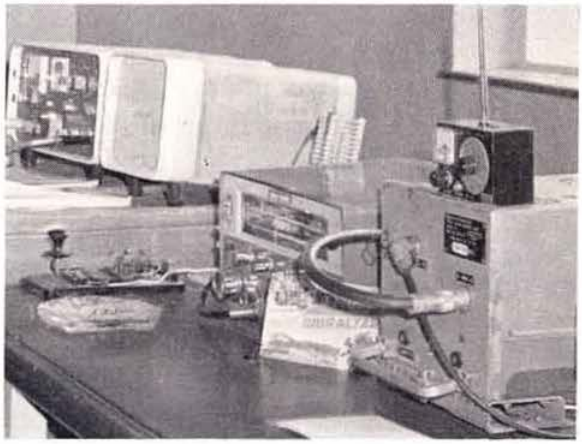
AUGUST 1968

Radio Communication

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

GC3OHH

ZB2VHF



PX1RI

G3NKL

TWO 4M FIRSTS—See page 489

incorporating RSGB BULLETIN

RADIO COMMUNICATION

ASSISTANT EDITOR
Trevor R. Preece, G3TRP

EDITORIAL ASSISTANT
David A. Evans, G3OUF

CONTRIBUTING EDITOR
Pat Hawker, G3VA

DRAUGHTSMAN
Derek E. Cole

ADVERTISING MANAGER
Mrs P. D. Harvey

EDITORIAL OFFICE
RSGB Headquarters
28 Little Russell Street,
London, WC1
01-405 7373
01-405 2444

ADVERTISING OFFICE
Sawell and Sons Ltd.,
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CLOSING DATES

SEPTEMBER
6 AUGUST

OCTOBER
6 SEPTEMBER

INDIVIDUAL COPIES 4/-.

FRONT COVER: TWO 4m FIRSTS.

On the evening of 9 June GC3OHH (Jersey, C.I.) worked ZB2VHF (Gibraltar). The sporadic *E* opening lasted a matter of minutes, but time enough for G3JVL (Hayling Island, Hants.) to inform G3OUF at GC3OHH on 70.26 MHz that an opening was " on ". The beam was immediately turned towards Gibraltar and ZB2VHF called on c.w. Ossie (ZB2VHF/ZB2AP) came straight back and 599 reports were exchanged both ways. On 23 June, G3NKL (Nr. Preston, Lancs.) worked PX1RI (Nr. Port d'Envalira, Andorra) on phone at 59 both ways (for full details of the PX expedition, see " Four Metres and down ").

AUGUST 1968
VOLUME 44 No. 8

NEW Heathkit Solid-State 2-meter AM Transceiver

• Frequency Range 143·2 to 148·2 MHz • Solid-state dual-conversion superheterodyne receiver • Pre-built, pre-aligned FET tuner • Spot function for finding transmit frequency on receiver dial • Hybrid transistor tube type transmitter design • 8 to 10 watts power output • 4 crystal sockets plus provision for external VFO • Built-in 120-240 VAC power supply • Optional DC mobile power supply (see below) • PTT operation, electronically switched • Front panel meter for signal strength and relative power output • Built-in automatic noise limiter and squelch • Lighted dial • Built-in speaker • Battery saver feature for low current drain during mobile monitoring • Low profile aluminium cabinet for easy mobile mounting • Gimbal mount included for mobile use • Ceramic PTT microphone included • 15 transistors, 20 diodes, 3 tubes, 2 circuit boards • Builds in about 20 hours.

The Heathkit HW-17 in detail. It's really a separate receiver and transmitter in one compact, versatile package (the only common circuitry are the power supply and the audio output/modulator). The solid-state dual conversion, superheterodyne receiver with a pre-built, pre-aligned FET tuner has a lighted dial with 100 kHz calibration, automatic noise limiter, squelch, and 1 μV sensitivity. Selectivity is 27 kHz at 6dB down. The front panel meter indicates received signal strength and relative power output. A 3-position switch on the front panel has a "Spot" position for finding the transmit frequency on the tuning dial, a Receive/Transmit position, and a Battery-Saver position.

A 3" × 5" speaker is built in.

Modulation is automatically limited to 100% or less. A front panel selector switch chooses any of four crystal frequencies or an external VFO (the Heathkit HG-10B VFO . . . is perfect for this job).

Front panel controls include Final Load, Final Tune, Crystal-VFO switch, Main Tuning, Squelch with ANL switch Battery Saver-Receive/Transmit-Spot switch; rear panel has S-meter Adjust, Headphone jack, Power socket, VFO power socket, VFO input, and Antenna connector (50-72 ohms, unbalanced).

HW-17 SPECIFICATIONS—RECEIVER: Frequency coverage: 143·2-148·2 MHz. **Dial calibration:** 100 kHz. **IF Frequencies:** Double conversion: 1st IF, 24·965 MHz; 2nd IF, 2 MHz. **Sensitivity:** 1 μV input for 10dB S/N + N. **Selectivity:** 27 kHz at 6dB down. **Input impedance:** 50-72 ohm, unbalanced. **Audio output:** 1 watt at less than 10% distortion. Headphone jack: **Low impedance,** accepts PL-55 type plug (standard 2-conductor $\frac{1}{4}$" sleeve). Transistor complement (2) 2N4416 RF Amplifier, 1st Mixer RF 502 HF variable oscillator (4) 2N3694 2nd Mixer, crystal oscillator, 1st IF amplifier, 2nd IF amplifier; (2) 2N3393 Audio Preamplifier. Squelch amplifier X29A829. Squelch Gate: 2N1274 Audio Driver; (2) 40050 Audio/Modulator output. **Transmitter: Frequency coverage:** 143·2-148·2 MHz. **RF Power input:** 25-30 watts. **RF Power output:** 8-10 watts. **Mode:** Type A3 (AM). **Modulation:** Automatically limited to 100% or less. **Output Impedance:** 50-72 ohm, unbalanced. **Crystal sockets:** Accepts FT-243 type holders, pin diameter ·093", pin spacing ·466" & HC6/U type in diameter ·050", pin spacing ·466". **Transistor/tube complement:** 7050 Oscillator/Amplifier Tripler-Tripler; 12GN7 Doubler/Driver; 8156 Power Amplifier; (2) 2N3393 Microphone Preamplifier, Microphone Driver. **Temperature range—** —20° to +50° C. **Power requirements:** 120 or 240 VAC input. Receiver-Trans—20 watts; Batt. Saver: 8 watts, Spot—35 watts, Transmitter—100 watts. **Cabinet dimensions:** 14$\frac{1}{4}$" W × 8$\frac{1}{4}$" D × 6$\frac{1}{4}$" H including microphone and mounting feet. **Net weight:** 13 lbs.

Kit K/HW-17, 2M Transceiver (less crystals) 17 lbs., **£69.2.0.** P.P. 10/6.

Kit K/HWA-17-1, Transistorized DC supply, 5 lbs., **£13.19.0.** P.P. 4/6.

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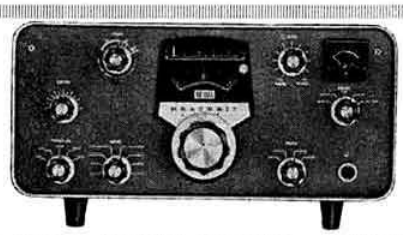

SB-401E Amateur Band SSB Transmitter . . . 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates "Transceive" with SB-301—requires SBA-404-1 crystal pack for independent operation.
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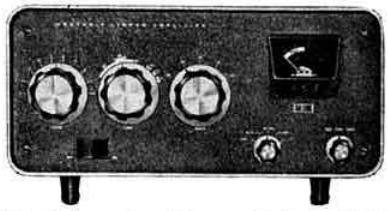

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Vertical aerials Mk. 1, 32ft. plus whip, complete, £3 10s. carr. paid. Two hvy. duty mains transformers for lin. amp., £3 and £4, carr. extra. H. Tonks, 11 St. Edwards Rd., Bournbrook, Birmngham 29.

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Trio JR60, 550 kHz–30 MHz plus 142–148 MHz, bandspread on all amateur bands, double conv., Q mult., Cal., a.n.l., S meter, etc., £40 o.n.o. P. P. Parker, G3UAP, 23 St. Michaels Close, Rough Common, Canterbury, Kent.

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Cossor 1035 double beam scope £15. V.h.f. rx R220, easily converted for 4m, complete with valves £3. Marconi tx/rx easily converted for 4m or 2m mobile £3. R. M. Everitt, G3TJK, 'Ferndale', Colchester Rd., Ardleigh, Colchester, Essex.

Heathkit RA1 rx plus CL1 cal., complete with manual and individual laboratory measured specs., 23dB s/n or better on 10m for 2 μV signal £35. D. T. Emerson, G3SYS, 50 Hurst Road, Hassocks, Sussex.

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HRO, 9 coils and p.s.u., resprayed, miniature valve front end, £20 o.n.o. Cine camera, 8mm, zoom lens, etc., sell or exchange for any s.s.b. tx., s.a.e. for details. D. Fishken, G3WZD, 11 Thames St., High Halstow, Rochester, Kent.

Minimitter 150 W all band tx, £30. V.h.f. rx. 20–145 MHz £20. Telephone Brookwood 2523 (Surrey), would deliver 100 mls. J. F. Akam, Ridgeway, Limecroft Rd., Knaphill, Woking, Surrey.

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FR100B £90. Leak TL12 plus varislope 3 pre-amp. £16, all as new. C. V. Stead, G2UZ, 2 Cliff Road, Gdns., Leeds 6.

Brand new and unused Electroniques transistorized i.f. strip Mk. 2, cost £12 12s., sell at £10 o.n.o. N. K. Waring, 33 Chestnut St., Southport, Lancs.

Lafayette KT320 rx, 550 kHz–30 MHz, bandspread amateur bands, excellent condit., b.f.o., Q mult., a.v.c./m.v.c., a.n.l., S meter, £20, buyer collects, callers weekends and evenings only. N. A. Mason, 60 St. Mary's Cres., Ruddington, Notts., NG11 6FR.

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Heathkit RA1 rx inc. xtal, cal., QPM16 mult., matching l.s. and preselector, a.t u , £30 o.n.o. Also complete RAE course (BNRS) £5 15s. G. S. Dawns, 94 Snape Hill Lane, Dronfield, Sheffield, Yorks.

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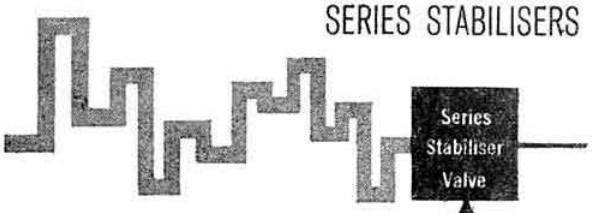

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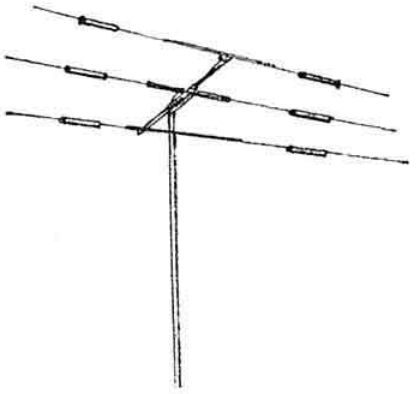

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Valves, PCF80, DL94, EB41, 6F15, 3AU6, EL42, 20F2, ECH83, ECH42, EF50, 12A6, PY31, PZ30, EC52, PL38, 25Y5G, PL33, EA50, EF80, 12AT7, ECL80, 6SN7, PCC84, ECC81. Any six to your selection, 10s. G. A. Jeapes, G2XV, 165 Cambridge Rd., Gt. Shelford, Cambridge.

2m transceiver (a.m.), 3 W o/p, 2N3553 final, FET first mix., 6 kHz mech. filter, size 7¼ by 6¼ by 3 ins., including rechargeable batteries, complete £50. HO10 monitor scope, £15. Webster band-spanner 10–80m with /M mount £13. D. Dall, G5AHK, 19 Copenhagen Way, Walton-on-Thames, Surrey.

TA12C, slight mods. £4. Valves FW4/500 4s. 6d. 6X5GT/G, 6AC7M, 6SN7G/TG, GZ32, 6AG5, 12SH7, 12K7, 12SQ7, 2s. 6d. 6H6GT/G, 2X2, 6G6G, EB34, 6P25, 9001, EF50, EF55L, 1s. 6d. Test set 5s. Post extra. J. W. Thompson, G3WQM, White House, Tollerton, York.

75S1 £120. Collins 302C wattmeter, 0–100–1000 W, £25. AR22 £17. UM4 Mod. transformer £4. BC221 ans p.s.u. £18. J. A. Mann, 145 Greenhill Rd., Halesowen, Worcs.

R206 with l.f. convertor and p.s.u. £20. 19 in. rack slide and rear doors, chassis, front panels £3. Ganging oscillator 343, £5, buyer collects. N. H. Hyde, G3PJM, 91 Pelsall Lane, Rushall, Nr. Walsall, Staffs.

Cowl gill motor and desynn indicator £5. KW l.p.f. £2. Eddystone round l.s. £1. 0–20 V vari. p.s.u. £1 5s. Haeyberd transformer 240–110 V, 250 VA, £2. LED two tone oscillator £2 10s. All new, postage extra. L. J. Barry, G3UFU, 15 Fairlawn Court, Acton Lane, London, W4.

Command rx. 160 and 80m, £3. HE30 rx 0·5–30 MHz £15. Transformer o/p, 250–0–250, 6 V at 2 A, 12 V at 2 A. Relay, 12 V, 2s. 6d. 250 V a.c., 6s. Telephone Hambleden 443. A. Smith, G3SQM, 5 Varnells Terrace, Hambleden, Henley-on-Thames.

Bendix MN26C rx. Marconi RP47 police rx. 2m 6/6 Yagi, £5 the lot, o.n.o. Also darkroom gear, enlarger, dishes, drier, etc. Offers. D. Boniface, 11 Homefield Rd., Ripon, Yorkshire.

KW2000 and a.c. p.s.u., exlt. cond. any test. Delivery poss. in Midlands or Central Scotland, £139. G. M. Smith, GM3SNO, 5 Tarvit Ave., Culpar, Fife.

Scope 339, £10. Rx matching amp. £1. Two 28 V toroids 375 V at 200 mA. Offers or exchange. T. C. Stagg, G3KPW, 62 Prospect Place, Grays, Essex.

Hy-gain Hy-tower, comprising three 8 ft. sections, £15. Tx/rx A Mk. 3 in suitcase £15. Needs slight attention. R1155LF with external non-functioning p.s.u. £5 o.n.o. A. I. McPhedran, GM3GTQ, 3 Argyll Rd., Bearsden, Dunbartonshire, Scotland.

Stereo amp., Airmec twin Mullard 5-10 with tone controls, perfect, unused £20. Pair B44 transceivers Mk. 2, matched xtals., 4m, working, full alignment and conversion, data, £4 each, o.n.o. Telephone FOU 3044. D. T. Wilson, G8APS, 177 Dower Rd., Four Oaks, Sutton Coldfield, Warks.

KW Vanguard 160–10m, Halilcrafters SX140 rx also R107, spare valves aerial c.o. relay, etc., must be sold. Offers. View and demonstrate at weekends by appointment. Consider delivery S.E. Telephone, 01-352 5340 evenings. T. O. Frost, G3PWT, The Manor House Ogbourne St. George, Marlborough, Wilts.

Galvanized steel tower 70ft. in 10ft. sections or will sell as 30ft. self supporting and 40ft. guyed. Triangular cross section, 15in. sides. Heathkit SB101 brand new with HP13 and HP23E. Offers. H. Perkins, G3NMH, 24 Hook St., Swindon, Wilts.

SP600JX rx., spkr., manual, superb. £80. Radio control tx/rx. Submarine hull with some servos, £20. Codar preselector £3. A., Gates, BRS 26681, 158 Robertson St., Clapham, London, SW8.

Trio transceiver TS500, extra v.f.o. unit, double 5 xtal. filter giving super audio quality and reception. P.a. 2 6146B, few weeks old, new price is £220, offered at £200 only. C. V. Taff, 239 Hagley Road, Edgbaston, Birmingham, Warks.

Class C wavemeter, needs attention, £2. Will design QSL cards for 2s., post extra outside UK, send spec. M. A. Higgins, 80 Elphinstone Rd., Hastings, Sussex.

Parmeko/Gresham transformers, chokes, ideal tx p.s.u., etc. Excellent quality guaranteed valves. Selling up, everything to go, prefer buyer collects but will deliver 30 miles. S.a.e. full details. AR88 p.w.o. £35 o.n.o. Telephone Swaffham 606—R. A. deVerteuil, G3UAK, 5 Mill Lane, Swaffham, Norfolk.

Hammerlund Super pro with p.s.u. and twin spkrs., £25 o.n.o. A. J. Bassett, G3EXP, 18A The Broadway, Newbury, Berks.

G2DAF rx, Philpots cabinet, QCC filters, Electroniques coils, £65. Sommerkamp FL200B, £120. AR88D rewired, £35. Teletype 15 p.p., p.s.u., paper, £25. 14TD, £10. DL6EQ t.u., loop switching unit, p.s.u. £15. Offers considered. J. M. Copson, G3TUL, 51 Ellers Drive, Bessacarr, Doncaster, Yorkshire.

Component parcels, valves, capacitors, etc., state your requirements s.a.e. please, minimum parcel 10s. E. A. Defty, 119 Westmoreland Rise, Peterlee, Co. Durham.

Labgear wide-band mult. type E5026. Eddystone 598 dial. Round meters 30 A and 100 A. Four EF91 valves, £5 the lot, post free, all the above gd. wkg. condit. J. Currie, 156 Hillhead Rd., Kirkintolloch, Dumbartonshire, Scotland.

Jennen Trio rx., model JR101 in exlnt. wkg. order. Spec. same as for HE30, £20 o.n.o. Will deliver up to 100 mls. C. I. Curgenven, Beech House, Uffculme, Nr. Cullompton, Devon.

Codar AT5 tx. with mains p.s.u., as new £15. Home brew 10m v.f.o. controlled, 10 W tx, £5. Pye 4m, 20 W tx. £15. All work well. M. T. Knights, G3TQY, Ashar, Cross Road, Tadworth, Surrey.

Crystals, 2 4 10m, s.a.e. for lists. Base tx for 2m (Pye), A3 with mains unit £12 o.v.n.o. Original manuals for SX28/T1154/R1155, offers. Teleprinter type 3X £6, buyer collects. A. H. Webb, G3KCG, 69 Lalleford Rd., Vauxhall Park Estate, Luton, Beds.

KW Vanguard Mk. 2, 160–10m, 50 W, complete, exlnt. condt., circuit. and instructions, deliver 30 miles., £35. A. Cockle, G3IEE, 14 Leewood Way, Effingham, Surrey.

Test calibration unit CT155, new contains reference cell, £5 Advance sig. gen., will exchange for /M rx. or Z match. H. G. Newland, G5ND, 161 Penrose Ave., Marton, Blackpool, Lancs.

Hallicrafters S27 rx, 28–143 MHz, £25 or exchange for EC10 rx. F. L. Parsons, G3MIX, 96 Blackamoor Lane, Maidenhead, Berks.

A.m. tx, 60 W, unfinished, in Eddystone cabinet, new and unused Geloso v.f.o. and dial. Mod. transformer and most major components included, also circuit and design notes £14. R. L. Luxford, G3TOX, 33 Long Lane, London, N3.

Heavy plexiglas ribbed airspaced coils, 3 in. dia., 6½ in. long. Has 65 tns. of 16 s.w.g. silver pltd. wire. Ex brand new RCA eqpt., £1 each, post paid. Lafayette HE73 preselector/convertor, offers. M. J. Evans, GW3UCJ, 4 Gower Crescent, Baglan, Port Talbot, Glam.

Canadian 19 Mk. 3 complete, mains p.s.u. for rx only, built into v.h.f. intercom compartment, but this circuitry A1 (removed valves supplied) A1 mech. and elec. £9 10s. Buyer arranges or pays carr. P. J. Cooper, 49 Vincent Rd., Luton, Beds.

Rot proof white nylon webbing, 1¾ in. wide, 0·1 in. thick, 2s. yd. or 11 yds. for 15s. Ceramic stand off terminal strips, 20 way, 3s. each or 5 for 10s. Post free. M. Mann, G8ABR, 71 Queens Rd., Tewkesbury, Glos.

LOWE ELECTRONICS

50/52 Wellington Street, Matlock, Derbyshire. DE4 3GS
Telephone Matlock 2817 - 2430 (evenings)

Just straight honest-to-goodness flogging this month. No rambling on, no wisecracks, nothing but a determined effort to induce you to part with loot. Somebody's got to pay for my week's holiday at Clacton!

NEW TRANSCEIVERS

Sommerkamp FT-150.—This is the improved version of the FT-100, VOX, PTT, MOX. 80-10 (all 2 MHz of 10), 120W PEP, switchable sidebands, transceive vernier, SSB, AM, CW. Built-in p.s.u.'s for both AC and 12V d.c. Built in xtal calibrator. All transistor except driver and & P.A.'s. Ideal mobile or fixed station. Complete £215. 0. 0.

Sommerkamp FT-500.—A 500W p.e.p. rig with all the gubbins—switchable sidebands, transceive vernier, VOX, PTT, MOX, SSB, AM or CW. 100 and 25 kHz calibrator. The works. Complete with built in p.s.u. £250.0.0.

Inoue 700 series:—Although this comprises three separate units—IC700R Rx, IC-700T Tx and IC-700PS power supply, the three are designed as a transceiver in that the Tx uses the Rx V.F.O. (with transceive vernier) and does not have its own.

IC-700R—All transistor Rx for Amateur Bands making wide use of FET's in the r.f., i.f., and oscillator stages to ensure maximum sensitivity and minimum cross modulation. It uses a top quality 9 mHz xtal filter for excellent image rejection and a single conversion chain for minimum noise.
Modes: AM, SSB, CW. (LSB on 80 and 40, USB on 20, 15 and 10)
Coverage: 80, 40, 20, 15 and 10 (28-29·5 MHz) plus 10-10·5 MHz.
Provision for xtal control.
Selectivity: 2·4 kHz at −6dB, 4·5 at −60dB (1·8 shape factor)
500 Hz audio filter for CW.
Sensitivity: Better than 1 microvolt for 10dB. The Manufacturer is very modest here—typical figures are 1 microvolt for 25dB.
Spurious signals: Not measurable.
Image rejection: Better than 60dB.
Stability: 100 Hz.
Power supply: 240V a.c. or 12V d.c. built in.
Size: 11 in. wide × 6½ in. high × 9½ in. deep. Weight 12 lb.
This is a very nice Rx indeed at the very attractive price of £85.0.0.

IC-700T Transmitter—The companion Tx is the same midget size and is again all transistor except driver, PA's and v.f.o. mixer. It uses the Rx v.f.o. and of course covers the same Amateur Bands, with provision for xtal control if required. The two 6146B's in the final are very conservatively operated with only 500V on the plates for 120W p.e.p. This ensures excellent linearity, minimum distortion products and TVI and gives long life. There's a lot to be said for operating the PA well within its rating rather than pushing it to the limit—and certainly this little beauty sounds very nice indeed. Price £80.0.0.

IC-700PS—Matching AC p.s.u./speaker, £30.0.0.

Package Deal: Bought separately, the three would add up to £195.0.0. and still be top value for money—the three ordered together as a package deal—£180.0.0.

NEW TRANSMITTERS:

Sommerkamp FL-500—Apart from cabinet styling, virtually the same as the well known and proven FL-200-B. A cracking good 240W p.e.p. rig, 80-10 with all the gubbins. SSB selectable sidebands, AM, CW, VOX, PTT, MOX. Break-in CW and transceive with the companion FR500 (or FR-100-B) Price—£145.0.0.

Star ST-700—SSB selectable sidebands, AM, CW, 80-10, 6146B's in PA for 200W p.e.p. Extremely accurate, stable and smooth v.f.o. VOX, PTT, MOX. Break-in CW. Transceive with the SR700 or separate. I like this Tx very much indeed and have heard nothing but praise for it. Price—£135.0.0.

NEW RECEIVERS

Sommerkamp FR-500—160 to 10 plus citizen's band (oh boy!) Notch filter, 100/25 kHz xtal calibrator, fast/slow a.g.c., 4 kHz AM, 2·4 kHz mechanical filter for SSB and optional 500 Hz mechanical filter for CW. Direct readout to 1 kHz. Price £130.0.0.
Optional extras: 2m converter, 500 Hz CW mechanical filter, FM discriminator, 24 kHz FM mechanical filter.

Star SR-700—80 to 10 plus 5 extra bands to cover any 5 600 kHz segments between 4 and 30 MHz with the appropriate xtal. 100 kHz calibrator, better than ½ microvolt sensitivity, 4 kHz, 2·5, 1·2 and 500 Hz selectivity, notch filter, 100 Hz stability. Very accurate v.f.o. reading to 1 kHz directly. Fast/slow a.g.c. Make no mistake, the Star SR700 is a good Rx. Price £115.0.0.

Star SR-200—Low cost Amateur Band Rx. Covers 160 to 10m (all of 10), 1 microvolt sensitivity, single conversion with a 1650 kHz single xtal filter, separate oscillator with cathode follower into the cathode of a low noise 6AU6 mixer. Product detector, amplified a.g.c., " S " meter, xtal calibrator, smooth slow motion tuning. How they do it for the money I'll never know. Price—£40.0.0.

Inoue IC-700R—See under " transceivers " for a top-notch transistor Amateur Band Rx.

SUNDRY NEW EQUIPMENT

G.D.O.'s. Tech TE-18 mains operated 360 kHz-220 mHz—£11.10.0.
S.W.R. Bridges, Hansen SWR-3—50 or 75 ohms. £3.10.0.
Bug Keys, £4.0.0.
Electronic Keyers: DAI 8-60 w.p.m. built-in monitor, mains or 12V d.c. £16.0.0.
Katsumi EK-9X (4 in. × 2 in. × 6 in. deep), 8-30 w.p.m., battery operated £7.15.0.
CW monitor. Katsumi AT-8. Can be used with any key—plain, bug or electronic. The output relay has a spare contact for Rx muting. Excellent tool £7.15.0.
Headsets. Low impedance padded jobs, £2 2.6.
Microphones. Teisco DM-501. Dynamic with PTT. High impedance. Another batch just off the boat. £2.15.0.
Intercoms. 2 station £3.0.0.
Bits and Pieces. New, not surplus, not seconds:
Tubular trimmers either ½-5pF or 3-15pF, 1/- each, 10/- dozen; Feedthroughs 1000pF screw type 1/- each, 10/- a dozen; Disc ceramics ·001 3/6d. doz.; ·01 5/- doz.; Standard coax sockets 1/- each; Standard coax plugs 1/4 each; Plugs (Octal, B7G, B9A), 2/6d each; Electrolytics—brand spanking new can types, complete with mounting clips, 10mF 350V, 1/8; 20mF 350V, 2/3; 20mF 450V, 2/9d; 100mF 350V, 5/6d.; 100-100mF 350V 6/8d.; 100mF 450V 7/2d.; 40-40mF 500V 7/3d.; 100mF 500V 7/9d.; 100-100mF 450V, 13/2; Silicon rectifiers—Current manufacture, NOT surplus NOT seconds. You can rely on these. SE-05 1000 p.i.v. 500mA 4/6; 1S1066 1000 p.i.v. 750mA 8/-. Panel indicator lamps for standard lilliput bulbs red or green 2/6d.; switches, jack plugs, miniature tantalum electrolytics, ¼W sub miniature metal oxide resistors etc. PL259 plugs 5/-; 100 kHz crystals, series resonant, very accurate to mil. spec. £2.0.0. H.D. Coax 75 ohm, 1/- a yard, 300 ohm ribbon 6d. a yard. A s.a.e. will get you my list of components etc.
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 d.c. 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.
Odds and Ends:
Codar PR30 £3.10.0. Walkie Talkies 100mW 28·5MHz £12.10.0 a pair. AR88D manual reprints 15/-. VHF/UHF 50 ohm dummy loads £2.10.0. (new, surplus). Xtals normal ½ in. pin spacing, 8025kHz, 8061·25, 8068, 8192-3 12/6d. each.

SECONDHAND RECEIVERS:

HA-350 Mint	**£60. 0. 0.**	**HR-22**	**£80. 0. 0.**
HQ170	**£70. 0. 0.**	**TCS-12**	**£12. 0. 0.**
EDDYSTONE 750	**£45. 0. 0.**	**RA17**	**£180. 0. 0.**
EDDYSTONE 770U	**£100. 0. 0.**	**EDDYSTONE 770B**	**£100. 0. 0.**
888A	**£65. 0. 0.**	**FR-100-B**	**£95. 0. 0.**
FR-100-B (earlier model)	**£75. 0. 0.**	**COLLINS 75A4**	**£200. 0. 0.**
COLLINS 75A2 Mint	**£95. 0. 0.**	**EDDYSTONE 940**	
LAFAYETTE HA500	**£35. 0. 0.**	**Mint**	**£100. 0. 0.**
HALLICRAFTERS		**BRT 402E**	**£60. 0. 0.**
SX140	**£20. 0. 0.**	**HALLICRAFTERS**	
HALLICRAFTERS		**S27**	**£12. 0. 0.**
SX111	**£75. 0. 0.**		

SECONDHAND TRANSMITTERS:

S/K FL-1000 linear	**£80. 0. 0.**	**HALLICRAFTERS**	
		HT37	**£80. 0. 0.**
HEATHKIT DK60 &		**TW COMMUNICATOR**	
HG10 v.f.o.	**£40. 0. 0.**	**80M**	**£35. 0. 0.**
VICEROY excellent	**£85. 0. 0.**	**COLLINS 32V3 Mint**	**£60. 0. 0.**
VANGUARD late			
model	**£40. 0. 0.**		

SPECIAL: Last National 200, complete with p.s.u. kit £185 0. 0.

Test gear:

Laboratory audio oscillator a thing of beauty	**£25. 0. 0.**
Lab. 0-30V at ½A p.s.u.'s, fully metered	**£15. 0. 0.**
Telequipment S324A 'scope	**£35. 0. 0.**
Solartron digital voltmeter, mint	**£35. 0. 0.**
Marconi TF390G 16-15 mc/s	**£20. 0. 0.**
Taylor Sig. Generator 100 kc/s to 45 mc/s	**£10. 0. 0.**
455 kc/s Panadaptor, mint	**£25. 0. 0.**

Postage: Allow lots, (it's always more than you think), I'll refund any left over.
A large s.a.e. will get you a copy of my latest lists.

73 Bandit Bill,
VE8DP/G3UBO.

MEMBERS' ADS members' ads MEMBERS' ADS members' ads MEMBERS' ADS

Collins new valves for 32 V, 4D32, £7. 6AK6, 4s. 6AG7, 5s. 7C5, 9s. OA2, 5s. 6SL7GT, 4s. 6d. 6SN7GT, 7s. 807, 7s. 5R4GY, 8s. Wilcox gay v.f.o., perfect £6 10s. plus postage, excess refunded. A. Ussher, GD3TIU, Ballacotch Manor, Crosby, Isle of Man.

Hamgear preselector and combined a.t.u., mains operated as new, £5, carr. paid. A. F. Walton, G3XBE, 39 Oakdale Drive, Worse, Shipley, Yorks.

RSGB Bulletins from April 1944 to Dec. 1967, 272 copies, any reasonable offer. R. H. Lloyd, 52 Lees Terrace, Bradley, Bilston, Staffs.

QQVO3–10 valves at 10s. each. Pye rangers, prices according to type. Most types of Pyegear can be serviced at £2 per unit plus cost of spares, post and packing. R. W. Limebear, G3RWL, 190 Winchmore Hill Road, London, N21.

VF1U, £4. Jap bug £2. DA1 El-keyer, new, £9. Heath GR64 g.c. rx. £14. KW Z match, £3. Numerous h.f. and l.f. xtals. Buyer collects after inspection. S. N. Gall, G3UCM, 175 Coulsdon Road, Old Coulsdon, Coulsdon, Surrey.

Mobile whip Minimitter 160/180m coils. £6 19s. 6d. 19 in. rack 6ft. high, door £4 19s. 6d. TF144G, £18 10s. TF517, £10 17s. 6d. 4X150A 15s. 6d. R1155 £3 10s. 6d. Philco rx 22 valves £4 19s. 6d. AR88D, S meter plus BC453, spkr/phones £38 10s. D. Byrne, G3KPO, Jersey House, Eye, Peterborough, Northants.

Xtals, few, FT243, 5906·7, 6140, 6150, 7173·33, 7300, 7525, 7900, 8125, 8150, 8375, 8400, kHz. FT241A 439 kHz. All 3s. 6d. each. Ex-gear ECC81, ECF82, E180F, 6BW7, at 2s. each. R. P. Norris, 19 Bluebridge Ave., Brookmans Park, Hatfield, Herts.

HRO, 5 g.c. coils, compr. p.s.u., l.s. and phones, xtal. cal., n.l. and handbook £25 o.v.n.o. Also xtal. mic. £25s. N. S. White, 50 Kendal St., London, W.2.

Lafayette HA350 rx., xtal, cal., Jackson s.w. knob fitted, with spkr., £50 or exchange 2m communicator in gd. condt. Also HRO p.s.u. 10s. Eagle earphone with boom mic., 30s. M. A. Pawley, G8AWV, 52 Sumatra Rd., West Hamstead, London, NW6.

Selling all. Xtals, many unobtainable, send for s.a.e., with wanted freq. 8790/10XJ f.b. 4m, 4s. post paid. V.h.f. BC221N, 60–600 MHz, not wkg., £8. Pair of KT88, £1 each. Lots of f.b. junk, callers only. A. Adkins, G3MVU, 583 Rayleigh Rd., Eastwood, Leigh-on-sea, Essex.

Xtals, FT241A, channels, 10, 11, 30, 64, 388. FT243, 5825, 5840, 5850, 7850, 8125, 8600. 10XJ type, 7010, 7810, 3s. each plus postage. G. L. Fitton, G8AVG, 29 Okus Grove, Upper Stratton, Swindon, Wilts.

Have many *Bulletins, SWM, QST, R9, Gramophones* 1931–66, to exchange for any volumes of *Wireless World* 1915–22, *Amateur Wireless* 1922–35, *Popular Wireless* 1922–38, *Practical Wireless* 1932–38. F. A. Herridge, G3IDG, 96 George St., Basingstoke, Hants.

Offers please for large number of *P.E., P.W.* etc. 1962–68 and earlier, willing to swop for components etc. J. G. Davies, 130 Bohemia Rd., St. Leonards-on-Sea, Sussex.

Codar T28 transistor rx perfect cond. £12 or exchange for aerial rotator. J. Darrington, G3WHL, 182 Thorne Rd., Doncaster, Yorks.

Marconi TF987 noise gen., 71Ω, £15. 813 with base, 30s. QY4-250 with base, £8. 5B254M 25s. Cowlgill motor new 50s. Transformer, 500 V at 1 A plus filament, ideal for 6HF5 linear £5 add postage. J. B. Smith, G3HSB, 11 The Crescent, Milton, Weston-super-Mare.

HA350 one year old, 230 V model mint condt., handbook, original packing £51 plus carr. AR88D and LF handbooks, 10s. each. M. J. Faulkner, G3IZJ, 35 Abbey Way, Farnborough, Hants.

Eddystone 840C as new £45 or exchange for EC10 with a.c. p.s.u. In, as gd., cond. Telephone 01–857 2593. F. A. Culling, 25 Kings and Rd., London S.E.22.

150 W c.w. tx, 80–10m, v.f.o. controlled, with 800 V p.s.u., buyer collects, offers, Telephone 01-508 3013. S. R. Alderton, G3UXV, 2a Goldings Rd., Loughton, Essex.

ART13 £7 13s. B44 £3. TS175U £15 needs audio transformer, exchange or loan 24 issues 73 1966/67/68 for QST/CQ. A. Walker, G3DAR, 20 Station Road, Esholt, Shipley, Yorks.

HRO with 80–10m b.s. coils, 8 g.c. coils, p.s.u. and manual, f.b. £25. Ameco 80–6m, 90 W tx. with external v.f.o., 12 V d.c. p.s.u. and kit for a.c. p.s.u. £38. E. Haycock, G3VKC, Two Four, The Comyns, Bushey Heath, Herts.

Collins 75A2 modified to 75A4 spec. includes fitted 2·1 kHz and unfitted 6 kHz mech. filters. First class mech. and elec. condit. £125. Prefer buyer inspects and collects. G. S. Harris, 25 Altcar Rd., Formby, Liverpool.

19 set Mk. 3 tx/rx plus p.s.u. for rx only. Not in wkg. order, but believe tx is wkg. order, but rqs. p.s.u. S. Thornton, 92 Low Rd., Dewsbury Moor, Dewsbury, Yorks.

AR88D not in original case with spare valves £20, reason for sale going hi-fi. A. R. Lloyd, 4 Bellbrook, Penkridge, Staffs.

Creed 3X teleprinter, gd. wkg. condit., 240 V a.c. mains unit for motor £3. Plenty, spools/paper also convertor unit, etc. C. H. Eldin, G3QC, 113 Russell Drive, Wollaton, Nottingham.

Eddystone 840C, new Jan. '60 £48. EC10 £36. Hallicrafters SX110 £40. HA230 £19. HE30 £14. Tokai transceivers, pair, £15. All items in new condit. Mags. British and American, cheap. S. N. Andrews, 34 Rawcliffe Lane, Clifton, York.

G2DAF tx complete with p.s.u., 160–10m, two 6164, two ½ lattice xtal. filter, v.o.x., p.t.t., Philpots cabinet, signal professional quality, arrange sked!, buyer collects £55. M. Niman, G3LGN, 9 Montgomery Drive, Unsworth, Bury, Lancs. Tel. WHI 2942.

DX100U incldg. 160m, working but rqs. attention, first reasonable offer secures, will deliver reasonable distance. D. W. Ashton, G3THA, 49 Sedgefield Drive, Thurnby, Leicester, LE7 9PT.

AR88D, S meter, BC453, spkr., spare valves, £36 10s. o.n.o. KW2000 d.c. p.s.u. £25 10s. Minimitter whip 160/80m £6 10s. TF144G £16 10s. TF517F/1 £10 10s. 19 in. rack 84 in. high £4 19s. 6d. 4X150A 15s. 6d. 85kHz coils 17s. 6d. mic. tester £10 10s. D. Byrne, Jersey House, Eye, Peterborough, Northants.

Eddystone 940 complete with spkrs and plinth in mint condit. £75 o.n.o. buyer collects. S.W. Edmonds, 82 Clingan Road, Boscombe East, Bournemouth, Hants.

Tx, p.p. 813 fully metered, professionally built to high standard, offers quantities of SWM and QST offers. 230 V to 110 V large transformer mounted on chassis, offers. S. Sunter, 18 Bramhall Park Rd., Bramhall, Cheshire.

Valves, f.m. radios in gd. condit.; 6AT5, 3V4, 6BW6, 6X4, 6BE6, 1L4, 1N5, 6BA6. Also antique valves APV4, 6KJ?, VM6, 4B, 6K7G, 25Z4, Marconi MS4B, 6Q7G, MKT4, also World Radio TV Handbook, offers. P. Ryder, 17 Abbey Road, London, NW8.

70 cm convertor with p.s.u., as new £6. 18 el. parabeam two months old £5. Buyer collects. S. Phelan, 9 Lime Tree Gdns., Goole, Yorks.

AR88D with 100 kHz cal. and spkr. £20 o.n.o. Prefer buyer inspects and collects, but could deliver Southampton/Portsmouth area. J. A. Rampton, G3VFI, 23 Oxford Close, Fareham, Hants.

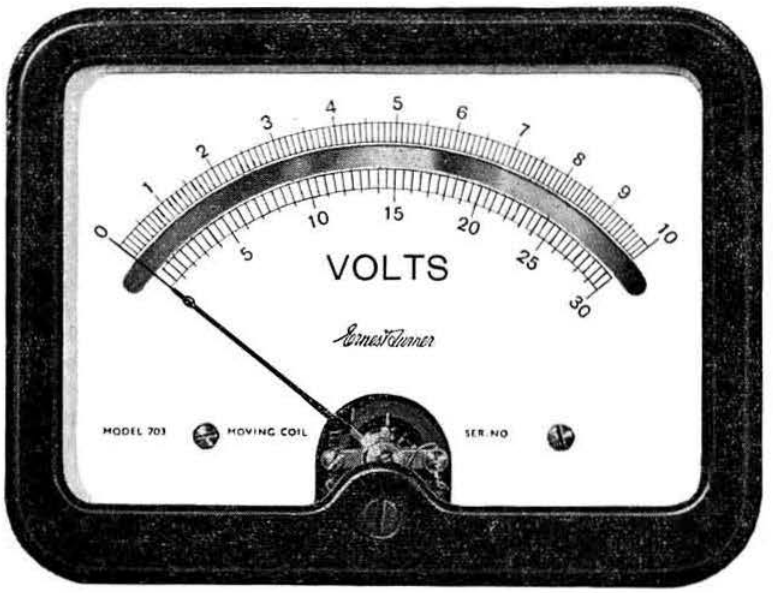
Large amount of useful parts and radio equipment for possible club use. Buyer collects, send s.a.e. for details. E. T. Manley, The Pines, 85 London Road, Kearsney, Dover, Kent.

Hartley type 13A Scope, with lid and accessories £15. Electric railway set with many extras, value £60, would exchange for a £25 2m tx or good portable sig. gen. of same value. Buyer collects. A. Boughton (RAIBC), 2 York Rd., Kennington, Ashford, Kent.

HRO MX modified 6BA6 r.f., EF92 i.f. etc., all coils, p.s.u. included refinished as new. Offers to G. G. Gibbs, G3AAZ, Copperwood, New Rd., Digswell, Welwyn, Herts.

Continued on page 558.

Special Scaling....



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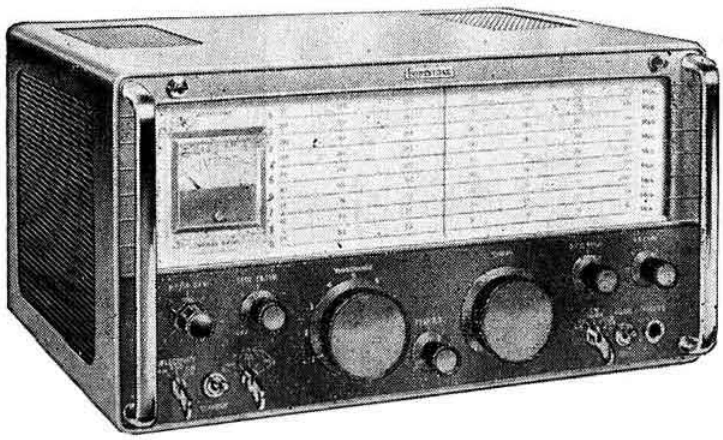
BRITISH MADE

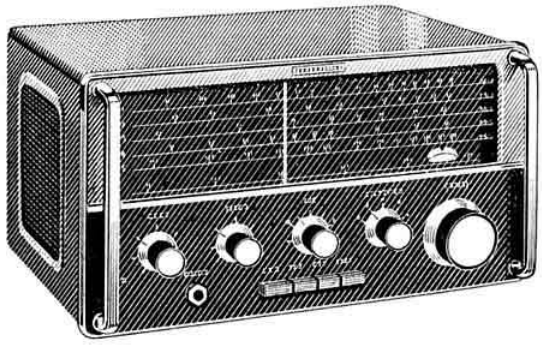
Amateur communications receivers

EA12



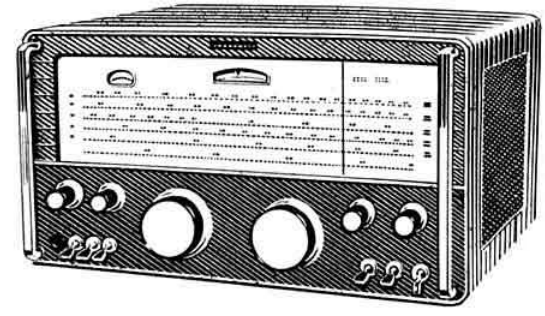
An amateur bands double-conversion superheterodyne receiver, for a.m, c.w, and s.s.b reception. For all amateur channels between 1.8 MHz and 30 MHz in nine 600 kHz bands with 28 MHz to 30 MHz in four bands.

Primary features. Crystal-controlled 1st oscillator, 2nd oscillator with continuously variable selectivity to 50 Hz, muting switched or by external relay, twin noise limiters, for a.m/c.w, and s.s.b, short-term drift better than 20 Hz and less than 100 Hz in any one hour, 'S' meter calibrated in nine levels of 6 dB and dB levels beyond 'S9', two a.g.c time constants, deep slot filter, independent r.f, i.f, and audio gain controls with outputs for f.s.k and panoramic adaptor.



EC10 communications receiver

The fully transistorized EC10 communications receiver, supreme in its class, covers both medium-wave broadcasting and all shortwave service to 30 MHz. Incorporating the famous Eddystone tuning drive, with logging scale and auxiliary vernier, shortwave reception is particularly simple. Battery-operated or from optional a.c mains unit.



940 H.F communications receiver

An outstanding 13-valve receiver with two r.f and two i.f stages, silicon diode noise limiter circuit and high quality push-pull output. Built to a professional specification, facilities include provision for c.w, a.m, and s.s.b reception over the range of 480 kHz to 30 MHz in five bands. Suitable for 110/125 V and 200/250 V. 40-60 Hz a.c mains.

Comprehensive information from your Eddystone distributor or: Eddystone Radio Limited, Eddystone Works, Alvechurch Road, Birmingham 31. Telephone: 021-475 2231. Telex: 33708

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QTC

THE NEW HANDBOOK
SHEFFIELD UNIVERSITY CONFERENCE
70cm MOON REPEATER?

The RSGB Handbook

The Fourth Edition of the RSGB Handbook, now known as the *Radio Communication Handbook*, will be on sale at the RSGB Exhibition on 2 October 1968. The new edition consists of 832 pages (compared with 560 pages of the previous edition) and is cloth bound on hard covers with a laminated jacket. The contents have been completely revised and there is a very high proportion of new material. The various chapters have all been contributed by writers who are acknowledged experts in their particular subjects.

We sold 35,000 copies of the Third Edition, which was indicative of its popularity and appeal to all having an interest in Amateur Radio. It is anticipated that there will be a heavy demand for the 15,000 copies of the first printing of the Fourth Edition.

Distribution in North America will be in the hands of Communications Technology of Greenville, New Hampshire, who are sole agents in the USA and Canada for the complete range of RSGB publications.

The retail price of the *Handbook* will be 63s. which, having regard to the increases in printing costs and paper, is an economical figure intended to have widespread appeal. For copies despatched by post there will be an additional charge of 6s. to cover postage and packing in a special container.

To assist members who will wish to obtain the Handbook a special price of 55s. (61s. post paid) will be available until 5 October. It is emphasised that this offer applies to RSGB members *only*.

Orders, accompanied by a remittance for 61s., can now be sent to RSGB Headquarters for despatch during the week of publication.

OY7J Visits London

The UK satellite *Ariel* carried several experiments all of which were under the control of UK organizations. One of these was initiated by the University of Sheffield who sought the co-operation of observers outside the UK. Following an initial contact between the RSGB and the Faroese Radio Society a goniometer station was established in the Faeroe Islands near the QTH of OY7J at Torshavn. The installation and maintenance of this station was undertaken by OY7J and as an appreciation of his efforts he was invited by the University of Sheffield to spend two weeks in the UK as their guest. During this period Just Siversten, OY7J, spent a day in London as the guest of the RSGB, visiting Headquarters and meeting the President and Members. He also made a recording for the World Radio Club which was heard on the BBC Overseas Service. OY7J brought to London an attractive book as a gift from the Faroese Radio Society to the RSGB. This volume will occupy a prominent place in the Society's library at the new Headquarters.

Sheffield University Conference

Mr C. E. Newton, G2FKZ presented a paper entitled, " Some aspects of communications techniques by means of bi-static radio aurora " to a conference on the Solar Terrestrial Environment. The conference, which was attended by many scientists of international repute, was organized by Professor T. R. Kaiser (Sheffield University) in honour of Professor Sandy Chapman, one of the most oustanding workers in the field of solar and terrestrial physics.

Members of the RSGB are reminded that an illustrated tape lecture by Mr C. E. Newton, G2FKZ is available from the Society's tape library. The lecture includes some of the material that was presented at Sheffield.

First G Operates in OK

The first British amateur to receive a licence for use in Czechoslovakia is K. M. Bishop, G3LQB. The call-sign OK8AAA has been issued for use on 160, 80 and 20m (mobile) from 26 July to 9 August while G3LQB is in Czechoslovakia on holiday.

Moon Repeater on 432 MHz

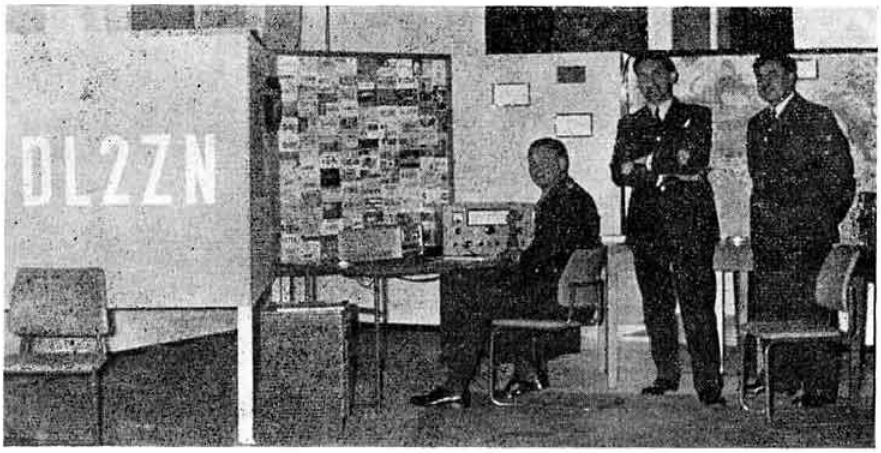
By the early 1970s it is hoped to have an active 432 MHz repeater station on the moon. The package, which will weigh (weight or mass?—Ed.) between 2·25 and 4·5 kg goes under the title of " Project Moonray." It is proposed that the repeater be placed on the moon by members of the third United States manned mission. Progress reports, specifications and other information will be transmitted from the Nassau College Amateur Satellite Tracking Organization (NASTAR), Garden City, USA, by teleprinter on one of the amateur bands.

Changes in QSL Sub-Managers

With effect from 1 August, F. H. Bliss, G3IFB will be the new sub-manager for the G3 L/M/N series. His address is " Coppalex " North Road, The Reddings, Cheltenham, Glos.

On 20 August, G. L. V. Butler, G2BUL, the sub-manager for the G3 I/J/K series and all BRS and Associate members of the RSGB will be moving to 9 The Heath, Chaldon, Caterham, Surrey, CR3 5DJ.

H.R.H. Princess Alexandra visited the "Forward to the '70s" exhibition laid on by the Ayr and District Junior Chamber of Commerce on 7-11 May. Space was allowed to the Ayrshire Amateur Radio Group, who put on a station signing GB3AYR, and here Princess Alexandra is seen talking to a visiting SWL while operators Joan Fish, GM3NYG and Gilbert Thomson, GM3TPW, look on.



The RAF Rheindahlen Amateur Radio Club took part in the recent three-day RAF Germany "Hobbies and Handicrafts Exhibition", by laying on a station DL2ZN. Three of the operators, Col. J. C. Clinch, DL5XR (Club President), Master Air Electronics Operators N. G. Cooper, DL5XD, and Chief Technician W. E. Dufton, DL5XC, are grouped around the KW201 receiver, KW Viceroy transmitter and Shure microphone.

The Australian EEB

This is an informal electronic experimenters bulletin edited by R. L. Gunther, VK7RG, and published monthly in Tasmania. The contents are almost entirely devoted to semiconductor devices and circuitry. In addition to descriptions of complete units there are informative comments on a variety of subjects and reviews of articles published in other journals. A year's subscription costs 15s. (sterling) and remittances should be sent to R. A. Walton, 115 Wilmot Street, Huonville, Tasmania 7109, Australia.

73 Magazine Subscription Rates

Notice has been received from 73 Magazine that the one year subscription rate is to be increased from $5 to $6 worldwide whilst the three year rate is reduced from $13 to $12. The two year rate is being discontinued. Subscriptions can be remitted via the Society with the equivalent sterling payment. The present dollar equivalent is 8/4d.

Silent Keys

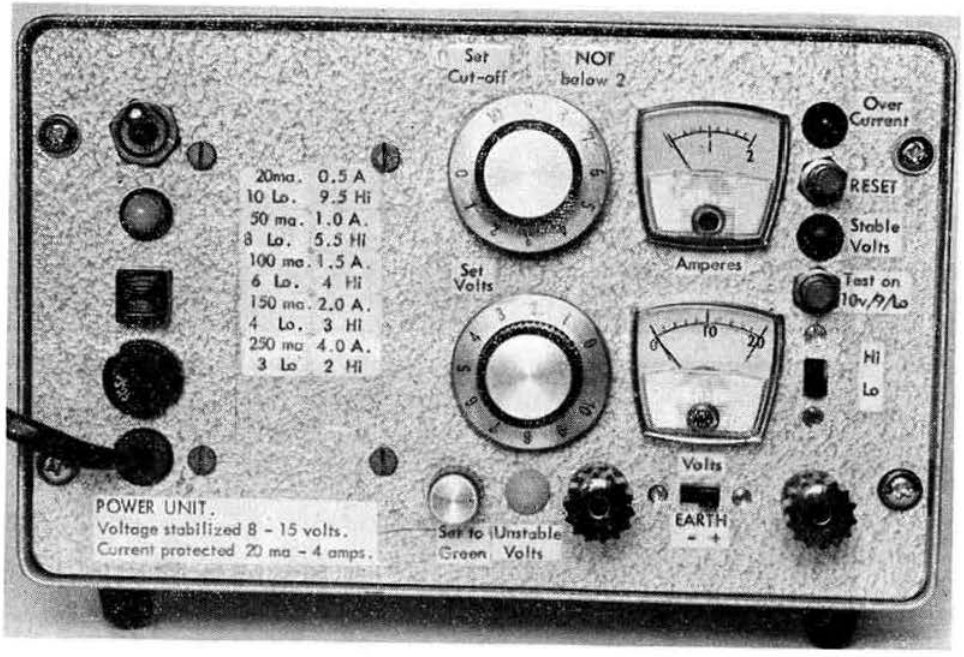
We record with sorrow the passing of the following amateurs:

M. P. Nicholson, MIEE, G2MN, of Havant, Hants.
H. F. Miller, G3CFB, of Oakham, Rutland.
H. J. Lawn, G3HLY, of Godalming, Surrey.
L. W. Osmond, GW2BBO, of Penarth, Glam.
D. Gwyn Johns, GW6GJ, of Swansea, Glam.
S. J. Hunter, W3VTT, of Glen Mills, Pennsylvania, USA.
A. Gamman, ZL2UD, of Hastings, New Zealand.

Oops . . .

Last month we reported G8IP having been awarded an MBE, but were unaware of another member who achieved the same distinction, Mr C. A. G. Meadows, G3RVV, and consequently did not mention it. We should also have noted that the distinguished list of CBE awards included Mr C. M. Benham, G4TZ.

A Voltage Stabilized Variable Current Overload Protected Power Unit



W. H. BOND, F.R.C.S., G3XGP*

FILLING the gap between taking the RAE and the result is difficult, for one does not like to presume the result by constructing a transmitter or learning Morse, neither does one feel so pessimistic that " swotting " must continue. As far as I was concerned, the gap seemed most appropriately filled by the construction of an utterly safe low voltage current protected power unit—a good exercise whether a fail or pass was achieved. The requirements of the unit were 9-12 volts stable to better than 5 per cent at 4 amps maximum with current protection to cut off immediately on overload. Interest centred on a design published in the *Bulletin* (July 1967) by S. F. Weber, G8ACC, in which the voltage developed across a sensing resistance was used to switch a tunnel diode from its low to the high voltage state when a fixed preset current was exceeded. Two defunct tunnel diodes later—at 22s. 6d. a time—it was apparent that pocket protection was even more desirable and redesign was called for. The circuit to be described was developed from Sven Weber's design, but does not use a transistor costing more than 7s. 6d., provides a stable variable 8-15 volt supply, and switches off instantaneously when a variable preset current is exceeded. The preset current can be varied from 4 amps to as low a level as is required; indeed it can be made to operate at a single milliamp although the design figure is 20 mA.

* 23 Chantry Road, Moseley, Birmingham 13.

The Circuit

Transistors 3, 5, 6, 7, with associated ZD1, 2, and R7, 8, 10, 11 and RV3 form a conventional voltage stabilizer circuit. The output voltage is preset by RV3, the lower limit defined by ZD2 and the upper by R10, the combination stabilizing the base-emitter voltage of TR5. TR4 operates as a switch for when hard on TR5 base is effectively at ground level and the output voltage virtually zero. TR4 base is normally at ground potential so that voltage stabilization is unaffected, TR4 being passive until actuated by the current sensing and latching circuit formed by TR1 and 2, R1, 2, and 5, and RV1; pilot light P1 indicates that current overload has occurred. Current sensing is done by R3 and 4 either of which may be selected by S1a, a variable part of the voltage developed across the resistance being applied to the base-emitter junction of TR1. At about 0·6 volt TR1 conducts, this potential also being applied to the base of TR4 which switches on bringing its collector and thus the collector of TR3 down to ground level, effectively bringing TR7 emitter and thus the output potential down to zero. When TR1 conducts it raises the base-emitter potential difference on TR2 which switches on, TR2 forming part of the bias chain for TR4—the potential difference across R5 maintains TR4 hard on. The circuit thus maintains TR7 at ground level until the reset button is closed cutting off TR2, TR1, TR4,

the control voltage via TR6 then being resumed. Rectification and smoothing are by a conventional bridge circuit using a Douglas MT5 transformer, a 4000 μF capacitor and 1 ohm resistance for smoothing, with 0·25 μF and 330 ohms resistance across the secondary for surge limiting. Diagrams are not necessary.

Luxuries

LP1 is an 80 mA pilot lamp serving to indicate that the preset current has been exceeded and replaces a collector load for TR2. TR8, RV2 and LP2 provide another indication that the output voltage is nil, LP2 flickering to show that voltage regulation is taking place, the relative illumination of LP1 and LP2 indicating stabilized to unstabilized voltage.

The greatest advantage of this circuit over the original lies in the latching circuit and the ability to vary the sensing potential, through RV1. R3 and R4 should be individually selected their exact value depending on the standing currents through the voltage stabilizing transistors. A value of 500 ohms for R3 gives 1 mA sensitivity, and in practice 6 ohms is adequate with a minimum preset value of 20 mA. C2 switched in on the high current range provides additional smoothing, but is excluded on the low current range otherwise cut off is not instantaneous. Using a low voltage Zener for ZD2 the output voltage can be brought down to under 4 volts, and the diode across the output short circuits reverse voltages from inductive loads. Building the unit on an insulated board, simple switching can earth either negative or positive supply. A test button shorts the output across 800 ohms and checks the cut-off circuit. Finally, cheap p-n-p silicon transistors with transistor switch. The circuit is so simple that I wouldn't be surprised to see it stolen, patented, commercialized and sold to the public!

COMPONENTS LIST

R1	330 ohms
R2	4·7 k ohms
R3	6 ohms
R4	0·5 ohms
R5	150 ohms
R6	6·8 k ohms
R7	330 ohms
R8	6·8 k ohms
R9	22 k ohms
R10	2·2 k ohms
R11	1 k ohm
R12	100 ohms
RV1	100 ohms
RV2	470 k ohms
RV3	1 k ohm
C1	0·05 μF
C2	250 μF
TR1	BCY38, 39, 40 or 54
TR2	BFY50, 51 with 3cm² heat sink
TR3	BFY50, 51
TR4	as TR1
TR5	as TR1 with 3cm² heat sink
TR6	as TR1
TR7	OC36
TR8	BFY51 with 3cm² heat sink
ZD1	3·9 V
ZD2	7·8 V or to choice
D1	OA10
LP1	20 volt 0·1 amp pilot bulb, or with cold resistance of 80 ohms minimum
LP2	20 volt 0·1 amp pilot bulb, or with cold resistance of 80 ohms minimum

Construction

Etched copper laminate is far the easiest method of building this, sketching the circuit onto the copper, covering with

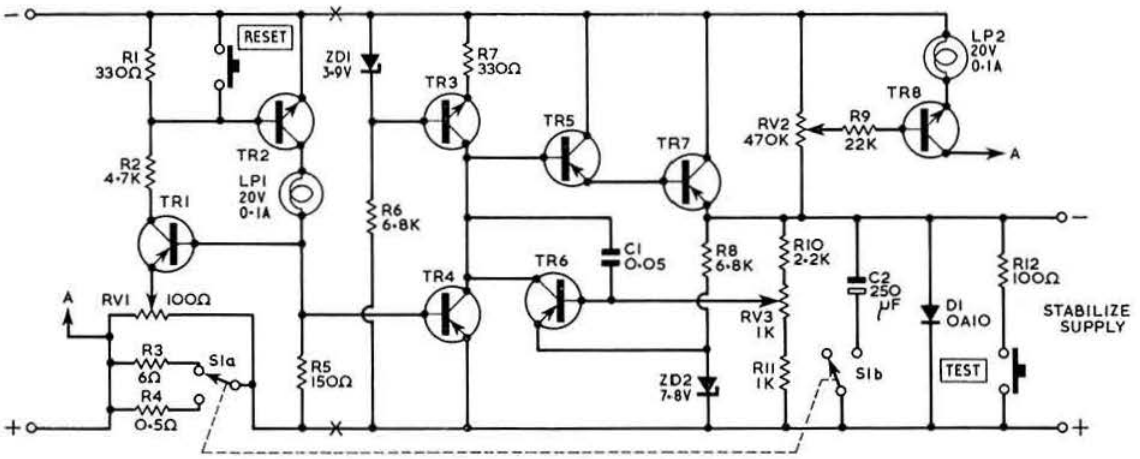


Fig. 1. The power supply, complete except for the mains transformer, rectification and smoothing circuitry.

very low leakage currents insulate the circuits and keep the cut-off voltage to extremely low figures.

Non-luxuries

Note that the essentials of the circuit lie between the input points and the X on the circuit diagram. For those who wish to apply a safety circuit to an existing power unit this section with LP1 replaced by an 800 ohm Post Office relay of suitable type will cut off the power supply with the same levels of sensitivity though without the instantaneity of the clear adhesive plastic film (Fablon) and using a surgical knife to trim off unwanted film prior to dissolving unwanted copper in ferric chloride solution. The lower value sensing resistance R4 is made from readily available resistance wire, and fuses safely if dramatics occur in the entrails rather than the external circuits. Similar wire is used to make the resistance in the smoothing circuit to form a second line of defence right on the transformer secondary, making this a truly safe unit. The photographs and diagrams show constructional details, the paxolin carrying the circuit boards being mounted on the back of the transformer, and the linking

leads to the panel being long enough to allow both to be laid flat side by side. The photographs show two output transistors, but one OC36 is preferable. The meters are revamped 50 microamp level meters at 15s. a time, the dials reversed, sprayed and relettered, with suitable series and shunt resistances, and the dial lights ex-computer. The mains transformer is designed for battery charging.

Performance and Precautions

A shorted load must obviously be removed before resetting the unit, but if this is likely to be forgotten, then the reset switch should be inserted in one or other main supply lines. For continuous running an average current of 2 amps at 13·5 volts appears to be safe and the voltage stabilization very good indeed, but continuous running at higher loads whilst practical is really beyond the capacity of the unit, things becoming very hot indeed!

The RSGB's Technical Committee have expressed some doubt over the possible over-running of TR1, 2, and 3, TR2 being particularly at risk. Whilst the author has had no difficulty, for those who do not wish to accept the need to replace TR2, and do not mind the lack of an over-current indicator, P1 should be replaced by a 3·3 k ohms resistor.

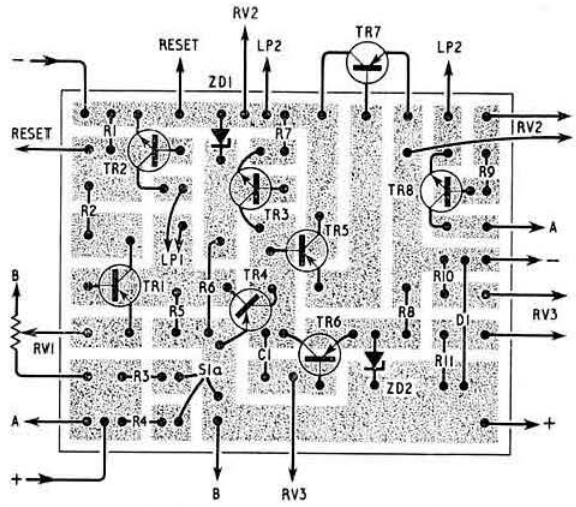
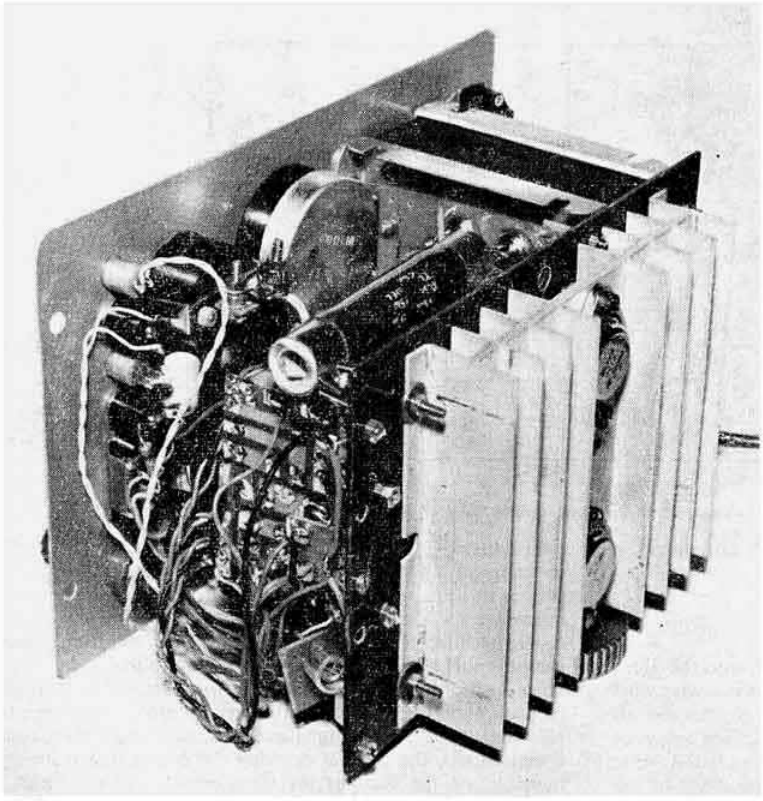


Fig. 2. Layout for etching the copper laminate board, seen from the copper side.

Applications

Not only is this a good little unit with a wide margin of safety suitable for feeding Class B modulators and Top Band transmitters but it is also ideal for experimental work. In particular the latching circuit has wide application as a simple bi-stable circuit being the complementary pair version of the asymmetrical Eccles-Jordan; it can be switched by negative or positive pulses of very low values applied either directly to the transistor bases or down a single line using steering diodes at one or other transistor.



G3XGP's power supply, showing the underside of the printed circuit board, and the heatsink carrying TR7, in this case consisting of two OC19s. These were later replaced by a single OC36. The 15 watt resistor is a 390Ω shunt across the rectifier output to limit the voltage and to discharge the smoothing capacitor on switch-off.

GB2LO

CITY OF LONDON FESTIVAL

By SYLVIA MARGOLIS

WE never realized, until we were irrevocably committed, just how big and ambitious the GB2LO project would be. Everybody said the idea would never get off the ground. There were too many qualifications to be fulfilled. The technical problems were forbidding. The length of operation would strain the Society's resources. It would be too expensive. We would never get permission for the venture from the City authorities.

At a meeting with the City of London PRO, with G2BVN, G3BID and myself, once the Festival authorities had ascertained that our idea wasn't going to cost them a penny, they agreed at once and thereafter lost interest in us. We were on our own from the start.

Location was the most difficult problem. It seemed impossible to find a prominent place within the City's 1·03 square miles, where the aerial could be mounted very high, where the public had controlled access, with total night and day security, with the minimum of expense to the Society, whose Council soon gave me the impression that it needed GB2LO like it needed a hole in its head! When I was ready to abandon the whole, delicious idea, a fortuitous combination of knowing the right people and an enormous slice of good luck brought us to the *Daily Mirror*.

They were already closely involved with the City Festival, promoting a sculpture display, the exhibition of Sir Alec Rose's *Lively Lady* and a children's procession. But, if the mighty machinery of the *Daily Mirror* was to handle the project, it must be done their way. My original vision of GB2LO's being set up on our customary RSGB shoestring faded. The *Daily Mirror* obtained permission (heaven knows how!) to mount an aerial on their roof and to erect a temporary building on the pavement at Holborn Circus; they obtained the building and installed it, carpeted and furnished it, provided a direct GPO telephone line; they provided all the display material, the graphics, publicity handouts and 1500 QSLs; they arranged police protection by day and Securicor protection at night; when we said the traffic noise would impede the efficiency of the station, they arranged for elaborate double glazing to be fitted; when we said it was too hot, they installed extractor fans; they provided an attractive magnetic map, which they later presented to us; we had the services of their carpenters and engineers night and day for two weeks.

The aerial, a three-band two-element quad, was put up two weeks beforehand in pouring rain and 70 m.p.h. gales by an RSGB party and the *Daily Mirror* team.

GB2LO strained Headquarters' resources to the limit, but Eric Dowdeswell, G4AR, the Society's General Manager, coped very well, considering that he had a Society to run, as well as to pander to this latest brainstorm of the Society's PRO!

It wasn't just a question of operating GB2LO. Operators had to be exceptionally experienced in s.s.b. h.f. operation—able to pick out the right signals (the loud, attractive ones that would entertain the public), and to handle the wolf-pack of prefix hunters. They had to be able to devote several days beforehand to the preliminary tests, be articulate extroverts and be tough physically. Conditions inside GB2LO were sometimes uncomfortable, despite the benevolent *Daily Mirror* and its magic wand. It was often crowded, stupefyingly hot or bitterly cold and, with 45,000 vehicles a day passing, and a bulldozer bulldozing across the road, the noise level, including the noise of the station's operation amplified for the public outside, was almost at the limit a human can stand for more than an hour at a time, according to one RSGB doctor-visitor. Some of the operators endured it for very long periods, day after day.

For the preliminary tests and setting up of the station we had G5AAM/WA6ZIQ, M/Sgt. Robert Lane, seconded for temporary duty from the US Air Force, for five days. Bob fulfilled every qualification we demanded of our operators, besides which he was able to give us 18 hours service a day the weekend before we set up shop.

From the beginning was justified our decision to install commercial equipment, rather than home-brew. Only a very few visitors showed any interest in the equipment details. What enchanted them was the radio amateurs' unique privilege, that they may talk to people all over the world, in the cause of international friendship. And, when we had our one real catastrophe—the mike played up an hour before the Lord Mayor was due to visit GB2LO and we thought the whole station had blown up—we were able to whip out the existing equipment and install a substitute within minutes.

The KW equipment behaved impeccably, considering the bashing it was taking! Radio conditions, of course, were awful. Nevertheless, we managed to work 108 countries, including some quite interesting DX. Once we were closed to the public, we could concentrate on real *amateur* operation, as opposed to *exhibition* operation. Between the two techniques there is a vast difference! G3UML did two all-night stints, chased by some of the biggest pile-ups he has ever experienced. G3MWG and G3OUF did some useful early-morning and late-night operation, including some c.w.

By arrangement with the police we were open to the public, with the public address operating, from 11 a.m. to 4 p.m. each day. The public were able to enter the station and Beryl Fletcher and I handled the public relations.

First contact: the KW GB2LO station with G3TR at the microphone and G3IUZ logging.
(Photo G3OUF)

John Graham, G3TR, RSGB President, opened the station on 8 July. First contact was an enchanted W2LEC, who will now be able to swap " fishing stories " with the even more enchanted W2RP, who spoke to the Lord Mayor of London. He was almost inarticulate with excitement.

The *Daily Mirror* gave us a party, attended by several V.I.P.s, including Mr George Wallace, M.P., Mr H. W. Atkins, *Daily Mirror* Director, with senior staff, RSGB President, Executive Vice-President and Council members, and the GB2LO helpers. The President presented Mr Atkins with a commemorative glass plaque, of quite unique design and craftsmanship, by courtesy of Joe Steele, G3KZI.

The " GB " prefix always attracts attention on the air and the " 2LO," with its sentimental associations of early BBC days, was a most successful choice of call-sign. The BBC covered the project in several Radio and TV Service programmes, one of them in Finnish!

One of the most significant incidents was when John Clarricoats, G6CL, in all his glory as Mayor of Enfield, arrived straight from a Mayors' service at St Paul's, to keep a sked with W1AW, the ARRL HQ station, with John Huntoon, W1LVQ, ARRL General Manager, operating. I understand from G6CL that this is the *first time* a formal Amateur Radio contact between RSGB and ARRL has ever occurred. If GB2LO had done nothing more than

Mr and Mrs Eric Dowdeswell, G4AR, Mr George Wallace, MP, and Rowley Shears, G8KW at the special reception.
(Photo G3NMR)

achieve this contact, in such gracious circumstances, I would have been proud and happy.

Whom should we thank? The *Daily Mirror*, of course, to whose generosity, omniscience and patience we could never pay sufficient tribute; Rowley Shears, G8KW, of KW Electronics Ltd., for the loan of the equipment; the US Air Force for the loan of Bob Lane; the City Police for their help support and patience, too! We thank all the RSGB members who survived the physical endurance test of installing and operating, for two weeks, GB2LO, especially G6RC, G2MI, G2OS, G3WRU, G4MJ, G3FKM and G3IUZ. We even thank the member who went off one night with the keys in his pocket, leaving us to walk up the walls next morning! We thank Mr Higgs, Chief Mechanical Superintendent of the *Daily Mirror*, an RSGB member, for his help and constant encouragement, and the Canteen Staff at the *Mirror*, who contributed to RSGB's enjoyment of the whole venture.

And what did we learn? We learnt that such a massive public relations display can do nothing but good for Amateur Radio, that by seeing the hobby at its glossiest, the public can be brainwashed away from its view of radio amateurs as kinks, kooks and assorted antisocial citizens! We learnt that, if we set our sights high enough, the sky's the limit for RSGB. And the whole operation cost the Society less than £40.

On right "Err . . . what's that? The latest boy-racer touch?" (An onlooker puzzling over G3WRU/M's mobile whip.)
(Photo G3NMR)

The etched-glass plaque presented to Mr H.W. Atkins by G3TR.
(Photo G3NMR)

THE RSGB SHOW

INTERNATIONAL RADIO ENGINEERING AND COMMUNICATIONS EXHIBITION

Royal Horticultural Society's New Hall, Greycoat Street, Westminster, London, SW1

The venue for this year's Exhibition is the same as the 1967 show. The Hall is only five minutes walk from the Victoria main line terminus and about the same distance from St James's Park station on the District and Inner Circle underground services. There are, in addition, numerous bus services running along Victoria Street, some three or four minutes walk from the Hall.

Parking is at meters although there are several garages in the area, including a multi-storey car park.

RECEPTION AREA

This portion of the stand will be in the charge of Michael Wallace, G8AKA, assisted by Mrs Eileen Vaughan, BRS26612, Council and Committee members and Headquarters Staff. RSGB subscriptions (both new and renewals), orders for badges and subscriptions for overseas periodicals will be dealt with at Reception in addition to general enquiries from Members.

Overseas visitors to the Exhibition should contact the Reception stand for any advice or assistance that they may require.

EXHIBITION STATION

This will operate on the h.f. and v.h.f. bands and, once again, will be manned by Ron Vaughan, G3FRV and operators from the Crawley Group.

GB3RS will operate on the bands between 3·5 and 28 MHz but this year, if our plans materialize, there will be no transmission from the hall itself except on 80 metres. Instead, there will be a station operating in the 70cm band and acting as a link between the Hall and the transmitting station in the Crawley area. The latter will have the advantage of an excellent location and the use of beam aerials which should enable many more contacts to be made.

GB2VHF will operate on the 2 or 4m bands, depending on activity, using a.m. These transmissions will be radiated through aerial systems located above the Hall.

Operating in co-operation with the RSGB Station will be the RTTY Station organized and manned by members of the British Amateur Radio Teleprinter Group. RTTY transmissions will use 850 Hz shift at a speed of 50 bauds and will normally be found on 144·6 MHz.

A special QSL card will be despatched automatically via the RSGB QSL Bureau for each contact with either station. Alternatively, visitors to the Exhibition may claim their QSLs at the Headquarters station stand. Your own QSL should be sent via the Bureau clearly marked GB2VHF/GB3RS via G3FRV.

HOME CONSTRUCTED EQUIPMENT

Following the excellent display last year the Society's Exhibition Committee has decided that the same pattern shall be followed in 1968. Only exhibits of a high technical or constructional standard will be displayed under the following arrangements:

(i) All items submitted for exhibition will be subject to acceptance by the Exhibition Committee.

(ii) Entries will be accepted (*a*) as items which have been the subject of published articles in the RSGB BULLETIN or RADIO COMMUNICATION during the period January 1967 to date. It should be made clear that only the member writing the original article will be allowed to enter; (*b*) from members who are prepared, if required, to write a constructional article for publication in RADIO COMMUNICATION featuring their entry, this article to be paid for at the normal rates.

(iii) Entrants will be required to certify that their entries were constructed entirely by themselves from commonly available materials and components.

(iv) RSGB members only will be eligible.

(v) The Horace Freeman trophy will be awarded for the most original piece of equipment on show.

(vi) Additional prizes may be awarded at the discretion of the judging Committee.

(vii) Members wishing to exhibit should write to the organizer, Mr A. J. Gibbs, G3PHG, 6 Dairyfields, Gossops Green, Crawley, Sussex, for entry forms.

Prizes will be presented by the President of the Society at 6.30 p.m. on Saturday, 5 October, the last day of the Exhibition.

INTRUDER WATCH

There will be a display showing the methods used by the Intruder Watch in locating and identifying commercial stations operating in exclusive amateur bands. The Organizer of the Society's Intruder Watch, Colin Thomas, GW3PSM, will be available to answer your questions.

EDUCATION COMMITTEE

Following the success of the Noviset equipment there will be further items in this range to be seen including a transceiver for the 3·5 MHz band, together with examples built by young amateurs. This exhibition is in the hands of Leon Newnham, G6NZ, and Tim Hughes, G3GVV.

BOOK SHOP

The complete range of Society publications will be available together with many other titles of interest to members. The new edition of the *Radio Communication Handbook* will be on sale together with *Amateur Radio Techniques* by G3VA, the new edition of the *Amateur Radio Circuits Book* and the 1969 edition of the *RSGB Call Book*. The joint Stand Managers will be W. R. Andrews, G3LRE, Ron Broadbent, G3AAJ and Phil Norris, G3ICI.

RECEPTION FOR OVERSEAS VISITORS

The Society is organising an informal Reception for overseas visitors, on the lines of that held in previous years, on Friday, 4 October at 7.30 p.m. Between 7.30 and 8.30 p.m. entry will be restricted to overseas visitors and invited guests, but Society Members may obtain tickets for this period at a cost of 7s. 6d. The Society hopes that all visiting amateurs will make themselves known at the Reception area, when arrangements will be made for them to attend the Reception.

OTHER FEATURES

The **Diplomatic Wireless Service** will be exhibiting some of their latest communication equipment on the centre stage display.

The **Manchester Group** of the **Radio Amateur Emergency Network** will be displaying their mobile operations room.

A display of operating certificates from the Societies of Region 1 of the IARU will be arranged by the RSGB Awards Manager, Chas Emary, G5GH, assisted by members of the Certificate Hunters Club.

An innovation will be a series of four lectures on technical subjects which will take place on the Thursday and Friday.

WEDNESDAY TO SATURDAY, 10 a.m.—9 p.m.

2-5 OCTOBER, 1968

Heat-Dissipating Valve Shields

By D. BYRNE, G3KPO*

IT is well known that modern valves get very hot, and most of us realize that they do not last nearly as long as they used to do in " the good old days." Like electric-light bulbs, they seem to be forever burning out, and the two facts are obviously related, for the hotter a valve gets, the shorter its working life.

An excellent example of the comparative temperatures is shown by the heat given off by the body of a small 6AQ5 —try pulling one out of its socket with your bare fingers immediately it is switched off, and remember that one could handle the 6V6 almost with impunity. They are the same valve, apart from size, but the 6AQ5 gets far hotter. The truly giant size of the old style valve, by present day standards, has doubtless a lot to do with its longevity for it has plenty of body-surface to dissipate internally-generated heat.

What can be done to improve matters? Some method of effectively increasing the outer surface of the hot valve is required so that it can dissipate heat much more quickly.

This problem set the writer thinking, and after some cogitation an entirely new type of heat-dissipating shield was evolved, which bears absolutely no relationship to the old familiar valve-screen. The latter pattern only succeeds in making the valve hotter, as it practically stops all circulation of air—just the opposite of what is required to cool things down!

The new KPO heat-dissipating shield is made up of several thin tin plates, each one slotted into the next like a Chinese puzzle. One side of half of an individual plate is in direct contact with the valve body (see " A " in Fig. 1), while the whole of the end of the plate acts as a cooling fin in circulating air (as at " B "). Heat is transferred by conduction from the valve body to the plate at " A," and transferred along the plate to " B," where it is dissipated into the air by convection as well as a certain amount of radiation. Each plate is painted matt black, except where it actually touches the valve, and this aids the cooling process.

The fins themselves can be twisted and bent into any shape in order to avoid nearby components, and if required, pieces can be snipped out of them, although this should seldom be necessary in practice as they are so flexible. No matter how crowded the chassis, provided there is a little space on at least one side of the valve, the shield will materially help in reducing its temperature.

A secondary advantage is that heat will be kept away from those nearby components which could so easily be damaged by an excess of radiation—electrolytic condensers in particular, which some manufacturers seem to delight in placing right next to rectifiers!

The heat-dissipating shield is simplicity itself to assemble from the individual plates, no tools, screws or nuts and bolts being required—merely a little juggling with the fingers. Slot " C " of one plate is slipped into either slot " D " or slot " E " of the next, until a complete circle is made, the right size to form a tight sliding fit on the valve body. (See

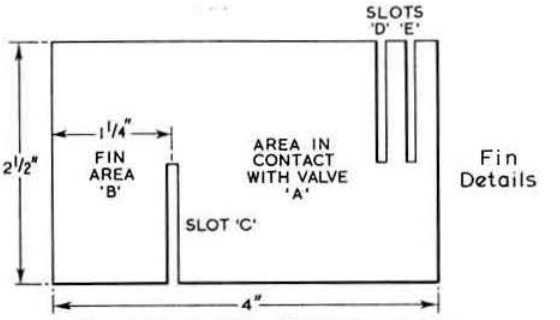


Fig. 1. The individual plate dimensions.

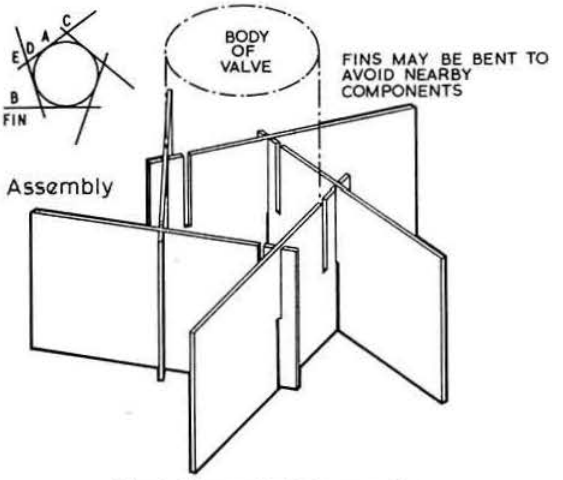


Fig. 2. The method of assembly.

Fig. 2). Half-a-dozen plates will fit a wide variety of valve sizes, for either four, five or six plates can be used, as required. Individual plates 4 in. long by 2½ in. deep make an ideal size for all medium-type transmitter valves as well as the usual run of rectifiers. By choosing either slot " D " or " E," the actual diameter of the shield can be varied in incremental steps. Of course, extra slots can always be cut if this is found to be necessary. The ideal fit is one which slightly bends each plate sufficiently for it to follow the contours of the valve body really snugly.

Remember that the valve cannot be damaged in any way by the shield for it will give and bend as the valve-body expands on warming-up and contracts on cooling down again afterwards. Neither need any force be used to get the shield on, as it will gently slide over the top either before the valve is placed in its socket or afterwards. Individual fin-tails can be " dressed " when the complete shield is finally in position.

Provisional Patents have been applied for by the writer but there is no objection at all to anyone " rolling his own " for personal use.

* Jersey House, Eye, Peterborough, Northants.

REGULAR FEATURE

TECHNICAL TOPICS

By PAT HAWKER, G3VA

RECENTLY, a US advertisement for a new s.s.b. transceiver included the proud claim that it is a " triumph of value engineering." At the moment this term, along with *cost-effectiveness*, is a vogue word in the electronics industry. Basically, as I understand it, value engineering implies that the maker has carefully sought out the lowest cost path to achieve a given standard or facility; this involves extremely careful analysis of every step in the production process in terms of the cost of basic materials, components, and labour to determine whether this is being done in the most economical way possible. Any frills, if they cost money without adding to the market value of the product, are rigorously deleted from the design or the manufacturing process.

It reminds one of the (apocryphal) story as to how broadcast radio and television chassis are supposed to be designed: first the prototype is made to work; then components are pulled out one by one until the set just stops working; then one component is put back in; and hey presto that's it.

Now in many ways value engineering is a very good thing. Firms have to make their designs competitive; and it is an excellent feature to feel that one is getting good value for money. So I am certainly not implying any criticism of the particular transceiver or manufacturer. But it will surely be a pity if this process leads to a sameness of approach, and the absence of all those extra facilities which often in the long run turn out to be of real value to an operator. For the experimentally inclined, too rigorous cost-effectiveness can stiffle new ideas. After all, if some of the war surplus equipments had been carefully value-engineered they would never have lasted so long!

In this connection, C. B. Raithby, G8GI, apropos my recent comment on plug-in appliance operation, considers (rather sadly) that this situation is an inevitable result of the coming of s.s.b. and the s.s.b. transceivers.

" Efficient yes—but how uninteresting and expensive . . . they can obviously inspire little enthusiasm in youngsters who see the same sort of thing in any electricity board HQ . . . today a DX contact may be just a link between two similar transceivers . . . shades of past amateur ingenuity."

Without by any means going the whole way—and having personally a good deal of admiration for the manner in which a compact transceiver can provide a highly effective h.f. station—one can see only too plainly what G8GI is getting at, even without the arrival of " value engineering."

It is no good being too nostalgic. There was a time when many amateurs stuck to spark because the valve seemed clinical and uninteresting in comparison. Some of us like seeing the glow of a valve heater rather than the squat impersonality of a transistor.

Rather, we have to ensure that despite all the many changes in components and equipments, whether home-built or factory-made, something at least continues of the old spirit of questioning, of ingenuity, and of personal innovation. Otherwise, we might as well rename the hobby " Amateur Operating," or (as I suppose someone will say rather wickedly) just " Radio Communication."

A recent *CQ* survey, based on 1100 replies to a questionnaire, suggests that 58 per cent of readers have " at least one piece of home-built equipment in the station." But on closer investigation, the most usual item of " home built equipment " turns out to be an aerial. So, put the other way, 42 per cent now have *no* home-thought-out items, not even an aerial!

Pocket Valve-voltmeter

The basis for a high impedance electronic voltmeter these days is usually either silicon transistors or FETs. For example the FET/bipolar unit described in *TT* (March, 1968) and about which, incidentally, a further suggestion has been published in *Electronics World* that it makes a useful approach to a receiver S-meter.

But many junk boxes still contain more valves than FETs, and a versatile little unit based on the old 3S4 battery valve appears in *Electronics Illustrated* (July, 1968) by W6FFS. This design (Fig. 1) is not intended for particularly high accuracy or linearity but can be used for odd measuring of d.c. volts up to about 500 while putting some 9-megohms across the line being measured. The " range " is selected by a linear pot rather than the usual switched high stability resistor network, allowing easy calibration against a good

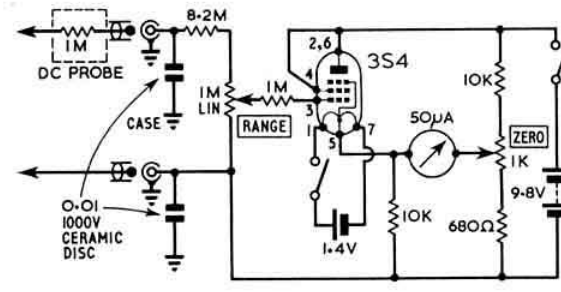


Fig. 1. Pocket valve voltmeter by W6FFS.
(Electronics Illustrated)

voltmeter with a minimum full-scale-deflection range of about 5 volts, and calibration marks to allow the pot to be re-set for ranges of 50 and 500 V. The original unit incorporates 1·4 V and 9·8 V mercury cells for " l.t." and " h.t.": it is calibrated first against 5 volts, and if the pot cannot be adjusted to give a full-scale-deflection a different value should be tried in place of the 8·2 M ohm input resistor.

For certain applications the meter can be adjusted by the zero setting control to give a mid-scale zero for such applications as the alignment of an f.m. discriminator. Since the two input sockets are both insulated from the small metal case, either positive or negative voltages can be measured.

Transistor Power Amplifiers

There can be little doubt that for most fixed station applications calling for more than a few watts output, the transistor is not yet the most " cost-effective " means of providing it. A transistor p.a. will almost certainly prove more expensive than a valve. But this does not mean that nobody should be trying them out. And linear amplification with bipolar transistors is still a real challenge.

Recently, I saw some impressive demonstrations of a new portable 100-watt p.e.p. output aperiodic linear amplifier (i.e. one requiring no manual tuning except of the aerial tuning unit throughout the band 2 to 12 MHz). This has been developed for military-type applications by Redifon engineers (including G3FRV and his colleagues) primarily for putting after their frequency-synthesized 15-watt manpack equipment.

But this new design incorporates a large number of ingenious ideas to prevent the eight power transistors (four 25-watt units each incorporating two transistors), immersed in liquid silicone coolant, from coming to any harm. Both the voltage and current supplied to the power transistors are continuously sampled by quick acting protection circuits, and the temperature of the coolant monitored to provide a thermal trip. The devices are operated at well under their nominal maximum ratings to overcome the inherent non-linearity of bipolar transistors. An interesting example of what can now be done, but also a warning against attempting to build relatively high power transistor amplifiers without adequate protection circuits. Once a transistor stage starts running into any of the very many forms of instability, the risk to the devices is considerable.

Derek Thom, G3NKS, recently drew attention to a Motorola application note: AN-150 " Getting transistors into single-sideband amplifiers." This is a good, if several years old, introduction, but few of the instability problems are discussed. AN-150 is available (one is supposed to write on a company letterhead) from Motorola Semiconductor Products Inc., PO Box 955, Phoenix, Arizona, USA: incidentally, later application notes on various transistor p.a. subjects are AN156, 214, 243, 246 and 282.

Class C amplification is generally less difficult, and a design for a 28-watt input, 17-watt output 14 MHz p.a., using the Mullard BD123, has been appearing in a number of that company's leaflets and publications (but note that due to a misprint some of the leaflets call it a " 17W a.m." unit which it is *not*). It can provide 17-watts c.w. *output* with a 28V supply and 1·1 watts drive, some 15-W from 24 V and about 5-W with 12-volts.

The circuit, Fig. 2, is fairly conventional but is useful since full component descriptions in British units are given. The circuit is matched to a 50-ohm source and load, with the

The Redifon GA480 linear amplifier and GR345 s.s.b. manpack undergoing a " field " demonstration in the hands of R. Vaughan, G3FRV (right) of the development team and K. E. Harris, Executive Director of Redifon Ltd.

transistor in common-emitter configuration. In the original, the 170 by 240 by 1·5 mm aluminium chassis was used as the heatsink, with the transistor insulated from it electrically with a mica washer, and the chassis bent into a channel section. The value of the base resistor varies from 0 ohms for 12-volt

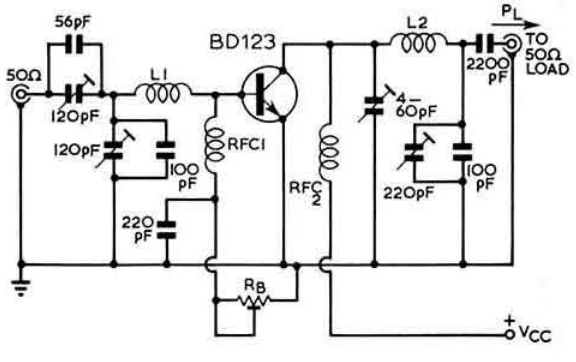


Fig. 2. Transistor power amplifier cable of providing 17 watts c.w. output at 14 MHz.

V_{cc} (V)	R_B (Ω)	P_{dr} (W)	P_L (W)
12	15	0·45	5
24	39	1·1	15
28	47	1·1	17

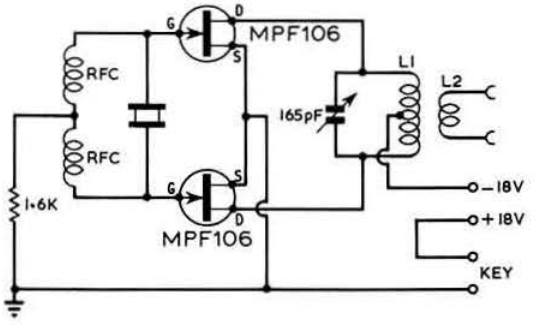


Fig. 3. QRP JFET c.w. transmitter by W2SMR. L1, 36 turns, 26 s.w.g. close wound on ½ in. diam. former. L2 is 4 turns over centre of L1.

supply to 100 ohms for highest efficiency with 24 or 28 V supplies.

L1 is 7 turns of 18 s.w.g. enamelled copper wire; close-wound and internal diameter 13·5 mm. L4 is 7 turns of 14 s.w.g. enamelled copper, 16·5 mm internal diameter, 32 mm length. L2 and L3 are r.f. chokes: L2 10 turns of 24 s.w.g. enamelled copper on Neosid slug (grade 900); diameter 6 mm; length 10 mm. L3 is 32 turns of 27 s.w.g. enamelled copper wire, close wound on air-cored former, diameter 6·4 mm.

A number of Mullard transistor circuits are brought together in a pamphlet TP990 from Industrial Electronics Division, Mullard Ltd, Mullard House, Torrington Place, London, WC1. Also useful is a booklet on the BD121, BD123 and BD124; this is TP888 if you can get hold of it.

But with transistors putting out watts, the QRP experts must be turning to other devices. A neat little 7 MHz transmitter using a pair of juncton-FETs and capable of some 700 mW input with 18 V supply or 225 mW with 9 V is given by W2SMR in *QST* (June, 1968): see Fig. 3.

Hint for KW2000A Owners

S. Weir (GM3SAN) has discovered a neat way of checking the 100 kHz crystal calibrator frequency on the KW2000 series by making use of 10 MHz WWV reception. This is possible by turning of the preselector knob to " 12 o'clock " (i.e. capacitor fully meshed) and listening for WWV on about 3710 kHz on the dial. This provides an " image " reception point on 10 MHz since the heterodyne oscillator is 6855 kHz, and with the dial at 3710 kHz the tunable i.f. is at 3·145 MHz; and $3710 + (2 \times 3145) = 10$ MHz. Once WWV or other 10 MHz standard frequency transmission has been located, the " calibrate " button can be pressed and, if necessary, any resulting beat note reduced to zero by adjusting the pre-set capacitor in the calibrator circuit. GM3SAN feels there must be many KW2000/KW2000A owners unaware of this facility.

He has also been doing some work on transformerless a.f. output stages for receivers, and we shall be returning to this subject another month.

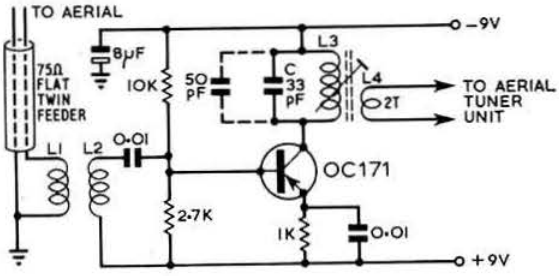


Fig. 4. Suggested preamplifier for 14, 21 and 28 MHz by G5BB.

Transistor Pre-amplifier for 21 and 28 MHz

The almost traditional pre-amp to hot up a receiver's performance on 21 and 28 MHz still shows few signs of fading out—no matter that the claimed noise and gain figures for modern receivers often suggest that this is an unnecessary luxury.

Alf Bruce, G5BB, sends along the details of a little gadget which he puts in the aerial feeder ahead of his aerial tuning unit. Although he has an EF183 in the receiver, he still finds the extra gain worthwhile, and since the gain is pretty flat over the band any touching up of tuning is done on the a.t.u. He puts the amplifier on to a 3¼ by 1¾ in. piece of Paxolin, and it can be used on 14 MHz by adding a fixed 50 pF capacitor as indicated. The amplifier is tuned up on the band required by adjusting the core of L3.

In view of the low input impedance one wonders whether a common-base arrangement might not be preferable, but the circuit shown in Fig. 4 is what G5BB is using. One also notes that there is no overload protection against signals from a local transmitter (for example by back-to-back diodes) although the low impedance input probably helps in this respect and also presumably keeps cross-modulation reasonably low, though one doubts whether an OC171 could cope with really hefty signals.

This gadget recalls a technique which is beginning to turn up more and more often in professional equipments, but which I have never seen referred to for possible amateur applications. Briefly, the idea is to use a fairly high-power r.f. transistor (typically an r.f. overlay type) in the first stage of a receiver or as a pre-amplifier. When biased to pass a standing current of quite a few milliamps, such a bipolar transistor can cope with a wide dynamic range of signals, and yet provide a low noise figure. One is putting almost a transmitting-type linear amplifier in front of the receiver or mixer; it reminds one of the once half serious suggestion of putting r.f. power valves in the front-end of receivers to improve dynamic range. But in this case the transistor is quite small, and need not be unduly expensive. Some of the professionals are certainly finding the idea worth using for various h.f. applications.

Transmitting Loop Suggestions

Interest continues high in transmitting loop aerials, and many comments and ideas are now appearing in *QST* and other US journals (e.g. " Ferris Wheel Antenna " in *73*, February 1968). K. Patterson, the designer of the original US Army loop has pointed out (*QST*, May 1968) that the *QST* version which produced disappointing results was by no means an exact copy, and that the matching constants seem wrong. Two other letters in the same issue suggest that loops can be made using the readily available 12 in. wide kitchen aluminium foil. In one case folded and Scotch-taped to the wall of an apartment with a minimum of folding; in another crumpled to form a rope-like conductor.

A note from R. L. Ames of Ingham suggests that a pipe loop aerial could be made up fairly easily using " Yorkshire " capillary (soldered) pipe fittings. He believes these would be simple to use, give a good soldered joint and could be disassembled; thus giving a low resistance joint without expensive equipment and possibly suitable for /A or /P with the help of ten minutes with a blowlamp. Am not sure what these fittings are made of—but willingly pass on the idea.

Oscillator Noise

As noted briefly last month both Alan Jubb, G3PMR and B. Priestley, G3JGO have commented on the question of oscillator noise (see *TT*, May 1968).

G3PMR, who has been interested in this subject for some time, has been measuring the noise (a.m. and f.m. sidebands) produced by a 5 MHz Pierce transistor oscillator using a variety of transistors. In view of the ultimate importance of this subject in the field of adjacent channel performance of receivers and transmitters, it seems well worth putting on record some of his findings.

(1) The low frequency noise performance of the transistor appears to have practically no bearing on the h.f. noise present in the oscillator spectrum. This, he notes, is contrary to what one would expect if it were assumed that the noise sidebands are produced by modulation of the carrier due to mixing of the l.f. noise and carrier by the non-linearity inherent in any oscillator circuit; so this does not appear to be what is happening.

(2) A.m. noise falls off relatively slowly, at about 3dB/octave of |(carrier—sideband frequency)|, while f.m. noise falls off at about 6dB/octave.

(3) Contrary to the quote from Edson (which was written before the era of transistor oscillators), G3PMR finds that the noise power relative to the carrier *does* increase as the carrier power increases, approximately linearly with emitter current.

(4) A large proportion of the f.m. noise appears to be caused by the cycle of collector-base voltage modulating the collector-base depletion layer capacitance, which in turn modulates the carrier frequency.

(5) Typical noise powers for this oscillator relative to the carrier at an emitter current of 1 mA are 145dB for a.m. and 125dB for f.m. referred to a bandwidth of 1 Hz, at 10 kHz from the carrier.

G3PMR points out that the figure I mentioned of 130dB in a 1 Hz bandwidth does not mean much, since it did not specify how close to the carrier this was measured. He has developed an interesting technique for measuring f.m. and a.m. noise in which the only commercial gear is a tunable selective amplifier, and with a discriminator based on the rapid change of impedance with frequency of a quartz crystal. Another section of his equipment which whets the curiosity is a v.x.o., and 'PMR hopes one day to get round to describing his circuit in *Radio Communication*. As one who still believes that the value of v.x.o. techniques has been underestimated, I for one hope he will do so!

G3JGO also notes that purity does not increase with oscillator output *per se*, an important factor being the level of oscillation inside the oscillator loop. He considers that provided the output power is sufficient to override the noise in the following amplifier there is no advantage in increasing the output coupling, as indeed this would reduce the tank circuit *Q*.

For most of us, this is still an esoteric subject and it is unlikely that many will want to undertake the fiddling job of noise measurements themselves. However, as we tried to indicate last May, the subject has very real practical importance, and this is likely to increase.

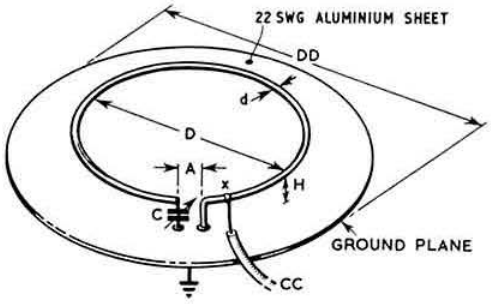


Fig. 5. 144 MHz DDRR Hula-hoop aerial by 5Z5FB. DD = 7 in. D = 5·4. H = 0·6. d = 0·1 (5Z4ZB used ⅛ in.). A = 0·3. X = 0·15 –1·0 in. (for best match to feeder). c = 1-15 pF. cc = 75 ohm semi-air spaced coax.

144 MHz DDRR Aerial

A. F. Ward, 5Z4FB has reported building a 145 MHz version (Fig. 5) of the ddrr " hula-hoop " aerial and obtained a v.s.w.r. of less than 1·2 : 1 at this frequency. He also feels that it should be possible to make a beam with horizontal polarization by turning the aerial on its side and adding quarter-wave loops at 0·1 and 0·2 wavelength spacing from the radiator, gradually reducing the diameter as with a Yagi. This seems a little debatable because of the dual nature of radiation from a ddrr, and the added complexity compared with a Yagi, but 5Z4FB intends trying it. Unfortunately, there is a shortage of 145 MHz operation in 5Z4!

Here and There

Recently, we finally got round to pulling out our old 807s from the p.a. and replacing them with a more modern TT21. Since there is rather poor ventilation, we were a little concerned to recall that the limiting factor in modern high perveance valves is bulb temperature. Somewhere or other we came across a note suggesting that one should be careful not to reflect heat back into these valves. Remembering the discovery some years back that a main cause of valve failure was the use of shiny aluminium screening cans, we have painted over the aluminium screening around the p.a. stage with dark paint. Whether or not this significantly lowers the valve temperature we have no means of knowing—but the tip might be worth following. At least the TT21 is working up to the time of writing!

Amateurs interested in EME (moonbounce) working are referred to an article by M. A. Weston in *Proc IEE* (May, 1968) giving an account of experiments by SRDE and RRE in moonbounce working at rates of 800 bauds or roughly some 50 teleprinter circuits using the DWS " Piccolo " signalling technique. This ran at 2624 MHz with RRE putting out 2 kW on a 45 ft. dish aerial, and SRDE receiving on a 17 ft. dish with maser pre-amplifier (overall receiver sensitivity about 250°K). Path loss at this frequency is about 278dB.

Crystal and Mechanical Filters

A Survey by P. G. MARTIN, B.Sc., G3PDM*

THE increasing popularity of single-sideband communication and the unrivalled performance of modern receivers has created a large market for high quality filters. Several manufacturers have introduced a low-cost range of filters with less stringent specifications for amateur use, and it is now a problem for the home constructor to choose the device most suitable for his equipment. With this in mind, the author has sought information on as many types as possible of those available in this country, and this is backed up by test reports on selected types towards the end of this article.

Full details are given only for filters which are useful for the standard amateur radio projects. Thus filter centre frequencies are limited to 100, 455 and 500 kHz, and 1·6, 9 and 10·7 MHz, and filter bandwidths are limited to below 10 kHz. Other filters of special interest are discussed under the heading of the relevant manufacturer.

Filter specifications

It will be obvious from the main table that there is a considerable spread in filter performance, particularly in shape factor and ultimate stop-band rejection. Requirements for these two parameters vary from one application to another: for a simple mobile s.s.b. transmitter a shape factor of 4 : 1 and a stop-band rejection of 35dB would be acceptable, whereas a good receiver might demand 1·5 : 1 and 80dB. Unfortunately the cost of a filter is closely related to these figures, and limited funds often affect equipment performance.

A further consideration when choosing a mechanical or crystal filter is the necessity of matching its input and output impedances. Many units are designed to be connected directly to valve or transistor circuits, but others require extra matching networks. Very often filter performance deteriorates under mismatched conditions, particularly in respect of passband ripple. In valve circuits the source and load impedances are generally greater than the resistive part of the filter impedance, and the matching circuit of Fig. 1(a) can be adopted. Here

$$C1 = C_o + \sqrt{\frac{2\pi f_o Q L1 C_a^2}{R_o}}$$

and

$$C2 = \frac{C_a\,(C1 - C_o)}{C1 - (C_o + C_a)}$$

where R_o = terminating resistance of filter
C_o = terminating capacitance of filter
f_o = centre frequency of filter
C_a = series combination of $C1$ and $C2$, and is a convenient low value of capacitance for the tuned circuit, say 20 pF for 9 and 10·7 MHz filters, and 100 pF for others.
Q = combined circuit Q of $L1$, source and load.

In transistor circuits the load impedance is often lower than the filter impedance, and Fig. 1(b) can be used. Here C_o is tapped in a ratio determined by

$$C4 = C_o \sqrt{\frac{R_o}{R2}} \text{ and } C3 = \frac{C4 \cdot C_o}{C4 - C_o}$$

where C4 includes the input capacitance of the transistor, and $R2$ its input resistance.

Brush Clevite Company Ltd.

Clevite filters consist of plated piezoelectric ceramic resonators stacked cylindrically and coupled together electrically and acoustically. The devices are particularly small, providing very good shape factors and a stop-band rejection of about 80dB. The TL-2D5A filter is recommended for s.s.b. service, and the upper and lower 6, 20 and 60dB points are given with each unit.

The Clevite Transfilters† (not in table) for transistor i.f. amplifiers are well known as simple coupling devices replacing conventional i.f. transformers, and costing less. They consist of a single ceramic disc with a dot (input) and ring (output) plated on one side, the other face being fully electroded for a common connection. The transformer ratio can be altered by varying the relative areas of the dot and ring. A typical response curve is given in Fig. 2.

Clevite also manufacture interesting mechanical filters for frequencies between 9 and 30 kHz. Mounted in HC-6/U crystal cans, these devices can be cascaded to obtain a symmetrical passband and an ultimate rejection of 60dB.

Cathodeon Crystals Ltd.

Cathodeon manufacture two miniature crystal filters for s.s.b., centred on 9 MHz. Carrier insertion frequencies are

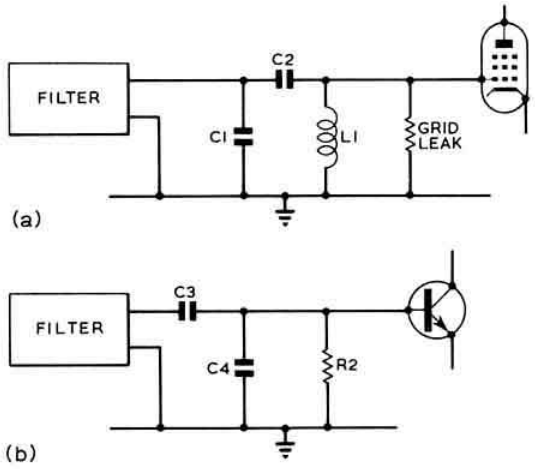


Fig. 1. Matching circuits for use where the load impedance is (a) higher, and (b) lower than the filter impedance.

* Oak Cottage, Witton Gilbert, Durham.
† Available from Lasky's Radio Ltd., 3-15 Cavell Street, Tower Hamlets, London E.1.

FILTER TYPE	C- Ceramic M- Mech. X- Crystal	6dB Bandwidth (kHz)	Shape Factor	at (dB)	Minimum stop band Rejection (dB)	Maximum Insertion Loss (dB)	Source Impedance	Load Impedance	Size (mm) R Rectangular C Cylindrical	Approximate Price £ s d	Suppliers
100 kHz filters											
Collins 526-7711	X	0·04[1]	6·0 : 1	1/60			1·5 kΩ	600Ω	R	30 9 0	A
Kokusai MF-100ZP-005R1	M	0·05[2]	16·0 : 1	3/50	60	10	20kΩ‖30pF	20kΩ‖30pF	R 157 × 31 × 63		C
Kokusai MF-100ZP-005R2	M	0·05[2]	16·0 : 1	3/50	60	10	600Ω‖50pF	600Ω‖50pF	R 157 × 31 × 63		C
S.E.I. QC 1173	X	0·3[2]	5·0 : 1	3/60	60	3	1kΩ	1kΩ	R 150 × 60 × 28		B
Marconi F2001	X	0·4	4·0 : 1	6/60	>50	9	18kΩ	18kΩ			M
Kokusai MF-100-02P	M	0·4	6·0 : 1	6/60	70				R 157 × 31 × 63		C
Marconi F2002-01	X	1·0	2·6 : 1	6/60	>70	16	18kΩ	18kΩ			M
Marconi F2002-02	X	1·0	2·6 : 1	6/60	>70	16	75Ω	75Ω			M
S.E.I. QC 1172	X	1·2[2]	5·0 : 1	3/60	60	4	1kΩ	1kΩ	R 100 × 60 × 28		B
Kokusai MF-100-06P	M	1·2	3·5 : 1	6/60	70				R 157 × 31 × 63		C
Marconi F 2003	X	1·5[2]	1·7 : 1	3/60	>65	16	18kΩ	18kΩ			M
Kokusai MF-100-10P	M	2·0	2·8 : 1	6/60	70				R 157 × 31 × 63		C
S.E.I. QC1171	X	3·0[3]	3·7 : 1	3/40	40	4	1kΩ	1kΩ	R 100 × 60 × 28		B
Kokusai MF-100-15P	M	3·0	2·2 : 1	6/60	70				R 157 × 31 × 63		C
455 kHz filters											
Collins 526-7703	X	0·1	7·2 : 1	6/60			1kΩ	1kΩ	R	26 5 0	A
Collins 526-7061	X	0·1	4·0 : 1	6/60			2kΩ	2kΩ	R 71 × 24 × 25	35 0 0	A
Collins 526-7067	X	0·2	4·0 : 1	6/60			2kΩ	2kΩ	R 71 × 24 × 25	35 0 0	A
Collins 526-7073	X	0·3	4·0 : 1	6/60			2kΩ	2kΩ	R 71 × 24 × 25	35 0 0	A
Collins 526-7079	X	0·4	4·0 : 1	6/60			2kΩ	2kΩ	R 71 × 24 × 25	35 0 0	A
Collins F455 FA-05	M	0·5	5·0 : 1	6/60		10			R 64 × 13 × 15	21 10 0	A
Collins F455 FB-05	M	0·54	5·7 : 1	6/60		10			R 64 × 13 × 15	27 5 0	A
Kokusai MF455-05D	M	1·0	4·0 : 1	6/60	50				R 50 × 26 × 80		C
Marconi F2007	X	1·2	3·3 : 1	6/40	>35		18kΩ ‖ 14pF	1·4kΩ‖50pF			M
Elliot PF1C/RX[4]	C	1·3	9·2 : 1	6/60		7			R 50 × 35 × 25	4 15 0	L
Kokusai MF455-10K	M	2·0	3·5 : 1	6/60			100kΩ	100kΩ	C 63 × 32 diam.	9 2 6	C, D
Kokusai MF455-10Z	M	2·0	3·0 : 1	6/60	40	10	10kΩ	10kΩ or 1 kΩ	R 45 × 15 × 15		C
Clevite TL-2D5A	C	2·0	2·5 : 1		80	10	2·5kΩ	2·5kΩ	C 39 × 8 diam.	14 10 0	E
Elliot PF1/SB	C	2·1	4·75 : 1	6/60		6			R 50 × 35 × 25	4 15 0	L
Collins F455 FA-21	M	2·1	2·5 : 1	6/60	60	10	100kΩ‖130pF	100kΩ‖130pF	R 64 × 13 × 15	12 10 0	A
Lafayette MF455-10ZA5	M	2·22	2·3 : 1	6/60		4·5	10kΩ	10kΩ	R	9 19 6	F, G
Elliott PF1A/RX[4]	C	2·3	4·35 : 1	6/40		6			R 50 × 35 × 25	4 15 0	L
Kokusai MF-455ZM-24PM[4]	M	2·4	2·0 : 1	6/66	60	15	20kΩ‖30pF	20kΩ‖30pF	R 92 × 22 × 21		C
Collins F455 FA-27	M	2·7	2·3 : 1	6/60	60	10	50kΩ‖130pF	50kΩ‖130pF	R 64 × 13 × 15	13 10 0	A
Kokusai MF455-15K	M	3·0	3·0 : 1	6/60			100kΩ	100kΩ	C 63 × 32 diam.	9 2 6	C, D
Marconi F2006	X	3·0	2·0 : 1	6/60	>70		18kΩ‖14pF	800Ω‖200pF			M
Collins F455 FA-31	M	3·1	2·1 : 1	6/60	60	10			R 64 × 13 × 15	17 10 0	A
Elliott PF1B/RX[4]	C	3·8	3·7 : 1	6/40		5			R 50 × 35 × 25	4 15 0	L
Collins F455 FA-40	M	4·0	2·1 : 1	6/60	60	10			R 64 × 13 × 15	17 10 0	A
Clevite TL-4D8A	C	4·0	2·0 : 1		80	7	2·5kΩ	2·5kΩ	C 39 × 8 diam.	14 10 0	E
Collins F455 FA-60	M	6·0	2·1 : 1	6/60	60	10			R 64 × 13 × 15	17 10 0	A
Clevite TL-6D11A	C	6·0	1·9 : 1		80	6	2·5kΩ	2·5kΩ	C 39 × 8 diam.	14 10 0	E
Clevite TL-8D14A	C	8·0	1·8 : 1		80	5	2·5kΩ	2·5kΩ	C 39 × 8 diam.	14 10 0	E
Clevite TL10D9-20A	C	10·0	2·0 : 1		50	4	2kΩ	2kΩ	C 23 × 8 diam.	8 10 0	E
500 kHz filters											
Collins 526-7323	X	0·16	5·0 : 1	3/60			1kΩ	1kΩ		39 15 6	A
Collins 526-7685	X	0·27					1kΩ	1kΩ		68 17 0	A
Kokusai MF-500 07N	M	1·4	2·5 : 1	6/60	50				R 73 × 26 × 34		C
Kokusai MF-500 30N	M	6·0	2·33 : 1	6/60	50				R 73 × 26 × 34		C
Clevite TL10D9-20C	C	10·0	2·0 : 1		50	4	2kΩ	2kΩ	C 23 × 8 diam.	8 10 0	E
1·6 MHz filters											
S.E.I. QC1113A	X	0·15[2]	3·33 : 1	3/60	60	6	75Ω	75Ω	R 71 × 35 × 41		B
S.E.I. QC1193E	X	0·2	7·0 : 1	6/60	60	3	1kΩ	100Ω	R 70 × 25 × 29	25 0 0	B
S.E.I. QC1193D	X	1·4	4·0 : 1	6/60	60	3	1kΩ	100Ω	R 70 × 25 × 32		B
Collins 526-7402	X	2·8	5·4 : 1	6/60			9kΩ	9kΩ	R	53 12 6	A
S.E.I. QC1193C	X	3·2	4·0 : 1	6/60	60	3	1kΩ	100Ω	R 70 × 25 × 29	25 0 0	B
S.E.I. QC1193B	X	9·0	4·0 : 1	6/60	60	6	1kΩ	100Ω	R 70 × 25 × 29		B
9 MHz filters											
KVG XF9B-01	X	2·0	1·75 : 1	6/60	80					16 0 0	J
Cathodeon BP4119	X	2·22	2·2 : 1	6/45	35	3	560Ω‖25pF	560Ω‖25pF	R 36 × 27 × 19	10 2 6	H
Cathodeon BP4122	X	2·22	2·2 : 1	6/45	35	3	560Ω‖25pF	560Ω‖25pF	R 36 × 27 × 19	12 10 0	H
KVG XF9B	X	2·4	1·66 : 1	6/60	80	4	620Ω‖30pF	620Ω‖30pF	R 36 × 27 × 19	£16/20	G, J
KVG XF9A	X	2·5	1·7 : 1	6/50	45	3	500Ω‖30pF	500Ω‖30pF	R 36 × 27 × 19	15 15 0	G
McCoy 32B1	X	2·8	1·56 : 1	6/50	45		560Ω	560Ω	R 44 × 32 × 35	17 12 0	D
McCoy 48B1	X	2·8	1·44 : 1	6/50	55		640Ω	640Ω	R 62 × 42 × 35	23 2 0	D
McCoy SSB-9	X	2·8	1·53 : 1	6/50	45		560Ω	560Ω			—
10·7 MHz filters											
S.E.I. QC1062G	X	7·5[3]	3·33 : 1	3/90	90	3	560Ω‖25pF	560Ω‖25pF	R 36 × 27 × 19		B
S.E.I. QC1121E	X	7·5[3]	3·33 : 1	3/80	80	3	560Ω‖15pF	560Ω‖15pF	R 38 × 18 × 15	14 18 0	B
S.E.I. QC1121D	X	7·5[3]	3·33 : 1	3/55	55	3	560Ω‖25pF	560Ω‖25pF	R 38 × 18 × 15	11 3 4	B
STC 445 LQU 901C	X	7·5[3]	2·3 : 1	3/70	90	4·5	470Ω‖25pF	470Ω‖25pF	R 36 × 27 × 19		K

Notes: 1. 1dB bandwidth 2. 3dB bandwidth 3. Available with centre frequencies of 455, 465 or 470 kHz. 4. Centre frequency 457 ±1 kHz.

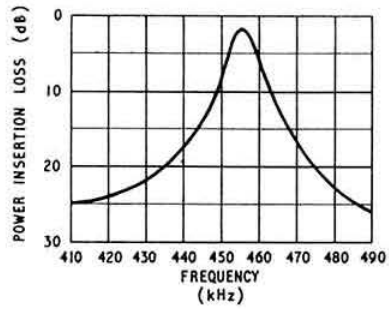


Fig. 2. Typical response curve obtained with the Clevite TO-O2A Transfilter for 455 kHz.

only 12dB down the filter response, so a good balanced modulator will be needed. Cathodeon recommend adjusting the filter matching network to resonate just below the centre frequency, so that it always looks into a capacitive termination. In this way the filter can be matched over a wider frequency range.

Collins Radio Company

Collins have extended their range of low-cost 455 kHz mechanical filters, bandwidths now available ranging from 500 Hz to 6 kHz. As in other mechanical filters, selectivity is achieved by a series of resonant high-Q metal discs, coupled together with rods which determine the bandwidth. In the Collins filters a magnetostrictive transducer is used to convert electrical signals into mechanical oscillations: other types use the piezoelectric effect.

Collins also produce computer-designed narrow-band crystal filters with a wide range of characteristics, and which can be made to customer specification for the same price as stock items. Although these are quite expensive, the shape factor of the narrow c.w. filters is very good. For details of filters on non-standard i.f. frequencies, request Bulletin CF 1001 from the UK agents (see list).

Elliott Electronics

G3FMO offers a further selection of low-cost ceramic filters for s.s.b. equipment and receivers. Filters are mounted on printed circuit board, or for a nominal extra charge can be supplied as plug-in units. Single ceramic resonators are also available for use in b.f.o. and carrier insertion circuits. Recommended carrier frequencies are issued with each filter, together with circuits for valve and transistor s.s.b. exciters.

List of Distributors

A. G. A. Stanley Palmer Ltd., Island Farm Avenue, West Molesey Trading Estate, Surrey.
B. Salford Electrical Instruments Ltd., Times Mill, Heywood, Lancs.
C. The Plessey Company Ltd., Abbey Works, Titchfield, Fareham, Hampshire.
D. KW Electronics Ltd., 1 Heath Street, Dartford, Kent.
E. Brush Clevite Co. Ltd., Thornhill, Southampton (minimum order £5).
F. G. W. Smith & Co. Ltd., 3-34 Lisle Street, London WC2.
G. J. B. Lowe, 51-53 Wellington Street, Matlock, Derbyshire.
H. Cathodeon Crystals Ltd., Linton, Cambridge.
J. Light Electro-Developments Ltd., Tattingstone, Near Ipswich, Suffolk.
K. Standard Telephones & Cables Ltd., Edinburgh Way, Harlow, Essex.
L. Elliott Electronics, 3 Sandgate Avenue, Tilehurst, Reading, Berks.
M. Marconi Ltd., Chelmsford, Essex.

Kokusai Electric Company

Kokusai's 76-page catalogue lists several hundred types of mechanical filter, of which only two are well known in this country: the MF-455 10K and 15K. Other types are available, however (see table). It is interesting to note that Kokusai make mechanical filters for the audio spectrum, from 300 Hz to 6 kHz, and also for the range 64 to 120 kHz. Both Kokusai and Collins make filters for a 250 kHz intermediate frequency. Filters in the 455 kHz range are available in rectangular cases as well as the more familiar cylindrical units, and are made for both valve and transistor impedance levels. Although the insertion loss of Kokusai filters is rather high, experimenters have found that the shape factor is usually much better than the "worst case" quotation from the manufacturers. Up to 10 mA of d.c. can be put through the input and output coils.

Kristall-Verarbeitung-Neckarbischofsheim G.m.b.h. (KVG)

Three 9 MHz s.s.b. filters by KVG are available in this country; see Figs. 9 and 10 for curves. Ultimate stop-band rejection is better than 100dB in the two better filters: to get full benefit from this, screening and h.t. decoupling must be perfect. KVG also make wide-band 10·7 MHz crystal filters. The 9 MHz filers are supplied complete with two carrier insertion oscillator crystals.

Lafayette Radio Electronics

The Lafayette mechanical filter available in this country is rather similar to some of the Kokusai types, both in appearance and performance. Carrier frequency attenuation and other information is marked on the can of each filter.

Marconi

Marconi manufacture several professional crystal filters although they seem to have rather high insertion loss. Type F2007 is intended for tandem operation with Type F2005.

McCoy Electronics Company

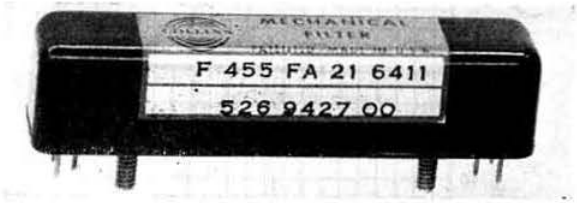
McCoy 9 MHz s.s.b. crystal filters are popular in the States for use in H.F. exciters. Prices include carrier insertion crystals and recommended circuits.

Salford Electrical Instruments Limited (GEC)

SEI manufacture a range of crystal filters for professional use, although several types are suitable for s.s.b. or c.w. amateur equipment. Not included in the table are asymmetrical s.s.b. filters for independent sideband systems and wide-band filters for mobile radio centred on 10·7 MHz.

STC and Electroniques

At present the STC range of standard crystal filters includes only 10·7 MHz types with bandwidths from 7·5 to 32 kHz. The 7·5 kHz filter (445 LQU 901C) has a shape factor of 2 : 1 and an ultimate rejection better than 90dB.



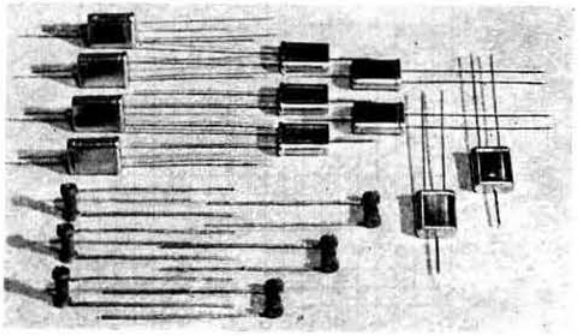


Fig. 3. The Collins F455 FA-21 mechanical filter, one of their low-cost amateur range. *(top left)*

Fig. 5. The constituent parts of an STC 10.7 MHz filter for mobile radio. *(top right*

Fig. 4. A filter from the KVG range. *(lower left)*

Checking Filter Responses

G3EDD recently passed on to the author details of measurements he had made on several different filters with the aim of checking manufacturers' claims, particularly in respect of shape factor and spurious responses. Experiments were carefully controlled, and used a Marconi TF2002 as a signal source.

Results are plotted in Figs. 7 to 12. The same scale is used on each graph so that fair comparisons can be made, and both measured response and manufacturers' claims are shown. Whereas the KVG crystal filters and Collins and Kokusai mechanical filters were all within specification, the cheaper Elliot PZT ceramic filters were well outside. In the case of the KVG filters, the actual response was so close to the claimed response that it was impossible to plot the two on one graph! Sample A of the Elliot PF1A/RX filter was found to be faulty, and was replaced by sample B.

Kokusai is the only firm publishing typical spurious response charts in their literature, and the experimental results in Fig. 6 are similar to them. Most filters have these spurious responses, which are due to complex modes of vibration in the quartz, ceramic or metal elements. Their importance is questionable when designing most communications equipment, although one could envisage trouble in some types of frequency synthesizer. Salford Electrical (GEC) claim in their literature that the ultimate stop-band rejection is maintained (free of spurious responses) 100 to 300 kHz either side of the centre frequency.

Conclusions

One obvious inference from the main table is that the more one is prepared to pay for a filter, the better it will be. The spread in performance between the cheapest amateur filters and the best professional types is incredible, and in the author's opinion the price differences are well justified.

At least three firms have been omitted from this survey. A UK agent for Murata mechanical filters could not be located, and literature was not forthcoming from Plessey's Filter Unit or from S.S.B. Products of Derby.

continued

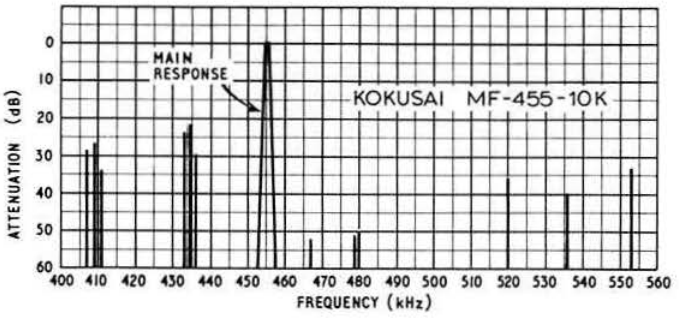


Fig. 6. Plot of the spurious responses of the Kokusai MF455-10K mechanical filter. Most filters using mechanically resonant elements exhibit spurii of this type, although some manufacturers manage to hold them below 60dB or so.

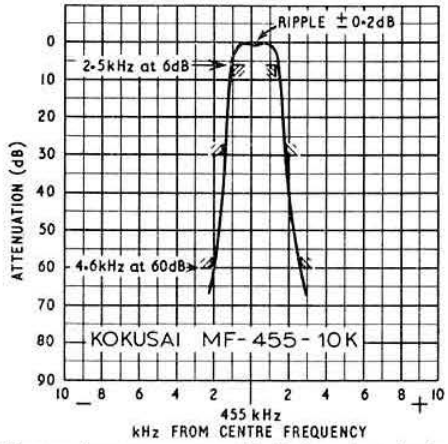


Fig.7. Measured response curve of a Kokusai mechanical filter, for comparison with manufacturer's claimed response, which is defined by the hatched areas.

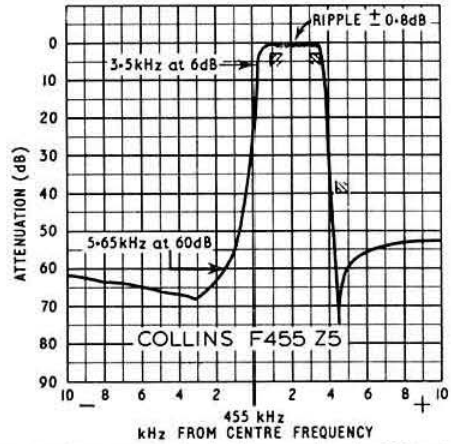


Fig. 8. Actual response of a Collins mechanical filter intended for independent sideband systems with an I.f. carrier frequency of 455 kHz. This particular filter does not appear in the main table.

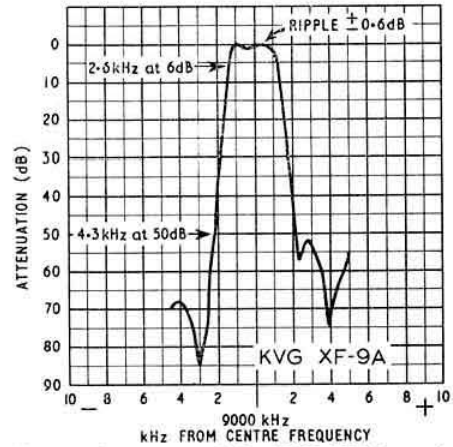


Fig. 9. Measured response of the KVG XF-9A crystal filter, centred on 9 MHz. The manufacturer's claimed response coincides exactly with the measured response down to the 50dB level, and is not plotted.

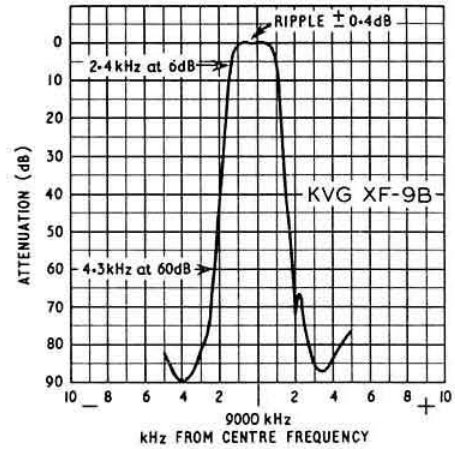


Fig. 10. The response of the more expensive KVG filter, which claims an ultimate rejection of more than 80dB. Again the claimed response coincides with the measured response.

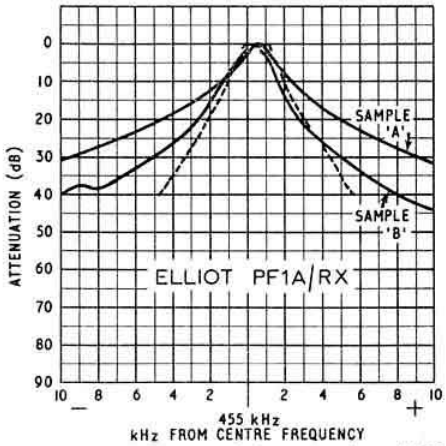


Fig. 11. Measured response of two samples of Elliot Electronics' PZT ceramic filter (the broken line is the claimed response). Sample " A " was found to be faulty.

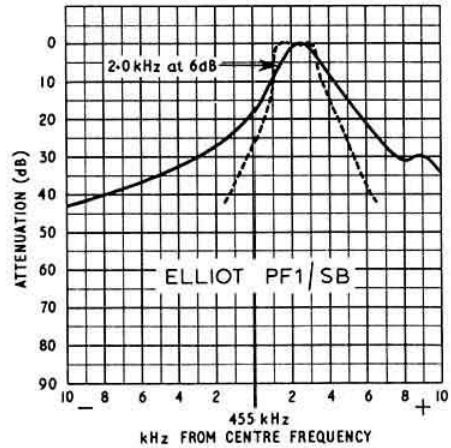


Fig. 12. Measured response of Elliot Electronics' S.S.B. filter Type PF1/SB. The broken line is the claimed response.

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P. SIMPSON, G3GGK and B. ARMSTRONG, G3EDD

THE PRINTSET 28/144 MHz TRANSVERTER TRV4

WHEN one reads an advertisement in *Radio Communication* for a transverter kit priced at £2 17s. 6d. post paid, the first reaction is to say " What is the catch? " and pass on. In retrospect, writing these words after having done the tests and thus having an intimate knowledge of the kit, perhaps Spacemark Limited, of 14 Piccadilly Manchester, the UK and Commonwealth Agents, are doing an injustice to the kit by not explaining in the advertisement why the price is so low. The reason is clearly stated in Spacemark's literature however.

Normal kits contain many components, resistors, capacitors and valves which the average amateur has in his shack. The Printset kits anticipate this situation and supply only the basic print board and those specialized components—valve holders, coil formers, and cans for which the print drillings are designed. For the TRV4, the items to be supplied by the constructor are: One 38·666 MHz crystal, 12 resistors, one potentiometer, 22 fixed capacitors, six chokes, one butterfly capacitor, one variable capacitor and the valves. Kits are ordered from Spacemark who arrange for the manufacturers, Hch. und Rud. Brumm in Western Germany, to send the kit direct to the purchaser. Delivery time quoted by Spacemark is 3-4 weeks and the review kit arrived in 14 days. Spacemark can help those who cannot obtain some of the unsupplied components.

Circuit Description

The block diagram shows the general circuit. The 38·666 MHz crystal is arranged in a Butler oscillator; the second half of the 12AT7 acting as a tripler to the final injection frequency of 116 MHz. A pair of link coupled circuits provide selectivity at 116 MHz to suppress unwanted crystal harmonics. A grounded grid EC88 amplifies the 116 MHz level to provide sufficient level to the cathodes of the 2C51 mixer. The injection is applied to the wiper of the cathode potentiometer the purpose of which is to adjust the d.c. conditions thus optimizing 116 MHz cancellation in the 144 MHz anode circuit.

The 28 MHz s.s.b. signal is applied to the grid of an EF80 amplifier via a band pass filter. An unbalanced/balanced transformer, choke fed from the anode of the EF80, feeds the grids of the mixer. The output from the mixer is link coupled to an EL83 amplifier which provides the final output level.

Construction

The kit was built in a total time of about four hours. Assembly of components onto the 3½ in. × 9½ in. board was very simple since the top side of the board is silk screened with component locations.

The majority of the time was spent in making the coils. Coil winding diagrams are given and the wire is provided, but it was felt that the instructions could have been clearer.

A problem arose when it was necessary to mount an 8 + 8 pF butterfly capacitor. The space provided is very small and the instructions give no clue as to what is intended. For the authors' kit, a sub-miniature trimmer made by Johnson (USA) was mounted by its spindle bush direct on the board. A pair of Philips concentric trimmers would fit in and be quite satisfactory but would have to be readily adjustable if complete band coverage is required. The handbook does suggest that the two trimmers which adjust the 144 MHz circuits are shafted and accessible to provide easy tuning if more than 500 kHz coverage is required.

Testing

With something approaching over-confidence, l.t. and h.t. was applied to the oscillator chain and after adjusting the necessary trimmers for some time with no results, it was decided to take a more cautious and analytical approach. The cans were removed from the tuned circuits, which is no easy job when eight or nine tags have to be desoldered. However, examination with a g.d.o. showed that the 38·666 MHz tuned circuit would not tune with the specified 39 pF shunt capacitor. 68 pF was necessary.

Tuning the coupled 116 MHz circuits was also a problem and the reason for their presence became apparent. The second harmonic on 77·33 MHz was so strong that it was masking the 116 MHz drive. Eventually, the oscillator chain worked all the way through and the correct r.f. voltage appeared on the wiper of the mixer cathode potentiometer.

It is necessary here to divert to advice to purchasers of the TRV4. Firstly, the slugs of the canned assemblies are treated with flock as a locking method. After a lot of tuning the flock makes the slug very stiff in the former and the slug will break. If this happens, all is lost, since almost certainly the former will crack.

The best procedure is to rub a lot of the flock off before assembly; there will be enough left to keep the slug firm. The other important point is to tack the coil assemblies in circuit without the shielding cans and check with a g.d.o. before applying h.t.

After the oscillator chain was judged satisfactory, a 100 per cent modulated 28 MHz signal was applied and the

28 MHz circuits were peaked. The 144 MHz output was terminated in a calibrated 75 ohm v.h.f. voltmeter. A 144 MHz receiver, with the i.f. signal displayed on an oscilloscope, was used to monitor linearity. The bandpass pair tuned up without trouble, but the unbalanced/balanced transformer had to have five turns removed from each side of the secondary. (There is no fixed shunt capacity that could have been altered).

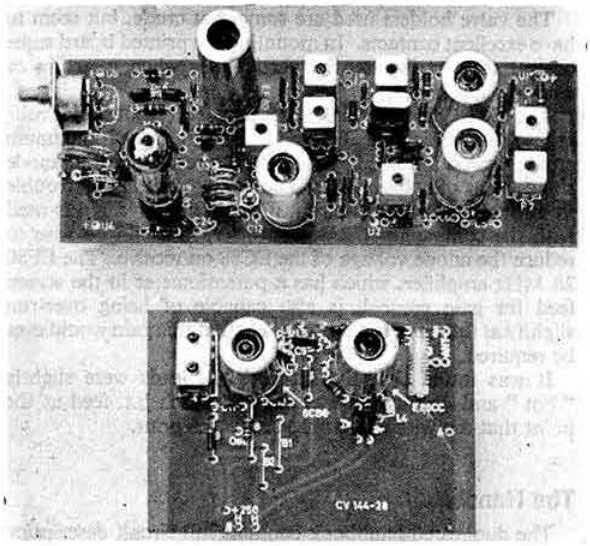
The specified 144 MHz circuits would not tune, but to be fair to Printset, they do suggest a g.d.o. on these circuits (" . . . but not absolutely necessary "). There is such a wide range of tuning capacitor mounting possibilities that to specify coil details is being optimistic to say the least. The first 144 MHz circuit in the author's kit would not tune *below* 260 MHz, with the specified coil, but this was undoubtedly due to the extremely short leads made possible by the acquisition of a sub-miniature butterfly trimmer.

Eventually with all circuits tuning, measurements were made. The output, which was terminated in a 75 ohm load was extremely disappointing. Printset, in their handbook, suggest an output of between 1 and 3 volts, but there is no mention of load impedance which is of course essential knowledge for the quoted voltage to be meaningful. The Spacemark literature says 3·5 volts across 2000 ohms which does at least mean something. This last fact was discovered only after tests were complete. Examination of the circuit showed that the 116 MHz injection was applied *through* the mixer cathode potentiometer so that approximately 5000 ohms undecoupled was in each cathode feed. A 1000 pF disc capacitor was placed from the wiper to each end of the potentiometer and the transverter output increased by over 10dB.

Measurements made under these conditions were as follows:

P.E.V. output (no visible envelope distortion)	1·2 volts r.m.s. (19 mW p.e.p.)
28 MHz input level with max. gain	45mV
116 MHz suppression rel. max. p.e.p.	46dB
3dB bandwidth	1 MHz

During these tests it was felt that the 116 MHz injection was low, although as specified in the handbook—0·4V r.m.s. The mixer bias is about 3·5 volts, and at least 5 volts of 28 MHz can be applied to the grids. Thinking back on the amount of second harmonic of 38·66 MHz that was present at the multiplier anode, it was decided to try a 58 MHz crystal. This was placed in circuit and the original 39 pF put back in the first anode circuit. It was also found necessary to reduce the oscillator anode coupling capacitor from 47 to 10 pF to avoid self oscillation. The change was quite marked. The mixer cathode injection voltage increased to 2·5 and the p.e.v. output to 2·4 (75 mW p.e.p). The 116 MHz suppression was, as expected, degraded to 40dB.



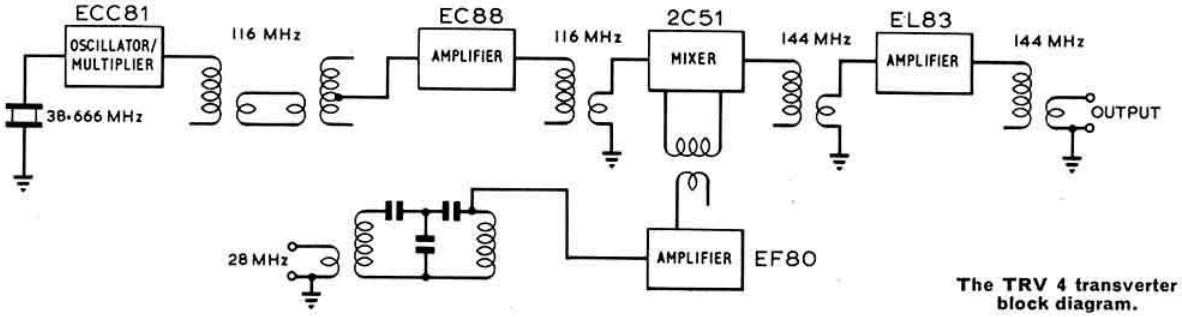
The Printset transverter and the 2m converter (see next page).

General Comments

The circuit of the TRV4 is attractive. Definite measures have been taken to reduce spurious outputs, and users should have no complaints of spurious signals every 455 kHz that have been reported from cruder methods of transverting. The ability to be able to switch off the h.f. s.s.b. transmitter p.a. entirely and take a sniff of the drive voltage is very much more acceptable than having to attenuate tens or even hundreds of unwanted h.f. s.s.b. watts.

The use of two apparently obsolete valves—2C51 and EL83 in a modern design is curious. In spite of finding both in the obsolete sections of data books, one valve supplier—Z. & I. Aero Services Limited—stated that both are in current production. Certainly there was no problem in obtaining them at a reasonable price, but neither is likely to be found in the junk boxes of the average amateur.

The boards are single sided and 1·5mm thick. This is a little on the skinny side for the TRV4 which develops a marked bow after assembly. The best way to mount the boards appears to be over rectangular slots in a chassis. It is a pity that very little area around the edges is available.



The TRV 4 transverter block diagram.

The valve holders used are somewhat crude, but seem to have excellent contacts. In mounting the printed board some central support is essential particularly when inserting or withdrawing valves.

The EC88 amplifier takes 15 mA with about 245 volts across it—this is over 3·5 watts. The published maximum anode dissipation is 2·0 watts with the result that the anode shows signs of colour. This is unlikely to give much trouble in normal transverter use, but if the oscillator chain is used with the companion CRV4 converter, it would be wise to reduce the anode voltage of the EC88 on receive. The EF80 28 MHz amplifier, which has a potentiometer in the screen feed for gain control, is also capable of being over-run slightly at full gain, but it is unlikely that this gain would ever be required.

It was found that the l.t. and h.t. leads were slightly "hot" and decoupling was added to each h.t. feed at the point that the wire was connected to the print.

The Handbook

The duplicated handbook contains full circuit description and good constructional and alignment details with the exception of the two points mentioned above—coils and variable capacitors. Useful voltages—both d.c. and r.f. —are detailed. The legibility of the duplicated circuit leaves something to be desired. The equivalent to the 2C51 is incorrectly quoted as a 2670; it should be 5670. This mistake also appears in the Spacemark literature.

Conclusions

The Printset TRV4 represents a refreshing philosophy in the kit market. For small effort and low price, the purchaser can have a piece of equipment which is well designed and does the job intended. It is not the kit for the amateur with neither constructional knowledge nor practical ability, but is ideal for the man with reasonable ability, a well stocked junk box and a little time. Although the reviewers had trouble getting their kit working, some of the trouble was over-confidence in the manufacturer. It is hoped that this review will lead to the suggested modifications being accepted by the designer, or some other solution found to certain problems. If any purchaser reads this review before constructing the kit, he should have no trouble.

THE PRINTSET CRV4 144 MHz CONVERTER

A companion to the TRV4 transverter is the CRV4 receiving converter. Since 116 MHz injection is available from the transverter, the converter consists only of an E88CC cascode amplifier and a 6CB6 mixer. The circuitry is conventional. The price is £1 14s. 9d. For those who want a full converter the CRV4 is sold complete with an add-on oscillator board, at £1 19s. 9d.

Assembly

The 4 in. × 6 in. board is supplied with valveholders, valve cans, ribbed coil formers, slugs, 28 MHz band pass transformer components and wire. Assembly took less than an hour in total but there was some waiting time taken in allowing coil fixing adhesive to dry.

Testing

Starting with experience of the companion TRV4, all coils were first checked with a g.d.o. The anode half of the output coupled circuit did not quite tune with slug fully out, so the 20 pF shunt was reduced to 15 pF. The 6½ turn anode circuit in the second half of E88CC needed a turn off, but this may be due to some confusion in the handbook.

Two capacitors, C5 and C7 are marked on the print board and specified in the component list, but are omitted from the circuit. Both are associated with the coil that needed alteration. They were fitted to the converter under test.

With the coils approximately on tune, h.t. and l.t. was applied. A signal generator was used as a signal source and the 28 MHz output was fed into a Sommerkamp FR100B. The converter worked immediately and a few moments were all that was needed to peak up the circuits. However, when a well matched aerial was connected, the E88CC went unstable. At this point it should be mentioned that during the assembly it was noticed that the whole of the E88CC circuit and outer of the aerial co-axial cable found its earth via the valve screening can base. The screen which has to be placed across the E88CC base is connected (as specified) to two points which are not connected directly to the main board earth. It was quickly established that a very short connection from both ends of the screen to the true board earth cleared all instability problems.

The following measurements were recorded:

Signal/noise ratio for 1 μV p.d. (50 ohm) 30 per cent mod.	16dB
Overall gain 144 MHz 50 ohm to 28 MHz 50 ohm	26dB
Gain variation between 144 and 146 MHz	4dB

It should be remembered that signal/noise ratio is very dependent on the audio bandwidth of the tuneable i.f., but it is estimated that the noise factor of the CRV4 was in the 5dB region. Certainly the converter performance was surprisingly good.

Handbook

The handbook is identical in presentation to the TRV4 handbook. Apart from the circuit omission of C5 and C7 mentioned above, several of the coils were described as centre tapped. In fact only one needed a centre tap.

Conclusions

Even though one has to buy the valves and handful of components, the price of the converter is a firm attraction particularly in view of the very good performance. Used in combination with the TRV4 transverter it enables true transceive operation when a 28-30 MHz h.f. transceiver is used as the controlling source.

REGULAR FEATURE

THE MONTH ON THE AIR

By JOHN ALLAWAY, G3FKM*

A SAD feature of many letters received by your scribe from overseas is the almost universal mention of the fact that although conditions have been good into continental Europe very few stations in the UK have been worked or indeed even heard. A glance at any set of international contest results will confirm the almost total lack of participation from this part of the world. One is forced to wonder whether we have the lowest activity rate or whether our insular character shows itself and causes the majority of British amateurs to occupy the v.h.f. bands and 160m, content to talk to each other over comparatively short distances. The other, and possibly more sinister explanation is that there is such a seriously high level of TVI in existence that many are afraid to use their equipment during television hours. It seems to be accepted fact that a considerable proportion of TVI is due to poor television set design, and it seems a great pity that some control cannot be exercised over the makers of some of the more TVI prone models at present being sold. Readers may be interested to know that the US Senate has just passed a Bill which enables the FCC to control the manufacture, sale, shipment, import and use of devices capable of causing interference to radio communications. This is, of course, an important step towards the clearing of pollution of the spectrum by electric motors, etc.

Top Band News

W1BB's *160 Meter DX Bulletin* dated 25 May gives a resumé of the 1967/68 season which produced many all time " firsts " in super-DX low power contacts. Stew himself reached a total of 100 countries worked on the band, for which he deserves our sincere congratulations. His 100th country was reached when he worked DL9KRA from CE3CZ. It seems likely that CE3CZ will be activated again on the band by DL9KRA sometime in the future, this time with 300 watts and an aerial supported by a 10ft. diameter balloon. VK5KO is reported to have spent up to 500 hours searching for the 15 QSO's he has had on 160m during the past 13 months—one was with G3LIQ and others with W0NWX, VQ8CCR, VK2BGH, and JA stations. The Transatlantic Tests did not seem to produce such good conditions as the previous series, although the 18 February and 3 March sessions were good, and during the 24 March test 5Z4LE succeeded in working five Ws. Activity seemed a little less than in previous years, possibly due to the counter attraction of good conditions on the other bands. There will be another programme of tests next winter, full details will be given as soon as they become available. Another item mentioned is the possibility of some Top Band operation by VK9GN in New Guinea, who apparently already has a 150 watt transmitter and permission to use 1800-1860 kHz but is in need of a converter for his receiver. Likewise VP8JG/G3UAU is interested in getting on 160 from Antarctica. News of UK stations is that G3LIQ has now passed a total of 10,000 QSOs on the band, that G3OQT is in the US for 12 months and that G3VTY managed a contact with W1BB on 4 February using 2 watts input!

G3s UID, WUW, XCK and XIQ will be in Wales between 24 and 30 August. They will be on 1880 kHz (approx.) between 17.00 and 23.00 during the week and 08.00 to 23.00 at the weekend. Their schedule is: August 24/25 Brecon, 26 Radnor, 27 Montgomery, 28 Merioneth, 29 Cardigan, 30 Carmarthen, and 31 possibly Brecon. Call-sign will be GW3UID/P, and all QSOs will be QSL'd with a special card.

A trip to GI and EI is planned by G3s RST and TXZ between 23 August and 9 September. They will be starting from Rosslare and leaving from Larne. They ask stations to contact them with requests for activity from needed counties, and interested parties are invited to write to: Eric Tucker, 6 Rosehill Gardens, Crowborough, Sussex.

DXCC News

Official Bulletin No. 173 from ARRL Headquarters announces the deletion of VS9H (Kuria Muria Is.) and ZC6 (Palestine) from the ARRL Countries list. Contacts made with Kuria Muria after 29 November, 1967 will be considered as the same as contacts with the Sultanate of Muscat and Oman. The ZC6 listing used to consist of the UN Truce Area bordering on Israel, which no longer exists. Honor Roll totals in December will have these two deleted.

The June issue of *QST* shows that there are now nearly 250 calls in the Honor Roll. The current maximum number of " countries " available is 322. UK scores mentioned are G3FKM 322, G4MJ 319, G8KS 319, G2BOZ 316, G2BVN 316, G2PL 315, G3HDA 315, G3HCT 314, and GI3IVJ 313. The only two UK stations in the Phone section are G3FKM 317, and G8KS 316.

The YL International S.S.B.ers Communication System

Readers familiar with this organization will be interested to know that in the recent elections Mrs Jessis Billon, WA6OET, was elected President (see June *MOTA*). Vice presidents elected were Mrs Monique Tendron, (FG7XT), Edward Huppler (WA0HMP) and John Lomasney (XE3LK).

Certificate Hunters Club

It has been arranged that a net will be held on 14,340 kHz at 12.00 on Saturdays open to all CHCers and designed to

* 10 Knightlow Road, Birmingham 17. Closing date for September is 7 August, for October, 11 September, and for November, 16 October.

enable European members to get together and to facilitate award hunting. Those interested in the organization are invited to join in to obtain information on membership.

Chapter 3—the SWL Chapter of CHC, has been restarted. Interested listeners are invited to contact either the President —W. Hodkinson, 29 Wellhouse St., St. Barnoldswick, via Colne, Lancs, or the Secretary—E. Waddington, 18 Barnwood Road, Earby, via Colne, Lancs. (please enclose s.a.e.). The aim is to encourage award hunting, and it is hoped that the Chapter will be issuing its own award if sufficient interest is shown.

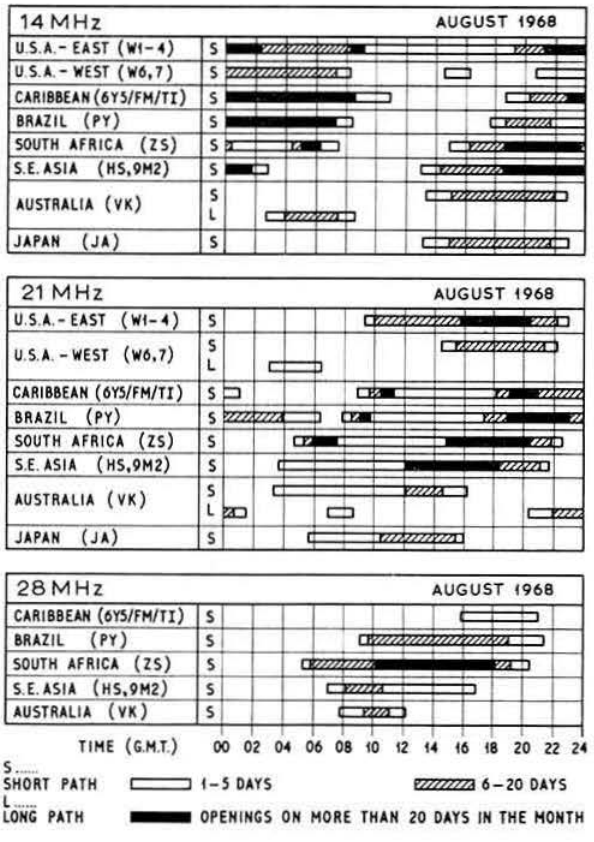
News from Overseas

Further to last month's remarks concerning former holders of VS9 calls a letter has been received from MP4BBA, RAF Muharraq, saying that they hold QSLs for VS9s ADO, AJH, AJM, AJP, ALK, AMD, ANP, APW, ARH, ARS, ASC, ASP, ATC, AWA, MC, MG, MSC, MP, OC, OSC, PQ, and ND. If the owners of these calls will send along their present addresses to Cpl. Dowdall, P.M., Airfield Troop, 255 Signal Squadron, RAF Muharraq, BFPO 63 their cards will be forwarded free of charge.

A letter has been received from David, the operator of TL8DL, saying that he will be leaving for the US in late June or early July, and that all QSL requests after 1 July should be sent to his home address (see *QTH Corner*). He points out that there will be a two month delay before he arrives in the US so that no QSLs will be sent out during that period. David does not have a W call yet, but hopes to obtain one soon so that he can re-establish contact with old friends. He says that " for the many courtesies extended me on the air I can only say a most sincere thank you." There is apparently no news at present of any other licence being issued to another station in the Central African Republic.

Just as *MOTA* was going to press a further letter was received from Peter Dowdall (see first paragraph) to say that he now has cards for more than 50 different VS9 calls and would appreciate hearing from *all* ex-VS9s, so that he may forward them to their owners free of charge.

The two remaining awards issued by the No. 9 (United Kingdom) Squadron of the FHC are the ECCA **(The English Cathedral Cities Award)**, and the SNA **(Squadron Nine Award)**. The former is obtained by confirming contacts with 40 (1st Class) 20 (2nd Class) or 10 cathedral cities (3rd Class award). These are listed as Birmingham, Blackburn, Bradford, Bristol, Bury St. Edmunds, Canterbury, Carlisle, Chelmsford, Chester, Chichester, Coventry, Derby, Durham, Ely, Exeter, Gloucester, Guildford, Hereford, Leicester, Lichfield, Lincoln, Liverpool, London, Manchester, Newcastle, Newport, Norwich, Oxford, Peterborough, Portsmouth, Ripon, Rochester, Southwell, Salisbury, St. Albans,



PROPAGATION PREDICTIONS

August is usually the last month for the poor summertime DX conditions, especially on 21 and 28 MHz. In the course of September these will steadily improve, and reach their best in October and November. On 28 MHz during August North America will only come through under exceptional conditions. South America too will not be heard every day. The most reliable traffic will be with Africa, which should show a slight improvement compared with the previous month. Similarly, better conditions are to be expected for contacts with South East Asia and Australia. On 21 MHz North America should again come through reliably in the early evening. This prospect improves as one moves further south in Europe. The propagation path to Western North America will also show some improvement. As the nights lengthen in the Northern hemisphere and shorten in the Southern, traffic areas in the Northern hemisphere (North and Central America, East Asia) will generally cease earlier than the previous two months, but to areas in the Southern hemisphere (South Africa, Australia) the opposite will be the case. As compensation for the continuing poor DX conditions this month, the sporadic short skip conditions will continue on the h.f. bands. 14 MHz will continue as a night-time DX band. The conditions to North America in the early morning will, however, worsen slightly. In the late afternoon contacts will be possible with South Africa, South East Asia, Japan and Australia, though badly affected by European QRM. During daytime 14 MHz will still be an ideal band for European traffic and maximum contact distances will increase as autumn approaches. The latter also applies to 7 and 3·5 MHz. In the latter half of the night on 3·5 MHz the dead zone will only interrupt local traffic on rare occasions.

The provisional sunspot number for June 1968 provided by the Swiss Federal Observatory at Zurich was 114·5 with activity fairly evenly distributed throughout the month. The predicted smoothed sunspot numbers continue to fall slowly and the figures for October, November and December are 107, 106 and 105 respectively. These figures are sufficiently high for there to be a reasonable expectation of good openings on 28 MHz during September and October 1968.

Sheffield, Truro, Wakefield, Wells, Winchester, Worcester and York. The SN Award is obtained by working members of Squadron 9—one point per member per band being awarded. 40 points are required for the 1st Class, 20 for the 2nd, and 10 for the 3rd. Only one QSL per member worked is needed the other QSOs should be submitted as certified log data. A membership list may be obtained from G3VNX, Ravenscourt, Grange-over-Sands, Lancs, in return for an IRC or s.a.s.e. The fee for each award is 5s. or eight IRCs. QSLs must be in hand but a GCR list is acceptable plus full log data for the other three awards.

Expeditions

Four members of the Radio Club de Bois-Colombes will be on the air from Djerba Is., Tunisia, using the call 3V8AA throughout August. They will be using an SB 101 transceiver, crystal controlled for transmission on 14,225, 21,225, and 28,725 kHz, but v.f.o. for reception. They will never listen on their own frequency. QSLs should be sent, together with 5 IRCs, to F5OJ (see *QTH Corner*).

I1IJ is hoping to make a trip to San Marino about 15 September. His call will be 9A1A on s.s.b. and M1H on c.w., and he will be active on all bands 7 to 28 MHz. QSLs will be despatched by K4PVZ.

VE6AJT and VE6APV plan to leave Vancouver on 8 September on the *SS Oriana* for the South Pacific area. They intend to spend a year or two on a world tour, stopping at as many places as possible and operating from as many countries as they can. A tentative outline of places and dates is as follows: September to December 1968—VR1 (British Phoenix Is.), ZM7 (Tokelau Is.), ZK2 (Niue), ZK1 (Cook Is.), 5W1 (W. Samoa) and VR5 (Tonga). January/February 1969—YB (Indonesia), VS5 (Brunei), 9M6 (E. Malaysia), CR8 (Portuguese Timor). March 1969—AC3 (Sikkim), AC4 (Tibet), AC5 (Bhutan), and 4S7 (Ceylon). After this they hope to go to Africa and activate some rare places on their way to Europe, which they expect to reach in September 1969. It is hoped to be able to give more detailed information about this one in a later *MOTA*.

The Addiscombe Radio Club will be on an expedition to Rutland from Friday 23 August to Monday 26 August, and will be using the call-sign GB2ARC/P. Operators will include G3s VIJ, VKI, XJO, and G8BJG, and operation will be on 160, 4 and 2m. C.w. and a.m. will be used (unless s.s.b. equipment becomes available), and contacts will be QSLd 100 per cent.

OK2DB has notified the Society that he will be on the air from Yugoslavia between 31 July and 17 August using the call-sign YU7LDB. He will be on 20, 15, and 10m, c.w. and s.s.b.

The GB2IS expedition recently activated by Manchester University ARS from St. Agnes, Scilly, managed a total of 700 QSOs in 70 countries and 40 US states. All bands 160 to 10m were used. Apologies are offered to those who did not get a contact on 160m—with six bands to cover there was not much time to spend on any one! QSLs will be sent via G2MI, while direct ones will be dealt with by G3VNR (see *QTH Corner*). Anyone who worked GB2IS in 1967 and who would like a better quality card (or anyone who did not receive one at all) is welcome to submit a request for another.

Bill, G3UOL, will be leaving for Greece on 22 July, and hopes to be on the air as ON8IT, G3UOL/LX, F0JA, YU7LCT, and with an OE call (not yet issued) between that date and 31 August. The Greek authorities have told him that they do not licence " aliens " (presumably the US SV0 stations have a special arrangement). Permission was requested for 160m operation to be allowed from Luxembourg but the authorities replied that this is not permitted.

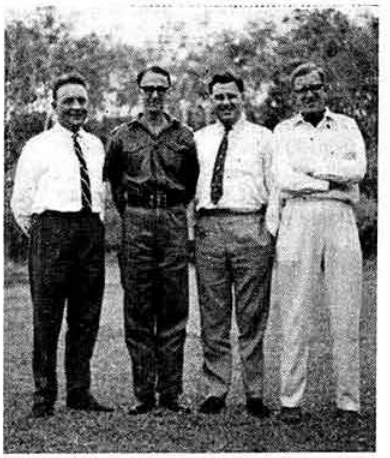
Ruth Sinclair, G3TNN, brings up the question of absent QSL cards for contacts with Iris and Lloyd Colvin during their recent trip in Africa. QSLs plus two IRcs per card have been sent to YASME but not one reply has been produced. She would like to hear from others similarly placed as she feels that action should be taken. Her address is 18 Clarendon Rd. North, St. Annes, Lancs.

Members of the Royal Military Academy, Sandhurst, Radio Club will be operating from Scotland between 8 and16 August. They will sign GM5PM/P from Clackmannanshire on all bands 160 to 10m, and operation will be on s.s.b. except during the period 20.00 to 23.30 when they will be on 160m c.w. Special QSLs will be sent out via G2MI for all contacts.

Contests

The DARC **WAE Contest** (c.w. section) takes place between 00.00 10 August and 24.00 11 August. The phone section between the same times 14–15 September. All bands 3·5 to 28 MHz may be used and stations may be worked on each band for QSO and multiplier credits. There are single and multi-operator sections, both single and multi-transmitter. Single operator stations may only operate for 36 out of the 48 hours, the 12 rest hours being taken in one or two periods. Contest exchanges consist of RS/T plus serial QSO number (starting from 001). (Multi-transmitter stations should use separate series of numbers on each band). Each QSO counts 1 point, except on 3·5 MHz where it counts 2 points. The multiplier for European stations is the number of ARRL Countries, plus each call area in JA, PY, VE/VO, W/K, ZL, ZS, UA9, and UA0, worked on each band. Entrants outside Europe use the WAE Country list for multipliers. Final score is total QSO points plus " QTC points " multiplied by the sum of countries from each band. A QTC is a report of a confirmed QSO that has taken place previously and later sent back to a European station and can only be sent from a non-European to a European. Each QSO reported is worth 1 point. A QTC should contain the time, call and QSO No. of the station being reported—e.g. 12.00/G3FKM/001 means that at 12.00 G3FKM was worked and gave the number 001. A QSO can only be reported once for QTC credit, and not back to the originating station. A maximum of 10 QTCs to a station per band is permitted, and may be passed in more than one QSO (although only one QSO point is allowed). A minimum of 4 hours participation is required to qualify for an award. Contacts may be used for WAE Award credit provided that the log of the station required has been submitted. It is advised that DARC logsheets are used, these may be obtained from Walter Skudlarek, DJ6QT, An der Klostermauer 3, D-6471, Hirzenhain, Germany. Mailing deadline for logs is 15 September for c.w. and 15 October for phone entries.

The 9th **All Asia DX Contest,** run by JARL, will be held between 10.00 24 August and 16.00 25 August. This is a single operator contest only, but entries may be single or multi-band. Stations outside Asia must work Asian stations for points, one point being obtained per contact. The


The photos taken during the recent Royals Signals Expedition to Brunei. Left: Dennis, 9M2NF, operating as VS5RCS. Centre: Jack, 9M2XX, Mike, VS5MH, Dennis, 9M2NF/VS5RCS and Maurice, VS6AA. Right: The luxury method of adjusting a quad!

number of Asian countries worked serves as a multiplier. Multi-band entrants use the sum total of countries from each band for their multiplier. Contacts must be on c.w. only on any band 1·8 to 28 MHz, and exchanges should consist of five figures—RST plus age (YL operators send "OO"!). Certificates will be awarded to top scorer in each country on each band and the three highest scorers in each country. There is also an award for top scorer on all bands in each continent. Logs should be written out on separate sheets for each band, and be accompanied by a summary sheet showing claimed score and a signed declaration that licence and contest rules have been observed. They must arrive no later than 30 November at: JARL Contest Committee, PO Box 377, Tokyo Central, Japan. In last year's contest UK scores were as follows: (Multiband) **G3IAR** (3,976 points), **G2DC** (3,654 points), **G3ABG** (2,299 points), G2AJB (444 points). **G3PJW** had 1,770 points on 21 MHz, **G3OXI** had 671 points on 14 MHz, and **G3OCA** (75) and **G3VRZ** (36) were the only 7 MHz entrants. **GM3KLA** scored 525 points on all bands to win a certificate for GM. (Certificate winners in heavy type.) A very few rule sheets are available from G3FKM.

The **LABRE DX Contest** (c.w.) section runs from 00.01 10 August to 24.00 11 August, the phone section between the same times 31 August/1 September. All bands 3·5 to 28 MHz may be used, single or multi-band entries are permitted. Exchanges consist of report plus serial QSO number starting from 001. Points are 1 for QSOs between stations in different countries outside the American continent, 2 for QSOs between American stations, and 3 for QSOs between American and non-American stations. A multiplier consists of 1 for each American country worked on each band and one for each PY call area (PY1–9). Logs must reach: LABRE Contest Commission, Caixa Postal 2353, ZC-OO, Rio de Janeiro, Brazil, no later than 1 December.

DX Briefs

KD6AA is rumoured to be about to come on the air from Daito Is.—some 600 miles from Saipan. The possible DXCC status of such an operation is not yet known. KH6EDY was scheduled to close down on 16 June, and no further operation from Kure Is. is at present planned.

As previously reported there is now activity from Willis Is. in the form of VK4EV. He has been reported on 14 MHz s.s.b. and has asked for QSLs to be sent to the VK3 bureau or to his home QTH (VK3AEJ) to await reply when he returns home in November.

A spate of activity from Andorra seems to be imminent. F3KT, F9RU, F1WS, and F8YY anticipate using the call-signs PX1KT, PX1RU, PX1WS and PX1YY during July and early August, and asked for QSLs via F3KT. F5JB and F2PY will then be PX1JB and PX1PY respectively between 15 and 31 August.

VE3FHO has purchased a home on the island of Montserrat and is likely to be on the air until mid-August with his VP2MF call. He has a TR3 and a quad, and seems to favour 14,190 kHz s.s.b. It is possible that he may have been on from Dominica during July as VP2DOC. All QSLs for either call-sign should be sent (with s.a.e. and IRC) via VE3GCO.

Due to the recent return of the Bonin Is. to Japan from US custodianship, it is believed that the prefix for this area has been changed to KA1. (This does not appear to be a Japanese prefix!).

VU2DIA, who is now in Goa, is said to have left his radio gear behind for a friend to use. Further activity from the Andaman Is. is awaiting the receipt of a licence from the Indian authorities.

ZL1TU is considering a trip to Chatham Is. (ZL3) in September.

G3FGP is leaving for St. Lucia shortly and has already despatched an NCX5 and Tri-band beam. His VP2 call is not yet known.

Greg, G3XHE, is at present in Bahrain, using a KW2000 and a dipole. He hopes to have a beam shortly, and is currently signing /MP4B.

Band Reports

Apologies to readers for an error last month when your scribe omitted to distinguish the c.w. calls from the phone ones! Activity and interest seems to be at a low ebb at present, although DX seems to be there on most bands for those who can resist summer counter attractions.

Many thanks to the following for their help in compiling this section: G2HKU, GW3AX, G3HCT, G3LQI, G3NKQ, G3OLY, G3PQF, G3TBK, G3VPS, G3WBN, G3WTJ, G4MJ, G8JM, G8VG, BRS27806, A5135, A5154, A5390, A5459, A5489, A5637, and A5852. Stations listed in italics are c.w., others s.s.b. unless other wise stated:

80m. 5Z4KL (22.15), 5Z4LE (21.20).

40m. Apparently suffering from increasing QRM from commercial stations. At least one US military station heard by G3FKM—the Albanians cannot be expected to know any better but surely the United States should? Calls extracted from the rubbish include EA6BG (23.15), CR6IM (21.00), LA2PH/MM (Off Capetown, 22.15), PYs (22.00), TA2BK (23.59), TJ1AL (23.15), TU2AK (21.40), VQ8CC (21.00), ZC4RB (20.52), ZD1JA (20.20), 5A3TW (21.00).

20m. *AP2AD* (17.12), CE0AE (05.03), CT2AA (01.46), *CT3AS* (11.06), *FG7TG* (10.09), FO8BY (09.41), FR7ZL/Tromelin (17.50), FG7TI/FS7 (23.33), HC8s FN (01.09), RS (00.58), HR6EB (02.20), HS3TM (17.44–QSL via K3LTV), *JT1AR* (12.00), JX6RL (17.55), KS6CT (07.23), KX6's DQ,FA (18.40), MP4BBW (02.53), MP4TCE (17.55), OK5PRAGA (15.00. Prague Stamp Exhibition.), PX1JI (10.53), *TA3AR* (22.55. QSL via WA7GQA), TI6DC (06.30. Box 666, Port Limon, Costa Rica.), *TJ1QQ* (00.22), VK9XI (17.39), VP2MF (01.34), VP2GN (23. 13. Grenadine Is.), VP2SY (07.35), VR6TC (07.39), YV0ZZ (? Genuine, Aves Is. 17.15), ZD3D (22.00), *ZD9BE* (21.00), *4L1A* (22.09), *8P6AE* (22.16), 8R1T (02.20), 9N1MM (21.32), *9Y4DS* (10.07), 9Y4LA (Tobago. 23.30).

15m. CE3NI (22.30), CE0AE (22.47), *CO2BB* (22.00), *CP2BH* (22.00), *CT3AS* (09.23), HR2WTA (a.m. 23.00), HS3DR (19.16), *K1FNA/KG6* (15.30), *W1BVP/KH6* (07.30), KL7FBO (09.41), *KR8DE* (10.00), W6FNS/KW6 (07.32), *KX6BU* (07.18), MP4BEU (19.00), *G3XHE/MP4* (08.10), PJ2MA (15.00), *TG4SR* (14.00), TI2SH (21.01), *TJ1AJ* (11.52), TJ1AL (17.55), TN8BG (08.10), TT8AN (18.25), VK9KS (New Britain. T.N.G., 10.25, QSL via W1YRC), *VP1NW* (14.40), VQ9DH (22.22), *VU2OLK* (07.07), *XW8CAL* (11.55), YS1NCB (20.02), ZD8JW (21.35), ZD9BE (17.05), *ZL2CD* (08.00), ZP3AL (19.47), 9K2BV (20.46), *9V1OL* (14.14).

10m. CE3NL (19.04), EL2AK (16.53), LU9DDH (18.35), K6KPC (19.30), ZB2AP (17.27), ZD8DG (21.15), ZE1CX (10.58), 4U1ITU (17.00), 5H3KJ (15.00), 5Z4SS (18.25), 9L1KZ (17.50).

Sincere thanks are extended to all correspondents, and to the following for permission to use material from their publications: The *DX'er* (K6CQF,) *DX News Sheet* (Geoff Watts), the *Ex-G Radio Club Bulletin* (W3HQO), the *DX'ers Magazine* (W4BPD), the *Florida DX Report* (W4BRB), *CQ DX* (ARI), the *HKARTS Newsletter*, *DX'press* (PA0FX), *NARS News* (5N2AAF), the *L.I.DX.A. Bulletin* (W2GKZ), *Long Skip* (VE3DLC), *QUAX* (SM4DXL), *Sigma* (Radio Club of Malta), and *QSO* (Saskatchewan ARL). Please send all items for **September** issue to reach G3FKM **no later** than **7 August,** for **October** issue by **11 September,** and **November** issue by **16 October.**

1968 Countries Table

	160m	80m	40m	20m	15m	10m	Total
G8JM	—	—	4	181	98	65	348
9J2BC	—	—	17	106	54	64	241
G3IAR	—	33	23	79	53	19	207
G3OLY	—	3	—	97	41	48	189
G3PQF	8	6	24	52	5	22	117
G8VG	5	15	22	43	49	50	184
G3TBK	—	4	26	37	30	23	120
G3VPS	12	21	18	39	3	—	93
G3XDV	15	10	17	38	1	18	99
SM2BYD	—	14	6	49	16	—	85
G3VJG	—	2	9	10	16	12	49
G3ING	9	11	12	5	11	7	55
A4886	14	56	50	187	103	89	489
BRS25429	3	55	54	171	125	93	490
A5390	4	20	31	137	138	87	417
A5662	12	30	35	133	102	95	407
BRS27806	5	27	18	148	127	76	393
A5154	3	25	21	140	121	70	380
A5135	4	20	25	100	54	45	248
A5466	5	21	23	98	33	25	205
A5459	8	25	34	84	37	22	210
BRS28198	2	32	46	66	32	92	270
A5126	2	31	31	81	53	44	242
A5489	—	10	6	99	86	51	262
A3942	14	38	36	58	60	50	256
A5943	5	15	30	29	30	23	162
A5610	10	71	17	35	25	31	191
A5437	3	24	3	19	18	6	73

(This month's table is in order of 40 plus 20m totals)

QTH Corner

GB2IS via G3VNR, 25 Dartmouth Av., Newcastle, Staffs.

GC2LU H. J. Chater, Flat 1, 14 Clarendon Rd., St. Helier, Jersey, CI.

K1FNA/KG6 Norman Lariviere, CMR Box 1209, APO San Francisco, Calif., USA 96334.

KG6IG (Now QRT) P.O. Box 1351, Torrance, Calif., USA 90505.

W6FNS/KW6 Box 61, Wake Island. 96930.

M1H (See 9A1A).

OD5FM Box 1824 Beirut, Lebanon.

PX1JI via G3JIJ, 29 Chesham Av., Castleton, Rochdale, Lancs.

PX1PU via G3RXH, " Adare," Raikeswood Crescent, Skipton, Yorks.

TA3AR Kay Hargis, 2615W 5750 S, Roy, Utah, USA.

TL8DL David L'Heureuse, 5201 38th St. NW, Washington, DC, USA 20015.

VK9RM Bob Murphy, P & T, Port Moresby, Territory of New Guinea.

VP1FW via VE3DLC, 30 Zenith Drive, Scarboro, Ontario, Canada.

VP1LL via VE3ACD, 305 Rosemary Road, Toronto 10, Ontario, Canada.

VP2AZ (11/7 to 14/7/68) R. S. Darling, 3487 Bayou Drive, San Jose, Calif., USA 95111.

VP2DC (3/7 to 7/7/68) W4USQ, PO Box 894, Plant City, Fla., USA 33566.

VP2MF VE3GCO, G. Hammond, RR4, Main Street, Atwood, Ontario, Canada.

VP5CB via K3NAU, C. A. Bliley, 965 Arlington Rd., Erie, Pa., USA.

VP8JX via GD3HQR, A.W. Anderson, 27 Greeba Drive, Onchan, Douglas, Isle of Man.

YU7LDB OK2DB, PO Box 99, Gottwaldov 1, Czechoslovakia.

ZD3D via W9JNF, R. Cohenour, 1900 E. Main St., Danville, Ill., USA.

ZD5V via 4A2YP, Jorge Parada, PO Box 139, Cd. Obregon, Son, Mexico.

3V8AA F5OJ, 26 Rue d'Est d'Orves, 92 Bois Colombes, France.

4W1ADO HB9ADO, Charles Evegue, Vidollet 41, Geneve, Ge., Switzerland.

9A1A via K4PVZ, Wilbur McFarland Jr., 1919 Holland Av., Burlington, NC USA.

RSGB QSL Bureau, G2MI, Bromley, Kent.

REGULAR FEATURE

FOUR METRES AND DOWN

By JACK HUM, G5UM*

Winning Post-Script

EVERY year the Society's V.H.F. Committee holds a meeting as soon as possible after the V.H.F./U.H.F. Convention to decide how the event fared, whether well or ill, and what can be done to improve it next time. When it performed this little exercise in self-criticism at its May meeting one thing it *did* feel justifiably satisfied about was that there was an estimated profit of just over £40; in other words, there will be no charge on the Society. There was some evidence that the huge success of the Bring and Buy sale (10 per cent to Convention funds) helped to achieve this result.

All other features of the 1968 Convention were gone over by the Committee with the proverbial fine tooth comb. Special attention was given to the lecture session: as always, some listeners had reported that the lectures were not technical enough, others that the exact practical balance had been struck, and not to make them any more technical than they were!

To ask the membership what *they* would like in future Convention afternoon sessions may be to risk receiving a flood of replies that cancel each other out—as public sampling techniques so often do. Even so, the requirements of the customers (meaning you and me) must be served, and it would therefore be useful if they could be expressed.

Beacons on 70cm

Further to the requirements of the customers, how many people are *really* keen to have beacons established on the 70cm band? Certainly there was a decided sense of loss when GB3GEC disappeared; and certainly there has been much comment in conversation and over the air to the effect that 70cm beacons would be a most valuable facility and would serve an even more useful purpose than the 2m beacons. But nobody (well, almost nobody) takes the trouble to scratch out a postcard to G3WXI (QTH as G8AGQ in the book) or to GB3CTC (beacon keeper is G3CZZ) saying a 70cm service would be welcome.

Just by way of reminder, these services would come from Sheffield and Camborne respectively. Setting them up is no child's game when the technical requirements are considered; namely, large output and the ability to give 24-hour a day reliability unattended. In other words, a lot of effort is called for—and those who are prepared to extend it would like to know in advance that it is required. A note to " Four Metres and Down " next time you are writing, to say you do (or don't) wish to see beacons established on 70cm would be helpful.

* Houghton-on-the-Hill, Leicester LE7 9JJ. Send reports for the September issue by 12 August, and for the October issue by 11 September.

Plans . . .

Believe it or not, the " Two Metre Bandplan " is getting on for 20 years old. It was in *Short Wave Magazine* for May of 1949 that G3CYY propounded his thesis for geographical sub-division of the UK by frequency area. With one or two subsequent " mods " the plan in its almost universal acceptance by British v.h.f. workers has represented a shining example of their ability to order their own affairs on a voluntary basis.

The last two " mods " to be made to it were c.w. in the bottom 100 kHz and sideband around 145·41 MHz, so that an operator who wishes to enjoy one of these modes knows where to look to find fellow adherents—a straightforward variant of the basic reasoning behind the Plan.

What sometimes seems to be overlooked is that today's bandplans are quite capable of coping with modern techniques of single channel working. It has long been accepted that the v.f.o.-equipped operator should call on the other man's frequency even though this might be outside the local zone. Then when the contact is completed a return should be made to one's own frequency zone so that others will know where to find you.

Although there are not yet many v.f.o. controlled signals to be heard on " Four " and " Two," be sure that the number is going to increase, and with them an increase in co-channel working is certain. Many a crystal controlled operator has been pleasurably surprised to be called on his own channel, sufficiently often perhaps to persuade him to check it before tuning.

A procedural point to adopt in this context is to announce after a CQ that you are going to " QMF," indicating that you will listen on your own frequency first.

And another point: c.w. is available for use *anywhere* in the v.h.f. and u.h.f. allocations when the need arises to identify oneself under weak signal conditions, although in practice nearly all A1-to-A1 communication now tends to be confined to the bottom 100 kHz.

. . . and Modes

Just how well the planning of " Two " for sideband operation works out was made very evident during the Fifth 144 MHz (S.S.B.) Contest of six weeks ago. The spot frequency of 145·41 MHz became in effect a sub-band of its own for the evening as contestants spread themselves a little way either side to dodge the QRM. The event provided a copy book example of how much occupancy can be squeezed into a few kilohertz when the sideband mode is used. It also demonstrated in some areas that the local shock excitation effect of s.s.b. makes the use of a.m. preferable for day to day contacts within an individual's immediate " service area."

It would be interesting to establish how many operators during the June contest were using the transverter principle and how many equipment specially designed for " Two." Enough has already been said in print about the dangers of unwanted mixer products being emitted by transverter line-ups that few operators can now be unaware of the problem. But there is another aspect of the transverter principle which so far as we know has not yet had an airing, and it is this:

To be able to transvert you need an external sideband source, generally specified as the station h.f. bands transmitter. What if you don't have a station h.f. bands transmitter; what if, like *all* Class B licensees and a sizeable proportion of Class A licensees, you don't use the h.f. bands at all and feel it to be uneconomic to fork out a few hundred pounds for equipment to be employed only as a sideband injector into a v.h.f. transmitter?

Some discussion would be valuable on non-transverter methods of achieving sideband at v.h.f.—and indeed at u.h.f. (at least one sideband station was going great guns on 70cm during the midsummer portable contest on that band, with an impeccable signal).

Among non-transverter designs the G3MNQ exciter described in *Radio Communication* for June is the most recent to appear in print—and with its use of all-semiconductor technology is likely to remain contemporary for a long time ahead. We have heard it can be built for about £15. Are there others around of this calibre? If so, readers curious to learn more about sideband, and particularly how to generate it economically for the metre wave bands, would like to know.

QRA or Georef: The Debate Continues

Some people get so hot under the collar about the relative merits of the QRA Locator and Georef systems of position-spotting that they cannot believe that the Society's V.H.F. Committee is completely open-minded on this issue. Believe us, it is! All it wishes to see is an adequate ventilation of pros and cons to establish a system the members themselves will prefer and want to use. We thought we bent over backwards last month to reiterate our neutrality on this subject!

To keep the discussion going we welcome comments from two well known protagonists of QRA and Georef respectively namely, G3HRH and G3JKV. Here are their views:

Says Ray Hills, G3HRH: " I just do not believe that you can ever really get a proper balance of opinion from our members by the technique of a circular letter or referendum: you will only get replies in the main from (*a*) those who are the real agitators behind the proposed change, and (*b*) those who are anxious to ditch the locator system *in toto* and hope that by introducing controversy will cause the whole thing to disappear in confusion.

" Please may we have a direct answer to two simple questions: (1) What are the chances of persuading any of the other Region 1 societies to drop QRA in favour of Georef? (My own assessment from several years as V.H.F. Manager is: Not a hope); and (2) If UK has to go it alone on Georef, what need is there for any locator system at all? (The present QTH exchanges are quite adequate, for contacts between UK stations armed with OS maps.)

" It is very difficult to try to sum up the position in respect of locator systems, but I think it might be done like this:

(*a*) A unified locator system throughout Europe became necessary because the increase in contacts on v.h.f. between

continued overleaf

V.H.F. PERSONALITIES: No. 2

Albert Latham, EI6AS.

Albert Latham's diverse knowledge of electronics suggests that he must be in the business. But no: " I'm just a printer," he says. To delve further is to discover that his special knowledge of printing on plastic led to his being offered a key job with a leading Dublin firm whose products are plastic sacks and bags for industry and agriculture. This is how G3JLA of Stevenage in Hertfordshire became EI6AS of Dun Laoghaire. The original call-sign has been kept for occasional use during holiday visits to the UK, but the main activity is from the new home, high on a ridge about a mile back from the harbour of Dun Laoghaire. From this site EI6AS operates regularly on 70, 144 and 432 MHz, using the h.f. bands for talk-links as required (e.g. with ZB2VHF, worked a number of times on " Four "). Much of this operating is on the key by reason of the remoteness of most of the main areas of v.h.f. activity and the difficulty of working them on a.m. or even sideband. And no " Friday Ireland Night " passes without Albert Latham's pounding away at the low end of " Two " in the hope that at least some of the men across the Irish Sea will have observed the often-repeated exhortation to turn beams westwards. Nor is he alone in this vigil: several other EI operators share it.

The c.w. rig runs 100 watts on " Two." On sideband 180 watts p.e.p. can be produced from a KW Viceroy transverted to 145·41 MHz. The 13-element Yagi is at 40 feet. Extensions from it on booms are two 6-over-6 slot arrays for 70cm. Here the power level is 25 watts.

On 4m where EI6AS has given many people their first EI on " Four," a 4-element Yagi is in use.

Albert Latham's genial personality and the pleasure he takes in social activities have brought him (or had wished on him) various organizational jobs. He was a prime-mover in activating the Stevenage Club many years ago. More recently, he was invited to become secretary-for-a-year of the IRTS shortly after his arrival in Ireland in 1963.

At the " Thirteenth Annual " at Whitton last year EI6AS had one of his proudest moments when he was presented with the International V.H.F. Trophy, the highest honour which can be made for consistent work on the v.h.f. bands.

BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emis-sion	Aerial Direction
GB3ANG	Craigowl Hill, Dundee	145·985 MHz	A1	S
GB3CTC	Redruth, Cornwall	144·13 MHz	A1	NE
GB3GI	Strabane, N.I.	145·990 MHz	A1	N/SE
GB3GW	Swansea	144·250 MHz	A1	E.N.E.
GB3GM	Thurso	144·995 MHz	A1	N/S
GB3GM	Thurso	70·305 MHz	A1	N/S
GB3GM	Thurso	29·005 MHz	A1	Omni
GB3GEC	W. London*	434·000 MHz	F1	N/W
GB3SX	Crowborough,Sussex*	28·185 MHz	A1	E/Omni
GB3VHF	Wrotham, Kent	144·500 MHz	F1	North-West

* Not operational

GB3VHF

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

Date	Time	Error
25 June	10.41 GMT	30 Hz low
3 July	10.30 GMT	687 Hz low
9 July	09.38 GMT	160 Hz low
18 July	09.56 GMT	520 Hz low
23 July	10.20 GMT	710 Hz low

countries of different language and of relatively unknown geography made it more and more difficult to locate with any accuracy the station at the other end.

(*b*) In the absence of any existing system at that time the DARC invented QRA-Kenner which was adopted by all Societies in Region 1 as the acceptable scheme, despite its shortcomings.

(*c*) It is now firmly entrenched in all other Societies.

(*d*) The unilateral adoption by the UK of any other scheme will achieve no purpose at home where the OS map is adequate, and will create hopeless confusion in international contacts.

(*e*) The only hope lies in persuading all Region 1 Societies to change over to Georef. The battle to establish QRA Locator was hard enough: to change this will be nigh impossible.

The whole crux of the matter lies in (*e*) above and I think that the V.H.F. Committee should put this fairly to the membership with their assessment of the chances of success. Only then can the users of the band see what the real alternatives are."

Now over to Wally Blanchard, G3JKV:

" It might be worthwhile stressing that I am not plugging Georef because of its greater accuracy, but mainly on account of the fact that it is much easier to understand, although of course there are many other factors in its favour.

" I feel that the ultimate solution may be to allow the use of either system in contests, and see whether Georef is taken up on a large scale or not (although I can see some headaches coming up trying to work out distances where the two positions are given in different systems!).

" It is rather a pity that some thought wasn't given to which grid to adopt when QRA originally came up for ratification by IARU. If only some effort had been made to publicise the fact that a new grid was about to be adopted, and a discussion got going such as we now have with Georef and QRA, we might never have been faced with the present situation."

New Horizons

And so to the DX scene—and what a month it has been! As the Summer rain roared down outside the radio room windows and the barometer slumped, any v.h.f. addict could have pardonably gone to bed but for the extraordinary patterning that carved up Band 1 television, indicative that propagation was becoming anomalous. And this indeed it did, with results on 4m which must have won many new recruits to the band. How heavy the occupancy of our newly extended 70 MHz band has been this Summer is shown by the latest statistics to come in from ZB2BO of Gibraltar, achieved largely through openings to the UK far too numerous to itemise in detail, occurring over the past couple of months pretty well as predicted.

ZB2	QSOs	Stations	Counties	Countries	Openings
VHF	507	200 plus	40	7	24
BO	104	60	20	4	9
BC	25	15	Not known	4	4

The figures cover ZB2VHF activity over two years. As for ZB2BC, his results have been obtained from an " impossible " v.h.f. site at the southern tip of the peninsula, using a Pye Reporter and a quad.

In addition to the great activity along the UK-to-Gib path, the other big 4m news concerns four " firsts " on the 70 MHz band. Three of them were made by the group in Andorra signing PX1RI. These were PX-G3NKL (PX1RI having been alerted by G3GVM on 14·260 MHz that the 4m band was opening), PX-EI9AJ and PX-GI3HCG. The PX trip is reported in greater detail further on in this column. The other " first " was between GC3OHH and ZB2VHF on 9 June, when a short sporadic *E* opening occurred in the late evening.

The effect produced when the skip lengthens on " Four " is demonstrated by the fact that DE13558, Heinz Stelberg of Konigswinter, heard and recorded G3SX of Wallasey at RS59 working cross-band on 70·53 MHz to two stations on 1·8 MHz. He also noted G2AYQ in Cornwall, GI3ALT in Belfast and *five* EI stations. His consistent reception activities are of great value to all UK students of 4m propagation: a shining light in a dark continent so far as 70 megs is concerned.

And here is another reception feat: on 23 June the Society's beacon at Thurso was logged by ZB2BO on 70·305 MHz for a new world reception record on " Four " along a 1500 mile path. Signals peaked 579. Scotland has produced two other big items of 4m DX news: on 14 June GM3EGW worked ZB2VHF for a new world record for 70 MHz sideband, and on 8 July GM3JAZ/P, the Chester Radio Society's expedition to the Orkneys, had a three minute contact with G3TCT in the far south at Guildford. The latter comments on the skip-produced fading characteristic of the Summer's long haul 4m contacts: he just managed the quick one with GM3JAZ/P, but PX1RI dropped out before he could be called. However, there was compensation for G3TCT in tropo contacts with EI6AS and G3TTG down in Cornwall.

It will be apparent from the above that various phenomena to produce anomalous propagation on " Four " have been at work in recent months. There's even been some aurora. On 14 June G3FDW in North Notts. worked G3UUT some 40 miles to the north by direct path and by Aurora reflection, the delay between the two incoming signals being quite evident. At the same time GB3GM from Thurso was pounding in at RS57A from the north and ZB2VHF at RS59 from the south. Yet another intriguing mode of

propagation is mentioned by G3FDW: back scatter. A number of stations have been worked this way when beams were not aligned, keying notes sounding rough and almost auroral. As for M.S., Mike has schedules laid on with South Coaster G3JVL to see if the August Perseids produce anything on " Four." Both G3JVL and neighbour G3JHM have identified the Thurso beacon by meteor pings on frequent occasions.

In the nature of things sporadic-*E* does not influence 2m in the same way as it does " Four." When it occurs it is hard to believe in retrospect that it ever happened, so sensational are the results (remember the OK, YU and HG opening of 1965—and wasn't YU worked back in '49?). What has characterized 2m activity over the last month or so has been a series of directional tropo-created openings which (like Spor. on " Four ") could be predicted if the signs were read aright. A fat " high " drifting into the North Sea from Scotland was a sign for UK operators to direct beams its way in the hope that a deflection shot would help raise Scandinavia. For dozens it did: typically, G8ANQ worked fourteen of them, plus the usual clutch of north Germans.

Then when the isobars favoured southerly propagation the British stations were queueing up for F9NL hard by the Pyrenees: G3XEB of Brookmans Park thought it would be worth trying out a new 1 watt transistor transmitter on him. Report was RS56. So for the higher powered stations it was a pushover to work the Frenchman—so long as you had the patience to wait!

There is *some* evidence that sporadic-*E* has been at work on " Two "; on 14-15 June when Heinz Stelberg was logging N.W. England and Irish stations on " Four," there were signs of Portuguese speaking stations on " Two," heard at EI5BH (" the most westerly 2m station in Europe "), but no identification before QSB supervened.

It would have been tropo, however, that produced the " lifts " on the even higher frequency bands, with some excellent openings on one or two of the Monday Night Activity Nights on 70cm, and G8AUE in Derbyshire working down into London and the Home Counties at great strength on 23cm. In such conditions a 70cm beacon chain would have been valuable to give early warning of openings. The 2m chain did: Ron Ham, BRS15744, in Sussex, taped GB3GW *for hours* off the side of its beam over a path distance of 170 miles. The tape goes to the Scientific Studies Committee.

Expedition to Andorra (70 MHz)

Six amateurs from the North West of England formed themselves into a group for the purpose of an expedition to the small republic of Andorra on the Spanish/French border.

The group requested licences for all bands from 160m to 2m including (our) 70 MHz allocation. To their surprise no Top Band licence was granted but fortunately permission to operate on 4m was given.

The group intended to use 8 four element 70 MHz Yagis in two vertical stacks in order to attempt tropo contacts with the British Isles from their site, which was about 8000 ft. a.s.l. Two transmitters were available, one using 40 W input for A1 and A3, the other being a transverter for use with the h.f. s.s.b. exciter (this was not, in fact, used).

On 22 June a 4-over-4 was erected in order to get the station into an operational condition. However, during the night a violent storm damaged the tents and demolished the aerial system. When finally the aerial was erected again on Sunday 23 June a sporadic-*E* opening occurred. The log of PX1RI (G3RIK) tells the remainder of the story:

Time (GMT)	Call Sign	Report Received	Report Sent
23.6.68			
18.10	G3EKP	heard at 599, no QSO	
18.15	G3SXT	heard at 59, no QSO	
18.19	G3NKL	59	59
	(First PX-G QSO on 70 MHz)		
18.20	G3PMJ	59	59
18.21	G3GVM	59	59
18.30	G3VNQ	59	59
18.40	G3REP/M	59	59
24.6.68			
20.21	EI9AD	59	559
	(First PX-EI QSO on 70 MHz)		
20.40	EI5AJ	59	59
20.47	EI8AU	59	57
20.55	EI4BK	59	59
20.59	GI3NF?	heard but no QSO	
21.30	GJ3WGU/P	heard at 59, no QSO	
21.37	GI3HCG	559	559
	(First PX-GI QSO on 70 MHz)		
21.42	G3WBQ	heard at 339, no QSO	
21.45	G3WQM	heard at 359, no QSO	
22.00	G3SXT	599	579
22.04	G3UUT	599	599
22.10	G3OHH	heard at 559, no QSO	
22.15	GI3NFM	569	579
22.00	G3OHH	569	599
23.00-23.20	GB3GM	heard at 539	
25.6.68			
15.20	G3UVR	449	339

Andorra is the second European country (first ZB) to be activated on the 70 MHz band. The fact that a licence was issued represents an advance. We can only hope that other European countries will be able to issue 70 MHz licences in the future!

Two metre gear was also taken, but no contacts were made with the UK despite many hours of listening on the band.

Congratulations to G3JIJ, G3PUO, G3RIK, G3RXH, G3VDS and G3WFK on a fine group effort.

Aurora—report from GM3GUI

On 12 June, at 13.00 GMT the Swedish beacon station SM4MPI was heard at S3/4 by aurora. On 13 June, faint signals were heard in the beacon band. From 14.00-17.20 GMT SM4MPI was readable at S6. GB3GM was heard from 14.05 to 17.52 GMT and DL0PR from 16.25 to 17.00 GMT. On 14 June SM4MPI was heard from 12.25 to 14.30 at S3, DL0PR from 13.30 to 13.45 and 1525 to 15.30 and GB3GM from 15.30 to 16.15 GMT. Tropo. conditions were also above average and on 15 June DL0PR was hard at 59 plus from 18.00 to 22.10 GMT (by tropo.) but no German amateur signals were heard.

Greece to France on " Two "

As if to show what sporadic-*E can* do to " Two," George Vernardakis of Athens, SV1AB, turns in a report telling how the band opened up to France for him on 23 June. In the course of a daily schedule with OK2WCG and F9FT on 144·1 MHz c.w., he heard a strong A3 station just above the frequency. It was F1YF in contact with another F. Netting the sideband transmitter on to him, SV1AB made contact at S9 plus. Then followed a contact with F1EX at Nimes.

Rotating the 9-over-9 aerial at the Athens end made no difference to signal strengths at either end. " It was a really f.b. sporadic *E* opening," says George.

But he goes on to lament the fact that large numbers of F stations hearing him in contact faded out before they could

be identified. None had c.w. or sideband, and in consequence many potential QSOs were lost.

It is worth remarking that this sporadic-*E* manifestation occurred only a couple of hours before the Andorra-to-UK path was opened on " Four " and the Thurso beacon was heard in Gibraltar, also on 4m.

Using a different mode, meteor scatter, SV1AB has a dozen European countries worked. His success with LX1SI was reported here last time. Much of his 2m work extends well beyond the thousand-mile mark, which makes the chances of opening the path to the UK not wholly impossible.

The Trek Back to " 70 "

It took about three years to allocate all the G8AAA series of Class B licences. There are signs that the G8BAA series will be issued in about half that time—or even less: as we write, we hear that G8BSM has just come up.

Reason? Simply the attraction of being permitted to work on 2m instead of only on 432 MHz and up, as hitherto.

Although many of the newcomers obtain all the satisfaction they need from their Amateur Radio by confining themselves to " Two," we do detect a widespread intention to move to 70cm just as soon as the equipment can be built, which for most people is rather more difficult than building for " Two." No doubt many of the newcomers to " Two " will not remain content to hold just the " Four Metres and Down Award " for this band but will wish to tackle the 70cm one.

* * *

Here's a problem. People in the West Country operating in the correct 70cm zone require crystals to drop them somewhere between 432·1 and 432·25 MHz. But these crystals also drop them between 144·03 and 144·08 MHz, *and these are frequencies in the c.w. segment of the 2m band.* No wonder fulminations are heard from West Country c.w. operators trying to work weak DX through local phone men uncaringly using their 70cm crystals to get them on to " Two." And no wonder there are complaints from the uncaring when they get clobbered by enormous local c.w. signals. They have no cause to complain: they shouldn't be there. New crystals don't cost *all* that much.

" Bring Back the Cumulatives "

Regrets continue to be expressed on the air about the proposed discontinuation of the Cumulative Activity Contests. No doubt several members of the V.H.F. Contests Committee will have heard them, where they are within range. What needs to be done, it seems, is to state these regrets (on a postcard please, if you like) to the Committee care of RSGB Headquarters.

Expeditionaries to Help with those Rare Counties

This must be a vintage year for hitting the hills with v.h.f. portable stations taken either on holiday or as specially mounted expeditions to help members collect the rarer counties towards their " Four Metres and Down " operating awards.

Later this month a four-man team from that well known establishment in Cambridge will be on trek as follows: Saturday 24 August in Brecon, then 25th in Brecon, 26th in Radnor, 27th in Montgomery, 28th in Merioneth, 29th in Cardigan, 30th in Carmarthen, and back possibly to Brecon on the 31st. Call-sign GW3WUW/P on 2m, and operation from 17.00 to 23.00 GMT weekdays, 08.00 to 23.00 GMT weekends. " All QSOs will be acknowledged with a special QSL card," says Allan Papworth, G3WUW.

Part-coincident with the above is the Ireland expedition of G3RST and G3TXZ. They arrive in EI on 23 August, and will work their way up to Northern Ireland in time for V.H.F. NFD, the whole station being accommodated in a Dormobile. Says G3TXZ, Eric Tucker, 6 Rosehill Gardens, Crowborough, Sussex: " We would be pleased if anyone who would like a specific county on 2m or 4m in GI or EI would drop me an s.a.e. and we will see what we can do."

Listen Out Especially For . . .

. . . the Midlands Scout Net on 145·3 MHz Sundays at 15.00 BST. Initiated by G8ALO of Sutton Coldfield and G8ABA of Coalville, it welcomes all members associated in any way with the Scouting movement.

. . . GW8AWS/P from his Flintshire mountain top on about 433·35 MHz. He is there most Thursdays and Monday-activity-nights. And knowing what varactors can do when they shouldn't, he has *two* high-*Q* breaks after his.

. . . G3BNL/M, now moved to Cheltenham from Nottingham, and operates from the top of Cleeve Hill in the Cotswolds every Wednesday night on 23cm, using 70cm and 2m as talk-links. Now for two for the 70 meg men. . . .

. . . G3TTG, Vic Batchelor, 236 Sunderland Ave., RAF St Eval, Cornwall, who is on " Four " daily at 18.30 GMT, available frequencies being 70·2, 70·26, 70·375 and 70·45 MHz. Has 5-element Yagi now, 8-over-8 slot (phew!) soon. Will welcome schedules on 4m, but asks for alternative days to be specified to help miss his Service duties.

. . . GM3ULP, one of half a dozen Lanarkshire operators who meet on " Four " each evening at 21.30 GMT, and are looking for contacts further afield. Schedules on 2m are also required. Letters to G. A. Hunter, The Bungalow, Broomside Braes, Camp Road, Motherwell. He is also. . . .

. . . GM6ADR/T, so here it's a case of *look* out especially as well as listen. He is anxious to hear from video-minded members in the Lanarkshire region.

. . . Mike Lillington of Romsey, on the Continent until 15 August, using F0GY/M, G3JFY/DL/M and OE7ZVJ-plus-district-number. Has a 4-el, a TW Communicator and 144·024, 144·258 and 145·123 MHz. On nightly.

. . . EI5BH and EI4AL operational on " Two " most nights from 22.00 BST onwards, using, respectively, 100 watts sideband and c.w., and 20 watts a.m. and c.w. Each is now equipped with a 10-element beam. Skeds will be welcomed.

NEW RECORD ON 13cm

Just as this issue was closing for press news came that the British record on the 13cm band had been raised to 52 miles on 21 July, when G3BNL/M operating from Cleeve Hill near Cheltenham worked G3EEZ/P seven miles north-west of Wolverhampton. Signals were RS59 both ways.

The story in detail will be described by G3EEZ next month.

From G3AAV (G. Neil Glover of Leeds):

Thanks largely to advocacy by G3BA the transverter principle of producing sideband on 2m is now well known. Although there have been a number of articles giving details of the G3BA circuits and ideas there has been no complete design. A number of people have run into trouble putting G3BA's principles into practice!

The design of the transverter used by G3AAV is shown in the illustrations. G6SN has built a (virtual) duplicate of it, and he took the photographs to assist construction. The companion receiver uses a transistor r.f. stage (AF239 in grounded base) and an FET mixer. Originally the receiver was built in the same case but this gave rise to spurious responses, due to frequencies earlier in the oscillator chain leaking through into the mixer. G6SN is at present using the transverter feeding into his old valve converter, but intends to use the G3JXK commercial item as used by G3BA himself.

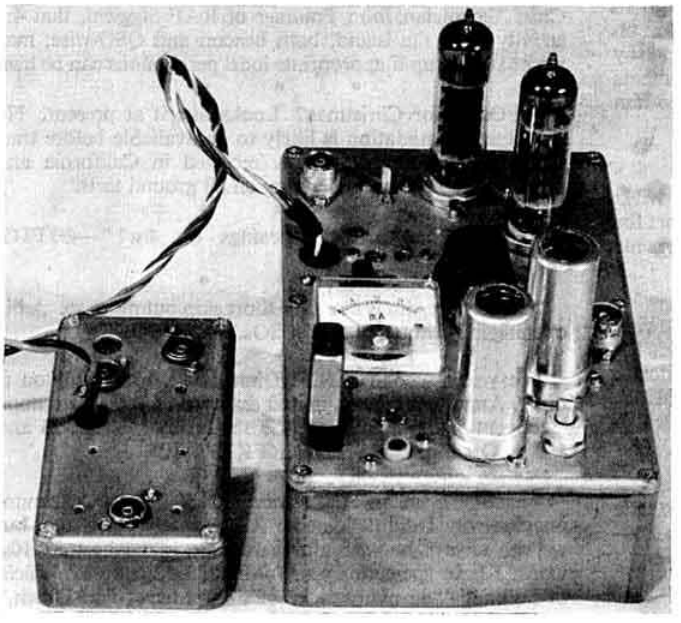
Input from the h.f. bands SB101 sideband transmitter (28–30 MHz) is applied through the co-axial socket which can be seen halfway down the transverter top panel. This is mixed in the first QQV03-10 with the output from the 2-valve crystal controlled multiplier chain at a frequency of 116 MHz to give full coverage from 144–146 MHz to the input side of the second QQV03-10, the amplified output from this stage appearing at the second co-axial socket to drive a QQV06-40A linear for SSB, used Class C for c.w. and a.m. G3AAV uses a 19·333 MHz crystal oscillator followed by a tripler and a doubler. G6SN, using a KW2000, has a crystal oscillator on 13·0 MHz, followed by two triplers to cover the s.s.b. sector of 2 metres only.

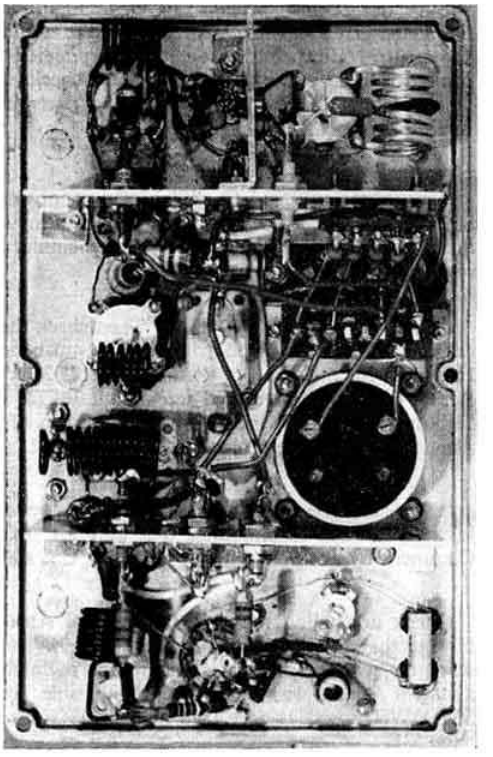
The small 0–20 mA meter is positioned for easy reading during setting up, and as G3BA has emphasized, is quite indispensable. A four position slide switch permits selection of the anode circuits of the various stages. For the two QQV03-10 stages the meter is shunted to read 0–40 mA.

Three points deserve special mention. One is the importance of stability in all stages. To achieve this a fundamental crystal oscillator is employed, supplied with its h.t. from a stabilized supply and with the crystal mounted well away from all sources of heat. A crystal was ordered for use with a 30 pF load capacity. A small trimmer across the crystal allows it to be set up exactly on frequency. Bias for the mixer and buffer amplifier is derived from 22 volt $1\frac{1}{2}$ W zener diodes in the cathodes of these stages and the screens are fed from a stabilized supply.

The second point to note is thorough inter-stage screening. The presence of stout screens across the 3-10 valve sockets will be noted from the illustrations. Earthing is to one point for each stage.

Thirdly, it is worth taking special care during the setting up operations to avoid the appearance of unwanted products at the final co-ax socket. It will be appreciated that any mixer system produces sum and difference frequencies (and





The G3AAV single sideband transverter for 2m. The 13 MHz crystal at the left is in a straight oscillator stage, and there is 117 MHz input into the grids of the first QQV03-10. Into the cathode circuit of the same 3-10 sideband is applied at 28·41 MHz and by mixing action 145·41 MHz emerges in the anode circuit. At left: the companion 2m converter.

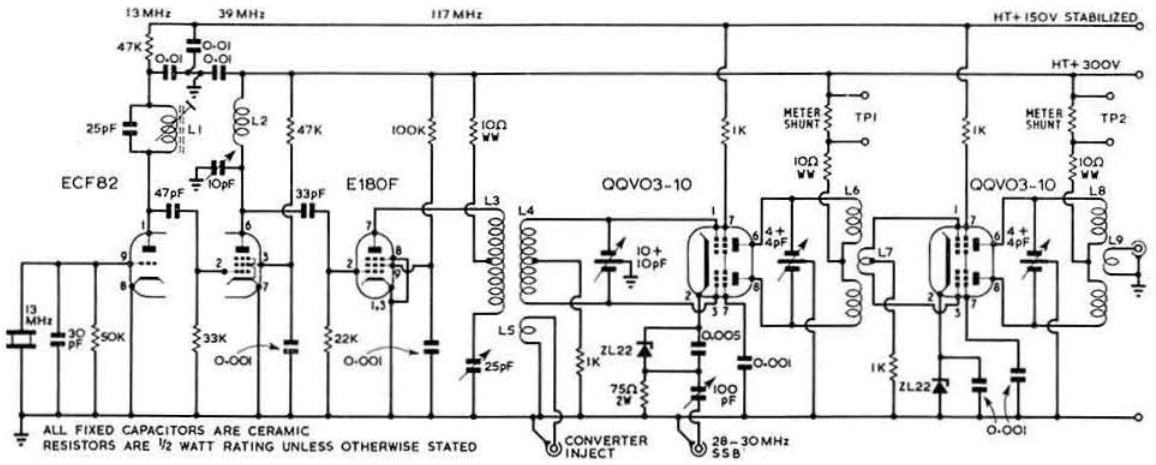


Fig. 1. The complete circuit diagram of the G3AAV transverter, designed to feed a QQV06-40A linear.

a few others besides) that can cause annoying interference within and outside the 2m band. Every effort should therefore be made to avoid these ills by proper attention to setting up before the device is put on the air.

At G3AAV in addition, three high-Q breaks are in use. The first, between the transverter and the linear amplifier, and the second between the final doubler and the receive mixer use normal tuned circuits coupled in and out with close-coupled single turn links. The third between the linear amplifier and the beam aerial is of co-axial design from the ARRL handbook. This is also used on receive where a reduction in signal strength was overcome by tuning the co-axial line between the high-Q break and the receive converter.

Here and There

" Re the Cornish beacon GB3CTC, thanks must go to Des Olds, G3CZZ, who constructed and runs the station on 144·1 MHz. He spends a lot of time keeping it on the air by means of a daily routine and frequency check . . . members who appreciate the service should send reports direct to him or to RSGB headquarters "—G3NKE.

* * *

" . . . most interested to read of the proposed 432 MHz Sheffield beacon. Please pass on to G3WXI my support for the project "—G3UBX (one of many similar comments received).

* * *

Equipped for RTTY on v.h.f.? Then check the following calling frequencies: 70·56 MHz on the 4m band, and, for 2m, 144·6 for the south of the UK and 145·3 for the north. Ready to give any required info about RTTY is G3LLZ, 51 Norman Road, Swindon, who is Hon. Sec. of the British Amateur Radio Teleprinter Group.

* * *

" Will someone please tell the continentals not only to tune high to low but to announce that they are doing so? "—Comment by about fifty-seven northerly UK stations.

* * *

Check northabout beacons for signs of Aurora on 2m. Noting that GB3GM and SM4MPI (145·96) were at great strength, with raspy notes, one recent midnight, G3LTF assumed Aurora was about, though invisible. It was—and SM5DWF raised at 56A. See also GM3GUI's report on page 531.

Although the " exigencies of the Service " set back the 9H1MB Malta beacon project, there's news from 9H1AY, Chief Technician John Tranmer of RAF Siggieni, that 4m activity from the island, both beacon and QSO-wise, may yet be started up if appropriate local permissions can be had.

* * *

An Oscar for Christmas? Looks like it at present. No rocket accommodation is likely to be available before then for the Australis Oscar, now received in California and returning 100 per cent efficiency on all ground tests.

* * *

" How about activity evenings on 4m? "—G3TTG, Cornwall.

* * *

" From here, 4m is like 10m short skip but more so. A big opening is 3-4 hours of solid QSOs "—ZB2BO.

* * *

The year's second V.H.F. Dinner at Wolverhampton is on 31 August, numbers limited as before to 40. Afternoon " conventionette " will have G3BNL to talk about 23 and 13cm. Organizers G3THW/G6FK/G8AEV.

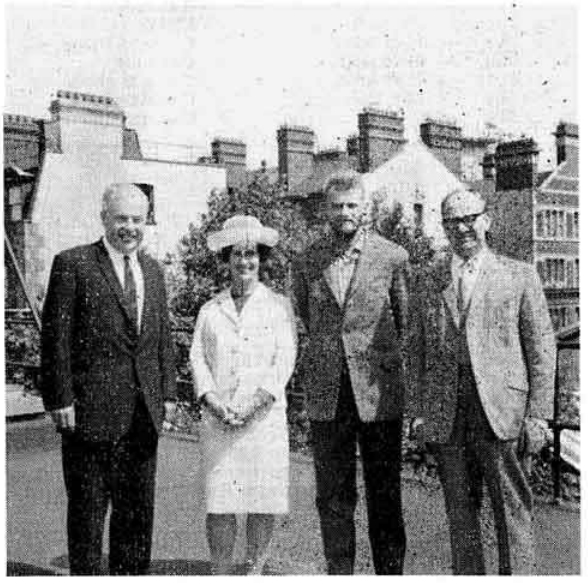
* * *

" Having been an SWL since during the war, I cannot imagine why I didn't join the RSGB many years ago, but we can always be wise afterwards! It is the best £2 10s. worth I have spent this year "—BRS30352, Bob Wakefield of Solihull, " an avid reader of Four Metres and Down," and a well known 2m reporter.

* * *

" I cannot supply any more printed circuit boards at the moment (see page 465 last month), 51 now having been sold " —G8ARV (More about this project next time: no space this).

SOCIETY AFFAIRS AND NEWS SUPPLEMENT



Just Siversten, OY7J, who recently visited Headquarters, with G4AR, RSGB General Manager, Mrs Margolis, the Society's Public Relations Officer and G2BVN. The photo was taken on the roof of 28 Little Russell Street.

A brief report of the RSGB Council Meeting held on 10 June 1968 in the Kingsley Hotel, London

Present: The President, J. C. Graham (in the Chair), Messrs. B. Armstrong, N. Caws, J. Etherington, R. J. Hughes, A. Hunter, E. G. Ingram, H. E. McNally, L. E. Newnham, A. D. Patterson, J. Petty, R. F. Stevens, J. W. Swinnerton, D. W. Thomas, G. Twist, E. W. Yeomanson, (Members of Council) and Mr. A. E. Dowdeswell (General Manager), and T. R. Preece (Assistant Editor).

Apologies for absence were received from Messrs. G. M. C. Stone and C. P. Pope.

Membership and Affiliation

It was resolved to elect 174 Corporate and 53 Associate Members.

Corporate Membership was granted to 19 Associates.

The subscriptions of four members were waived because of blindness or disability.

Council approved the Affiliation applications of the Rugby and District Radio and Electronics Club and the RAF Rheindahlen Amateur Radio Club.

Operating Certificates

Council accepted a recommendation that Certificates should be reviewed and redesigned where necessary. This was left to a small Committee under the Chairmanship of Mr A. E. Dowdeswell and will include The President, Mr Emary and Dr Allaway. A report will be made to the Council.

BBC World Radio Club

Mr Stevens asked Council for guidance in the matter of Third Party Traffic, as he had been asked to comment on this in the BBC Programme, World Radio Club. Council reaffirmed that the RSGB could not support Phone Patch Traffic on the United States Pattern, nor in any case where such traffic would divert income from the GPO. Nevertheless, third party traffic in emergencies or on behalf of service personnel in remote areas was considered desirable.

Region 1 ORM

Council approved the proposal of Mr O'Brien to hold an ORM on 29 September. Messrs Petty, Patterson and McNally would attend on behalf of Council.

Regional Representative

It was agreed to invite Mr C. Sharpe, G2HIF, to take office as RR for Region 17 until the end of 1968.

Council accepted with thanks the offer of Mr Preece (Assistant Editor) to manage the Society's Bookstall at the Mildenhall ARMS Rally on 30 June.

Mr R. F. Stevens also kindly offered to manage the Society's Bookstall at RAF ARS Convention at Locking.

Interference on 70cm

Mr Stevens reported that following an approach by the Society, Lufthansa had agreed to restrict the use of certain Radio Altimeter equipment whilst their aircraft were in UK air space.

Annual General Meeting

Council agreed to hold the AGM on Friday, 6 December, at the Royal Society of Arts.

Minutes of Meetings of Committee

Council approved the following Minutes: RAEN Committee (6.4.68), Finance and Staff Committee (9.4.68), V.H.F. Committee (17.4.68), GPO Liaison Committee (19.4.68), Education Committee (20.4.68), V.H.F. Contests Committee (23.4.68), Mobile Committee (26.4.68), Exhibition Committee (3.5.68), Membership and Representation Committee (3.5.68), Mobile Committee (4.5.68), Scientific Studies Committee (6.5.68), H.F. Contests Committee (9.5.68), V.H.F. Committee (13.5.68), and Finance and Staff Committee (20.5.68).

Council was in session for 4½ hours.

IARU

Region 1 calling

INTERNATIONAL AMATEUR RADIO UNION

By R. F. STEVENS, G2BVN

Region III Organization Formed

At the Region III IARU Congress held in Sydney during 12–16 April it was decided to form a Region III organization similar to those already existing in Regions I and II. Support for the meeting came from a number of Societies in Region III and representatives from Japan, the Philippines, New Zealand and Australia were present. Representatives of the National Societies of these countries, together with the President of the IARU, R. W. Denniston, W0DX, were nominated as Directors, whilst the Secretariat consists of VK3KI, VK3QV and VK3ADW with VK3IZ as Secretary-General.

Rules for the organization are to be drafted and submitted for approval at the next Plenary meeting which will be held in Tokyo in 1971. In a letter to Region III societies VK3IZ comments " It is not our intention to form an organization in name only. We intend to do all within our power to intensify the image of Amateur Radio in Asia and Oceania—not only with each other, but with our respective administrations, both educational and telecommunication."

The WIA invited representatives from the RSGB and Region I IARU to attend the Congress but the travelling expenses involved made this impossible. However there has been close liaison with the WIA and amateurs everywhere will welcome the efforts that have been made to strengthen the world-wide organization which is vital to the very existence of the amateur movement. The writer is indebted to John Battrick, VK3OR, Pierce Healey, VK2APQ and Peter Williams, VK3IZ, for their co-operation in sending information on Region III developments.

With IARU organizations now existing in all three Regions a world-wide meeting would no doubt be desirable but is hardly practicable in view of the high cost involved. However regular exchange of information between Regions I and III is certain to take place.

VK3OR becomes WIA President

Max Hull, VK3ZS, Federal President of the *Wireless Institute of Australia* for the past seven years has been succeeded by John Battrick, VK3OR, and Peter Williams, VK3IZ, has been elected Federal Secretary.

Swiss Reciprocal Licences

USKA, the Swiss National Society, confirms that the Swiss authorities are not yet willing to issue licences for holiday or business trips but that it is hoped that such licences may be available during 1969. British nationals residing in Switzerland who wish to obtain a licence should write to: Generaldirektion PTT, Sektion Allgemeine Radioangelegenheiten, Speichergasse 6, 3000 Berne.

Lebanese National Society

Officers of the *Association des Radio-Amateurs Libanais* for 1968 are: President, OD5LX; Secretary, OD5FB; Treasurer, OD5AD; Committee Members OD5AR and OD5BZ. The address of RAL is P.O. Box 1217, Beirut, Lebanon.

US Licences

Recent information from the FCC gives the number of licensed operators as 256,160. The division of this number amongst the various classes of licence produces the following percentages: Novice 4·8 per cent; Technician 22·3 per cent; Conditional 14·2 per cent; General 42·2 per cent; Advanced 14·4 per cent; Extra 2·1 per cent. The current trend seems to be a decrease in the number of Novice and Advanced Class licencees with small increases in the other classes.

Meetings

The 1968 Convention of the *International Amateur Radio Club* will take place at Geneva over the period 6–8 September.

The postponed Annual General Meeting of the *REF*, the French National Society, will now take place on 19–20 October at Tours.

The European Band Plan

This plan is supported by all the IARU Region I Societies and was agreed at the 1966 Conference.

Frequency Band	Types of Emission
3·5 — 3·6 MHz	C.w. only
3·6 — 3·8 MHz	C.w. and phone
7·0 — 7·04 MHz	C.w. only
7·04 — 7·1 MHz	C.w. and phone
14·0 — 14·1 MHz	C.w. only
Around 14·090 MHz	RTTY
14·1 — 14·35 MHz	C.w. and phone
21·0 — 21·15 MHz	C.w. only
21·15 — 21·45 MHz	C.w. and phone
28·0 — 28·2 MHz	C.w. only
28·2 — 29·7 MHz	C.w. and phone

RAE Courses

Bromley, Kent. At the Adult Education Centre, 28 Beckenham Road, Beckenham, Kent. Thursdays from 7 p.m. to 9 p.m. Commencing on the 26 September. Fees according to age. All enquiries to: M. D. Bass, G3OJE, 42 Cleveland Road, London SE20.

Corbridge, Durham. Corbridge County School. Commencing mid-September. Details from V. I. Allison, G3TNX, 14 Silverdale Drive, Winlaton, Co. Durham.

Coventry, Warks. Coventry Technical College. Wednesdays from 7 p.m. to 9 p.m. Commencing September. Enrolment dates, 9-12 September. Fee £2 Enquiries to F. J. S. Chandler, G3HHM, C.T.C., Butts, Coventry CV1 3GD.

Crawley, Sussex. Ifield Evening Institute, Lady Margaret Road, Ifield, Crawley, Sussex. Monday evenings. Commencing Monday 23 September. Enrolment dates 18-19 September between 6 p.m. and 9 p.m. Fees, under 19, 26s. 6d. Over 19, 66s. 6d. Instructor, A. J. Gibbs, G3PHG.

Harlow, Essex. Harlow Technical College. Fridays 7 p.m. to 9.30 p.m. Commencing September. Full details from E. P. Essery, G3KFE, 17 Ascot Close, Parsonage Lane, Bishops Stortford.

Huddersfield, Yorkshire. Ramsden Technical College, Queensgate, Huddersfield. Monday and Friday evenings. Commencing September. Enrolment dates 9-11 September. Enquiries should be addressed to the course tutor, R. Hay.

Ilford, Essex. Ilford Literary Institute (County school for girls), Cranbrook Road. Wednesday evenings from 7.15 p.m. to 9.15 p.m. Commencing 25 September. Enrolment 9-12 September at 8.30 p.m. Fees: Under 21, 25s. Over 21, 40s. Instructor G8JM. Further details may be obtained from: W. G. Hall, G8JM, 48 Hawkdene, North Chingford, London, E4.

London, E4. Chingford Community Centre, Friday Hill House, Simmons Lane, E4. Monday evenings from 7.30 p.m. to 9.30 p.m. Commencing 23 September. Enrolment, the week before the course starts. Fees, under 18, 14s. Over 18, 38s. 6d. Instructor, G2HR.

London, N7. At the Montem School, Hornsey Road, Holloway, London N7. Mondays from 7.30 to 9.30 p.m. Commencing on 23 September. Enrolment at the school from 16 to 20 September in the evenings. There is also a Morse class. Fees 35s. for one course or 40s. for both.

Northwood, Middx. At the Northwood School, Potter Street, Northwood. Enrolment on the 9/10/11 September between 6.30 and 8.30 p.m. Enquiries to: H. Hardy, G4GB, 12 Lawn Close, Ruislip, Middx.

Slough, Bucks. Slough College of Technology. Thursday evenings 7 p.m. to 9.30 p.m. Commencing September. Enrolment dates 11-12-13 September between 2 p.m. and 4 p.m., also from 5.30 p.m. to 8 p.m. Instructors are G3FVC and G3WQC.

'IF YOU'RE IRISH . . .'

We shall soon be able to say in the words of the popular song—"Come into the parlour"! Our friends in the Irish Radio Transmitters' Society have just weighed in with a £20 donation to the Headquarters Fund, saying—to quote their own words—"a small gesture of thanks for the many facilities you have placed at our disposal over the years." We look forward to welcoming I.R.T.S. members at Doughty Street whenever they are in the London area, and to thanking them personally for their help. Our thanks also to the anonymous donor of £100—and this is not the first time that he has dug deeply into his pocket to help a wide variety of Society activities. *Your* pocket may not be so deep, but have *you* tried digging? And if all you find in your pocket is a 1933 penny—just send us that!

So far only one other club has sent us a membership total so that we can compare the Harrow "Money per Member" challenge, so again we print the list of subscribers in alphabetical order:

Clubs and Groups	Debentures	Donations
	£	£ s. d.
Basingstoke Amateur Radio Club		7 7 0
Bedford & District Amateur Radio Club	25	
Belfast and District RSGB Group	25	
Chiltern Amateur Radio Club		9 11 0
Cornish Radio Amateur Club	25	3 3 0
Crawley Amateur Radio Club		5 10 6
Cray Valley Radio Society		10 0 0
Crystal Palace Club		11 0 0
Edgware and District Radio Society		1 7 0
Glasgow University Radio Club	25	
Radio Society of Harrow	25	36 4 0
Mansfield Amateur Radio Club		5 0 0
March and District Amateur Radio Society	50	
Mid-Ulster Group of RSGB	25	
North Kent Radio Society	25	
Painton Radio Society		5 0 0
Reading Amateur Radio Society		3 0 0
South Dorset Radio Society		5 5 0
Stockport Radio Society	50	
Wimbledon and District Radio Society		13 0 0
Wirral Amateur Radio Club	25	
	£300	£115 7 6

At the new Headquarters itself, the pattern of "things to come" is at last emerging, as the decorators begin their final assault on some of the rooms. All being well, we'll be "home and dry" by winter!

"Uncle's Southend Do"

An invitation from G6NU to attend the annual rally at Southend on Sea which takes place on Sunday, 18 August. Rendezvous point is the top entrance to the pier at noon or 3.30 p.m.

GB3 New Welsh National Eisteddfod Station

The Barry College of Further Education will be operating a station with the above call-sign during the period of the Welsh National Eisteddfod 5-10 August inclusive at Barry.

Equipment has been kindly loaned by Messrs K.W. Electronics, Electroniques (Prop. STC), Eddystone, Mosley and Belling & Lee. The station will operate mainly in the s.s.b. section of all bands 160 to 10m, but will also welcome a.m. and c.w. contacts. Operating times will normally be from 0800 to 2000 GMT, but this schedule may be subject to some alteration should local conditions dictate.

QSL Certificates will be issued to all contacts, and to SWLs if a stamp is enclosed with reports. Cards should be sent to GW3VKL direct, or via the RSGB Bureau.

EI-GI CONVENTION

Sunday, 6 October, 1968

Ballymascanlan Hotel, Dundalk

Exhibition open 10.00 a.m.
Main Meeting 2.30 p.m.
Dinner 7.00 p.m.

Tickets: Complete day £1 15s.
Day (less dinner) 15s.
Dinner only £1 7s. 6

Tickets obtainable from: Mr S. H. Foster, GI3GAL
31 Belmont Park,
Belfast 4

Affiliated Society Representatives

New ASRs have been appointed for these societies:

School of Electronic Engineering, G3IHH, Arborfield, Reading, Berks.
R. Murphy, G3NRX, 4 Ampleforth Road London, SE2.

Torbay Amateur Radio Society
B. E. Symons, G3LHJ, 52 Reddenhill Road, Babbacombe, Torquay, Devon.

Bradford Radio Society
W. G. Scarlett, G3RXS, 12 Otley Road, Eldwick, Bingley, Yorks.

South Shields and District Amateur Radio Club
F. Harrison, G3SFL, 42 Woodlands Road, Cleadon, Sunderland.

Affiliated Societies

The following Clubs have recently become affiliated to the RSGB:

Rugby and District Amateur Radio and Electronics Club, Hon Secretary, R. T. Craxton, 103 Clifton Road, Rugby.

Royal Air Force (Rheindahlen) Amateur Radio Club, Hon. Secretary, Cpl. R. Collett, Headquarters, Royal Air Force, Germany, BFPO 40.

Rhyl and District Amateur Radio Club.
A. Antley, Fairholme, Fairfield Avenue, Rhyl.

Area Representatives

Four new area representatives have recently been appointed:

Mid Ulster RSGB Group, V. I. Gracey, GI3WEM, Innsmount, Inn Road, Dollingstown, Lurgan, Co. Armagh.

South East of Romford, Essex, D. F. Beattie, G3OZF, 4 Hollywood Close, Great Baddow, Chelmsford, Essex.

Aberdeen and Kincardine.
P. I. Park, GM3PIP, 21 South Street, Mintlaw, Aberdeenshire.

Ilford, Essex.
L. C. Currie, G3UKX, 219 Halley Road, London, E12.

Silent Key

LES OSMOND, GW2BBO

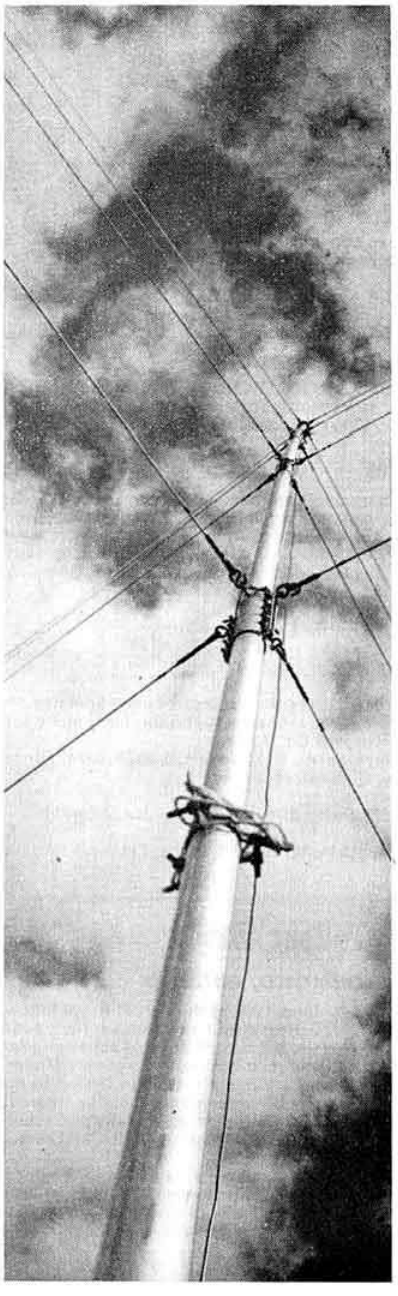
The death occurred on 26 June, 1968, at the Cardiff Royal Infirmary, of Les Osmond, GW2BBO. He had suffered from a serious heart condition for a number of years, but despite this his active interest in amateur radio, both fixed and mobile, never decreased. Moderately interested in DX c.w., his main interests were talking to his friends on l.f. bands and helping the younger members to progress in the hobby. He enlisted in No. 614 Squadron (County of Glamorgan), Auxiliary Air Force in 1937, as a wireless operator, and served with the Unit throughout the War.

In all truth it must be said that Les was an amateur in the finest tradition, and he will be sadly missed by a large number of friends in the amateur world covering two generations. The deep sympathy of members in Region 10 is extended to his wife and daughter who survive him

C.H.P.

NFD '68

8-9 June, 1968



NFD Trophy
Cannock Chase ARS — 2334 points

Gravesend Trophy
Croydon RSGB Group—Surrey Radio Contact Club — 2163 points

Bristol Trophy
Stourbridge DARS — 1180 points

Frank Hoosen (G3YF) Memorial Trophy
South Birmingham RS — 743 points

Scottish NFD Trophy
Lowland Royal Signals RS — 1074 points

Leading Scores on Individual Bands

1·8 MHz—Sheffield Group—G8NN/P	260 points
3·5 MHz—Cannock Chase—G3ABG/P	507 points
7 MHz—Cannock Chase—G4CP/P	651 points
14 MHz—South Birmingham RS—G3OHM/P	743 points
21 MHz—Croydon—SRCC—G3BFP/P	356 points
28 MHz—Croydon—SRCC—G6LX/P	125 points

Overseas Stations giving most Points to NFD Entrants

Cyprus (Famugusta) RSGB Group—5B4SS/P
Malta (RAF Luqa) Group—9H1BA/P

FINE weather and slightly fewer entries sums up the 1968 NFD, together with the continuance of the trend towards single station entries. Cannock Chase are this year's overall winners with a checked score of 2334, well in front of their nearest rivals. Croydon (1967 winners) take second place this year with 2163 points to win the Gravesend Trophy.

In the " single station " stakes, Stourbridge improved their 1967 12th position to win the Bristol trophy with 1180 points. The Scottish NFD trophy has been won by the Lowland Royal Signals Group with 1074 points.

1·8 MHz

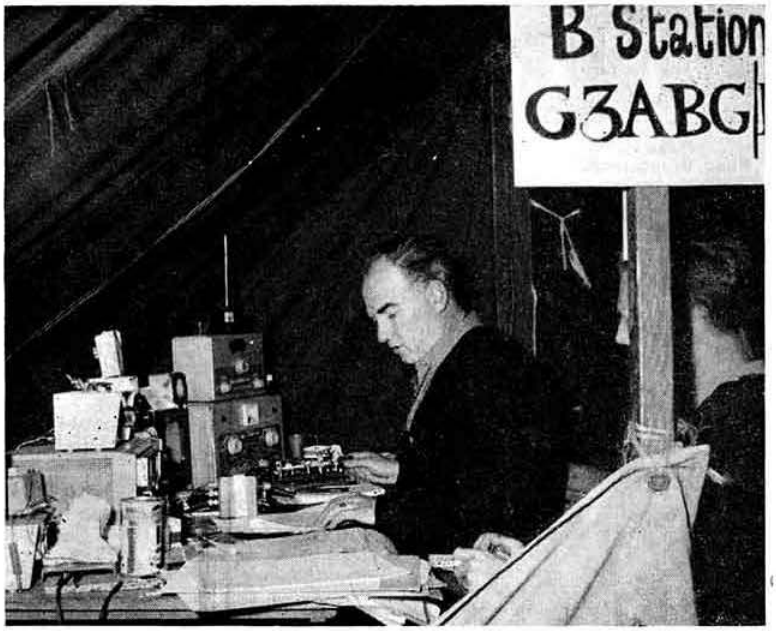
The continuing trend towards single station operation has resulted in the lowest number of 160m logs for some years. Only 67 logs were received, compared with 90 last year and 105 in 1966. Nevertheless, the leading scores are much the same as in 1967 no doubt stemming from a reasonable level of activity coupled with favourable conditions—a number of portables, GMs included, worked HB9CM/P and OL2AIO/P.

Sheffield (G8NN/P) are this year's band leaders with a corrected score of 260 points from 143 QSOs, 74 of which were with portable stations. Sheffield had a twin fed windom aerial, a Denco DCR19 receiver, and a homebrew transmitter with a 6V6 in the final. In second place were the Hull and DARS (G3LIQ/P) who made 108 contacts worth 246 points. Their transmitter was a modified Valiant using a 5763 p.a. which fed a half-wave dipole; the receiver was an HRO. The third highest scorers were the Glenrothes ARS (GM3PFQ/P) with 230 points from 100 QSOs; they used an S640 receiver, a dipole, and ran 9 watts to a 2E26.

The Sheffield group obviously intended to put in a strong bid for the band leaders award as they were on 160m for all of the 24 hour period. As a comparison, Hull spent 8½ hours (18.00–02.30) on the band, and Glenrothes 6½ hours (20.00–02.30).

3·5 MHz

" Eighty " produced 100 logs from contestants, from which Cannock Chase (G3ABG/P) emerged as a band leaders with 507 points, a safe margin over their nearest rivals Crawley (G3TR/P) with 455 points.



Half of the effort which took Cannock Chase to the top of the results table: the B station, G3ABG/P. The overall score was 2334 points, winning the NFD Trophy by 171 points.

Cannock Chase used a NE/SW half-wave dipole at a height of about 30 ft., energized by a modified DX40 with a 2E26 p.a. The receiver was an HA350 with a *Q* multiplier added.

Crawley used a modified KW2000 with 250 V h.t. on the p.a. and a 2E26 final; the aerial was an inverted V dipole. It is of interest to note that well known DX operator Mike Dransfield 5N2AAF/G3JKO was amongst the four operators.

Next in line were *Portsmouth* (G3TVI/P) with 451 points derived from an all 5763 transmitter and a half wave long wire. The receiver was an RA17L.

Conditions generally appear to have been fair, with G and continental /P stations providing a high activity level over the whole of the contest period.

A quick survey of the logs revealed that 21 groups used modified KW2000 transceivers and 25 groups used various other modified commercial transmitters or transceivers. Just over half the entrants employed home constructed transmitters, including an all transistor transceiver used at *Harrow*.

7 MHz

A total of 86 logs was received for 40m; a band on which it was possible to achieve a high scoring rate during nearly the whole of the 24 hour period. Top scoring group were Cannock Chase (G4CP/P) with a corrected score of 651 points. The runners-up were South Birmingham (G3NKI/P) who scored 616 points, and third were the Medway ARTS (G3OHP/P) with 600 points.

Cannock Chase used a modified Vespa, a Drake 2B, and two dipoles; one running NE-SW and the other NW-SE. An analysis of their 40m log reveals that of their 204 contacts, 77 were with British Isles portables, 80 with continental portables, eight with W/VE, and two with VK. G4CP/P was on the band during the following periods: 18.45–19.10; 20.45–23.00; 00.40–01.50; 03.50–04.35; 05.10–10.30; and 11.10–13.40. South Birmingham made 183 QSOs with a modified KW2000, a dipole, and a 40 ft. vertical with seven radials.

In view of the wide areas and long distances over which contacts were made, it is interesting to record that all of the five leading stations on this band had two aerials available; either two dipoles at right angles or a dipole and a vertical.

5B4SS/P and 9H1BA/P were active on 40m, but they worked comparatively few stations.

14 MHz

Top score on 14 MHz was made by the South Birmingham Radio Society, who, with an excellent total of 743 points, win the Frank Hoosen (G3YF) Memorial Trophy. They had 218 contacts, and worked a large number of W stations right through the night, using a modified KW2000 and a Quad aerial.

Next came another Midland Group, Cannock Chase ARS with a score of 634 points from 185 contacts. They did not contact nearly as many Ws as their neighbours, but made a good score working European portables. Their equipment was a modified DX40 transmitter, an HA350 plus *Q* multiplier as the receiver, and again a Quad aerial.

In third place were Croydon RSGB Group—the Surrey Radio Contact Club—close behind with 625 points. A "Home-brew' transmitter and receiver and a Quad aerial made up their station.

It is interesting to note that the next two stations were from Wales, i.e. Port Talbot and the Cardiff Radio Contest Club.

Scotland represented by the Moray Firth ARS were in 6th position —quite a good international result.

Band conditions were a bit mixed with few stations finding it easy to work into W during the night.

All continents provided contacts; some of the more unusual (for 10 watts) were XE, VK, ZL, MP4, VU, 9H1, 5B4, 9J2, 5Z4, 9J8, 4X4, AP5, and TA2.

Quads were by far the most popular aerials but all sorts from dipoles up were used, including rhombics and Vee beams.

Forty-eight groups used "home made" transmitters against 33 with modified commercial types.

21 MHz

Conditions were not very good on 15m although the band had been open to North America for long periods during the previous week. However, there were a few bright spells which benefited those groups who checked the band at frequent intervals.

Croydon (G3BFP/P) did just this making 102 contacts to produce an adjudicated score of 356 points which gives them the band leaders award. In second place comes Cannock Chase (G4CP/P) with 334 points from 87 contacts.

For the first hour or so of the contest 15m was just open, principally to W/VE, SE Asia, Africa, and the Mediterranean area. It opened again for a short period around 22.00 to W/VE and then closed until 06.00 when contacts were made with stations in VK and SE Asia. Subsequently very little was worked until 14.00 when both European and North American stations appeared on the band providing plenty of points until the end of the contest.

G3BFP/P used a quad backed up by dipoles and a long wire, an AR88, and a mixer v.f.o. transmitter with a 2E26 in the p.a. G4CP/P had a modified Vespa, a Drake 2B, and a cubical quad.

NFD '68

TWO STATION ENTRIES

Posn.	Band Group	Insp.	Group	A Station Call	B Station Call	1·8	3·5	7·0	14·0	21·0	28·0	Total
1	a	•	Cannock Chase ARS	G4CP	G3ABG	190	507	651	634	334	18	2334
2	a		Croydon RSGB Group/SRCC ..	G3BFP	G6LX	161	440	456	625	356	125	2163
3	b		South Birmingham RS	G3OHM	G3NKI	—	383	616	743	210	5	1957
4	a		Oxford DARS	G2DU	G8PX	185	419	498	459	216	13	1790
5	a		Guildford DARS	G6NA	G8GS	159	396	415	318	199	17	1504
6	e		Ariel Radio Group (BBC) ..	G3GDT	G5SX	200	279	419	306	233	46	1483
7	a		Leyland Hundred ARG	G3XII	G3GGS	198	391	456	287	142	—	1474
8	a		Chiltern ARC	G5WW	G3BXS	156	436	390	263	139	76	1460
9	a	•	Crawley ARC	G2DP	G3TR	142	455	314	275	144	34	1364
10	a		Rad. Soc. Harrow	G3EFX	G3HBR	169	371	360	331	106	13	1350
11	c		East Molesey	G8SM	G3TVS	176	405	181	302	142	95	1301
12	a		Chelmsford ARS	G6ZC	G4VF	171	410	356	89	80	10	1116
13	a		Wirral ARS..	G3NWR	G2AMV	135	245	236	332	128	—	1076
14	a		Lowland Royal Signals	GM3TLR	GM3VIO	128	252	405	201	88	—	1074
15	a		Torbay ARS	G3GDW	G3NJA	172	269	331	113	173	—	1058
16	d		Portsmouth DRS	G6NZ	G3TVI	173	451	274	113	2	—	1013
17	a		Hull and DARS	G3LIQ	G3AMW	246	223	241	267	22	2	1001
18	a		Grimsby ARS	G4XC	G3RSD	157	339	333	138	21	—	988
19	a	•	Weston-S-Mare/RAF Locking ..	G5DV	G8FC	186	266	270	171	14	—	907
20	a		Dundee	GM2HFV	GM4HR	12	287	133	366	72	—	870
21	a		Aberdeen ARS	GM3BSQ	GM5YK	—	70	329	418	51	—	868
22	a		Basingstoke ARC	G2UM	G3TCR	165	359	271	69	—	—	864
23	a	•	Chester DRS	G3GIZ	G3FNV	191	336	161	162	—	—	850
24	g		Purley DRC	G3TWJ	G3FTQ	173	309	145	30	95	3	755
25	a		Derby DARS	G3ERD	G2DJ	91	318	236	98	—	—	743
26	a		Pontypool	GW3RNH	GW3JBH	163	336	209	8	—	—	716
27	a		Lothians RS	GM3HAM	GM3UM	143	67	173	260	50	—	693
28	a		North Kent RS	G6HD	G3OFM	169	223	212	58	28	—	690
29	a	•	Ayrshire ARG	GM3NPR	GM4QK	146	139	280	92	11	—	668
30	e		East Kent/University of Kent ..	G3UKC	G3LTY	127	197	—	144	47	3	518
31	f		Addiscombe ARC	G3UFY	G3VYI	178	258	35	—	1	—	472

Band Group. *a*, 1·8, 7·0, 21·0 MHz; *b*, 1·8, 14·0, 21·0 MHz; *c*, 1·8, 3·5, 28·0 MHz; *d*, 1·8, 7·0, 28·0 MHz; *e*, 1·8, 3·5, 7·0 MHz; *f*, 1·8, 14·0, 28·0 MHz; *g*, 1·8, 21·0, 28·0 MHz.

SINGLE STATION ENTRIES

Posn.	Insp.	Group	Callsign	1·8 MHz	3·5 MHz	7·0 MHZ	14·0 MHZ	21·0 MHz	28·0 MHz	Total
1		Stourbridge DARS	G6OI	—	357	502	321	—	—	1180
2	•	Caterham	G2AJS	—	372	426	301	—	—	1099
3		Basildon DARS	G3EDM	—	395	500	143	—	—	1038
4		Spen Valley ARS	G6LD	—	331	498	205	—	—	1034
5	•	Cardiff RCC	GW3XEJ	—	220	295	515	—	—	1030
6	•	Reigate ATS	G3REI	—	286	586	—	109	—	981
7		Stockport RS	G3NBN	—	286	395	292	—	—	973
8		Macclesfield DRS	G3LDT	157	430	—	380	—	—	967
9	•	Medway ARTS	G3OHP	—	281	600	—	82	—	963
10		Verulam ARC	G3VER	185	299	471	—	—	—	955
11		Leicester RS	G3LRS	83	352	494	—	—	—	929
12		Port Talbot	GW5VX	—	284	—	607	—	9	876
13		Wolverton DRC	G4CK	—	333	395	139	—	—	867
14	•	Belfast & District	GI5UR	—	373	—	374	113	—	860
15	•	Cheltenham	G3CGD	207	313	337	—	—	—	857
		Midland ARS	G3MAR	205	309	343	—	—	—	857
17		Norwood and S. London	G3IIR	—	324	—	332	189	—	845
18		West Kent ARS	G3WKS	—	386	385	—	57	—	828
19		Chingford RSGB	G8JM	—	412	281	132	—	—	825
20	•	Barnsley DARC	G5IV	—	368	364	89	—	—	821
21		Durham City ARS	G3TAK	—	290	—	416	102	—	808
22		Stevenage DARS	G3SAD	152	302	347	—	—	—	801
23	•	Cray Valley RS	G3RCV	—	283	445	72	—	—	800
		Maidstone YMCA	G3TRF	—	372	249	179	—	—	800
25		Worcester DARC	G3GJL	—	238	239	302	—	—	779

Posn.	Insp.	Group	Callsign	1·8 MHz	3·5 MHz	7·0 MHz	14·0 MHz	21·0 MHz	28·0 MHz	Total
26		Gloucester	G3MA	172	288	311	—	—	—	771
27		Nottingham ARC	G3EKW	58	327	273	—	—	—	757
28		East Barnet ARCC	G3RPB	—	236	283	234	—	—	753
29		Edgware	G3VW	—	336	348	68	—	—	752
30		Blackpool	G8GG	182	—	—	354	206	—	742
31	*	City and County of Bristol	G2IK	180	314	—	225	—	—	719
32		South Dorset RS	G3SDS	—	280	280	146	—	—	706
33		Sutton and Cheam RS	G2XP	—	341	286	74	—	—	701
34		Reading ARC	G3ULT	—	200	314	174	—	—	688
35		Swindon DARC	G4AP	—	304	348	34	—	—	686
36		Cheltenham ARS	G5BK	—	269	272	144	—	—	685
37	*	Bristol ARC	G4UZ	—	349	276	—	55	—	680
38		Southdown ARS	G4FV	73	346	254	—	—	—	673
39		Nailsworth DARS	G3VVV	135	328	—	198	—	—	661
40		Glenrothes ARS	GM3PFQ	230	—	341	—	78	—	649
41	*	Surrey Radio CC (Coulsdon)	G3DVQ	149	256	241	—	—	—	646
42		Lincoln Short Wave Club	G4BU	100	271	270	—	—	—	641
43		Clifton ARS	G3GHN	—	207	269	162	—	—	638
44		Magnus Grammar School	G3PAW	—	—	435	99	74	—	608
45	*	Gt Yarmouth ARC	G3VLK	—	278	297	31	—	—	606
		Southgate RC	G5FA	—	376	230	—	—	—	606
46		Bury and Rossendale	G3BRS	—	233	214	150	—	—	597
47		Norfolk ARC	G3IOR	—	113	—	330	137	—	580
48		Bradford Radio Soc.	G3NN	166	191	214	—	—	—	571
49		Bedford DRC	G3WTP	—	248	229	86	—	—	563
50		Stoke on Trent ARS	G3GBU	128	272	—	155	—	—	555
51		Salisbury	G3FKF	157	369	—	24	—	—	550
52		Cornish RAC	G3OHB	—	—	266	116	165	—	547
53		Racal ARC	G3SVD	—	383	—	132	—	—	515
54	*	Bangor DARS	GI3KDR	—	201	—	232	79	—	512
55		Scarborough ARS	G4BP	—	328	—	164	16	—	508
56		Southampton	G3SOU	127	279	—	94	—	—	500
57		Stroud & District	G3SDR	133	219	145	—	—	—	497
58	*	Liverpool DARS	G3AHD	—	365	66	53	—	—	484
59	*	Ilford	G3ULB	112	227	140	—	—	—	479
60		Southend DRS	G5QK	154	156	155	—	—	—	465
61		Echelford ARS	G3UES	152	195	—	106	—	—	453
62	*	South Shields DARC	G3DDI	—	151	—	284	—	14	449
63		Chippenham DARC	G3VRE	—	375	—	63	7	—	445
64	*	Bury St Edmunds	G3IRM	—	260	174	—	—	—	434
65	*	Conway Valley ARC	GW3RUA	—	255	—	156	—	—	411
66		Chorley RSGB	G3DBY	191	219	—	—	—	—	410
67		Shefford DARS	G2DPQ	207	193	—	—	—	—	400
68	*	Havering DARC	G3TTB	85	287	—	—	—	—	372
69	*	Ainsdale RC	G2CUZ	198	—	—	139	30	—	367
70		Crystal Palace DARS	G3VCP	157	161	37	—	—	—	355
71		Greenock DARC	GM3UWX	—	18	6	270	—	—	294
72		Bromsgrove DARC	G3VGG	—	143	47	95	—	—	285
73		Pudsey DRC	G3XEP	102	132	42	—	—	—	276
74	*	Sheffield	G8NN	260	—	—	—	—	—	260
75		Mid-Herts ARS	G2BLA	51	165	43	—	—	—	259
76		Southport RS	G3WQP	113	135	—	10	—	—	258
77		Northern Heights RS	G2SU	96	90	—	—	43	—	229
78		Mid-Lanarks RSGB	GM3NRP	—	69	114	—	15	—	198
79	*	Sunderland ARS	G3IV	85	—	51	12	—	—	148
80		Fulford DARS	G3XLH	109	—	19	—	—	—	128
81		Blackwood ARS	GW6GW	—	116	—	—	—	—	116
82		York ARS	G3HWW	22	57	31	—	—	—	110
83		Trinity School ARS	G3TSC	47	57	—	—	—	—	104
84		Chesterfield Radio Soc.	G3VKK	49	38	—	12	—	—	99

ENTRIES DISALLOWED

The following entries have been disallowed for the reasons stated. The scores are *claimed* figures only.

Rule	Group	Call	1·8	3·5	7·0	14·0	21·0	28·0	Total
11	Worthing DARC	G3WOR	196	237	168	—	—	—	601
6	Fareham DARC	G3VEF	157	258	—	—	—	—	415

Rule 11—Excess power declaration. Rule 6—No entry form submitted.

G3JKF operating and G3TIK logging at Crawley's B station, G3TR/P. (*Photo G3TNO*)

G3REI/P, the Reigate Amateur Transmitting Society. (*Photo G3UJM*)

28 MHz

Croydon (G6LX/P), repeating their 1967 success on 10m, are once again the band leaders. In spite of the poor conditions that prevailed over the NFD weekend, they managed to make 31 contacts worth 125 points. No doubt G3FPQ's home-brew quadruple superhet helped them to winkle out the weak ones! East Molesey (G8SM/P) take second place with 95 points made with the aid of a modified KW2000. Chiltern (G3BXS/P) are third, they scored 76 points with the assistance of a Racal RA17 receiver. All three leading stations used cubical quads.

Call areas worked in the 24 hours period included CR7, LU, PY, VP8, 5B4, 5Z4, 7X0, 9H1, 9J2, 9J8, 9L1 and 9M2. Most of the activity was during the Sunday afternoon.

Comments from Groups

Racal want the same good WX ordered by RSGB for next year's event.

Leyland Hundred want single station entries to be allowed to work on all six bands.

Cannock Chase say " undoubtedly our peak effort " (Yes!).

Hong Kong (*VS6AJ/P*) Conditions bad, but catering arrangements superb! Charcoal-broiled steaks, barbecued spare ribs and 25 cases of beer!

Southgate " No bad tempers, no catastrophes, no bad weather—what more can we ask? "

Croydon " Where were the G's on 10m?"

Norwich spent eight hours after the start erecting a large Rhombic —operators then too tired!

Verulam had a lack of drive cured by cabinet-thumping!

Southend forgot their tent poles and had to drive 10 miles.

The Moan Department (Contest Committee)

We are glad to say that the general standard of entries was much improved this year; our unkind remarks in respect of the last event have borne fruit as can be seen from the almost total lack of disallowed entries. Of course, there are *always* the odd few logs apparently recorded in a foreign script! Entrants falling in this category are asked to state the language to assist the Committee in obtaining translations . . . seriously though, why must some clubs submit original logsheets, complete with alterations and crossing out?

Some Groups do not pay sufficient attention to the paperwork side of NFD. For instance, it is apparent to us that in quite a few cases little or no effort is made to check the accuracy of the re-writing or typing-out of the original log sheets, as even a cursory glance reveals glaring errors in call-signs and serial number sequences. There was also an increase in the number of unmarked duplicate contacts appearing in the logs. We often wonder if certain groups bother with a check list as, for example, in one 40m log 10 per cent of the entries were unmarked duplicate QSO's for which points had been claimed. Needless to say this group have had their score adjusted by a suitable amount—as have all the other groups committing similar " crimes "!

We would like to make it clear that no points are deducted for contacts marked as duplicates with no claim for points, but a log which is full of unmarked duplicate QSOs often tries the patience of the adjudicators. Please bear in mind the obvious; we, the adjudicators, can only judge your efforts by the accuracy of the logs you present to us. A little time spent in rewriting and careful checking may spare us that irksome task of having to deduct points from your score, and may well result in your group being placed higher in the table of results.

The Funny Side . . .

Ariel Radio Group (*BBC*) had visitors from the police during the night, and it appears that one of the constables was so overcome by what he saw that he fell into the swimming pool! Exit one policeman (wet) in patrol car . . .

Crawley had a letter from one of the local rural district councils, stating that " a lorry had been seen delivering parts of aerial masts " at the Crawley NFD site. The Council pointed out that Planning Permission would be required for this " mast." In fact, the lorry was delivering extension ladders which the Crawley boys use to hold up their aerials!

WHO were the group who had themselves so well hidden on Lord Derby's estate that our station inspector had to enlist the aid of a milkman to smuggle him in?

Station Inspections

Our Station Inspectors once again struck in many quarters, but this year we had a number of cases of groups who could not be found. In some cases, this was because NGRs had been wrongly computed, but in many cases grossly inadequate information had been given. The Committee are considering altering the rule for the next event to require groups to give more information on both site and means of access. For this year, we have *not* regarded failure to give adequate information as reason for disqualification.

By the way, if your group was inspected but is not shown as such, it is possible that our man has not " reported in " at the time this was written. Once again, we have to thank the many members who acted, on our behalf, as Station Inspectors.

Check Logs

Once again, the Committee have to thank the many stations who took the trouble to forward check logs. This year saw a " dead-heat " between two overseas Groups, 5B4SS/P and 9H1BA/P, for the certificate awarded to the overseas station giving most points to entrants. In the circumstances, we propose to give each group a certificate, rather than sending half to each! The full list of check logs reads:

DJ6SI/P, G2QT/P, G2ASF/P, G2DHV/P, G3FVA/P, G3GMK, G3NTS/P, G3XEU/P, GI3FFF/P, GM3TKV/P, OK?BEW, SK3BR/P, SM3WB/P, SM5UU, SM6DSU, SM7TV, VE2LY, VS6AJ/P, W1EEF, W1MDO, W4HOS, YU1SF, ZC4JU, 5B4SS/P, 9HIBA/P.

Many thanks to all!

The Last Words

Well, we did it again! This year four members of the H.F. Contests Committee completed the checking in only ten days to meet the August *Radio Communication* deadline. It only remains for us to thank all the participants and look forward to next year's contest. CU then.

G3SHY at the Magnus Grammar School rig. Call-sign was G3PAW/P.

Mr R. Clannahan (GPO RSD) putting the Ayrshire ARG B station GM4QK under inspection. Operator is GM3UVK.

G6KQ operating G3RPB/P, the East Barnet Group's station.

CONTEST NEWS

V.H.F. Contest Scoring

By now most regular contest operators will have had a chance to assess the new radial scoring system (described in the January, 1968 issue), which has been in operation for this year. Most have agreed that the new system is considerably quicker to use than the old system (of exact measurement in km or miles between the two stations worked). In fact the radial system was designed largely to eliminate the small errors which always seem to creep into measurements and to cut down the number of hours spent in arriving at a score. In these respects comments received have been extremely favourable.

However the V.H.F. Contests Committee will be reviewing two points at its next meeting on 13 August. The two points are: (i) The points to be scored in each radial increment; (ii) The station multiplier.

At present the system is designed to operate in the following way. Stations that make a large number of contacts generally have most of their contacts over small distances. The station multiplier tends to give such station's scores a boost. Stations that make a fewer number of longer contacts do not get such a good multiplier but do gain on their distance score because long contacts score proportionally higher than short ones. But, is the present system considered to be fair? Does it favour one region or another? If you think that the answer to the latter question is *Yes*, look at some of this year's results first and then send your constructive alternatives (to the present system) to the Committee.

Can you for example suggest a scoring system that is simple to use, while giving an equal chance to such contrasting areas as; (*a*) a station in Scotland, Northern Ireland or SW England with a poor site, (*b*) a station on a 1000 ft. hill in the Midlands, (*c*) a station in an outlying area with a *good* site. The committee has considered using height as a criterion, but you could have a very good take-off at 200 ft. a.s.l. or be on a 1000 ft. hill and blocked off in the direction you most want. Power, aerial gain etc. are all factors but the site is considered to be the most important coupled with its geographical position. We appreciate that there are factors for the existence of v.h.f. contests which do not relate to the final results, activity being one example. But what is required is an acceptable scoring system which is quick and simple to use that allows all stations to enter with some chance of success. Your comments then, please, to the Secretary, V.H.F. Contests Committee, 28 Little Russell Street, London, WC1, now . . .

V.H.F. NFD 1968

Entrants are requested to use cover sheets (for each band) of the type reproduced in the January 1968 issue of *Radio Communication*. Summary sheets for V.H.F. NFD, cover sheets and log sheets are all available from RSGB HQ upon receipt of a *LARGE* s.a.e.

First 432 MHz (Open) Contest 1968

The first 432 MHz open contest held on the 4 and 5 of May received a total of 44 entries. Section A and C received 19 entries each, section B received 5. Two listeners' logs were also submitted and will be credited towards the V.H.F. Listeners' Championship; these were from BRS 26234/P and BRS28005.

The weather was typical V.H.F. contest weather, plenty of rain and very strong winds most of the time. Water in the coax feeder or aerials blown away were not uncommon comments to hear.

The majority are not in favour of the 70 and 23cm contest running simultaneously. Owing to the low activity several suggested two separate shorter contests would be preferred to enable interested stations to devote more time to 23cm.

SECTION A

Position	Call-sign	Points	QSOs	QTH
1	G8AKE	7375	55	Melton Mowbray
2	G2RD	3116	49	Caterham
3	G3XEB	2695	52	Brookmans Park
4	G8AAY	1925	27	Poole
5	G8BGQ	1728	44	Rickmansworth
6	G8AAZ	1377	37	Wimbledon
7	G8AKT	1292	29	Biggleswade
8	G3UQK	1245	33	Manchester
9	ON4HAI	915	16	Zomergem Belgium
10	G8AUM	860	28	Berkhamsted
11	G5UM	798	25	Leicester
12	G3VYB	760	29	Prescot
13	G3UBX	735	22	Wolverhampton
14	G8AOD	666	24	East Grinstead
15	G8AVL	580	29	Croydon
16	G8AZU	364	25	Sunbury-on-Thames
17	G5DF	242	15	Reading
18	G2WS	240	12	Weston-super-Mare
19	G3XFW	207	12	Yeovil

SECTION B

1	G3PMH	3723	43	March
2	G8ATK/A	2880	44	Reading
3	G3SLJ/A	2519	40	Chelmsford
4	G8AOL	1888	42	Bexleyheath
5	G8AAC/A	1316	34	Sheffield
6	G3OUL	1102	30	Liverpool

G8AGY/P states that many stations still arrange for 23cm contacts via 70cm. Surely the great pleasure in working stations on 1296 MHz is the element of surprise when one comes out of the blue! Let us have a rule which prevents prior arrangement on 70cm or 2m, or at least suggest that this practice should be frowned upon.

G8AWS/P is to be congratulated on being overall winner and leading station in section C with G8AKM/P a close second.

G8AKE was the leading station in section A and G2RD runner-up. G3PMH lead in section B.

The best scoring contact was between G8AKE and ON4HN.

These stations will receive a certificate of merit, subject to approval of Council.

SECTION C

Position	Call-sign	Points	QSOs	QTH
1	G8AWS/P	11316	81	Leek, Staffs.
2	G8AKM/P	10665	74	Walbury Hill
3	G8ARS/P	10560	68	Clee Hill
4	G3NNG/P	10414	70	Wantage
5	G3MAR/P	8491	64	Redditch
6	G8AGY/P	7395	39	Evesham
7	G3WLE/P	6867	60	Worthing
8	G8BGM/P	6292	68	Ivinghoe Beacon
9	G8AMU/P	5967	61	Worthing
10	G8ARC/P	4868	50	Swindon
11	GW8ACG/P	4708	50	Flint
12	GW3UCB/P	4345	40	Conway
13	G8ALM/P	3272	50	Britwell Hill
14	G8ASP/P	2587	42	Dunstable Downs
15	G8APQ/P	2448	54	Epsom Downs
16	G8ADC/P	1888	39	Dunstable Downs
17	G3NNW/P	1292	32	Rochdale
18	GW3ITZ/P	1057	26	Wrexham
19	G8AJC/P	252	13	Dunkirk Hill

Second 432 MHz (Portable) Contest, 1968

Twenty-one entries were received for this 23 June contest, and this reflects the opinion of many competitors that conditions were poor and activity low. The length of the contest, and the rules, have met with general approval and the same rules will be adopted for the 1969 event.

Congratulations go to the winner, G8ARL/P, assisted by G8AKM, who achieved a substantial lead over the runner-up, the Midlands Amateur Radio Society entry (G3MAR/P) operated by G8ASW, G3KPT and G3HAZ. Subject to Council approval, awards will be made to G8ARL/P and G3MAR/P.

The Committee (*a*) notes that several stations are still using the old type cover sheets—new ones can be obtained from Headquarters, RSGB; (*b*) notes that requests for logs and cover sheets are not always accompanied by s.a.e.; (*c*) thanks all entrants for their participation and (*d*) thanks G8AFA, G3XFW, G8AOD, G2WS and G8AVG for check logs.

Call-sign	Posn.	Score	QSOs	County	Best DX (km)	Power (Watts)	Aerial
G8ARL	1	8937·5	68	Berks.	192	18	32 el.
G3MAR	2	5505·5	52	Worcs.	180	30	14/14 el.
G8AYB	3	3740	52	Beds.	146	25	18 el.
G3VXK	4	3139	40	Wilts.	180	20	14/14 el.
GW8ACG	5	2453	39	Flint	133	25	6/6 slot
G8AWO	6	1984	38	Bucks.	180	26	18 el.
G8ANU	7	1482	30	Staffs.	189	15	18 el.
G8BCT	8	1402·5	33	Bucks.	122	25	18 el.
G2DJ	9	1347	31	Derby.	132	5	14 el.
G3CZU	10	1181	44	Surrey	160	10	18 el.
G3NNW	11	1053·5	27	Lancs.	210	6	8/8 slot
G3TQA	12	987	29	Yorks.	156	28	8/8 slot
G5UM	13	780	16	Leicester	95	15	6/6 slot
G8APQ	14	496	20	Berks.	120	16	6/6 slot
G3TND	15	348	15	Somerset	165	24	18 el.
GW8BHY	16	330	11	Radnor	165	8	18 el.
G3EEZ	17	297	14	Worcs.	141	20	8/8 slot
G3RZG	18	240	12	Wilts.	95	9	18 ele.
G8BCH	19	161·5	9	Dorset	120	2·5	18 el.
G8AJC	20	150	9	Kent	160	8	16 el.
G8AKT	21	60·5	6	Norfolk	60	7	16 el.

Fifth 144 MHz (S.S.B.) Contest 1968

Congratulations again to G3BA who follows up his previous successes by winning the fifth s.s.b. contest, held on 24 June. Tom made a total of 37 QSOs of which 33 were over 50 km. Runner-up was G3BHW with 30 contacts.

Conditions were only fair during the contest with some 50 stations active.

Several participants remark on the lack of publicity for the contest. The usual notice appeared in *Radio Communication* in plenty of time, but steps will be taken to have all u.h.f./v.h.f. contests announced on GB2RS.

There was general approbation for the contest rules which wil now be standardized for these events. Competitors should note that Rule 8c in the General Rules for V.H.F./U.H.F. Contests 1968, which states that contacts may be made on A3j (S.S.B.) only, means what it says. QSOs with other stations who use a.m. or c.w. are not admissible.

The V.H.F. Contests Committee thank all who submitted logs and hopes that the total will rise for the next event of this type. Thanks also to G4LX for his check log.

Call Sign	Posn.	Score	Pwr.	QTH County	Best DX Call	Best DX Dist (km).
G3BA	1	4830	600	Warks.	PA0IJ	506
G3BHW	2	4582	250	Kent	G3AAV	336
G3DAH	3	4560	100	Kent	G3OZP	451
G3AWZ	4	3442	400	Salop	G3BHW	316
G3NEO	5	2646	150	Yorks.	PA0ACG	425
G6RH	6	2214	150	Kent	F9FT	365
G3EGK	7	1936	60	Cheshire	G3BHW	365
PA0IJ	8	1875	600	CL38F	G3BA	506
G3WW	9	1827	125	Cambs.	PA0IJ	380
G3OUL	*	1566	140	Lancs	G3DAH	346
G2NH	10	1419	200	Surrey	PA0ACG	395
G3LAS	11	1406	120	Herts	PA0ACG	350
G3TCG	12	1105	150	Essex	PA0IJ	337
G3OMK	13	936	100	Leics.	G3BHW	234

* Club station.

RSGB National Mobile Rally

WOBURN ABBEY, BEDFORDSHIRE

Sunday, 18 August, 1968

The park opens at 11 a.m. Among attractions will be visits to the state apartments, more than 3000 acres and 2000 animals, a trade exhibition, surplus sale, Grand Raffle, children's playground, Pets Corner and boating lake, children's sports, children's lucky dip, an amusement park and funfair, the Woburn Safari Service, restaurants and snack bars. There will also be a bring-and-buy sale. Please price any surplus equipment for sale before putting it on display and remember that a deduction of 10 per cent will go towards rally funds.

Car parking in a specially reserved car park.

Talk-in stations GB2VHF, G3VHF and GB2RS on 2m, 4m and 160m.

Organized by the Radio Society of Great Britain. Use of Woburn Abbey by kind permission of His Grace, the Duke of Bedford.

RADIO AMATEUR EMERGENCY NETWORK

By S. W. LAW, G3PAZ*

NO amount of erudite discussion as to its true nature can alter by one iota the inexorable passage of Time. Even the poets of bygone days (who wrote better than we do, by far!) have done no more than make the passing of the days more pleasant. It was with a slight sense of shock that we perused a back issue of the forerunner of *Radio Communication* and read an announcement by the then President (Mr Leslie Cooper, G5LC) of the formation of the Radio Amateur Emergency Network. Some 15 years have passed since the original RAEN Committee was formed and it is gratifying to note the familiar names and calls and to realize that there are members of that committee still doing a grand job for RAEN.

Onward

Having reminisced a little, what of the next 15 years? We now have the inevitable increase in the " sophistication " of communications systems professionally available to our User Services (did we help to show them the way?). This has inevitably brought about a sense of self-reliance on their part as the " mystique " of radio has given way to the commonplace, coupled possibly with the very human absorption with a " new toy " to the exclusion of our non-professional services. Yet it is in this very lack of the professional outlook in the radio amateur that our strength lies since we are of necessity adept in the art of improvisation. What else is more useful in an emergency than just this, since a course of action in an emergency can hardly be laid down to cover all contingencies? We may rest assured, therefore, that RAEN has little to fear from a mythical world in which " everything is under control." Life is not like that—and indeed it would be a very dull world if this were so. Another fifteen years will still find RAEN a part of life, not only in this country but in its equivalent form in all parts of the world where the radio amateur is to be found.

Not Only Here

We had the privilege recently of viewing some slides which showed the amazing liaison between the Italian authorities and the radio amateurs during the appalling floods in 1966. It was frightening to see the muddy watermarks several storeys high on buildings in the middle of a city and to visualize the utter and complete chaos that resulted. Normal life was obviously impossible for a radius of many miles and help was forthcoming from a vast area. The radio networks that were set up at short notice conjointly by the amateurs and professionals were a classic example of what can (and must) be done when the efforts of all are concentrated on the one aim of humanity to the exclusion of all else.

Armbands

The Hon. Registrations Secretary, G2ABC (address below) still has a supply of RAEN armbands for members who require them—and the price is still only 2s. 6d. A good buy, unaffected as yet by inflation!

Annoying

Heard any pirate " Raynet " stations? There have been instances of radio being used illegally for communications in connection with certain outdoor activities and when this has been queried the answer has been " They were amateurs—these emergency fellows." We hope that members, in particular Controllers, will make energetic endeavours to stamp hard on anything of this nature that might occur in their area. Never mind whose toes get hurt—jump hard and fast; and let the RAEN Committee know.

Even More "Mod"

Whilst the circuit modification to the Reporter which we gave in the July issue may keep many happy with the level of modulation, there will inevitably be others who will strive for more. Bearing in mind the points which have been raised on other pages in connection with modulation levels on v.h.f., it may not be amiss to provide details of another modification which has been tried on the long-suffering Reporter.

Limited Supply

It will be remembered that the source of supply for the original double-button microphone consists of a divider in the cathode circuit of the EL85 modulator valve. Obviously this supply is limited by the valve current. No doubt it may have already occurred to some that we have a large supply of d.c. available from the vehicle battery! Naturally a /P rig operating from a 12 V battery has a ready source of d.c. available for a carbon microphone, but when a car is mobile the conditions at the battery are not quite the same.

Smoothing Problems

A little thought will reveal that there are a number of pulses and surges present at the terminals of a car battery. This is taken care of in the transceiver power unit by various smoothing devices, so if the d.c. is to be utilized before the input terminals of the set some smoothing is essential. Since a large current is not required (the GPO quote 70mA for a carbon microphone), smoothing should not present any great difficulty and we may leave that part to the operator's ingenuity.

Not Too Much

Obviously 12 V d.c. is far more than is required for a carbon microphone of the type we are using (we can safely forget transverse-current types). The modern car battery is not easy to tap, therefore a potential-divider is an easier solution. Since the makers have provided an on/off switch in the battery line, this is the obvious place for the " power take-off " on the Reporter.

Level Control

A preset potentiometer of from 1 to 10k ohms (wire-wound, of course) is easily fitted in a convenient position on the chassis and connected between the " remote " side of the on/off switch and chassis. The connection to the junction of the EL85 bias chain (brown wire to R44/R45) is removed and connected to the slider of the potentiometer.

Polarity

A capacitor of from 25 to 100 microfarads should be connected across the wire-wound potentiometer, positive to chassis (assuming that the battery is the normal " positive-earth " connection). It is also necessary to reverse the existing capacitor C68 in the Reporter as we have now a negative supply at this point. Here we must offer an apology for an error that crept into the circuit (Fig. 1) last month. Capacitors C68 and C69 were inadvertantly shown with their polarities reversed. It is of course obvious that the original supply from the bias chain of the EL85 must be positive with respect to chassis.

Setting Level

It has been found that between 5 and 7 volts are required at the slider of the potentiometer for 100 per cent modulation. This value is naturally subject to experiment according to the characteristics of the particular transceiver, but this value will serve as a rough guide until reports are obtained.

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

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**

MOBILE RALLIES

North-Eastern Rally, 26 May

On Sunday, 26 May, the North Eastern Mobile Rally organized by the Scarborough and Bridlington district amateurs was held at the Spa Royal Hall, Bridlington, in bright sunshine. The event was well attended, with some 150 cars present, 50 of which were equipped for /M operation.

The opening ceremony was performed by His Worship, the Mayor of Bridlington, Councillor A. C. Dunn, G2ACD. As this was his first official public engagement of his year of office this was a most fitting occasion. The organizers and patrons were also honoured by the presence of the President of the RSGB, John Graham, G3TR, who made a 550 mile round trip to attend the event. John most certainly qualified for the prize for the longest distance traveller but generously declined, the prize going to a visitor from Warrington. Also present was Council Member J. R. Petty, G4JW, from Sheffield.

There were many trade stands and also represented were the Royal Signals with a teleprinter link to their HQ station at Blandford, the Police who demonstrated their v.h.f. walkie-talkie equipment and the British Red Cross.

The two local radio inspectors of the GPO Radio Services Dept., A. C. Homes and J. Penrose were there with a detector van which caused much interest and consternation parked alongside the mobiles!

Judging the mobile installations was performed by His Worship the Mayor, G2ACD, and Mr A. C. Holmes. The proceedings were then brought to a close by a large draw for raffle prizes conducted by J. Jones, G3VLM.

Encouraged by comments heard at the rally and later over the air the organizers are now satisfied that all the pre-event labours were not in vain and are considering a possible repeat performance in 1969.

Standing beside the Post Office detector van at the North-Eastern Mobile Rally at Bridlington are (left to right) J. Penrose (GPO), the Deputy Mayoress, A. Holmes (GPO), the Deputy Mayor, the Lady Mayoress, and His Worship the Mayor, G2ACD.

(Photo by G3JBR)

Gilwell Park Rally, 23 June

The first of the two Mobile Rallies organized by RSGB took place at Gilwell Park, Essex, on 23 June, 1968. The Rally site had once again been made available for camping and caravanning and we are pleased to say that a number of hardy souls braved the atrocious weather to set up temporary home in the Branchet Field.

R-day minus one could hardly have been more unkind to the small band of Mobile Committee members who optimistically arrived to set up the aerials and prepare the site generally for the following day. Torrential and continuous rain and high winds made it impossible to work out of doors and certainly precluded raising anything in the way of aerials more than a few feet above the ground.

The Rally day was a little better and apart from a most discouraging weather forecast with the prospect of heavy showers and a foot or two of London clay underfoot to trap the unwary, the trade stands and talk-in stations were set up and the Rally got under way.

The organizers have been criticised for inadequate talk-in facilities. The 4m transmitter developed a relay fault from first switching on which could not be rectified without a direct replacement, which was not to hand and 160m operation was made impossible by the persistent static activity of certain /M units inside the Rally site. We apologize to any mobile who was unable to obtain clear directions to Gilwell because of this.

A number of new faces appeared amongst the trade exhibitors and Echelford Communications, Auto Needs and Jim Fish appeared for the first time at Gilwell.

The Committeee also express their grateful thanks to Mr. L. Taylor, G3JMU for his kind donation.

The Bring and Buy sale proved a most popular innovation and the Society benefited to a small degree from the proceeds. It is a pity to have to introduce a discordant note but a number of people, having taken advantage of the opportunity provided by the Society for them to dispose of their spare equipment, made good sales and then conveniently forgot to make their contribution to Society funds from the proceeds. It is this sort of behaviour which is likely to spoil things for the other genuine vendors when next the Committee considers a similar scheme. If your conscience pricks you the Treasurer of the Mobile Committee would be pleased to hear from you with no hard feelings.

By far the largest vote of thanks must go to the loyal band of Rally followers who made their way to Gilwell Park despite the promise of monsoon conditions, thus transforming a near fiasco into a reasonably successful Rally.

Our thanks to Mr John Thurman, OBE, JP for his kind permission for us to use the Gilwell Park facilities for the Rally.

The RAFARS Hamfest

One of the essential ingredients to a successful hamfest is good weather and the 250 plus visitors to the RAF Amateur Radio Society event at RAF, Locking, on 6 July enjoyed abundant sunshine. The first visitors, led by G3KSH/M, were in QSO with the 80m talk-in station at around 10.30 arriving at Locking an hour or so later. From 13.00 onwards the reception staff were busy dealing with a constant stream of arriving visitors. There were many features of interest including the three talk-in stations operating from the G8FC shack; a display of measuring techniques arranged by G3CHW; the CHC/FHC display, monitored by G3VNX, of operating certificates, and visits to the museum and laboratories of No. 1 Radio School. The DX chase, where competitors were allowed five minutes with an HW32 and a ground plane aerial produced W2 as the winning effort. One hastens to add that conditions up to 17.45, when the chase closed, were hardly a DX'ers dream.

To round off the day more than 80 members and guests assembled for dinner at the Grand Atlantic Hotel, Weston-super-Mare. Among those present were the President and Chairman of RAFARS in the persons of Group Captain N. W. Maskall, Commandant of No. 1 Radio School, and Wing Commander J. L. Whitfield, the Senior Training Officer. The Mayor and Mayoress of Weston-super-Mare were the guests of the Society and in his speech the President of RAFARS emphasised the good relations that existed between the Borough and the RAF station. Group Captain Maskall also outlined the current activities of the Society and reported a steady increase in the membership which augured well for RAFARS in the years ahead. After dinner an opportunity for personal QSOs (and what thirsty work this is!) rounded off a most enjoyable occasion. On behalf of all visitors a sincere thank-you is extended to G5UG and members of the RAFARS Headquarters staff for their welcome and hospitality.

G2BVN

CLUB NEWS

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

REGION 1

Ainsdale (ARC)—14, 28 August, 8 p.m. 77 Clifton Road, Southport.
Allerton (Liverpool) Scout Radio Hobbies Society—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 (East Lancashire ARC)—5 September, YMCA, Limbrick, Blackburn.
Blackpool (B & FARS)—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate. Morse tuition from 7.30 p.m.
Bury (B & RRS)—Please note change of features. 13 August (" Budget Stereo," by E. Wigzel), 10 September (" Astronomy," by J. Ashworth), 8 p.m., George Hotel (Private Room), Market Street, Bury. Club Secretary G3VVQ, 411 Holcombe Road, Greenmount, Bury.
Chester (C & DARS)—Tuesdays, 8 p.m., YMCA.
Crewe & District—No Meetings will be held for the time being as no accommodation is available. However, the Area Representative, R. Owen of 10 Circle Avenue, Willaston, Nantwich, will welcome visitors at his home.
Eccles (E & DRC)—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft. Every Thursday, Club Top Band net at 8.30 p.m.
Leyland Hundred Amateur Group—Weekly net each Thursday at 7.15 p.m. (1·915 MHz).
Liverpool (L & DARS)—Tuesdays, 8 p.m., Conservative Association Rooms, Church Road, Wavertree (13th August, Visit by Regional Representative).
Liverpool (NLRC)—16, 30 August, 8 p.m., Landsbury House, 13 Crosby Road South, Liverpool, 22.
Macclesfield (M & DRS)—13, 27 August, 8 p.m., The George Hotel, Jordangate.
Manchester (M & DARS)—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10. Hon. Secretary, G. Tillson, G3TJX, 95 Kelverlow Street, Oldham, Lancs.
Manchester (SMRC)—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden.
North West V.H.F. Group—Following the loss of their Headquarters, Meetings are taking place on a temporary basis every Tuesday at 50 Great Ancoats Street, Manchester. Members are asked to keep in touch with the Committee for any changes which may take place at short notice. G3FNM, 141 Norris Road, Sale.
Preston (PARS)—8, 22 August, 5 September, 7.30 p.m., " Windsor Castle " (Private Room), St Paul's Square. Members are busy planning the arrangements for the Mobile Rally, which will take place on Sunday, 1 September.
St. Helens (SES)—6, 20 August, 3 September, 7.30 p.m., IVS Centre, 55 College Street, St Helens.
Southport (SRS)—Wednesdays, 8 p.m., and Sundays, 2.30 p.m., The Esplanade.
Southport (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 (SRS)—7 August (" Colour TV "), 21 August, 4 September, 8 p.m., Royal Oak Hotel, Castle Street, Edgeley. New Members are always welcome. Further details from G3FYE.
Warrington-Culcheth (CARC)—Fridays, 7.30 p.m. Chat Moss Hotel, Glazebury. 9 August (" Transceiver for Top Band, fixed, mobile and portable," by G3SAY). All visitors will be welcome. Please note new Secretary—K. Bulgess, 32 Hendon Street, Leigh.
Westmorland—2, 16 August, 6 September, 7 p.m., The Allen Technical College, Sandes Avenue, Kendal.
Wirral (WARS)—8 p.m., Former Civil Defence Headquarters, Upton Road, Bidston, Birkenhead. Please note new address. 7 August (" Radio Teletype," by Bill Evans, G3VQT), 21 August (Cine Film Show), 4 September (" Transistorised Transmitters," by Dave Oakden, G3UFO), 18 September (NFD 1969 Discussion), 2 October (Annual General Meeting). The Society has now taken possession of its own premises, a former Civil Defence Headquarters building and all meetings are now being held there. The location is in the grounds of Noctorum Lodge in Upton Road, near the top of Bidston Hill, the highest point in the town and three quarters of a mile from the old QTH. The entrance drive to the new club rooms is marked by a MANWEB Substation and is between Thermopylae Pass Footpath and Noctorum Lane.

REGION 1 V.H.F. CONTEST

Will Region 1 (N.W.) Members please note that details of Region 1 V.H.F. Contest (4 August) and Region 1 Field Day (15 September) may be obtained from the Regional Representative, B. O'Brien, G2AMV. 1 Waterpark Road, Prenton, Birkenhead.

Future events also include the Preston Mobile Rally on 1 September and the Regional ORM at Southport on 29 September. Details of these events are also available from the same source.

REGION 2

Bradford (BRS)—3 September (" My Golden Jubilee Year," taped talk by J. Clarricoats G6CL), 7.30 p.m., Bradford Technical College, Great Horton Road, Bradford.
Cleveland Amateur Radio Society—This new club meets at the RAF Association Club, Newcomen Terrace, Redcar, Yorkshire on Tuesday evenings, 7.15 p.m. Facilities include a permanent shack, work benches and lecture room. All SWL's and amateurs in the area are welcome. Details may be obtained from G3EHB the Chairman.
Northern Heights—11 August (" Scavenger Hunt," by Paul MacArtney and Noel Mallinson), 14 August (Demonstration station at Bingley Agricultural Show), 25 August (visit to Humber Radio, Mablethorpe), 28 August (Sale of surplus equipment, conducted by G8CB), 7.45 p.m. at " Sportsman " Inn, Ogden, Halifax.
Otley (ORS)—Meets every Tuesday. The Society now has its own call sign, G3XNO. Details of the Society may be obtained from the publicity officer, M. T. G. Powell, G3NNO, 82 Forest Avenue, Harrogate.
Scarborough (SARS)—Tuesdays, 7.30 p.m., 3 Trinity Road, Scarborough.
South Shields (SS & DARS)—Fridays, 7.30 p.m., Trinity House Social Centre, Laygate, South Shields.
York (YARS)—Thursdays, 7.30 p.m., British Legion Club, 61 Micklegate, Yorks.

REGION 3

Birmingham (MARS)—Third Tuesday in each month, 7.45 p.m., Midland Institute, Margaret Street, Birmingham 3.
(South)—7 August (Field Day Discussion and Report), 24 August (Exhibition Station at Marston Green and District Horticultural Show). Meetings held 8 p.m., The Scout Hut, St. Stephen's Church Hall, Pershore Road, Selly Oak.
Dudley (DARC)—9 August, 23 August. From September, meeting night will change to Tuesday evening at the Central Library, Dudley. The Club will put on an exhibition station at the Hobbies Exhibition

to be held in the Town Hall Dudley on 7, 9 and 10 September. Meetings 8 p.m., Art Gallery, Dudley.

East Worcestershire (ARG)—8 August (Visit to GPO Bearley, 7.30 p.m.). At the June meeting of the Group Dr Mike Dransfield gave a talk, illustrated by film, on Amateur Radio in Nigeria. Dr Dransfield, who is on leave at present and whose Nigerian call-sign 5N2AAF is well known in this country is the secretary and Editor of the Nigerian Amateur Radio Society.

Hereford (HARS)—First Friday in the month, Trinity Hall, Whitecross Road, Hereford.

Lichfield (LARS)—5 August, 20 August, 7.30 p.m., Swan Hotel, Lichfield.

Mid-Warwickshire (MWARS)—Monday evenings, Hamilton Terrace. Set programme will start again end of August.

North Staffs (NSARS)—Every Third Tuesday in the month at Moorland Road, Junior School.

Rugby (RADARAEC)—Drury Lane, centre of the town. Anyone in the district who has not already joined is invited to contact Mr Craxton G3IKL (Bob), 103 Clifton Road, Rugby. Tel: Rugby 71835.

Salop (SARS)—No meetings in August.

Stourbridge (STARS)—6 August (Informal Meeting), The Library, Longlands School, Stourbridge.

REGION 4

Burton-on-Trent (BoTARS)—Details of meetings from G3ACR.

Chesterfield (C & DARS)—Details of meetings from G3VDI.

Derby (D & DARS)—Wednesdays, 7.30 p.m., Room 4, 119 Green Lane, Derby.

Grimsby (GARS)—Alternate Thursdays, 8 p.m. 50 Welholme Road, Grimsby.

Leicester (LRS)—Mondays, 7.30 p.m., The Club Rooms, Gilroes Estate Cottage, Groby Road, Leicester.

Mansfield (MARS)—First Friday every month, 7.45 p.m., New Inn, Westgate, Mansfield.

Newark (NSWC)—Mondays, Tuesdays, 7.30 p.m., Guildhall, Guildhall Street, Newark.

Nottingham (ARCN)—Tuesdays, Thursdays, 7.30 p.m., Room 3, Sherwood Community Centre, Woodthorp House, Mansfield Road, Nottingham.

Worksop (NNARS)—Tuesdays (RAE Class), Thursdays (Lecture) 7.30 p.m., Clubroom, 13 Gateford Road, Worksop.

REGION 5

Bedford (B & DARC)—Thursdays, the Dolphin Inn, The Broadway, Bedford.

Bishops Stortford (BS & DARC)—Details of meetings from G3VWS.

Cambridge (C & DARS)—On 9, 16, 23 August the club will be open for informal meetings. 30 August (Final briefing for V.H.F. NFD), 6 September (NFD gear will be checked), 7/8 September (NFD; site will be at Duddenhoe End, Saffron Walden), 13 September (Grand Junk Sale). Meetings on Fridays, 7.30 p.m., Corporation Yard, Victoria Road, Cambridge.

Dunstable (DDRC)—The secretary of this newly formed radio club is George Bath (G3NMZ), tel. Fancott 487. Alternate Fridays at 7.30 p.m., " Star and Garter," High Street, South Dunstable, Beds.

March (M & DARS)—Tuesdays, 7.30 p.m., Old Police HQ, High Street, March, Cambs.

Shefford (S & DARS)—8 August, 22 August (D/F hunt organised by G2AUA), 29 August (" Test Meter Design," by G3VMI), 8 p.m. Church Hall, High Street, Shefford, Beds. Meetings are preceded with a Morse class at 7.45 p.m.

REGION 6

Cheltenham (RSGB Group)—First Thursday in each month, 8 p.m. Great Western Hotel, Clarence Street, Cheltenham.

Cheshunt (CARC)—6 September (lecture by G3XNP). Full details of activities from M. Invest, 93 Manor Court, Enfield, Middx.

Chilton (CARC)—Last Thursday in each month, British Legion Hall, High Wycombe. Details of meetings from M. G. Pemberton, 205 Bowerdean Road, High Wycombe, Bucks.

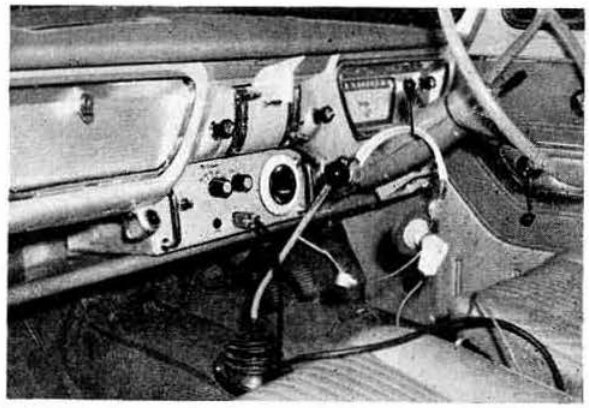
Nailsworth—3 September (" Aerials," by G6CJ) 24 September (" Radio over the years," a recorded lecture by the late Capt. P. P. Eckersley).

Oxford (O & DARS)—Second and fourth Wednesday in each month, Cherwell Hotel, Water Eaton Road, N. Oxford.

REGION 7

Acton, Brentford, Chiswick (ABCRC)—20 August (" Membership Drive " meeting), 7.30 p.m., Chiswick Trades and Social Club, 66 High Road, Chiswick.

Addiscombe (AARC)—Second and fourth Tuesdays in each month, 7.30 p.m., 158 Lower Addiscombe Road (Toc H Hall).



The Mid-Sussex ARS held a mobile evening on 19 June, at Clayton Windmills, near Hassocks. A number of amateurs from the West Kent, Brighton and Southdown Clubs turned up. In all, about 60 people were present at what is described "a great success in spite of the weather". The raffle prize of a QQV06-40A was won by G3WQQ. It is hoped to hold another rally later in the year.

The lower photo shows the 4 m mobile station of G3RXJ/M (who submitted both pictures). The rig is in fact a B44, which has undergone extensive modification to suit the limited shelf space in an Anglia Super, and to meet the RSGB safety recommendations for mobile operation. Special facilities for portable/contest working are provided. Some reduction in size was achieved by transferring the p.s.u. (suitably transistorized) to the boot, and fitting a new facia, essential relays and bias components having been moved to the main chassis. G3RXJ has increased the p.a. input to give some 8 watts output in 75 ohms, and the modulation depth to 95 per cent by a three stage transistor microphone amplifier feeding the existing input transformer. Five crystal controlled channels are available on both the TX and RX, and a v.f.o., of course, on the receiver. The r.f. stage incorporates a 6CW4 Nuvistor, inductively neutralised using the existing coils, feeding a suitably "souped" i.f. amplifier for restricted bandwidth.

Ashford (Middx.), (Echelford ARS)—8, 22 August, St. Martins Court, Kingston Crescent, Ashford.

Barking (B & DEC)—Tuesdays and Thursdays, 7.30 p.m., Gascoigne Recreation Centre, Gascoigne School, Morley Road, Barking, Essex.

Bexleyheath (NKRS)—12 September (Film Show), 26 September (" Could you take out a patent," by G3FFL), 7.30 p.m., Congregational Hall, Chapel Road, Bexleyheath.

Chingford Group—Fridays. For details of meetings telephone 01-524 0308.

Chingford (SRC)—Fridays, 8 p.m., except the first Friday in the month, Friday Hill House, Simmons Lane, Chingford, E4.

Croydon (Surrey RCC)—20 August, 7.30 p.m., Blue Anchor, South End, Croydon.

Crystal Palace (CP & DAC)—17 September (Mobile evening), 21 September (" Receiver Measurement Techniques," by G3FZL and G3OOU), 8 p.m., Emmanuel Church Hall, Barry Rd., near Dulwich.

Dorking (DR & DRS)—13, 27 August, "Wheatsheaf," Dorking.
Ealing (E & DARS)—Tuesdays, 8 p.m., Northfields Community Centre, Northcroft Road, W. 13.
East London—the first meeting of this club will take place on 15 September at 5 p.m. Full details may be obtained from G3AAJ.
Edgware and Hendon (EADRS)—19 August, 8 p.m., St. Georges School, Flower Lane, Mill Hill, NW7.
Gravesend (GRS)—Third Wednesday of each month, 8 p.m., RAFTA Club, Overcliff Road, Gravesend.
Guildford (G & DRS)—9 August (members films of NFD), 23 August (V.H.F. NFD discussion), 8 p.m., Guildford Engineering Society in Stoke Park.
Hampton Court (TVARTS)—First Wednesday in each month, 7.30 p.m., Cardinal Wolsey, Hampton Court.
Harlow (DRS)—27 August (Semiconductor devices), 31 August to 1 September (Radio show at Harlow Town Show, operating on 160 and 2m on A3, 20m on A3j and on 40m A1), meetings at Mark Hall Barn, First Avenue, Harlow.
Harrow (RSH)—9 August (Junk Sale), 16 August (Practical), 23 August("Radio Aurora," tape and slide lecture by G2FKZ), 30August (Film show), 8 p.m. Roxeth Manor School, Eastcote Lane Harrow.
Havering (H & DARC)—14, 28 August, British Legion House, Western Road, Romford, Essex.
Holloway (GRS)—Mondays, 7 p.m. (RAE), Wednesdays, 7.30 p.m., (Morse), Fridays, 7.30 p.m. (Club), Monten School, Hornsey Road.
Kingston (K & DARS)—Second Wednesday in each month, 8 p.m., YMCA, Eden Street, Kingston.
Leyton & Walthamstow—Tuesdays, 7.30 p.m., Leyton Senior Institute, Essex Road, E10.
London U.H.F. Group—First Thursday each month, 8 p.m., White Hall Hotel, Bloomsbury Square, Holborn, WC1.
Maidenhead (N & DARC)—20 August, 7.30 p.m., Victoria Hall, Cox Green, Maidenhead.
New Cross—Wednesdays and Fridays, 8 p.m. 225 New Cross Road, London, SE14.
Norwood and South London—See Crystal Palace.
Paddington (P & DARS)—Thursdays, 7.30 p.m., Beauchamp Lodge, 2 Warwick Crescent, W2.
Purley (P & DRS)—First and third Thursdays each month, 8 p.m., Railwaymen's Hall, 58 Whytecliffe Road, Purley.
Reigate (RATS)—First Wednesday each month, 7.45 p.m., George and Dragon, Cromwell Road, Redhill.
Romford (R & DRS)—Tuesdays, 8.15 p.m., RAFTA House, 18 Carlton Road, Romford.
Scouts (Kensington)—Next meeting 15 August, 7.30 p.m., Baden Powell House, Queensgate, South Kensington, SW7.
Sidcup (CVRS)—5 September ("The RSGB," by John Graham, G3TR), Congregational Church Hall, Court Road, Sidcup. 15 August (Natter Nite), All Saints Church Hall, Bercta Road, New Eltham. All meetings commence at 8 p.m.
Slough (SDR Group)—First Wednesday each month, 7.30 p.m., United Services Club, Wellington Street, Slough.
Southgate (SRC)—8 August, 7.30 p.m., Parkwood Girls School, (behind Wood Green Town Hall).
St Albans (Verulam ARC)—21 August (Heathkit demonstration), 7.30 p.m., Cavalier Hall, Watford Road, St Albans.
Sutton & Cheam (SCRS)—18 August (Party to RSGB National Mobile Rally at Woburn Abbey).
Welwyn (Mid Herts ARS)—8 August, 8 p.m., Welwyn Civic Centre, Welwyn.
Westminster (CSRS)—13 August, 6 p.m. Civil Service Recreation Centre, Monck Street, Westminster.
Wimbledon (W & DRS)—9, 30 August, 8 p.m., St John Hall, 124 Kingston Road, South Wimbledon, SW19.
Wembley (GECARS)—Thursdays, 7.30 p.m. The club is open to non GEC employees by invitation, Telephone ARNold 1262 first. Sports Club, St Augustin Avenue, North Wembley.

REGION 8
Mid-Sussex (MSARS)—No meetings during August. *G3RXJ.*
North Kent (NKRS)—Details from G2FNT.
South Coast (South Coast V.H.F. Group)—21 August (V.H.F. NFD arrangements), 4 Newling Way, Worthing.
Worthing (W & DARC)—The club will be closed during August. Details from G6KFH/T, 46 Hillview Road, Worthing. 3 September (AGM), 8 p.m., Rose Wilmot Youth Centre.

REGION 9
Bristol (RSGB Group)—19 August ("DX working for SWLs," by BRS 26222), 7.30 p.m., Becket Hall, St Thomas Street, Bristol 1.
Bristol (BARC)—Mondays and Thursdays, 7.30 p.m., University Settlement, 41 Ducie Road, Barton Hill, Bristol 5.
Cornwall (CRAC)—First Thursday in each month, SW Electricity Board Social Centre, Pool, Camborne. Visitors to Cornwall are invited to the group meetings.
(SSB Group)—Second Thursday in each month, 7.30 p.m.
(VHF Group)—Third Thursday in each month, 7.30 p.m. Both groups meet at the Barley Sheaf, Truro.
Exeter (EARS)—First Tuesday in each month, 7.30 p.m., George and Dragon, Black Boy Road, Exeter.
Plymouth (PRC)—First and third Tuesdays in each month. The Annual Picnic takes place on Sunday 4 August at Yelverton, near Plymouth. Meetings 7.30 p.m., Virginia House, Bretonside, Plymouth.
Saltash (S & DARC)—9, 23 August. 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 (RSGB Group)—The N. Somerset RAEN Group is being reformed. G3WPJ/G8ANI would be pleased to hear from any mobiles who would be interesed in participating, from the Minehead to Burnham-on-Sea areas. The next meeting of the group will be 9 August, 7.30 p.m. Lecture Theatre, Taunton Technical College.
Wells (WARS)—Mondays, 8 p.m., EMIE Sports and Social Club, Chamberlain Street, Wells.
Weston-super-Mare (WSMARS)—First Friday in each month, 7.30 p.m., Westhaven School, Ellesmere Road, Uphill, WSM.
Yeovil (YARS)—Wednesdays, 7.30 p.m., 21 August (RSGB tape lecture) Park Lodge, The Park Yeovil.

REGION 10
Blackwood (ARC)—Fridays, 7.30 p.m. Club call-sign is GW6GW. Details of meetings from G6BK.
Barry (Barry College of Further Education ARS)—Thursdays, 7 p.m., Club call-sign GW3VKL. Colcot Road, Barry, Glam.
Cardiff (ASGB Group)—12 August, 7.30 p.m., TA Centre, Park Street, Cardiff.
Llanelli (Boys Grammar School ARS)—Friday 3.30 p.m.
Pontypool (PARC)—Tuesdays, 7 p.m., Educational Settlement, Rockhill Road, Pontypool, Mon.
Pembroke (PARC)—Last Friday in each month. Defensible Barracks, Pembroke Dock.
Rhondda (RARS)—Pengelli Hotel, Treorchy. *GW3PHH.*
University College (UCARS) (Cardiff)—Details of future activities from the Secretary, Students Union, Dunfries Place, Cardiff.

REGION 11
Rhyl (R & DARC)—Second Tuesday in each month. Rhyl's Silver Band Room, Windsor Street, Rhyl.

REGION 13
Edinburgh (LRA)—Alternate Thursdays, 7.30 p.m. Board Room, YMCA 14 South St Andrew Street, Edinburgh.

REGION 14
Ayrshire (AARG)—7, 19 August, 7.30 p.m., Peter Boyle Bowling Club, Graigie Road, Ayr.
Glasgow University (GURC)—9 August, 7.30 p.m., Engineering South Building, University of Glasgow.
Greenock (G & DARC)—16, 30 August, 7.30 p.m., Arts Guild, Campbell Street, Greenock.
Lowlands Royal Signals Group (LRSG)—20 August, 7.30 p.m., 21 Jardine Street, Glasgow.
Mid-Lanark RSGB Group—16 August ("S.S.B.," by GM3CIY) 7.30 p.m., YMCA, Brandon Street, Motherwell.

REGION 15
Bangor (B & DARC)—First Friday in each month. Silverstream Unionist Hall, Belfast Road, Bangor, Co. Down. RAE class will probably start in September, for details contact GI3OLJ.

REGION 16
Ipswich (IRC)—16 August (Visit to GPO sorting office), 28 August (Electronic Control), 7.30 p.m., British Red Cross HQ, Gippeswyk Avenue, Ipswich.
Norwich (NARC)—Mondays, 7.30 p.m., The Clubroom, Brickmakers Arms, Sprowston Road (Near ring road roundabout).
Gt. Yarmouth (GYRC)—Fridays, 7.30 p.m., 98 Southmarket Road, Gt Yarmouth.

REGION 17
Chippenham (C & DARC)—Tuesdays, 7.30 p.m., 14 August (Mini D/F Hunt), 27 August (Amateur TV reception), Chippenham High School for Boys, Hardenhuish Lane, Chippenham.
Farnborough (F & DRS)—13 August (TVI, Questions and Answers). 27 August (Marine Radio by G3NVM), 310 Farnborough Road, Farnborough.

LOOKING AHEAD

5-10 August—Special Event Station, GB3NEW. Welsh National Eisteddfod, Barry, Glam. 160-10m, a.m., c.w., 08.00-20.00 GMT.
7-9 August—DXpedition to Jersey. GC3KNZ, GC3LDH, GC3SVK, GC3TTN. All bands 160-10m. QSL via bureau.
8-16 August—DXpedition to Clackmannanshire. GM5PM/P. 160-10m, s.s.b., and c.w.
9-11 August—Special Event Station, GB3SFS. South Shields Annual Flower Show, Bents Park, South Shields. 160-10m, a.m. and s.s.b.
17 August-7 September—Special Event Station, GB3EIF. Edinburgh International Festival, 1968. Heriot Watt University, Mountbatten Building, Grassmarket, Edinburgh 1. 80-10m, s.s.b. 2m, a.m., c.w.
23-26 August—DXpedition to Rutland. GB2ARC/P. 160, 4 and 2m, c.w. and a.m.
23 August-6 September—DXpedition. Eire and Northern Ireland. G3RST/P and G3TXZ/P. 4m and 2m.
24-31 August—DXpedition. Brecon, Radnor, Montgomery, Merioneth, Cardigan, Carmarthen, Brecon. GW3UID/P h.f., G3WUW/P v.h.f. Operation from 17.00 to 23.00 GMT week days, and 08.00 to 23.00 GMT weekends.
7 September—Special Event Station, GB3WRA. Wycombe Show, High Wycombe, Bucks. 160-10m, a.m., c.w. and s.s.b. Details from G3FSN.
24-27 September—Electronics, Instruments, Controls and Components Exhibition and Convention. Belle Vue, Manchester. Admission tickets, free, from the Exhibition Secretary, Institution of Electronics, 78 Shaw Road, Rochdale, Lancs.
29 September—Region 1 Official Regional Meeting, Southport.
6 October—EI-GI Convention.
2-5 October—RSGB International Radio Engineering and Communications Exhibition.
6 December—RSGB Annual General Meeting.

CONTESTS

10-11 August—DARC WAE Contest, 3·5-28 MHz, C.W. (see page 525).
10-11 August—LABRE DX Contest (C.W.).
11 August—Oxford D/F Event (see page 472, July).
24-25 August—All Asia DX Contest (see page 525).
31 August/1 September—LABRE DX Contest (Phone).
1 September—DARC WAE Contest 3·5-28 MHz, C.W.
7-8 September—(DARC), 3·5-28 MHz, (Phone).
7-8 September—V.H.F. National Field Day (see page 324, May).
7-8 September—VU/4S7 DX Contest (C.W.).
14-15 September—VU/4S7 DX Contest (Phone).
14-15 September—Scandinavian Activity Contest (C.W.).
15 September—80m Field Day (see page 472, July).
15 September—Region 1 (NW) Field Day.
15 September—Maritime Mobile D/F Competition at Alwalton. 2.30 p.m. to 7 p.m. Talk-in station G3DQW on 1980 kHz. Details from G3KPO.
21-22 September—Scandinavian Activity Contest (Phone).
21-22 September—(SSA), 3·5-28 MHz, C.W.
22 September—D/F National Final.
28-29 September—(SSA), 3·8-28 MHz, Phone.
5-6 October—Third 432 MHz (Open) Contest.
12-13 October—28 MHz Telephony Contest (see page 405, June).
12-13 October—Second 1296 MHz (Open) Contest.
19-20 October—11th Jamboree-on-the-Air.
26-27 October—7 MHz (C.W.) Contest (see page 404, June).
9-10 November—7 MHz Phone 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.

MOBILE RALLIES

18 August—RSGB National Mobile Rally, Woburn Abbey, Bedford. (see page 545).
18 August—Torbay ARS Mobile Rally, Dartmouth Football Ground, close to the Naval Helicopter Station, Tournstall. Talk-in station on 160, 80, 4 and 2m a.m./s.s.b.
18 August—Derby Mobile Radio Event, Rykneld Schools, Bedford Street, Derby. Talk-in stations will be operating from 10 a.m. to 3.30 p.m. with the call G3ERD/A on 160m and G2DJ/A on 2m. Admission and parking are free. The events will include a prize draw with over 40 prizes, the famous Derby junk sale, numerous field and children's events, and trade stalls. Refreshments, ice-cream, minerals etc. will be on sale at very reasonable prices and there is ample indoor accommodation if wet.
18 August—Uncle's Southend Party. Meet at 12 noon or 3.30 p.m. at the top entrance to Southend Pier.
25 August—Swindon Mobile Rally, Lydiard Park and Mansion, 3 miles west of Swindon off the A420 Swindon-Chippenham Road, ref. 103847. There will be signposting on all roads, directing cars to "SDARC Rally." Talk-in stations will be G3WEF/A on 1850 kHz, with G3LTZ/M and G3JAP/M in the area to assist, G3SIR/A on 70·56 MHz or 70·65 MHz, and G3LLZ/A on 144·12 MHz. There will be competitions, and raffles for all the family, with trade sales, model railway rides, tours around the mansion, lucky number programmes and refreshments at reasonable prices. Ample parking space and covered accommodation will be available. Enquiries to G3PRR.
25 August—Sutton and Cheam Radio Society Mobile Rally.
1 September—Preston Mobile Rally.
1 September—Bromsgrove Mobile Picnic, Dodderhill Common, on the B4091. Talk-in station G3VGG will be on 160m. Visitors must take their own food. Enquiries to G2CLN.
2 September—Peterborough Mobile Rally, Riverside Park, Peterborough (between swimming pool and boathouse; entry via Bishops Road). The Rally will start at 2.30 p.m., while a talk-in station G3DQW will be on 1980 kHz from 1 p.m. There will be the usual trade stands, surplus sales and competitions, with boat trips down the river and an exhibition stand of "Wireless in the Twenties." There will be plenty of free parking space, with picnicking on the grass and banks of the river. Enquiries to G3KPO.
22 September—Scottish Mobile Rally, The Cartland Bridge Hotel, Lanark.
20 April, 1969—North Midlands Mobile Rally, Drayton Manor Park, near Tamworth, Staffs.

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FL-DX 2000 linear amplifier, 960 watts PEP	100	0	0
Sommerkamp FT-DX 150 transceiver, 80–10 metres	215	0	0
Sommerkamp FT-DX 500 transceiver, 80–10 metres	250	0	0
Swan Line Equipment:			
Swan 500 SSB transceiver, 80–10 metres	250	0	0
Swan 350 SSB transceiver, 80–10 metres	210	0	0
Swan 230-XC power supply (to suit 500 or 350)	49	0	0
Swan 410 VFO and adapter	61	15	0
Hallicrafters Equipment:			
SX-130 Communications receiver	86	15	0
SX-122 Communications receiver	148	5	0
SX-146 SSB receiver, 80–10 metres	137	5	0
HT-46 SSB transmitter, 80–10 metres	192	5	0
HA-1 electronic keyer	42	15	0
Eddystone Radio Ltd.:			
Eddystone EA12 Amateur bands receiver, 160–10 metres	193	0	0
Eddystone 940 Communications receiver	143	0	0
Eddystone 840C Communications receiver	70	0	0
Eddystone EC10 receiver	53	0	0
Eddystone EB35 receiver	62	10	0
Eddystone EB36 receiver	56	5	0
Trio Communications Receivers:			
Trio JR-60 14 tubes amateur communications receiver, 540 kc/s.–30 mc/s., plus 142–148 mc/s.	61	19	0
Trio 9R59 9 tube communications receiver	34	13	0
Trio 9R59DE 8 tube communications receiver	39	15	0
Trio JR500SE Amateur bands receiver 80–10m.	68	0	0
Trio TS-500 SSB Tranceiver complete with a.c. P.S.U. and split-frequency V.F.O. 80–10 metres 200 watts PEP	199	0	0
Lafayette Communications Receivers:			
HA-500 Amateur bands receiver, 80–6 metres	44	2	0
HA-700 Communications receiver (with product detector)	37	16	0
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K.W. 201 Amateur bands receiver, 160m.–10m.	111	0	0
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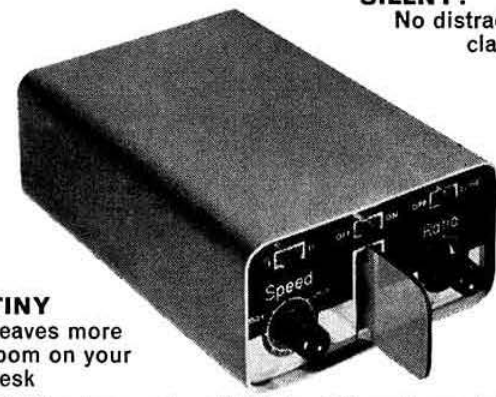

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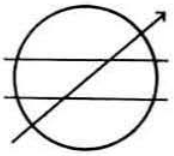

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