 S-points. The trap inverted-V appeared to have a much lower angle of radiation than the G8KW trap dipole. The longer distance reports were better while the more local ones were the same or down. On one or two occasions it exhibited less QSB than the horizontal aerials. The Ground Plane performed similar to the inverted-V, but generally just slightly down. The Joystick was 2 to 3 S-points down on the dipole, although again not many were logged because they could not be heard.

The most interesting effects were when using the single element quad. This clearly showed the effect of changing conditions. Theoretically the single element quad in this diamond configuration gives no gain over a dipole. This does not tell the complete story, however. As the band was beginning to open up, the dipole, with its higher angle of radiation was slightly up compared with the quad. As the band opened the longer skip predominated and the single element quad went between 1 and 2 S-points up compared with the dipole.

Conclusions

Summing up the results is not a very easy task. Probably the best all round aerial for multiband operation turned out to be the trap semi-vertical, as shown in Fig. 2, but one of the problems with this aerial can be TVI. The other important point is that a good earth is an absolute necessity.

The G8KW trap dipole performed extremely well, particularly on the more local contacts into Europe. On 80m the difference between this trap dipole and a full size dipole is negligible and on 40m there is no apparent difference at all. On 20m it out-performed the dipole for relatively local contact but on 15m it did not seem to perform quite as well. The trap inverted-V seemed to make up for some of the disadvantages of the horizontal aerials. It apparently had a

(Continued on page 169)

MARTS G3RNL/P TEST LOG SHEET

Start	Finish	Station	Freq. kHz	TX/RX Sig.	Ref. Dipole	G8KW	G5RV	Joy Stick	Trap Inv. V.	Trap Semi Vert.	Remarks	Operator
2010	2020	I1KVA	7065	His	5 6 9	5 7 9	5 7 9	N/C				G3SXZ
				Ours	5 9							
2100	2112	DL20C	7044	His	5 6	5 6						G3SXZ
				Ours	5 6	5 6						
2112	2120	UD6BR	7044	His	5 7	5 7	4 4					G3SXZ
				Ours	5 7							
2140	2148	DL8SQ	7070	His	5 8	5 8	5 5	N/C				G3SXZ
				Ours	5 9							
2240	2256	SM5CFM	7080	His	5 6 9	5 6 9			5 7 9	4 6 9	Vert: More noise on Rx.	G3SXZ
				Ours	5 8	5 7			5 9	5 8/9	Ref: Less QSB	
											Inv. V. — to dipole	
2304	2315	SM5DFQ	7080	His	5 9	5 9		4 6	5 9 + 10	5 9 + 10	Vert: More noise on Rx.	G3RNL
				Ours	5 7	5 7			5 7	5 7	Inv. V. — to dipole	
2317	2337	ZB2AO	7040	His	4 6	4 6		N/C	5 7/8	5 8/9	Inv. V. — to dipole	G3RNL
				Ours	5 2/3	5 2/3			5 7	5 9		
2324	2337	OY7ML	7040	His	5 7				5 9 + 5	5 9	Inv. V. — to dipole	G3RNL
				Ours	5 4				5 6	5 4	Less noise on Rx.	
23/9/67 0530	0600	ZL4IE	7018	His	4 4 9	4 4 9	5 2 9	5 4 9	5 2 9	5 5/6 9		G3SXZ
				Ours	5 5 9	5 5 9	4 4 9	5 5 9	4 4 9	5 6/7 9		
24/9/67 0230	0248	W4NDU	7008	His						4 6 9	N/C on other aerials	G3OHP
				Ours						4 5 9		

Better Signals

By S. S. BEE

IT has been heard on the air that a station new to s.s.b. said " I wouldn't go back to a.m. because I would miss seeing the meters kicking up! " The effect of the " needle flapping " is almost hypnotic and leads some operators to frustration in trying to wrap the needle round the stop. It's almost like driving a car and trying to discover what the top speed is at every available opportunity. Like the bad car driver an s.s.b. operator can easily upset nearby stations with thoughtless operating. In addition the equipment manufacturer can get a name for turning out equipment which puts out a foul signal.

Let us consider an actual example, using one of the most popular pieces of amateur equipment used in this country, namely a KW2000. The following example is equally applicable to other equipment, but the actual figures may vary. Going by the manufacturer's recommendations the p.a. should be loaded for a maximum input of 150 mA. If you cannot load it down to this figure then there is something wrong with your aerial—it is probably reactive. With the p.a. correctly set up, and the rig in the TUNE position, the microphone gain can be increased from zero and the indicated current will gradually increase up to 150 mA. Any further increase in microphone gain will not increase the indicated current. In fact it may well decrease slightly. Again, if this does not occur, then attention should be paid to the aerial or aerial matching arrangements.

With voice modulation the meter finds it impossible to follow exactly what is going on. In fact when the voice peaks are driving the p.a. to peak input, the meter will be registering only about half, i.e. 75 mA indicated. Unfortunately the psychological effects of having a meter, the f.s.d. of which is 200 mA and only kicking up to 75 mA—just over $\frac{1}{3}$ of f.s.d.—is just a bit too much for some operators. Just because the f.s.d. is 200 mA it does not mean that this figure should be aimed for! In fact it's a pity that the range of the meter is not switched, 200 mA for tune up and 100mA for normal s.s.b. operation.

What is the effect of overdriving the p.a. in this type of rig? An indication of the effect can be realized from what happens during the TUNE procedure. With a correctly loaded p.a. the cathode current will gradually increase as the microphone gain is advanced up to 150 mA indicated input. Further increase in microphone gain will not increase the anode current any further and a point will be reached when the anode current decreases. This all means that beyond a certain point it does not pay to drive the p.a. any harder. The output will not increase and in fact, driven hard enough it will decrease. In addition any extra drive beyond that required to drive the p.a. to maximum will result in grid current being drawn. This is where TVI is likely to occur in many cases. With the grid drawing current a diode is formed between grid and cathode and this will immediately cause harmonics of the original signal to be generated—hence TVI.

Getting back to the fundamental frequency, the effect on this when overdriving is to cause the peaks of the signals to " flat top ". This introduces splatter and puts signals into the band of frequencies which were previously pretty well clear due to the effect of an expensive mechanical or crystal filter. The moral here is that if operators must persist in overdriving the p.a., a more economical method would be to use d.s.b. instead of their so called s.s.b.

Flat topping is the biggest cause of splatter, but it can be avoided to a certain extent by introducing a form of automatic level control (a.l.c.). *KW Electronics* have introduced an a.l.c. system that can be installed in their transmitters. Most of the American equipment and the fairly recently introduced Japanese equipment have a.l.c. as part of the standard equipment. When used correctly this a.l.c. can provide protection against excessive grid current by monitoring the grid of the p.a. to detect the onset of grid current. When this occurs a negative control voltage is derived to reduce the gain of an earlier stage or stages. This can also effect a form of compression by reducing the gain of signals above a certain level, while the gain is maximum for lower level signals. The average level is, therefore, increased and the meter will indicate higher than it would without the a.l.c., yet the p.a. is still not flat topping.

This all sounds too good to be true. Too much of this form of compression can introduce distortion in the early stages of the transmitter. The most obvious cause of distortion is the balanced modulator. Utilizing the a.l.c. system to introduce some compression means advancing the audio gain control. Unfortunately some operators using a.l.c. have their minds only on the fact that the p.a. is not being overdriven. With increased audio it may well be that the balanced modulator is being overdriven. This results in distortion which will be reproduced by the p.a. The consequences are a bad quality signal—and who wants that!

But even if the balanced modulator is not being overdriven by the increased audio, one of the following amplifiers or mixers could be. The problem with all this is that the anode (or cathode) current meter cannot be relied upon to give a useful indication—except perhaps in the case of no-signal standing current of the p.a. On second thoughts even that is doubtful! If the carrier suppression is not good this will show up as an increased standing current. If the owner of the rig with this faulty condition sets the standing current up to the book, the p.a. will be over biased and distortion will occur. You can't win, can you?

But let's assume that the carrier suppression is good, and the standing current is set up correctly. Assume also that the carrier frequency is positioned correctly with respect to the passband and all things are as they should be. The problem then arises as to how can the operator ensure that a reasonable signal emanates from the rig. The most satisfactory way is to monitor the signal with a 'scope in order to determine at what level flat topping occurs. Ideally this visual monitor should be kept on the rig at all times. To avoid this the anode current meter indication, corresponding to maximum undistorted output on speech, can be noted and used for future operation. This is not particularly satisfactory because the meter is moving so fast for speech. One method using a meter indication can be far more useful and this is to meter grid current. With class AB_1 operation no grid current should be drawn. The grid current meter, therefore, can be used as an overdriving indicator. The audio gain should be advanced, while speaking into the microphone, until the grid current meter is just seen to move, and only just. This is the limit of drive for correct operation. Driving the p.a. any harder will result in distortion and harmonic generation, both highly undesirable.

This method of monitoring the grid current is only useful provided a.l.c. is not applied. If an a.l.c. circuit is included, and it's a good one, driving the p.a. hard will still only result in something less than 100 microamps of grid current. How does one know how much the audio gain can be advanced when using a.l.c.? The a.l.c. should really be used as a protection device and, as stated earlier, can be abused resulting in a distorted transmission. To make the best use of a.l.c. the best method of setting up is to first switch it out of circuit and talk up the p.a. until the grid current is about 0·75 mA. The a.l.c. can then be switched back in whereupon the grid current will be prevented from rising too high, in fact it will be kept to within approximately 50 microamps. At this sort of level the deterioration in signal quality will only be marginal, but it will occur. One can, therefore, imagine what would happen if some of the operators on the bands were to switch out their a.l.c. The grid current would be found to be kicking up to around 3 mA, and that indication is only the average!

The last cause of distortion to be discussed here is due to incorrect tuning of the p.a. If this is not " on the nose," the p.a. can be on the verge of instability, and could, in fact, be taking off on voice peaks. This results in a harsh, gritty and " squirty " transmission which will upset adjoining QSOs. The problem is that most of us are brought up to tune the p.a. for a " dip " in the anode current. With a linear p.a., and only if the p.a. is perfectly neutralized, will an anode current dip coincide with maximum output. If the p.a. is not perfectly neutralized, then a certain amount of positive feedback occurs—this causes instability, which, again, means distortion. It is almost impossible to neutralize perfectly over the full frequency range, therefore, all setting up is done at the highest frequency band in use. This is because the internal capacitance of the p.a. valve becomes more significant (less reactance and hence more feedback) at the higher frequencies. The only safe way to tune up the p.a. is to tune for maximum output. This ensures that the phase of the output is exactly the same as the phase of the input to the p.a. If these phases do not coincide then the neutralizing will not be having its full desired effect.

The moral of it all is to tune up and operate your equipment either as the manufacturer recommends, or, if you build your own, within the ratings of the valves used. This way the manufacturers of the equipment can take some credit for producing a better rig than one would imagine by listening to some. For the home constructors, correctly operating the rig can, perhaps, attract some people back to real Amateur Radio by proving that home built equipment can be, at least, as good as expensive commercial gear.

Which Aerial? **(Continued from page 167)**

lower angle of radiation with an appreciably lesser null off the ends compared with the horizontals. The G5RV did not come out too well on these tests. It is, of course, a compromise, and it appears to be much more of a compromise than the trap dipole. It was a puzzle on 20m, particularly after hearing so many good reports from other stations using one. The fact remains, however, that in direct comparison tests it was out-performed in most cases by the other aerials.

The Joystick did not appear to substantiate the far reaching claims made for it. On the other hand it did not necessarily encourage the critics. Generally it was well down compared with all other aerials, with the marked exceptions of ZL on 40m c.w. and VK5 on 20m s.s.b. The only explanation for these exceptions can be that the aerial was vertical and, therefore, exhibited a much lower angle of radiation compared with the horizontal dipole.

The conclusion to all this is that there is not one aerial that will do everything. In the case of 40m it came very near to it with the trap semi-vertical. Generally speaking a station must decide which sort of contacts he wants. Is it local or DX? If an aerial is chosen which is nearing optimum for one, it is a compromise for the other. A further split, for near optimum operating, should be made. The 40m band and lower frequencies should be on one aerial and each band above 20m on separate aerials. The multiband aerials are a good choice for the l.f. bands, but leave a lot to be desired when it comes to h.f. band working. For those who do not feel inclined to erect multi-element beams on the h.f. bands a single element quad offers a great deal. This can be erected quite simply using a mast with a cross member as indicated in Fig. 4. This could be made into a three band affair by putting the three loops one inside the other, and feeding with a common feeder.

One question that will arise as a result of these tests is, how much can one get away with by folding or bending the aerial to fit into the space available? Obviously this is going to cause some degradation of the aerial performance, and if this must be done the bends should not be greater than 90° if it can be avoided. Additionally, bends must be as far away from the centre as possible. If space is limited the compromise is going to be more or less the same, irrespective of which aerial is used. An interesting point on this is that the aerial which appeared to come out on top, namely the trap semi-vertical, took up the least space. In fact, if this aerial had been all vertical, no doubt the results on 80m would have been even better. Going in the other direction the vertical section could be reduced so that the trap appears part of the way along the horizontal section. This will reduce the effectiveness of it though. For house dwellers with no garden, or those with difficulties in erecting a suitable mast for this aerial, a possible solution would be to run the aerial up alongside the house and take the horizontal section through into the roof.

Some comments that may arise as a result of these figures given is that certain stations may well be saying " but I can get RS 5—9 from VK on 20m any time, using my multiband aerial." Well, maybe they can, but just think how much easier it could be if, say, a single element quad was used!

Finally, members of the Medway Amateur Receiving and Transmitting Society would like to thank all concerned in these tests, particularly all of the stations with whom QSOs were had. QSL cards are being sent for every QSO via the RSGB Bureau.

REGULAR FEATURE

TECHNICAL TOPICS

By PAT HAWKER, G3VA

RECENT correspondence has shown the keen interest that exists (and rightly so) in current questions of communication receiver design, and such related matters as whether the growing family of FET devices are as good as they are sometimes cracked up to be, whether the first i.f. should be far above signal frequency, whether the importance of good mixer design is always sufficiently appreciated, and what should we be doing about it all.

Certainly, there is a tendency—perhaps understandable on the part of semiconductor manufacturers—to announce each new development as the complete answer to all existing problems. And some of the statements and supporting claims tend to harden up in progress from the labs to the marketing copywriters. A degree of scepticism on what makers claim for FETs is therefore a healthy sign!

Brian Bower, G3COJ, for instance, is a little unhappy about the diagram we included in the January *TT*, pointing out that it could be misleading since a bipolar transistor can usually be fed directly from a 50-ohm input impedance without the step-up used with an FET so that the real advantage of an FET would be more like 8dB than the 20dB suggested by the curves.

He points out that the main problem in cross-modulation lies in the mixer rather than the r.f. amplifier, where signals are usually much weaker and where the stage can be designed for linear operation. This point was well made in the almost classic article (on valve receivers) by W0SYF (*QST*, January 1955) which indicated that in a typical receiver cross-modulation tended to be due initially to the 2nd mixer, and then as signal strengths increased further to the 1st mixer, and finally to the r.f. stage.

It would be extremely interesting to see an impartial comparison of performance—particularly in terms of signal handling capabilities—of the various possible approaches including gated beam valves in balanced and unbalanced circuits, dual and single gate FETs, bipolar transistors in pairs with high oscillator injection, diode pairs and quads, also driven hard. On a number of occasions in *TT* we have pointed to the advantages of balanced and double balanced mixers—most lately in the form of hot-carrier diodes.

The possibility that these devices will soon be available at much reduced cost seems to be opened up by a recent announcement by HP Associates in the States suggesting that a new form of hybrid hot carrier diode fabrication should bring some prices down to one-fifth of current prices. Hot carrier diodes would seem to overcome some of the objections to say the use of conventional in diode mixers which tend to be noisy and lossy.

FET/Bipolar Converter

Arnold Mynett, G3HBW, also has some pertinent remarks on the use of FETs. He agrees with BRS16468 that a

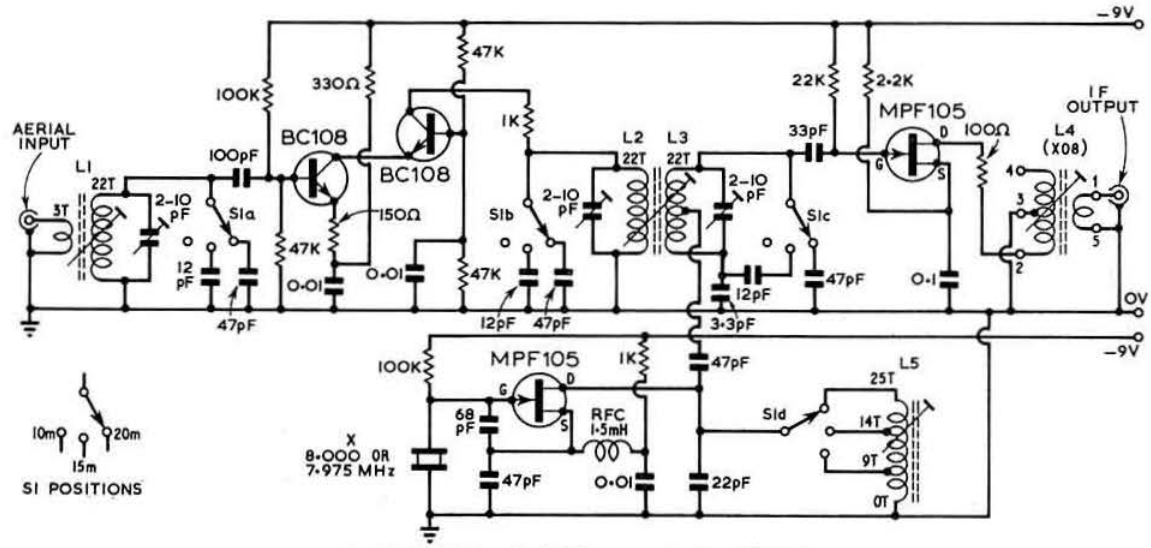


Fig. 1. A 14, 21 and 28 MHz converter by G3HBW.

2N3819 is not so different from a 6C4 except in noise and v.h.f. performance. Most 2N3819's, he considers, are still good at 800 MHz.

He sends along a most interesting converter design (Fig. 1) for 28, 21 and 14 MHz which is virtually a transistorized version of a popular form of valve converter. Interestingly enough, in view of our earlier remarks, he does not use FETs in the r.f. amplifier, but bipolar and cheap BC108s in cascode configuration.

G3HBW considers that it is only worth while replacing bipolars with FETs in amplifiers at v.h.f. but in mixers at almost any frequency—in other words wherever it is difficult to use inverse feedback. The cascode shown, he says, is slightly better than an FET cascode from the linearity point of view, with measured levels of intermodulation a few decibels lower, although the gain is much the same, 24 to 28dB over the band.

His mixer is an FET in a " pseudo-balanced " arrangement to make the best use of a low injection level. Unlike many other designs, he adopts an FET as oscillator, allowing the use of the valve " modified Pierce " circuit, which he says has always been a favourite of his.

Another point he makes about FETs is their very high input impedance compared with bipolars though he has found this to vary considerably among junction-FET devices. He notes that 2N3819s have amazingly good gate-channel diode reverse characteristics whereas the very cheap Motorola MPF102 series (often under 7 shillings) have much greater leakage, though this is no real disadvantage in many amplifier circuits.

The output i.f. of this converter—which he considers could also form the basis of a useful front-end for a receiver—is in the range 1·6 to 4 MHz, using an 8 MHz crystal.

Up-conversion Again

If a signal can be put straight into the mixer without pre-mixer gain, then the dynamic range of the receiver should be a maximum. This, of course, supposes that the noise figure of the mixer is sufficiently low, and also that some technique is adopted to reduce image and other spurious responses.

Last month, we mentioned briefly the up-conversion fixed-channel h.f. receivers developed by Granger Associates offering a claimed dynamic range of 100dB, noise figure of 10dB maximum, in-channel modulation distortion better than 40dB, and image rejection better than 100dB, and a frequency stability better than 20 Hz up to 20 MHz. These receivers, intended for reception on either a single-channel (Model 353: see Fig. 2) or on eight fixed channels (Model 351) do not have to cope with the problems of continuous tuning, but they would seem to have features of general interest.

The receivers use a form of Wadley loop for drift cancellation, having two crystal controlled oscillators. They use a crystal filter at the high first i.f. (65 MHz), and feature FET mixers.

The following is a quote from the sales leaflet on this receiver: " Innovations in circuit design have eliminated the need for an r.f. stage and the overload and front-end noise associated with it. The up-conversion used in the G/A design allows one simple tuned-circuit preselection stage to be used to obtain image rejection in excess of 100dB because

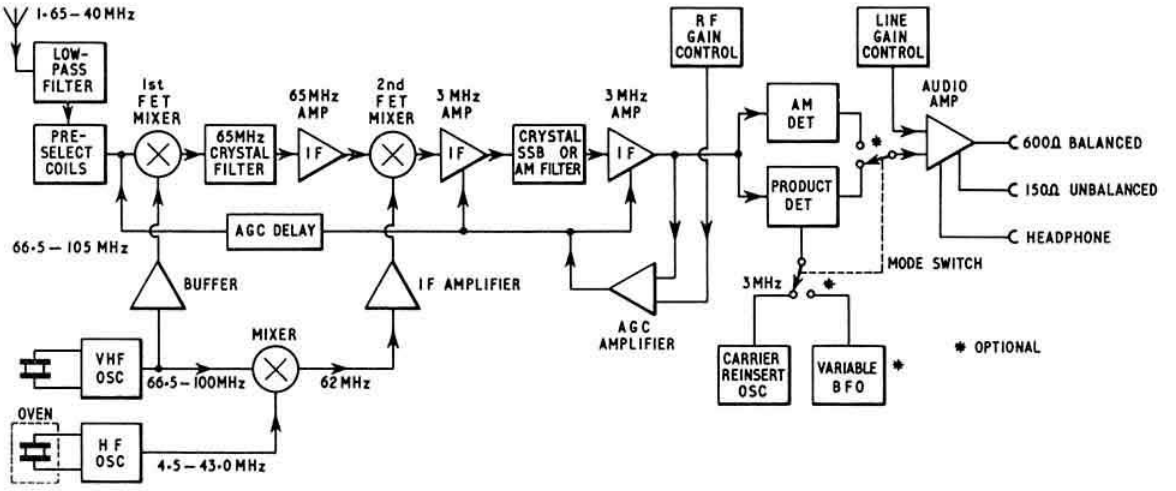


Fig. 2. Outline of the Granger Associates fixed channel h.f. receiver.

the image is 130 MHz above the received frequency. (Conventional down conversion requires three or four tracked tuned-circuit preselectors to obtain adequate image rejection. Since these tuned circuits contribute noise, such receivers require an r.f. amplifier to obtain a good noise figure.) The G/A Model 353, with a single tuned circuit, has a good noise figure (10dB) without r.f. amplification. Other reasons for eliminating the r.f. amplifier are that it is usually the limiting factor in obtaining a large dynamic range, and it tends to overload the first mixer when strong adjacent signals are present."

There have been a number of amateur-band designs which have eliminated r.f. stages with varying degrees of success. One of the more successful (but not the cheapest) was the Squires-Sander SSR1 which introduced the concept of the balanced 7360 first mixer.

Combined with up-conversion and a reasonably effective v.h.f. crystal mixer, this no-r.f. stages approach has interesting possibilities. Soon, perhaps, the boot will be on the other foot with people using h.f. converters with v.h.f. receivers!

Paramp Up-converters for Transmission

The mention of paramp up-converters for h.f. receivers provoked Ron Glaisher, G6LX into mentioning that he has been using an up-converter with varactor and transistorized pump chain to obtain s.s.b. on 144 and 432 MHz since mid-1965. He reports that he got the idea from W1FRR who has done a lot of work with up-converters and varactor multipliers and who also supplied the varactor diode.

He has also tried a varactor up-converter experimentally in a 432 MHz converter but was unable to achieve a reasonable noise figure; on 144 MHz it worked quite well—and '6LX now intends to try the system out on lower frequencies.

The transmitting up-converter has been used by Surrey Radio Contact Club to obtain 432 MHz to drive a modulated p.a. during two v.h.f. NFDs.

Pre-mixer Techniques

Last month, we touched very briefly on the form of partial frequency synthesis or heterodyne v.f.o. arrangement found in the Hallicrafters SX146 and Drake R4A receivers as well as in quite a number of s.s.b. transceivers. This system seems to be becoming increasingly popular as a method of obtaining a constant tuning rate on all bands while avoiding the problems of tunable i.f. strips.

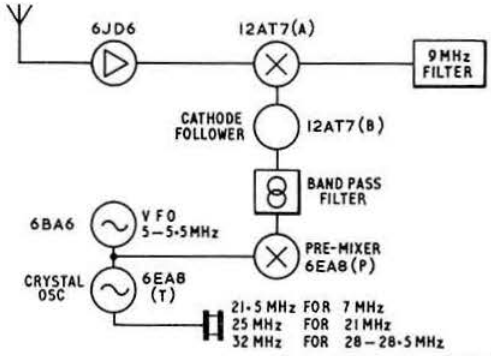


Fig. 3. Pre-mixer arrangements of the Hallicrafters SX146.

One of the questions which have still to be settled is whether at this stage the home builder (or those contemplating purchase of a receiver) should go for the tunable i.f. or the pre-mixer system. Clearly, the pre-mixer makes possible all fixed i.f. with an early crystal filter immediately after the first mixer and hence is attractive in terms of dynamic range and i.f. breakthrough—the question remains, however, whether the heterodyne v.f.o. can be made sufficiently free from spurious outputs without extensive filtering and shielding. Very few articles comparing the two techniques quantitively have yet appeared.

Fig. 3 indicates one of the simpler systems, as used in the SX146 and taken from the *QST* review (April, 1966). This receiver has single-conversion with a 9 MHz i.f. and uses a minimum of h.f. crystals since the basic oscillator range of 5 to 5·5 MHz is used directly for 3·5 and 14 MHz.

A considerably more complex arrangement can be found in the Drake R4A with its hybrid valve transistor design. This has 2N3858 variable oscillator, 2N3855 buffer, 6HS6 pre-mixer and 6HS6 first mixer (5645 kHz first i.f. with crystal filter), 12BZ6 r.f. amplifier, further conversion with a 12BE6 to 50 kHz where there is passband selection and passband tuning. The transistor crystal oscillator is a 2N3394 with a crystal for each band. Examination of the circuit diagram for this receiver shows that it is quite a complicated affair.

Pre-mixer techniques have been used in some of the transceivers subjected to performance tests by G3EDD and his team. His reviews show, at least in some cases, that the pre-mixer receiver is not always free from internally generated spuriae, and one may presume that there must also be some spurious responses from these spuriae. In common with other forms of frequency synthesis, the question of the purity of the output is thus an important one.

It will be noted that this type of synthesis is directly related to the much more elaborate partial synthesis with phase-locking as used in the PR155 and HRO500. The simplification is possible in amateur-bands-only receivers and where stability requirements are not quite so rigorous.

Incidentally G3HBW has made a transceiver which uses phase-locking techniques extensively, with first conversion up to about 31 MHz, and we hope to return to his ideas in the months to come.

Signal-frequency Q-Multiplier Improvement

Still on the subject of receiver front-ends, but this time with the " ancient " but still practical valve approach, some useful hints have recently come in from across the Channel.

A. De Smet, ON4CC of Schilde, tried some time ago a form of the W1DX " Miser's Dream " front-end with signal-frequency *Q*-multiplier (*TT*, July, 1965 from *QST*, May, 1965) as the main receiver on 3·5 MHz in conjunction with converters for the higher frequency bands. He had earlier decided that a 6BA7 provided a better mixer for this purpose than the original unbalanced 7360 (with an equivalent noise resistance of around 60,000 the 6BA7 would be noisy for the higher bands but quite effective on 3·5 MHz).

This valve requires a higher injection voltage than the 7360 but requires fewer components. The '4CC version used two gang-tuned input circuits with 3 pF top capacitance coupling, with an aerial tuning unit and receive-transmit relay. For night-time conditions, a crude attenuator could be connected in series with the a.t.u. and 6BA7 mixer.

Unfortunately, '4CC found that any adjustment of the attenuator, the converters or a.t.u. upset the feedback of the *Q*-multiplier. Finally, efforts to improve the " not very encouraging " results were discontinued, and the set stayed for a time on the shelf. Recently, however, a further onslaught on the problem has been made, and a simple solution found. This essentially is to isolate the regenerative " front-end " from the attenuator and converters with the aid of a grounded-grid stage using the second half of the 12AT7: see Fig. 4.

Now, the regenerative control needs practically no adjusting during operation, and the setting of the 50 pF tuning control is so critical that it requires a vernier control. '4CC says enthusiastically that " the signal gain is amazing, the ' S ' meter sticks to the proverbial pin when the circuit is tuned on the ' nose ' to an average signal."

The dust iron toroid input coil is home made with 20mm outside diameter, 6mm thick and 8mm diameter hole; as shown the feedback coil for the *Q*-multiplier has 6 turns. It is very important that oscillation of this valve starts very gently with no " plop." The coupling capacitor to the grid of the 6BA7 should not exceed 5 pF. For regenerative control, '4CC began with a 10k pot and then measured the voltage from slider to ground when the triode was on the verge of oscillation. Then a suitable resistor was connected from the potentiometer to ground to obtain the same voltage reading at the slider, and a 1k pot substituted to facilitate the regeneration control.

This seems a highly useful approach to improving the performance of the signal-frequency *Q*-multiplier which can be a great help in overcoming image response in relatively simple receivers. Thanks ON4CC.

FET Voltmeter

In view of the recent FET voltmeter design by G3LTZ (*Radio Communication*, January, 1968), it may seem redundant to present an alternative circuit so soon. Nevertheless, there may well be some readers looking for a unit which uses only a single low-cost FET plus one silicon n-p-n transistor, in conjunction with a 50 μA meter. The voltmeter shown in Fig. 5 could be extended to cover additional higher voltage ranges by extending the high-stability input network —and to cover a.c. measurements by means of a diode probe.

The arrangement shown is based on a design which originally appeared in *Electronics World* in February, 1967 but with some modifications suggested by another correspondent to that journal in the November 1967 issue. The original circuit used a p-channel FET plus one of the relatively rare p-n-p silicon transistors. The modified unit, however, has a readily available n-channel FET (of a type currently being offered in the UK at about eight shillings) and the much more usual n-p-n silicon transistor.

The FET is connected in a source-follower arrangement directly coupled to the silicon transistor, and the correspondent in *Electronics World* writes enthusiastically of the high linearity which he suggests is " at least as good as most commercially available d.c. valve voltmeters " and considers that with high quality resistors in the input network and with accurate calibration would come close to laboratory type units. Even if this claim may be pitched a little high, the simplicity of the unit should make it attractive.

Earth Conductivity and Vertical Aerials

One of the recurrent themes of *TT* has been the effect of earth conductivity on vertically polarized aerials—and

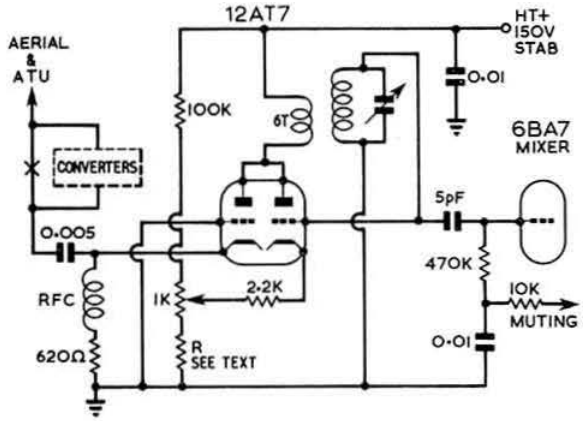


Fig. 4. ON4CC's modified " Miser's Dream " front-end.

of the importance of a good low-ohmic earth connection when the aerial is tuned against earth. Much of the almost traditional belief that vertical aerials provide more effective low-angle radiation than horizontal ones is based on the theoretical vertical radiation pattern diagrams that appear in almost all of the Handbooks. Unfortunately, those patterns are the ones which would be obtained over a perfectly conductive ground-plane, and this fact is not always made clear. In practice, in many locations, far from the strong almost horizontal radiation, there is virtually a null. For reception purposes, a reasonably simple artificial ground plane or earth mat can help eliminate the null, but this is not so easily achieved for transmission. This is, in fact, a notable example of how the simplified approach so often adopted by those of us who put pen to paper can at times be positively misleading.

An illuminating paper on the improvement that can be obtained at m.f. when an aerial " looks out " over salt-water was included in a recent IEE conference on " m.f., l.f. and v.l.f. radio propagation." This was by P. Knight of the BBC research department and is believed to have resulted from studies made in connection with a proposed overseas m.f. relay station.

This paper points out that " if the Earth were a perfect conductor, the direct and ground-reflected waves for a vertical aerial would tend to add at very low angles, giving a large radiated field, the vertical radiation pattern having a maximum in the horizontal direction. With imperfectly conducting ground, however, the phase of the ground wave is reversed at low angles and the vertical radiation pattern has a zero in the horizontal direction."

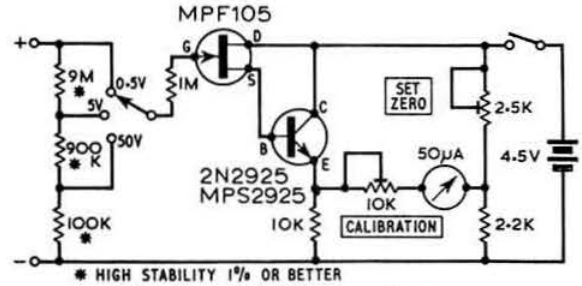


Fig. 5. An FET/Bipolar voltmeter.

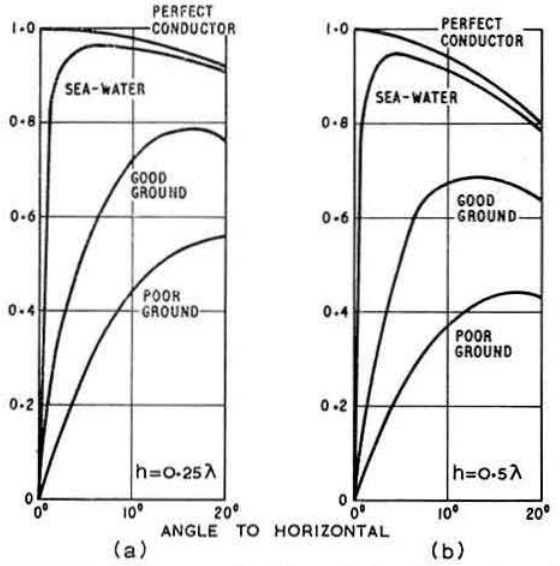


Fig. 6. Effect of the ground on the vertical radiation pattern of (a) ¼ λ and (b) ½ λ vertical aerials.

The author points out that " the vertical radiation pattern for sea-water resembles those for perfectly-conducting ground down to angles very close to the horizontal, whereas those for imperfectly conducting ground start their downward trend at much higher angles." The observation is also made that " very large increases in signal strength might occur when propagation to the distant receiver takes place via a low-angle mode. These increases cannot often be realized (in broadcasting) because the contribution of higher angles modes—to which smaller increases apply—will usually predominate because receiving aerials on land discriminate against lower angle radiation by the same mechanism as that for transmitting aerials."

The paper indicates that increases in receiver input voltage of at least 6dB and may reach some 16dB if the transmitting aerial is sited near the sea instead of on ground of average conductivity. It suggests that the most important part of the ground plane is the first *50 wavelengths* in the direction towards the receiver.

These arguments would apply also on h.f. (although here a rough sea might have unfortunate results) and underline the importance of the ground conductivity extending well out beyond the aerial itself.

Fig. 6 gives a theoretical indication of the variation of low angle radiation of a 0·25 λ vertical aerial, calculated at 750 kHz.

Another paper at the conference gave a full list of ground conductivity constants of various soils, sea and fresh water, and of many types of rocks, sediments etc. This shows variations (in units of mho/m) from 4 to 5 for sea-water, 10^{-2} to 10^{-1} for good soil, 10^{-3} to 10^{-4} for poor soil and fresh water. There is a fascinating figure given for galena (PbS)—no less than 20 to 200. So perhaps when looking for a good site, it may be advisable to find out what is underneath. Anybody know a galena deposit extending out to 50 wavelengths in all directions?

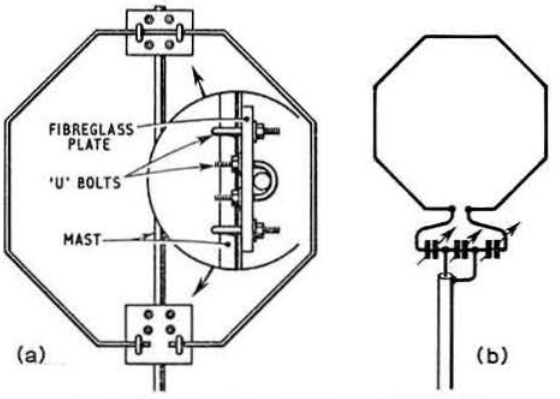


Fig. 7. Transmitting loop used by WB2PWU.

Those Transmitting Loops

Last month, we noted (in anticipation of his full article) that work by G6NA on transmitting loops (*TT*, November, 1967) seems to confirm that this is an effective and thoroughly practical approach on 1·8 MHz; in his case with an ingenious alternative to large diameter copper tubing, and with a simple unbalanced matching network.

Since then an encouraging report on this technique has also come in from Ed Gerber (WB2PWU) who has been using an octagonal loop roughly of the type described in November to work some useful DX on 7 MHz. Like G6NA he is using a simple all-capacitor matching network, but in a balanced arrangement. He writes:

" I have had a sad dipole up on forty metres, the opposite of an inverted-vee, but could never work out locally very well. Though I did work 18 countries in the October, 1967, *CQ* WW test. But, in any case, this loop aerial interested me. So, with the help of W2GCX, I constructed one.

" I used ¾-in. (inner diameter) copper pipe and ' plumbers' 45s ' (they are actually 135° angle couplers), with regular plumbers' liquid solder to connect the pipes to the couplers. At the top and bottom of the loop I used a piece of about ¼-in. heavy fibreglass board with an oxen-yoke arrangement to secure the octagon to the mast. I had to use heavy steel pipe to support the loop as aluminium pipe bent around freely. I use three about 500 pF variables (this may be 5500 pF variables—3VA) to tune the ' thing.' "

With the loop at a nominal height of 30 ft. mounted next to the aluminium siding of the house, and with the loop tuned for 7 MHz c.w. low-frequency end driven by a Swan 500 he has worked: IT1AGA (589), DM2BTO (579), YU3BUV (579), LZ2KLC (579), YO9APJ (559), G8AX (459), 7X2ED (569), VE6WG (579) and PY7AUU (559)—the signal reports indicating incoming report, from Rockville Centre, New York. He is hoping to try the aerial out soon on 3·5 MHz but seems already convinced that this is " a great low frequency aerial."

Looking back over the years, old timers may recall that a good deal of early v.h.f. (56 and 112 MHz) activity made use of the active type of loop aerial which also formed the p.a. tank coil. And checking through *Proc IRE* on this track recently, several articles on h.f. transmitting loops were found (typically January, 1934 and May, 1936).

THE MONTH ON THE AIR

By JOHN ALLAWAY, G3FKM*

READERS will be happy to learn that a letter has been received from ZC4MT, President of the Cyprus Amateur Radio Society saying that the Service Authorities have now come to an arrangement with CARS whereby old call-signs will no longer be re-issued. The major stumbling block has been the fact that records relating to calls previously issued by the Cyprus Republic authorities are not available to the Services. However, records belonging to CARS and dating back to 1960 are being examined, and all holders of re-issued calls are being given new ones. Sgt. E. Milne, formerly ZC4FB, has now become ZC4JM, and the present holder of ZC4CZ will also be receiving a new one.

Last month's remarks concerning the use of the term Hertz in place of cycles/second have disclosed that the opposition to this step is very considerable. It is understood that no obligation has been placed on the use of the term by ITU. Your scribe would like to make it clear that any use of it in this article is due to the work of the Editor, not G3FKM! Another change which will have come about by the time this is being read is the adoption of Central European Time in the UK. Readers are asked to remember that all times in MOTA will of course continue to be given in GMT.

Congratulations to **Gus Browning, W4BPD,** who has been named as the first member of *CQ Magazine's* **DX Hall of Fame.** Gus must be well known to most readers, and has given us many hours of pleasure and many contacts whilst on his marathon DXpeditions. Since he was first licensed in 1925 as NU4ADB, he has held a total of 123 different call-signs in 117 countries throughout the world and is believed to be the only amateur ever to have made DXCC in terms of the number of countries from which he has actually operated! He calculates that he has made over 380,000 QSOs during the course of his travels.

GW3DZJ, manufacturer of the " G-Whip " aerial, offers to lend one or two of the tri-band models to *bona fide* clubs or groups who may be contemplating making expeditions. Interested parties are invited to send dates and details direct to GW3DZJ.

Information has been received from the Gibraltar QSL Bureau manager, ZB2AP, that cards are being received for "ZB2I " and " ZB2F "; neither of these stations is legitimate and both are suspected of being located in the UK.

Rotarians of Amateur Radio

VE3MJ has notified the Society that arrangements are being made to set up an Amateur Radio station in the Convention Hall, Mexico City, during the 1968 Rotary International Convention (12 to 16 May). The President of LMRA (the Mexican Amateur Radio Society), XE1CCP, is an active Rotarian. ROAR now has some 600 members in 35 countries and is under the Chairmanship of W9JKC. VE3MJ is the organization's publicity officer and may be reached at PO Box 86, Chatham, Ontario, Canada.

Top Band News

A most interesting letter from Sima, JA3AA, gives the news that he has so far not heard any European signals, or any from the Eastern USA. During the *CQ* 160m Contest he raised six W6s, three W7s and a VE7 between 12.59 and 15.34 and JA2CLI managed a QSO with KH6IJ. There are now about 30 Japanese stations active on 160m and JA3AA has worked nine countries; other keen types are JA6AK (seven countries), JA2CLI and JA1BHG (each with five countries) and JA1PVK and JA4AH (four countries each). KL7FRY, who has now returned to his W8DGP location, was worked on all bands 160 to 10m during the *CQ* WW DX Test! Sima hopes to manage a contact with the UK in the not too distant future.

ARRL President W0NWX completed what is thought to be the fourth Top Band WAC when he worked KA9MF on 28 January. Equipment in use consisted of a 700 ft. wire between 50 and 75 ft. high, and a 50 watt transmitter.

MP4BBQ reports that 160m operation is now permitted in Bahrain. He suggests that interested UK stations should write to MP4BBW or MP4BEU with suggestions of times, frequencies and so on, in an attempt to produce the first ever contact between Bahrain and the UK on Top Band. Ian Cable, MP4BBW, may be reached at Box 425, Awali, Bahrain, and MP4BEU's address is A. K. Cairncross, c/o Gulf Aviation Co. Ltd., Bahrain. Reports of progress would be very much appreciated by your scribe.

Joe, VO1FB (PO Box 51, St. John's, Nfd., Canada) is once again active on 160m but is still confined to his 200 ft. wire as the weather has been too cold for him to erect his 700 footer. He found conditions very good during the *CQ* Contest, probably better than they were in 1966 or 67. During the First Timer's test morning the following weekend he worked 11 G's between 00.00 and 05.00, but the band closed before the Test officially started at 05.00. Joe will be active around 00.00 most Sunday mornings for the next two months or so.

Roley, ZC4RB, has now worked 16 countries on 160m but still needs GC and GD. Stations in the Isle of Man and Channel Is. are asked to look out for ZC4RB—he has been reported on 1804 as early as 18.00. QSL's should be sent to the address in *QTH Corner*.

* 10 Knightlow Road, Birmingham 17. Please send contributions for the April issue to arrive by 14 March, for the May issue by 13 April, and for the June issue by 8 May.

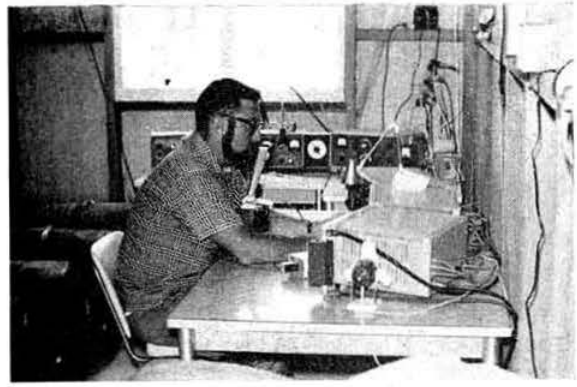
The Ballymena Radio Club will be activating Co. Fermanagh at Easter. Top Band operation will be between 19.30 and 05.30 on April 13/14, 14/15, and 15/16, with possible activity on the 12/13. The call-sign will be GI3FFF/A, and skeds may be arranged through the club at 46a Bridge Street, Ballymena, Co. Antrim. GI3SGR will also be visiting Fermanagh in July. Any ideas from readers concerning other needed rare Northern Ireland counties would also be welcomed by the club. Incidentally there will be activity on all other bands up to 70cm (GI8AYZ/P), on 4m the call will be GI3RNY/A, and the other bands GI3XDX.

News from Overseas

Latest information on the situation in the VP8 areas has been received from G3NMH. VP8JD (S. Orkneys) has now closed down and his equipment is en route to Stonington Is. where it will be used by VP8JG. There is now no point in sending QSLs to G3NMH for VP8JD contacts as logs were normally passed by radio and Hal is no longer able to do this. Robin, VP8IU, is leaving for the UK sometime in March and will then be G3SFN—Hal is able to handle UK QSLs but VE7AON deals with those for the rest of the world. Ian, VP8JN, is still on Argentine Is. and will be there another year, an HW32 has been shipped to him and should arrive soon. VP8JD's place in the S. Orkneys will be taken by Dave, VP8JO, who at present has no amateur gear and has to use the base equipment but may receive an SB100 soon. Other stations on Argentine Is. are VP8JT, Dick, who has a KW2000A, and VP8JI whose future movements are not known. As an indication of the reliability of the UK—VP8 path Hal points out that he has managed 340 QSOs with VP8HZ in two years and he has had over 500 VP8 QSOs in the past six months!

An interesting letter from MP4BBQ gives news of current Bahrain activity. He is at present in Kuwait, but happened to visit Bahrain at the time of one of the MP4B's bi-monthly meetings, and had the pleasure of meeting Ian Wollen (ex-4S7IW, G3UZI) who is now MP4BGS. The club station at RAF Muharraq is MP4BBA; the present operator there is awaiting his personal call-sign but has been on 10, 15 and 20m s.s.b. with the TA33 Jr. beam pointing towards UK. Terry, MP4BGU, also at Muharraq, is mostly active around 28550 on a.m. in the mornings and around 14050 c.w. Ian, MP4BGS, has a KWM2 and will be on from his own home soon with a TH4 beam at 50 ft., he is awaiting delivery of an HA 14. The other Ian, MP4BBW, now a family man, hopes to be more active soon. Alec, MP4BEU, has not been too active recently, but appears occasionally on 40m c.w. between 18.00 and 20.00. He is always on the look out for G contacts and cannot understand why so few UK stations appear to hear his signals. Lastly, Bob, MP4BCC, a very well known DX voice, is not too active, but may occasionally be found on 14192 kHz s.s.b. at around 12.00 GMT.

GM3LWS reports receiving a letter from Angus Murray Stone (ex-5N2AMS etc.,) to the effect that he arrived in Takoradi on 8 November last. He has obtained the call 9G1GG and has a KW Vespa, a KW201 and a TH3 Mark 2 beam. As soon as a transmitter fault can be cured Angus will resume his daily sked with GM3LWS. Readers will be interested to know that Angus expects to be ordained into the Church in Takoradi Cathedral next July. Your scribe feels sure that all readers will like to join him in wishing Angus every good wish in his new calling.



Don Miller, W9WNV, operating VK2ADY/9 on Cocos-Keeling during the 1967 CQ World-wide DX Contest. The station made 3300 QSOs and 5 million points.
(CQ Magazine)

DXpeditions

According to information received from W4DQS, the recent operation by TJ1QQ from the QTH of EA0AH resulted in 1463 QSO's being made. Dale says that Herman expects to return to **Fernando Poo** soon. QSL's are being received from W4DQS and also direct from the Callbook address of EA0AH. After HB9FP's return to Switzerland his place will be taken by HB9TU, who will most probably use the callsign EA0TU. Ali should have s.s.b. available and hopes to make a reasonable number of " contest style " contacts. Possible operating frequencies are given as 7005, 14,005, 21,005, and 28,005 c.w. and 14,205, 21,205 and 28,505 kHz on s.s.b.

There is a possibility of an expedition to **Macao**, CR9, by members of the Hong Kong Amateur Radio Society, if local activity there remains as low as it is at present. Further details will be given when available.

It is rumoured that Guy, FR7ZP, will be staying in **Europa Is.** for three months in the near future. This island counts as Juan de Nova for DXCC purposes. Other reports say that FR7ZI/MM who is now in Brazil has shown a valid **Clipperton Is.** licence to PY2PE. Some activity from this FO8 area would be very welcome.

A party of amateur treasure hunters is said to be on its way to **Cocos Is.** (TI9). One of the members is WA6OKN, and some amateur radio activity is a distinct possibility. Other small island groups in the S. American area being talked about at the present time include Malpelo Is. (an expedition here depends on co-operation from the Colombian Navy), and **San Felix Is.** (CE0X) whence CE3ZN, CE2PK and CE3UF are said to be planning a trip during the coming summer.

Although not strictly a DXpedition, VK9RJ is expected to begin operations from **Nauru** around 11 March. He will be there for three years. Readers may be interested to know that according to a UN survey in 1964 this island had the world's second highest per capita income! Inhabitants have full employment, rent free houses and free water and electricity. The population numbers some 5500 about 2800 of whom are indigenous.

K9GCE expects to be active from **Sint Marten** during April; he will be there for the *CQ S.S.B. Contest* and will have two other operators with him. His PJ5 call is not yet known,

and he is also considering a spell of operation from the French half of the island with an FS7 call.

The Manchester University ARS expedition to St. Agnes, Isles of Scilly, will in fact take place between 22 March and 1 April. Their call-sign will be GB2IS, and QSL's may be sent to them at the University Union, Oxford Road, Manchester 13, or via RSGB.

Late word on the projected VS5RCS expedition is that it will take place during May or June and will last from a Tuesday to the following Friday (4 days). Operators will be 9M2NF and 9M2XX, and there will be no 160m operation. Donations to WA6VVJ would be welcome.

Contests

In the **1967 VERON Contest** the highest UK score was achieved by **G2LB**, who made 4224 points. Other participants were G3ESF (who in fact was second only as a result of one less QSO although due to a mistake on the official result list was shown to have only 3402 points!), **GM2HCZ** (2295 points), **GD3AIM** (1302 points), and G3JFY (864 points). Highest non-PA score was 10,176 points by UB5HS. The 1968 event will take place between 12.00 27 April and 18.00 28 April and will cover all bands 160 to 10m and also 2m and 70cm. Cross band or cross mode QSOs are not permitted and each station may only be contacted once per band, either phone or c.w. Stations outside the Netherlands send report plus serial number of QSO, PA/PE/PI stations also add a two letter suffix indicating their province. Each complete contact counts 3 points; 2 points may be claimed if only the received number is logged. The final score is reached by multiplying the total number of QSO points by the number of band/provinces worked (a maximum of 88). Logs should show date and time, call-sign, multiplier (if claimed), number sent, number received, and points claimed. They should be posted before 15 June to Mr P. v. d. Berg, PA0VB, Contest Manager, VERON, Keizerstraat, 54, Gouda, Netherlands.

An interesting contest has been arranged by the **IARC** to assist the club's propagation research programme. This will start at 00.01 1 April and finish at 23.59 30 April. The objective is for amateurs to contact as many other amateurs in as many different CPR zones as they can during the month. Entries may be single operator (phone, c.w., or RTTY; single or multi-band) or multi-operator (same categories). A mobile and a club section are also available. All contacts must be made on the same mode (i.e. c.w. to c.w. etc.,) and crossband contacts do not count. Stations exchange report plus CPR zone number (in the case of the UK this is 27). QSOs between fixed stations in different zones count 1 point, no points are counted for QSOs within the same zone. Space precludes the publication of full details of this competition and interested parties are advised to write to L. M. Rundlett, W3ZA, Chairman, IARC Contest Committee, PO Box 6, Geneva 20, Switzerland, from whom complete details may be obtained. The information includes a CPR zones list and map and it is suggested that at least two IRCs should be included for return postage.

The **Florida QSO Party** will take place between 15.00 and 20.00 30 March, and between 00.00 and 05.00 and 14.00 and 24.00 31 March. Each contact with a Florida station counts 1 point and counties worked count as multipliers. A bonus of 100 points is given for working the first 15 counties, of 200 for the next 15, of 500 for the next 15 and of 1500 for working all 67! Phone and c.w. are separate contests, and the same

Fred, G3SVK, seen here at the operating position at GM3SVK, Shetland Is. Although now in Rutland he hopes to return to the far north soon to hand out some more rare contacts.

station may be worked on each band for points. Logs should be sent before 30 April to Florida Skip, Contest Chairman, PO Box 51, Miami Springs, Fla., USA 33166, and must indicate category of entry and operator's signature. Suggested QRG's to search for Florida stations are 3530, 7030, 14030, 14230, 21030, 21330, 28030 and 28820 kHz.

The **CQ World Wide WPX Phone Contest,** probably one of the most sensible contests to be held, will take place between 00.00 6 April and 24.00 7 April. Only s.s.b. operation will be allowed and total operating time limited to 30 hours out of the 48 hour spell. The 18 hours non-operating time may be taken in up to five periods—thus allowing time for eating and sleeping and removing the endurance factor from the event! Multi-operator stations may operate for the full 48 hours however. QSO points are three for contacts with stations outside one's own continent, and one for those with stations in the same continent. No points between stations in the same country but these contacts may be used to obtain prefix multipliers. The multiplier is the total number of prefixes worked—each may only be counted once regardless of which band it was obtained on. Entry forms may be obtained from G3FKM in exchange for a s.a.e.—each log sheet has room for about 70 entries, please give an idea with your request of how many forms are needed.

Apologies for an error in the **CQ S.S.B. Contest** results last month—the score credited to G8KG should have been given as **G3SSO's.** The Contest Committee possibly copied 8KG's callsign in error, as he signed the logs on behalf of the club station G3SSO.

YL International S.S.B. Communications System

Many readers will be familiar with this system, which meets daily on 14,332 kHz. A great deal of organization and hard work has been put into the running of it by K4ICA, V. Mayree Tallman, who founded the organization and has been its President since its inception. V. Mayree has now graciously decided to step down from this position and a ballot for her successor will be held. One of the contenders for the presidency is London born Marcia Guest, well known as WA4SBK (formerly WA6MAZ) and an RSGB member. Marcia is an extremely competent operator and your scribe would like to wish her every success in the ballot.

DX Briefs

HV3SJ reports that his call has been pirated on c.w. He is at present only active on s.s.b.

A new station has been heard on the air from **Galapagos Is.** This is HC8RS, Rolf, who previously operated as HC8JG. He has a Swan 350 and a dipole and has been worked on 20 s.s.b.—he is said to be unable to read c.w.

According to *DX'press* the Bonin and Volcano Is. (K6G) will be returned to Japanese jurisdiction during March and therefore may count as Japan from that date. The status of Marcus Is. will not be changed.

KC6CO, who is also W6GEO/MM, is active from Koror in the **W. Caroline Is.** He is an electrician with a film unit making a film starring Lee Marvin, and will be there until April. Another interesting /MM station is KC4USQ who was worked in December from the US destroyer *Calcaterra* when 900 miles S. of New Zealand while taking part in Operation *Deepfreeze*.

According to NRRL the call 3Y0EB has not been issued and nothing is known about a scientific expedition to Bouvet Is. The only licence issued is 3Y0AB which belongs to Don Miller and is valid until 31 December, 1968.

ITU is said to have provisionally allocated the prefix series 70A-70Z to the new South Yemen Republic (formerly Aden).

Les, 9V1OS, was scheduled to leave Singapore for Thailand on 20 February. He expected to be there for about five weeks and hoped to be able to operate with an HS call.

Tom, VR6TC, has resumed his skeds on 21350 at 21.00 on Mondays. Another "island" station is OY4OV (ex-OZ4OV) who says that he will be active at the high end of 80m around 18.00 daily.

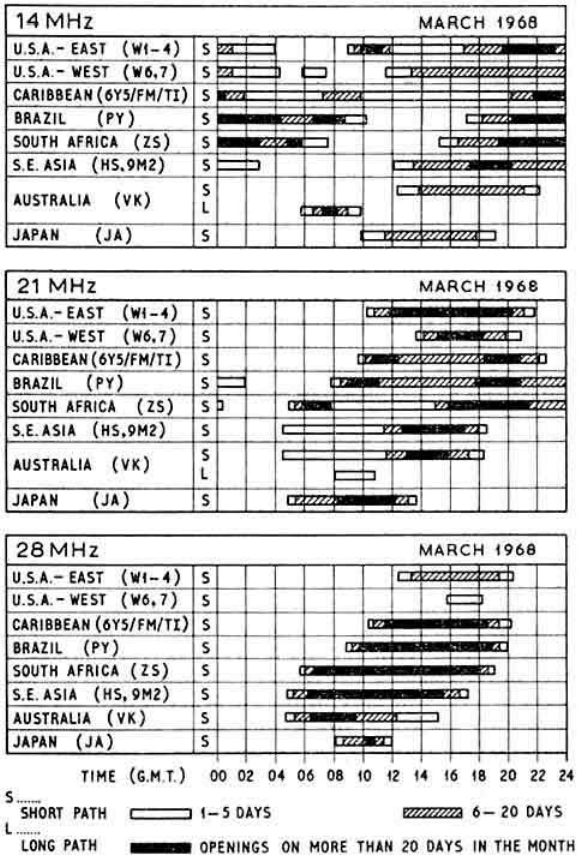
A 5L2 prefix will be used by a special station in **Liberia** during Liberia Field Day (12.00 30 March-24.00 31 March).

Band Reports

Once again conditions seem to have been reasonably good on the l.f. bands, although the very first sign of spring in the form of early morning signals from W6 on 20m has been observed. Many thanks to the following contributors who kindly supplied the information contained in this column: G2BOZ, G2HKU, GW3AX, G3LP, G4MJ, G6LK, G8JM, G8VG, GM3CSM, G3HDA, G3HCT, G3MBL, G3NRU, G3SML, G3URX, G3XDV, BRS25429, BRS28198, A3942, A5032, A5096, A5126, A5224, A5437, A5459, A5489, A5610, A5653, A5837, A5852 and A5920. A reminder that calls mentioned in italics are c.w., the others s.s.b.

On **160m** *OE2JZ* (23.32), *OH0NI* (22.00), *VO1FB* and *W1BB/1*. (Often for 15 mins. around 23.00 then fade out), *W3DPJ* (05.54) and *ZC4RB* (21.34) have been reported.

Undoubtedly the star band for DX has been **80m.** Stations reported read more like those heard on the h.f. bands and include CR4BC (00.50), CT2AA (01.15), CT3AC (22.15),



Propagation Predictions

During March the F2 m.u.f's slowly begin to fall as the summer season approaches. This disadvantage will show up mainly on the 28 MHz band. On average, 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 for only short periods. Propagation conditions on 21 MHz will not be affected yet by the seasonal fall in the F2 m.u.f. 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 latter half of the night than in the previous two months. This band will not become a real night time DX-band until probably 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 much more favourable than the direct path. Favourable times for traffic to Alaska and Hawaii during good conditions on 14 MHz will be from about 07.00 to 09.30 and from 17.00 to 19.00 GMT. As the great circle passes through the auroral zone, contacts will be frequently interrupted by disturbances here. 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 around 22.00 GMT and remain audible until shortly after sunrise. From 03.30 to 06.30 GMT on 7 MHz there will be opportunities for working Western North America, and when conditions are very favourable Alaska and Hawaii may be worked between 04.30 and 06.00 GMT. On 3·5 MHz the East Coast of the USA will probably be heard from about 00.00 to 05.30 GMT. 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 1968 was 115·3 with the periods of greatest activity occurring during the first thirteen and last three days of the month. On 31 January the daily number was 209. The predicted smoothed sunspot numbers for May, June and July are 117, 116 and 115 respectively. The Zurich Solar Observatory forecast names May 1968 as the month of the maximum of the present sunspot cycle.

EP2GI, (21.56), ET3FMA (20.26), ET3USA (01.33), HB0LL (21.49), HV3SJ (22.00), JW3XI (21.15), KA2DM (24.00), K4RSH/KG4 (05.54), W1FZJ/KP4 (23.28), MP4TAH (21.23), OA8V (07.56), PZ1CF (22.34), TA2BK (23.00), TI2WR (03.43), TT8AJ (20.34), VK5HV (? Q5 S9 at 01.55. QSL awaited with interest . . .), VP1PV (23.00), VP5AA (23.21), VS6DO (20.00), VS9ML (24.00), VQ9JW (21.21, 00.14), XE2BB (08.34), YV4HN (03.47), ZB2AP (21.53), ZD3F (23.45), ZL2BCG (07.25), 5Z4KL (20.40), 8R1G (07.38), 9G1BF (04.55), 9J2AD (22.11), 9M2NF (21.20). Amongst the more glaring pirates is " 8Z4AB " who continues to find those who are willing to work him and hope for the best!

The only **40m** signals of note reported were FP8CY (20.30), OY7S (19.27), *TA2SC* (21.00), VQ9JW (19.17), W7's (08.00), *XE1EK* (07.20), YV6GG (21.51), ZS1JA (19.03), 5Z4AA (19.18), 6*Y5GS* (23.58) and 8R1IG (08.28).

Listeners to **20m** after midnight have been rewarded occasionally with good openings into the USA and Canada. (G6LK reports working all VE districts one night between 00.00 and 04.00). At other times the following have been in evidence: AP2AD (14.55), AP2SG (18.40), CE0AE (09.07), EA9EJ (18.40), EA0AH (16.25), *FB8XX* (17.09), *FB8ZZ* (15.30), FK8's (08.30), FO8's AG, BQ (08.46), FR7ZN (18.43), HK0BKW (19.06), JX6RL (17.17), JW6GL (Bear Is. 20.10), KC4USX (09.20), KC6BY (W. Carolines 08.33), W4UAF/KH6 (18.24), KX6DQ (07.58), KW6EJ (08.25), *OA4UO* (10.40), OY5NS (15.03), TI9JIC (10.42), VP2MJ, (20.39), VP8HZ (21.15), VP8IU (21.24), VQ9V/D (16.13), VR1L (08.15), *VR4CR* (08.15), *VR6TC* (18.50), *W4ORB/Mobile/W4*. (12.25. RST 579, 5W. input!), VE/W7,etc (00.00), YK1AA (07.15), ZS2BA (Prince Edward Is. 19.20), 9A1AA (17.05), and 9*VI's OJ, OK* (L.P. 09.30) and *OS* (S.P. 17.11).

15m has remained much as it was in mid-winter. CE3FI (10.58), CP8AU (20.30), *CR3KD* (18.15), *CR4BL* (09.30), *EA0FP* (11.50), EP2DW (13.01), HL9KD (10.30), KG6AAY (10.06), KR6AX (10.37), LX1RB (10.27), MP4MBB (13.37), TU2BJ (12.13), VK9XI (13.12), *VP8JH* (17.30), VQ9JW (15.43), *VS6FX* (09.58), *YS1WKE* (18.20. QSL via K4RCS), ZD7KH (17.40), 5N2ABG (17.20), 5X5JK (15.30), and 9Y4DS, have been of interest.

10m has still been in the doldrums during the period under review, however it should not be long before it really opens up. Some DX reported includes: CX2CO (12.30), EP3AM (13.07), ET3USA (13.20), HC1PC (16.16), K0ILI/KG6 (09.05), MP4BGU (10.10), OX3WE (11.05), VK6QR (15.55), VP8HZ (17.23), VU2JM (10.24), *W6GAJ* (17.20), *ZD7WR* (17.13), 9N1MM (09.00) and 9X5AA (10.15).

An unusual WAC QSO is reported at 20.30 16 February on 20m s.s.b. including ZC4RB, ZL2LH, WA4SBK, PZ1BW, 5Z4ERR, and G4MJ. All stations were copying each other!

Many thanks are due to the following for permission to reproduce the contents of their publications: *The HKARTS Newsletter*, *On The Air* (ON4AD), *DX'press* (PA0FX), *NARS News* (5N2AAF), the *LI.DX.A Bulletin* (W2GKZ), the *DX'er* (K6CQF), *DX News Sheet* (Geoff Watts), the *Ex-G Radio Club Bulletin* (W3HQO), *QUAX* (SM4DXL), the *DX'ers Magazine* (W4BPD), the *West Gulf DX Bulletin* (W5QK), the *Florida DX Report* (W4BRB), and *CQ DX* (ARI). Please send all items for the **April** issue to reach G3FKM no later than **13 March**, for the **May** issue no later than **8 April,** and for the **June** issue by **13 May.**

FINAL 1967 COUNTRIES TABLE

	160m	80m	40m	20m	15m	10m	Total
G3HDA	2	48	74	162	148	97	531
G3IAR	10	56	64	171	126	81	507
G8JM	1	–	13	207	140	109	470
GM3SVK	20	25	60	163	130	66	464
G8DI	–	25	38	102	81	30	276
G8VG	6	21	30	58	74	78	267
7Q7LZ	–	–	7	111	86	59	263
9V1LK	1	5	22	98	62	46	234
G3PQF	7	27	44	39	27	69	213
G3KSH	3	22	48	53	47	39	212
G3ING	13	26	30	46	39	32	186
SM2BYD	–	33	61	–	85	–	179
G3TBK	5	14	32	41	50	9	151
G3VJG	1	3	13	22	28	72	139
G3RTU/4X4	–	2	3	55	42	2	104
G3OJV	1	1	37	21	23	20	103
G3VOK	14	36	6	38	1	7	102
G3JVJ	16	19	12	23	6	21	97
9J2EC	–	–	2	29	16	43	89
G3VWC	5	5	22	21	26	5	84
A4886	11	49	76	245	151	116	848
BRS25428	5	66	75	185	140	130	601
A4038	18	37	36	116	201	146	554
A4568	10	42	42	167	140	120	521
A3942	14	51	69	129	108	94	465
A4266	10	82	80	124	90	55	441
BRS28198	1	50	53	138	85	94	421
BRS27806	3	23	40	116	121	103	406
A5390	3	14	17	128	107	76	345
A5273	5	50	47	102	73	52	329
A5004	4	54	29	112	41	48	288
A5135	4	26	41	92	87	36	286
A5105	2	27	38	110	65	42	284
A5126	4	25	33	82	72	37	252
A4182	3	29	25	69	56	48	230
A5610	8	34	18	57	16	29	162
A5437	–	14	4	72	35	3	128
A5153	2	17	12	57	31	8	127
A5459	4	9	11	56	36	5	121
A4552/VK	–	1	2	80	10	2	96

Congratulations to the winners and sincere thanks to all who entered. Mere totals do not do full justice to the amount of success attending each individual effort as some represent the results of only one part of a year's activity and others "phone only" scores. The first 1968 table will appear in the April issue.

QTH CORNER

CR4BL	PO Box 64, Praia, Cape Verde Is.
EA0TU	via HB9TU, Albi Wyrsch, Kirchbreite, Buchrain, Nr. Luzern, Lu., Switzerland.
EP2GI	via GI3HXV, R. R. Parsons, 45 Erinvale Avenue, Finaghy, Belfast 10.
FB8XX	via FR7ZD (see below).
FB8YY	9/3/67 to 13/12/67 to F9MS, 63 Rue Voltaire, Suresnes, Se., France (Otherwise via REF).
FB8ZZ	via FR7ZD, Guy Hoarau, 10eme Km, Tampon, Reunion.
GM3SVK/A	Fred Curtis, GRSF, RAF Cottesmore, Oakham, Rutland.
HK0BKW	Fred Howard, PO Box 219, San Andres Is.
JX6RL	c/o Norwegian Embassy, Reykjavik, Iceland.
KC6CO	viaW6GEO, Robert Teasley, 9768 Sunland Blvd., Sunland, Calif., USA 91040.
TA1IB	PO Box 699, Istanbul, Turkey.
TA2BK	via DJ2PJ, Hans Teichmann, Schulstr. 49, 6051 Dudenhofen, Germany.
TJ1AJ	(QSL Mgr.) Tracy Levy Jr., Box 714, Eau Gallie, Fla., USA.
TT8AN	BP443, Fort Lamy, Tchad.
VP8JH	(U.K. QSOs only) via G3NMH, 24 Hook St, Hook, Nr. Swindon,Wilts. (Others) via Eric Chilvers, 1 Grove Road, Lydney, Glos.
VQ8BZR	Herbert S. Lambert, Vingta Road, Vacoas, Mauritius.
VQ8CB etc.	All QSLs now to W0QKC, 8713, Charlton Lane, Affton, Mo., USA.
VQ8CDC	via VQ8 Bureau, PO Box 467, Port Louis, Mauritius.
VQ9DH	PO Box 191, Mahe, Soychelles.
VQ9V/D	V. C. Harvey-Brain, Bel Eau, Mahe, Seychelles.
VS5RCS	viaWA6VVJ, David Healy, 1628 151st Av., San Leandro, Calif. USA.
VS6FX	viaW2CTN, 159 Ketcham Avenue, Amityville, NY, USA 11701.
YA1ZC	PO Box 638, Kabul, Afghanistan.
ZC4RB	via G3VIR, 14A RomanWay, Hale Road, Farnham, Surrey.
ZF1DX	(Oct. 1967) K6KDX, Richard Miller, 2 Stallion Road, Palos Verdes Peninsular, Calif. USA.
5U7AN	via W4WHS. W. R. Pennington Sr., Box 56, Lincolnton Ga., USA.
7Q7AM	PO Box 215, Lilongwe, Malawi.
9G1GG	Angus Murray-Stone, British Sailors Society, PO Box 71, Takoradi, Ghana.
9K2AG	PO Box 433, Kuwait.
9X5AA	BP 28, Kigali, Rwanda.
9X5AV	BP 104, Kigali, Rwanda.
9X5BW	BP 608, Kigali, Rwanda.
	RSGB QSL Bureau, G2MI, Bromley, Kent.

FOUR METRES AND DOWN

By JACK HUM, G5UM*

QRD Whitton

"AN excellent venue . . . perhaps we shall be able to have it next year . . ." So many visitors to last year's V.H.F./U.H.F. Convention at The Winning Post at Whitton delivered themselves of this opinion that V.H.F. Manager Geoff Stone had no hesitation about booking the same place for the 1968 event. This he did almost before the last good-byes of 1967 had been said; there was no time to lose, for even then the hotel had been booked almost solid for 1968.

And so for the second year it's to be The Winning Post again, with broadly the same ground plan which experience and members' reactions have shown to be desirable, namely, conversazione and trade show in the morning, tech-session in the afternoon and the dinner in the evening.

What is heartening to report at a time when inexorably rising prices erode the private individual's disposable income ever more drastically as each year passes is that the ticket price for the 1968 V.H.F./U.H.F. Convention is to be held at last year's figure of 30s. Which makes the " day session only" price 4s. 6d. and the " dinner only " ticket 25s. 6d.

As always at Convention a strong technical team will be lined up to deliver the afternoon talks: Arnold Mynett, G3HBW, on V.H.F. Phase Locking and Frequency Synthesis (a subject on which members who have had their appetites sharpened by references in " Technical Topics " will be glad to hear some more; progress reports on 13cm by the G3RPE team and on moonbounce by G3LTF; the Gibraltar beacon (design, construction and results achieved) by G3JHM and G3JVL, who have had much to do with bringing the ZB2VHF concept to such a degree of success; Sideband by V.H.F. by Tom Douglas, G3BA, pioneer exponent and enthusiast for the art; and something quite new, which is intended to involve our trade exhibitor friends and is to be called " Shop Window." In this department there will be a talk by Vic Hartopp of J-Beams on the much debated and very topical subject of comparing flat top aerials with slot arrays. Plus one or two further novelties to be itemized here next month.

No venue provides unlimited accommodation and although the V.H.F. Convention has never had to put up the " House Full " notice it came very near to doing so last year. Moral: send your ticket application with cheque to Frank Green, G3GMY, the hon. treasurer for the Convention, just as soon as you have made up your mind to go.

New Record on "13"

In one of those dramatic leaps forward characteristic of amateur communication the distance record for the 2300 MHz band has been hoisted to no less than 209 miles, substantially exceeding the former record of 170 miles made in The States in 1963.

The operators to whom goes the honour of establishing this new record were HB9RG, widely known as one of the leading metre-wave protagonists on the Continent of Europe, and DJ4AU. The date was 21 January this year. Contact was made on both c.w. and s.s.b.

In reporting this news Fred Lambeth, G2AIW (IARU Region 1 V.H.F. Secretary), says credit should be given to DL9GU for constructing a highly efficient parametric amplifier that helped make the QSO possible. Fred also reports that on 29 December, 1967, the first Switzerland to Germany contact on 13cm was effected when HB9RG worked DJ3EN, again on c.w. and sideband.

Which brings us to the subject of—

Ratifications

—and to further news of the early work done on this band in the U.K. From Bob Tunney of Nottingham, G8DD, comes a reminder that the British record on 13cm was lifted from the existing 35½ miles to 45 miles on 14 November, 1949, when G8DD/P and G6CW/P made contact between sites near Loughborough and Sheffield, on 2300 MHz.

Bob also asks " Four Metres and Down " to put on record the following " firsts ";

On 17 November, 1949, over a distance of four miles G8DD and G6CW made on 1290 MHz what is believed to be the first contact on this band outside the United States. Later came the following QSOs, all on 23cm:

1 October, 1950,	G8DD/P to G3QC/P	60 miles.
Same date,	G8DD/P to G3QC/P	75 miles.
26 July, 1953,	G8DD/P to G3QC/P	100 miles.

This last contact, adds G8DD, was between sites near Ludlow and Lancaster. It stood as a world record for some time and received ARRL acceptance.

To Make a Start on "Two"

" How best to get started on 2m?". The question put by G5VU in January brought plenty of replies but no space in which to print them last month (more than a page of " Four Metres and Down " typematter had to be held out of the February number through sheer pressure on space: have a thought for the editorial staff at No. 28 who are faced with this permanent problem).

As shortly as possible, then, some of the comments which G5VU sparked off:

From G3NBU, Basingstoke: " Tell G5VU over half the stations I work on 2m use less than 15 watts . . . largely TW Communicators. Myself, trampling anew on the hallowed ground of Four Metres and Down, I use a 5-ele Yagi in the shack (first floor, neck level) that works up to 30 miles through the gaps in the trees . . ."

* Houghton on the Hill, Leicester LE7 9JJ. Send reports for the April issue to arrive not later than 11 March; for the May issue by 8 April.

From G6JP (but printed under protest!): "Suggest G5VU builds himself a transistor Quickstarter converter . . ."

From Sutton Coldfielder G2DCI: "Stan Henton will be surprised what he'll work even if he does keep his aerial inside. As for a TW2, yes, that little rig is big enough. Noted that G5VU is retired, a PL like me (Professional Loafer), and equipped for 2m. We should get together on the band more often, especially weekday daytimes."

And full circle back to Nottingham and a comment from G2ATM: "While newcomers to Amateur Radio—or at any rate v.h.f.—may feel it to be a waste of time to try to operate from a poor location with only limited resources, I can assure them that they will have great fun and at least some really QRM-free contacts . . . make sure your modulation is 100 per cent but not more, if you wish to work outside your backyard. So frequently one hears strong carriers that would produce good semi-DX contacts if the percentage of modulation were not so low that one could not even read the call-sign. Another thing: use the key more often."

Putting the above advice into practice, G2ATM has just qualified for his Four Metres and Down award for 144 MHz using no more than 10 watts input and a variety of indoor aerials.

Parchments

It was at the February meeting of the Society's V.H.F. Committee that the G2ATM claim (above) was ratified. He will receive Certificate No. 105 for 2m, while Certificates nos. 104 and 103 will go to G3PWJ and G3BJD respectively. And to G3KHA the sixteenth "2M Senior."

The 4m claims are steadily approaching the half hundred: nos. 47, 48 and 49 went to G5NU, G3OZJ and GI3HCG/P.

At the February meeting more 70cm claims were cleared than the other two put together: eight certificates were approved, all but one to Class B licensees, from G8AOD who collects Certificate No. 30 to G8ATK who is 37th.

Also at its February meeting the V.H.F. Committee straightened out a point in respect of the Supreme V.H.F. Award: it was agreed that this should be for fixed stations only, *i.e.*, home QTH or alternative address. How do you get it? See page 754 last November.

A Claim Sheet describing how to go about obtaining one of the Society's "Four Metres and Down" certificates may be had from HQ on application, with s.a.e.

GIBRALTAR V.H.F. FIRSTS

70 MHz ZB2VHF: Frequency 70·26 MHz, A.m./c.w./f.s.k., 17 watts output

13.5.67 ZB2/ZB2	ZB2VHF-ZB2AM	20.25–20.27 GMT A3
2.6.67 ZB2/G	ZB2VHF-G3RIK	17.08–17.10 GMT A3
2.6.67 ZB2/G	ZB2VHF-G3IFF	17.19–17.23 GMT A1
3.6.67 ZB2/G	ZB2VHF-G3PLX/M	17.32–17.33 GMT A3
11.6.67 ZB2/GI	ZB2VHF-GI3RXV	19.15–19.16 GMT A1/3
11.6.67 ZB2/GM	ZB2VHF-GM3EGW	19.20–19.24 GMT A1
(New world record for 70 MHz)		
16.6.67 ZB2/EI	ZB2VHF-EI6AK	18.26–19.28 GMT A3
18,6.67 ZB2/GW	ZB2VHF-GW4CG	11.02–11.03 GMT A3
11.6.67 ZB2/GI	ZB2VHF-GI3PDN	19.24–19.28 GMT A1
11.6.67 ZB2/GI	ZB2VHF-GI3NUM	19.39–19.40 GMT A3

144 MHz ZB2AP (ZB2VHF after 1 April, 1966): Frequency 144.091 MHz, 8 watts output to 8-over-8 slot-fed Yagi at top of Rock.

12.9.65 ZB2/EA7	ZB2AP-EA7FT	21.30–22.00 GMT A3
26.4.66 ZB2/CT1	ZB2VHF-CT1GZ	21.25–21.35 GMT A3
16.6.66 ZB2/CN8	ZB2VHF-CN8ED	23.00–23.40 GMT A3
4.6.66 ZB2/EA7	ZB2VHF/M-EA7HZ	21.30–21.40 GMT A3
30.6.66 ZB2/CN8	ZB2VHF/M-CN8MG	22.00–22.10 GMT A3
9.3.67 ZB2/ZB2	ZB2VHF/M-ZB2A	21.55–22.15 GMT A3

"That was a very nice picture in the January issue of young Robert Perry, grandson of W1BB, doing his apprenticeship on 160 metres. Me, I'm an old hand on 70 centimetres, and I help my dad, G8AWO, put out that whopping great signal from Welwyn Garden Crty. My name's Mark Gray, but my young brother isn't called Space . . . thought I'd tell you in case you asked."

Old-Timer G8-Man

Coming back to the subject of getting started, there is among the G8 fraternity one who came into radio half a century before Class B licences were thought of. He is H. E. Nicholls of Brislington, Bristol, who became G8AQZ in February of last year—and now, after a twelve-month of activity on 432 MHz, is awaiting that elusive twentieth county to qualify him for the "Four Metres and Down" operating award for the 70cm band.

"Nick," who is an automobile engineer and consultant by profession, will if pressed show visitors a faded piece of paper dated 18 March, 1915, which is the receipt from the GPO of his equipment impounded by them early in World War 1. Six years later it was dutifully returned to him: one tuning inductance coil, one detector (minus crystal), one motor cycle ignition coil (then as now a marvellous generator of r.f.) and the rotary make-and-break and spark gap that went with it, plus various other items which had been very much outdated by the development of the thermionic valve in the course of that war.

From 1922 came the experience, so vividly remembered to this day by the elderly, of listening to barely audible sounds in the phones that were the time signals from FL, the Eiffel Tower.

Says G8AQZ: "For various reasons, which now viewed in retrospect seem quite inadequate, I did not take steps to obtain a transmitting licence until after my retirement from business when, in 1966, at the age of 73 I took the RAE and obtained the 'B' Licence."

And what an appropriate age at which to get it! But that is not the end of the story: G8AQZ is now brushing up his Morse speed, at present 8 w.p.m. ("... owing to neglect and the inevitable slowing up of activity of that grey matter in the upper storey which comes with advancing years" as

he puts it), and hopes to get it back to the 15 or 18 " per " he was able to copy in the 'Twenties.

Contest Reminders

By the time this drops through the front letter box the traditional early-March " Two Metre Open " will be three days behind us, so rest our larynxes. The next big event is the Second 70 MHz Open in April. The first such, 11 February, brought a big turnout and much comment from southern stations on the QRM at the low end . . . yet there was room at the top, and the QHL tuners netted some tasty ones.

In between, there are three cumulatives (pity they aren't printed in " Contests Diary ": after all, they *are* contests, even if used, especially on 70cm, as social gatherings, which is a rather nice way for treating contests). Relevant dates: 9 March, 23 March and 6 April, on 2m and 70cm as described on page 59, January.

Continental Contests

From time to time members ask that details should be published of v.h.f. contests organized by Continental societies. These we will be glad to include in " Four Metres and Down " as and when they become known. So it's thanks, G2AIW, for the following information which has come through about forthcoming French contests:

4/5 May, " Coupe de REF " on 144, 432 and 1296 MHz.
6/7 July, Portable and mobile event on 144 and 432 MHz.
7/8 September, IARU Region 1 international contest.
5/6 October, a " derby " on 2m.

Even though no details about the rules may be forthcoming it is usually easy to get the drift of what is happening after listening to a QSO or two. For those in search of an elusive F to complete a collection towards an RSGB certificate, these contests will present appropriate opportunities; the third of them should produce a good many more prefixes besides.

From *this* year's " Autumn International " now back to last year's, which was held conjunctly with our own V.H.F. NFD. The outstanding performance put up by British stations during that event should encourage even more of them to participate *this* year, for in the six sections of the IARU event UK stations headed all but one.

In Section 2, for 2m portable GC3WMS/P were top with 52,340 points.

In Section 3, for 70cm fixed stations, the leader was G3MCS (4022 points).

In Section 4, for 70cm portables, GC3VXK/P topped the list with 12,118 points.

In Section 5, for 23cm fixed stations, G3MCS once again galloped home by several electronic lengths with 1351 points, with DL8AQA next with 180.

And in Section 6, which was for 23cm portables, all three ranking positions were filled by G-men, namely, G3NNG/P with 1003 points, G3MAR/P with 878 and G3OBD/P with 845, a fairly close run thing.

No UK stations shone in Section 1, which was for 2m fixed stations, possibly for the good reason that a large proportion of members were out in the field that weekend. Two of our Italian friends topped this section, I1CZE with 44,563 and I1SVS with 39,094 points.

Altogether a very interesting and lively international get-together on two metres and down. Book the date for the next.

OK for all-round looking

One of the advantages of living in Czechoslovakia (from a v.h.f. point of view) is to have the whole of Europe so encompassing the operator about that it is possible to work several countries on almost any night—so long as those formidable mountains don't get in the way. Even with this order of availability, though, it is still no mean feat to have worked *twenty-nine* countries on " Two." This is the achievement of OK2WCG who by pulling in LA (by meteor scatter, as with many other of his countries worked) sets an example of sheer pertinacity backed up by some very fine equipment and the knowledge how to use it—three prerequisites to success in meteor scatter operation.

Another leading OK operator on " Two " is Tomas Dvorak, OK1DE, who by now will almost certainly have captured his hundredth PA0; he was up to 98 of them worked just before Christmas—all of them more than 400 miles away. Country-collecting is incidental to his activities; he approaches " Two " from a thoroughly scientific point of view, and by making careful plots of weather maps is able to forecast when it will profit him to take the portable rig up into the mountains. The following comment which Tomas has turned in gives all of us in the UK food for thought:

" It is a great pity that nobody in England and especially in GM/GW/EI goes portable when there is an opening. I bet there were many possibilities for GM *etcetera* to work as far as OE and HG during some of the days at the end of 1967 . . . the ground inversion layer, which is practically always present in big openings, covers you up and causes strong attenuation, which you can override only by getting above it. This theory is confirmed by the fact that most of the Gs we work are at coastal QTHs and come through at S9. We cannot hear the inland stations. The sea causes a hole in the inversion through which our signals from OK go down to the coast but pass overhead for the inland stations.

" Please may more British OMs be encouraged to prepare for portable work during the openings. I feel it would be great fun to sit in GM and have all Europe, including SP/OK/HG/OE, calling you! If a GM or GW or EI appeared we would call them 100 per cent the whole evening! "

From OK now across to ON. . . .

Contest Point

" Herewith comment on two contact points publicized in *Radio Communication* for January, First, the G3JHM suggestion to limit portable contestants to their own county or within 30 miles of their own QTH; from my Birmingham location this would rule out Hereford, Rutland, Bedford and Lincolnshire, as well as all GW, all much in demand on 4m. When I decide to travel some way to work Stroke P, I prefer to be in a position to make as many contacts as possible. Many of us are indebted to members who have operated from rarer countries during contests to help us towards our RSGB awards, and to those who after working you from their home site will charge out to distant hilltop to work you again for a required county.

" Now the new contest rules: precise measurements are to a large extent unnecessary. Surely there is no need to use a QRA for British working? A distance from a large town should be quite sufficient for a correct score to be obtained." —G3RWM (Note.—G3RWM/P is holder of Senior 4m Certificate No. 2.—J. H.)

Another VK-W Contact via the Moon

We read from the latest *VERON V.H.F. Bulletin*, received via G2AIW, that those pioneers of moonbounce communication, VK3ATN and K6MYC, effected a further contact on 2m by E-M-E on 20 December, signals each way reaching 3 to 6dB above the noise level in a 100 Hz bandwidth.

The same number of the *VERON V.H.F. Bulletin* lists several countries from VK through to SM where a practical interest in E-M-E possibilities is developing, along with the very specialized equipment needed if any sort of success in this mode is to be achieved.

* * *

Now for E-M-E on the 23cm band, which in the view of many workers in this field holds real potential: during 12-14 April the now famous Crawford Hill V.H.F. Club, W2NFA, will be putting out 200 watts of c.w. or f.s.k. on 1296 MHz plus or minus 5 kHz at moonrise in New Jersey, which is as follows: 12 April, at 23.00 GMT; 13 April, at 00.18 GMT; each test to last the ten hours or so during which the moon is visible.

Alternative (perhaps additional) tests will be on 19 April at 06.20 GMT and on 20 April from 07.05 GMT, each for nine hours.

Echo testing will commence at moonrise on each of the above days and will continue for half an hour prior to any schedules.

For schedules, airmail Dick Turrin, W2IMU, Box 45, RR2, Colts Neck, NJ, stating equipment capability.

Preview of " Australis "

A rare opportunity to hear what an *OSCAR* beacon sounds like before the device is lifted off is offered by G2AOX. Bill Browning has received from Melbourne a piece of tape giving one cycle of the Australis telemetry signal. This he has edited to make an endless tape giving a 8 minute pre-recording of what we shall hear on 2m when Australis goes up.

Club secretaries may be interested in buying a copy to allow their members to take copies themselves. As was announced over GB2RS on recent Sundays, the spool costs 4s. and may be had, cash with order, from Mr. W. Browning, 47 Brampton Grove, London, NW4.

" Compact, close-knit groups . . . "

There are in East Anglia several " compact, close-knit groups " (in the best and completely apolitical sense), who don't have to put up with much in the way of topographical obstacles in their flatlands, but certainly enjoy few advantages of elevated site. One of their members of some years ago, we recall, had a theory that he missed much of the DX that was going simply because it literally passed over his head from distant stations sited much higher than he was. In which context see the comment by OK1DE earlier.

What we are leading to is a suggestion that beams should be more frequently turned to those parts of the country where activity *appears* to be minimal. Even under normal conditions one or two surprise signals may pop out.

East Anglia is one good bet for operators along the heavily populated spine of G-land who habitually beam NW-SE because that is where the majority of signals seem to come from, including, most important of all, that electronic barometer GB3VHF. It can be rewarding indeed to swing off the axis-of-habit from time to time.

At least two other thriving areas of activity come to mind: the Whitby to Tees axis, with several on 70cm, and around Humberside 50 miles to the south, where increasing interest in the same band is developing, to complement some of those hefty 2m signals for which the district is noted. A welcome report from G8AZO (he uses a BAY96 driven from a Pye base station) tells us that he keeps regular schedules with G3FCY in Hull and G3NJF across the water at Waltham, while G3WPQ has nearly finished a tripler for the band. More skeds further afield would be welcomed by G8AZO (Frank Wilson, 7 Manchester Street, Hessle Road, Hull).

Keep those beams on unaccustomed headings.

Around the V.H.F. Groups

The latest of the v.h.f./u.h.f. groups to have been formed—The South Coast Group—is the natural coalescing of the thriving activity which has been such a feature of the South Hants-West Sussex scene for many months past. As will be known already, several of its members have played a prominent and practical part in getting the ZB2VHF beacon (among others) into commission (more of this later): in other areas of activity they have two complete sets of gear (and equally important, test facilities) for 10,000 MHz, and ask the question: " Are there any other interested parties in the UK? " As it happens, the same question was put to us by G8ASP on behalf of a number of West Herts and Bedfordshire members: the two groups might find it productive to get together.

Much of the activity by members of the South Coast Group is on 4m, where the accent is on the adoption of modern operating techniques, *e.g.*, during the 4m c.w. contest VXO was widely used to permit many contacts to be made by means of single channel working and break-in.

Correspondence about the new Group to Don Hayter, G3JHM, 4 Newling Way, Worthing, Sussex.

* * *

Sixty miles to the east the South East Group under the benevolent chairmanship of Jim Foster, G2JF, heading a strong committee of seven, with Mike Dormer, G3DAH, as Hon. Sec. have once again produced a fixture list of meetings featuring some of the leading names in the British v.h.f. art. This month (right now, in fact: the meeting's on 8 March), Ron Vaughan, G3FRV, the well-known voice on 145·1 MHz of a Sunday morning at 9.30 (what, don't you listen to GB2RS?) will discuss Portable and Contest Operations. Venue: Rutherford College, University of Kent, Canterbury. The following meeting at the alternative venue, Wye College, University of London, Ashford, will feature Peter Jones, G2JT, whose talk on Aerial Power Tactics at last year's Midlands V.H.F./U.H.F. Convention will, if he'll forgive us, be long remembered as a smash hit. The date: 10 May. Keep in touch with G3DAH—in fact ask him for a copy of the fixture card. " No subscription or entry fee " it says on the back. In fact, if you like v.h.f., just roll up.

* * *

This last philosophy guides also the Leicestershire Group, which has just completed its first six months of activity. It has the privilege of a *gratis* meeting room in the College of Technology, and the only charge on its visitors is a shilling a head to pay for the cost of the monthly circular. Its next meeting has Dave Dryden, G3BKQ, demonstrating his unique FET converters and i.f.-strip valve-substitutes. Date: 21 March.

Beaconry

Beacons on 2m and 6m may shortly supplement the well known ZB2VHF one on 4m. The South Coast V.H.F./U.H.F. Group (closely identified with G3WLE) hopes to supply a transmitter for 145·00 MHz for use on the Rock. Running 20 watts input, it will feed an 8 over 8 already there.

" In addition," adds Don Hayter, G3JHM, " a transceiver for 50 MHz is being supplied by W2ISI to operate as a beacon on 50·1 MHz. A licence has already been granted for this. It is hoped to receive reports on all beacons from as many people as possible to enable a complete analysis to be carried out on 50, 70 and 145 MHz over the same paths."

Easter Expeditionary

Easter will present an opportunity to acquire that rare county of Fermanagh—or more precisely an expedition mounted by the Ballymena Radio Club will.

GI3RNY/A will commence operation on 4m at 19.30 GMT on 13 April, continuing through to 12.00 GMT on 16 April. If 145 MHz equipment becomes available there will be operation also at the top end of " Two " using the same call-sign. On 70cm the Club will have GI8AYZ/P on the air throughout the same period.

Schedule makers should write to the Club's hon. secretary at 46a Bridge Street, Ballymena, Co. Antrim, stating preferred bands and times and enclosing an SAE.

Skeds Wanted

By G3WBQ, Trevor Brook, " Saxonholme," Orestan Lane, Effingham, Leatherhead, Surrey, with GI, EI and GM stations on 4m: " . . . sad to relate, my earlier request for skeds with stations at over 150 miles met with a complete lack of response." Trevor operates 70·19 MHz a.m., c.w. or s.s.b. every evening.

By G8ASP, Ian Gurton, 28 Broomfield Road, Harpenden, with any 70cm stations interested to participate in the Herts Net, Wednesdays at 21.00 GMT.

Tech Corner

From G3HBW (Arnold Mynett of Chesham):

I noticed the comment by George Elliott, VE2LI, in " Tech Corner " on the subject of the TIS88. It might be worth mentioning that the 2dB and 4dB values given for 100 and 400 MHz are maxima. The average values to be expected are 1dB at 144 MHz and just over 2dB at 430 MHz!

I confirm the 144 MHz figure, having made measurements of just under 1dB on a couple of samples, but I have not been quite able to achieve the quoted figure at the higher frequency.

The TIS88 is intended to run in neutralized common source at both 144 and 430 MHz, by the way, and at 29s. (in this country) seems quite a " good buy." It will probably replace the popular BF180 in 70cm front ends before long, unless somebody brings out something even better.

From G8ANQ (Bill Burton of Whitby):

A good 70cm converter may be made even better by the addition of a preamplifier showing a low noise factor: there is no point in adding one that doesn't, for all you do is to increase the overall noise coming out of the i.f. strip without a worthwhile improvement in the actual signal.

The preamplifier shown at Fig. 1—no originality claimed for the circuit—using an AF239 is in operation both at

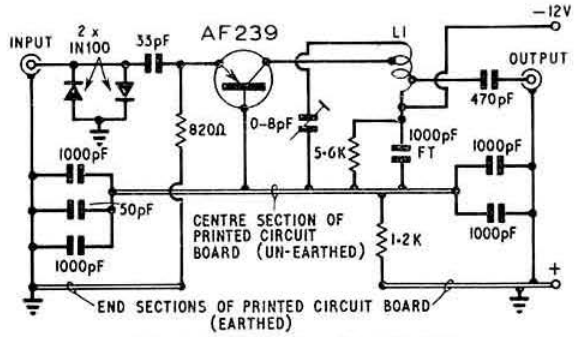


Fig. 1. G8ANQ 70cm preamplifier.

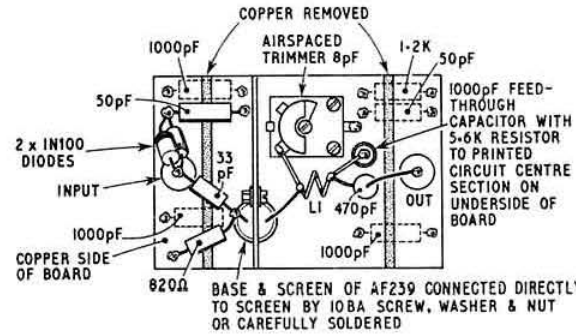


Fig. 2. Component layout of preamp.

G8AXC and G8ANQ, and does meet the low noise requirement, the measured figure on both samples being 2dB. This is better than that claimed by the transistor suppliers and may be peculiar to the samples used by both of us.

In Fig. 1 component values are given on the diagram with the exception of L1, which should have 1½ turns ¼ in. diameter, which makes it ½ in. long. Gain and bandwidth are dependent on collector and output taps. Conveniently, the 470pF capacitor may be tapped half a turn up and the collector tap ¼ turn down. The trimmer to L1 was a glass tubular type in the version built at G8ANQ.

The mechanical arrangement is shown at Fig. 2. All one need add is that the printed circuit board on which the device was constructed measured 1½ by 1 in. and was mounted on an aluminium switch box.

Here and There

Looks as if K2LME will be in Iceland only until mid-March at least on his present tour. Keep watch for him on 144·100 MHz from 20.00 GMT onwards . . . he *may* be signing TF2WKR.

* * *

" Couldn't check ' Four Metres and Down ' deadline . . . managed to deposit my copy of *Radio Communication* in track of bus, ruining it irretrievably . . . HQ kindly obliged with a new copy by return. Full marks."—G3ERB.

* * *

Did you notice the early posting date for reports for the next " Four Metres and Down? " Reason: Easter is right in the middle of the printing schedule for *Radio Communication.*

R. F. Radiation Hazards

By G. A. Frampton, G3LRH*

During the past few years there have been a number of references in the technical and the popular press to the hazards of radio frequency radiation. Although some of these have tended to be rather sensational, there is a very real danger if certain basic safety precautions are not taken. The potential risk until recently was considered to be confined to those involved in high power military and industrial work, but with the increasing use of microwave ovens the risk will move into a much larger field.

With the development of the u.h.f. and s.h.f. Amateur Bands, coupled with their application to moonbounce and similar advanced experiments, there is a possible risk as power levels increase and aerial beamwidths narrow. It is therefore felt that the essential facts of this danger, as they affect the radio amateur, should be drawn to the attention of experimenters.

The major risk arises directly from the heating of the body tissue by the absorption of radio frequency energy. This risk is enhanced in certain parts of the body by poor temperature regulation and the nature of the organs. A complete lack of temperature sensation in the vulnerable organs means that there is no uncomfortable feeling to warn of the danger.

The eye is likely to be damaged more readily than any other part of the body because of its use and structure. Exposure to excessive energy gives rise to opaque areas or cataract in the normally clear material of the lens. The working safety limit internationally agreed is a power density of 10 mW/cm^2 and this is endorsed by the Medical Research Council. It should be noted that this safety limit is an experimental level below which no harm is expected to result even after prolonged total body exposure. The relationship between power density, exposure time and frequency for damage to various organs to result is a complex one and extensive work on this and associated problems is still being carried out in the medical field. At some future date it is likely the safety limit will be defined more precisely.

The frequency range covered by the existing safety limit is 30 MHz to 30 GHz although the greatest risk is believed to be from 1 GHz to 15 GHz. The calculation of power density must take into account the relative phase and polarization of all components in the area under consideration, including spurious effects. Thus it is possible in an otherwise safe area to find small areas with greatly enhanced power density.

For the amateur the safest policy is that of not placing himself at risk by avoiding certain common practices, such as making adjustments to the matching of the feed to a dish or corner reflector. Also the measurement of the field pattern should not be carried out at high power levels. As an example of the degree risk, a dish aerial having a diameter of 3m will produce a power density of approximately 12 mW/cm^2 at a distance of 18m (the Rayleigh distance) at a frequency of 1·2 GHz using a power output of 500W. Another very definite don't is that of looking up a waveguide whilst making adjustments with the power switched on.

* Dane End, Hollywood Lane, West Kingsdown, Sevenoaks, Kent.

Taking Your Rig Abroad?

Although in most cases radio amateurs have had no difficulty in taking their mobile radio equipment from one country to another, certain cases occurred last year where radio amateurs did experience trouble and delays at certain frontiers. In general, these difficulties arose because customs officials required some guarantee that the equipment imported would in fact be exported again. In some cases radio amateurs have had to desposit money at the frontier, while others have had to arrange bank guarantees at the frontier.

After discussions we are pleased to announce that an arrangement is being made with the Autobile Association whereby Members will be able to obtain a customs document to include the car *and* the radio equipment mounted in it. This document has been recognized by virtually all customs administrations throughout the world.

Applications for customs papers should be made to the Automobile Association, Documents Preparation Department, Fanum House, Leicester Square, WC2, but *not* to any local AA Office.

The AA will require

1. A Bankers Indemnity, or cash Deposit of £75, to cover a portion of the duty liability.
2. The AA will be prepared to consider reducing this Guarantee in individual cases when the value of the equipment is appreciably less than £75.
3. If any Members should find it inconvenient to give such a Bank Guarantee or cash deposit, the Royal Insurance Company of 48 St. James's Street, London, SW1 will in most cases be prepared to send a Banker's indemnity form on a payment of £2.

The above service will be available to Members of the AA who are also Members of the Radio Society of Great Britain or the Amateur Radio Mobile Society. The AA will make no additional charge, as it will be included in their normal 5-star Travel Service. The AA advise that their overseas services are being very considerably extended in 1968.

The application forms should be headed:

Radio Society of Great Britain or *Amateur Radio Mobile Society* to facilitate the handling in the AA's offices. Headquarters hold a supply of forms for Members.

A similar service will be available for overseas visitors hiring cars in this country although the Guarantee may have to be slightly modified in these cases.

During the discussions with the AA the Society was represented by Mr R. F. Stevens, G2BVN, and the ARMS by Mr N. A. S. Fitch, G3FPK, and Mr E. M. Wagner, G3BID.

Mr Wagner was responsible for initiating the approach to the AA and carried out a great deal of preliminary work prior to the meetings.

News from Headquarters

Committees of Council 1968

The following members have been invited to serve on the Committees of Council during 1968.

Contests, H.F.: *Council Members:* J. C. Graham, G3TR, R. J. Hughes, G3GVV. *Non-Council Members:* R. S. Biggs, G2FLG, A. E. Dowdeswell, G4AR, D. A. Findlay, G3BZG, R. L. Glaisher, G6LX, M. Harrington, BRS20249, D. Thom, G3NKS, R. G. B. Vaughan, G3FRV.

Contests V.H.F.: *Council Members:* B. Armstrong, G3EDD. *Non-Council Members:* A. H. Dormer, G3DAH, D. A. Evans, G3OUF, B. W. Godwin, G8AOL, A. J. Gould, G3JKY.

Education: *Council Members:* R. J. Hughes, G3GVV, L. E. Newnham, G6NZ, J. W. Swinnerton, G2YS. *Non-Council Members:* D. M. Pratt, G3KEP, R. Wallwork, G3JNK.

Exhibition: *Council Members:* L. E. Newnham, G6NZ, R. F. Stevens, G2BVN, E. W. Yeomanson, G3IIR. *Non-Council Members:* W. R. Andrews, G3LRE, P. Balestrini, G3BPT, R. J. C. Broadbent, G3AAJ, L. A. Crane, G3PED, A. J. Gibbs, G3PHG, G. W. Norris, G3ICI, P. A. Thorogood, G4KD, R. G. B. Vaughan, G3FRV, M. G. Wallace, G8AXA.

Finance and Staff: *Council Members:* B. Armstrong, G3EDD, N. Caws, G3BVG, H. E. McNally, GI3SXG, L. E. Newnham, G6NZ, R. F. Stevens, G2BVN, J. W. Swinnerton, G2YS, E. W. Yeomanson, G3IIR.

GPO Liaison and TVI: *Council Members:* J. Etherington, G5UG, L. E. Newnham, G6NZ, A. D. Patterson, GI3KYP, R. F. Stevens, G2BVN, J. W. Swinnerton, G2YS, D. M. Thomas, GW3RWX, E. W. Yeomanson, G3IIR. *Non-Council Member:* A. E. Dowdeswell, G4AR.

Membership and Representation: *Council Members:* N. Caws, G3BVG, J. Etherington, G5UG, R. J. Hughes, G3GVV, A. F. Hunter, GM3LTW, H. E. McNally, GI3SXG, F. K. Parker, G3FUR, A. D. Patterson, GI3KYP, J. R. Petty, G4JW, D. M. Thomas, GW3RWX, G. Twist, G3LWH. *Non-Council Member:* A. E. Dowdeswell, G4AR.

Mobile: *Council Members:* J. Etherington, G5UG, A. F. Hunter, GM3LTW, J. R. Petty, G4JW, E. W. Yeomanson, G3IIR. *Non-Council Members:* H. T. Brock, G3FD, K. F. Eastty, G3LVP, N. O. Miller, G3MVV, P. J. Simpson, G3GGK, J. M. Stuart, G3TUM.

RAEN: *Council Members:* R. F. Hunter, GM3LTW, L. E. Newnham, G6NZ, E. W. Yeomanson, G3IIR. *Non-Council Members:* P. Balestrini, G3BPT, E. R. L. Bassett, BRS16075, Dr A. C. Gee, G2UK, J. D. Kingston, G3VK.

Scientific Studies: *Council Members:* R. F. Stevens, G2BVN, G. M. C. Stone, G3FZL. *Non-Council Members:* W. H. Allen, G2UJ, R. G. Flavell, GM3LTP, D. T. Hayter, G3JHM, G. Mills, G3EDM, C. E. Newton, G2FKZ, J. F. Shepherd, GM3EGW. *Corresponding Members:* Prof. M. Harrison, G3USF, A. Low, GM3GUI, A. J. Oliphant, GM3SFH, I. W. Sheffield, GM3VEI.

Technical: *Council Members:* B. Armstrong, G3EDD, R. F. Stevens, G2BVN, G. M. C. Stone, G3FZL, D. M. Thomas, GW3RWX. *Non-Council Members:* W. H. Allen, G2UJ, D. N. Corfield, G5CD, G. C. Fox, G3AEX, T. L. Herdman, G6HD, G. R. Jessop, G6JP, J. W. Mathews, G6LL, G. D. Roe, G3NGS.

V.H.F.: *Council Members:* N. Caws, G3BVG, A. F. Hunter, GM3LTW, E. G. Ingram, GM6IZ, G. M. C. Stone, G3FZL. *Non-Council Members:* W. H. Allen, G2UJ, P. Balestrini, G3BPT, D. A. Evans, G3OUF, F. E. A. Green, G3GMY, F. A. Griffiths, G3MED, J. H. Hum, G5UM, W. F. McGonigle, GI3GXP, A. L. Mynett, G3HBW, M. Wallace, G8AXA.

IARU Working Group: *Council Members:* N. Caws, G3BVG, J. Etherington, G5UG, E. G. Ingram, GM6IZ, L. E. Newnham, G6NZ, R. F. Stevens, G2BVN, G. M. C. Stone, G3FZL, J. W. Swinnerton, G2YS, E. W. Yeomanson, G3IIR.

Statement on GB Call-signs

Over the last two years or so the Post Office has received an increasing number of requests for special call-signs for various purposes and has asked the Society to publish the following:

1. Call-signs for individual amateur stations and club stations are issued in strict alphabetical sequence.
2. The Post Office feels that there is no reason why Amateurs taking part in contests should not operate within the terms and spirit of the Amateur Licence; and no special arrangements are offered for contests.
3. Amateurs that set up special stations for exhibitions, talk-in for rallies, DXpeditions and similar events can obtain special licences with call-signs in the GB series and every effort is made to suit the call letters to the event. Applicants should state a preferred letter group and also an alternative. Simultaneous operation on two or more bands is permitted when specially requested.

The Society feels that this approach is fair to all those who require special facilities and supports the views of the GPO. Members are reminded that under the General Rules for RSGB Contests the use of GB call-signs is not permitted.

Facsimile Transmission

Hitherto this mode of transmission has not been amongst those permitted by the terms of the Amateur (Sound) Licence. With the increasing interest in fascimile and the availability of reproduction equipment the Society requested the GPO to permit the use of A4, F4 and allied modes. The Post Office readily agreed to this concession and Members who wish to make use of these facilities should make a formal request. This should be sent to the Radio and Broadcasting Department, GPO, Armour House, St. Martins-le-Grand, London, EC1.

Council Election, 1968

Apologies are offered for the omission of Mr D. M. Thomas, GW3RWX and Mr G. Twist, G3LWH, from the list of Council Members on pages 9 and 52 of the January issue. These members were nominated, unopposed, for Zonal Representation on Council and duly elected.

Mr R. J. Hughes, G3GVV, has been co-opted by Council to fill the vacancy for Zone C, brought about by the appointment of Mr J. C. Graham, G3TR, as President of the Society for 1968.

The Eagle K-126B Grid Dip Meter

This equipment was reviewed in the August, 1967 issue of the RSGB BULLETIN. The U.K. distributors, B. Adler & Sons (Radio) Ltd., have now announced that they are no longer handling this item.

Radio Amateur's Examination, 21 May 1968

The Society will again be providing a centre in London for the above examination. Details will be notified later. Applications to sit the examination must be sent to the General Manager, RSGB, accompanied by the entry fee of £1 15s. for members of the RSGB or £2 5s. for non-members. *The closing date for entries is 17 April, 1968.*

RSGB Lecture Meeting

" The Development of a U.H.F. Television Service " was the subject of a lecture given by Mr. R. C. Hills, G3HRH, Head of the Mast and Aerial Section of the ITA, on Wednesday, 31 January, 1968 at the Institution of Electrical Engineers, Savoy Place, London. Illustrated by many slides, the lecture was attended by more than 70 guests and Members. A vote of thanks to the speaker was proposed by Mr B. D. A. Armstrong, G3EDD.

Obituaries

Fred Ruth, G2BRH

It is with great sorrow that we have to record the passing of Fred Ruth, known to all his friends and acquaintances as " Junko."

His workshop, which he put at the disposal of the Ilford Group, was known to many and was a meeting place for everyone. He gave many hours of his spare time to help up and coming Hams to pass the Morse Test. One of the most important items in his yearly agenda was that of Stand Manager at the RSGB annual exhibition, and the work he did there will be sadly missed. Fred was involved in RAEN when it first started, and on NFD outings, which were one of the Group's greatest features, we would always find him available.

Fred will leave a space which will be hard to fill—another great old timer has left the ranks.

At his funeral on Tuesday, 13 February, were many floral tributes from local amateurs, the RSGB and Region 7. Fifteen call-signs were present, and the RSGB was represented by Mr A. E. Dowdeswell, G4AR.

We are sure many will join in this expression of sincere sympathy to his widow Florence, son Ron and family, and also brother Sid and family.

F. G. J.

André Leroy, F8MW

The death on 27 December last of André Leroy, an Old Timer of the mid 1920's at Vire in Normandy will be much regretted by many British Amateurs especially those active on 70 and 144 MHz in the Southern Counties.

For his services to the French Resistance Movement he had been made a Chevalier de la Légion d'Honneur and had been awarded the Médaille Militaire 1939-45, the Croix de Guerre with Palm, the Médaille de la Deportation et Résistance and the Croix des Volontaires de la Résistance. During the German Occupation he organized and operated an underground radio network until he was arrested by the Germans and taken to Buchenwald Concentration camp. His experiences there and in the " Dora " V2 Rocket plant permanently affected his health and led to his death at the age of 57.

A. C. W.

James N. Roe, M.I.R.E., F.R.S.A., G2VV

The death on 7 January, 1968, of James Neville Roe, G2VV, came after many years of ill-health courageously borne and known only to his close friends.

Scrapbooks kept by Jimmie and regarded by him as a priceless possession, now in safe keeping, show a unique history of Amateur Radio. Photographs and newspaper cuttings take one back to the early 1920s when he was a schoolboy wireless enthusiast. His " Artificial Aerial " call-sign 2BUW was issued in 1927 with G2VV following in 1929. Around 1932 he was manager of the RSGB QRP Group and during the middle 1930's the Thames Valley Amateur Radio and Television Society developed under his Secretaryship.

Jimmie made many friends arising from the initial contact. He kept in touch with a number both at home and overseas and corresponded over a wide range of subjects apart from radio. His large mail bore witness to these lasting friendships. He will be sadly missed on the bands and by those who followed his many articles appearing in magazines, and not only radio ones, since the 1930s. He helped many on the path of Amateur Radio with particular interest in assisting the younger ones to obtain their licence.

The funeral took place on 13 January at Farnham, Surrey, where he spent his early days of radio and where G2VV was first heard on the air. To his sister and two brothers we extend our deepest sympathy.

S. E. J.

Lt. Cdr. B. Maimon

It was with great sorrow we learnt that Lt. Cdr. Benni Maimon, 4X4AC-G5AEA, was on board the Israeli submarine *Dakar* which was reported missing in the Mediterranean on 27 January last.

Lt. Cdr. Maimon was a member of the RSGB, and had, in fact, attended many Society events during the two years he spent in Britain while the submarine was being refitted. He was present at the 1967 Radio Communication Exhibition, and is seen photographed* with his wife and Mr A. D. Patterson, GI3KYP, 1967 President, at the reception for overseas visitors.

We know that we share with all members deepest sympathy for his widow in her days of anxiety which followed the first reports, and then for her tragic loss.

A. Leith, G2COG

It is with deep regret that we record the passing of Archie, G2COG, on 12 January, 1968.

Because of failing health, Archie did not spend too much time on the air but, as Founder Member and host to the East Ham group for 21 years, many hours were spent on enthusing others with cheery words of wisdom, and inspiring many in the art of building equipment.

All who knew Archie admired his courage in his illness, and to old and new members he will be sadly missed at local meetings of the East Ham Group.

W. H. P.

F. G. Maynard, G4OU

The death at his home on his 55th birthday, on 17 September last, of Fred. Maynard, G4OU, has saddened the amateurs of the Medway area.

Although in failing health for many years, he retained a keen sense of humour and interest in Amateur Radio. His ready willingness to offer advice or help and his interest in RAIBC will be sadly missed.

He leaves a widow and three sons to whom deepest sympathy is extended.

E. H. T.

* *Photo by courtesy of CQ Magazine.*

Society Affairs

A brief report on the January Meeting of the Council.

THE meeting was held on Thursday, 11 January, 1968, and was attended by Messrs J. C. Graham, President (in the Chair), B. Armstrong, N. Caws, J. Etherington, A. Hunter, E. G. Ingram, H. E. McNally, L. E. Newnham, F. Parker, A. D. Patterson, J. Petty, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, D. Thomas, G. Twist (Members of Council), C. P. Pope (Secretary), A. E. Dowdeswell (General Manager), and T. R. Preece (Assistant Editor).

Mr E. W. Yeomanson was absent owing to an unfortunate accident on the way to the meeting.

Executive Vice-President

In accordance with Article 11, Mr J. W. Swinnerton, G2YS, was elected Executive Vice-President for 1968.

Casual Vacancy on Council

In accordance with Article 54, Mr R. J. Hughes, G3GVV, was appointed to fill the vacancy arising from Mr J. C. Graham's appointment as President in January, 1968.

Membership and Affiliation

It was resolved to elect 117 Corporate and 37 Associate members and to grant Corporate membership to 15 Associates.

Council approved the waiving of five members' subscription on the grounds of disability in accordance with Article 23. One application for life membership was granted (Article 24).

The following applications for affiliation were accepted by Council.

South East Kent YMCA Radio Club.
Llanelli Boys Technical School Amateur Radio Society.
British Railways Amateur Radio Society.
Forest Glade DX Club.

Committees

Council approved the constitution of the Society's Committees for 1968. See page 187.

Appointments

Council approved the following appointments for 1968.
QSL Manager: Mr A. O. Milne, G2MI.
V.H.F. Manager: Mr G. M. C. Stone, G3FZL.
Certificates Manager: Mr C. R. Emary, G5GH.
Slow Morse Practice Transmissions Organiser: Mr M. A. C. McBrayne, G3KGU.
Film Library Curator: Mr R. A. Cathles, G3NDF.
Recorded lecture Library: Mr G. S. Milne, G3UMI.
Society Representatives to the City and Guilds of London Institute.
Messrs J. W. Swinnerton G2YS
L. E. Newnham G6NZ
Public Relations Officer: Mrs S. Margolis.

New Headquarters

Mr Caws reported that the response to the letter sent to each member had been most encouraging. Tenders for the alterations to 35 Doughty Street had been received and were under consideration.

Council expressed its appreciation of the work carried out by Mr R. Broadbent, G3AAJ, and his helpers in sending out the 12,000 letters.

Publications

It was reported that the production costs of *Radio Communication* would be rising. The Society's printers, Garden City Press Ltd., had agreed to a staff wage increase which was to be backdated to 30 October, 1967. There would be a further rise in the Autumn of 1968. This increase, coupled with a rise of 12½ per cent in paper costs would be reflected to the Society in an overall rise of 7½ per cent.

Council approved the publication of new printings or editions of the following books: A Guide to Amateur Radio, Amateur Radio Circuits Book, Technical Topics for the Radio Amateur, and a Mobile Log Book.

Model Power Boat Association and Society of Model Aeronautical Engineers

A letter from the above associations was tabled requesting the co-operation of the RSGB in liaison on licensing matters. This was welcomed and approved in principle by Council.

The Council was in session for 4¾ hours.

New Recorded Lecture

A recent addition to the Society's recorded lecture is a tape, together with over thirty colour slides, entitled "The World at Your Fingertips." It is intended to give a complete picture of the scope of Amateur Radio to newcomers to the hobby, or to those with no knowledge of it at all. Starting with illustrations of the interior and exterior of amateur stations, followed by views of NFD and mobile rallies, it goes on to show how a beginner can benefit from club activities and tuition, until he eventually receives his licence. Secretaries of clubs and affiliated societies, organizers of youth clubs and schoolmasters, will find that this could well be included in their programme; it could be particularly encouraging to those taking an RAE course.

The lecture and slides were produced by John Swinnerton, G2YS, (Executive Vice-President) and John Knowles, G3RPA, for the RSGB Education Committee. They may be obtained on loan by applying to the curator of the recorded lecture library, Mr G. S. Milne, G3UMI, 23 Linacre Road, Eccleshall, Stafford, Staffordshire.

Delivery of J-Beam Aerials

With the start of the v.h.f./u.h.f. contest season J-Beam Engineering Ltd. are receiving many orders asking for delivery in less than seven days. We have been asked to point out that as most aerials are despatched by British Road Services, the firm is in their hands and even if the goods are ex-stock, there is no certainty of them being delivered in time. Orders should be at least 14 days in advance and then, if the goods are damaged in transit, there will still be time to get replacements.

Silent Keys

We record with sorrow the passing of the following:
L. Hobson, G3ABV, of Edmonton, London.
S. W. Morris, G3CQT, of Bolton, Lancs.
J. A. Shelton, ORS27531, Kampala, Uganda.

Last month we recorded the death of Sydney Poutney, G3NM, but regrettably mixed up the call-sign, which appeared as G3MN. Our apologies to his family, and those who knew him.

Radio Amateur Emergency Network

By S. W. LAW, G3PAZ*

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.

DURING the past few months, apart from overseas news of civil disasters, a number of hazardous situations have hit the headlines in this country, e.g. floods, high winds and aircraft accidents, and the question is often asked "Where was RAEN?" Perhaps it would be as well to clarify the position once again for the benefit of those impatient people who long only for action (or could there be other motives?). We exist to provide *emergency communications*—it is as simple as that! Where the existing communications systems are still operative and adequate the User Services will obviously not require our assistance, therefore we shall not be called upon. This does not mean, however, that we remain unaware of the possibility of a call-out maturing since, when an understanding and friendly alliance exists between the User Services and local RAEN groups, the Controller may well be alerted by the services concerned as to the possibility of a call-out during any given emergency. It is then the responsibility of the Controller to decide whether his immediate assistants should also be kept informed, whether the whole Group should be called to "Alert," or the matter noted for later action should the need arise. There should be no necessity for a Controller to proffer assistance to a User Service at the time of an incident, since liaison should have been maintained at such a level that the prospective user is fully aware of the scope and capabilities of the local Group.

RAEN Committee

The first meeting of 1968 was held at RSGB Headquarters on Saturday, 20 January at 11 a.m. and was honoured on this occasion by the presence of the President of the RSGB. In opening the meeting, the President welcomed the members who had agreed to serve on the RAEN Committee, and stated that he hoped to be present at as many of the meetings as his duties permitted. He asked for nominations for the posts of Chairman and Hon. Secretary, and Mr Balestrini and Mr Bassett were respectively proposed and seconded for these posts—both agreed to serve. It was also proposed and seconded that it be recommended to Council that Mr J. Scarborough, Mr R. Ledgerton and Mr S. W. Law serve on the RAEN Committee, Mr Ledgerton as Hon. Registrations Secretary and Mr Law to be Publicity Officer. Matters discussed included RAEN Procedure, Zoning and County Grouping, GPO liaison, Publicity (including lectures and tapes), and the formation of new groups in various parts of the country. A considerable amount of correspondence was also dealt with. The meeting closed at 5.35 p.m.

Raynet Contest 1967

The full results of the Raynet Contest held last October were not to hand at the time of going to press. This was due to a sudden rush of business which involved the organizer, G3MBQ in some extensive travelling, and left no opportunity for the necessary careful check of the large number of logs submitted. However, we are able to give the main scoring so, in response to the many requests received, we publish a short list of the winners below. The full details will be available for the next issue, so please have patience until next month. Congratulations are due to the SWLs of the Norfolk Group who top the Receiving Section. As to the other results—as a member of the Surrey Group, the writer must leave things unsaid at the risk of inviting criticism! Sufficient that I am proud to be a member.

What's in a Name?

Some time ago we mentioned that changes were contemplated in the titles given to RAEN officials. The reason for this has been queried from various quarters, and some explanation would seem to be in order. There has been a re-organization of Police boundaries and these now bear little or no relation to county boundaries in many areas. Since the Police are our principal User Service, and many members of present RAEN County Groups are, in any case, resident in counties adjacent to the parent County, it is evident that some new thinking is required on the jurisdiction of a Controller and the titles of his various officers. The question has been raised in the RAEN Committee, and a ruling on the matter will appear in due course. Meanwhile, any comments on this topic will be welcomed by the Chairman, G3BPT.

Lectures

So much to do—and so few hands. The Committee is most gratified at the number of requests for lectures which have been received, and we must crave your indulgence whilst assuring all applicants that their requests are carefully noted. As yet we have too few lecturers sufficiently near to some of the prospective venues, and the Committee would, in fact, be pleased to hear from experienced members, in outlying areas who would be prepared to undertake an occasional lecture to Clubs in their area.

RAEN CONTEST 1967—WINNERS

Individual Transmitting Section

1	G3HVE (Surrey)	144 points
2	G3VK (Surrey)	110 points
3	G3TCL (Surrey)	107 points

Receiving Section

1	Brian Roe A5464 (Norfolk)	216 points
2	A. D.Wilson BRS20134 (Norfolk)	124 points
3	D. A. Youngman (Norfolk)	28 points

Group Average (computed from current membership)

1	Surrey Group	average points 53
2	Norfolk Group	average points 20

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

"Until it Hurts"

" . . . I am 74 years of age, and my wife and self have to make ends meet on a combined income of less than £12 per week . . . I enclose 10s."

" I enclose a donation of £40—40 years on the air!"

" Please accept this very small amount. I am sorry that I cannot send more than 5s. as I am only a schoolboy (14 years)."

" . . . a donation of 2s. 6d. If everybody were to give 2s. 6d. . . . " (schoolboy associate).

" It really shakes me to realize that £1 per member would resolve our difficulties. I have already contributed on occasions but have no hesitation in forwarding a further donation. Enclosed cheque £10."

" 20 years a member × 10s.—£10. QSL bureau *alone* is worth it."

" Sorry donation (10s.) is not very much but this is one week's pocket money."

This is a selection of comments received from members—not only from most parts of the country and from Eire, but from many parts of the world—from members who are prepared to give " until it hurts." They have heeded our appeal and appreciate our need—*your* need for a worthy Headquarters. Over £2000 in donations has reached the Society since June, while the debenture issue now stands at just over £16,000. But this is still really £4000 short of the target, achievement of which will ensure that we do not have to realize any more of the Society's investments. The building now *belongs to the members*—we are not indebted to the bank. News is already coming in of the response to the Harrow Challenge—the Verulam Club, for example, is pressing its members (whether members of RSGB or not) to contribute odd coppers to a " piggy bank " which will amount to a useful donation at the end of the year. But the selection of comments above comes from individual members who are prepared to give " until it hurts." Are you?

Directory of Semiconductor Manufacturers, Part 2

A number of people have congratulated Mrs K. M. Priestley about the Directory of Semiconductor Manufacturers which appeared in the BULLETIN a year ago, and the Technical Committee asked her to bring it up to date. To do this she has asked us to seek opinions on whether the Directory was of any practical value to you personally, and in what ways it could be improved. If you have purchased any transistors after using the Directory, please write or telephone to let her know how you fared. Collective answers from club secretaries will also be very welcome. The address is Mrs K. M. Priestley, 43 Raymond Road, Langley, Slough, Bucks. Telephone, Slough 43596.

Assistance for BARTG

" The British Amateur Radio Teleprinter Group is looking for voluntary help in preparing drawings for a book covering all aspects of RTTY. Any person who is able and willing to assist is invited to contact the Hon. Secretary, D. J. Goacher, G3LLZ, 51 Norman Road, Swindon, Wilts.

Resonance Simplified?

We unfortunately let an error slip through in Martin Osment's article published last month. The formula giving the reactance of L should, of course, have read:

$$X_L = \omega L = 2\pi f L \text{ ohms}$$

Commonwealth Call Areas

The list on page 57 of the January issue of *Radio Communication* contained some incorrect changes in prefixes. For VP4 read 9Y4, for 9Y5 read 6Y5, ZS8 is now 7P8, VP6 is 8P6, and VP3 should be deleted altogether.

THE FOURTEENTH INTERNATIONAL V.H.F./U.H.F. CONVENTION IS ONLY SEVEN WEEKS AWAY. THERE WILL BE

IN THE MORNING: A HIGHLY ATTRACTIVE TRADE EXHIBITION

IN THE AFTERNOON: LECTURE SESSION PLUS SOMETHING QUITE NEW CALLED " SHOP WINDOW " WHEN TRADE EXHIBITORS WILL DISCUSS THEIR PRODUCTS

IN THE EVENING THE CUSTOMARY GRAND BANQUET (NOT FORGETTING THE RAFFLE)

ALL FOR 30s.

IF YOU BRING YOUR WIFE, FIANCEE OR GIRL FRIEND TO THE EVENING FUNCTION A DINNER-ONLY TICKET COSTS 25s. 6d.

GET YOUR CHEQUE OFF NOW TO THE CONVENTION SECRETARY FRANK GREEN, G3GMY, 48 BOROUGH WAY, POTTERS BAR, HERTS, TO MAKE SURE OF GETTING IN

THE DATE IS THE LAST SATURDAY OF NEXT MONTH, 27 APRIL.

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. McBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.

Sundays

Clock Time	Call-sign	MHz	Town
09.30	G3KZZ † G3TNF	1·920	South Shields, Co. Durham Gateshead
09.30	G3HZL	1.940	Isleworth, Middlesex
09.30	G3TYB	28·400	Ashford, Kent
09·45	G3USK	1·975	Mablethorpe, Lincs.
10.00	G2FXA	437·000 to North	Stockton-on-Tees
10.00	G3TTK	1·860	Coalville, Leices.
10.00	GM3PIP	3·590	Mintlaw, Aberdeen.
10.15	G3CGD	1·875	Cheltenham
10.30	G2FXA	437·000 to South	Stockton-on-Tees
10.30	G3SFO	1·850	Doncaster, Yorks.
10.30	G3NPB	1·875	St. Ives, Cornwall
11.00	G2FXA	1·900	Stockton-on-Tees
12.00	G3VNC	1·825	Hertford
12.00	GM3HBY	1·832	Glasgow
12.00	G3SVD	1·870	Reading, Berks.
12.00	G3HVI	1·890	Stoke-on-Trent
12.00	G3GNS	1·910	Weston-super-Mare
12.00	G3TLH	1·960	Wakefield, Yorks.
14.30	G3UGF	1·844	Halifax, Yorks.
17.30	G3TNF	1·920	Gateshead
20.30	G3EPU	1·980	Wimbledon, SW London
20.30	G3XAL	1·915	Brentwood, Essex.
20.45	G3IFF	1·992	Havant, Hants.

Mondays

Clock Time	Call-sign	MHz	Town
17.30	G3TNF	1·920	Gateshead
18.30	GW3UMB	1·880	Colwyn Bay
18.00	G3SWR	1·980	Middlesbro', Yorks.
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.
19.00	G3NNW	433·080	Rochdale, Lancs.
19.30	G3CZA	1·970	Ely, Cambs.
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	G3UXI	1·915	Harlow, Essex.
20.00	G3VTY † G3WDW	1·915	Leeds, Yorks.
20.15	G3SAZ	1·845	Ashford, Middx.
20.45	G3IFF	1·992	Havant, Hants.
21.30	G3SVD	1·870	Reading, Berks.

Tuesdays

Clock Time	Call-sign	MHz	Town
17.30	G3TNF	1·920	Gateshead
19.00	G3UPA	1·850	Sutton Coldfield, Warks.
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	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	3·590	Bishopton, Renfrewshire
20.15	G3UIJ	1·845	Whitton, Middx.
20.30	G2ABC	1·915	Woodford, Essex
20.45	G3IFF	1·992	Havant, Hants.
21.00	G4RS	1·865	Blanford, Dorset
21.00	G5PX	1·850	Ashton-under-Lyne, Lancs.
21.30	G2ABC	144·750	Woodford, Essex
22.00	G3HZM	1·925	Manchester

Wednesdays

Clock Time	Call-sign	MHz	Town
17.30	G3TNF	1·920	Gateshead
18.30	G2FXA	1·900	Stockton-on-Tees
19.00	G3NNW	433·080	Rochdale, Lancs.
19.30	GM3HBY	1·832	Glasgow
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, Middx.
20.30	G3KGU	1·915	Theydon Bois, Essex.
20.30	G3SJE	1·870	Harrow, Middlesex
20.45	G3IFF	1·992	Havant, Hants.
21.00	G3HVI	1·890	Stoke-on-Trent
21.00	G3RIS	1·980	Cromer, Norfolk
21.00	G3LQI	1·990	Lancing, Sussex

Thursdays

Clock Time	Call-sign	MHz	Town
17.30	G3TNF	1·920	Gateshead
18.00	G3SWR	1·980	Middlesbro', Yorks.
18.30	G3RXH	1·910	Skipton, Yorks.
18.30	GW3VBP	3·590	Barry, Glam.
18.30	GW3UMB	1·880	Colwyn Bay
18.30	G3NC	1·968	Swindon
19.00	G3LGK	434·326 to South-west	Ilkeston, Derbys.
19.00	G3WGU	1·880	Bispham, Lancs.
19.30	G3GNS	1·910	Weston-super-Mare
19.45	G3LGK	434·326 to South-east	Ilkeston, Derbys.
20.00	GI3JEX	1·860	Belfast
20.30	G3LGK	434·326 to North-west	Ilkeston, Derbys.
20.45	G3IFF	1·992	Havant, Hants.
21.00	G4RS	1·865	Blandford, Dorset
21.00	G3ROE † G3TIQ	1·915	Harlow, Essex
21.00	G3VDS	1·820	Stockport, Cheshire

Fridays

Clock Time	Call-sign	MHz	Town
17.30	G3TNF	1·920	Gateshead
18·30	G3NCZ	1·920	Blackburn, Lancs.
18.30	G3VLT	1·913	Chelsfield, Kent.
19.00	G3NPB	1·875	St. Ives, Cornwall
19.30	G3PQF	1·825	Farnborough, Hants.
20.00	G3UCZ † G3WIX	1·915	Pudsey, Yorks. Bradford, Yorks.
20.15	G3SAZ	1·845	Ashford, Middx.
20.45	G3IFF	1·992	Havant, Hants.
21.00	G3RIS	1·980	Cromer, Norfolk
21.30	G3JCS	144·525	Caversham, Berks.

Saturdays

Clock Time	Call-sign	MHz	Town
09.30	G3UNV	1·845	Ashford, Middx.
10.00	G3TTK	1·860	Coalville, Leics.
10.00	G3PLE	1·820	Stourbridge, Worcs.
12.00	G3WCS	1·980	Liverpool
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
20.45	G3IFF	1·992	Havant, Hants.

† Alternately

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.

RSGB 21-28 MHz Telephony Contest 1967

TRANSMITTING SECTION

Position	Call-sign	Points	
1	G3NMH	9267	
2	G3RJH	8189	*
3	G3HCU	6540	
4	G3RWF	5935	
5	G3UQR/A	5430	
6	GM3JKF	4880	
7	G2DVD	4545	
8	G3PMX	4300	
9	G3WJN	4060	
10	G3ILO	3695	
11	G3WRA	3415	
12	G3IAR	3400	
13	G3VYS	3205	
14	5N2AAF	2868	*
15	G3UMV	2295	
16	G3TZU	2290	
17	GW3NWV	2040	
18	G3TOQ	2025	
19	W9LKI	1935	*
20	K1IMP	1930	*
21	GW3SFC	1865	
22	W3BYX	1805	*
23	GM3RFR	1560	
24	G2AJB	1535	
25	K8CFU	1515	*
26	VK6XX	1505	*
27	G3JMY	1495	
28	W0LBS	1435	*
29	CR5DX	1415	*
30	K1YZW / 9H1AG	1385	
31	W8RQC	1385	
32	W2DKM	1380	*
33	KP4CL	1350	*
34	CT1LN	1310	*
35	ZC4RB	1280	*
36	UB5KCA	1260	*
37	GW2HFR	1255	
38	SM2CTY	1220	*
39	ZC4JU	1190	*
40	ZD7DI		
41	G3VLM	1185	
42	W3TBF	1175	
43	5X5JK	1145	*
44	G3FPK	1100	
45	K8WIJ	1040	
46	SM2ALU	1010	
47	CT1EE	990	
48	UV3AAE	980	*
49	UB5KMX	975	*
50	WB2FZC	970	
51	SM3WB	930	
52	W3HQO	887	
53	VE3BJK	880	*
54	K1HTV	847	
55	OH3SN / OH6WY	840	*
56	PY4KL	820	*
57	ZD8RB	815	*
58	G3SMM	805	
59	W8PCS	800	
60	VS6FZ	790	*
61	W2STM	785	
62	ZE1CS	756	*
63	UY5HB	730	
64	SP4JF	725	*
65	G8TK / GM3TBV	700	
66	JA7UJ	680	*
67	UW3GU	660	
68	UW3VT / ZL1AAS	640	*
69	3C2AFC	600	*
70	WA9QJW / UA9BE	595	
71	YO3ZM	580	*
72	G3MWZ / 5Z4KN	575	
73	HB9UD	540	*
74	W3QZH	535	
75	WB2EXZ	510	
76	VK4PJ	470	*
77	UA3AVV	465	
78	WA9NDK	455	
79	OH3NY	445	
80	OH5VS	410	
81	LA9UI	400	*
82	UA3ANN	395	
83	JA6ECM / SM2CAA	385	
84	UB5FG	355	
85	JH1APM	350	
86	JA6AFL	310	
87	OK2DB / UA3YR	295	*
88	WA4QPB* / W4HOS	285	
89	CR6II / SM3DXC	280	
90	OA4JR / W8MFU	265	*
91	JA1FRE	260	
92	UA2KAP	210	
93	VP8HZ	177	
94	ZL1AGO	175	
95	UV9PP	155	
96	PY2SD	140	
97	YU4CA / VP8JD	130	
98	JA1ANG	100	
99	WA9NSR	90	
100	SM0BDS	80	

* Certificate winners.

RECEIVING SECTION

Position	Identification	Name	Points
1	* ISWL-G11051	R. L. Williams	4823
2	* BRS24957	W. Moncrieff	4479
3	BRS24962	C. Noblet	4418
4	BRS24631	J. Skidmore	4391
5	A5228	W. Felton	4274
6	BRS26793	A. Aston	4190
7	BRS25605	P. W. Whipps	3740
8	RC2023	K. M. Southgate	3730
9	—	R. G. Poppi	3620
10	A5271	M. R. Arnold	3590
11	BRS25429	D. A. Whitaker	3330
12	A4886	C. D. Morris	3305
13	BRS26003	G. Ferguson	3235
14	BRS28198	N. Henbrey	3185
15	BRS27330	E. F. Parker	3085
16	BRS26407	G. Owen	3050
17	—	A. Mitchell	3040
18	A3675	F. R. Popham	2880
19	A2966	S. Jesson	2860
20	A4504	J. E. Hart	2838
21	A5224	R. Stratton	2815
22	A4610	M. J. Channin	2680
23	A4533	D. Rollitt	2625
24	BRS29473	D. Weston	2480
25	BRS18461	F. C. Powell	2410
26	BRS20249	M. Harrington	1725
27	BRS26298	J. D. Flegg	1705
28	BRS28201	R. Birkett	1700
29	BRS29641	R. L. Dowdell	1600
30	A5126	M. Pemberton	1515
	BRS26870	W. C. Torode	
31	A5495	J. H. Clark	1385
32	A4884	C. R. Lade	1380
33	A5032	C. Baker	1215
34	BRS27880	B. Thomas	1185
35	BRS27575	C. Tredwell	975
36	A5516	G. Coomber	830
37	A5459	W. Mantovani	605
38	A5490	B. Auckland	540
39	A5182	M. R. Kent	515
40	* SMI-3589/0	T. Hemph	435
41	* WPE-4 IHI	R. H. Johnson	430
42	* ISWL-DL8497	F. W. Kradepohl	360
43	A5665	J. D. Parkinson	335
44	* B.O.R.S. 29463	D. Smith	265
45	* YU3-RS-779	M. Lukan	240
46	* A4874/9J	D. C. Housden	220
47	* WPE7BLN	E. Fellows	
48	* ZL149	B. D. Thomson	215
49	A4772	K. Parkins	
50	* ISWL-W8-8260	P. Jones	190
51	* A5689	D. P. Chal	130
—	BRS27662	J. W. Trueman †	—

† Disqualified: Rule 3 (ii) and (iii)

The conditions prevalent during the latest 21-28 MHz Contest are reflected by the number of entrants, and the scores of the leading stations: both are approximately double those of the 1966 contest. The rate of QSOs was extremely high: one a minute hour after hour, by the leading Gs.

Hal Perkins, G3NMH, with 9267 points again wins the Whitworth Trophy. G3RJH with 8189 points is in second place. Another high-scoring veteran of this contest A. E. White (6540 points) is third.

Linear amplifiers, together with tri-band beams or quads, were the order of the day. There was very little use of a.m.

Most British stations followed approximately the same operating pattern. From 07.00 for three hours, they worked mainly JAs on 28 and 21 MHz (G3NMH contacted nearly 70, plus VS6, ZL, VK 6-5-4, KR6, HL9, UV9, 9M2); between 10.00 and 11.00 many contacts were made with European stations; from 11.00 onwards beams were turned west and a phenomenal number of stateside QSOs followed. This is commented upon by the leading overseas station, 5N2AAF, who says " 9H1, ZD7, ZD8, ZC4, 7Q7, ZE, 9G1, as well as 5N2, were calling " CQ Contest, Gs only," and getting no response from G.

An analysis of the entries shows that there were nineteen G3 + three letter call-signs, two G2 + two letters, one G8, three GMs, and three GWs. " Last year I worked 11 G2 + 2 calls, this year only 7". (5N2AAF).

The standard of the logs varied from excellent to just legible, with the majority in the former category. Generally, the best logs were from the highest scoring stations.

Comments by entrants showed enjoyment of the contest, and few found fault with the rules: " For me, it was a mammoth and unpleasant task filling out 38 pages of contest log sheets in only two weeks" G3RJH. " This certainly was a fine affair—conditions were excellent, and it was fun to talk to old friends " K8CFU." Without a doubt it is the day of the s.s.b. I've never had to work so hard for points" 9H1AG. " Very enjoyable test—looking forward to next year " W2DKM. " I HATE CONTESTS, but am pleased to join in any scheme to help drive intruders off our allegedly exclusive amateur bands " G3FPK. " I find it a bit hard going to get through the wall of W/K and EU stations who were obviously S9 in the UK. Most Gs seemed to be concentrating on working strings of Ws and not bothering to look for the rarer countries, obviously mounting up more points this way. Perhaps the rules could be modified to encourage them to look for people like me! " ZD8RB.

The following are thanked for their check logs: G2KO, G2DHV, G3FLG, G3MTB, K4KJN, W2UHE, WB2QZD, 5H3KJ. The one received from G2KO was a magnificent effort running to 18 pages, and compiled in conjunction with his brother-in-law G3UPO; G2KO writes " I could not see that the contest ' tested ' anything more than the ability to talk and write quickly. It did not test the skill of operating—I would like to see more points given for working different countries. . . ."

In the receiving section, logs were neatly presented, though there were a number of inaccuracies in recording call-signs. The Contests Committee is pleased to note that nearly half the entries were from Associate Members; their logs were as well compiled as those from BRS members.

CONTEST NEWS RULES—RESULTS

Low Power Contest 1968

The Rules for the Low Power Contest are given below, and the H.F. Contests Committee wishes to point out that if support for this event does not increase, then it may decide to discontinue the contest in the future.

1. When: 07.00 GMT—19.00 GMT on 31 March, 1968.

2. Eligible Entrants: All fully paid-up members of the RSGB resident in Europe.

3. The General Rules relating to RSGB H.F. Contests, published in the January, 1968, issue of *Radio Communication*, will apply except as superseded by the Rules of this Contest.

4. Contacts: Must be made on c.w. (A1) only between 3500 and 3600 kHz.

5. Scoring: Points will be scored on the following basis.

Watts input to p.a. stage	Up to 0·5	To 1	To 2	To 3	To 4	To 5
Points per contact	100	50	25	15	10	5

A bonus of 10 points may be claimed for the first contact with each different county area listed on page 63 of the January, 1968, issue of *Radio Communication*.

6. Contest Exchanges: RST reports followed by the contact number, starting at 001, and the county code letter, e.g. 579001SY.

7. Logs: Entrants should use RSGB Contest Log Sheets (available on request from HQ) with column (5) headed "His County," and column (6) "My Power." The Cover Sheet must be made out in accordance with the General Rule (4) and the declaration signed.

Entries must be postmarked not later than Monday, 15 April 1968.

8. Awards: At the discretion of the Council, the 1930 Committee Cup will be awarded to the winner, and certificates of merit to the runner-up and to the non-transmitting member submitting the best check log.

Fourth 70 MHz (C.W.) Contest, 1967

Twenty-three logs were received for the Fourth 70 MHz (C.W.) Contest, 1967, which is three down on the 1966 contest. Propagation conditions were fair, the longest contact recorded being between G3GDU/A (Westmorland) and G3JHM/A (Sussex) at 430 km. The timing and duration of the contest now seem to be popular; the timing was intended to assist those with TVI problems as was the rule permitting the use of the mode F1. The rule on the exchange of location information was not very clearly worded and thus no points have been deducted from those who did not exchange QRA locators. The 1968 General rules, however, makes the position clear by asking for both QRA and QTH to be sent. This is a compromise which meets the diverse opinions of entrants. Congratulations to all the winners: G3OHH, G3VPK, G3OXD/A and G3RIK/P and thanks to BRS15822 for his entry for the Listeners' Championship.

Section A—Single Operator, Fixed Stations

Position	Call-sign	Points	QSOs	County
1	G3OHH	5828	34	Staffs.
2	G3VPK	4690	33	Essex
3	G3REL	4001	25	Yorks.
4	G3JEQ	3771	38	Surrey
5	G3FDW	2278	18	Notts.
6	G5NU	2139	25	Berks.
7	G3GVM	1871	24	Hants.
8	G2WS	1859	13	Somerset
9	G3UUT	1652	11	Yorks.
10	G6HD	1590	25	Kent
11	G3JKY	1098	22	Kent
12	GI3WEL	1027	8	Armagh
13	G3OJE	992	20	London

Section B—Club, Multi-operator and /A Stations

1	G3OXD/A	6269	41	Worcs.
2	G3GDU/A	5959	30	Westmoreland
3	G3VZN	2887	39	Middx.
4	GI3UPG/A	1138	9	(Belfast)

Section C—Portable Stations

1	G3RIK/P	6142	33	Lancs.
2	G3NUE/P	6012	39	Worcs.
3	G3PIA/P	5672	41	Berks.
4	G3RCV/P	4254	41	Sussex
5	GW3UCB/P	4082	25	Caerns.
6	G3GGL/P	2427	17	Salop

Grafton Society Top Band Contest

The rules for this annual G2AAN Contest are as follows:

C.W. section: 16 March 1968, Phone section: 23 March 1968, 21.30 GMT until 24.00 GMT on both dates.

Competing stations shall call "CQ GRS" on c.w. and "CQ Grafton Contest" on phone and should exchange RST (or RS) reports followed by a serial number commencing with any number between 001 and 100, increasing by one for each contact. Serial numbers for the two sections should continue consecutively. RST and serial numbers must be acknowledged.

Each contact will count for one point, and any station may be worked only *once* in *each* section. First and second place certificates will be awarded to the stations achieving the two highest total scores, and further certificates will be awarded to the individual winners of each section.

Logs, bearing the usual signed declaration, should be sent to G2CJN, 145 Uxendon Hill, Wembley Park, Middlesex, to arrive not later than 3 April. Blank log sheets and rules are available from him on receipt of an s.a.e.

CONTESTS DIARY

9-10 March	—BERU
16-17 March	—ARRL DX Contest (C.W.)
30-31 March	—(REF), 3·5-28 MHz, Phone*
31 March	—Low Power Contest (3·5 MHz)
6-7 April	—(PZK), 3·5-28 MHz, C.W.
20-21 April	—Second 70 MHz (Open) Contest
27-28 April	—(VERON), 1·8-432 MHz
4-5 May	—First 1296/432 MHz (Open) Contest
4-5 May	—(RSF), 3·5-28 MHz, C.W.
19 May	—Fourth 144 MHz (Portable) Contest
1-2 June	—(DARC) 3·5-28 MHz, C.W.
8-9 June	—(UBA), 1·8-28 MHz, C.W.*
8-9 June	—National Field Day
23 June	—Second 432 MHz (Portable) Contest
24 June	—Fifth 144 MHz (S.S.B.) Contest
6-7 July	—Summer Top Band Contest
21 July	—Third 70 MHz (Portable) Contest
3-4 August	—Sixth 144 MHz (Open) Contest
10-11 August	—(DARC), 3·5-28 MHz, C.W.
1 September	—(DARC), 3·5-28 MHz, C.W.*
7-8 September	—(DARC), 3·5-28 MHz, Phone
7-8 September	—V.H.F. National Field Day (provisional date)
15 September	—80m Field Day
21-22 September	—(SSA), 3·5-28 MHz, C.W.
28-29 September	—(SSA), 3·5-28 MHz, Phone
5-6 October	—Third 432 MHz (Open) Contest
12-13 October	—28 MHz Telephony Contest
12-13 October	—Second 1296 MHz (Open) Contest
19-20 October	—11th Jamboree on the Air
26-27 October	—7 MHz Phone Contest
7-10 November	—7 MHz C.W. Contest
11 November	—Seventh 144 MHz (S.S.B.) Contest
16-17 November	—Second 1·8 MHz Contest
1 December	—Fourth 70 MHz (C.W.) Contest

* Restricted to Members only

CLUB NEWS

REGULAR FEATURE

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.

Yet another club is in difficulties with its landlords; this time the well known Crystal Palace and District Radio Club. Meetings were first regularly held in 1951 when Don Gilmour, G2VB then RSGB Area Representative made the front room of his house available. Meetings then transferred to Windermere House, Crystal Palace, until 1962 when the move toWoodyates Road was initiated. But now owing to disbanding of the Civil Defence Corps future meetings are in some doubt. It is urgently requested that any bright ideas of alternative accommodation be forwarded to the club, c/o G. M. C. Stone, G3FZL, 11 Liphook Crescent, SE23.

Before we start Club News proper this month, congratulations are deserved by Nailsworth and District ARS, Oxford and District ARS and Swindon and District ARC for their fine bi-monthly journal, *Wiltshire Hams*.

REGION 1

Ainsdale (ARC).—13, 27 March 8 p.m., 77 Clifton Road, Southport. 22 March (Annual Hot Pot Supper) at the " Morris Dancers," Scarisbrick.

Allerton (Liverpool) (SRHS).—Thursdays, 8 p.m., 3rd Allerton Scout Group Headquarters, Church Road, Woolton, Liverpool.

Ashton under Lyne (AUL & DARS).—Fridays, 7.30 p.m., 6 Stamford Street, Stalybridge.

Blackburn (ELARC).—7 March, 4 April, YMCA, Limbrick, Blackburn.

Blackpool (B & FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate. More tuition from 7.30 p.m.

Bury (B & RRS).—12 March, 9 April, 8 p.m., George Hotel (Private Room), Market Street. Club Nets—other Tuesdays 8 p.m. and Sundays 11 a.m.

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

Crewe & District.—1 April, 8 p.m., 80 Albert Street.

Eccles (E & DRC).—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft. Every Thursday, Club Top Band net, 20.30 hours.

Leyland Hundred Amateur Group.—Weekly Net each Thursday at 19.15 GMT (1915 kHz).

Liverpool (L & DARS).—Tuesdays, 8 p.m., Conservative Association Rooms, Church Road, Wavertree.

(NLRC).—15, 29 March, 12 April, 8 p.m., Landsbury House, 13 Crosby Road South, Liverpool 22.

Macclesfield (M & DRS).—12, 26 March, 9 April, 8 p.m., The George Hotel, Jordangate.

Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10.

(SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden. 15 March (" Logic," by D. Hyde), 29 March (" Layman's Approach to Colour Television," by D. Holland). The Club is to hold its Constructional Contest on 26 April. Anything members have built is eligible. Notices will shortly be sent out for the Annual General Meeting scheduled for 24 May. The Club Station did well in the 1967 *CQ Magazine* 160 Metre Contest—also in MCC being 17th out of 100 entrants. Members look forward keenly to the results of the AFS. All hands are now at work on the Club's caravan to have it ready for the Belle Vue Convention on 19 May.

North West V.H.F. Group.—Mondays and Tuesdays, 8 p.m., Club Headquarters, Chapeltown Street, Manchester 4.

Preston (PARS).—7, 21 March, 4 April, 7.30 p.m., " Windsor Castle " (Private Room), St Paul's Square.

St. Helens (SES).—19 March, 2 April, 7.30 p.m., IVS Centre, 55 College Street.

Southport (SRS).—Wednesdays, 8 p.m. and Sundays, 2.30 p.m., The Esplanade.

(73 S.S.B. Society).—Tuesdays, 8 p.m. (all commencing with a talk on part of the RAE Syllabus), 73 Avondale Road North, Southport.

Stockport.—6, 20 March, 3 April, Royal Oak Hotel, Castle Street, Edgeley.

Warrington-Culcheth (CARC).—Fridays, 7.30 p.m., Chat Moss Hotel, Glazebury.

Westmorland.—15 March, 5 April, 7 p.m., the Allen Technical College, Sandes Avenue, Kendal.

Wirral (WARS).—6, 20 March, 3 April, 8 p.m., Harding House, Park Road West, Claughton, Birkenhead.

REGION 2

Barnsley (B & DARC).—8 March (Film—" Nuclear Power," by UKAEA), 22 March (Tape Lecture—Basic Transistor Principles), 7.30 p.m., King George Hotel, Peel Street, Barnsley.

Bradford (BRS).—26 March (AGM), 7.30 p.m., Bradford Technical College, Great Horton Road, Bradford.

Halifax and District ARS.—8 p.m., Sun Inn, Rastrick. The Club took part in the ARRL contest on Saturday, 3 February for the benefit of Club's SWLs. The equipment included two s.s.b. stations using KW2000 transcelvers and an a.m. station using a KW Vanguard with a KW77 receiver to back it up. *G3WLW*.

Hull (H & DARS).—Fridays, 8 March (" Transistor Circuitry," by G3PQY), 15 March (" Working DX," by G3LZQ), 22 March (" Hints and Kinks, "by G3FCY and G3OHT), 29 March). " D/F Equipment," by G3PQY), 7.45 p.m., 592 Hessle Road, Hull.

Leeds (P & DRC).—13 March (" Operating Mobile," by M. S. Gaunt, G3WGW), 20 March (" Transistor Circuitry," by E. Lawson, G3DLD), The Game Cock Hotel, Pudsey Road, Leeds 13. The club started in full swing on 3 January, 1968 when a station was installed on the premises, and to everyone's delight DX was worked to an extent of 5 miles! The meeting on 31 January, 1968 was very well attended by a number of distant amateurs who enjoyed, along with all other members, an excellent lecture on Working DX by Mr K. Robson, G3VTY. This lecture was well received by everyone and he is to be congratulated for the effort put into his very comprehensive talk.

Northern Heights.—13 March (" Going Mobile," by D. Millard, G3OGV); the club hopes that this lecture will stir things up in time for the mobile rallies. 27 March (Discussion on NFD); it is hoped this year to get a bit further up the list instead of being third bottom. 10 April (AGM); it is earnestly requested that as many members as possible turn up at this meeting as there are going to be some big changes in the list of officers and committee which may shake the roots a little. 7.45 p.m., Sportsman Inn, Ogden, Halifax.

Scarborough (SARS).—Thursdays, 7.30 p.m., rear of 3 Trinity Road, Scarborough.

South Shields (SS & DARC).—8 March (" Communication Receivers," by J. Melvin, G3LIV). The judging of the Constructional Competition will also be carried out on the same date by J. Melvin, G3LIV, Chairman of the Durham City Club and it is hoped to have a good number of entries. On 9 February, " Aerials " was the subject of a talk by Malcom Muir, G3WOM. 7.30 p.m., Trinity House Social Centre, Laygate, South Shields.

York (YARS).—Thursdays, 7.30 p.m., British Legion Rooms, 61 Micklegate, York. Annual General Meeting was held on 18 January and proposals for the forthcoming year were discussed and officers elected. 15 February a Film Show was arranged.

REGION 3

Birmingham (MARS).—19 March (" V.H.F. Converters," by M. Marment, G8ABP), 7.45 p.m., The Midland Institute, Margaret Street, Birmingham 1.

Coventry (CARS).—8 March (Night on the air), 15 March (" Directional Finding "), 22 March (Night on the air), 29 March (" Canal Cruising," by Coventry Canal Society), Annex of CD HQ, Canal House, Drapers Fields, Foleshill Road, Coventry. 8 p.m., club equipment includes a KW2000 Transceiver which is the basis of our " Night on the Air " sessions.
Dudley (DARC).—8 March (" V.H.F. Aerials," advantages and disadvantages), 22 March (Constructional contest), 8 p.m., Art Gallery, St James's Road, Dudley.
Hereford (HARS).—First Friday of the month. 5 April (RSGB Tape Lecture), Mortimer Hall, Mortimer Road, Hereford. Membership is steady at present around 40 mark and a few have dropped out. At the January meeting they had a talk by Bill Wells, G3HVX, on Receivers and for the meeting on 2 February a Heathkit Demonstration by G3HXN. During January the first Annual Buffet Supper was held and attracted around 25 members, XYLs and friends.
Mid-Warwickshire (MWARS).—Every Monday. 11 March (Film Show), 25 March (" Relays and their uses," by J. Conquest, GEC Ltd.), 8 p.m., 28 Hamilton Terrace, Leamington Spa.
Salop (SARS).—7 March (" Eddystone Receivers " talk and demonstration by N. Scobie), 14 March (Speaker from Royal Signals), 19 March (" Club Projects," G3UDA), 28 March (Junk Sale), Old Post Office Hotel, Milk Street, Shrewsbury.
Stourbridge (STARS).—2 April, 7.45 p.m., The Library, Longlands School.
Sutton Coldfield (SCRS).—11 March (Films: " Ship to shore " and " Trans-Atlantic Link "), 27 March (Natter Night). Fox Inn, Walmley.

REGION 4

Burton on Trent (B-o-T ARS).—13 March (Ladies' Night—Films, Slides), 10 April (Components recognition Quiz with Derby and District ARS), 7.30 p.m., Club Room, Stapenhill Institute, Stapenhill, Burton-on-Trent.
Derby (D & DARS).—6 March (Surplus Sale), 13 March (" My World Journey," by W. A. Roberts, C.Eng., F.I.E.E., M.B.I.M.—ladies invited), 20 March (" Test equipment for the Constructor," by H. K Taylor), 27 March (" The last 20 years on V.H.F.," by Jack Hum, G5UM), 29 March (Lecture Demonstration by R. Palmer, G5PP—venue to be announced), 3 April (Surplus Sale), 7.30 p.m., Room 4, 119 Green Lane, Derby. It was reported at the AGM that the fully paid membership for year ended 31 December, 1967 was 174 of whom 86 held transmitting licences. The Society's finances are sound although a loss had been incurred over the year. Officers elected for the ensuing year were: Chairman, T. Darn, G3FGY; Vice-Chairman, K. J. Pegg, G3FSH; Secretary/Treasurer, F. C. Ward, G2CVV; Management Committee, Messrs. D. Bosworth, G8BAV, J. Anthony, G3KQF, R. E. F. Street, B. J. Speakman, G3UBS, G. P. Miles, G3TOV, R. Chambers, G3RTG, M. Shardlow, G3SZJ, J. Smith, G3SMV and R. Lax, G8BNX. *G2CVV.*
Grimsby (GARS).—Thursdays, 7.30 p.m., Club Rooms, Model Engineering Society, Fletchers Yard, Wellowgate.
Heanor (H & DARS).—12 March (Surplus Sale), 19 March (" More Electronic Devices," by E. E. West, G3KTP), 26 March (Transmitting Evening in the Shack), 7.30 p.m., Club Room, South East Derbyshire, College of Further Education (Heanor Branch), Ilkeston Road, Heanor.
Hunstanton.—Bucket and Spade Party organized by G3JEC, G3SAW and G3ANM will be held on 16 June at Brookes Refreshment Rooms Car Park near the pier. The talk-in station *G3ANM/P* will operate on 160m from whom further particulars can be obtained.
Leicester (LRS).—Mondays, 7.30 p.m., Sundays, 10.30 a.m., Club Room, Gilroes Estate Cottage, Groby Road, Leicester.
Loughborough (LARC).—Fridays, 7.30 p.m., Club Rooms, Bleach Yard, Wards End, Loughborough.
Mansfield (MARS).—First Friday in the month, 7.45 p.m., New Inn, Westgate, Mansfield.
Melton Mowbray (MMARS).—21 March (" Transmitter Design and TVI," Tape Lecture, by N. Shires, G3DTM), 7.30 p.m., St John Ambulance Hall, Asfordby Hill, Melton Mowbray.
Newark (NSWC).—Mondays, Thursdays, 7.30 p.m., The Guildhall, Guildhall Street, Newark.
Nottingham (ARCN).—Tuesdays, Thursdays, 7.30 p.m., Room 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Sherwood, Nottingham.
Peterborough (P & DARS).—Fridays, 5 April (Film Show), 7.15 p.m., Peterborough Technical College, Eastfield Road, Peterborough.
Spilsby Junk Sale, 5 April, 7 p.m., The Bull, Halton Road, Spilsby, Lincs.
Worksop (NNARS.—Tuesdays (RAE Class), Thursdays (Lecture), 7.30 p.m., Club Room, 13 Gateford Road, Worksop.

REGION 5

Bedford (B & DARC).—Thursdays, 7 March (Questions through the Chair), 14 March (" Some Boots," by G3SME), 21 March (" The State Side View,"by G5AGU), 28 March (The ARRL Contest—Talk) " The Dolphin," Broadway, Bedford. *G3XDU.*
Cambridge (C & DARC).—15 March (Informal), 22 March (Talk: Heathkit SB 101 Transceiver), 29 March (Informal). Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.
University (CUWS).—14 March (*Provisional*—Visit to Mullard Observatory, Lord's Bridge). Meetings normally held during term in the Psychology Department, Downing Site, Cambridge.
March (M & DRAS).—Tuesdays, 7.30 p.m., Old Police Headquarters, High Street, March, Cambridgeshire.
Shefford (S & DARC).—7 March (" Using the HRO on c.w.," by G2AUA), 14 March (" Film on Computers," by G3TDW), 21 March (Programme Planning), 28 March (Second NFD Planning). Thursdays 7.45 p.m. (Morse Classes), Meeting 8 p.m., Church Hall, High Street, Shefford, Bedfordshire.
Stevenage (S & DARS).—7 March (" Junk Sale," organizer, Dennis French, G3TIK), 21 March (" Demonstration of Kits and Equipment " by F. E. Mann of Electroniques, Harlow). Meetings at Hawker-Siddeley Dynamics Ltd., Gunnels Wood Road, Stevenage, Hertfordshire.

REGION 6

Cheltenham RSGB Group.—First Thursday in the month, 8 p.m., Great Western Hotel, Clarence Street, Cheltenham. The AGM in February was fairly well attended but a number of Old Timers were missing.
Gloucester (GRC).—Second and fourth Thursdays in the month (Morse practice included each evening), 7.30 p.m., Lamb Inn, Market Parade, Gloucester. Watch for details of future meetings and visits.
Oxford (DARS).—Meetings second and fourth Wednesdays of month at Cherwell Hotel, Water Eaton Road, North Oxford at 7.30 p.m. Annual dinner, 23 March, Royal Oxford Hotel—details from G3PMI.

REGION 7

Acton, Brentford and Chiswick (ABCRC).—19 March (" DX-pedition to Monaco and San Marino," by G5ACX/9A1AA/3A0AE), 7.30 p.m., Chiswick Trades and Social Club, 66 High Road, Chiswick. During the AGM held in January the following officers were elected; Chairman, G6RC; Vice-Chairman, G3OJX; Secretary, Treasurer and Press Agent, G3GEH.
Addiscombe (AARC).—Second and fourth Tuesdays, 7.30 p.m., 158 Lower Addiscombe Road (Toc H Hall).
Ashford (Middlesex) Echelford (ARS).—8, 22 March, 7.30 p.m., St Martin's Court, Kingston Crescent, Ashford.
Barking (R & EC).—Tuesdays and Thursdays, 7 p.m., Gascoigne School, Morley Road, Barking.
Bexleyheath (NKRS).—14 March (Weller Electrics, " The Art of Soldering "), 28 March (Sound for Home Movies), Church Hall, Chapel Road, Bexleyheath.
Chingford RSGB Group. Fridays, Royal Forest Hotel, Chingford.
(SRC).—Fridays, except first in month, Friday Hill House, Simmons Lane, Chingford, E4.
Croydon (SRCC).—19 March, 7.30 p.m., Blue Anchor, South End.
Dorking (DR & DRS).—12 March, 8 p.m., Wheatsheaf, 26 March, 8 p.m., Star & Garter, Dorking.
Ealing (E & DARS).—Tuesdays, 7.30 p.m., Northfields Community Centre, Northcroft Road, Ealing, W13.
East Ham.—12 Leigh High Road, East Ham.
East London.—17 March (" Introduction to Atomic Physics," by Robert Alden, G3VUN), 2.30 p.m., Wanstead House, The Green, Wanstead, London, E11.
Edgware & Hendon (EADRS).—11, 25 March, 8 p.m., John Keble Hall, Church Close, Deans Lane, Edgware.
Gravesend (GRS).—Third Wednesday, 8 p.m., RAFTA Club, Overcliff Road.
Guildford (G & DRS).—8 March (Quiz Nite), 22 March (Talk on Eidaphor), 8 p.m., Guildford Engineering Society in Stoke Park.
Hampton Court (TVARTS).—First Wednesday, 7.30 p.m., Cardinal Wolsey, Hampton Court.
Harlow (DRS).—Tuesdays, Thursdays, 7.30 p.m., Mark Hall Barn, First Avenue.
Harrow (RSH).—Fridays, 8 p.m., Roxeth Manor School, Eastcote Lane.
Havering (H & DARC).—Second and fourth Wednesdays. Romford.
Hemel Hempstead (HH & DARS).—15 March (G2YS, John

Swinnerton with Lecture and Slides on his visit to the US), 7.30 p.m., Ruckles Lane Hall Kings Langley.

Holloway (GRS).—Mondays (RAE) 7 p.m., Wednesdays (Morse), 7.30 p.m., Fridays (Club), 7.30 p.m., Monten School, Hornsey Road.

Hounslow (HADRS).—18 March, 7.30 p.m., Canteen, Mogden Main Drainage Department, Mogden Works, Isleworth.

Ilford.—Thursdays, 8 p.m., 103 Heath Road, Chadwell Heath.

Kingston (K & DARS).—Second Wednesday each month, 8 p.m., YMCA, Eden Street.

Leyton and Walthamstow.—Tuesdays, 7.30 p.m., Leyton Senior Institute, Essex Road, London, E10.

London U.H.F. Group.—Thursday, 4 April (U.H.F. Aerials), White Hall Hotel, Bloomsbury Square, Holborn.

Loughton.—8, 22 March, 7.30 p.m., Loughton Hall (nr. Debden Station).

Maidenhead (N & DARC).—19 March, 7.30 p.m., Victoria Hall, Cox Green, Maidenhead.

New Cross.—Wednesdays and Fridays, 8 p.m., 225 New Cross Road, London, SE14.

Newham Radio and Electronics Society.—Wednesdays, 6 March (Junk Sale), 13 March (AGM), 7.30 p.m., Vicarage Lane School, Vicarage Lane, E6.

Norwood & South London (CP & DRS).—16 March (Film Show), 8 p.m., the meeting place is uncertain at present. Please contact G. M. C. Stone, G3FZL, for details.

Paddington (P & DARS).—Thursdays, *now*, 7.30 p.m., 1967 Beauchamp Lodge Award was presented to SWL Terry Collins for his work for the club. All visitors welcome. Beauchamp Lodge, 2 Warwick Crescent, W2.

Purley (P & DARS).—15 March (Spring Junk Sale), Railwaymen's Hall, Side Entrance, 58 Whytecliffe Road, Purley. Ninety Guests from four clubs were made welcome at the Southern Amateur Radio Association's Dinner.

Reigate (RATS).—George & Dragon, Cromwell Road, Redhill.

Romford (R & DRS).—RAFTA House, 18 Carlton Road.

Scouts ARS.—21 March, 7.30 p.m., Baden Powell House, Queensgate, South Kensington, SW7.

Sidcup (CVRS).—7 March ("An American Tour", by Arthur Milne, G2MI), Congregational Church Hall, Court Road, Eltham. 4 April (Annual General Meeting), 21 March (Natter Nite), 8 p.m., All Saints Church Hall, Bereta Road, New Eltham.

Slough (SDR Group).—First Wednesday each month, 7.30 p.m., United Services Club, Wellington Street.

Southgate & District.—14 March, 7.30 p.m., Parkwood Girls' School (behind Wood Green Town Hall). Southgate entered for the **AFS contest this year and made a score of 1047 points, with five operators and one SWL taking part. Operating on the first night of the contest were G3VRY and G3WCE, and on Sunday the team consisted of G3VND, G3LZE, G3TIE, G3WCE and SWL Derek Austin. It is interesting to note that two of Southgate's enthusiastic operators, G3VND and G3LZE, are both blind.**

St Albans (Verulam ARC).—6 March (Informal Meeting), 7.30 p.m., Watford Road, St Albans. A gathering of 35 Verulam members and their friends were present for the club's January meeting when a high standard for other forthcoming lectures in 1968 was set by Derek Purchese, G3LXP, talking about "Mobile Operating up-to-date." Supported by a display of a wide range of home-built and commercial mobile equipment for the bands from 1·8 MHz to 432 MHz, Derek covered the growth of this aspect of the hobby from the pre-war activities of G8TL to the present day. In his presentation G3LXP was assisted by Brian Grist, G3GJX, who related the events surrounding the first Mobile Rally held at Oxford in 1955, in which he played a principal part, and also described his present mobile equipment with which he specializes in s.s.b. work on 10, 15 and 20m. Derek's talk provided considerable encouragement for those amateurs who have so far not sampled the pleasures of mobile radio contacts and emphasized the need for reliability and simplicity of control in designing gear for this purpose. Easily adaptable microphone arrangements were discussed which, along with a properly adjusted VOX control, provide genuine two-handed driving facilities and the highest possible standard of road safety. G3LXP's simplest adaptation makes use of a plain wire coathanger and takes just two minutes to make! *G3GJX.*

Sutton & Cheam (SCRS).—19 March, 8 p.m., The Harrow Inn High Street, Cheam.

Welwyn (Mid-Herts ARS).—14 March (Annual Constructors' Competition and Film Show), 8 p.m., Welwyn Civic Centre, Welwyn.

Wimbledon (W & DRS) and South London Mobile Society.—8 March (Radio Astronomy), 8 p.m., St Johns Hall, 124 London Road, Merton, SW19. Following a meeting on 26 February it has been decided to transfer the few remaining SLMS members to Wimbledon club. The title of the SLMS would, however, remain and the call-sign G3SLM will be used later this year.

Wembley (GECARS).—This club is now open to non-GEC employees by invitation. Telephone: ARNold 1262 first. Sports Club, St Augustin Avenue, North Wembley.

Westminster (CSRS).—First and third Tuesdays of the month, 2 April ("Aerials," by F. Charman, G6CJ), 6.30 p.m., Civil Service Recreation Centre, Monck Street, Westminster, SW1.

Tom O'Donald, G3UNX, nearest camera and George Eddowes, G3NOH, rattling off QSOs from Ward 16, Mount Vernon Hospital, Northwood, Middlesex. The G3NOH/A rig (described in the December *RSGB Bulletin*) has been temporarily augmented by the arrival of Tom who is having treatment to his foot. Since out last report this "locker top" KW2000A and Joystick matching unit has been increased to include a Z match for the 160m long wire aerial, and a digital type transistor El Bug!

(Photo by Paul Fletcher)

REGION 8

Canterbury (EKRS).—Details of future meetings from G3MDO.

Crawley (CARC).—Wednesday, 13 March (Informal), for details contact G3FRV, Wednesday, 27 March ("Colour Television," by Graham Roe, G3NGS), 8 p.m., Trinity Congregational Church Hall, Ifield. The club's annual Construction Contest, judged at the January meeting by members of the Reigate Club, was won this year by Mike Underhill, G3LHZ, with a three band full-size Quad aerial. The second prize was taken by Derek Bradnum, and the special prize by M. Beck, G3UOV.

Maidstone (M YMCA ARS).—Maidstone YMCA Amateur Radio Society meets every Wednesday at "Y" Sports Centre, Melrose Close, Cripple Street, Loose, Maidstone, at 8 p.m. Classes for the RAE and Morse Test also take place at the same place on Friday evenings at 8 p.m.

Medway (MARTS).—Details of future meetings from P. Carey, G3UXH.

Mid-Sussex ARS.—First Thursday of the month, 7 March (Sale of Surplus Equipment), 7.45 p.m., Marle Place Further Education Centre, Burgess Hill. Members and visitors are asked to note the change of venue effective from last month. Membership last year grew to 25 fully paid-up members of which all licensed amateurs were members of RSGB. We wonder how many other clubs can claim this! *G3RXJ.*

Worthing (W & DARC).—Tuesdays, 12 March ("Aerial Rotating Equipment"), 26 March ("Transistor Power Supplies"), 8 p.m., Rose Wilmot Centre Littlehampton Road, Worthing.

REGION 9

Bristol RSGB Group.—18 March ("Amateur Radio, is there a future?" by R. F. Stevens, G2BVN) 7.30 p.m., Becket Hall, St Thomas Street, Bristol 1. The well-attended January meeting featured a talk by G. Twist, G3LWH, in which he explained how a good match between transmitter and aerial can reduce or prevent TVI. No doubt after this fine talk, many went home with ideas on building a similar "Omni match" to the excellent home-built example that was demonstrated by G3LWH. *G3PFD.*

Bristol (BARC).—Mondays and Thursdays, 7.30 p.m., University Settlement, 41 Ducie Road, Barton Hill, Bristol 5. D/F Hunts start this year on Sunday, 5 May at 2 p.m., then monthly thereon. Each Hunt is an individual competition with a prize, also points awarded at each one accumulate to go towards overall main prizes for the year's series. Transmission 1900-1920 kHz. Open entry to all. *G3WLZ.*

Burnham-on-Sea (B-o-S ARS).—Second Tuesday in each month, 8 p.m., Crown Hotel, Oxford Street, Burnham-on-Sea.

Cornwall (CRAC).—First Thursday in each month, 7.30 p.m., South Western Electricity Board Social Centre, Pool, Camborne, Cornwall. *G3NKE.*

S.S.B. Group.—Second Thursday in each month, 7.30 p.m. The Barley Sheaf, Truro.

V.H.F. Group.—Third Thursday in each month, 7.30 p.m., The Barley Sheaf, Truro. *G3OCB.*

A talk was presented at the February club meeting by Mr D. Barnes, Camborne Meterological Station, assisted by the Chief Engineer, Mr Williams. Together they explained and demonstrated the many complex methods of obtaining weather information, including sonde transmitters. A visit to the Station with a demonstration of the latest radar is to follow. The March programme is demonstrations of various types of equipment by members. This will be an opportunity to see various sets and make comparisons. *G3NKE.*

Exeter RSGB Group.—First Tuesday in each month at George and Dragon, Blackboy Road, Exeter, 7.30 p.m. 2 April (Surplus Equipment and Junk Sale). *G3HMY.*

Plymouth (PRC).—Every Tuesday, 7.30 p.m., Virginia House, Bretonside, Plymouth.

Saltash (S & DARC).—Alternative Fridays, 7.30 p.m., Burraton Toc H Hall, Warraton Road, Saltash.

South Dorset (SDRS).—First Friday in each month, 7.30 p.m., Labour Rooms, West Walk, Dorchester.

Taunton.—Alternative Thursdays, 7.30 p.m., Lecture Theatre, Taunton Technical College. *G3LCJ.*

Torquay (TARS).—Every Tuesday and Friday from 7.30 p.m., 30 March (" Video Tape Demonstration," by E. J. Hayman, G3ABU), 7.30 p.m., Club Headquarters, Bath Lane, Rear 94 Belgrave Road, Torquay. *G3VNG.*

Wells (WARS).—Mondays, 8 p.m., EMIE (Wells) Sports and Social Club, Chamberlain Street, Wells. *G3OTK.*

Weston-super-Mare (WsM ARS).—First Friday in each month, 7.30 p.m., 5 April. The club has moved to a new headquarters at the Westhaven School, Ellesmere Road, Uphill, Weston-super-Mare. The February meeting was held there for the first time, local Amateurs met and discussed the future plans which include the setting up of a permanent club station; many facilities are available on these premises. Films closed the meeting with the presentation of a new film made by Marconi International Marine Co. " The Merchant Navy Radio Officer." The Weston Club will be partaking in the celebrations this year of the 50th Anniversary of the RAF when the local RAF Radio School, Locking, near Weston-super-Mare will have an open day on 6 July. *G3GNS.*

Yeovil (YARC).—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil. The club is running a series of technical lectures for the RAE by G3ARD over the next few months. *G3NOF.*

Yeovil Summerleaze Park ARC.—Tuesdays at 4 p.m. and Fridays at 1 p.m. *G3SEL.*

REGION 10

Barry College of Further Education Radio Society.—Thursday evenings, 7 p.m., College of Further Education Colcot Road Barry, Glam. Facilities are available for constructional work. The club is organizing a Top Band contest for Welsh stations on Sunday, 10 March, of four hours' duration; details from Secretary, D. H. Adams, *GW3VBP.*

Blackwood (ARC).—Fridays, 7.30 p.m., lectures and practical programmes with section devoted to RAE exam. Blanche Cottage, off High Street, Blackwood, Mon.

Cardiff (RSGB Group).—11 March (Film Show), 7.30 p.m., TA Centre, Park Street, Cardiff.

University College (ARS).—This Society is now well established and will be active on the air in the near future. All enquiries to the Secretary, Students' Union, Dumfries Place, Cardiff.

Llanelli Boys' Grammar School (ARS).—Friday, 8 March (AGM), 4 p.m., Boys' Grammar School, Llanelli, Carms. Society meetings are held at the School every Friday at 3.30 p.m., to which all radio enthusiasts are invited.

Pembroke (ARC).—Friday, 29 March (Film Show), 7.30 p.m., Defensible Barracks, Pembroke Dock.

Pontypool (ARC).—Tuesdays, 7 p.m., Educational Settlement, Rockhill Road, Pontypool, Mon.

Port Talbot ARC.—2 April (Annual Social Evening); details from Secretary, J. E. Williams, GW3SSK.

Rhondda RS.—The clubroom is open for practical and instructional activities on Monday, 18 March. Secretary, Cyril Parry, GW3PHH, 34 Cae'r Gwerlas, Tonyrefail, Glam.

REGION 11

Bangor (UCNWARS).—8 March (Presidential Address by A. R. Owens of the Department of Electronic Engineering), 5.30 p.m., Small Lecture Theatre of the Department of Physics.

Llandudno (CVARC).—21 March (Junk Sale), 7.30 p.m., Parade Hotel, Church Walks.

REGION 13

Edinburgh (LRS).—14 March (Quiz, with prizes), 28 March (" Pinhole Detection," by J. Leitch of Messrs Bruce Peebles), 7.30 p.m., YMCA, 14 South St Andrew Street, Edinburgh 2.

REGION 14

Ayrshire (AARG).—6 March (" Aerials," by GM3FMB/GM3LAN), 20 March (NFD), 7.30 p.m., Peter Boyle Bowling Club, Craigie Road, Ayr.

Auchenharvie (A & DARS).—5, 7, 12, 14, 19, 21, 26, 28 March, 7.30 p.m., Auchenharvie Community Centre, Stevenston.

Glasgow University (GURC).—8 March, 7.30 p.m., Engineering North Building, University of Glasgow.

Greenock (G & DARC).—8, 22 March, 7.30 p.m., Art's Guild, Campbell Street, Greenock.

Mid-Lanark RSGB Group.—15 March (" V.H.F. Transmitters "), 7.30 p.m., YMCA, Brandon Street, Motherwell.

REGION 15

Belfast and District RSGB Group.—Third Wednesday in the month, 8 p.m., War Memorial Building, Waring Street, Belfast.

REGION 16

Chelmsford (CARS).—Tuesday, 2 April (" Frequency Plan and Allocation," by G. J. McDonald of Marconi Marine Co.), 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

Norwich (NARC).—Mondays, 11 March (Informal), 18 March (Team Quiz), 25 March (Informal), 1 April (" Competition Quiz," by G3IOR), 7.30 p.m., Old Lakenham Hall, Mansfield Lane, Norwich. During the course of the AGM, held on 8 January, M. J. Cooke was elected Secretary. Those wishing to contact him should write to 76 Falcon Road, West Sprowston, Norwich, NOR 73R.

REGION 17

Basingstoke (BARC).—Third Saturday in the month, 16 March (Junk Sale), 7 p.m., Chineham House, Reading Road, Basingstoke.

Chippenham (C & DARC).—Tuesdays, 26 March (Junk Sale), 30 April (AGM), 7.30 p.m., Chippenham High School for Boys, Hardenhuish Lane, Chippenham. Future events will include an Amateur Television demonstration and D/F Hunts. *G3PQG.*

Farnborough (DRS).—Second and fourth Tuesdays of the month, 12 March (Talk by RSGB President, John Graham, G3TR), 26 March (Ragchew), 7.30 p.m., 310 Farnborough Road, Farnborough, Hants.

Harwell AERE (ARC).—Third Tuesday in the month, 7.30 p.m., Social Club, AERE Harwell.

Maidenhead (MDARC).—First Monday in the month (Formal). Third Tuesday in the month (Informal), 7.30 p.m., Victory Hall, Con Green, Maidenhead.

Portsmouth (P & DRS).—Wednesday, 7.30 p.m., Room 5, Twyford Avenue Community Centre, Portsmouth.

Reading ARC.—12 March (" Use of Unusual Tools "), 26 March (NFD Preliminary Discussion), 8 p.m., St Paul's Hall, Whitley Wood.

Southampton (RSGB Group).—Second Saturday in the month, 7 p.m., Engineering Lecture Theatre, Lanchester Building, The University, Southampton.

University (ARC).—Thursdays, 9 p.m., Union Bar. It seems that a number of errors crept in to our December report on this club. To keep the record straight, it has not yet moved into the new shack and secondly although money has been allocated for equipment, the club are still shopping around. Until the move is completed operating will be confined to contests, so look out for club call G3KMI.

Swindon (S & DARC).—Alternate Wednesdays, 13 March, 7.30 p.m., Penhill Junior School, Swindon.

MEMBERS' ADS

These advertisements are published free of charge for the benefit of the Society's Members. The number of words is limited to 30 (not including the address). It is essential that we receive the advertisement at RSGB Headquarters by the first of the month for the following issue, typed or written on a *standard post card* and *posted in an envelope* with your last *Radio Communication* wrapper. The address on the wrapper must, of course, agree with that in the advertisement. We cannot accept any responsibility for errors.

No trade announcements can be included here, but these can be submitted in the usual way for Classified Advertisements.

FOR SALE

Swan 350 with p.s.u., Shure mic., headphones. Almost unused, in mint condition. £220 o.n.o. Phone 01-736 5395 evenings. John Tringham, 34 Setterington Road, London, SW6.

4m XTALS, 8790 kHz, 10XJ, 4s. each. A. J. W. Adkins, G3MVU, 583 Rayleigh Road, Eastwood, Leigh on Sea, Essex.

HRO 5T RX, a.c., 6V d.c. p.s.u.s, six g.c. coils, good cond. First £24 secures, or Exchange 70cm gear w.h.y. Will deliver 25 miles. Also brand new XTALS. S.a.e. for list. R. M. Clarke, G8AYD, " Hillside " Quickedge Road, Mossley, Ashton under Lyne, Lancs.

Superb Heathkit SB300, immaculate cond., offered in exchange for equivalent general coverage RX e.g. AR-8516L, Eddystone 940 e.t.c. Mint condition essential and must be in A1 electrical condition. R. Hough, 225 Brown's Lane, Allesley, Coventry, Warks., CV5 9EF.

AR88D in wooden console cabinet working, £25, buyer collects or will deliver approx. 10 miles. Also Codar RQ10X, Q multiplier, self powered, £5. Codar pre-selector 70s. P. W. Willcocks, G8AIE, 27 Manor Road, Barnet, Herts. 01-449 6153.

RA1 RX in good working order with XTAL cal and matching l.s. £30 o.n.o. CR100 needs attention £7 o.n.o. P. Cleall, G8AFN, 23 Langbay Court, Walsgrave Coventry, CV2 2AZ.

AVO valve voltmeter £10 o.n.o. Parmeko xfmr, 300-0-300V, 125 mA, 6·3V CT 4A, 6·3V A1, weight 6 lb. for Mullard Amp. New £3 o.n.o. 12s. 6d. plus carriage. H. H. Seymour, 25 Ryde Building, Webb Street, London, SE1.

KW Viceroy Mk 1 mods to Mk 2 with p.s.u. working perfectly all bands, vox and c.w. break in. 10% higher output than KW 2000A. Speech quality excellent. Guaranteed for two months, £60. C. V. Taft, 239 Hagley Road, Birmingham 16. Edgbaston 1825.

Commercial new cond. 80-1000V 100 mA constant current voltage stabilized p.s.u. variable trip. Variable 500V 500mA stabilized supply, Trip, low ripple. Wanted h.f. RX QRO 2 and 4m transceiver, Vertical aerial. J. J. Forbes, 22 Portnalls Rise, Coulsdon, Surrey. CR3 3DA.

Minimitter 160/80m Mobile Whip, £5. 600V p.s.u. 30s. 234A p.s.u., new, £2. HRO dismantled for re-build good cond., £4. 52 set a.c. p.s.u., new 50s. Motorola 145·15 MHz walkie/talkie and manual £14. E. Haycock, G3VKC, " Two Four," The Comyns, Bushey Heath, Herts. 01-950 3387.

RA1 RX, £30. Mohican, £20. Wanted, 12-12·16 MHz XTALs and outer case for BC342. C. G. James, G3VVB, 63 Halkingcroft, Langley, Slough, Bucks. Slough 28014.

XTALs, 35 MHz third overtone for 4m, 28 MHz third overtone for 10m and many others. S.a.e. please for lists. 144 MHz TX, 12W A3, no p.s.u. A. H. Webb, 69 Lalleford Road, Luton, Beds.

FREE RSGB membership application forms. Enrol a new member this year and help your Society so that it can help you. Forms from RSGB, 28 Little Russell Street, London, WC1.

FT241 XTALs, ch 53, 337, 350 (2), 351, 7s. 6d. each. J. A. Lush, 55 Edgcumbe Road, St Austell, Cornwall.

BC342N, improved, two speed a.g.c. " S " meter, output stage. Home brew p.s.u. with speaker for above. Ideal for v.h.f. tunable i.f. s.a.e. for more details, £12. P. Nickalls, G8AQA. The Rectory, Nailsea, Nr. Bristol, Somerset.

Cowl Gill motor, director indicator 25ft Alloy pole, £7. LM10 with partly calibrated book £7. Wanted, National 1-10 coils and loan or purchase of circuit. J. G. Haggart, G3JQL, 22 Alnwick Road, Newton Hall, Durham. 61116.

BC221, internal p.s.u. £12. Withers TW2 TX, £17. Withers 2m Converter, 4-6 MHz i.f. £8, both as new. BC348, £10 all o.n.o. Collect if possible. P. D. Lucas, G3JDN, 14 Rushetts Road, Woodhatch, Reigate, Surrey.

KW Vespa with a.c. p.s.u. and ACOS XTAL mic (double insert type with PTT switch). Thoroughly overhauled and aligned with new e.h.t. capacitors. Includes manual, £75. D. J. Cutter, G3UNA, 124 Briercliffe Road, Scarborough, Yorks.

1131 TX mod 10m and XTAL mic, spares and H/B. £5 o.n.o. ET4336 TX with RCA speech amp., spare mod. strip, Wilcox Gay v.f.o. H/B etc, £10 o.n.o. Buyers collect. L. Miles, GW3IMQ, 76 Vicarage Road, Morriston, Swansea.

Components, including XTALs 3s. 6d. each, valves etc. s.a.e. for list. Wanted, secondhand and/or partially worked 'scope tube. type GEC 1374K or 1325F. R. P. Norris, 19 Bluebridge Avenue, Brookmans Park, Hatfield, Herts.

Uniselector eight bank, 25 way Ex new equipment 27s. 6d. Block paper capacitors, 4 uF 600V 7s., 8 uF 800V, 12 uF 600V 12s. Wanted Geloso 4/64 v.f.o. W. H. Fletcher, G3NXT, Holmdale, Martin, Lincoln.

HRO bandspread coils, 14-30, 7-17, 3·5-7·3 MHz. G.c. 0·9-2·05, 0·48-0 0·96. MHz all 25s. Marconi AD94 aircraft RX, current type, min. valves, a.c. p.s.u. 35mm film scale. S.a.e. for details, £20. S. A. G. Cook, G5XB, Little Orchard Gallows Tree Common, Reading, Berks. Kidmore End 2195.

Pots. 5, 100, 200, 250, 500 ohm., 1k, 2k, 2·5k, 5k, 7k, 10k, 20k, 25k, 50k,. 100k ohm, 2s. each or six for 10s, all post free. Many servo pots also M. Mann, G8ABR, Flat 71, Queens Road, Tewkesbury, Glos.

Heathkit RG-1 g.c. RX. Used about 4 hrs, £35. Will deliver. C. T. Hanley, 81 New Road, Chilworth, Guildford, Surrey.

Star 550 amateur bands RX, 160-10m, double superhet £45. P. A. Bubb, 58 Greenacres, Upper Weston, Bath, Somerset.

For Sale/Exchange. VCR type 6in. c.r.t.s., RX R208, 10-60 MHz, popular electronics, 1963-68. Wanted Video equipment. J. Kasser, 21 Kings Close, London, NW4. 01-203 2822.

High Gain Tri-Bander TH3 and CDR rotator complete cost £72, bargain at £40 delivered. Takes kW plus and elements do not sag. Col. Baynham, School of Infantry, Hythe, Kent. 66567.

Hammobile 2m TX/RX with a.c. p.s.u. and 12V transistor p.s.u. £15 or would exchange for a. g.c. RX. J. Cronk, G3MEO, 6 Anvil Avenue, Littlington, Nr. Royston, Herts.

19 set with p.s.u. and connectors HRO with p.s.u. slight repair required the lot £10. H. F. V. Webb, 15 Blackmore Road, Tiverton, Devon.

Quantity of 2N697 Radio Control transistors 4s. each. Three rolls of ½ in. super coax, approx. 130 ft. per roll, 25s. each. XTALs B7G e.t.c. 5 MHz-20 MHz. Lists. Pre-War valves, side contact e.t.c. R. C. Shuck, Tregarron, Lowe Lane, Wolverley, Kidderminster, Worcs. Wolverley 570.

Codar CR45 RX complete with all coils, cabinet, factory built, £7.

Nine transistor Walkie Talkies, £6. Callers please. J. Harrison, Sandy Brow Farm, Kirkby, Nr Liverpool.

Two Ex AM, TX/RX's TR1520, 115-146 MHz, TR1920, 100-125 MHz, XTAL transceive (Adaptable Clapp), 24V, some plugs, control boxes, set spare chassis each manual, £8 the lot. J. Cassoh, G2ACT, 14 Station Road, Upper Poppleton, York.

Telefunken Magnetophon tape recorder with dynamic mic and audio lead all in perfect condition—new 1964—£30. 12V. d.c. converter by Valradio giving 230V 50Hz, 80W. A. Coles, G3SAQ, 6 Eden Park, Lancaster. Lancaster 2625.

BC433G RX with tuner panel and drive cable, £5. BC RA1B RX, £5. P.s.u. 234A, 50s., Cossor 339 'scope, £10. TX53 v.f.o. will drive two 813s, £5, all in good condition. S. D. Ward, G3HBM, 7 Regent Street, St Burnham on Sea.

160-80-40m a.m./c.w. 30W home brew TX separate p.s.u. in matching cabinets, £15 or exchange AT5. Deliver/collect. Wanted, SB10U adaptor manual. K. Muller, G3VYP, 423 Chester Road, Castle Bromwich, Birmingham. 021 747 2358.

Truvox R92 Mono Tape Recorder, good condition, semi-professional, high quality machine, mixing and superimposition facilities, complete with dynamic mic will deliver 50 miles, £30. P. E. Lonsdale, 4 Woodland Mansions, Highland Road, Parstone, Poole, Dorset.

160m a.m./c.w. 10W TX built in a.c. p.s.u., circuit RSGB H/B, will easy Mod to cover 80m. Meters and Eddystone dial, solid construction, excellent performer, £8. Collected. D. Coles, G3NYD, 113 Berrow Road, Burnham on Sea, Somerset.

DX100U modified for use with SB10 unit and SB10, connecting cables, manuals. £60 carriage paid. C. P. Nicholes, GI3NEX, St Patrick's, Robar Mhuire, Crossgar, Belfast, N. Ireland.

KW Viceroy, 80-10m, recently overhauled l.p. filter, built in aerial relay, D104, ptt, extra ½ lattice filter, silicon p.s.u. £80. Brand new HRO dial, £1, C. C. Olley, G3AIZ, 157 Wanstead Park Road, Ilford, Essex.

New XTALs, not Ex Govt., 15s. each, any six £4. 7110, 7135, 7640, 7678, 7709, 7864, 8778, 8822, 9396, 9028, 9378, 9693, 9840, 10465, 10509, 10140, 10662, 10809kHz. E. H. Page, G3HKV, 16 Abbey Street, Crewkerne, Somerset.

British National Radio School RAE Correspondence Course, complete, as new and unsoiled. Study Lessons, worked examples. Questions and Answers, Licence details. £4 12s. 6d. plus 7s. 6d. postage. H. E. Nicholls, G8AQZ, 1 Alford Road, Brislington, Bristol 4. Bristol 77348.

Rare variable capacitor five gang, 16-240pF, four gang 10-370 pF, 3BP1 with mumetal screen, KW l.p.f. ch 5 75 ohm, Ex Gov. direction indicator with TX POTR. Wanted, Heathkit dummy load. L. M. Airey, G3GEJ, 14 Brandles Road, Letchworth, Herts.

Complete BCC fixed station plus mobile, all XTAL controlled 70 MHz, complete with mic p.s.u. cables e.t.c., £7 the lot plus carriage. F. J. Dickenson, G3HVB, 103 Foxcroft Drive, Fox Farm, Wimborne, Dorset.

Free! must clear stock of components. Send only 5s. towards post and packing for giant assortment of silver mica capacitors and 5 per cent resistors. All new, not Ex-Govt. equipment. B. E. Gee, G3LDG, Magnolia House, Ravensden, Bedford.

Trio 9R59 communications RX, as new condition, £25 o.n.o. C. G. Mundy, 119 Constance Crescent, Hayes, Bromley, Kent.

Selling all. TX's, 150W 80-10m, c.w. £20. 10W 160m a.m./c.w. £7 both with p.s.u. QRO aerial change over relay with p.s.u. £1. H.f. pre-amp £3, El Bugs. S.a.e. for other items. R. W. L. Limebear, G3RWL, 190 Winchmore Hill Road, London, N21.

Codar CR45 RX, with three coils, 160-10m perfect condition, £7 plus postage. J. Rudge, Fields End, Gastrells, Stroud, Glos.

KW Vanguard 160-10m, £32. Geloso G209 RX, £35 or £65 the pair or o.n.o. Home brew TX 25W, 80-20m, £8. Telefunken stereo amplifier £5 collect or carriage extra. J. L. Marshall, G3RKH, 17 Sadler Street, Wells, Somerset.

EC10 plus a.c. p.s.u. excellent condition in original packing, one year old, must go owing te emigration, £40. J. G. Farnell, 23 Ferndale, Waterlooville, Hants.

1155 RX built in p.s.u. good condition. £6. Wanted Panda a.t.u. Z match coupler, class D wavemeter, carriage paid. H. Griffiths, G2DFH, 4 Westbourne Terrace, Saltash, Cornwall.

RSGB BULLETIN 1963, '64 '65 complete. Geloso 4/103 2m v.f.o. with dial but less valves and XTAL. Mains xfmr for DX40U. Offers to P. F. Scottorn, 80 West Cliff Road, Bournemouth.

Two 620-0-620V Parmeko p.s.u.s. £2 each. UM3 £2. Tiger Z Match a.t.u. £3. S.w.r. meter £1. KW l.p. filter, £1, other gear. Buyer collects Dr L. C. Bousfield, Church Gate, Billingshurst, Sussex. 2521.

KW2000 and a.c. p.s.u. with spare valves. Vertical aerial, 32 ft. plus whip, canvas bag, e.t.c. £3 carriage paid. H. Tonks, 11 St Edwards Road, Bournbrook, Birmingham 29, Warks.

Offers for, G2DAF RX Mk III. 160m a.m./c.w. TX and p.s.u., AN/USM 38 oscilloscope, B44 chassis and H/B, 8A Variac, xfmr's, mic's, keys, valves, s.a.e. please. Wanted SP 600, 2/4 transverter for KW-2000. J. K. Lee-Rand, 9 Oakway, Feltham, Middlesex.

BC221 freq meter, new cond., £30. Class D No. 1 Mk 2 wavemeter with p.s.u., £3. Signal Generator 1-130-A, 100-150 MHz, £5. Pye Reporter, 2m, 12V or mains, £8. Wanted, transcription record deck-Stereo in good condition. R. Morton, 61 Towthorpe Road, Haxby, Yorks. OYO4 68856.

PCR3 modified as in June 1965 *Practical Wireless*, not working, but complete with 230V p.s.u. and valves and components, offers invited. C. J. Howard, 48 College Road, Ardingly, Sussex.

Electroniques Ham Band front end, £8. Japanese micro-switch paddle, 30s. QY4-250 (new) plus base, offers. 888A RX, offers? M. M. Bibby, G3NJY, "Halla," Shop Lane, Leckhampstead, Newbury, Berks.

Variac 2A output 0-230V, 240V input, good condition, £4 10s. o.n.o. Prefer buyer collects. B. V. Court, 3 Eden Road, High Halstow, Nr. Rochester, Kent.

No 36 set, 20, 15 and 10m. Mint condition, H/B, circuits, mic, connectors, p.s.u. Link coupled output. Absolutely complete and in original heavy oak transit cases, £12 o.n.o. M. R. Kidman, G3SDK, 232 Marsh Road, Leagrave, Luton, Beds.

XTALs, 12 and 16 MHz, fundamentals, most 2m areas, 12s. 6d. each. Also quantity on 14 MHz, 10s. each. R. C. Scott, G3DXI, 41 Sweet Briar, Welwyn Garden City, Herts.

KW77 RX and matching speaker, perfect, recent KW overhaul, £75 o.n.o. Advance constant voltage xfmr CV1000 input 190-260V 50 Hz. Output 240V 500 VA and 0-60-70V 7A, £10. M. A. Trundle, G3TCG, 16 Stephens Crescent, Horndon on the Hill, Essex.

Valves, two off 6DQ5, 15s., also two 6AG5, two VR150/30, one off 807, 5U4G, 5Z4GT, 6V6GT/G, £1 the lot. C. R. Burchell, G3NKQ, Officers' Mess, RAF Fylingdales, Pickering, Yorks.

HRO 21 MHz b/s coil, homebrew but very hot, surplus to requirements, £2. M. Darkin, 4 Ash Drive, Catshill, Bromsgrove, Worcs.

Labgear Topbander TX. Three new valves recently. Perfect order, H/B and spares, space wanted, £12 o.n.o. C. R. Keeble, G3TUU, 7 Woburn Avenue, Kirby Cross, Frinton on Sea, Essex.

Gemini Astronauts use this Omega "Tachymeter" stopwatch. Four dials sweep second hand. Luminous, Exchange for useful c.w. equipment or w.h.y. G. A. Partridge, G3CED, 17 Ethel Road, Broadcast, Kent. Thanet 62839.

R220 4m RX, good working condition, minus XTAL. R107. good electrical condition, working demonstration, £5, buyer collects. R. Adaur, 16 Demesne Park, Holywood, Co. Down, N. Ireland. 3372.

QQV02/6 20s., QQV06/40 25s., QV04/7 10s., 6146 (USA) 28s., 832 15s., 2C39A 30s., TT11 5s. Also EF80, 6SN7, 12AT7, PCF80 ECL80, 10F1, 10s. any six, your selection, please add postage. G. A. Jeapes, G2XV, 165 Cambridge Road, Great Shelford, Cambs.

Hammarland HQ120X RX £20. Labgear LG300 TX £20, both in excellent condition, would deliver reasonable distance. Admiralty W7460 vibrator pack 12V, 300V 100mA 30s. BC312 dynamotor 12V

235V 90mA, 30s. F. H. Watts, G5BM, 60 Maidenhall, Highham, Gloucester. Gloucester 25415.

V.H.F. TX, 94-104 MHz pocket size, range up to 200 yards, mic and telephone pick up, £10 o.n.o. Will exchange for good field telephones. J. E. Waters, 15a Midmoor Road, SW12.

AR88LF, mint, with S meter, £25. 15W mobile TX 160-80m professionally built, with 60W d.c. inverter, control box and transistor converter for car radio £18 10s. M. S. Beer, G3OGZ, Braizedale Close, Leadhall Lane, Harrogate Yorks.

22 set including headphones and mic, spare valve, needs p.s.u. offers? or exchange for 12V mobile p.s.u. Other items e.g. 19 set chassis, valves, e.t.c. S.a.e. M. L. Kinnersly Taylor, G3WTA, Seaton Ryde, Tranwell Woods, Nr Morpeth, Northumberland.

Clearing valves, 811, £1, 4X150A, 17s. 6d., 2C39A 17s. 6d., U19 3s. 6d., 12AT7, 12AU7 1s. 6d., 6BA6 1s. 6d., 6AG5, 6AQ5 2s. 6d., EF95, 1s. 6d., 6J4 1s. 6d., 6AK5 1s. 6d., 807 2s., A1714 2s. Quantities available. A. Papworth, G3WUW, 25 Station Road, Over, Cambs. Swavesey 339.

Panda PR120V TX, 150W, late model with Woden xfrms, £30. RTTY Creed 7B, 50,000 series, a.c. or d.c. motor, silence cover £22 10s. Printer 8B, 24V d.c., £8. Terminal unit, W2JAV, £4. Offers considered. J. M. Copson, G3TUL, 51 Ellers Drive, Bessacarr, Doncaster. 55357.

Exchange Eddystone EC10, 4m Reporter tunable RX and Cathodeon XTAL, HRO 15m b/s coil for HW12, good linear. Codar mobile rig, Ham Band RX or w.h.y. J. W. Woods, G3OQC, 23 AMQ Langtoft, Market Deeping, Peterborough, Northants.

Unused xfmrs, 450-400-0-400-450V., 0-4-5V. 3A., two off 6·3V 4A., all 0-200-220-240V primary. Very well known make, space needed. Offers to D. A. Ramsey, G3UAA, 28 Loxley Road, Glenfield, Leicester. LE3 8PB.

South Coast QTH for sale. Three bedroom detached house, built 1953. Garden 175 ft. long and neighbours used to all kinds of aerials £5000. P. Dutfield, 20 Stokes Avenue, Poole, Dorset.

1000 kHz XTAL on HC6U mount in 6/12V oven, £3. Also a.c. input stabilized p.s.u. for EC10 RX, £5. W. J. Mainwaring, 33 Champion Wat, Church Crookham, Fleet, Hants.

AR88, £30 good condition, 43 ft. steel lattice tower, £40. Mullard 5-10 amplifier, £5. Wanted, s.s.b. TX, G2DAF or similar home brew considered. K. Schofield, G3KYT, 37 Collins Drive, Eastcote, Ruislip, Middx.

Galaxy V Mk II transceiver—remote v.f.o.— Vosc- Calibrator and 230V a.c. p.s.u./l.s. console. Offers? Consider cheaper transceiver, i.e. FT100 as part payment. Separately, unused 117V a.c. p.s.u. would also suit Swan, £20. C. Corson, 37 Windermere Road, Ealing, W5. 01-579 1739.

Hickock 202B valve voltmeter with stabilized p.s.u. 0·5, 2·5, 10, 50, 250, 1000V a.c./d.c. and six resistance ranges. 1945 vintage and 110V input but perfectly operational. £2 10s. payable to RSGB HQ Fund. J. Kirby, G3JYG, 72 Farleys Lane, Huchnall, NG15 6DN.

Bliley 10 MHz XTAL, B9A envelope, 15s. Six band KW trap dipole, 90 ft. co-ax, used once during NFD, £5. Would consider exchange for De Luxe Joystick and tuner. E. H. Ross, GM3LWS, 24 Ettrick Way, Glenrothes, Fife, Scotland.

Marconi valve voltmeter, alb model, £8 10s. Solar resistance/capacity bridge and electrolytic rejuvenator £8 10s. 4X150's 17s. 6d. Avantic Beamecho stereo pre amp. P/STEP/21, £4 10s. TF144G signal generator, £19 10s. All plus carriage. Byrne, G3KPO, Jersey House, Eye, Peterborough. Eye 351.

Back copies of *CQ*, *QST* and *SWM* some back to 1935 but largely 1946-60. Enquiries and offers to S. R. Kharbanda, 39 London Road, Harston, Cambs.

Bridge megger evershed ignols, leather case £10. Triplet 1632 Sig., Gen. as new in transit case, 250V a.c. 1000 kHz XTAL output meter, output meter, 100 kHz to 120 MHz, £20—prefer buyer collects, £20. S. D. Ward, G3HBM, 7 Regent Street, Burnham on Sea, Somerset.

Hallicrafters HT37, s.s.b./c.w./a.m. TX, 70-100 p.e.p. output on 80-10m, in excellent condition, £80. M. G. Green, G3PBQ, 63 Sheffield Road, Sutton Coldfield, Warks.

Pye Reporter 4m, mobile TX/RX with handset. Less TX XTAL, RX tunable. Net control and improved mod. With circuit diagram but needs alignment. £6 carriage paid. J. Farrar, G3UCQ, " Elm Cottage," Ventonleague, Hayle, Cornwall.

Over 100 *RSGB Bulletins* and *SWM* given free to caller. D. C. Griffiths, G3RDG, Flat 2, 147 Sanderstead Road, South Croydon, Surrey.

Trio 9R59, £28. Lafayette HA63, £20. Both mint. AVO wide range sig. gen. £12. R209, 6V, £10. Carriage extra on all items. R. L. Bastin, G3LHA, 112 Attoxhall Road, Coventry, Warks. Cov. 87679.

Parts for 1200V p.s.u. less rectifiers, £3. Top band c.w. TX self contained, £4. Buyers collect. Labgear WBC unit, 522 Mod. xfmr, 807, 832A, VR150, 6AC7, 6SC7, 6CH6, 6V6, offers. R. Edginton, 8 Springfield, Ashby Gardens, Kegworth, Derby.

BC348 mod, Beacon band converted to 30 MHz internal a.c. p.s.u. " S " meter, £15. Marconi oscilloscope TF816B, £8. Pair power Selsyns, 240V, £2. R. J. Rogers, G3LIA, 93 Bradshaws, Hatfield, Herts. Hat. 64149.

New Japanese filter, 450 kHz for sideband use. List price £10. Selling £8. Heavy smoothing choke 500 mA, XTAL mic, offers. A Parker, G3KH, Station Road, Cropston, Leicester. LE7 7HH.

BC221-T freq. meter with internal a.c. p.s.u., £20 o.n.o. Will deliver within 50 miles, otherwise make own collection arrangements. J. D. Heys, G3BDG, 418 The Ridge, St Leonards on Sea, Sussex.

LG50, CR100 and GEC 100 kHz XTAL calibrator. All good cond. £40 the lot. Callers or deliver up to 25 miles. D. C. Cave, G2FMJ, 27 Oakmere Lane, Potters Bar, Herts.

RAEN. For emergencies. Lister 1½ kW air cooled Diesel electric generator 240V a.c. New cylinder liner and piston. Engine weight 260 lb. £50. E. W. Shackle, GW3MIS, Broad Haven, Haverfordwest, Pembs.

Eddystone EA12 £130 o.n.o. Pye PTC115 TX/RX, 170 MHz, suitable 2m station QQV04-20 p.a. a.c. home brew p.s.u. built in £5. D. T. Emerson, 50 Hurst Road, Hassocks, Sussex. Hassocks 3857.

Heathkit resistance and capacitance bridge type C-3U complete with instruction manual and spare xfmr and indicator. £7 10s. o.n.o. D. R. Bowman, G3LUB, 32 Lynton Road, Chesham, Bucks.

Eddystone EA12 nearly new, £130 for quick sale. W. F. Morris, G4HU, 34 Birch Avenue, Romily, Cheshire. Woo 3858.

R206 RX, p.s.u., adaptor, nine bands. 50 kHz-30 MHz also Minimitter converter, excellent condition see write up in December *Practical Wireless*. Nothing gives this coverage better, still cheap at £30. F. F. Whitehead, 91 Blackpool Road, Ansdell, Lytham St Annes. Lytham 7680.

Unused Electroniques QP166 front end for sale, £8 inc. postage, no offers. Slightly mod chassis. E. Hopper, G3ULA, 57 Mill Road, Fareham, Hants.

Acos GP20 pick up arm, with specialist diamand mono stylus, on GP93/3 mono head. Little used, £1. Large 1 MHz XTAL, 7s. 6d. A. R. Williams, GM3KSU, 35 Howard Place, Edinburgh 3.

WANTED

Circuit and H/B for the CR100 RX for purchase or loan. C. Williams, 108 Bromley Lane, Kingswinford, Brierley Hill, Staffs.

FT243, XTAL 5873 kHz and 0·5A r.f. meter. To purchase or exchange XTALs (list available), and 3 and 4A, r.f. meters for exchange. A. G. Thorburn, G3WBT, 27 Banklands, Workington, Cumberland.

19 Set TX/RX with p.s.u. in g.w.c. D. B. Mc Garva, 4a Argyll Square, Oban, Argyll.

Exchange Gledhill Brooks (pendulum) time recorder 45 in. × 15 in. × 12 in. time card stamping clock, for Pilot Pal, BEME or similar portable/mobile D/F radio.

Circuit diagram and H/B for CR300/1 RX. Admiralty Pattern M500B. Also 1953 RSGB *Bulletins* which covered the Elizabethan TX. Information loan would be returned promptly or I would be prepared to purchase. J. P. Moore, G3IKR, 16 Silverbirch Road, Solihull, Warks.

Heathkit DX-100U TX and Mohican RX reasonably priced and in good cond. F. Parsons, G3MIX, 96 Blackamoor Lane, Maidenhead, Berks. 26723.

H/B and/or circuit for AR88LF. J. B. Procter, Crag House, Snowdon, Otley, Yorks.

New members. Enrol a new member this year and help your Society so that it can help YOU. Application forms are available from RSGB, 28 Little Russell Street, London, WC1.

BC221 required. Must be in good condition with original charts. Please send full details and price to F. J. Crisp, Carnmenellis House, Carnmenellis, Redruth, Cornwall.

Has anyone a discarded h.f. bands TX for club struggling to get started. F. H. Cooper, G2QT, Ashford ARC, Woodlees, Sellindge, Kent.

GEC Miniscope mains xfmr or will purchase otherwise defective unit for spares. J. F. Breach, 1 Massey Park, Belfast 4.

30 ft. signal aerial plus 14 ft. whip (as on page 134 of March '67 Bull), Good condition unnecessary but must be complete with guys etc. and be serviceable. Will pay 30s. I. Hazelton, 7 Dorset Road, Burnham on Crouch, Essex.

Old fashioned brass telegraph key in good cond. J. G. Evans, G3WET, 17 Heathfield Road, Four Oaks, Sutton Coldfield.

Advance D1/D signal generator in good cond. Have for disposal, BPL electrolytic capacity bridge as new in transit case. R. A. Coates, 5 Bridge Street, Whitby, Yorks.

Geloso v.f.o. 80-10m—cheap. Must have bandwidths and coils. Write stating model, cond., and price to C. L. K. Ledger, G3UBL, 1 Conholt Road, Andover, Hants. 2766.

Command RX, 28-30 MHz, Zone 2, 8 MHz XTAL s.c.d. p.s.u. for KW2000A or parts to build. R. Reynolds, G3IDW, Orchard Cottage, Hook, Swindon, Wilts.

RAE Course required. Must be recent issue. Full details please to O. W. A. Wade, 1 Lomond Crescent, Cyncoed, Cardiff.

BC221 freq meter in good working cond. with calibration charts for up to £15. Will collect from London or Leeds. M. A. Hall, 30 Montagu Crescent, Oakwood, Leeds 8, Yorks.

EC10 RX a.c. p.s.u.—good condition. P. K. Hamblett, G8AAL, 234 Shenstone Avenue, Norton, Stourbridge, Worcs. Stour 6846.

L.p. filter tunable for channel 1, 180W p.e.p. EC10, mobile TX or transceiver 12V positive earth, h.f. or l.f. 2m s.s.b. mobile TW Communicator 70 MHz. J. J. Smith, GI3AOB, " Strathleven," Toome Road, Ballymena, County Antrim, N. Ireland.

12V d.c. p.s.u. for KW2000 service manual for TR1986 to buy or loan. Y. I. Gracey, GI3WEM, Innsount, Inn Road, Dollongstown, Lurgan, Co Armagh, N. Ireland.

U.H.F. RX, freq., coverage 30-165 MHz a.m./c.w./f.m. s.s.b. complete with manual only commercial RX considered. Must be in mint condition. Cash waiting. L. A. Siberry, 49 Coity Road, Bridgend, Glam.

Calibration details for Class D wavemeter No.1 Mk II. All documents returned after photocopying and expenses refunded. P. F. Duvoisin, 16 Holt Drive, Wicham Bishops, Nr Witham, Essex.

Xfmr 550-0-550 250 mA with or without 350-0-350 200 mA. Potted choke, 10H 200 mA. Ceramic switch two bank two pole four way, break before make. C. Haddock, G3UZM, 26 Featherbed Lane, Exmouth, Devon.

Wilcox Gay v.f.o. unmodified, also G2DAF s.s.b. TX. Complete or otherwise. N. H. Brown, G3DRS, 9 Meadow Bank, Hollingsworth, Hyde, Cheshire.

Looking Ahead

19 May—Amateur Radio Convention, Belle Vue, Manchester.

Mobile Rallies

19 May—Northern Mobile Rally, Harewood Park, Nr Leeds.
16 June—Painton Mobile Rally, Bembridge Drive, Northampton.
30 June—11th Longleat Annual Mobile Rally, Longleat Park, Warks.
6-7 July—Cheltenham Festival Rally, Pittville Park Cheltenham.
7 July—South Shields Mobile Rally.
21 July—Cornish Mobile Rally, Pentire Head, Newquay, Cornwall.
25 August—Swindon Mobile Rally, Lydiard Park.
2 September—Peterborough Mobile Rally, River Bank, Peterborough.

XTAL FT243-6075 kHz, FT241 2624, 2626 MHz or similar. R. J. Constantine, 14 Holdsworth Terrace, Shaw Hill, Halifax, Yorks.

Wanted for historical purposes, correspondence with any soldier stationed at Fort Regent, Jersey before the war. Please contact R. Hankinson, 41 Maison Street, Louis, St Saviour, Jersey, C.I. All letters answered.

KW2000 in any condition required by Bristol ARC, offers to T. Boucher, G3OLB, 19 Church Road, Thornbury, Glos.

Valves Type 6W7G (8D4 or CV512). Same as 6J7G, but with 0·15A heater. R. D. Eldridge, " Kenvin Lodge," Abbess Roding, Nr Ongar, Essex.

Circuit for Admiralty Pattern e.h.t. p.s.u. A3441. J. Bell, G3DII, " Ashlawn," Ryland Road, Welton, Nr Lincoln.

Radiovision Commander communication RX—any condition. Also RME 69 RX plus DB20 pre selector any condition. A. Winter, 105 Donnithorne Avenue, Nuneaton, Warks.

Circuit for HRO jnr and any data for mods to HRO RX from RSGB Bulls etc. R. Waring, 23 Tallington Road, Marston Green, Birmingham 33.

AR88 front panel and Bendix RA1B circuit. G. R. Smith, G8AOJ, 121 Kemple Wick, Cirencester, Glos.

40m resonator for Newtronics Hustler mobile vertical and Multiband a.t.u. G. C. Badger, G3OHC, 23 Aulton Road, Four Oaks, Sutton Coldfield, Warks.

Ancient wireless XTAL or valve RX, old type valves and components and radio books and magazines from the 1920s for Radio Museum. R. G. Chamberlain, G3VYU, 40 Elmfield Road, Peterborough.

D.c. to d.c. converter core, Mullard ferroxcube type FX 1079 or equivalent, please send details with postage price added. C. Baker, 18 Collingtree, Stopsley, Luton, Beds.

Large reel enam. copper wire, 23 or 24 s.w.g. and 29 or 30 s.w.g. Prefer 3 or 5 lb. in weight. Price and weight to F. Pardy, 27 Roe Parc, St Asaph, Flints.

Circuit and manual for R209 also 19 set Mk II and 19 set for spares. A. Humphries, 14 Fosseway Crescent, Tredington, Nr Shipston on Stour, Warks.

Class D wavemeter for 240V a.c. XTAL must be OK. Fair price given. D. C. Pickering, 25 Penybont Road, Pencoed, Nr Bridgend, Glam. 444.

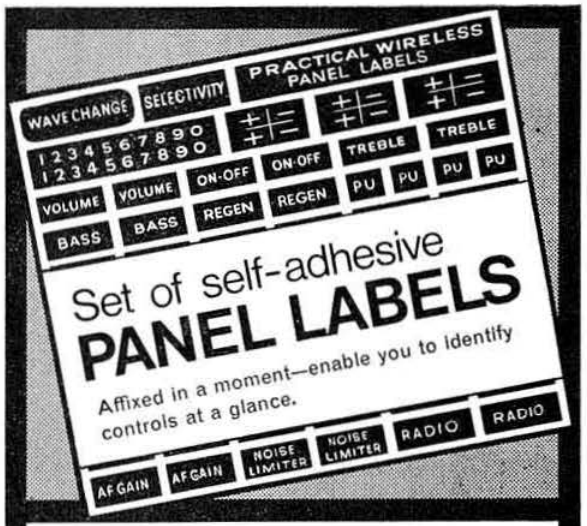
Audio output xfmr for AR88D, price to G. A. Farrall, G3MNT, 31 Springfield Road, Gatley, Cheadle, Cheshire.

G3WXT wishes to purchase manuals for Vanguard Mk II TX and HRO MX RX. Original preferred, but would take photostat copies if necessary. Your price paid. All letters answered H. C. Pryse, 36 Hart Road, Byfleet, Weybridge, Surrey.

Exchange Amateur Radio equipment (Valves, transistors, XTALs, etc.) for Aquaria gear. J. Brown, G3LPB, Marlborough Farm, Falmouth, Cornwall.

10X XTALS between 3500 and 3800 kHz and 10X between 7000 and 7050 kHz. Will pay carriage etc. Offers to R. J. Basford, 74 Walcote Drive, West Bridgford, Nottingham, N92 7GS.

Oscilloscope. Type Telequipment 551 or similar. A. D. Patterson, GI3KYP, 24 Cyprus Avenue, Belfast 5. Belfast 658333.



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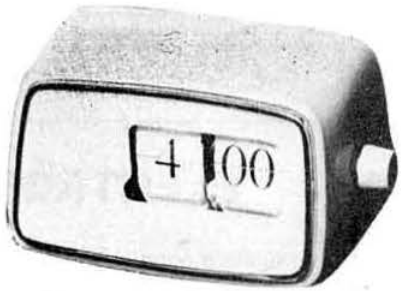

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TR10 9R59DE, few weeks old, £30. Up-dated Eddystone S640, £18 ono. Cossor 104 Mark 3 scope, £189 ono.—Phone: Gerrards Cross 85882.

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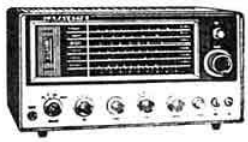

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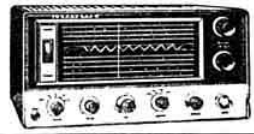

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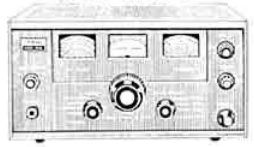

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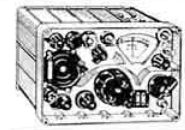

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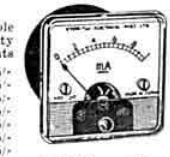

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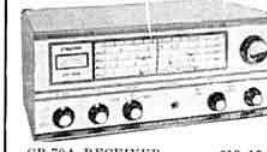

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