APRIL 1968

Radio Communication

JOURNAL OF THE RADIO SOCIETY OF GREAT BRITAIN

ENGLAND TO FRANCE ON 13 CM

Incorporating RSGB BULLETIN

KW2000A

SSB TRANSCEIVER

The finest value available, with no extras to buy. 180 watt PEP operation on all amateur bands 10-160m, complete with AC psu: VOX control: crystal calibrator: Independent receiver tuning: Upper/lower sideband tuning: Top band included: Automatic linearity control on transmit: Special attention to TVI proofing.

Deliveries from stock

There are alternative crystals available for full coverage of the 10 and 15 metre bands.

BACK BRITAIN
BUY KW EQUIPMENT

KW VESPA MK II

TRANSMITTER

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

KW 1000

LINEAR AMPLIFIER

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

KW 201

AMATEUR BANDS COMMUNICATIONS RECEIVER

Now with two detectors. i. product detector for SSB and CW. ii. diode detector for A.M. The KW201 has been specifically designed for optimum performance on Single Sideband. Eleven ranges give coverage in the amateur bands from 1·8 Mc/s to 30 Mc/s bands mechanical filter gives an IF selectivity of 3·1 kc/s at 60db, and 6 kc/s at 60db. A "Q" multiplier is available giving a variable range of 3·1 kc/s to 200 cycles selectivity.

KW ELECTRONICS LIMITED

Write for our list of KW Tested "Trade-in" equipment

K.W. ELECTRONICS LTD.

1 HEATH STREET · DARTFORD · KENT

TELEPHONE: DARTFORD 25574 · CABLES: KAYDUBLEW, Dartford

RADIO COMMUNICATION

ASSISTANT EDITOR
Trevor R. Preece, G3TRP

EDITORIAL ASSISTANT
John J. Adey, A4663

CONTRIBUTING EDITOR
Pat Hawker, G3VA

DRAUGHTSMAN
Derek Cole

ADVERTISEMENT 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.,
4 Ludgate Circus,
London, EC4
FLE 4353

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

CLOSING DATES

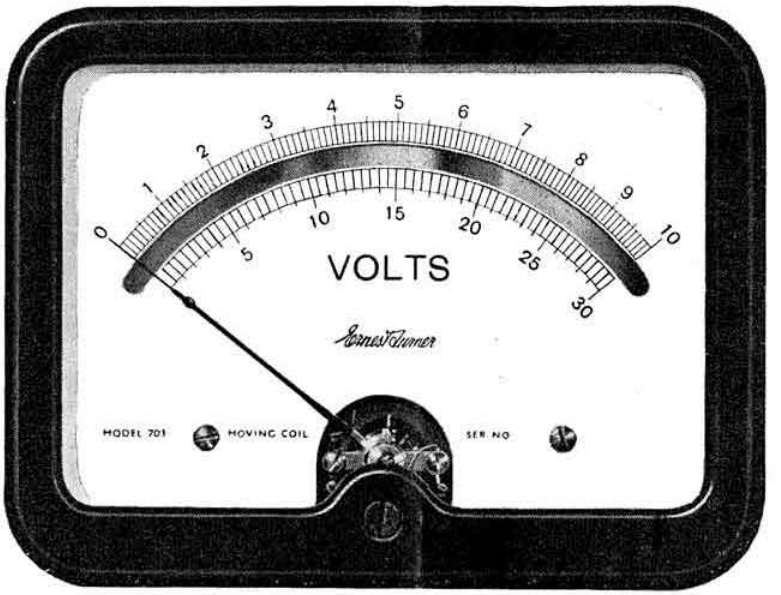
JUNE
3 MAY

JULY
6 JUNE

INDIVIDUAL COPIES 4/-.

APRIL 1968
VOLUME 44 No. 4

Special Scaling....



....A Feature of the Ernest Turner Service Geared to the Needs of the Radio Amateur.

Illustrated above is our Model 703 approximately full size, with an example of the special scaling for which this company is famous.

Since every instrument is manufactured individually, it follows that virtually any scale marking can be carried out, even on a single instrument, and a long production run is not required to justify a departure from some arbitrary 'standard' scale. In this way, Ernest Turner are able to fulfil the requirements of the small user.

Please write for catalogue 86/30 which gives concise details of the full range of Ernest Turner instruments.

ERNEST TURNER ELECTRICAL INSTRUMENTS LTD.

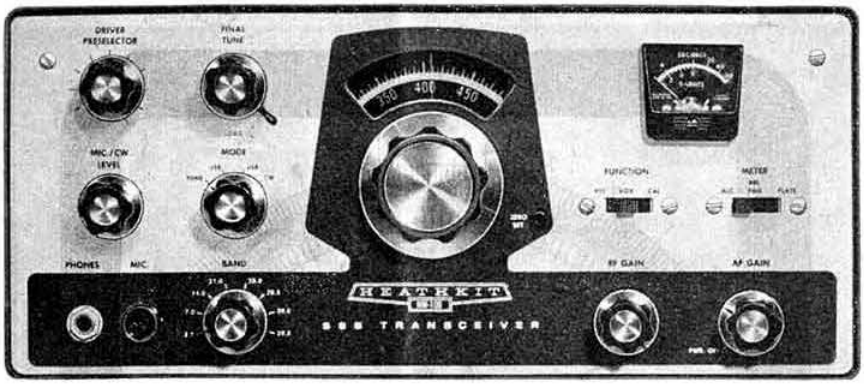
CHILTERN WORKS - HIGH WYCOMBE - BUCKS

Tel: High Wycombe 30931-4

£125 KIT

EXTENDED PAYMENT PLAN
DEPOSIT £31. 16. 0.
19 monthly payments £5. 9. 0.

Total credit Price £135. 7. 0



NEW HEATHKIT HW-100
5-BAND SSB-CW TRANSCEIVER

You asked for it . . . a multi-band version of the Heathkit " single-banders " . . . low-cost SSB operation on 10 or 15 metres . . . an SSB transceiver equal or superior to many assembled rigs, but at *much lower cost*. That's the HW-100.

How did Heath do it? We expanded on the " single-bander " design . . . borrowed from the heritage of the famous SB-101 . . . took a look at the competition . . . and produced the most SSB equipment you can get for the money.

Check the features and the specifications:

• Solid-state (FET) VFO • 80-10 metre coverage • Switch selected upper or lower sideband or CW • 180 watts input PEP SSB • 170 watts input CW • Crystal filter • Full coverage on all bands with 500 kc/s per band segment • Smooth vernier control of frequency with patented Harmonic Drive™ dial mechanism • Built-in 100 Kc/s calibrator • Separate offset CW carrier crystal • TALC • Quiet, enclosed relays • Fixed or mobile operation with HP-23 or HP-13 power supplies • Easy assembly with circuit boards and wiring harness

Kit HW-100, 18 lbs., no money dn. **£125 0 0**
Kit HP-13, DC power supply, 7 lbs. **£37 2 0**
Kit HP-23, AC power supply, 19 lbs. **£30 18 0**
Kit SB-600, 8 ohm speaker, 6 lbs. **£10 2 0**

HW-100 SPECIFICATIONS—RECEIVER. Sensitivity: Less than .5 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. **Selectivity:** 2.1 Kc/s minimum of 6 dB down, 7 Kc/s maximum at 60 dB down (3.395 Mc/s filter). **Input:** Low impedance for unbalanced coaxial input. **Output impedance:** 8 Ω speaker and high impedance headphone. **Power output:** 2 watts with less than 10% distortion. **Spurious response:** Image and IF rejection better than 50 dB. Internal spurious signals below equivalent antenna input of 1 microvolt.

TRANSMITTER. DC Power input: SSB: (A3a emission) 180 watt P.E.P. (normal voice: continuous duty cycle). CW: (A1 emission) 170 watts (50% duty cycle). **RF Power output:** 100 watts on 80 through 15 meters; 80 watts on 10 meters (50 Ω nonreactive load). **Output impedance:** 50 Ω to 75 Ω with less than 2 : 1 SWR. **Oscillator feedthrough of mixer products:** 55dB below rated output. **Harmonic radiation:** 45dB below rated output. **Transmit-receive operation:** SSB: PTT or VOX. CW: Provided by operating VOX from a keyed tone, using grid-block keying. **CW Side-tone:** Internally switched to speaker or headphone, in CW mode. Approximately 1000 c/s tone. **Microphone input:** High impedance with a rating of —45 to —55dB. **Carrier suppression:** 45dB down from single-tone output. **Unwanted sideband suppression:** 45dB down from single-tone output at 1000 c/s interference. **Third order distortion:** 30dB down from two tone output. **RF Compression (TALC):** 10dB or greater at .1 ma final grid current. **GENERAL. Frequency coverage:** 3.5 to 4.0; 7.0 to 7.3; 14.0 to 14.5; 21.0 to 21.5; 28.0 to 28.5; 28.5 to 29.0; 29.0 to 29.5; 29.5 to 30.0 (megacycles). **Frequency stability:** less than 100 c/s per hour after 30 minutes warmup from normal ambient conditions. Less than 100 c/s for ± 10% line voltage variations. **Modes of operation:** Selectable upper or lower sideband (suppressed carrier) and CW. **Dial calibration:** 5 Kc/s. **Dial mechanism backlash:** Less than 50 c/s. **Calibration:** 100 Kc/s crystal. **Audio frequency response:** 350 to 2450 c/s. **Front panel controls:** Main tuning dial. Driver tuning and Preselector. Final tuning. Final loading. Mic and CW level control. Mode switch. Band switch. Function switch. Meter switch. RF Gain control. Audio Gain control. **Side controls:** Meter Zero control; Bias; VOX Sensitivity; VOX Delay; ANTI-TRIP; Neutralizing. **Valve complement:** OA2 Regulator (150 V); 6AU6 RF amplifier; 6AU6 1st receiver mixer; 6AU6 Isolation amplifier; 6AU6 1st IF amplifier; 6AU6 2nd IF amplifier; 6BN8 Product detector and AVC; 6AU6 VFO Amp., 6CB6 2nd transmitter mixer; 6CL6 Driver; 6EA8 Speech Amplifier and cathode follower; 6EA8 1st transmitter mixer; 6AE8 2nd receiver mixer and relay amplifier; 6AE8 CW side-tone oscillator and amplifier; 6GW8 audio amplifier and audio output; 12AT7 Heterodyne ocillator and cathode follower; 12AT7 VOX amplifier and calibrator oscillator; 12AU7 Sideband oscillator; 6146 Final amplifiers (2). **Diode complement:** 6 Germanium Diodes: Balanced modulator, RF sampling, and crystal calibrator harmonic generator; 9 silicon Diodes; ALC rectifiers, anti-trip rectifiers, and DC blocking; 1 Zener Diode; cathode bias. **Transistors:** 2N4304 FET- VFO; 2N3393 — Voltage regulator. **Rear apron connections:** CW Key jack; 8 Ω output; ALC input; Power and accessory plug; RF output; Antenna; Spare. **Power requirements:** 700 to 850 volts at 250 ma with 1% maximum ripple; 300 volts at 150 ma woth .05% maximum ripple; —115 volts at 10 ma with .5% maximum ripple; 12 volts AC/DC at 4.76 amps. **Cabinet dimensions:** 14.13/16" W. × 6.5" H. × 13.3/8" D.

DAYSTROM LTD, **Dept RB-4**
GLOUCESTER ENGLAND Tel: 29451

HEATHKIT Amateur Radio Equipment

DEFERRED CREDIT TERMS BY ARRANGEMENT (OVER £10 U.K. ONLY)

SB-301E Amateur Band Receiver . . . SSB, AM, CW and RTTY reception on 80 through 10 metres + 15 Mc/s WWV reception. Tunes 2 metres with SBA-300-4 plug-in converter.

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

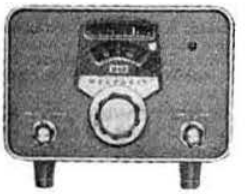
SB-401E Amateur Band SSB Transmitter . . . 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates "Transceive" with SB-301—requires SBA-404-1 crystal pack for independent operation.

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

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

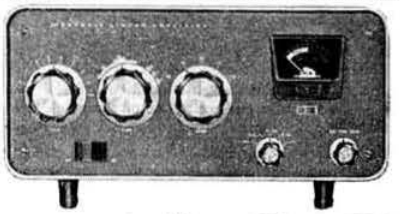
SB-101 80 Through 10 Metre SSB Transceiver . . . 180 watts PEP SSB, 170 watts CW (the practical power level for fixed/mobile operation). Features USB/LSB on all bands, PTT & VOX. CW sidetone, and more. Unmatched engineering and design.

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



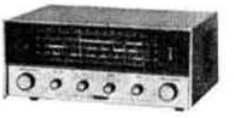
SB-640 External LMO for SB-101 . . . Provides Linear Master Oscillator frequency control or either of two crystal controlled frequencies for a total of five frequency control options. Power supplied from SB-101 Trans.

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



SB-200 KW SSB linear Amplifier . . . 1200 watts PEP input SSB, 1000 watts CW on 80 through 10 metres. Built-in antenna relay, SWR meter, and power supply. Can be driven by most popular SSB transmitters (100 watts nominal output).

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



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

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

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

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

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

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

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

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

HEATHKIT

Please address all mail order enquiries to:

DAYSTROM LTD., Dept. RB-4, GLOUCESTER

☐ Enclosed is £.....post paid U.K

☐ Please send model(s).....

.....

☐ Please send FREE Heathkit Catalogue.

NAME .....

ADDRESS .....

.....

Prices and specifications subject to changes without notice.

SHOWROOMS: *GLOUCESTER*-Bristol Rd. *LONDON*-233 Tottenham Ct. Rd. *BIRMINGHAM*-17/18 St. Martin's Hse., Bull Ring.

GAREX ELECTRONICS

MOBILE SOLID STATE POWER UNITS READY BUILT

A QQVO3-20a transmitter Kit availble next month. Price in next issue.

NEW POPULAR
12 volt DC input. 300v DC 150ma output, or 175v at 100ma. Alternative output and DC input relay controlled. Built on aluminium chassis 6 in. × 4 in. × 2½ in. with Toroidal transformer (2¼ in. × 2 in. × 1⅞ in.) mounted on top of chassis. Postage 4/6 **£6 18 6**

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

DE LUXE DUAL OUTPUT
12v DC in. 400v DC 200ma out plus 250v at 150ma: or 400v only. Outputs and input relay controlled. Built on aluminium chassis 8 in. × 5 in. × 2½ in. with Toroidal transformer (3¼ in. h. × 2⅞ in. w. × 2½ in.) and heat sink mounted on top of chassis. Postage 6/6 **£12 12**

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

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

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

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

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

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

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

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

Valves
QQV03-10 **7/6**
QQV03-20a/C1134 **38/6**
QQV06-40a/5894 **39/6**
OB2 new **2/9**

Modulation Transformers

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

Transformers

230 volt to 115 volt with 4 other taps. new Auto 250w shrouded	Postage 4/6	**15 0**
Toroidal transformer for transistor power supplies. With secondary taps up to 390V 200ma 12V. DC input. New 2¼h × 2½ × 2⅞ circuits provided		**47 6**

Tank Circuits
QQV03-20a/6-40a base tank cct micro adjustable link 2m only. **10 0**

Meters
All new British manufacture

0-500 microamp 4½ by 4⅛	**35 0**
0-500 microa,p 3⅞ sq.	**20 0**
0-100 microamp 3⅞sq.	**25 0**
0-100 microamp 3⅛ by 3⅛	**37 6**
25-0-25 microamp 3⅛ by 3⅛	**25 0**
Edge reading British 100 microamp calibrated in DB's scale slides out. Depth 3 in. overall width 2⅛ in. height 1¼ in.	**35 0**

Capacitors

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

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

Coax relay up to 2m, 3 plugs and extra set of switching contacts 50v coil. *New.* ... ... Postage 2/6 **£1 7 6**

Postage packing insurance 2/6 except on valves large type 1/- & small type 6d each Orders over £2 post free unless otherwise stated. Early closing Wednesday

SATISFACTION GUARANTEED OTHERWISE MONEY REFUNDED

GAREX ELECTRONICS, CHINNOR, OXON

Callers welcome by arrangement please telephone G3MMJ Kingston Blount 476 ex. ZS6QP.

J. B. LOWE

50-52 Wellington Street, Matlock, Derbyshire, DE4 3GS

Telephone: Matlock 2817 (2430 after 6.00 p.m.)

It's a bit early to announce the winner of my Classical Quote competition as this is being written whilst we are still in February. However, I've had one or two real beauties and I'll publish the best of 'em in next month's blah. Incidentally, dig the crazy address, man. Like a malignant growth we are expanding—our tentacles reach out and engulf adjacent property. We can now display even more lovely stuff, make lots more money and get even fatter. Our new shop is loaded with Rx's, Tx's, test gear etc., we have a spacious basement for components, surplus goodies and nameless horrors and best of all, we have a very nice showroom for the shiny new exotic stuff—fully fitted carpet no less. You really must pay us a visit, even if it is just to wipe your feet on our new carpets. Here you can try out stuff on the air and compare performance. We're only 20 minutes from the M1, so drop in and take a perfunctory butchers hook. I suppose I should add that you will not be subjected to high pressure salesmanship—but this would be telling a fib—I'll do everything I can to get you to empty your wallet. You should see me go into my act—real tears stream down my face as I brokenly moan about devaluation and unfair competition from British Industry—I hungrily gnaw on a piece of dried bread as I tell you that times are hard. I have hired a bunch of local waifs who continually grizzle "Daddy, I'm hungry." Man, I tell you it'll melt the hardest heart, so when you come along to see the latest gear for goodness sake leave your money behind, or you'll get it taken from you!!

NEW STUFF:

SOMMERKAMP

FR-500 Rx—All bands including all of 10 and top band. 500 cycle, 2·1 kc/s and 4 kc/s mechanical filters. Notch filter. 100 kc/s calibrator and multi-vibrator giving calibration points every 100 kc/s or 25 kc/s. Sensitivity, selectivity, stability and general handling right up with the best of 'em.
Price: £130 0 0.

FL-500 Tx—80-10. This actually is virtually the same as the previous FL-200-B model, merely re-styled to match the companion receiver.
Price: £145 0 0.

FT-500 Transceiver—This looks a winner to me, lads. 500W p.e.p. 80-10 (all of 10 in 4 segments). SSB (selectable sidebands, AM & CW. MOX, PTT, VOX. 4 crystal controlled channels by plugging in the appropriate xtal (not supplied). 3 tuneable Auxiliary bands again by using the appropriate crystals. Noise limiter, slow/fast/off AVC, R.I.T. 1 kc/s readout, 100 kc/s or 25 kc/s xtal marker. P.S.U. built in. All you need is a suitable piece of wire at one end, a speaker and a mike at the other for a complete, and I do mean complete, station.
Price: £250 0 0.

FT-150 Transceiver—120W p.e.p. 80-10 (all of 10 in 4 segments) SSB (selectable sidebands), AM, CW, MOX, PTT, VOX. 4 xtal controlled and 3 auxiliary VFO channels like the FT-500. R.I.T., 1 kc/s readout, 100 kc/s calibrator, all transistor except driver and P.A. Both 12 vdc and 240 vac p.s.u.'s built-in. This midget (7" high × 13½" wide × 10½" deep) is a little gem. I honestly don't know how they do it for the money. Everything you want for base station or mobile in such a small package—remarkable.
Price: £215 0 0.

Paros 22TR Transceiver—3 bander. Paros, from the Greek meaning pull the ladder up, Jack, I am aboard. Seriously, look at this:
80, 40 and 20m 80W p.e.p. SSB/AM/CW, 100 kc/s calibrator, 9 mc/s xtal filter, solid state pre-mixed linear V.F.O. transceive vernier (RIT or whatever you want to call it) adjustable noise limiter. VOX, MOX or PTT, grid block keying. 2 r.f. stages. This is a beautiful sounding signal and one of the quietest yet very sensitive (½ microvolt) Rx's on the market. Complete with PSU/speaker.
Price: £120 0 0.

This must surely be the answer for the impecunious—everything you want for the price of a Rx (and I'll bet you won't get as good a Rx either!). Don't forget, lads, there's lots of Dx on 20m. Your present gear will likely cover the HP deposit—so come on in, the water's fine.

STAR LINE:

Come along and play with the new Star equipment. By importing direct I have got the prices down to rock bottom. SR700A Rx—80-10. Triple conversion, tuneable I.F. 5 extra band positions for any additional 5 600 kc/s segments between 4 and 30 mc/s. Notch filter, xtal calibrator. A very sensitive selective Rx designed to operate either separately or transceive with the companion ST700 Tx. The VFO is really tops with direct readout to 1 kc/s.
Price: £115 0 0.

ST700 SSB/CW/AM. 200 W p.e.p. Selectable sidebands, VOX, MOX, PTT, a beautiful rig.
Price: £135 0 0.

These two represent to my mind an extremely good buy. It is rather interesting to note that in Japan (and they should know!) the SR700A is more expensive than the FR500 and the ST700 is the same price as the FL500. In the States the SR700 is £165.0.0 and ST700 £220.0.0—this must surely be the only time when an imported piece of gear is cheaper in Great Britain than the States! Anyway, it helps bear out what I say and that is that the Star Line is excellent value for money. If you don't believe me, what about this then:

Star SR200—160 to 10m (all of ten) plus 10 mc/s WWV. Single conversion, 1650 kc/s single xtal filter, product detector, noise limiter, xtal calibrator, amplified a.g.c. An excellent Amateur Band Rx at the very reasonable price of £40.0.0.

SPECIAL: Two National 200s left in stock at the pre-devaluation price of £185.0.0 complete with p.s.u. kit.

OTHER NEW STUFF:

DAI electronic keyers—£16.0.0.; bug keys—£4.10.0; VT300 Valve Voltmeter —£15.5.0; TE65 valve voltmeter—£16.0.0; 100 kc/s xtals—new, not surplus, to Mil. Spec. HC13/U—£2.0.0; 28·5 mc/s walkie talkies—£12.10.0 a *pair* (amateurs only). Tavasu mobile whip in stock. All bands £12.10. Sommerkamp linears—£100.0.0.

SPECIAL: AR88D manual—reprints beautifully done 15/-; SP-600-JX manuals. Imported from Hammarlund at enormous cost, so awful sorry, lads, you have to pay through the nose, £3.10.0. You won't believe me, I know, but I'm selling these at a loss. It breaks my heart, but if I charged you what they cost me, you would have a fit.
Boom mike/headsets, excellent—£3.0.0.

SECONDHAND:

Usual lot of old diehards including HRO's, £25.0.0. NC190—£55.0.0. SB300 with all filters—£130.0.0. 75A4 with all filters—£250.0.0. HR22—£80.0.0; Collins 75A1—£80.0.0; LG300 r.f. deck—£20.0.0. Hammarlund HX50—£120.0.0. Collins 32V2—£40.0.0; Geloso Miniphase—£45.0.0. Note that all these have been checked, serviced and re-aligned.

SUNDRIES:

'Scopes: CR52 brand new, £22.10.0; Laboratory audio oscillator, a thing of beauty, £25.0.0; Marconi TF1100 VTVM £25.0.0; Marconi TF390G, 16-150 mc/s. £20.0.0; Boom Mikes—at last a comfortable effort. Nice padded low impedance earphone and a nice high output, high impedance mike. Really excellent and only £3.0.0.

COMPONENTS:

NEW: Tubular trimmers either ½-5pF or 3-15pF 1/- each, 10/- a doz.; Feedthroughs 1000 pF screw type 1/- each; 10/- a doz.; Disc ceramics .001, 3/6d a doz; .01 5/- a doz.; Standard coax sockets 1/- each; Standard coax plugs 1/4d. each; PL259 plugs 5/- each; Alligator clips 6d. each; Plugs (Octal, B7G, B9A) 2/6d. each; 2pF and 3pF ceramics, 3d. each, 2/6d. a doz; Electrolytics—brand spanking new can types, complete with mounting clips. 10mF 350V, 1/8d.; 20mF 350V 2/3; 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.; 100-10mF 450V 13/2d.
Silicon rectifiers—Current manufacture, NOT surplus, NOT seconds. You can rely on these. SE-05 1000piv 500 mA 4/6d.; 1S1066 1000piv 750mA 8/-.

NEW SURPLUS:

Resistors, most values from 2d. each. Capacitors from 2pF to 150mF from 2d. each. Mica trimmers 1000 pF 1/-. 2,800 pF solid dielectric variables—ideal top band loading 1/-; Oil filled 8mF at 750V dc 2/-; Pots—from 5 ohms to 1 meg 6d. each. I can make up a useful bunch of 25 for 10/-. The guts of the 19 set variometer 5/- post free.
Service Department: Word is getting round—we're still booked pretty solid.
Postage: except where items are marked " carriage paid " postage is extra. Please remember the days of the penny black are over and something weighing 2 lb. 1 oz. costs 4/6d. Don't be frightened of sending too much, I'll return any excess. A s.a.e. will get you my latest blurb.
H.P. Certainly—(Provided the Budget hasn't killed it!)

73 Bandit Bill,

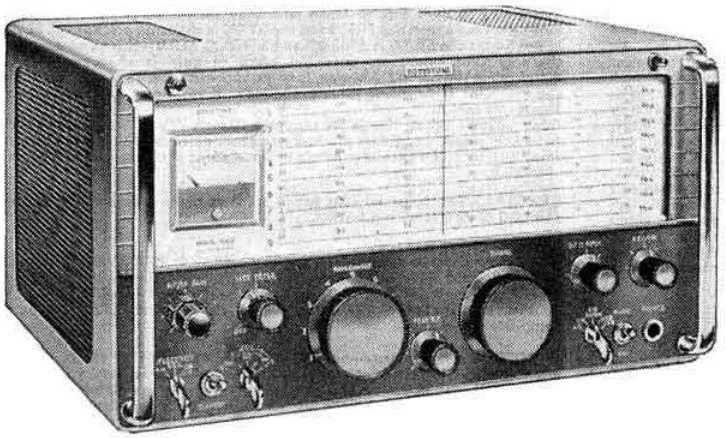
VE8DP/G3UBO.

Eddystone

BRITISH MADE

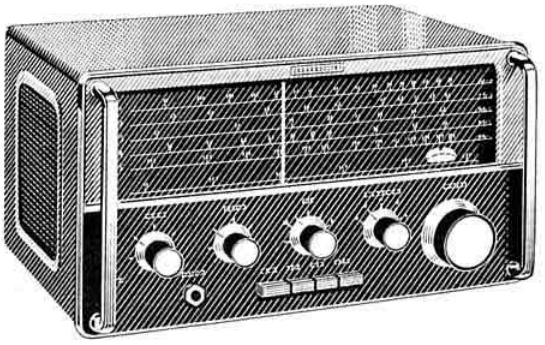
Amateur communications receivers

EA12



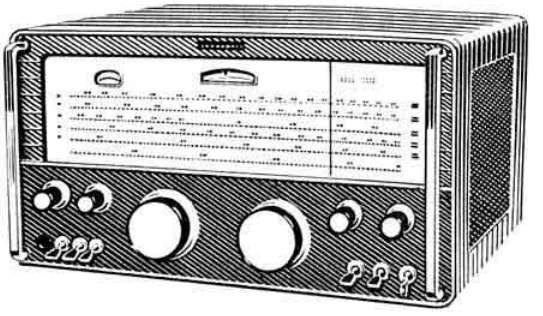
An amateur bands double-conversion superheterodyne receiver, for a.m, c.w, and s.s.b reception. For all amateur channels between 1.8 MHz and 30 MHz in nine 600 kHz bands with 28 MHz to 30 MHz in four bands.

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

A MARCONI COMPANY

LTD/ED551

RADIO SOCIETY OF GREAT BRITAIN

FOUNDED 1913, INCORPORATED 1926

MEMBER SOCIETY INTERNATIONAL AMATEUR RADIO UNION

PATRON: H.R.H. THE PRINCE PHILIP, DUKE OF EDINBURGH, KG

COUNCIL 1968

PRESIDENT	J. C. Graham, G3TR
EXECUTIVE VICE-PRESIDENT	J. W. Swinnerton, TD, B.Sc.(Econ), G2YS
IMMEDIATE PAST PRESIDENT	A. D. Patterson, B.A.Sc., GI3KYP
HONORARY TREASURER	N. Caws, FCA, G3BVG

ORDINARY ELECTED MEMBERS

B. Armstrong, G3EDD
J. Etherington, G5UG
E. G. Ingram, GM6IZ
L. E. Newnham, G6NZ
R. F. Stevens, G2BVN
G. M. C. Stone, C.Eng., MIEE, MIERE, G3FZL
E. W. Yeomanson, G3IIR

MEMBERS ELECTED BY ZONES

R. J Hughes, G3GVV
A. F. Hunter, GM3LTW
H. E. McNally, GI3SXG
F. K. Parker, G3FUR
J. R. Petty, G4JW
D. M. Thomas, GW3RWX
G. Twist, LLM, G3LWH

SECRETARY	C. P. Pope
GENERAL MANAGER	A. E. Dowdeswell, G4AR

REGIONAL REPRESENTATIVES

Region 1.—North Western.	B. O'Brien, G2AMV, 1 Waterpark Road, Prenton, Birkenhead, Cheshire.
Region 2.—North Eastern.	K. Sketheway, BRS20185, 51 Baret Road, Walkergate, Newcastle upon Tyne.
Region 3.—West Midlands.	R. W. Fisher, G3PWJ, 63 Swan Crescent, Langley, Oldbury, Warley, Warwickshire.
Region 4.—East Midlands.	F. C. Ward, G2CVV, 5 Uplands Avenue, Littleover, Derby.
Region 5.—Eastern.	S. J. Granfield, G5BQ, St. Lukes, 47 Warren Road, Cambridge.
Region 6.—South Central.	L. W. Lewis, G8ML, 34 Clevelands Avenue, Cheltenham, Gloucestershire.
Region 7.—London.	P. A. Thorogood, G4KD, 35 Gibbs Green, Edgware, Middlesex.
Region 8.—South Eastern.	D. N. T Williams, G3MDO, Seletar, New House Lane, Thanington, Canterbury, Kent.
Region 9.—South Western.	J. Thorne, G3PQE, Jessamine House, Chapel Allerton, Axbridge, Somerset.
Region 10.—South Wales.	C. H. Parsons, GW8NP, 90 Maesycoed Road, Heath, Cardiff, Glam.
Region 11.—North Wales.	M. Williams, GW3LCQ, " Dwyros," 12 Penrhos Avenue West, Llandudno Junction, Caerns.
Region 12.—North-East Scotland.	J. MacIntosh, FCCS, MIERE, FAIA, GM3IAA, Broom Park, Cradlehall, Inverness.
Region 13.—South-East Scotland.	G. P. Millar, GM3UM, 8 Plewlands Gardens, Edinburgh 10.
Region 14.—West Scotland.	N. G. Cox, GM3MUY, 191 Maxwell Avenue, Westerton, Bearsden, Glasgow.
Region 15.—Northern Ireland.	J. Thompson, GI3ILV, "Albany," Newry Road, Armagh, N. Ireland.
Region 16.—East Anglia.	W. J. Green, G3FBA, Meadway, Links Avenue, Brundall, Norwich, Norfolk, NOR 86Z
Region 17.—Southern.	L. Southwell, G3JLS, 15 Hollybank Road, Hythe, Southampton, Hants.

QSL BUREAU MANAGER	A. O. Milne, G2MI, 29 Kechill Gardens, Bromley, Kent.
V.H.F. MANAGER	G. M. C. Stone, G3FZL, 11 Liphook Crescent, Forest Hill, London, SE 23
CERTIFICATES MANAGER	C. R. Emary, G5GH, c/o RSGB HQ.
PUBLIC RELATIONS OFFICER	Mrs Sylvia Margolis, 95 Collinwood Gardens, Clayhall, Ilford, Essex.
SLOW MORSE PRACTICE TRANSMISSIONS ORGANIZER	M. A. C. MacBrayne, G3KGU, 25 Purlieu Way, Theydon Bois, Essex.
FILM LIBRARY CURATOR	R. A. Cathles, G3NDF, 4 Dawnay Road, Great Bookham, Surrey.
RECORDED LECTURE LIBRARY CURATOR	G. S. Milne, G3UMI, 23 Linacre Road, Eccleshall, Stafford.

CURRENT COMMENT

DISCUSSING TOPICS OF THE DAY

Participation in the work of a National Society is often frustrating. The space does not exist to provide by the printed word full details of the essential activities of the organisation, and further, it is the voiced opinion of a number of members that they are not concerned as to how the work is done but only that they should continue to enjoy the benefits of membership and the privilege of operating in the amateur bands. Fortunately, however, from time to time something occurs which shows that persons do exist who are fully aware of the work and aims of the organisation. In this context a feature in the March issue of The Radio Constructor *should be read by all who participate in Amateur Radio and this is reproduced in full.*

" From time to time, various scraps of information come our way, the nature of which gives us cause to think! Recently for instance, we heard it said that only approximately half the radio amateurs with transmitting licences in this country were members of the RSGB. We are not in a position to confirm or deny the accuracy of this statement, but the fact that it was made by a person who would be likely to know the true state of affairs in this country, assures us of one thing, and that is that the proportion of transmitting amateurs who are members of the RSGB is far, far, too low. Considering all that the RSGB do, and have done in the past, for the hobby of amateur radio, not only in this country but in the international sphere as well, one would have thought that at least 90 per cent of the licensed amateurs in this country could have seen their way to supporting the Society. In fact, it is difficult to see why 100 per cent don't join! The privilege of using sections of the radio frequency spectrum was not given to the amateur radio transmitting licensee as a birthright. It had to be fought for, and once obtained, it has to be continuously preserved. Those wishing to use the radio spectrum are scrabbling over one another to grab whatever is going and the amateur only holds his allocations by constant vigilance and the organisation which correlates this activity is the RSGB. This vigilance has to be applied not only at home, but in the international sphere as well, and here the RSGB has diligently fought for the radio amateur's cause.

The Society has, through its publication, kept the radio amateur abreast of technical developments and has set a high standard in this respect making available to the amateur much knowledge which would otherwise be available only to the professional. The encouragement of exhibitions, contests and trophies has given the competitively minded targets to aim for and for those who find the social aspects of the hobby of major interest, the RSGB has encouraged and provided opportunities in this direction. From ensuring our survival at one extreme to providing the frills of the hobby at the other, the RSGB has served every participant of Amateur Radio in the country.

It is a trend of the times, that a large number of our leisure activities are in danger of being taken from us if we don't fight for them. Be it walking in the countryside; sailing in the coastal waters of these islands; motoring; flying or what have you, someone will have good reason for stopping you doing it—usually in the name of ' progress or development '—which mostly means ' in the interests of commercialism.' So beware; support the organisations which fight for your liberty. And in the case of Amateur Radio, this is the Radio Society of Great Britain."

The majority of the persons who will read this will already be Members of the Society, but many Members must know transmitting licence holders who are not part of the RSGB. If these members will send a postcard to Headquarters giving the names and addresses of the amateurs concerned, we will be pleased to send them a copy of "Radio Communication", together with an invitation to join the Society.

The Cover

The date of 18 February, 1968, will remain an important one in v.h.f. chronicles when what is believed to be the first contact between England and France on the 13cm band was established by Dr. Dain Evans, G3RPE/P, on the cliffs of Dover, with Claude Paillard, F2FO/P, operating near Calais. The cover illustration shows Dr. Evans and his young son, with the equipment that helped make the contact possible. Details in " Four Metres and Down", page 242.

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

PART 2
(Continued from March)

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

The 10 Watt P.E.P. Output Linear Amplifier

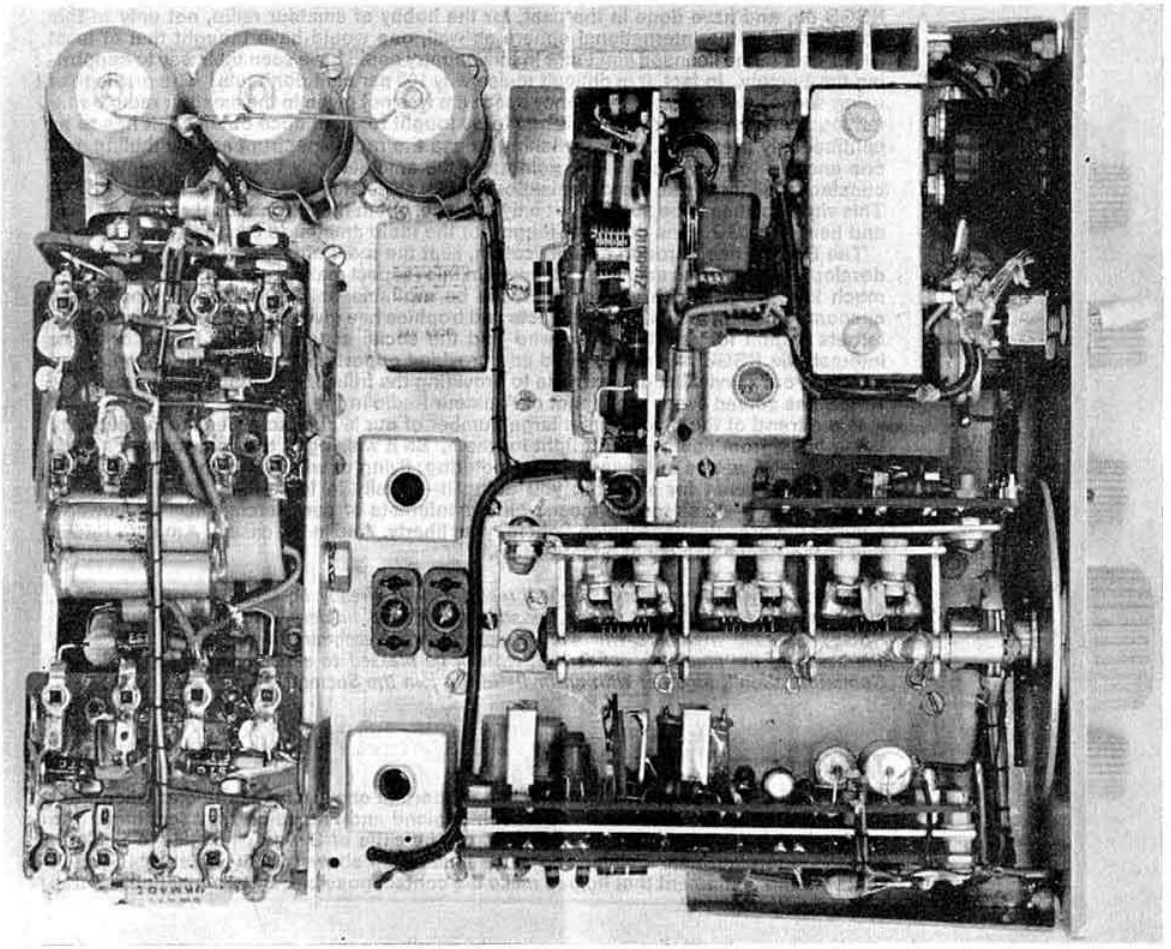
The linear amplifier consists of one stage operating in class A followed by a class B driver stage and class B output stage.

The first stage consists of a neutralized amplifier using a transistor type C111 whose collector current is adjusted to about 2 mA.

The collector circuit is loaded with a 2 k ohm resistor to increase the bandwidth of the stage. It was found that this stage had a slight tendency to instability which was corrected by the inclusion of a 3·9 pF neutralizing capacitor. The correct phase of feedback will have to be found by trial and error by connecting either one side of the L10 secondary to the neutralizing capacitor or the other side.

The s.s.b. driver stage makes use of a Mullard type BFY50 transistor. This is one of the best available r.f. power devices, and can be purchased for as little as 6s. 6d. The quiescent collector current for the driver stage is set at about 2 mA

* 32 Lynton Road, Chesham, Bucks.



The briefcase portable transceiver—a view above the chassis of the author's unit. The components can be identified by referring to the diagram opposite.

Note that the bias for the driver and output stage is derived from a low voltage Zener diode stabilized line.

The collector coil is constructed using an STC toroid. The use of toroids is recommended because of the high coupling ratio and limited external field. There is no reason why the driver should not use the same type of toroid as that used in the output circuit. In the original design the output stage made use of a BFY50 to deliver 4 watts p.e.p. output. The present design uses an RCA transistor type 2N2876. This device has a very much better upper frequency limit than is required, and the author would suggest the use of the much cheaper type BD123, which has recently become available. The writer substituted this transistor for the 2N2876 without any change to the circuit or transceiver performance. The BD123 has a collector dissipation of 45 watts and in this circuit does not require a heat sink. It should be mounted in such a way as to minimize the collector to ground capacitance. Note that the collector is connected to the case of this device. It might be worth reducing the capacitance in parallel with L12 to compensate for the different output capacitance of the BD123 type transistor. Base emitter breakdown is the most frequent cause of r.f. transistor failure, and is prevented in the present design by the inclusion of D5 and D6. These diodes are type 1N916; alternatively any other type of silicon computer diodes will do. This stage is biased to have a quiescent collector current of 18 mA, though due to the short duty cycle and class B operation, when using the 2N2876, it need only have a heat sink of about 10 sq. in. in area.

The need to make the transceiver very small necessitated the limited transformer size. The main 30V supply is regulated so as not to exceed 30 volts, but under single tone transmitting conditions drops considerably. With 6000 μF reservoir capacitance the supply is found to have adequate dynamic regulation for speech. This poor d.c. regulation is a considerable advantage, making thermal runaway impossible, and secondary breakdown of the output stage unlikely.

Large signal transistor amplifiers are inherently non-linear and prove to cause television interference. It is most important to incorporate a low pass filter between the tank circuit and the aerial. A TVI trap circuit comprising L11 and a 3-30 pF beehive trim capacitor tuned to BBC 1 is wired between the collector and the tank circuit. These measures completely eradicated all traces of TVI.

Measurements made on the transceiver indicate that the distortion products are at least 25dB below the peak s.s.b. output.

Transmit Receive Switching

The transmit receive switching is carried out by a small relay, which in turn is operated by a press to talk switch on the microphone case. When the transmit receive relay is operated the —9V supply is switched from the transmitter to the receiver with the exception of the following common stages: the v.f.o., TR6, TR7, the b.f.o., TR20 and the balanced mixer TR12. which remain permanently connected to the —9V supply. The relay disconnects the low voltage stabilized bias line from the linear amplifier, and aerial change-over is also performed by this relay. It was found necessary to make the press to talk switch apply a short circuit across the microphone, in addition to operating the relay. This is necessary owing to a small delay on change-over from transmit to receive before the microphone audio amplifier goes dead.

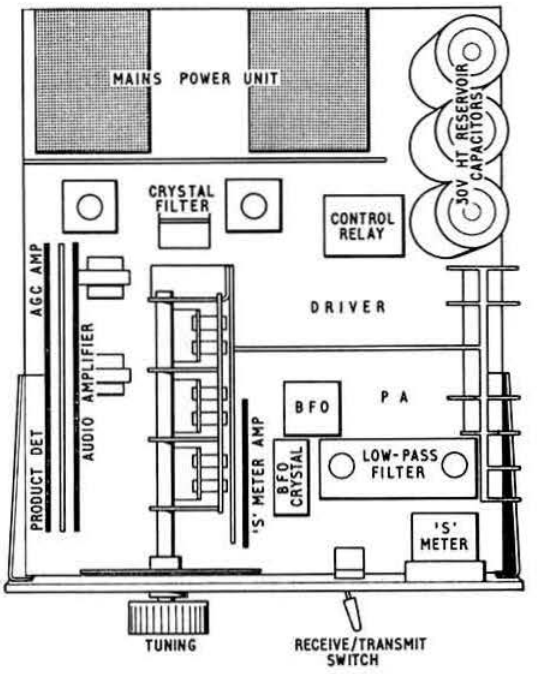


Fig. 3. The functions of the above-chassis components and sub-assemblies which can be seen in the photograph opposite.

Metering Circuits

The front panel meter is switched to measure the following:

Signal strength on receive.
—9V supply line.
30V supply line.
P.a. collector current 0-1A.

The S meter circuit is a simple transistor voltmeter tied to the a.g.c. line. The measure of the p.a. collector current is made by connecting the meter in parallel with the 0·2 ohm resistor located in the supply lead to the tank coil. This resistor will have to be chosen to suit the basic movement of whatever meter is used in the circuit. The meter will occasionally reach full scale on speech peaks, but the 1 amp. full scale deflection is adequate even though the peak collector current approaches 2 amps.

The Power Supply

Two small mains transformers with similar specification of 0-16V at 300 mA, are used in the power supply section.

The first transformer uses a simple full-wave bridge rectifier circuit to supply —12 volts for the relay operation, and —9 volts stabilized by a shunt connected Zener diode for the receiver and exciter circuits of the transceiver. Also tied to the —9V line is a stabilized —7·5V rail for the v.f.o. This uses a further shunt connected Zener diode type OAZ244. The +30V supply is provided from a voltage doubler circuit connected

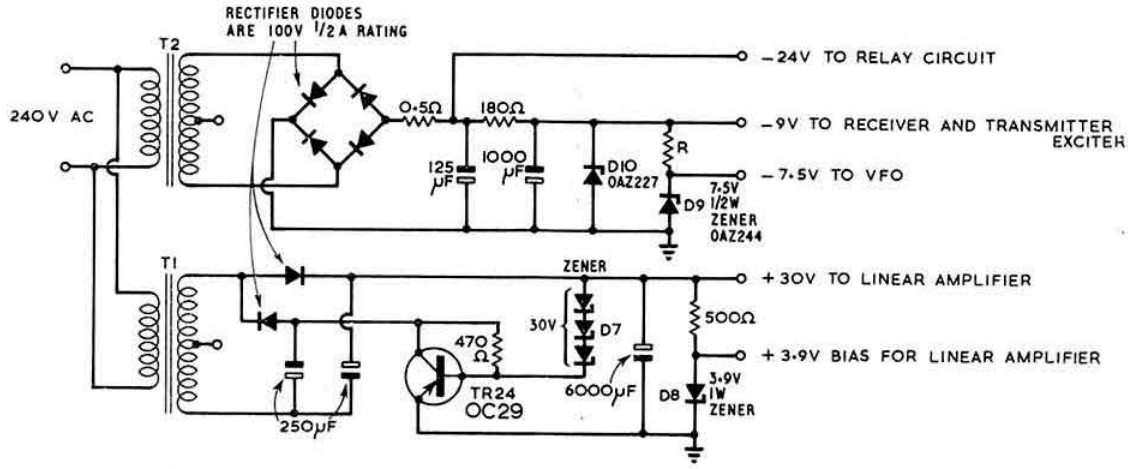


Fig. 4. The mains power supply for the transceiver.

to the second transformer. This supply is series stabilized at +30V and also has a shunt resistor chain and 3·9V Zener diode to produce the stabilized bias line for the driver and linear r.f. output amplifiers. The reference voltage for the OC29 series stabilizer is made up of a number of series connected Zener diodes making a total of 30 volts.

Alignment Details

The alignment procedure is straightforward. Any amateur contemplating the construction of this transceiver will, it is hoped, be experienced in general alignment techniques, and so the writer will only note a few important points.

No mention has been made in the text so far of the audio amplifier. This circuit is of the standard 500 mW push-pull output type, very commonly used in miniature transistor portables. The 10 k ohm preset potentiometer in the bias circuit of the push pull stage should be adjusted until a zero signal current of 1-2 mA is measured in the h.t. line to the centre tap of T4.

The adjustment for correct operation of the product detector has already been dealt with.

The alignment of the i.f. amplifier is considerably simplified by the use of transfilters instead of the more usual transformers, the only adjustment necessary being to tune the core of L7 to the centre of the passband. In this case 455 kHz. It is adequate just to trim L7 for maximum S meter reading when the receiver is tuned to a steady signal.

The transfilters used in the i.f. amplifier have a bandpass response centred on 455 kHz and therefore the crystals for the filter must be spaced on either side of this frequency. It is advisable to use brand new crystals which can be purchased from QCC. It is important to state that X1 at 456·3 kHz and X2 at 454·0 kHz are for series resonant use while X3 at 453·6 kHz is intended for parallel operation with a shunt capacitance of 30 pF.

If a signal from an r.f. signal generator is injected into the base circuit of TR3 it should be possible to scan the 455 kHz i.f. frequency and make adjustments to the cores of L3 and L4 so as to level up the two peaks of the filter response. There should be a valley between the peaks of not greater than 6dB. By connecting 0·5-2 pF across the h.f. crystal the shape factor can be markedly improved, but care must be taken not to use too great a capacitance or the side lobes will become too great; 1·5 pF proved adequate in the writer's case. A 25dB unwanted sideband rejection is about the best performance that can be expected from a single half-lattice filter.

The adjustment of the correct mixer injection voltage has already been dealt with.

The r.f. circuits of L1 and L2 should be resonated to the

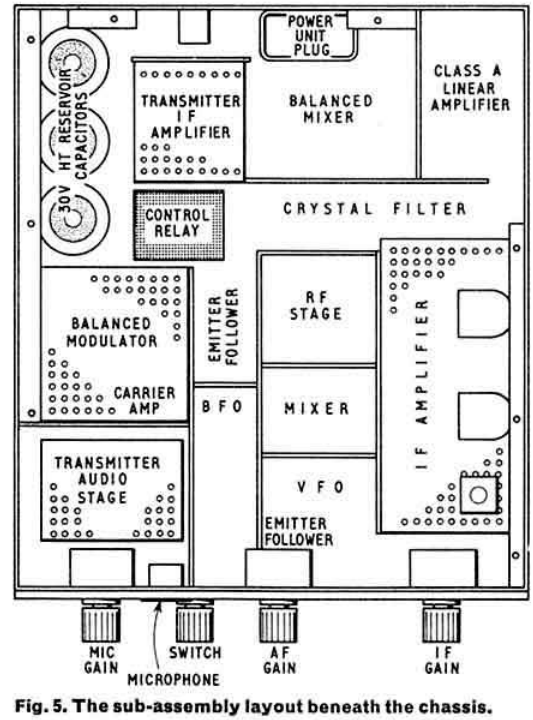
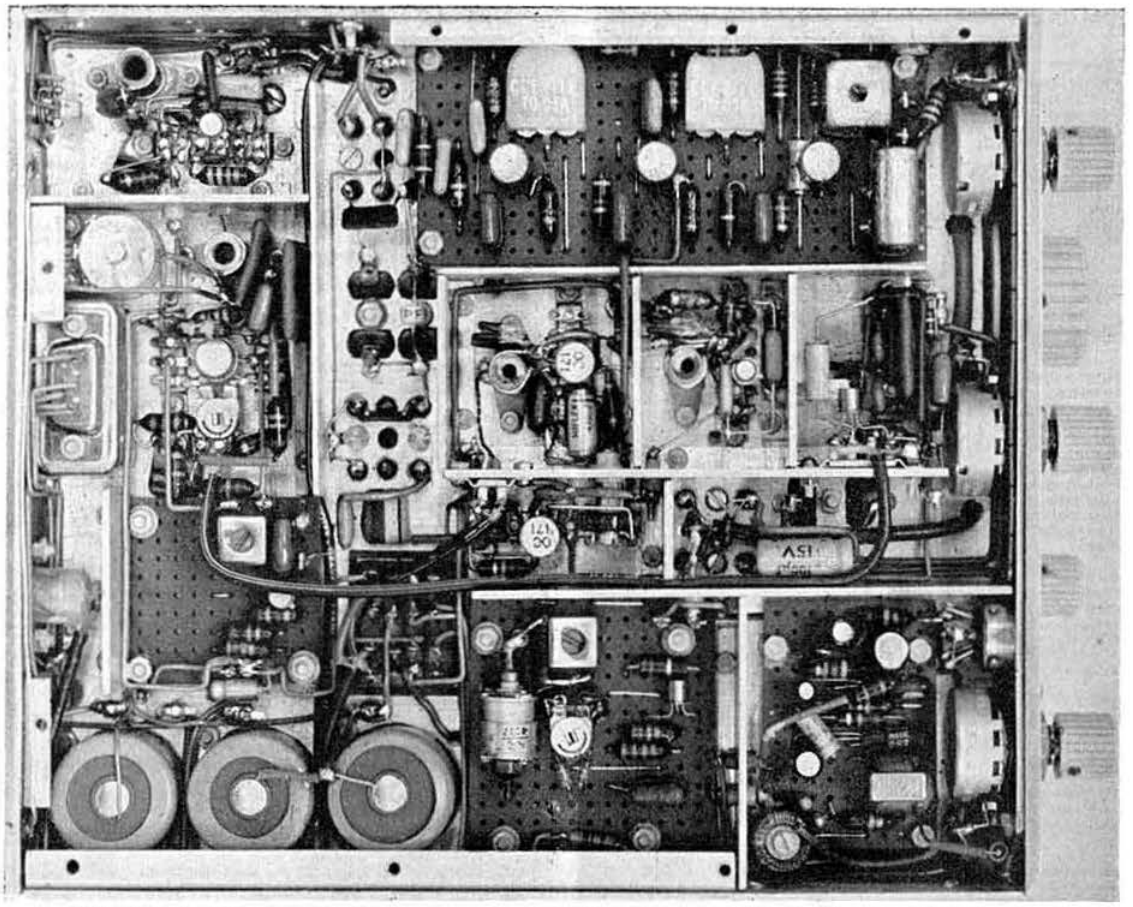


Fig. 5. The sub-assembly layout beneath the chassis.



This photo beneath the chassis illustrates the liberal use of screens necessitated by the compact construction.

receive frequency and tracking alignment will be found to cause little trouble, because of the limited frequency coverage of 3·7-3·8 MHz,

If the time constant of the a.g.c. system does not suit the constructor, then it may be adjusted by a change in either the 20 μF a.g.c. line to ground capacitor, or the 47 k ohm resistor in parallel with D4.

This completes the alignment of the receiver section of the transceiver.

The alignment of the transmitter section should be undertaken as follows: The −9V supply should be connected to the exciter sections remembering for the moment not to connect the +30V line. A quick check of the potentials appearing across the emitter resistors will give an indication that all circuits are biased correctly. Next the microphone should be connected to the audio amplifier and with a continuous whistle the audio voltage appearing across the 5 k ohm gain control should be noted and compared with the figures given in the chart. The writer used a Heathkit V-7AU valve voltmeter throughout to make the measurements listed. During the following adjustment procedure, a dummy load consisting of a 50 ohm resistor should be connected across the aerial r.f. output socket.

With a brief whistle into the microphone the a.c. audio potential should be measured at the collector of TR19 and compared with the value noted in the valve voltmeter check table.

The r.f. voltage appearing on the emitter of the common base b.f.o. amplifier should be measured and again checked against the table.

The next step is to measure, using an r.f. probe, the voltage appearing across the junction of D2 and the 470 ohm resistor to earth. When the carrier is balanced out, the junction of D3 and the 470 ohm and D2 and 470 ohm resistors to earth, will show a similar voltage reading.

The output of the v.f.o. emitter follower measured across the 1 k ohm emitter resistor of TR6 and should be of the order of 0·9 V P/P.

Again with a brief whistle into the microphone and the microphone gain control set to max, 3V P/P should be measured on the base of TR16. If the trimming potentiometer P2, situated in the balanced mixer stage, is adjusted,

Transistor and Diode Table

Function	Circuit ref.	Type	Manufacturer	Remarks
Receiver r.f. amplifier	TR1	OC171	Mullard	
Receiver mixer	TR2	3N125	Motorola	
Emitter follower	TR3	OC171	Mullard	
Receiver b.f.o. amplifier	TR4	C111	Fairchild	
S-meter amplifier	TR5	OC44	Mullard	
V.f.o. emitter follower	TR6	2N706	Fairchild	
V.f.o.	TR7	2N706	Fairchild	
I.f. amplifier	TR8, TR9, TR10	OC171	Mullard	
Transmitter i.f. amplifier	TR11	C111	Fairchild	
Transmitter balanced mixer	TR12	2C415	Fairchild	Possible alternative 2 off type C111 or 2N706
Transmitter class A amplifier	TR13	C111	Fairchild	
A.g.c. amplifier	TR14	OC75	Mullard	
Product detector	TR15	OC44	Mullard	
Class B driver	TR16	BFY50	Mullard	
Class B linear output stage	TR17	2N2876	RCA	alternative type BD123
High input impedance microphone amplifier	TR18	OC75	Mullard	
High gain audio amplifier	TR19	OC44	Mullard	
B.f.o.	TR20	2N706	Fairchild	
Audio driver	TR21	OC75	Mullard	
Push-pull audio output	TR22, TR23	ACY19	Mullard	
30V series d.c. stabilizer	TR24	OC29	Mullard	
Front end r.f. protection	D1	1N916	Fairchild	Possible alternative OA202
Balanced modulator	D2	CV448		Any balanced pair of crystal diodes, such as 2 off OA79
A.g.c. delay diode	D4	1N916	Fairchild	OA202
Emitter-base breakdown protection	D5 & D6	1N916	Fairchild	
30V d.c. stabilized line reference	D7	30 volts of various 2W Zener diodes in series.		
Linear amplifier stabilized bias supply	D8	2W 3·9 V Zener		
−7·5V stabilized supply	D9	½W 7·5V Zener, OAZ244		
−9V stabilized supply	D10	9V OAZ227	Mullard	
Power supply rectifiers	Use any type with ratings of 0·5A and excess of 100 p.i.v.			

Valve Voltmeter Checks

Audio	Collector of TR19	Audio gain max. with a brief whistle into the microphone	0·4V a.c.
B.F.O.	Emitter of TR4		0·3V P/P r.f.
	Junction of D2 and 470 ohm Junction of D3 and 470 ohm	Carrier balanced	0·7 VP/P r.f.
V.F.O.	Emitter of TR6		0·9V P/P r.f.
S.S.B.	Base of TR16	With audio at max. and a brief whistle into the microphone	3V P/P r.f.

The following P/P voltage readings are only included as an indication (see text)

	Base of TR17		5V P/P r.f.
	Output across 50 ohm load	With audio at max. and a brief whistle into the microphone.	

When the output is observed on an oscilloscope, the peak to peak voltage is in excess of 60 volts across 50 ohms

A.G.C.	All controls at max.		
	Emitter of TR8	1·1V at no signal.	
	Emitter of TR8	0·2V at max. signal.	
S-Meter	0-500 μA miniature meter		

Coil and Transformer Details

T1, T2 16 volt 300 mA heater transformers 240V a.c. primary
T3 Standard push-pull audio driver transformer
T4 Standard push-pull audio output transformer

All coils are wound on ¼ in. o.d. polystyrene formers, ⅞ in. long. 8 in. lengths of rod can be obtained from Home Radio etc.)

L1 18 turns, 30 s.w.g. enamelled copper wire, with a 5-turn aerial coupling link wound over the earth end, tuned with an iron dust core.
L2 18 turns, 30 s.w.g. enamelled copper wire also tuned with an iron dust core.
L3 See text.
L4 See text.
L5 Miniature broadcast transistor i.f. transformer.
L6 See text.
L7 Miniature broadcast transistor i.f. transformer.
L8 Miniature broadcast transistor i.f. transformer.
L9 40 turns, 36 s.w.g. enamelled copper wire with 5 turn link wound on the centre of the primary. *Note.* Do not use a tuning slug.
L10 40 turns, 36 s.w.g. enamelled copper wire with a 10 turn link wound over the collector end of the primary, and tuned with an iron dust core.
L15 15 turns, 30 s.w.g. enamelled copper wire wound on an STC WP 3310/SA400 toroid, with a collector tap 4 turns from the supply end. Near the collector end is a bifilar wound 4 turn link.
L11 43 MHz TVI trap. 8 turns, 22 s.w.g. enamelled copper wire close wound ⅛ in. diam. and tuned with an 8-30 pF beehive trimmer.
L12 20 turns, 30 s.w.g. enamelled copper wire on an STC WP3809/SA400 toroid with a collector tap at 6 turns from the supply end and 6 turn link winding over the toroids collector end.
L13 A conventional audio driver transformer as used to drive the push-pull audio output stage in miniature broadcast receivers.
L14 Conventional broadcast i.f. transformer as used in miniature transistor receivers.
RFC 2·5 mH chokes or 40 turns, 30 s.w.g. enamelled copper wire wound on SEI toroid type MM623.

it should be found possible to reduce the v.f.o. component of the output considerably. Alternatively the adjustment can be made for a minimum indication in the collector current of the output stage, but only in conjunction with the carrier balance control. The balance of the mixer consisting of TR12 (a and b) is most important as the *Q* of tuned circuits L15 and L12 is not great enough to reject the v.f.o. frequency. At this point in the alignment the carrier can be further reduced by careful adjustment both of the 100 ohm potentiometer P1 and the 8-30 pF Philips trimmer for a minimum in the residual r.f. voltage reading on the base of TR16. If increasing the 8-30 pF trimmer capacitor makes the carrier leakage worse, the trimmer should be connected across the other diode to ground, where a carrier balance should be obtained.

The alignment of the linear amplifier is much simplified by the use of relatively wideband toroids. L7 should be resonated to the mid-band frequency of 3·75 MHz. The bandwidth of L15 and L12 will be found to be very broad and it may be difficult to peak them, but as long as they are resonant within the frequency band of 3·7-3·8 MHz the overall response will be found to be reasonably flat. If a TV set is available then L11 and trim capacitor should be adjusted until any TVI on the local BBC frequency is removed.

It will be noted that the output r.f. voltage is 60 volts peak to peak when measured with an oscilloscope and only 30 volts peak to peak when measured using the r.f. probe and valve voltmeter. This is due to the extremely poor h.t. regulation, as explained earlier, which reduces the output considerably when the transceiver is driven with a continuous whistle. If speech is used for the measurement then the oscilloscope gives a peak to peak in excess of 60 volts but the valve voltmeter will show a lower reading as it is cali-

brated for r.m.s. values when used with a sine wave.

$$\text{The p.e.p. output power (peak envelope power)} = \frac{(\text{r.m.s. voltage})^2}{2R}$$

$$\frac{22^2}{47 \text{ ohms}} = \frac{470}{47} = 10 \text{ watts}$$

Components

All semiconductors can be supplied by LST Components Ltd [Ref. 4], including the alternative to the 2N2876 r.f. output device type BD123 at 15s. 3d. each. The only other expensive semiconductor is the 3N125 FET mixer at 49s. 6d. The author has considered substituting an RCA 3N141 in its place and at the time of writing was awaiting its delivery. The coil formers used for L1 and L2 can be obtained from Home Radio (Mitcham) Ltd., as can the Brush Clevite filters. The toroids used in this design will be found listed in Electronique's Catalogue.

Many readers may have noticed that no fuses are shown on the circuit diagram. The writer's unit was very short of room and as the only fuse holders available were rather large they have been omitted. Any constructor who considers fuses necessary should include a 1A fuse in series with the main supply line. No main on/off switch was used, but once again the constructor could include a double pole switch in series with the main input if he wishes.

Results

The unit was first and foremost intended to be a small briefcase portable and the overall dimensions of 3½ in. high, 7½ in. wide and 9 in. deep easily meet this requirement. The weight is 7 lb. The unit has shown itself to be reliable for the last six months, during which time it has given service from a number of locations around the country. It was used with most surprising results from a holiday location at Langdale in the Lake District. The aerial was an 80m dipole with a maximum height of 12 ft. The range was dependent upon the time of day and varied from 10 miles to 300 miles, but the climax to this operation from the Lake District was a report from New Zealand of 4/4 from ZL2BCG early on the morning of 24 September, which has been confirmed by QSL card.

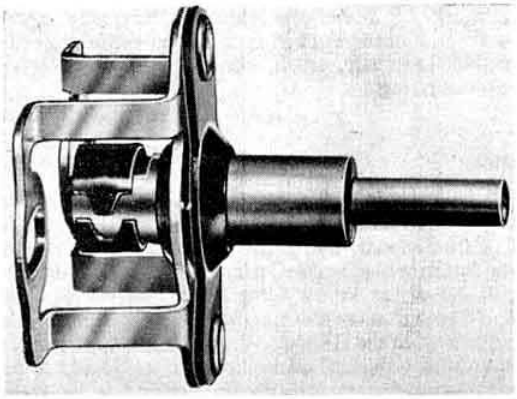
References

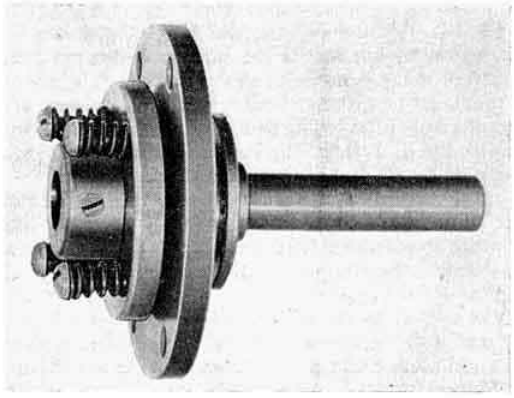
[1] *RCA Silicon Power Circuits Manual*, page 294.

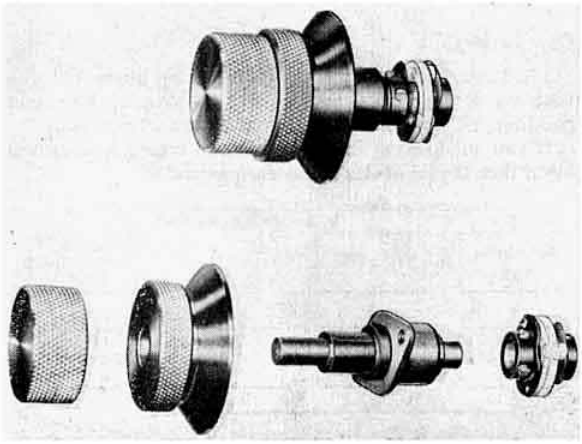
[2] Motorola Si High Frequency Transistor 2N3296 DS5072. Page 4.
or
Motorola Si High Frequency Transistor 2N3297 DS5073. Page 4.

[3] The *Amateur Radio Handbook*, RSGB, page 459.

[4] LST Components, 23 New Road, Brentwood, Essex.







In an effort to combat the growing problem of fitting controls to radios and panels of ever-decreasing surface area, Jackson Bros. Ltd. of Kingsway, Waddon, Croydon, Surrey, are producing a ball drive catalogue no. 5690 (top left) condensed to overall dimensions of 0·98 in. by 1·18 in. long. Its reduction is ratio 4½ : 1, and the construction is quite capable of coping with a component possessing a torque of 10 oz. in. The spindle diam. is 0·125 in. The mounting is designed to couple it to a solid dielectric capacitor, but no doubt there are several possible ways of using it in conjunction with more sophisticated types. The second illustration is a new 6 : 1 ball drive type 5620 exhibiting an unusual feature: the output torque is continuously adjustable within the limits of 20 and 60 oz. in. The overall diameter is 1 in., and a four-hole panel mounting is provided. The shaft spindle and socket are standard ¼ in. diam.

According to the literature supplied to us, the drive type D in the lower illustration is designed for manufacturers of professional equipment. This, of course, is reflected in the price of 29s., but it will buy a 4½ : 1 epicyclic drive unit, fitted with two satin anodized aluminium knobs, one with a skirt 1¼ in. diam. coupled direct to the output shaft and a 1 in. diam. matching type fitted to the reduction shaft. A ¾ in. flexible coupler is included with the drive unit.

EQUIPMENT REVIEW

By R. F. STEVENS, G2BVN

THE ETM-2 ELECTRONIC KEYER

THIS electronic keyer is a completely transistorized, self-contained unit made by M. Samson and Company of Trier, West Germany, and available in the United Kingdom from Spacemark Limited, 14 Piccadilly, Manchester 1.

The brief specification of the keyer is:

Nine silicon planar transistors and seven diodes.

Power requirements: four standard 1·5V batteries.

The keying output is a keyed line to earth.

Sidetone output is at 800 Hz to feed high impedance headphones or for connection to the a.f. amplifier of a receiver.

Controls: on-off switch, speedrange switch, tune-operate switch, speed control and dot-to-space ratio control.

Speed range is 10 to 60 words per minute.

Net weight 1 lb.

Size 4 in. wide × 2 in. high × 6 in. deep.

Price £21.

The advantages of the ETM-2 keyer are: its compactness, without the need for an external power supply, the use of a sealed dry reed relay as the switching element, and its suitability for use with any keying system, including grid-block.

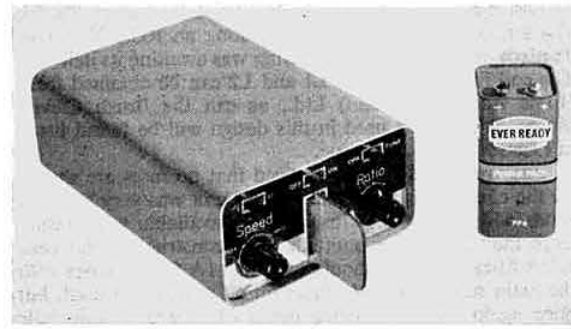
Comparison with other Keyers

To obtain a comparison between the ETM-2 and the Japanese keyer DA-1 which is extensively available in the United Kingdom market at around £16 10s., one of the latter units was borrowed. The DA-1 is a larger unit which takes up some 60 sq. in. of table space compared with 24 sq. in. of the ETM-2. Additionally, the switching element is a noisy relay which all but masks the sidetone from the built-in speaker. The DA-1 needs a connection to the a.c. mains or the provision of external batteries. In the opinion of the writer the feel of the keying paddle of the ETM-2 was superior to the DA-1. It should be mentioned that the tension and the gap on the ETM-2 are fully adjustable.

To many operators the price will seem prohibitive but to put this in perspective let us consider what other similar keyers are obtainable at the present time. The DA-1, already mentioned, is the cheapest on the market at £16 10s. The *Heathkit HD10* keyer sells at £30 12s. assembled although you can save £7 by doing the construction work. This unit uses transistor switching, a good point, but is physically larger and needs either external batteries or a mains supply. The *Hallicrafters HA-1* keyer, which is still a valve operated device as far as the writer is aware, retails in the United Kingdom at around £40. Lastly, there is the *Waters Codax* keyer which uses a reed relay and is self powered, and after devaluation sells at £48. This keyer has a high reputation, in common with all Waters equipment, but few United Kingdom operators would even consider a keyer at this price.

Batteries

The manufacturers recommend the *Ever Ready* mercury cells type ZM9 but if the operator is willing to forgo the advantages of this type then there is no reason why ordinary penlite cells should not be used. The keyer operated satisfactorily on 4½ volts and the average life of ordinary batteries, assuming a fair amount of use, should be at least three months. When the keyer was first received from Spacemark Limited, the possibility of incorrect battery polarity was mentioned as the circuit does not incorporate any protective diodes. Information was received that incorrect connection would not damage the unit there being only a small leakage current. Still somewhat hesitant to apply the crucial test the writer eventually connected the batteries incorrectly, operated the keyer, and then reverting to correct connection the unit functioned perfectly. On this showing the keyer deserves an idiot-proof rating.



The ETM-2 keyer with a PP6 battery for comparison.

Operation

In use, the keyer was convenient and did not skid on the operating table (which is surfaced with perspex sheet). The use of silicon planar transistors ensures consistency of switching action in high ambient temperatures, a fault noticeable with the earlier keyers using germanium transistors. The silent dry reed relay ensuring noiseless operations, is a major advantage of the ETM-2. When connecting the keyer to the transmitter, shielded cable should be used and a good earth provided to prevent the appearance of r.f. in the transistor circuitry.

Conclusion

The keyer comes complete with batteries, plugs (for sidetone and keying jacks) and instruction manual. The foam padding in a cardboard case should ensure safe transit.

If you are looking for a reliable and compact electronic keyer then the ETM-2 is highly recommended.

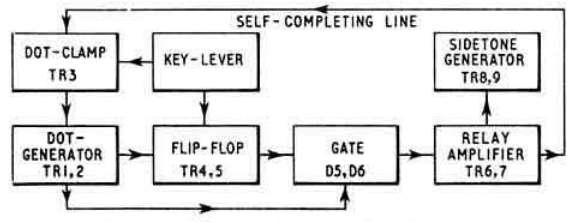


Fig. 1. The block diagram of the keyer.

Concerning a Case of TVI

THE station of Noel Hall, G3DRF, is located in the Wiltshire village of Corston, near Malmesbury. In so far as TV reception is concerned the village is in a fringe area with little more than 100 μV from any of the programmes.

Inevitably the activities of G3DRF on the h.f. bands caused interference to the TV viewing of several of his neighbours. The GPO South West Division Radio Interference Branch were called in and carried out a great deal of work and investigation; the amateur was told that his equipment was functioning correctly and free from any significant spurious or harmonic emissions. Despite the fitting of high pass filters the interference proved obstinate and a group of the neighbours affected began to think that other means than the normal GPO investigation might bring a speedier solution to their problems.

Three complainants jointly consulted a solicitor and instructed him to write to G3DRF demanding an abatement of the nuisance failing which legal action would be taken. After some correspondence with the solicitors the matter was referred by them to the GPO Legal Department and thereafter this approach was abandoned.

The next line of attack was that one of the complainants contacted his local MP, Mr Daniel Awdrey, as a result of which a written reply was made by the Postmaster General, the substance of which was that tests on Mr Hall's transmitter had shown that it was operating within the strict technical requirements laid down and with the correct frequencies and power. Further, the basic cause was the inability of the TV sets to reject unwanted interference. At the same time the complainants presented a petition to the local Parish Council.

The story had by now reached the ears of the Press and cuttings from several newspapers were sent to the Society's Public Relations Officer who wrote to the papers concerned placing on record the attitude and policy of the RSGB in the matter. This letter triggered off one of the complainants, a Mr W. J. Denly, who sent a letter to the Press offering to make a donation of £20 to the National Institute for the Blind if the RSGB could prove that a satisfactory TV picture would be obtained whilst G3DRF was transmitting.

After a rapid consultation with the Society's GPO Liaison and TVI/BCI Committee, it was decided that the offer made by Mr Margolis, G3NMR, and his wife to travel down to Corston on Saturday, 17 February to take up the challenge should be accepted. Mr Jack Etherington, G5UG, had agreed to attend on behalf of the Society's Council, and Laurie Margolis, G3UML, was a member of the investigating team. Five representatives of the Press had been detailed by their papers to follow up the story and act as independent referees.

This then was the situation at 11 a.m. on the Saturday morning when the various parties concerned met in the village. Mr Denly was visited and agreed that the tests should go ahead.

To cut the story short it is sufficient to say that after a great deal of consultation, passing of instructions by walkie-talkie, not to mention tests with filters of every shape and size, a completely interference-free picture was shown to Mr Denly on his own set and aerial. It emerged, however, that the interference was not the only complaint but that the quad aerial used by G3DRF had not been seen as a thing of beauty by the viewers. Its disappearance due to gale damage coincided with a great reduction in TVI, although it was immediately replaced by a Yagi array which, however, is hardly visible to those concerned.

Finally all parties assembled in Mr Hall's house and after explanations had been offered it was agreed that as a gesture of goodwill G3DRF would not re-erect his quad and that in return the viewers would, in future, co-operate with the Post Office and also withdraw the petition lodged with the Parish Council. It was pointed out, and agreed by everybody, that no better way exists of clearing this type of problem, than prompt full co-operation with the amateur concerned, albeit a great need exists to explain to the viewing public the various aspects of the TVI situation.

One hopes that the prompt action of the Society in this case will result in happier relations for all in this small village; at least a new start has been made with a handshake all round. Mr Denly honourably promised that the National Institute for the Blind would get their £20 and expressed the wish that the RSGB could have intervened earlier. G3DRF very generously forgoes his quad but seems more than happy that all is now quiet on the Corston front.

The Society would like to take this opportunity of expressing their thanks to all who gave their time to help in this matter, and particularly to Mr and Mrs Margolis who travelled a long distance, at short notice, to take up the challenge made to the Society.

WELCOME TO LONDON PROGRAMME

The Welcome to London Programme of the Radio Society of Great Britain operates to welcome overseas radio amateurs. They are invited, on arrival in London, to call any of the following numbers, so that suitable arrangements for their reception can be made: 550.0882, 205.1443, LAB.5733, 204.2520, SM8.5866 or, on arrival by ship at Southampton, Newport (Isle of Wight) 2050.

Calls made direct to RSGB Headquarters for the Programme will be re-routed to one of these numbers. Arrangements can be made for visitors to meet British radio amateurs. Assistance with shopping, advice on restaurants, sightseeing, theatres, travel, emergency medical or legal aid—all come within the scope of the Programme, which is staffed entirely by volunteers. We regret that no responsibility can be accepted for booking hotel accommodation and prospective tourists are strongly advised not to consider arriving in London unless they have a firm hotel booking confirmed by letter.

It would be mutually helpful if visitors were to write beforehand to RSGB, introducing themselves and explaining their requirements. No charge is made for the use of the Programme.

All information from the Public Relations Officer, Sylvia Margolis, 95 Collinwood Gardens, Clayhall, Ilford, Essex, England.

TECHNICAL TOPICS

By PAT HAWKER, G3VA

TWENTY years is a sizeable chunk of time by most standards—and it came as quite a shock to see the spate of articles commemorating the 20th anniversary of the transistor—confirmed experimentally during December 1947 but not announced publicly until June 1948. Even more striking is the realization that after years of rapidly increasing production of these devices, what may well prove to be the all-time peak may now have passed. In 1967, there were in fact substantially fewer discrete transistors manufactured than the year before.

For transistors, as such, are already being pushed firmly aside by the up-and-coming semiconductor integrated circuits. But just as the thermionic valve has stayed around much longer than might have seemed likely a few years back, so one suspects the individual transistor will stay with us a good while yet; certainly in the field of devices handling some power.

And there is little doubt that it has taken these 20 years to learn how to make the most effective use of the semi-conductor family in communications equipment, and there may yet be further substantial advances in such practical application.

Only recently, for instance, I heard one of the country's most influential communications engineers putting forward much the same view as my recent rather rash statement that transistorized h.f. receivers have still some leeway to make up on good valve designs—though hazarding the opinion that this will not be the case for long.

So if in numbers alone, transistors may now be past their prime, there is every hope that in quality the great days are yet to come.

On the subject of anniversaries, I may be permitted to note that this month *TT*—which first appeared in April, 1958—now enters its second decade: a youngster compared with the transistor perhaps, though a fair stint for a column. My grateful thanks to many members who, over the years, have contributed an increasing proportion of the total, and, of course, to the overseas journals in which so many of the ideas have originally appeared.

The Paramp Up-converter for H.F. Receivers

It had not been my intention to refer again quite so soon to the paramp up-converter technique for h.f. receiver front-ends, but a detailed letter from Walter Schreuer, K1YZW/G3DCU—including a mass of practical information on their design that I have not seen elsewhere—just cannot be held over. For it would seem likely that Walter Schreuer, while at National, was probably the first person to realize and demonstrate the use of a parametric device for the front-end of a tunable h.f. receiver (US patent No. 3,063,011 of 1962 supports this view).

Several points emerge from this most informative letter. In the first place the idea is not so new as I had imagined (the patent application was filed in 1959!). Secondly, there are practical limitations which restrict its usefulness in so far as amateur receivers are concerned: K1YZW/G3DCU puts it very fairly that "a parametric converter can be made better than needed and the real limitation is the 'purity' of signals. This being the case, other recent devices are almost as useful, especially for amateur receivers."

In view of the considerable interest in this technique, I am quoting at length from the letter. Walter Schreuer writes:

"The basic idea is to obtain an h.f. receiver which is virtually free from the usually disastrous effects of strong off-channel interfering signals, such as blocking, cross-modulation etc. If the desired signal together with the strong interference is converted linearly (in amplitude) to a fixed frequency, the latter can then be filtered out. A conventional (or time variable resistance) mixer would require excessive local oscillator power which must always be large compared to the signal plus interference power, and is quite noisy. The paramp converter, consisting of a varying capacitor, needs only volt-amps, not watts, and being reactive, is almost noiseless.

"The non-inverting 'up-converter' is the only circuit configuration which is stable with changing source (aerial) impedance and also provides some gain. The latter will be larger the higher the output frequency or 'first i.f.' All up-converting receivers suffer from the disadvantage of strong signals at submultiples of the 1st i.f. causing spurious responses. This is particularly serious in a receiver with a very large linear (or dynamic) range, so that a very high 1st i.f. is again desirable. Another factor in its favour is its help in minimizing local oscillator radiation from the aerial. Against the high i.f. is the need for the highly selective (i.e. crystal) filter with low insertion loss and low noise ampli-

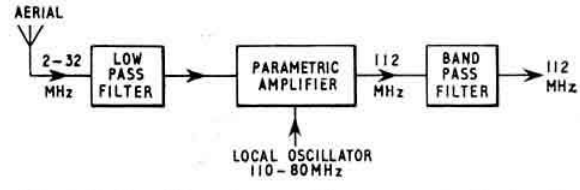


Fig. 1. Basic outline of parametric up-converter front end.

fication. As a compromise, in the first receiver design 112 MHz was chosen, being over three times the highest signal frequency of 30 MHz. Overtone crystals of sufficient *Q* were available for filter fabrication. Since then at least two crystal filter manufacturers have introduced v.h.f. filters at this frequency, so it seems that 112 MHz has become a standard of sorts!

" I have obtained a useful linear signal input range of about 136dB. In more exact terms, the minimum useful input (10dB above noise) was 0·35 μV e.m.f. behind 50 ohms, with a detector bandwidth of 3 kHz and maximum input of 2 volts which caused a 1dB departure from linearity. The minimum level represents a noise figure of 6dB, which is quite respectable. In this test an attenuator was used behind the converter so as to keep its output constant and thereby avoiding overloading the subsequent circuitry. In a complete receiver, a.g.c. would normally be used for this purpose. Theoretically, there is no limit to the dynamic range which can be obtained with a single signal.

" However the real value of large dynamic range is in combating the effects of large amplitude off-channel interference, and here we run into a severe limitation which is the noise power associated with the local oscillator. Consider the following situation: desired signal (12·0 MHz) 1 μV; interfering signal (11·9 MHz) 130dB above 1 μV; local oscillator 100 MHz; 1st i.f. 112 MHz; final bandwidth 3 kHz.

" The noise power, in a 3 kHz band, at 100·1 MHz due to the local oscillator will be about 130dB below its peak power; this can be regarded as good performance (see textbook ' Vacuum Tube Oscillators ' by Edson). This noise will beat with the interfering signal to produce a noise output at 112 MHz of the same amplitude as the desired i.f. output. Thus in order to ensure that a 20dB s/n ratio is retained, the maximum interfering signal 100 kHz from the desired signal cannot exceed the wanted signal amplitude by more than 110dB (130–20dB). At 50 kHz separation this becomes 104dB; for 25 kHz 98dB etc.

" So far we have assumed a perfect (noiseless) interfering signal. In laboratory tests this has been simulated by a high level crystal oscillator, and figures very close to those given above have been obtained. But in practice, the situation will be worse by at least 3dB (the case when the local oscillator and the interfering signal are equally ' noisy '). From the noise point of view the high first i.f. is a disadvantage, since this makes for high local oscillator frequencies. In the example given, the local oscillator frequency is almost three times higher than the highest signal frequency, thereby ' penalizing ' the receiver by 10dB at 30 MHz and more at lower signal frequencies."

Practical Details

" The parametric up-converter may be considered as a cross between a balanced modulator and a coupled pair of circuits; see Fig. 2. For proper match and maximum power gain, the total capacitance swing (varactors are considered to be in parallel) should be:

$$\triangle C = \sqrt{\left(\frac{C1 \cdot C2}{Q1 \cdot Q2}\right)}$$

" Here *Q1* is the *Q* of the signal circuit when loaded by the aerial only, and *Q2* that of the i.f. circuit loaded by the filter and subsequent amplifier. C1 and C2 are the corresponding tuning capacitances. For simplicity, I have omitted blocking capacitors and bias feed resistors for the varactors, each of which must be reverse biased. If the circuit were designed for approximate match at all frequencies, the gain at the low end would be excessive. However, by matching near the high end of the tuning range, purposely mis-matching at lower frequencies and using capacitive tuning, fairly constant gain can be obtained. The varactors should have a large inverse voltage rating (100 is not unusual) and be subjected to a peak to peak swing almost as large. The larger these voltages, the stronger the signal which can be handled linearly.

" Because of the limitation represented by the ' purity ' of signals, other recent devices are almost as useful, especially for amateur receivers. The latter have a considerable advantage in not being continuous coverage, so that a first i.f. of 9 or 35 MHz etc may be used. A combination of such devices as the Comdel HDR10 amplifier (using a FET device) with the CM100 double balanced mixer can give a noise figure of less than 10dB, which corresponds to 0·25 μV for 10dB s+n/n sensitivity, while an interfering off-channel signal of 0·2-volt (applied) will have no effect except cause a noise rise when its frequency displacement is insufficient."

Walter Schreuer included some leaflets on the " building block " high dynamic range amplifier Model HDR10 and the double-balanced mixers produced by Comdel Inc of which he was a co-founder. I feel that his letter has cleared up many questions not only on the parametric up-converter but also on some aspects of oscillator " purity " and other matters of importance to all attempting to design receivers for modern conditions. While the outlook for the paramp approach, at least for amateur receivers, may be less sanguine than I had hoped, I am sure that many will be grateful to

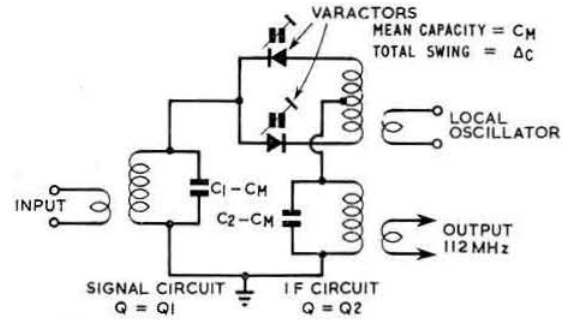


Fig. 2. Simplified circuit of the parametric mixer.

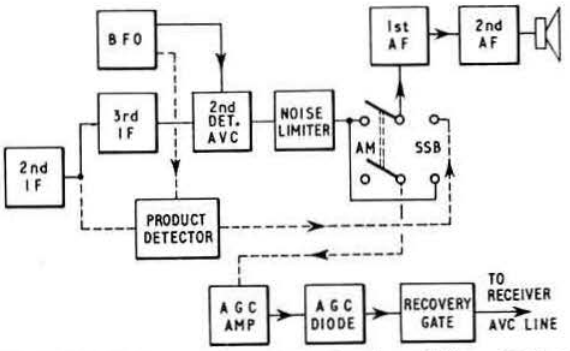


Fig. 3. Block diagram of receiver showing additions (dotted lines) of product detector and a.g.c. system.

Walter for putting the whole situation so well into perspective, and coming up with the " missing " information.

Redifon R499 Receiver

Before leaving the subject of h.f. front-ends, a further sidelight on the question of dynamic range can be found in another recently announced commercial fixed-channel receiver. This is the new all bipolar transistor Redifon R499 which I described recently in *Electronics Weekly* (21 February). This achieves an unusually high degree of protection against r.f. input and also wide dynamic range. While precise details of the front-end have not been announced, my guess was that the single conversion (1·4 MHz i.f.) receiver uses a double-balanced diode mixer with hot-carrier diodes, has bipolar r.f. amplifier stages but with transistors of considerably greater power rating than the usual small signal devices, and has an a.g.c. controlled variable attenuator between aerial and first r.f. This latter seems likely to be a *pin*-diode system such as that described in *TT* (March, 1967). The set also features a double distributed a.g.c. system allowing it to cope with very strong signals.

MOS FET Adaptions

The modification of basically good but now rather dated communications receivers for improved s.s.b. performance continues to be a subject of topical concern. Some useful looking ideas appear in *RCA Ham Tips* (October, 1967) where W. M. Stobbe, W3KDT gives detailed information on the use of 3N128 MOS FETs as (*a*) a product detector; and (*b*) as an a.g.c. recovery gate in a fast attack and " hang " audio-derived a.g.c. system. He has used these circuits to modify his CR91 (I think this is the set usually known here as the AR88LF) as well as an AR88, but he points out that they are applicable to most general purpose receivers.

Fig. 4 shows the circuit diagram of the product detector which is roughly on the lines of one of the first FET circuits given in *TT* (September, 1965). The FET is particularly useful in this application since it requires considerably less b.f.o. voltage (only a few millivolts) than for most other forms of product detector.

A separate i.f. transformer (T1) is used to couple the s.s.b. i.f. signal from the grid of the final (third) i.f. amplifier valve to the FET. C1 minimizes capacitive loading on the circuit being sampled and also permits tuning of the primary winding of the transformer. C2 is a twisted-wire " gimmick " capacitor of about 1 pF to couple b.f.o. voltage. Note that

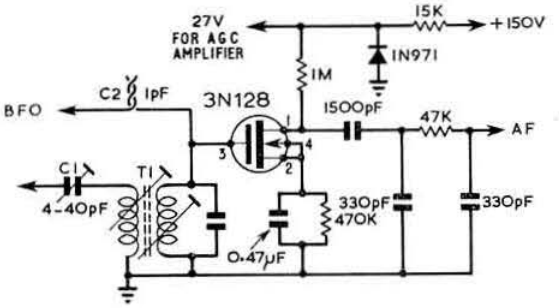


Fig. 4. Circuit diagram of product detector.

excessive b.f.o. voltage blocks the signal and reduces output.

W3KDT gives the following notes: " As the output of the product detector is switched into the receiver audio-frequency volume control, the output of the conventional a.m. detector is disconnected from the circuit. The b.f.o. should be " on " and a.v.c. switched to " manual." Gain is then controlled by the r.f. gain control. If the audio a.g.c. system is used, this voltage is connected into the receiver a.v.c. bus line. Audio volume is then set to about three-quarters of full " on." and sensitivity controlled by the r.f. gain control. The s.s.b. signal is tuned for maximum intelligibility by means of the main tuning control and the b.f.o. pitch control.

Audio-derived A.G.C. System

W3KDT points out that operation on s.s.b. is greatly enhanced by the use of the a.g.c. system in Fig. 5. This comprises a two-stage audio amplifier using *n-p-n* transistors; an a.g.c. diode; and a MOS FET for the recovery gate. Proper operation depends on a completely isolated a.v.c. line in the receiver with infinite resistance to ground, and use of the MOST in conjunction with a time-constant circuit to control recovery to the maximum-gain bias condition.

The input signal to the amplifier is taken from the output of the receiver noise limiter to remove noise peaks which might initiate a.g.c. Output of the a.g.c. diode is applied to the time-constant network R11 and C6 which controls the decay time. The MOST is connected across the a.g.c. output line, and is non-conductive when the signal is applied. Conduction threshold is determined by the receiver's r.f. gain control, isolated from the a.g.c. line, by means of CR3. The time-constant network discharges until gate voltage on the FET reaches a point allowing conduction, so that decay

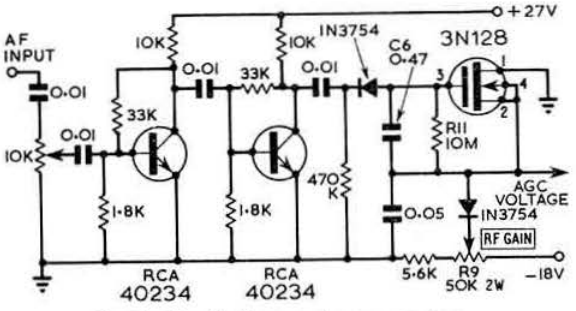


Fig. 5. Circuit diagram of a.g.c. system.

is speeded up until another input signal resets the time constant. Value of C6 may be changed to alter the decay time, or a switch used to select various time constants if required.

It should be noted that a high degree of isolation of the receiver's a.g.c. line to earth is important to correct operation, and that even a resistance of some megohms may affect the " hang " function. Maximum-gain threshold is adjusted by the receiver r.f. gain; minimum gain limiting by R10; and hang time constant by C6/R11 and is most easily changed by means of altering C6.

The Vackar V.F.O. Again

W. K. Murphy has kindly sent along an article " The Vackar V.F.O., a design to try " by Gary Blake Jordan which appeared recently in *The Electronic Engineer*. This is a four-page design feature on the single-transistor Vackar, and makes acknowledgement to the various references to this form of transistor oscillator that appeared following the first known publication in *TT*, July 1966 of a transistor Vackar oscillator developed by L. Williams, BRS25769.

The American author discusses the points made by BRS25769, G3BIK, G3KOV and yours truly, and claims that he began looking at transistorized Vackars as early as March 1965. Nevertheless it may be noted that his suggested circuit very closely resembles that of BRS25769 except that it is moved a decade higher in frequency to 30 MHz with corresponding changes in component values! At least he agrees on the merits of the Vackar, and to check his belief that in fact it is an " ideal " circuit, Jordan built up a 10-watt experimental 10m transmitter (the exciter stages of which are shown in Fig. 6) running directly from the 26·86 to 34·70 MHz v.f.o., and provides performance figures as well as a fairly detailed analysis of his design approach.

There is a good deal of interesting information in the *EE* article (though there are one or two points about which I have some ill-defined reservations). Altogether he puts in a strong plug for the Vackar in terms of stability, tuning range and constancy of output.

To quote Jordan: " There are three distinct performance criteria which make the basic Vackar very desirable. First, it can tune over a frequency range of at least 2·5 : 1. Second, the output over that range can be made absolutely constant. Finally, it has the greatest inherent stability of any known configuration, except for a design with independent external load feedback. Any one of these advantages would be sufficient to warrant use of the circuit, but all three taken together make it ideal."

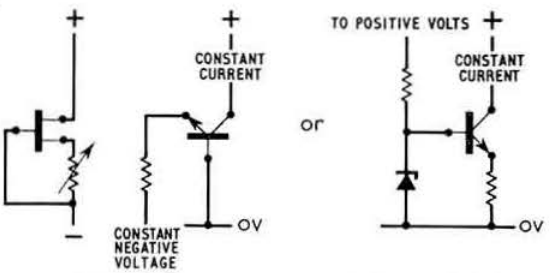


Fig. 7. G3KOX'S suggestion on constant-current devices.

Some of the performance figures are of interest. A temperature test over 20 to 100° F showed a linear 1 kHz per degree positive drift. Compensation with N750 capacitors at C1 and C2 can yield 10 Hz/° it is suggested.

Stability is reported as excellent under severe chassis deforming, in contrast to the usual result. Negligible variation in output over a temperature range of 80° F. Loaded distortion less than 3 per cent deviation from pure sinewave. Output changes less than 1·5dB with 30 per cent frequency change.

Jordan concludes: " It is very important to note that with this circuit, the stability is completely independent of the LC ratio. Isn't this a factor that every designer has looked for for years in the design of better v.f.o's? "

W. K. Murphy comments that a Vackar oscillator might be good in the simple synchrodyne form of receiver.

More on Constant-Current Diodes

N. J. Waite, G3KOX comments on the notes (*TT*, January) on constant-current diodes. He points out that the resistor shown in the FET drain circuit is not necessary unless to protect the device or to form a voltage drop; but that if a variable resistor is included in the source circuit the constant current can be adjusted to any value of current up to the device's I_{DSS}. Another point he makes is that if the emitter current of a bipolar transistor is controlled, the collector current is bound to be almost constant for the range of collector voltage from knee to breakdown, but that in this case, unlike that of the FET, a separate supply is needed.

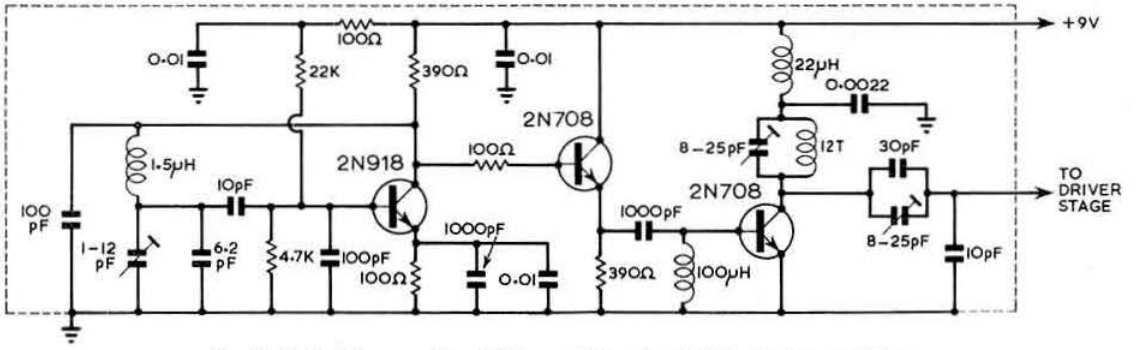


Fig. 6. Part of the experimental transmitter using 28 MHz Vackar oscillator.

AMATEUR RADIO ARRAYS

THE NEW 'Parabeam'

14 ELEMENT YAGI

Parabeam 14 element Yagi for 2 Metres.

The new Parabeam with increased gain—over 15dB—and broader bandwidth.

Overall dimensions:
Length 234" 595cm. Width 41" 104cm.

Horizontal beamwidth between half power points: 24°. CAT. NO. 2/14P.

AMATEUR RADIO ARRAYS PRICE INCREASES

For the past few years we have been able to maintain prices throughout the range of our Amateur Aerials, apart from one or two slight changes. In this length of time however, we have had to sustain a number of cost rises in our raw materials, which we have been able to partially offset by greater manufacturing efficiency.

With devaluation however, in November last, there was a sharp rise in Aluminium, since then, other materials have also been substantially increased in price. It is regretted therefore, that as we can no longer absorb these increases, we have with great reluctance been forced to increase all our prices by 10% as from January 1st, 1968.

Aerials Band	Cat. No.	Description	dB gain over Dipole	Price
10 Meter	10/4Y	4 Element array with twin crossbar	7.0	19 16 0
4 Meter	4/3Y	3 Element folded dipole yagi with 1¼" boom	5.7	2 17 6
	4/4Y	4 Element folded dipole yagi with 1¼" boom	7.0	3 18 0
	4/6Y	6 Element folded dipole yagi with 1¾"/2" boom	8.7	8 14 6
	4/8Y	8 Element folded dipole yagi with 1¾"/2" boom	10.0	12 13 0
	4/10Y	10 Element folded dipole yagi with 1¾"/2" boom	11.2	17 8 0
	PM4	Coaxial harness to match and phase two 4m aerials		1 13 0
2 Meter	2/4Y	4 Element folded dipole yagi with 1" dia. boom	7.0	1 18 0
	2/6Y	6 Element folded dipole yagi with 1" dia. boom	8.7	2 8 6
	2/8Y	8 Element folded dipole yagi with 1" dia. boom	10.0	3 0 6
	2/10Y	10 Element "Long Yagi" with 1¼" boom and braces	13.2	7 2 0
	2/14P	14 Element "Parabeam" with 1¼" boom and braces	15.5	11 11 0
	2/8	Double 4 slot fed yagis with 1" dia. booms	10.0	3 17 0
	2/12	Double 6 slot fed yagis with 1" dia. booms	11.7	5 4 6
	2/16	Double 8 slot fed yagis with 1" dia. booms	12.6	6 12 0
	2/HO	"Halo" mobile aerial, head only.		16 6
	2/HM	"Halo" mobile aerial with ½" dia. mast		1 1 6
	PM2	Coaxial harness to match and phase two 2M aerials		1 1 6
70Cm.	70/16	Double 8 slot fed yagis with ½" dia. booms	12.6	3 18 6
	70/14Y	14 Element folded dipole yagi, multi reflector	16.0	5 2 6
	70/18P	18 Element Parabeam yagi with 1¼" boom	17.0	5 3 6
	PM70	Coaxial harness to match and phase two 70cm. aerials		16 6
Rotators	9528	Automatic Tenn-a liner complete		19 19 0
	9519	Compass Tenn-a liner complete		14 14 0
	9523	Rotator alignment bearing-up to 1¼" masts		3 17 6
	9525	Ball bearing guy ring-up to 1¼" masts		2 7 6

Prices and details of accessories, Chimney Lashings, Wall Brackets, Aluminium and Steel Masts, Tubing, Cable, etc, together with New Catalogue and Price List. Free on request.

TERMS: C.W.O. All prices include free delivery in U.K.

All aerials fitted with Universal Mast Clamp, Balun and Waterproof Connector Box and Aerials matched to 75 O.H.M. Feed impedance.

ROTHERSTHORPE CRESCENT, NORTHAMPTON, ENGLAND.

Telephone:. NORTHAMPTON 62147 (ONO4)

A Visit to the School of Signals, Blandford Camp, Dorset

The party visiting Blandford Camp School of Signals assembled outside the new teaching block. From left to right are: G4AR, General Manager, RSGB; C. E. Godsmark, of the Radio and Broadcasting Dept. of the GPO; G3TRP, Assistant Editor, Radio Communication; Lt. Col. H. P. Pargeter, who plays a valuable role in our fight to keep frequency allocations; G3GVV, newly co-opted Member of Council; Sir Evan Y. Nepean, BT, G5YN; G3IIR, Past President; G2YS, Vice-President; C. P. Pope, Secretary; G3TR, President 1968, G6JP, Member, Technical Committee; G4KD, Exhibition Organiser.

WE must admit to being not a little curious about an invitation extended to some of those in the hub of the workings of your Society to pay a visit to the headquarters of the Royal Signals, Blandford Camp. Through our distorted minds ran a few preconceived notions such as suspicion that it was to be proven that their Amateur Radio Society does not actually control the workings of the camp's signal handling, or perhaps enlistment! However, such was the reception and very amenable surroundings afforded by a newly constructed teaching block that one voice was actually heard to ask just how one should go about enrolling.

The camp is obviously justifiably proud of its modern new facilities, and it these which we were to be shown.

At 9 o'clock (sorry, 09.00 GMT), all were gathered at the entrance to platform 10, Waterloo (save the bearer of the tickets!), from where we were to travel in inevitably freezing conditions to Salisbury. A couple of waiting 15 cwt. mini buses ushered us over the 21 miles to Blandford Camp, unmistakably adorned with two rhombics and a TA33.

With coffee in hand, we had the chance to inspect some of the camp's history behind glass—a no. 9 set, for instance, being the last of the hand-made devices, immediately produced some reminiscent noises! A couple of dishes supported by racks of electronics was apparently the first pulse transmitter, but for some unfathomable reason was labelled WS 19!

Briefed with facts of the organization, rank and courses, we were free to inspect the facilities at the disposal of trainees. Morse training for instance, is provided by several booths equipped with headphones driven by a bank of eight Ferrograph tape recorders. The techniques are standard, students being acquainted with the rhythm before they have a chance to analyse the code. We were led through the message handling dept., which is completely functional although constructed for tuition. Here 5-digit message tapes are sorted and the d.c. signals routed to the systems control. It is at the latter stage where the five-unit teleprinter codes are converted into an 8-digit system where automatic error detection processes can be brought into use. An intriguing adjunct to this facility is that, should a received signal become distorted and misread, a special command signal interrupts any simultaneous out-going traffic, suitably coded so that the distant receiver responds by automatically causing the mis-read section of the message to be repeated.

Before being introduced to the next link in the chain, the transmitter rooms, we were given a further insight into the scope of the training, which includes intense instruction in voice procedures. Many amateurs might find this part of the course of considerable value!

Replete, we were given the opportunity of feasting eyes on the meat of the visit, the r.f. systems. In a vast air-conditioned room, which would do justice to any large computer installation, was found "teaching" machinery such as triple diversity Marconi receivers and transmitters—up to 1 kW—featuring "basic" facilities such as aerial cables through which is pumped dried air. Torture was taken a stage further in the transmitter "hall," where sat a Marconi MST 30 kW output self-tuning transmitter, backed up by two 1 kW DS13s and a couple of STC 2-3 kW transmitters. With the 30 kW transmitter comes a stability of 1 part in 10^8, derived from a frequency synthesizer, and all modulation applied before power is considered at all. In such installations, the 75-ohm output coax can be mistaken for scaffolding poles, and looking at the tank circuit no longer can any impression linger that plumbing is strictly for water or microwaves! The automatic tuning procedure is very rapid, the controls stepping and spinning under servo control in a far shorter time than manual methods could achieve.

Still drooling, the day was closed with a visit "home," to the Amateur Station, G4RS, which makes use of a KW2000A and SB101, although in pride of place is a complete Marconi DS11 transmitting-receiving station, with teleprinter, which was the result of a presentation. This station has, incidentally, been seen at our Radio Communications Exhibition.

It was difficult to leave without regard for the effort which is put in to ensure that students are carried through communications courses in the shortest possible time, but without sacrifice to reliability of the "end product." The surroundings are modern (and of some surprise, comfortable) and the equipment is very up-to-date. We were impressed.

The Cornishman

PART 2

SINCE the original article was published in the October 1967 issue of the RSGB BULLETIN, the author, Mr J. Taylor, G3OFN, has received more than 150 letters requesting assistance or containing comments on difficulties met by individual constructors. It is the purpose of the present article to correct omissions in the original and to make available information on further work that has been carried out by the author.

Corrections

References to page and figure numbers are those appearing in the October 1967 issue of the *Bulletin*.

Page 647, Fig. 6: the centre point of the left hand side of the bridge configuration of silicon diodes should be connected to earth.

Page 645, Fig. 2: the identification of V7 and V8 are reversed. V7 is the v.f.o. and V8 the v.f.o. amplifier.

Page 644, Fig. 2: the switch positions are reversed and 160m should appear at nine o'clock moving clockwise to 10m at three o'clock.

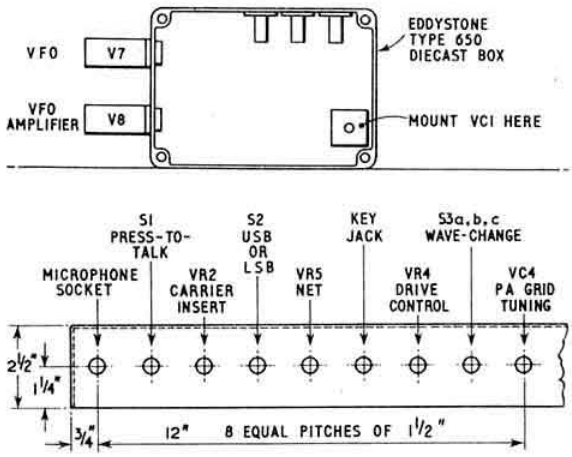


Fig. 1. The above diagrams show (a) the positioning of components on the die-cast box and (b) suggested drilling details for controls at the bottom of the front panel.

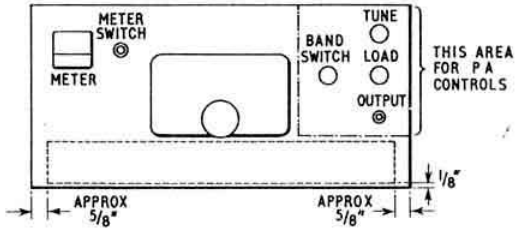


Fig. 4. After the v.f.o. tuning capacitor (VC1) has been fitted the v.f.o. box should be mounted so that the extension shaft from VC1 clears V5 and V6. The Eddystone dial should be mounted to mate with shaft. The layout can be seen on the upper photograph on Page 643 of the October issue of the *Bulletin*. Suggested positions for the p.a. controls and the meter are shown above.

Page 644, Fig. 2: the sideband selector switch should be annotated S2.

Page 648, components list: S1 and S2 are both of the toggle type.

Page 648, components list: add—

S5, 2 pole, 3 way, break before make, *Radiospares*.

VR6, 20 k to 100 k, 3 watt, wirewound, *Radiospares*.

Construction

To assist intending constructors three additional diagrams have been prepared which show details of the layout and positioning of components.

Modifications

In a small number of cases it has been found that there has been a lack of drive on 10m and occasionally on 15m also. Suggestions received that this fault may have been due to the method of constructing the coils has been disproved by experimental work carried out by the author. It

(Continued on page 236)

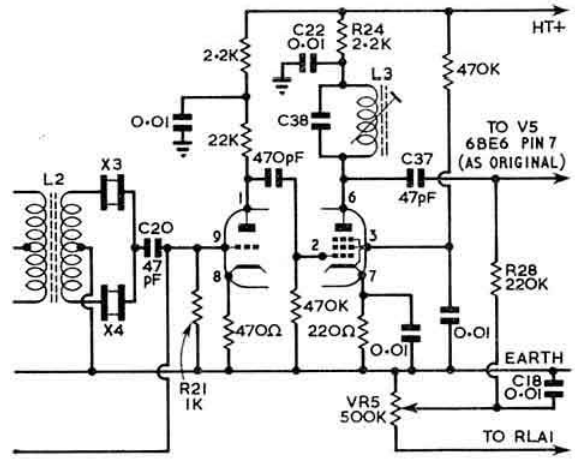


Fig. 2. The alterations required to convert the filter amplifier (V4) from an EF80 to an ECF82 (6U8) are shown. This modification will provide more drive than that given by the original circuit.

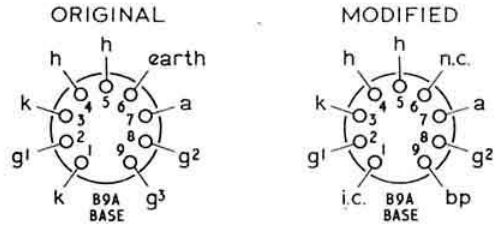


Fig. 3. The modifications necessary to convert the driver stage (V8) from an EF80 to a 6CH6 are shown. The strap from pin 1 to pin 3 should be removed and R43 and C26 connected to pin 3.

The 9L1HX Dual Band Converter for 2m and 70cm

By P. DODD, 9L1HX*

DURING earlier *OSCAR* experiments, I realized that I would benefit by having two converters, for 2m and 70cm, capable of good frequency setting accuracy when used with an ex-services receiver, such as the BC 348, on the low frequency range around 2 MHz. Furthermore, it would be even more satisfactory if they could be operated from the same crystal, to save as many stages as possible. A design was evolved, and this consists of a 432 MHz mixer with a 2m converter as first i.f., both sections using the same crystal multiplier chain. This means, of course, that the first i.f. can be used as a conventional 2m converter.

A crystal of 14333·33 kHz is multiplied by 10 to give a 143·3333 MHz local oscillator frequency for the 2m section. This 143·3333 MHz is then doubled for the 432 MHz mixer, to 286·6666 MHz.

The 432 MHz input is mixed with 286·6666 MHz to give a first i.f. of 145·333′ MHz. The first i.f. signal is then mixed with 143·3333 MHz and the second tunable i.f. would read 2 MHz for 432 MHz and 3 MHz for 433 MHz.

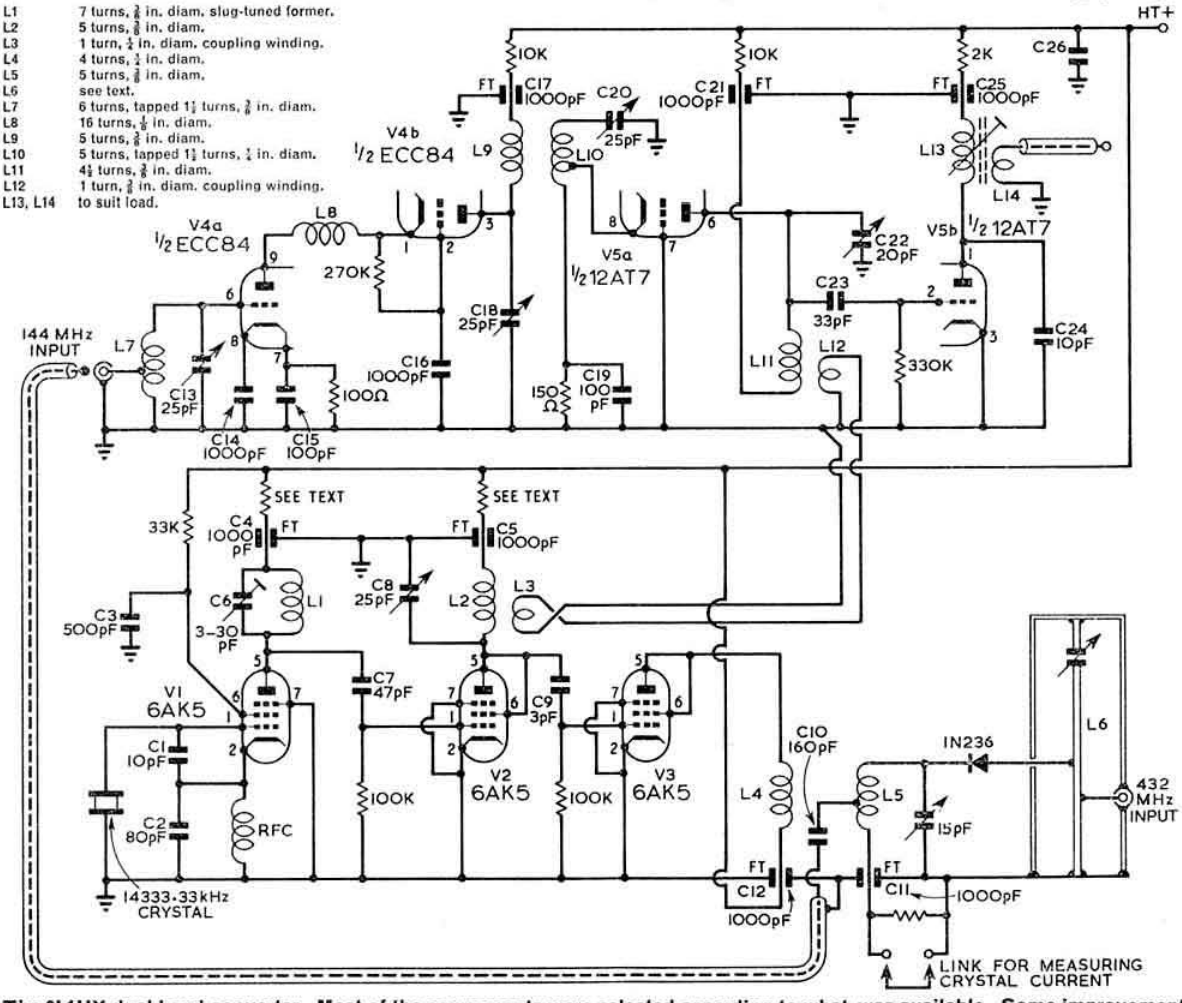
* c/o Sherbro Minerals Ltd., Private Mail Bag, Freetown, Sierra Leone, West Africa.

Construction

The design of this converter was dictated by parts (or

COIL TABLE

L1	7 turns, ⅜ in. diam. slug-tuned former.
L2	5 turns, ⅜ in. diam.
L3	1 turn, ½ in. diam. coupling winding.
L4	4 turns, ½ in. diam.
L5	5 turns, ⅜ in. diam.
L6	see text.
L7	6 turns, tapped 1¼ turns, ⅜ in. diam.
L8	16 turns, ⅛ in. diam.
L9	5 turns, ⅜ in. diam.
L10	5 turns, tapped 1¼ turns, ½ in. diam.
L11	4¼ turns, ⅜ in. diam.
L12	1 turn, ⅜ in. diam. coupling winding.
L13, L14	to suit load.



The 9L1HX dual band converter. Most of the components were selected according to what was available. Some improvement in performance would be possible if V4 were to be replaced with an ECC88 or E88CC. The anode resistors for V1 and V2 should be chosen to suit the h.t. voltage; 2 k ohms would be suitable for 250 volts, C26, 0.01μF.

lack of them) available and consequently is rather antiquated by present-day standards. However, it was decided to go ahead and build the converter and obtain some transistors for a low noise r.f. amplifier to go ahead of the 432 MHz mixer at a later date.

The converter is built into a tin box and all valvebases, screens and components to be earthed are soldered direct to the chassis.

Crystal Multiplier

As the object of the design is accurate readout, and the only crystal available was a B7G glass base type not cut for overtone use, this mode was avoided. A Pierce Colpitts electron coupled oscillator was tried and gave a very good output on the fifth harmonic but was subject to pulling when tuning up. The "hot cathode" Colpitts harmonic crystal oscillator was found to remain stable when the fifth harmonic anode tuned circuit was tuned through resonance. Although the effect of the parallel capacity on the crystal frequency is not known,† it should not be more than 20 Hz lower than the frequency indicated on the crystal. This is equivalent to 400 Hz at 400 MHz.

Because the first i.f. is so high the final local oscillator frequency is only 286·6666 MHz, and this is inductively coupled to the 432 MHz mixer i.f. output coil. The fact that the oscillator injection is done after the 432 MHz signal has passed through the crystal diode does not seem to affect the mixer performance.

As can be seen in the diagram the last doubler stage in the local oscillator chain is a 6AK5, strapped as a triode; a valve was used in this case because a diode was not available at the time. There is more than enough mixer diode current available, and is adjusted for optimum signal-to-noise ratio by adjusting the coupling of the two coils L4 and L5.

Design of the crystal multiplier circuit should allow for a fairly high local oscillator voltage at V2 anode so that the correct 145 MHz mixer grid current can be obtained with very loose coupling. This is necessary to reduce the loss of 145 MHz through the local oscillator tuned circuit, caused by having a very low second i.f., resulting from the local oscillator and mixer input tuned circuits being tuned nearly to the same frequency. A reasonably high V2 local oscillator voltage is also required to give a usable amount of diode current for 432 MHz if a crystal doubler is used.

† To be sure of a high readout accuracy it would be worthwhile obtaining a crystal with a known capacity loading for the frequency indicated, and adjusting C1 and C2, allowing for the valve input capacity, for the correct crystal loading.

432 MHz Mixer

The 432 MHz mixer consists of a ¼ wave tuned trough line. This was used because it is easy to tap and match, compared with a coil. The capacitor is made of a short strip of phosphor bronze, one end of which is soldered to the trough wall and the free end is arranged so that it can be pushed towards the other plate of the capacitor with a screw. As the earthy end of the capacitor is soldered direct to the trough it obviates the need to make a good r.f. connection through the screw to earth.

The inner line is made of 14 s.w.g. silver plated wire. The end opposite the capacitor is soldered direct to the end of the trough, a small hole being drilled first so that the 14 s.w.g. wire can be pushed through the trough wall. This enables the length of inner line and capacitor maximum to be set easily.

Performance

As this converter was made from junk box parts, the performance is not up to present day standards. The figures were taken, using a Motorola T 1034C (50 ohms) signal generator and measuring the output at the audio stage of the receiver with the b.f.o. switched on and the signal generator on c.w.

Frequency	Signal Input	Audio Output
145 MHz	0·1 μV	1·2V
	0·2 μV	2·2V
	0·3 μV	3·2V
432 MHz	0·1 μV	0·6V
	0·2 μV	0·68V
	0·3 μV	0·8V
	0·4 μV	0·95V

The noise under no signal conditions was 0·5V and the noise bandwidth about 5 kHz.

The Cornishman (Continued from page 234)

was thought that perhaps a ring diode balanced modulator might yield some advantage but here again no improvement over the original circuit was noted.

Two modifications that did produce some additional drive were the substitution of an ECF82(6U8) for the existing EF80 filter amplifier (this is V4 in Fig. 2 on Page 644), and the replacement of the existing EF80 driver amplifier (V6) by a 6CH6.

Two accompanying diagrams show the circuit alterations necessary to effect these changes. Obviously the alignment will have to be checked after the modifications have been carried out.

Components

The ferrite ring specified in the original design is now available from *Electroniques* (prop. STC), Edinburgh Way, Harlow, Essex, at a cost of 7s. 6d. plus postage.

Crystals apparently present difficulties to some builders and an alternative source of supply outside the UK is Jan Crystals of 2400 Crystal Drive, Fort Myers, Florida, 33901, USA. It is strongly suggested that before making any attempt to order intending purchasers should first send for a copy of the latest catalogue, enclosing at least two IRC for postage. Remittances to the USA must be by International Money Order as postal orders or UK cheques are not valid.

Future Development

A great deal of interest, both at home and overseas, has been shown in the *Cornishman* and the design has fulfilled a demand for a simple transmitter giving adequate performance. It is hoped, that in due course, a Mark 2 version will make its appearance and, in keeping with modern practice, the accent will be on semiconductors.

THE MONTH ON THE AIR

By JOHN ALLAWAY, G3FKM*

THE following is printed with acknowledgements to an overseas author who wishes to remain anonymous! It is called the " I know what you mean department " and is a guide to understanding what certain often heard expressions actually mean.

1. " DX is not really important " (*I missed it*).
2. " I've 320 countries confirmed but am not interested in DXCC " (*I've 280*).
3. " C.w. is a thing of the past " (*Dots and dashes confuse me*).
4. " He didn't come back to me " (*Why didn't anyone tell me he was on?*)
5. " I don't care about what other people think " (*As long as they agree with me*).
6. " The old times were better " (*I missed it*).

G3NMH wishes it to be known that despite repeated requests to the appropriate authorities he is still receiving QSL cards from all over the world for VP8 stations via the bureau. All QSLs which senders desire to go via the bureau should be sent to the Uruguayan QSL Bureau—the VP8 stations pay an annual fee for its services. Hal is able to deal with direct QSL requests (with s.a.e.) from UK stations only.

A letter from G3SMO gives the news that he is in fact VS9AJH, recently returned from Aden. He has had some QSL cards printed and would be pleased to send them to those who have not so far received confirmation of contacts. All that is required is full QSO data plus s.a.e. if direct reply is required, otherwise cards will be sent out via the bureau. (See *QTH Corner*.)

News from Overseas

VK4SS notifies us that it is intended that an amateur station shall be set up from the site of the 24th Session of ECAFE (Economic Commission of Asia and the Far East) which will take place in Canberra during April. The station will be on for about three weeks and will have the call-sign VK1EC. Operation will be mainly on 20m, both a.m. and s.s.b., but other bands may be used. A special commemorative QSL card will be used to confirm all contacts. The only operator whose call-sign has been mentioned is VK2AWW.

G3PLQ/MM, aboard S.S. *Grafton* reports that he will not be able to operate until such time as the ship calls at a UK port. He received this information two days before joining the vessel at Le Havre, and even though he had already paid the £6 for his licence the GPO would not alter their decision. John is at present at Capetown and expects to visit the Arabian Gulf, Japan and the US before returning to the UK. He apologizes to those who have been on the lookout for him.

Top Band News

The skeds arranged by VK5KO with VQ9JW unfortunately did not result in contact being made. However, John reports an opening to Europe on 28 January when he found a pile-up of Europeans calling him at about 19.50. Amongst them was G3LIQ who was worked with signal reports of 559 both ways. This opening appeared to last about 8 or 9 minutes, a few minutes either side of sunrise in Adelaide. Also from Australia there is news that stations heard during the Trans-Pacific tests by SWL Allen included JA, W6, W7, W9, and W0. He also heard G3UNT on 12 February.

W1BB's *160 Meter DX Bulletin* gives the news that GC3HT will be active from Guernsey ot 06.30 on 1 and 2 July, and 30 September/1 October on 1813 kHz. Special skeds may be arranged via Richard Taylor, LaCour de Longue, St Saviours, Guernsey, CI. Other items mentioned are the first ever Brazil to Aldabra contact between PY2BJH and VQ9JW on 22 January, and a contact between PY2BJH and CE3CZ (DL9KRA) on the 27th. PY2BJH is trying to work Europe and may be found every weekend on 1803 or 1827 kHz. A summary of the season's Transatlantic tests shows that they have not been too rewarding, and it seems that conditions have been peaking earlier in the night than 05.00, on many occasions the band had gone out by that time. Suggestions that 00.00 would be a more suitable time next winter have been made by VO1FB. The only really good conditions during a test were on 17 December. The *CQ* WW 160 DX Test hit a good weekend and it is believed that 25/30 countries were active.

It is expected that TG9EP will soon be on 160m.

Don Miller, W9WNV, availing himself of the hospitality of Jim, VK6RU, standing.

* 10 Knightlow Road, Birmingham 17. Please send contributions for the May issue to arrive by 8 April, for the June issue by 13 May and for July by 12 June.

Contests

This year's **Helvetia 22 Contest** will take place between 15.00 20 April and 17.00 21 April. The object is to contact as many Swiss stations as possible on all bands 160 to 10m and on any mode or modes. Cross band or cross mode contacts are not permitted. Exchanges consist of report and serial number of QSO (starting from 001), and in addition Swiss stations give a two letter suffix indicating their Canton. Each station may only be contacted once on each band, each complete contact counting 3 points, and incomplete ones only 1½ points. The total score is the number of QSO points multiplied by the total of Cantons worked on each band added together. Separate logs should be submitted for each band and written on one side of the paper only. They should be sent to Marius Roschy, HB9SR, Chemin Grenadiers 8, 1700 Fribourg, Switzerland, within 30 days of the contest, and should include a declaration that all rules have been followed closely. In the 1967 contest the top scorer outside Switzerland was UA4KKC (22,134 points), the highest UK score being achieved by **G3IMV** (4,959 points). Other UK scores listed include **GD3AIM** (4,200 points), **GM2HCZ** (1,296 points), **GI2DZG** (819 points), and G3JFY (468 points). Those listed in heavy type receive Diplomas. This contest gives an excellent opportunity to contact rare Cantons for the Helvetia 22 Award, full details of which are given in the *Awards* section.

The **SP DX C.W. Contest** is a c.w. only affair starting at 15.00 6 April and finishing at 24.00 7 April. All bands 80 to 10m may be used and the usual exchanges of RST plus serial number of QSO should be made. Each QSO counts 3 points and a station may be worked once on each band; the multiplier is the total of districts SP1-SP0 worked on each band—a maximum of 50. There are single and multi-operator (single transmitter) sections. Separate logs should be kept for each band and multipliers should be indicated. A summary sheet showing the scoring and the entrant's name and address in block letters and the usual declaration that all rules and regulations have been obeyed should be sent with the logs to: PZK Contest Committee, PO Box 320, Warszawa 1, Poland, not later than 1 May. This contest is useful to those trying to obtain the SPPA Award (see *Awards* section).

The **1968 Russian "Peace" Contest** will be an all c.w. activity running from 21.00 4 May to 21.00 5 May. Although only a 12 hour continuous period of operating may be claimed for scoring *all* QSOs should be entered in the log. All bands 80 to 10m will be used and the usual RST plus serial number of QSO will be sent by non-USSR stations. Russians will send RST plus their Oblast number. Participants should call "CQ M." Each station may be worked once per band and QSOs between stations in the same continent count 1 point, in different continents 3 points. A multiplier consisting of countries worked on each band (according to the "R-150-S" countries list) is used to reach the score for each band and these totals are then added to reach a final score. Logs should consist of date, band, time, call-sign, number sent, number received, and points claimed, and should be sent to PO Box 88, Moscow no later than 1 June. QSOs in contest logs may be used for credit to all the USSR awards.

The 1967 **OZ-CCA Contest** results mention the following UK entrants—**G2DC** (61,644 points), **GW3MTL** (55,450 points), G3XOI (? correct call-sign 41,548 points), G3JFY (29,965 points), **GD3AIM** (15,408 points), and G3RJB (3,498 points). **G2DC**'s score was eighth highest outside Scandinavia. Congratulations to the winners. The 1968 event takes place between 12.00 11 May and 24.00 12 May. It covers 80 to 10m and is c.w. only. The usual RST plus serial number of QSO should be exchanged; 1 point is earned for a correctly received report and two more for the QSO number. Contacts with OX, OY and OZ count double. The multiplier is the sum of all countries (as per ARRL list) worked on all bands, each W, VE, PY, LU, VK, and ZL area counts as a country for this contest. Logs should be mailed before 15 June to EDR Contest Committee, PO Box 335, 9100 Aalborg, Denmark. A signed statement that all local and contest rules have been observed, and that EDR Contest Committee's decisions will be accepted must accompany all logs.

Dr John Attaway, K4IIF, operating the station KV4AA, St Thomas, US Virgin Islands, during the 1966 CQ world-wide DX contest.

Last month's *MOTA* did not make it sufficiently clear that there are single band categories for entry in the ***CQ* World Wide WPX S.S.B. Contest**. This applies to single operator entrants only—multi-operator entries (either single or multi-transmitter) must be multi-band.

Awards

The **Helvetia 22 Award** is a very attractive certificate awarded to those who can provide evidence of having contacted all 22 Swiss Cantons since 15 April, 1948. Contacts may have been on any mode. QSL cards plus return postage and a check list should be sent to Henri Bulliard, HB9RK, PO Box 384, 1701 Fribourg, Switzerland. Your scribe considers this to be the most colourful certificate he has seen.

The **SPPA Award** is issued by PZK, the Polish Society, to licensed amateurs and SWLs who have proof of contact with (or verification of reports from) at least 100 different Powiats (districts), since 1 January, 1946. QSOs with club stations (three-letter calls starting with K, P, or Z) do not count. The Powiat is usually indicated by an abbreviation on the QSL cards from Polish stations. Applications should consist of a check list of QSOs (in alphabetical order of Powiat's abbreviations). QSLs may be checked by the Awards Manager of a national society, and the certified list should be sent to PZK Awards Manager, PO Box 320, Warszawa 1, Poland, together with seven IRCs.

With further reference to the **BP-A Awards** (I, II, and III), information from HA5AW, via G3WP, makes it clear that

the fee is five IRCs for Part I, eight more IRCs for Part II, and a further eight for Part III—a total of 21 IRCs for all three parts apparently, even if all are applied for together.

The **Auckland Award** is issued to those having worked 15 ZL1 stations in NZART Branch 02 (Auckland) since WW II. ZL1TB is custodian, and will help with QSL cards if required. His address is Mark Churton, 15 Grassways Avenue, Pakuranga, New Zealand. G8JM has recently received the first of these awards issued to a G station. There is no charge and a certified list of QSLs is all that is required.

DXpeditions

G6SU will be visiting Eire in April and will have the call-sign EI8BT/M and /P. He will be accompanied by G3MEA and G6CY, and they will be on all bands 80 to 10m. North of the border the call will be GI6SU.

DXpedition of the Month news is that Harold Lund (ex-ZD8HL) has been active in the Caribbean area as VP2AC, and that his QSLs will be dealt with by DOTM. Another well known station recently taken over for QSL purposes by DOTM is VQ9JW. Golden, W8EWS, is now back at Montserrat for a two month stay, and uses the call-sign VP2MK. His favourite frequencies are 3695, 7090, 14,190, 21,250 and 28,600 and QSLs should be sent to his home address.

In a letter to HB9J, Harvey, VQ9HB, is said to have said that there would be no chance of his visiting Farquhar Is. during the next few months. The centre of a hurricane hit the island in late February.

The recent expedition to Juan Fernandez Is. resulted in 3000 QSOs in about 60 hours on the air. A total of 80 different countries was worked. The operators were so pleased with their trip that they are giving thought to another sortie next year—possibly to CE0X (San Felix Is.).

Ed, VR3DY, was overheard to say that he had managed over 1800 contacts during the second weekend of the ARRL phone contest. Propagation to Europe does not seem to have been too good during his stay on Fanning Is. It is not anticipated that his trip to British Phoenix Is. (VR1) will take place until next year.

A DXpedition to Londonderry, Tyrone, Fermanagh, and Armagh is being planned by G3UBI and G3UGF to take place between 28 July and 11 August. All bands will be used, but the emphasis will be on 160m. The call-sign used will be GB2NI, and equipment will consist of a KW2000 and separate units for 160m, 4m, and 2m. Operation will take place from a caravan, and the operators would be interested to hear from anyone wishing to contact them. They would also appreciate hearing about which are the most " wanted " GI counties. G3UBI's QTH is 64 Caldene Avenue, Mytholmroyd, Halifax, Yorks.

An expedition by KP4CSW and KP4BDU in the Caribbean area is scheduled to take place as follows: VP2G (Grenada) 3 May, VP2L (St Lucia) 6 May, VP2D (Dominica 7 May, VP2A (Antigua) 8 May, VP2K (St Kitts) 9 May, VP2 (Anguilla) 10, 11 May, PJ2M (Neth. St Maarten) 12 May, VP2V (Br. Virgin Is.) 13 or 14 May, and then back to KP4. They expect to be on 14,220 kHz from 20.00 to 05.00, with a second station on 3820, 7220, 14,340, or 21,260 kHz. All QSLs should arrive at their home QTHs by 22 June with s.a.e. and return postage; QSOs will have a serial number which should be quoted. KP4CSW is listed in the latest *Callbook* as Nicholas M. Testa Jr., Box 10816, Caparra Heights, Puerto Rico.

Joe, K9GCE, will be PJ5MM during the WPX contest on 6/7 April. He may also operate from FS7. QSL details are given in *QTH Corner*.

DXCC News

Following up a comment made in one of the US DX news sheets your scribe was dismayed to receive a letter from W1LVQ, General Manager of the ARRL, to the effect that the Awards Committee is currently checking on several complaints made to them concerning DXpedition activities several years ago. As Mr Huntoon goes on to say " Going very many years back does indeed become impractical, working a hardship on both the Committee and the participant in attempting to establish the truth." He then suggests that there be some kind of " statute of limitations " to " prevent digging out old skeletons purely for harassment purposes," and asks for suggestions as to what period this should cover. So the witch hunt would appear to be about to continue—in the writer's opinion to the extreme detriment of the DX section of the hobby. Surely it would be unfair to investigate operations which have taken place comparatively recently and exclude those taking place just a little earlier? If any more are to be investigated the same treatment should be accorded to *all* expeditions which have taken place since the resumption of Amateur Radio activities after World War II. In view of the fact that the whole business is supposed to be just a hobby it seems ridiculous to waste time and members' subscriptions trying to do the impossible!

An EA0AH QSL card of the type sent out by W4DQS (his QSL manager) has been submitted for DXCC credit and returned with instructions to submit again later. The card clearly states " EA0AH operated by guest operator Herman Olarte." The writer knows of no such case of an EA9EJ card being rejected by ARRL and would be interested to hear a fair explanation for what appears to be very unfair discrimination. Readers may remember that EA9EJ was recently operated by W4QCW under similar conditions. QSL cards are being received direct from the licensee of EA0AH as listed in the *Callbook*—are these being rejected too?

DX Briefs

EP3AM, who is often to be heard around 14,195 kHz at 13.00 on Sundays is the US Ambassador in Teheran.

The current operator of SV0WFF is K4FUV. He will be in Crete for another two months or so, and may be QSLd via Ron Harris, Box 599, APO New York, NY, USA 09291.

A new station is now active from Tristan da Cunha, this is ZD9BJ who seems to prefer 15m s.s.b. He requests QSLs via GB2SM. ZD9BE has been reported active on both 10 and 15m.

K8NHW/XV5 had a spell of very great activity from Saigon during the few days preceding his return to the USA. It is believed that he was not " cleared " by FCC for working US stations and that therefore his cards would not be valid for DXCC.

FR7ZL apologizes for the delay in dealing with his QSL chores and promises that 100 per cent of contacts will be QSLd. He works for the Mauritius Broadcasting Corporation, and his duties take him to the outlying islands such as St Brandon and Agalega from which locations he may possibly operate in the near future using the transceiver donated for this purpose by W9WNV and the Long Island DX Association.

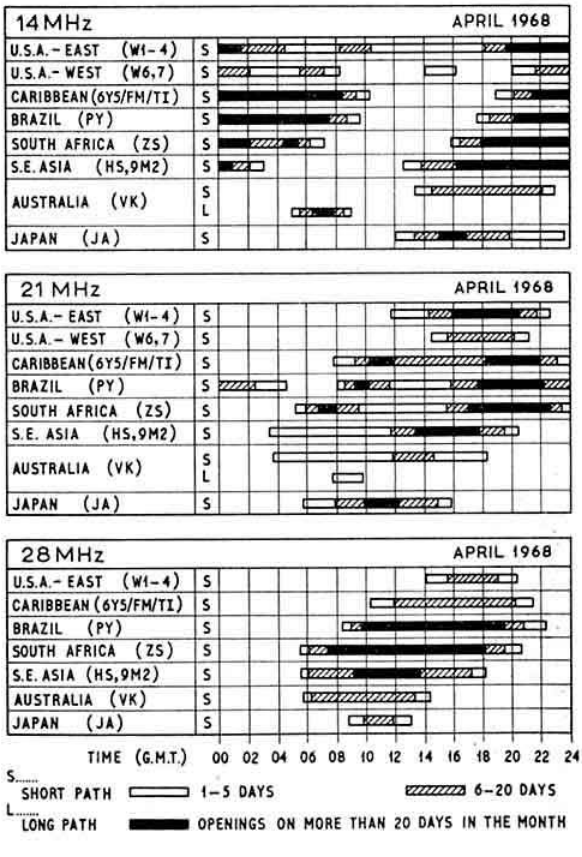
FO8BU, who was on the air from the Tuamotu Archi-

Propagation Predictions

In April, the regular transition from winter to summer conditions is usually complete. Whilst in winter the F2 m.u.f's are very high during the day and very low at night, the difference between day and night time conditions in summer is much less. This applies particularly to 28 MHz. Whilst during the period of sunspot maximum this band makes possible regular contact with all continents during winter months, except on disturbed days, from April onwards USA traffic frequently drops out. On the other hand contacts on 28 MHz with South East Asia, Africa and South America will remain reliable. On the 21 MHz band conditions will be very favourable, with practically all continents workable with certainty. However, signal strengths of transmissions lying wholly in daylight areas will be lower than on 28 MHz. Compared with the previous month 14 MHz will be more of a night time DX band and on this band during daytime, transmission paths will decrease as summer approaches. During the present season (equal day and night) there will be practically no opportunities for contacts via the long path except with Australia. On 7 and 3·5 MHz DX possibilities during the coming months will be markedly worse as a result of the increase in static and the shorter nights. On 3·5 MHz local traffic during the early morning will only be interrupted by disturbed conditions.

The provisional sunspot number for February 1968 issued by the Zurich Solar Observatory is 107·3 with periods of high activity at the beginning and end of the month. The predicted smoothed sunspot numbers for June, July and August are 116, 114 and 112 respectively.

It will be noted that for the first time for many months the predicted numbers show a decline indicating that the peak of the present solar cycle is expected in May 1968.



pelago a few months ago returned to France in February, and is now F5IG.

VK0AL has been reported on 20m s.s.b. He is located on the Amery Ice Shelf (70 S, 70 E). He is in ITU Zone 69 for those working for the P-75-P Award or the IARC CPR competition.

The numerical prefix series 80A-80Z has been issued by ITU to Botswana (formerly Bechuanaland). It is understood that Mexican stations will be allowed to use the 4A1, 4A2, and 4A3 prefix between 31 March and 31 December this year.

John, VQ9JW, operated briefly from Picard Is. and Cosmoledo Is.—both near Aldabra. He had difficulty from water getting into his equipment whilst at the latter place and did not manage as many contacts as was hoped. All QSLs should go to DOTM (see *QTH Corner*).

Hy, ex-VP3HAG, is now in Grenada, and has the call VP2GAE.

Band Reports

The last month has again produced reports of good DX being heard on all frequencies although one or two correspondents report a falling off on the l.f. bands. A sad reflection of current behaviour on 80m is that the fact that the proposed 80m DX net (announced recently) has had to be abandoned due to deliberate interference. This may give pleasure to a small group of amateurs with mini-brains, unfortunately some would appear to be in this country and appropriate action from the GPO may be feared by those responsible this side of the North Sea.

Many thanks are due to all those who have supplied your scribe with logs and information, especially the following: G2BOZ, G2HKU, G3HCT, G3HDA, G3LQI, G3SML, G3SYC, G3TBK, G3URX, G3WBN, G4JZ, G4MJ, G8JM, G8VG, BRS25429, BRS27683, BRS28198, A4886, A5032, A5126, A5154, A5333, A5390, A5459, A5489, A5610, A5801, A5837 and A5852.

Some of the more interesting stations logged on the various bands include the following: (c.w. in italics, rest s.s.b.) **160m.** *W1TX* (03.00), *W2RAA* (02.45), *W9WNV/2* (06.25), *K3ERO* (02.58), *W3FE* (ex-K3EKO, 06.50). G2HKU reports a peculiar "echo" effect (as often heard on W6 signals on 20m) at 23.20 on 10 February. An explanation would be interesting.

80m. CT2AP (21.15), EP2GI (22.00), ET3FMA (22.06), HP1JC (05.35), HR6BC (05.40), TF5TP (21.25), YV7DQ (06.05), ZD3F (23.20), ZD8NK (23.05), G3WBL/5A (19.21), 5Z4LG (19.48, 21.29), 9G1LZ (20.00), and 9M2NF (21.58).

40m. FP8CY (20.22), MP4BEU (20.40), VP1CP (04.38), VR4SS (21.50. YL op. QSL received), VS6DO (18.40), W7SFA (04.56), XE1CCW (06.28), and *9H1AV* (01.02).

20m. Now often open all night has produced *FB8YY* (20.04), *FG7TG* (20.14), FO8BS (05.58), FR7ZD (16.50), *KC4USM* (11.25), KG6IC (08.00), KH6EDY (06.59), KS6CK (07.00), KW6EJ (good signal at 16.30), PK1SH (16.27), W6TNS/TA (17.03), *UA1KED* (Franz Josef Land 10.59), *UA0KIP* (Wrangel Is. 07.34), UA0YH (Zone 23, 15.59), VK0AL (Amery Ice Shelf, 17.50), VK0GL (Wilkes, 16.30), VP2DH (22.02), VP8IU (00.25), *VQ8CDC* (Chagos. 16.32), VQ9V (18.46), VR1L (08.33), VR3DY (07.00 to 09.00), *VR4CR* (018, 07.45), K8NHW/XV5 (20.47), ZD3D (23.15) ZD9BE (19.55), 5V4TR (19.22), 5W1AS (05.24), 7P8AR (19.35), 9K2BV (19.18) and *9Y5RA* (19.35),

15m. CE8DB (21.30), CP6HB (11.15), FK8BG (09.28), HK0BKW (19.34), HM9BF (09.00), K8SLB/KG6 (12.15)

QTH CORNER

CE9AT	Dante Kalise, Matucama 115, Valparíso, Chile.
CT2AA	Box 215, 1936 Comm. Sqdn., A.P.O., New York, NY, USA 09406.
EA0TU	now via HB9AHA, Rene Oehninger, Im Moos, 5707 Seengen, Ag., Switzerland.
FO8BQ	via WA6WMG, Michael Wagner, 251 Lurelane St.,Rialto, Calif., USA.
G3XEM/HZ	P. K. Booth, c/o Airwork Services Ltd., PO Box 2142, Jeddah, Saudi Arabia.
I7RUI	via I1ZIZ, Umberto Rava, Via Gustavo Modena 13, Firenze, Italy.
I8CLC	via I1CLC, Carlo Ciapetti, Via Del Cappuccini 12, Firenze, Italy.
JT1AG	via UA1CK, Vladimir Cuploon, PO Box 2, GPO, Leningrad, USSR.
KC4USP	5130 Hillcrest Drive, Clarence, NY, USA 14031.
KM6BI, DE	Box 43, FPO, San Francisco, Calif., USA 96614.
MP4MBC	via G3HSR, 11 The Crescent, Milton,Weston-super-Mare, Somerset.
PJ5MJ	via W2BBK, Dr J. L. Evans Jr., 79 Glenwood Rd., Englewood, NJ, USA.
PJ5MM	via K9GCE, William Poston, 309 Benton, Indianapolis 27, Ind., USA.
W6TNS/TA	via W6TNS, Donald Stoner, Box 7388, Alta Loma, Calif., USA.
VP2AC	via DOTM (see VQ9JW).
G3WKN/VP2K	via VE3CUS, Roy Golding, 69 Gordon Rd., Willowdale, Ont., Canada.
VP2MK	via W8EWS, Golden Fuller, 9500 E. Atherton Rd., Davison, Mich., USA.
VQ9JW	via DOTM Box 7388, Newark, NJ, USA 07107.
ex-VS9AJH	J. B. Holmes, 99 Coneygrey Spinney, Flintham, Newark, Notts.
XE1PJL/XF4	via XE1J, Jose Levy V., M. Herrera 254, Colima, Mexico.
YK1AM	Box 35, Damascus, Syria.
ex-ZD7IP	G. Barrett, " The Lodge," Hanslope, Wolverton, Bucks.
ZD9BJ	via GB2SM, The Science Museum, South Kensington, London, SW7.
5L2PL	PO Box 1477, Monrovia, Liberia.
5U7AN	via W4WHF, 255 Suntan Avenue, Sarasota, Fla., USA 33577.
8P6's AH, AZ, BM, BN BX, CD.	via VE3DLC, R. J. Kreger, 30 Zenith Drive, Scarborough, Ont., Canada.
8R1C	via WA4UOE, Herbert Spitz, 340 S.W. 64th Way,West Hollywood, Fla., USA 33023.
9K2BV	c/o American Independent Oil Co., Box 69, Kuwait, or via W5EGR.

RSGB QSL Bureau: G2MI, Bromley, Kent.

1968 COUNTRIES TABLE

	160m	80m	40m	20m	15m	10m	Total
G3IAR	—	31	10	28	26	15	110
G3VPS	11	14	5	16	—	—	46
G3ING	9	11	12	5	11	7	55
G3XDV	13	—	6	12	—	10	41
G3PQF	6	2	8	5	3	14	38
G3TBK	—	1	14	9	12	14	50
G8JM	—	—	—	124	57	47	228
G8VG	—	—	—	—	23	33	50
A5610	10	71	17	35	25	31	191
A4886	11	55	47	171	90	64	438
BRS25429	3	53	43	132	88	71	490
A3942	14	38	36	58	60	50	256
BRS3942	14	38	36	58	60	50	256
BRS28198	2	32	28	19	8	72	161
A5437	3	24	3	19	18	6	73
A5459	5	22	7	23	10	5	72
A5466	3	20	17	79	27	12	158
A5126	2	21	28	66	37	33	189
A5390	2	9	14	92	86	70	273
A5154	—	11	4	91	39	28	173
A5489	—	7	5	58	36	37	143

KH6BB (18.40), KL7FAR (17.40), KR6SJ (10.35), MP4MBC (18.07), TN8AA (22.07), VK9WD (11.13), *VQ8CC* (18.57), VR2EK (08.45), ZL's (07.30 to 11.30), *4S7DA* (11.40), 5VZAB (08.46), 6O1VG (19.46).

10m. CE3UQ (18.03), EA9AQ (11.18), EA0TU (10.24), HC5KA (14.29), HS3DR (08.45), HZ1AB (16.06), KC4USF (Grahamland. 18.14), KR6TAB (09.55), OA4JR (15.15), OX3CJ (17.52), *VK8NO* (11.04), *VQ8CC* (11.50), *VQ9JW/P* (Picard Is. 18.11), VS6FZ (09.39), XW8CAL (11.27), ZD9BE (11.00), ZD9BJ (15.40), ZS9L (10.29), *4S7RN* (12.40) G3BID/6W8/Mobile (18.13), 9K2BV (10.22), *9L1TL* (17.15), 9N1MM (11.27), and 9V1VX (12.35).

Many thanks to the following for permission to reproduce the contents of their publications: *On The Air* (ON4AD), *DX'press* (PA0FX), *NARS News* (5N2AAF), the *L.I.DX.A. Bulletin* (W2GKZ), the *DX'er* (K6CQF), *DX News Sheet* (Geoff Watts), the *Ex-G Radio Club Bulletin* (W3HQO), *QUAX* (SM4DXL), the *DX'ers Magazine* (W4BPD), the *West Gulf DX Bulletin* (W5QK), the *Florida DX Report* (W4BRB), *CQ DX* (ARI), the *HKARTS Newsletter*, *WA Bulletin*, (VK6WY), *QTC Newsletter* (5Z4KL), *First Class C.W. Operators' Club News Sheet* (G8VG), and *QUA* (ZE1BW). Pease send all items for the **May** issue to reach G3FKM no later than **8 April**, for **June** issue by **13 May**, and for **July** issue by **12 June.**

Call Book Amendments

The following are amendments to the 1968 edition of the *RSGB Amateur Radio Call Book*.

G3UBR .. Brunel University Amateur Radio Society, Woodlands Avenue, Acton, London, W3.
G3WBM .. J. E. Durrant, 350 Mersea Road, Colchester, Essex.
G3KMQ .. R. G. Heslop (Abroad).
G8AXP .. G. R. J. Addis, 44 Knowle Road, Woodley, Reading, Berks.
G6TEB/T .. G. R. J. Addis, 44 Knowle Road, Woodley, Reading, Berks.
GM3WFJ .. R. Andrew, Nether Craig, Alyth, Perthshire.
G2FLK .. T. L. Delvin, 165 Central Park Road, E6.
G3WQJ .. J. C. Corson, 37 Windermere Road, Ealing, W5.
G3VNJ .. C. H. Fowler, 9 St. Paul's Avenue, Hasland, Chesterfield.
G8APX .. W. H. Jarvis, Valley Farm, Wittesham, Ipswich, Essex.
GW3RWX .. D. M. Thomas, Cefn Craig, Rhwbina, Cardiff.
G3LYY .. J. T. A. Johnston, 49 Wood Lane, Louth, Lincolnshire.
G3NBU .. P. J. Bendall, 3 Alexandra Terrace, Bramley Road, Sherfield on Loddon, Basingstoke, Hants.

Correspondent Sought

Earl Lagergren, K7OEP, 3588 South 2400 East, Salt Lake City, Utah 84109, USA, would like to correspond with anyone interested in the technical and practical aspects of synchronous, synchrondyne and phase locking techniques.

Can You Help?

● R. G. Hayward, " Sunnyfields," Lighthouse Road, St. Margaret's Bay, Dover, Kent, who requires information on the Naval receiver type P58 (300-650 MHz)?

● F. A. Herridge, G3IDG, 96 George Street, Basingstoke, Hants., who seeks a supplier of Elstone mains transformers and smoothing chokes and a present day equivalent of the self adhesive, strip aerial marketed under the name of PIX?

● G. Henry, Carrow Laverty, Armady, Ballymoney, County Antrim, Northern Ireland, who is trying to obtain some small thyratrons type NGT5?

FOUR METRES AND DOWN

By JACK HUM, G5UM*

SPACE is so short in *Radio Communication* these days that we won't expend a lot of it on the Fourteenth International V.H.F./U.H.F. Convention except to say that full details appear in the panel on the next page, and that ticket applications should be mailed to G3GMY in the next day or two.

Four reminders we *would* like to put over, however, are these:

Bring along your latest item of home constructed equipment. It might win you The 1962 V.H.F. Committee Trophy; even if it doesn't, it will help swell the always intriguing " Made it Myself " exhibition that is yearly such an important feature of Convention.

Secondly, your latest home-builts may perhaps have put into the shade some of those built in earlier years, now worth passing on to someone else for a small sum, and possibly the agency for getting that someone else started on v.h.f. In other words, there is going to be during the morning a small bring-and-buy sale at Convention this year. When you come in ask the Committee man on the door where you should deposit your " for sale " item and he will show you (*sic!*). Make sure it has a price tag attached. It will then be offered for sale, with 10 per cent of the price going to Convention funds.

Something else new will be the crystal calibration service offered by G3OOU using his frequency counter to measure the frequency of anyone's crystals to an accuracy of 1 Hz. So pocket a few of your favourite v.h.f. crystals before you leave home.

Pocket also plenty of small silver change for buying raffle tickets. A very attractive batch of prizes is being purchased by Committee Man G3BPT to be displayed beforehand. Then there will be the Dinner Ticket Prize: a 10-element J Beam Yagi.

It was not our intention to go into further detail about the afternoon and evening events—all info in the adjoining panel—but as it happens very special topicality is lent to two of them, namely, the G3JHM/G3JVL dissertation on the Gibraltar Beacon, and the G3RPE Progress Report on 13 centimetres, both the subject of afternoon tech-lectures and both the subject of important developments in the last few weeks. . . .

Mediterranean Opening

It was on Sunday 3 March that the UK-to-Gibraltar path on 4m opened up when G3JHM and G3WBQ detected the ZB2VHF beacon first of all in a number of short bursts followed by a sustained opening of 24 minutes that peaked signals at RST589, following very much last Summer's pattern. Signals from ZB2VHF were heard in several other southern England localities, e.g., by G3HYG/M while on the move, and by G3PLX/P, G3UPQ and a BRS man in Brighton.

The opportunity was taken by several operators to check for the Malta beacon 9H1MB without success on that occasion, though G3JVL detected part of the call-sign on 27 February.

Three days after the above events a listener on Gibraltar reported logging the Rhodesia beacon on 6m, when ZE1AZC on 50·04 MHz peaked at 599 at 14.30 GMT on 6 March. This news came to Don Hayter, G3JHM, via ZB2VHF, and of course prompts the thought that transequatorial reception of the 4m beacon in Rhodesia is not beyond the bounds of possibility.

All members who log DX-range beacons on v.h.f. and u.h.f. are urged to forward precise details to G3JHM (4 Newling Way, Worthing) who as a member of the RSGB Scientific Studies Committee and himself professionally engaged on work in the radio propagation field is in a special position to co-ordinate them.

Four-metre operators who wish to attempt to open up the path can fix schedules with the " non-beacon " ZB2VHF by writing to J/T Osborne, Devils Tower, RAF, Gibraltar, or by contacting him on 14·26 MHz at 18.00 GMT weekdays and 19.00 GMT on Wednesdays (note GMT).

England to France on " Thirteen "

Now for some important news of developments on 13cm, which as we say above lends special topicality to the progress report which Dr Dain Evans, G3RPE, will be giving at Convention on 27 April. It is to the effect that the English Channel was spanned on this band on 18 February when G3RPE/P on the cliffs near Dover Castle worked F2FO/P at Cap Blanc Nez 15 km west of Calais, an optical path about 35 km long.

This development will not be new to many u.h.f. people who have heard it discussed on the bands and mentioned on GB2RS. Our apologies for reporting it so late. We tried to get a stop-press paragraph into *Radio Communication* last month, but printing schedules are just not that flexible.

Two transmitters were in use at G3RPE. One had a DET22 self-excited oscillator with transistorized modulator, input 8 watts and A3 output 300mW at 2320 MHz. The other had a self-excited oscillator/amplifier using experimental transistors and made by a colleague of G3RPE, Peter Tunbridge. The output was chopped 1 kHz, the input was 2·5 watts and the mean output power 400mW. " A feature of this transmitter," says Dain, " is its stability. It can easily be held on a narrow band receiver (4 kHz) while being keyed."

On the receive side a crystal controlled converter 2350-2352 MHz fed a narrow band (4 kHz) transistorized tunable i.f.

* Houghton-on-the-Hill, Leicester, LE7 9JJ. Send reports for the May issue by 8 April and for the June issue by 13 May.

FOURTEENTH INTERNATIONAL V.H.F./U.H.F. CONVENTION

The Date: Saturday, 27 April.

The Place: The Winning Post Hotel, Whitton, near Twickenham.

How to get there: Southern Electric rail to Whitton station, and then less than ten minutes walk. By road as shown on the accompanying sketch map. Note that the Great Chertsey Road is dual carriageway with no gaps between for a considerable distance either side of the hotel. Conveniently, the venue may be approached from the rear: the road from Whitton Station will take you straight to the hotel car park.

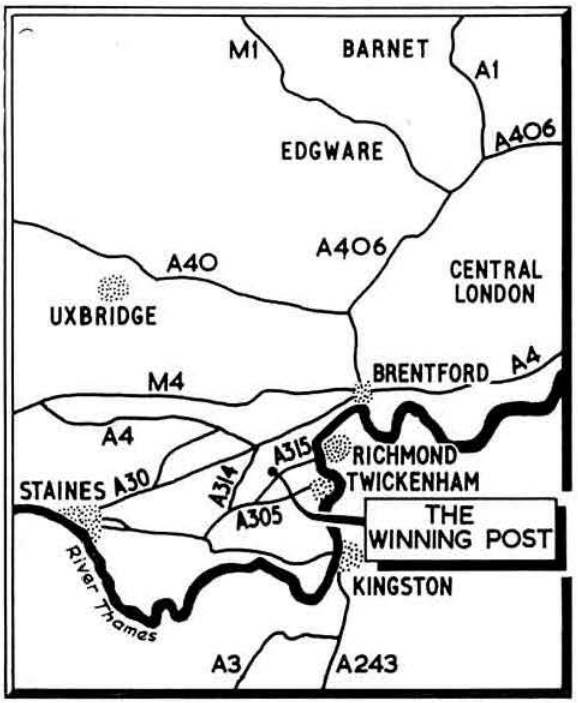
Talk-in Station: G3VHF on 70.26 MHz, with G3OUF as chief operator, will accept calls from 11 a.m. to 2 p.m. clock-time.

The Programme: 11 a.m. Convention opens. Trade display. Home construction display to compete for The 1962 V.H.F. Committee Cup (all items should be accompanied by a card giving a brief description for the judges' guidance). Bring-and-buy sale (closes at 2 p.m.). Price your surplus items for sale before putting them on display: there will be a deduction of 10 per cent to go towards Convention funds.

At 2 p.m. the Lecture Session opens with G3BA discussing sideband at v.h.f. Then G3HBW will follow with a talk on Frequency Synthesis and Phase Locking. Third, G3LTF will give a progress report on current developments in earth-moon-earth communication. Then comes the G3JHM/G3JVL description of the Gibraltar Beacon project (illustrated with slides). Item No. 5: " Shop Window," with discussions on Flat Tops or Slots (J Beams) and Low Noise Frontends (G3JXK Company). Item No. 6: Progress Report on Developments on 13cm. There will be a short tea break at midpoint.

The Raffle: Tickets will be obtainable from any V.H.F. Committee man for the grand raffle at 6 p.m. Prizes will be on display.

The Dinner: Commences at 7 p.m. promptly. Among the distinguished guests will be Mr H. Stanesby, deputy director of engineering of the GPO, who will propose the toast of The Society, and G/Capt. A. H. Dormer, G3DAH, v.h.f. correspondent to the *Short Wave Magazine*, who will reply to the toast to The Visitors. President John Graham, G3TR, will present The 1962 V.H.F. Committee Cup to the winner of the Constructors' Competition, and the G4KD Trophy " for consistent work on 4m and down."



Tickets: Price 30s. for the full Convention.
Price 4s. 6d. for the morning and afternoon sessions only.
Price 25s. 6d. for the dinner only (for the benefit of members' ladyfolk who may wish to come: an increasing number each year).

Get them from Convention Secretary Frank Green, G3GMY, 48 Borough Way, Potters Bar, Herts. Numerous applications were received following last month's Convention note in *Radio Communication*, which suggests that the sooner you get yours into the mail the better.

AND A VERY HAPPY FIESTA TO ALL!

---

strip. The aerial was a 4 ft. dish eight feet above ground on a 350 foot site.

At F2FO/P for this believed first into-Europe contact on 13cm was a 2C39, pulse modulated at 200 Hz, transmitter delivering 1 kW peak output on 2350 MHz, a broadband receiver and a one-foot dish at 400 feet a.s.l.

Looks as if the Society's V.H.F. Committee will need to have on an early agenda the subject of including " Thirteen " in the " Four Metres and Down " certificate canon. With portable operation on the band increasing at the rate recently reported, counties worked totals are going to rise; and keen groups prepared to travel could get not only F in the bag but some inter-UK prefixes as well.

Contest News

Congratulations go to G2WS for heading the 2m section of last year's Cumulative Contest, and to G8AKE as leader of the 70cm section—a deserved success to a very consistent and persistent operator in each case (details in Contest News this month).

This weekend (6 April) sees the finals of the present Cumulatives. May there be plenty of QRM at the low end of " Two," where it'll be a c.w.-only event. All modes on " Seventy."

Plenty of QRM there was indeed a month ago when the Third 144 MHz Open brought them out in their hundreds. The G2JF team were well into their serial 200 by the end of the event. Another team effort, that of G3OHC/A, found it worth taking sideband gear along: they worked 24 sideband-to-sideband as well as some scores of A1 and A3. Conditions, which were decidedly " up " before the contest began, disobligingly slumped to normal almost precisely at starting time.

Coming up in three weeks' time is the Second 70 MHz

At the Calais end of the G3RPE/P and F2FO/P link: top, F2FO himself. Below: F9OE (who is general secretary of the R.E.F.).

UK TO FRANCE ON 13CM

(Story on page 242)

On site for " Thirteen": left to right, G3THQ and G3RPE with junior operator, on the Dover cliffs on 18 February, when contact was made on 13cms with F2FO/P.

Open, followed a week later by what is probably the most important contest of all where furthering the state of the art is concerned: the First 1296/432 (Open) event.

Herewith now a comment on the new v.h.f. contest rules which appeared on pages 58–59 in January. North Notts member Mike Gibbings, G3FDW, feels that they " stack the cards even more heavily against contest entrants from remote areas " and that they will discourage participation by the man out on a geographical limb. He does not like the idea of what are in effect two contact-multipliers: " A multiplier should surely be an indication of the quality not the quantity of QSOs."

And Now, to Start on " Seventy "

With Stan Henton, G5VU, now safely launched on 2m, and working stations right, left and centre from his by no means good v.h.f. site at Nottingham (but then, he went straight on to sideband and c.w.), it is appropriate to turn to the next band up to see what assistance can be drummed up for those about to start on 70cm.

Prompted by the ready response of members to the G5VU enquiry, Laurie Thursting of Stanmore in Middlesex, who has just acquired G8BHA after some years as BRS28345, says:

" I am in the same position as G5VU. I want to start. How do I go about it? Of course, I want to start on 70cm, not on Stan's 2m (mustn't jump the gun!). But there are other differences. Stan with his call-sign is somewhere near the top of a very tall building (" Tower " more appropriate), whereas I am still at ground level trying to get on the first step of the stair. So here we have the beginner and the experienced both asking the same question. Such is the fascination of Amateur Radio."

Over to a Class B licensee for the answers.

In Zone on " Seventy "

A pertinent comment on current 70cm operating practices comes from G8ADE:

" Why does everyone on 70cm when there is a contest on always tune l.f. end up? Those of us towards the h.f. end can call for hours and not get heard, unless we decide to join the pile up just above 432 MHz."

He and many other 70cm operators would probably agree that this band lags behind 2m where contest operating techniques are concerned. On " Two " most people tend to keep within their geographical zones, and generally revert to them if they happen momentarily to nip outside them to v.f.o. on to a wanted station. In 2m phone contests " tuning high to low" is heard just as much as the other way round. Zone adherence on " Two " means that everyone knows where to direct the beam and in which frequency segment to search.

This ought to be happening on 70cm more than it does. Gone is the time when the band was apt for cosy local contacts; today, advancing techniques have given it a nationwide range, making observation of the Band Plan more than ever important. Efficient use of the whole of the 2 MHz communication segment from 432 to 434 MHz means filling all of it all of the time, and especially during contests. The Band Plan offers the most effective way of doing just this. It is shown on page 89 of the current *Callbook*.

Receiving " Firsts "

Further to v.h.f./u.h.f. ratifications, a point raised by BRS26325 of Newport on Tay suggests that it might be

possible to initiate " first ever " claims in respect of *reception* of as well as transmitting to countries outside one's own. That is, if you can get the QSLs in to prove it, a none too easy undertaking for many.

To make a start, BRS26325 reports that he has been fortunate enough to get QSLs back from such exotica as CT1CO dated September, 1962, and UR2BU, dated August, 1963, both for 2m, as well as F8MX/A on 70cm verified in September of 1962 (a good haul that, France to the River Tay on 432 MHz) and he wonders if these are either UK firsts or GM firsts (or both).

His listening from time on the 6m band has landed him cards from such widely separated—and very DXy—places as LU, ZE and XE, he tells us.

Points of View

" Mobile calling frequency on 2m . . . I would like to see a decision taken on this point before I return to the UK, as I hope to be operating as G3SLI/M from July onwards. Why not the midband frequency of 145·0 MHz for this? "—Alan Osborne, ZB2AP/ZB2VHF.

* * *

" I'm completely at a loss to explain why s.s.b. has not caught on on 4m. Can it be that the v.h.f. lads from the technical top drawer just have no time for ' Four '? It would appear so, which would explain why it is becoming known as the Undergraduates' Band! I've seen many first class v.h.f. calls arrive on 4m, stay a while and then depart for ever. It's very sad, and after five years of trying I'm beginning to think the departed are right and I am wrong! Just for the record, I've now been at my present QTH for two years, and have worked from here 337 different 4m stations, with 61 counties and eight countries worked (and confirmed!). And not one county or country which was not worked on s.s.b. or c.w."—G3FDW.

* * *

" I certainly agree with January's comment about the use of s.s.b. for local working, and I am sticking to a.m. for such contacts, although a fully transistorized s.s.b. exciter and transverter are available for use on 4m. It can even be said that the use of sideband is discourteous on a band such as 4m (where a large percentage of operators are using equipment without b.f.o. facilities), if the station being worked could be worked equally readably on a.m."—G3WBQ.

Expeditions to Scotland

The team that did so well in the 144 MHz Open contest at the beginning of March under the call-sign G3OHC/A are planning to move considerably farther north from their customary Midlands eyrie, to Kirkcudbright, no less, for the portable contest next month. So during the weekend of 18–19 May look out for GM3PWJ/P from that county, operating a.m. at the top end and c.w. at the low end.

Behind the call will be G3OHC, G3NZS and G3PWJ. As they will start operations on the Saturday night *before* the Fourth 144 MHz (Portable) Contest opens up, they particularly ask operators from the south to look for them to help them evaluate the site.

Later in the year a husband-and-wife team will be in Scotland coincidentally with RSGB contests. They are G3ERB and G3WOP. During the weekend of the Third 70 MHz (Portable) Contest, 21 July, they plan to be in Roxburgh, Selkirk and/or Peebles, which should please a great many 4m operators to whom these counties are rare indeed.

V.H.F./U.H.F. BEACON STATIONS

Call-sign	Location	Nominal Frequency	Emission	Aerial Direction
GB3ANG	Craigowl Hill, Dundee	145·985 MHz	A1	
GB3CTC	Redruth,Cornwall*	144·10 MHz	A1	North-East
GB3GI	Strabane, N.I.	145·990 MHz	A1	N/SE
GB3GW	Swansea	144·250 MHz	A1	E.N.E.
GB3GM	Thurso*	145·995 MHz	A1	S
GB3GM	Thurso*	70·305 MHz	A1	N/S
GB3GM	Thurso*	29·005 MHz	A1	N/S
GB3GEC	W.London	434·00 MHz		
GB3VHF	Wrotham, Kent	144·50 MHz	F1	North-West

* Not operational.

RSGB V.H.F. BEACON STATION GB3VHF

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

Date	Time	Error
13 February	15.55 GMT	82 Hz high
20 February	10.33 GMT	190 Hz high
27 February	10.30 GMT	260 Hz high
5 March	16.03 GMT	66 Hz high

And during the Sixth 144 MHz (Open) Contest of 3-4 August they will either be in Ross & Cromarty or possibly even in the Outer Hebrides, in Harris, which by our reckoning is about 120 miles from the nearest 2m activity. Says G3ERB: " We would be very glad to be put in touch with anyone with first hand knowledge of good sites in those counties, accessible to a quite heavily loaded vehicle with low ground clearance." Offers of advice—and of skeds—to Leslie Goldsbrough, 56 Kings Lane, Bebington, Cheshire.

. . . and in England

Here is news of what could become a " permanent expedition," and it will interest the men on " Four."

Frustrated by the bulk of the South-Downs getting in the way of their 70 MHz radiation, G3UFP and G3TAL at the University of Sussex in Brighton have decided to go portable up on Ditchling Beacon on as many Sunday mornings as they can manage. They will operate on 70·58 MHz using a B44 into a 4-element J-beam which from up there should lay a large signal over much of the Southern Counties, and they hope beyond.

They ask for more turning of beams southwards and for schedules, and also for an ear to be turned towards another local, G3SJX, who is regularly on 4m. Offers of schedules to Malcolm Hamilton, G3TAL, 3 Madeira Place, Brighton BN2 1TN, who, striking a topical note, adds: " I don't think we shall be swamping other locals on the South Coast because (1) we use only about 2 watts input, (2) we haven't heard any South Coast stations (but would like to!), and (3) we haven't been in any contests."

England and Scotland Expeditionary

An opportunity for 70cm operators to work into a remote part of Scotland will be offered by G8APX this month. He will be radiating as GM8APX/M from around Golspie and the Moray Firth between 18 and 21 April—and no doubt Stroke P also, from some of the high-up exposed mountain road sites that abound in the area. On his return he will operate from the Newcastle on Tyne area on or about 22 April. Schedule-makers should write W. H. Jarvis, G8APX, at Burwood House, Royal Masonic School for Boys, The Avenue, Bushey, Herts.

Skeds Operative

By GM3VAP and members of the Glasgow University Radio Club: on 4m every Thursday, Saturday and Sunday at 22.00 hours clocktime, Saturdays at 10.00 and 15.00, and Sundays at 15.00 hours. All 4m operators welcome, as are reports, to GM3VAP, Colin Weston, Engineering Library, University of Glasgow, Glasgow W2.

New frequencies to look for from the north-east 70cm sked-keepers are 433·047 for G3NWU and 433·65 MHz for G8ANQ at 22.30 GMT nightly. The G8ANQ-G8AZO schedule is now 21.00 to 21.30 GMT nightly.

Tech Corner

From G3JGO (B. Priestley of Slough):

The subject of swamping of local stations by nearby portable operations receives another airing in " Four Metres and Down " for February (page 112). I don't know if G3JHM ever gets TVI complaints, but if so he might find himself at the wrong end of his own line of argument! We in Amateur Radio can hardly castigate television sets for bad large-signal characteristics and poor selectivity if we complain bitterly when our *own* receivers suffer the same order of interference.

It would be interesting to know what sort of receiving set-ups the complainants have. Do their front-ends use bipolar transistors or FETs? Or if there is a mixture, is there an FET mixer or just an FET in the r.f. stage where it does the least good? Is the gain between aerial and mixer deliberately held to 10dB as advocated by Rheinfelder (" Design of Transistor Low Noise Amplifiers "), or will any signal within 100 miles drive the mixer into Class C because there is neither a.g.c. nor a switch to unbypass a 56 ohm emitter resistor (see *73* for March, 1964)?

Business radio designs for the v.h.f. bands meet just these problems and cope with them daily. Amateurs are quite capable of achieving the same order of performance, realizing as most of them do the rate at which electronics is developing, although no doubt a down-to-earth article on this subject of converter overload would be welcome. I can think of at least one transmitting amateur, involved with business radio design, who is well placed to discuss the latest ideas.

Simply pushing an FET into your converter is, however, on a par with expecting a pi-tank " with one discriminating sweep of its moving vanes " to cure TVI.

From G6RH (R. H. Holmes, of Bexley):

May I add a line or two to the discussion which has been proceeding on the subject of low-noise transistor front-ends? After some work was done on FET converters using the latest types, a very satisfactory arrangement was found to be a pair of TIS88 in an a.c. connected cascode arrangement. As will be known, these transistors have a very low noise figure, and very small feedback capacitance, and are far superior to the 2N3819 and TIS34 types. I now have results giving a signal-to-noise improvement over the Nuvistor.

* * *

On a different subject, that of sideband on 2m, a transverter which has just been completed has been built into the h.f. transmitter and delivers about 0·4 watt p.e.p. output to a 50 ohm line which is connected to the v.h.f. transmitter.

In the latter, the last frequency doubler is an EL91, and this has been switched such that a 50 ohm resistor is connected in its grid circuit in place of the 72 MHz tuned circuit.

What are your views on. . . . ?

QRA Locator *for or against*
Georef *for or against*
Grid systems generally

The V.H.F. Committee is anxious to have your opinions.

Please write to RSGB Headquarters for a special questionnaire.

This valve is biased for Class A operation, as is the following QV04-7 buffer stage, which in turn feeds the final single-ended 4CX250M. Quality, stability, carrier and sideband suppression seem to be very good with this arrangement.

By G5UM (Jack Hum, Leicester).

In the January number of *Mullard Technical Communications* there is an article by L. M. Cash discussing the design of v.h.f. transistor transmitters for a.m. and f.m. intended for operation directly from vehicle batteries. A four-transistor unit delivering 350 mW at 170 MHz is suggested as a driver for a BLY33-BLY35 amplifier section giving 7 watts a.m. at this frequency.

A larger amplifier section uses a BLY33 pre-driver, a BLY33 driver and two BLY35 paralleled transistors to give 11 watts or 15 watts c.w. at 170 MHz.

Another design uses four transistors after a c.o. in the 40 MHz region to deliver 8 to 9 watts a.m. at 83 MHz, which would appear to have potentialities for the nearby 70 MHz amateur band.

We have inquired of Mullard the list prices of the transistors specified in the above designs. These are:

BFX44 8s. 6d.
BSX19 8s. 0d.
BLY33 £3 9s. 6d.
BLY35 £15 0s. 0d.

These prices are for single devices only. The transistors being industrial types will not be readily available from dealers but could be ordered through them from distributors.

Here and There

You won't find them in the *Callbook* yet but you'll hear them on 70cm: Mike Lee of Hatfield, who has just acquired G8BGM, and Peter Taylor of Gorton, Manchester, G8BCG, who has a " Four CX " building.

* * *

As already announced over GB2RS, it looks like no launching of the next Orbital Satellite Carrying Amateur Radio (Australis I) until early June: no launch vehicle available.

* * *

Instead of a Midlands V.H.F. Convention a local dinner for v.h.f. operators. It was on 16 March at Wolverhampton and all 40 seats were soon taken. " Not so elaborate an arrangement as the previous Conventions . . . a substitute for one year only " says G6FK.

* * *

As a pointer to 4m conditions G3WBQ checks the sound channel from Meldrum 430 miles north of him. Its 4 kW signal on Channel 4 is heard on the G3WBQ c.c. converter at any time via meteor ping.

IARU

Region 1 calling

INTERNATIONAL AMATEUR RADIO UNION

By R. F. STEVENS, G2BVN

Reciprocal Licensing

A reciprocal licensing agreement has been concluded with **France** and the first licence issued to a UK amateur was that to G3OOH who received the call F0FR. Applications should be made to the Ministere des Postes at Telecommunications, 20 Avenue de Segur, Paris 7e. A simple form has to be completed and copies of this may be obtained from RSGB Headquarters. There is no charge for the licence. The French licence conditions of course apply and the maximum d.c. input allowed is 100 watts, but French amateurs do not have the use of the 70 MHz band. Mobile operation is allowed without further formality. The French National Society, REF, have long been pressing for the conclusion of an agreement and it is pleasing that their efforts have now met with success.

The agreement with **Denmark** announced two months ago is restrictive and at the present time reciprocal facilities are only available to UK amateurs who are staying in Denmark for at least one or two years. The Danish mobile licence is normally for v.h.f. use only and if special permission is given for h.f. use then the input is restricted to 10 watts. It is to be hoped that further facilities in Denmark will soon be freely available. Applications for licences should be addressed to: Generaldirektoratet for Post-og Telegrafvaesenet, Centralpostbygningen, Tiergensgade 37, 2, 1530 Copenhagen. V.

CCIR Meeting

A meeting of the CCIR Study Groups X, XI and XII will be held at Palma, Majorca, between 29 April and 10 May. During this period a special station with the call **EA6ITU** will be operated and one of the operators will be A. Prose Walker, W3BMX.

UBA General Meeting

The annual general assembly of UBA will be held at the Hotel Lido, rue de Limalsart, Rixensart-Genval, about 15 kilometres from Brussels. It will take place over the weekend 11-12 May and will include a fox-hunt and mobile rally. Further information may be obtained from: F. Detraux, ON5KP, 42 rue de Revinaux, Ottignies (Bt).

Temporary mobile licences for visiting amateurs may be obtained without charge by sending full particulars of the equipment, vehicle and duration of stay in Belgium to: M. le Directeur General des Radiocommunications de la RTT, 42 rue des Palais, Brussels, 1. Applications should be made at once in view of the short time now available.

PA0AA

Due to a disastrous fire at the paint factory in which this station is located PA0AA will be off the air for some time. The equipment was damaged by water only but the aerials were destroyed. The weekly broadcasts will be continued from a station located in the Leyden area but the strength of the transmissions will be considerably less than that usually heard from PA0AA.

RTTY Operation

It has been pointed out by G3LLZ, the Honorary Secretary of the British Amateur Radio Teleprinter Group, that the listing of only one RTTY frequency in the Region 1 Band Plan gives the impression that operation is restricted to and around this spot. This, of course, is not so and the listing of a spot frequency on the 14 MHz band was by the request of the RTTY group at the last Region 1 Conference with the idea of suggesting a section of the band where activity on this mode should be concentrated. If RTTY operators would like spot frequencies designated in other bands the proposition can be made through the National Society at the next Region 1 Conference in May 1969.

IARU Membership

The National Societies of *Bulgaria* and the *Ivory Coast* were recently elected to membership of the IARU and in addition the *Amateurs Radio Algeriens* are now members of the Region 1 Division, which has 28 member societies.

ITU World Administrative Conference

Following the paragraph in this feature which appeared in the February issue of *Radio Communication*, the Final Acts of the 1967 Maritime World Administrative Conference are now available and there is no proposal to extend the h.f. maritime allocations beyond those already existing in the Radio Regulations (Geneva 1959). It seems unlikely that a conference which will deal with the frequency allocations of all services will take place in the near future although a further Maritime Conference has been requested for 1973 to deal solely with questions relating to coast stations.

Region 1 Conference 1969

The next triennial Conference will take place at the Hotel Metropole in Brussels in May 1969. At these meetings proposals submitted by Member Societies are considered by one of the three committees and later brought to a full Plenary meeting. There is usually a very full agenda but if any club or group has a proposition which it feels could be sponsored by the Society then this should first be sent to the appropriate RSGB committee for consideration.

UAMPT

These initials stand for *Union Africaine et Malagache des Postes et Telecommunications*. The 14 members of this Union comprise the former French territories in Africa and at a conference in Niamey in November 1967 the Union passed a recommendation the effect of which was to give duty free entry to radio equipment destined for amateur stations in their countries. This is an important concession and could prove to be a valuable stimulant to the development of amateur radio in the newly independent countries of Africa. This information came from F8RU, the Secretary of the International Amateur Radio Club at Geneva.

QTC

Class B Licence Extended

In a written reply on 11 March 1968 the Postmaster General (Mr. Short) stated that he had decided the Amateur (Sound) Licence B could be extended to permit operation in the radio frequency band 144-146 MHz. This facility is therefore now available to all holders of the Class B Licence.

This is an extension for which the Society has been pressing for some time and it is hoped that it will, in due course, lead to increased activity on the 2m band. By the terms of the Geneva Radio Regulations (1959) national administrations cannot issue transmitting licences for frequencies below 144 MHz without first requiring evidence in proficiency in sending and receiving the Morse code.

Beginner's Licence to be Introduced

In the second part of his reply on 11 March the PMG stated that " I have also decided to introduce a Beginner's Licence to encourage interest in radio by people not yet possessing the qualifications needed for a full Amateur licence. The details are still being worked out, but I expect to have it on issue by the Autumn of this year".

This statement came as a complete surprise to all concerned and as no details of the new licence are available comment is not possible. The Society had previously advised the GPO that it could not support a novice licence having in mind the regulations for this type of licence in the USA. The GPO has stated that as soon as details of the new licence are available they will be sent to the Society for consideration and discussion at a subsequent meeting between the GPO and representatives of the RSGB.

Details will be released as soon as possible and in the meantime members are requested not to make further enquiries to Headquarters on this subject.

Region 14 Representative

Mr N. G. Cox, GM3MUY, 191 Maxwell Avenue, Westerton, Bearsden, Glasgow, has taken over the duties of RSGB Representative for Region 14 from Mr A. F. Hunter, GM3LTW, who was elected to Council in January this year.

The Harrow Challenge

The Edgware & District Radio Society has noted with interest the Harrow "Challenge" in the February edition of *Radio Communication*, and while it is unable to match the financial heights of the Harrow Club, being only small in membership, it challenges this Club to provide a speaker who can choose his own radio subject to lecture at their new QTH in Mill Hill. For every minute spent lecturing the Edgware Club will pay one shilling from Club members' donations towards the Headquarters Fund. Further offers to increase the rate would be welcome. The maximum time for lecturing will be 1½ hours.

CLASS B FOR TWO METRES BEGINNERS' LICENCE

Radio Amateur's Examination, 21 May 1968

The Society will be providing an examination centre at the College of Preceptors, Bloomsbury Square, London, WC1, for the above examination. Applications to sit the examination must be sent to the General Manager, RSGB, accompanied by the entry fee of £1 15s. for members of the RSGB or £2 5s for non-members. The closing date for entries is 17 April, 1968.

CQ Magazine

We have been taken to task over a paragraph in the February issue announcing a subscription increase for *CQ Magazine*. The cost of US subs has apparently risen, but this does not affect orders from the UK which remain at $6 per year, $10 for two years and $14 dollars for three years. RSGB can handle orders for *CQ* in sterling at the current exchange rate of 8s. 4d.

Annual Camp in Holland

The Annual Camp organized by VERON, the Dutch National Society, will be held this year on 31 May, 1, 2 and 3 June, at a site one mile south of Amersfoot. Hotel accommodation and restaurants are within easy reach, and it is hoped that this will encourage visiting amateurs to take their wives and families with them. Arrangements can be made in advance by writing to W. Kerstens, Machtegaalspad, 2 Arnhem, Holland.

A camp station will be in operation with the call-sign PA6AA and it will be possible for British amateurs to obtain special short-term licences. Application should be made to Radio Controledienst, Kortenaerkade 12, The Hague, Holland, enclosing a copy of your British licence.

Pirates Fined

As a result of Post Office enquiries into the suspected unlicensed use of wireless telegraphy transmitting equipment, the following convictions have been obtained on using wireless transmitting apparatus without the appropriate licence, contrary to the provisions of Section 1 of the Wireless Telegraphy Act, 1949.

At Dartford Magistrates' Court on 20 November, 1967 a Mr Colin George Poore of 23 Selborne Road, Sidcup, Kent and a Mr David Stapleton Cotton of 1 Hurst Court, Station Road, Sidcup, Kent, were each fined £10 and ordered to pay £5 5s. costs with forfeiture of transmitters.

At Nuneaton Magistrates' Court on 23 November, 1967 a Mr Graham Harold Clarke of 117 Bermuda Village, Nuneaton, Warks., was fined £5 and ordered to pay £5 Advocates' fee with forfeiture of transmitter.

At Linsdale Court, Bletchley on 5 December, 1967 a Mr Jack Sharratt of 10 Pebblemoor, Eddlesborough, Dunstable, Beds., was fined £20.

And at Liverpool Magistrates' Court on 13 December, 1967 a Mr Frank Stuart, 56 Kensington, Liverpool 7, was given a conditional discharge and ordered to pay £15 15s. costs with forfeiture of equipment.

New Publications

New editions of the "**Guide to Amateur Radio**" and the "**Amateur Radio Circuits Book**" are now in preparation and will be available from Headquarters in about four weeks time.

Due to rises in the cost of printing and also the cost of paper, it has been necessary to increase slightly the prices of these two publications. The cost of the *Guide to Amateur Radio* will be 6s. 9d. (post paid) and that of the *Amateur Radio Circuits Book* will be 11s. 6d. (post paid).

The *Amateur Radio Circuits Book* has been enlarged and contains many new features. The volume has a spiral binding which proved popular with the previous edition.

Orders for these new editions can be placed with Headquarters for delivery on the day of publication.

Special Events Stations

GB2PS at the Peterborough Show, 16-18 July. Further details later.

GB2OHE from the Hobbies Exhibition, the Town Hall, Oswaldtwistle, Nr Accrington, Lancs., 27-30 March, 1968. Operating on all bands from 160m to 70cm from 3 p.m. to 9 p.m. and will include many special exhibits including CCTV. Special QSL Card available.

GB3MHE from the Rotary Club Hobbies Exhibition, Margate. Thanet Radio Society will operate from Lausanne School, between 24–27 April on 80, 40, 20, 15, 10, 4 and 2m A3 with special QSLs.

RAOTA Reunion—3 May, 1968

The 10th Annual Reunion of the Radio Amateur Old Timers' Association will be held at The Horse Shoe Hotel, Tottenham Court Road, London, W1, on Friday, 3 May, 1968, at 7 p.m., with cocktails from 5.30 p.m. The Chair will be taken by Mr Arthur Milne, G2MI. The cost of the meal is 30s.

Membership of RAOTA is open to any radio amateur who has held a transmitting licence issued by the British Postmaster General for an unbroken period of 25 years, including the war years. Radio amateurs who held an Artificial Aerial Licence at the outbreak of the war in September 1939 and obtained a full licence during 1946 are also eligible to apply for membership. The life membership subscription is 21s. (which covers also the cost of a distinctive call-sign lapel badge) and the Association operates a Benevolent Fund. An application form and further details can be obtained from the Founder-Secretary (John Clarricoats, OBE, G6CL), 16 Ashridge Gardens, London, N13. The Association now has a membership of 226.

21/28MHz CONTEST 1967

The entry from G3KMA was inadvertently omitted from the published results in last month's *Radio Communication*. G3KMA scores 3920 points, and therefore is in tenth place. Stations with less than this number of points, move down one position. We offer our apologies for this error.

Change of Call-Sign

Member N. Ashmore, of County Durham, who hitherto used the call-sign G3TBL, has obtained permission from the Post Office to perpetuate his late father's call G3NSI.

German Radio Amateur Meeting

The Wolfsburg branch of the DARC are organizing a radio amateur meeting which will take place in the Volkswagen City on Friday, Saturday and Sunday, 31 May and 1/2 June. Overseas amateurs are cordially welcomed and fee for participants is DM.6 per person which will provide entry to all events. Intending visitors should write to Gerd Schnabel, DJ7GS, 316 Wolfsburg, Rontgenstrasse 26, German Federal Republic, who will deal with requests for accommodation. Visitors who will arrive by car are asked to mention this when writing.

Our Public Relations

So many members have sent me newspaper cuttings regarding the Corston TVI case and the allegations that radio amateurs were interfering with the Arctic Expedition communications that it would be uneconomic for the Society if I were to acknowledge each letter separately.

I am most grateful, however, for the members' co-operation and hope that lack of personal acknowledgement will not prevent members from carrying on the good work and alerting me of every instance of Press coverage about Amateur Radio, be it flattering or otherwise!

SYLVIA MARGOLIS

Obituaries

Philip Fennel Dunford, G3AUF

It is with deep regret that we record the sudden death of "Phil" Dunford in his home at Stratford-upon-Avon on 9 February. He was 60 years of age.

Phil spent his entire life in radio communications, first as an operator on board ship and later with the GPO. He served in the Rugby transmitting complex and finally at the Post Office Receiving Station at Bearley where he was working up to his death. During the last few years he took a great part in the recently completed modernization of that Station.

He was issued with the call-sign G3AUF just afterWorld War II and was interested in all aspects of Amateur Radio although his first love was c.w. at which he was a past master. He was a long standing member of the Society and a founder member of Stratford Radio Club. Phil was an ardent supporter of NFD both as a constructor and as an operator.

Phil was a kindly, generous and very modest person with an ever open shack and a never failing patience with exasperating students of the Morse code. He will be sadly missed by all of us who knew him. He leaves a widow to whom we offer our sincere sympathy.

M. J. W. W.

Arthur R. George, G2MX

The death occurred in early January of A. R. George, G2MX of Fishpool, Nr Mansfield, following a heart attack. Arthur, who was an ex-Marconi ship's operator, moved to a new house which he had built some eighteen months ago in open country near Newstead Abbey, from which he was usually heard on 80m.

Our sympathy goes to his widow and son and daughter for their loss.

F.N.F.B.

Charles F. Woodward, GW5WO

The sudden death of Charles F. Woodward, GW5WO, came as a great shock to his many friends in the Conway Valley Amateur Radio Club (of which he was Vice-Chairman).

Although he was only amongst us in North Wales for a relatively short time, Charles had endeared himself to us all with his capacity to participate in local amateur activities. He was actively engaged in mobile and fixed station working on all h.f. bands (s.s.b.) until his death. Charles hailed from Wolverhampton and we feel sure that his many friends in and around the Midlands will join with us in this tribute to him.

Radio amateurs throughout the world will miss him. His many friends will take some comfort in the fact that no one could have had more pleasure from Amateur Radio than Charles did, in over 30 years of operating.

We extend to his widow and family our deepest sympathy in their great loss.

R. J. and M. W.

LETTERS TO THE EDITOR

Neither the Editor nor the Council of the Radio Society of Great Britain can accept responsibility for views expressed by correspondents. Letters for inclusion in this feature should be concise and preferably not more than 200 words in length.

The Georef System

From: W. Baker, G3HDQ, Alvechurch, Birmingham

G3JKV's article on the Geroef system[1] has convinced me, and doubtless many others, of its superiority over QRA in simplicity, accuracy, ease of understanding, world-wide applicability and lack of ambiguity. Will someone now show us how it can be applied in a simple manner to determine distances between Amateur Radio stations, as required by v.h.f. contest operators to arrive at their claimed scores, and by Contest Committees for checking purposes? Georef must be excellent for NATO which doubtless has all the maps of suitable scale and adequate Lat. and Long. markings necessary for adequate determination of locators, as well as computors for the calculation of distances; but these are facilities not available to the average amateur!

For inter-G working Georef locators could be converted to National Grid co-ordinates for calculation of distances by the rule of squares without too much difficulty, but calculation of distances from circular co-ordinates would be much too complicated where a lot of data has to be processed. Measurement on a map involves either a standard map overprinted with a grid (which G3JKV rightly wants to get away from), or the snags discussed by G3HRH[2], in either case the potential of greater accuracy would probably be sacrificed.

I suggest that it is premature for the V.H.F. Committee to canvas support from members for any proposal to replace QRA by Georef, until it has been explained how the amateur can apply Georef to the calculation of distances between stations.

[1] *Radio Communication*, January 1968.

[2] "QRA Locatormanship," G3HRH, RSGB Bulletin, March 1965.

G3JKV replies:

It appears that Mr Baker has based his entire letter on a misconception which it is all the more difficult to understand arising because of his obviously close reading of both G3HRH's article and my own.

This is that Georef is based on spherical (not circular) co-ordinates whereas QRA is not. In fact, both systems are based on lat./long. and differ only in their method of lettering and numbering, and subdivision. It has been my intention only to show that the QRA method is unnecessarily clumsy and complicated compared with Georef, and I am glad that G3HDQ agrees with me in this respect.

The National Grid, on the other hand, is not based on, and has no relationship with, lat./long. It is a truly rectangular grid, based on an arbitrarily chosen false origin off Land's End, and therefore its relationship with lat./long. in the form of either Georef or QRA cannot be defined easily. I fail to see how G3HDQ can claim that QRA can be converted to N.G., but not Georef, since the basic mathematics in both cases involve the conversion of lat./long. to N.G.

He has also misinterpreted me in claiming that I wish to get away from a grid overprint—I do not, since it is by far the easiest and simplest analogue computer I know. What I want to eliminate is the necessity as in QRA, of actually having to draw in the necessary lines between those already existing on most maps. Georef requires only that existing lines be lettered and numbered.

If the points between which distance is required are already plotted on suitable maps of either Georef or QRA, there can be no difference in the difficulty of actual measurement, nor in the errors if the maps are of similar projection and scale. Where the difficulties and errors arise is in the actual transference of position from a dot on a map to a series of letters and numbers and back again.

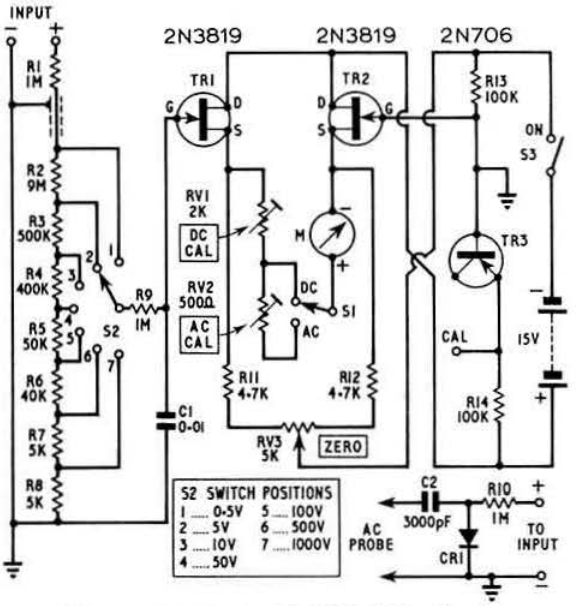
As for the claim that suitable Georef maps are not available to the average amateur, all G3HDQ has to do is to go to the nearest map and chart agent for HMSO, and he will find there a profusion of maps overprinted with Georef, in all styles and sizes! He should then try buying a QRA map from the same agent!

A Field Effect Transistor Voltmeter

From: J. E. Hodgkins, G3EJF, Bedale, Yorks.

May I be allowed a few comments on Mr Allenden's article in your January issue.

The cheapest generally available FETs appear to be the MPF105, advertised at 8s. each in the same issue. These are N-channel depletion type and could be used with the circuit shown for ZN3819s. It is perhaps worth mentioning that of the three FETs purchased one had such widely differing characteristics that it was difficult to zero the meter and anyone intending to build the voltmeter would be well advised to obtain one or two spares.



The amended circuit of G3LTZ's FET voltmeter.

The Calibrate Voltage obtained from the base/emitter junction of TR3 proved to be 7·5 volts in my case and this remained constant although the battery voltage was reduced from 15 to 12 volts. The change when the battery voltage was further reduced to 10 volts was less than half a volt. This is more than adequate. Total battery drain is 2 mA.

The a.c. probe given by Mr Allenden is the subject of my main criticism. Firstly the diode should be reversed to give the polarity shown on the output of the probe and if it is to be used to measure up to 1000 volts r.m.s. the diode will surely be subject to a peak inverse voltage of 2828 volts. A 1000 p.i.v. diode would not last long. The use of a rectifier type of diode will considerably restrict the frequency range of the meter due to the high capacitance of such diodes. As I could foresee little use for the meter at such high voltages I decided to restrict its range to 50 volts and go for better performance at r.f. At 50 volts r.m.s. the diode is subject to a p.i.v. of 141·4 volts so two OA81s were used in series. The type of capacitor used has a considerable effect on the frequency range of the probe and a Hunt's Super Moldseal Metallized Film Type M301/1 of 0·1 μF 250 volts working was found to be very suitable. This is a black tubular capacitor, made of a bakelite-like material, about an inch long but is unfortunately too large to fit into a ballpen case. A suitable case for the probe was found on the XYL's dressing table containing cuticle remover. Using the diodes and capacitor specified the frequency response was flat from 20 cycles (darn it, Hertz) to 10 MHz. Between 20 MHz and 100 MHz variations of up to 15 per cent occurred, probably due to probe resonance, and above the latter frequency the meter reading fell off sharply.

I sincerely trust that none of the above will be taken as "knocking" Mr Allenden's article; the meter has been used to measure voltages at a wide range of frequencies from many different sources using a professional valve voltmeter as standard. It has proved extremely stable and accurate.

SOCIETY AFFAIRS

A brief Report of the February 1968 Meeting of the Council

THE meeting was held on Friday, 9 February, and was attended by Messrs J. C. Graham, President in the Chair, B. Armstrong N. Caws, J. Etherington, R. J. Hughes, A. F. Hunter, E. G. Ingram, H. E. McNally, L. E. Newnham, A. D. Patterson, J. Petty, R. F. Stevens, G. M. C. Stone, J. W. Swinnerton, D. Thomas, G. Twist, E. W. Yeomanson (Members of Council), C. P. Pope (Secretary), A. E. Dowdeswell (General Manager) and T. R. Preece (Assistant Editor).

An apology for absence was received on behalf of Mr F. Parker.

Membership and Affiliation

Council approved the election of 125 Corporate and 40 Associate members. Nineteen members were transferred from Associate to Corporate Membership.

The following applications for Affiliation were accepted by Council.

Exeter University Radio Club, G3XEU.
Havering Technical College Amateur Radio Society.
Pudsey & District Amateur Radio Club.
Bangor & District Amateur Radio Society (Northern Ireland).
Ballymena Radio Club.
Gloucester Amateur Radio Society.
Etessa Amateur Radio Society, Ongar.

Publications

Council was informed that as a result of a wage increase together with a 12½ per cent rise in paper costs, the cost of producing *Radio Communication* would rise by 7½ per cent.

Reports of Committees

GPO/TVI LIAISON COMMITTEE

It was reported that as the result of an approach by the Society the GPO will grant facsimile facilities on individual application, transmission characteristics to conform to CCIR standards.

RAEN COMMITTEE

Mr J. Scarborough, Mr R. Ledgerton and Mr S.W Law were co-opted to serve on the RAEN Committee

V.H.F. COMMITTEE

The Council agreed that the bands 70cm, 23cm and 13cm are likely to be used for amateur space communication in the next decade and that accordingly authority for such use should be sought after consultation with IARU.

The frequency of GB3ANG is to be changed to 145·95 MHz to avoid interference with the RSGB News Bulletin on 145·8 MHz.

New Headquarters

Mr Caws reported that the response to the letter sent to all members was most satisfactory. It is hoped that work on the new Headquarters building will commence in the near future and the building be occupied before the RSGB Exhibition.

Meeting with G.P.O.

It was reported that four members of the GPO/TVI Committee, together with the General Manager, had had a two and a half hour informal meeting with the GPO. A report on the meeting was being prepared.

Accommodation for the December 1968 RAE

It was reported that the College of Preceptors could not provide two rooms for the Examination as before, and new accommodation was being sought.

Minutes of Committee Meetings

The following Minutes were approved.:
V.H.F. Contests Committee (27.11.67).
GPO Liaison/TVI Committee (28.11.67)
Mobile Committee (4.12.67)
RAEN Committee (16.12.67)
V.H.F. Contests Committee (18.12.67)
V.H.F. Committee (18.12.67)
H.F. Contests Committee (4.1.68)
Exhibition Committee (5.1.68)
Education Committee (13.1.68)
RAEN Committee (20.1.68)
GPO/TVI Liaison Committee (23.1.68).

The Council was in session for four hours.

Letters to the Editor

It Still Hertz

From: R. E. Molland, G3CNC, Reigate, Surrey.

Congratulations to the " reactionary " G3FKM for his outspoken remarks about the changeover to the Continental term " Hz " in " The Month on the Air " (Feb).

The reasoning behind the change to Hertz is also lost on me, and no doubt on many others. Have we suddenly become ashamed of the English language, or is this just another insidious piece of " Continentalization "?

If it is simply a matter of commemorating names we might as well go further to the stage where one travels by " Stephenson " from London to Dover and boards a " Noah " to cross the Channel. Those who wish to travel faster will board "Wrights " at the airport.

Listeners will be switching on their " Marconis " to hear the news and viewers will be watching their " Bairds." A ship's navigator will switch on his "Watson-Watt " in fog and will check his " Tompion " against daily Greenwich time signals. There is no end to this kind of nonsense.

Mobile Rallies and Insurance

From: W. G. Mott, Hornchurch, Essex.

Now that we are approaching the season for Mobile Rallies I suggest that motoring members of the Society who intend to take part in these events should examine carefully the present restrictions in their insurance policies.

During the last year many Insurers have amended their policies so as to specifically exclude indemnity for any claims arising during Competitions, Rallies or Trials. This is intended to apply to motoring events but Members would be well advised to ask their Insurers to confirm in writing that Amateur Radio Mobile Rallies are not considered as events outside the scope of the Motor Policy. A simple explanation should be sufficient and no extra premium will be demanded. If it is, then the remedy is simple.

I would also remind Members that the normal Private Motor Car Policy is void when passengers are carried for hire or reward, so, if friends are taken to a Rally take care with the " contributions."

Which Aerial?

From: H. Griffiths, G2DFH, Saltash, Cornwall.

In reply to G3RNL's report on aerial performance in the March issue of *Radio Communication*, I am of the opinion that he did not use the " Joystick " v.f.a. to the best advantage.

He used a short length of feeder connected to the bottom of the V.F.A. instead of the top, surrounded it with other aerials at greater height, incorrectly tuned it and possibly used an inferior earthing system. I have used a Joystick for over five years on sites where a more conventional type of aerial would not better its performance.

The Joystick V.F.A. was designed and manufactured for amateurs who had very limited space at their disposal and this is the basis of the manufacturer's claims, which are genuine.

I suggest that G3RNL give the Joystick a further test, observing manufacturer's instructions, and extending the test period to seven days on all bands.

The Sixth 7 MHz DX Contest

C.W. SECTION

Position	Call-sign		Points
1	GW3OAY	●	3781
2	G3POI	●	3436
3	G5RP		2139
4	G2DC		1995
5	GW3BQY		1900
6	G5PQ		1845
7	G3ESF		1700
8	G2QT		1650
9	GM3JZK	●	1645
10	G3RWL		1465
11	W2LXK	●	1310
12	G3DYY		1175
13	GW3NJW		1165
14	G3KZC		1150
15	DL2OM	●	1130
16	SM5BNX	●	1110
17	G3APN		1100
18	DL4RO		1025
19	YU1EXY	●	990
20	SM3WB		975
21	W1EVT	●	965
22	G3KSH		945
23	W4BYB	●	940
24	GI3SSR	●	930
25	ZC4RB	●	875
26	SM6DLY		825
27	SM5AOG		780
28	ON4XG	●	765
29	SM0TW		750
30	DJ4UF		745
31	SM5ARR		740
32	OZ2UA	●	727
33	DL5YX		710
34	G3LQI		700
	SM6ARH		700
36	DJ4HR		692
37	SM6ALJ		685
38	SM5CMP		677
39	G8KU		675
	SP2AEL	●	675
41	YU1NBQ		670
42	GD3AIM	●	665
43	SM5DRW		660
44	DJ3NA		650
	EP2BQ	●	650
46	YO2BC	●	630
47	F8TM	●	625
	OF9NV	●	625
49	SM2BYD		615
50	F5OJ		605
51	HB9DX	●	600
52	PA0ABM	●	597
53	F2LV		592
54	SP2LV		580
55	LA6U	●	570
56	YO9HP		562
57	OH1MY		550
58	UA1ZX	●	540
	UT5LF	●	540
60	OK2BIO	●	530
61	DJ8SG		525
	YU1AAO		525
63	YU1KO		522
64	SP5NE		507
65	YU4BMN		502
66	SP5ATO		500
67	ON8RA		475
68	G3GNS		465
69	LZ1KAA	●	450
	UY5CW		450
71	OH3MM		440
72	G3GMK		435
	YO3KSD		435
74	UP2BU	●	430
75	OK1KOK		420
76	KZ5TW	●	395
77	YO8GP		385
78	OK1AOV		380
79	F9DW		375
	UT5XB		375
81	YO3AAJ		372
82	YU1SF		370
83	OZ3LI		350
	YO1AW	●	350
85	SP5AIB		337
86	YO9APJ		330
87	YU1DKL		317
88	DL1RB		312
89	OH5WH		295
90	W4HOS		290
91	UW3HV		285
92	UA9KCE	●	250
93	SP8CGN		245
94	UI8AI	●	225
95	UA1KUA		220
96	F8SF		210
97	UC2AF	●	120
98	UT5SH		115

● Certificate of Merit

TELEPHONY SECTION

Position	Call-sign		Points
1	G3NYY	●	2895
2	G3NLY	●	2227
3	G5HZ		2095
4	ZC4RB	●	2030
5	EP2BQ	●	1850
	G3IAR		1850
7	CN8AW	●	1780
8	G3SME		1770
9	G3GEW		1545
10	G3DYY		1082
11	SM2AYE	●	1020
12	GM3RFR	●	995
13	G3PQF		990
14	EI6AS	●	957
15	DJ4AX	●	860
16	G3KSH		855
17	GM3JZK		837
18	SM3WB		817
19	SM0CER		815
20	F5OJ	●	805
21	G3ILO		779
22	G3RAA		720
23	SM5CMP		667
24	PA0GKO	●	662
25	OH1OE	●	580
26	K4CGC	●	550
27	I1PHN	●	484
28	OZ3SK	●	475
29	HB9DX	●	455
30	OH0NI	●	427
31	ON4XG	●	420
32	YV4IQ	●	400
33	W1DIT	●	395
34	W3AZD	●	365
35	OH3NY		355
36	YV5BPG		325
37	F2VX		292
38	YO3AID	●	235
39	OZ7DX		130

● Certificate of Merit

RECEIVING SECTION

Position	Telephony Identification		Points
1	BRS26431	●	2416
2	G11051	●	2385
3	A4266		2210
4	BRS26444		2180
5	BRS27987		2110
6	A3942		2015
7	A5224		1950
8	R. T. Jackson		1830
9	BRS28198		1740
10	BRS18461		1715
11	BRS25429		1690
12	A5105		1680
13	A5546		1665
14	BRS26189		1580
15	A5154		1520
16	A5544		1480
17	BRS2780		1335
18	A5563		1325
19	A5315		1315
20	BRS27575		1295
21	BRS29641		1285
22	BRS26003		1255
23	BRS27330		1210
24	A4378		1185
25	A5032		1050
	A5135		1050
27	A4574		1020
28	A5126		985
29	A4884		975
30	G. M. Axtell		970
31	EI-221	●	850
32	SM5-2735	●	810
33	A5379		800
34	VE3-11606	●	760
35	UB5-45067	●	605
36	A5489		470
37	A5505		415
38	WPE7BLN	●	350
39	ONL-383	●	345
40	WIAL6042	●	250

● Certificate of Merit.

Position	C.W. Identification		Points
1	A3942	●	1715
2	BRS15822	●	930
3	WIAL6042	●	550
4	BCRS195	●	450
5	ONL-383	●	370
6	UQ2-037-10	●	360
7	UA4-13321	●	285
8	UB5-06035	●	250

● Certificate of Merit.

The upward curve of the sunspot cycle, thus improving conditions for higher frequencies, is possibly mirrored in the partial decline of the 7 MHz contest. This applies mainly to the c.w. section with 98 entries, the lowest for the six years in which the contest has been organized. The telephony section has kept up with previous years, so also the receiving sections but no appreciable increase is to be noted.

A smaller number of entries must in no way detract from the fine efforts made by the winner and runner-up in the c.w. section. Their final scores are by far in excess of other competitors.

R. N. Graham, GW3OAY, is the winner with 3781 points, using a home-built transmitter into a dipole at 40 ft. and an inverted-Vee at 35 ft. GW3OAY was placed first in the multi-operator section last year. Taking second place with 3436 points is C. S. Penna, G3POI, who forsook crowded London for Emsworth, Hampshire. Participating for the first time in the Telephony section, W. A. F. Davidson, G3NYY, has won the event with 2895 points, giving him a comfortable margin over R. Smethers, G3NLY who scored 2227 points. G3NLY has taken part in five successive 7 MHz telephony contests and has finished 2nd, 6th, 6th, 4th and now 2nd again. This consistency is to be admired.

For those who like to know what equipment the leading stations used, G3POI had a KW2000A into a 400 ft. per leg Vee beam on the USA, a groundplane and dipole. G3NYY had a Collins KWM-2 + 30L-1 linear amplifier into a 135 ft. Zepp-fed, while G3NLY had a Viceroy plus SB200 into a ground-plane.

The Telephony Receiving section has been won by J. Skidmore, BRS26431, with 2416 points. Taking part for the first time in 1966 ,

he was placed eighth. Second position goes to R. Williams with 2385 points. Having been placed third and second in the two previous years in the c.w. section for listeners, A. A. Goacher, A3942, takes first place with 1715 points. Runner-up with 930 points is R.W. F. Thomas, BRS15822.

Conditions for both sections of the contest were varied but nobody claims them to have been good. Europe and the USA took the most prominent part in the event. There were about a dozen c.w. contacts with VK, one with ZL but none with JA or other Pacific areas. ZL1AGO was good enough to report that in the telephony section he heard, but could not make contact with, G5HZ and several other British Isles stations.

There were a few c.w. and telephony contacts made with South and Central America but surprisingly little was heard from VE. A breakdown of the leaders' logs gives the following information.

The clash of the c.w. section again with the OK DX Contest is very unfortunate. This is despite notification by the RSGB to the IARU well in advance as in previous years.

Call-sign	Total contacts made in value of points				Contacts with Bonus
	5 points	15 points	25 points	50 points	
GW3OAY	244	86	4	6	44
G3POI	235	83	3	2	43
G3NYY	179	55	13	—	43
G3NLY	132	40	8	—	38

The standard of log-keeping was very good except for one or two cases of duplicate contacts. There was even a triplicate contact! The Contests Committee wishes it to be noted that YO and LZ are in Europe and therefore are worth only 5 points.

The Contests Committee wish to thank the following for their useful and always welcome check logs: (C.W.) DM2CCM, DM4ZL, OF3TR, OK1ZW, OK2BFX, OK2KNN, PA0MIB, SM3BCS, SM5UU, SM0BDS, UR2DE. (Telephony) CT1RR, DM6YAH, G3JFY, G8NF.

Cumulative Activity Contests—Winter 1967

144 MHz Contest

Position	Call-sign	Score	QSOs	Best QSO (km)	QTH	Aerial
1	G2WS	8541	52	522	Weston-s-Mare	4/4
2	GW3FSP	7163	35	558	Pencoed	10 ele.
3	G3IGV	6271	22	570	St. Austell	6/6
4	G3TCG	1424	15	237	Horndon, Essex	6/6

There was a disappointing entry for this contest, only four logs being received. Congratulations, however, go to the winner, G2WS, who turned in excellent logs for all periods. Subject to Council approval, he will receive a Certificate of Merit.

The opening on 18 November provided the best conditions for G2WS and for GW3FSP, both of whom made contact with PA0PMQ for their best QSOs of the contest. G3IGV in Cornwall and G3TCG both found 7 October to be best for them. On that night, G3IGV worked a string of French stations, the best DX being F1RM at Chateauroux, Indre, while G3TCG had a good contact with GW3GHC in Cardiff.

A constructive report accompanied the entry from G2WS. Among other suggestions was one that there should be a break between the 144 MHz and 432 MHz sections and to this the Committee has agreed for future contests. Consideration is also being given to the inclusion of 70 MHz and 1296 MHz sections in similar Contests but, in view of the poor response for this period it hardly seems as if there would be much demand for this. However, the Contests Committee would be pleased to have comments on this proposal. The number of logs required for each section is also under review.

Several requests have been made for more prominent notice in *Radio Communication*. In future, Cumulative Activity Nights will be included in the Contest Diary and announcements will be made on the GB2RS News Bulletins.

A. H. D.

432 MHz Contest

Posn.	Call-sign	Score	QSOs	Best QSO (km)	QTH	Aerial
1	G8AKE	8670	75	544	Melton Mowbray	2 × 14 ele
2	G3NNG	7843	58	576	Faringdon	6/6 Slot
3	G3PMH/A	6727	83	375	March	8/8 Slot
4	G2XV	6471	54	260	Nr Cambridge	40 ele Stack
5	ON4HN	6382	21	420	Zomergem	64 ele Colinear
6	G8AUE	6264	60	420	Nr Matlock	18 ele Parabeam
7	G8AWO	5455	63	440	Welwyn G.C.	2 × 18 ele Parabeam
8	G8AOD	5266	52	365	E. Grinstead	10 ele.
9	G8ARD	4045	34	240	Yeovil	18 ele Parabeam
10	G8ADC	3508	44	229	Nr Luton	14 ele
11	G8AJC	3440	17	420	Canterbury	18 ele Parabeam
12	G8ANS	2824	56	275	Brookmans Park	18ele Parabeam

Only 12 entries were received for this contest compared with 31 for the Spring event. Of the 12, eight were from Class B licensees and one was from Belgium, represented by a 70cm "regular" Henri Van Gastel, ON4HN.

The winner was John Warrington, G8AKE, of Melton Mowbray, Leicestershire. His two 14 element Yagis at 45 ft., driven by a 4CX250B with 150 watts input yielded 75 scoring contacts during the first, second, third and sixth operating periods.

Runner-up was C. L. Desborough, G3NNG, of Faringdon, Berks with 58 contacts in the first, second, sixth and seventh periods. His contact with DL1OX was the best recorded, at 674 km. In contrast to G8AKE, G3NNG was using 10 watts to a DET24 and a slot fed 6-over-6.

The most favourable conditions for most of the contestants occurred on 18 November. ON4HN made his entire score from 21 contacts in this period, all with G stations. The extent of the opening is indicated by the logs of G8ANS and G8AWO, 8km apart in Hertfordshire. In the first half of the period, G8ANS worked ON4HN, F8NJ and GW8ASA. At the same time G8AWO was exchanging signals with PA0PCR, DJ1IH, and G3ILD (Darlington). It is strange to note that two of the S9 contacts between the two Hertfordshire stations contained errors in logging!

There were few comments with the entries but G8AUE requested that future cumulative contests should be based on clock time. This will shortly be made easy by the adoption of BST (British Standard Time) throughout the year.

G8AFA of Yeovil sent a check log with a plea that portable stations should be allowed to enter, either in a separate section or with a points handicap.

Subject to Council approval, a certificate of merit will be awarded to G8AKE.

A. J. G.

CONTEST NEWS RULES—RESULTS

High Power H.F. Field Day

13–14 JULY 1968

The rules for this experimental multi-operator c.w. portable event have been framed around the suggestions put forward in recent NFD correspondence and the answers given in the last questionnaire. The contest is open to Affiliated Societies and RSGB groups in the UK and at British Service Establishments overseas. Each group may enter one station, which can use a power input of 150 watts (or less), and can operate on any, or all, of the h.f. bands, 3·5, 7, 14, 21 or 28 MHz. Operation must be from a portable location and no power for any part of the station may be derived from public or private supply mains. No prior notification of entry or site is required and there are no restrictions on the equipment, or the type and number of aerials that can be used.

1. The **General Rules** for RSGB H.F. Contests, as published in the January 1968 issue of *Radio Communication* will apply, except as amended or superseded by the contest rules below. In particular the attention of entrants is drawn to General Rules 1, 3, 4, 6 and 7.

2. When: from 17.00 GMT on Saturday, 13 July to 17.00 GMT on Sunday, 14 July 1968.

3. Eligible Entrants: any group of members resident in the UK, or any Society affiliated to the RSGB, either in the UK, or at a British Service Establishment overseas. Each entering group must nominate a person to be responsible for their entry, and to certify on the contest cover sheet that the station has been operated within the rules and spirit of the contest.

4. Operators: each operator must hold a current British (GPO) Amateur (Sound) Licence A, a valid GPO Amateur Radio Certificate or an equivalent licence issued to a member of the British Armed Forces stationed outside the UK.

5. (*a*) **Type of Emission:** the contest is restricted to the use of c.w. (A1).

(*b*) **Location:** For purpose of General Rule 7, this is a Portable Contest.

6. Contest Exchanges: an exchange of reports must be made and acknowledged before points may be claimed. In contacts made by competing stations the report must include a rising serial number commencing with 001 and increasing by one with each successive contact made by the station (e.g. RST 579001), etc., and such serial numbers, both incoming and outgoing, together with signal reports, must be entered on the log sheets.

Only the signal report from a non-competing station need be logged. Proof of contact may be required.

7. Scoring: three points may be claimed for a contact with a fixed station and six points for a contact with a portable station. These apply, irrespective of the location of the station being worked.

8. Logs and Entries:

(*a*) *Logs:* must be tabulated in columns headed (in this order); " Date/Time GMT "; " Call-sign of station worked"; " My report on his signals and serial number sent "; " His report on my signals and serial number received " (where applicable); " Call-sign of operator "; and " Points claimed."

(*b*) *Cover Sheets* must be set out in accordance with General Rule 4, but additionally must include the name, call-sign and address of the person responsible for the entry (who must also sign the declaration), the name of the entering group (or Affiliated Society), details of the power supply used and the name and call-sign of *every* operator. (*Entrants please note that no printed cover sheets are available for this contest*).

FAILURE TO COMPLY WITH ANY PART OF THIS RULE WILL RESULT IN AUTOMATIC DISQUALIFICATION.

(*c*) Entries must be postmarked not later than Monday 27 July 1968.

9. Awards: at the discretion of Council, Certificates of Merit will be awarded to the leading G, GC, GD, GI, GM, GW stations and to the leading overseas entrant and runner-up.

Second 1·8 MHz Contest 1967

Position	Call-sign	County	Total QSOs	Score
1	GW3OAY	MH	142	820
2	G3BMY	SE	119	710
3	G3JEQ	SY	116	684
4	G6BQ	KT	117 (2)	670
5	G3IGW	YS	116 (2)	648
6	G3TEL	BE	109	636
7	G3SJJ	NM	108	632
8	G3BFP	SY	108 (1)	627
	G3PWU	BE	121 (1)	627
10	G3GVA	WK	103	618
11	G3JVJ	SX	103	614
12	G3SVW/A	LE	103 (1)	611
13	G3OLB	GR	106	604
14	GM3KHH	BF	102	600
15	G3SQX/A	WK	98	588
	G3TIR	SX	100	588
17	G3BDQ	SX	101	586
18	G3LHJ	DN	95	564
19	G2DC	HE	96	552
20	G3BIK	ND	91	546
21	G3JTW (Op G3RZP)	EX	94 (5)	525
22	G3TAA	LD	83	492
23	G3SKC	MX	82	486
24	GM3FXM	FE	81	480
25	GM3KMR	MN	80	474
26	G2MJ	LE	79	456
	G3IGZ/A	KT	76	456
28	G3USE	BD	78	452
29	G3RSD	LN	78	450
30	G3JNJ	MX	80	446
31	G3OVL	SY	72	432
32	G3SFR	HE	73 (1)	429
33	G3VIP/A	LN	73	426
34	G3VNC	HF	71 (1)	417
35	G3KMI (Op G3WWC)	HE	73	404
36	GM3UKG	BF	70	378
37	G3MFJ	YS	62	372
38	G3KMM/A	ST	63	348
	G3NSY	SE	58	348
40	G3VPW	NM	56	318
41	G3UFY	SY	49	276
42	G3UJX	CH	50	272
43	GW3GWX	CV	45	270
44	G3JFY	HE	45	264
45	G5AAQ (W3TWD)	LD	39	234
	G3DGN	HF	43	234
47	G3WIT	HE	40	232
48	G3TPJ	EX	40	222
49	G2XP	SY	37	216
50	GI3RNY	AM	34	192
51	G2HDR	GR	30	164
	G3VXV	WK	29	164
53	G3VDG	SD	26	152
54	G3RPJ	WK	23	138
55	G3WSN	EX	25 (4)	130
56	G3WRR	SY	8	48

Figures in brackets are the number of QSOs scoring 3 points.

Entries not accepted: G3GIZ/A Multi-operator. Claimed score 438
G3NPA Multi-operator. Claimed score 409

The Second Top Band Contest 1967, held on 18-19 November, resulted in a decisive win for Neil Graham, GW3OAY, who scored 820 points from 142 contacts. Subject to Council approval GW3OAY will receive the " Victor Desmond Trophy." The runners-up were Tom Cashmore, G3BMY, with 710 points, and Roy Steverson, G3JEQ, who made 684 points, and they will receive Certificates of Merit in due course. The leading Scottish entry was from William Cecil, GM3KHH, who made 600 points, which puts him some 120 points ahead of his nearest rivals—GM3FXM and GM3KMR—in the first round of the competition for the " Maitland Trophy."

Many favourable comments on the new scoring system were received. The basis for this scoring system was suggested to the H.F. Contests Committee by a well known and regular entrant in Top Band contests who has made an exhaustive study of these events for many years. The object is to handicap competitors who work large numbers of local and semi-local stations with comparative ease, and consequently this benefits the stations in remote areas. However, for the short contests, it would seem that perhaps the change-over from 6 to 3 points should occur after a somewhat smaller number of contacts with stations in any one country as very few of the entrants in this recent event were subjected to this handicap.

" Glad it was only five hours long as the last two hours were rather boring once I had established an overall lead," GW3OAY. " Congratulations (to the Contests Committee) on a change of scoring at last . . . the perfect time, length, and scoring," G3JEQ. " A very good contest as usual, five hours is plenty long enough," G3PWU. " Apart from stupid scoring system I enjoyed the contest," G3SVW. " Good to hear some recent call-signs among the more familiar ones," G2HDR. GW3GWX apologises for a fault in his netting system which caused him to miss many of the stations who called him.

Most of the logs were neatly written or typed on RSGB Contest Log Sheets, but there was a small minority of entries on non-standard paperwork. The H.F. Contests Committee reminds members that the rules for these Top Band contests demand the use of RSGB Contest Log Sheets. The reason is quite simple—it facilitates quicker checking. Log sheets and cover sheets are available on request from RSGB HQ. *Please* do not send your request for contest paperwork to the Contests Committee, or include it with your contest entry.

Thanks to all entrants who forwarded comments with their logs; the H.F. Contests Committee is always pleased to receive suggestions and comments, and these are invariably considered when the rules are reviewed. Thanks are also extended to G3BY, G3DWW, G3KPJ, G3SXW, G3VDF, G4VF, GD3VWN and GW3UCB for their check logs.

First 70 MHz (Open) Contest 1968

A total of 41 logs was received for this contest which took place on 11 February 1968. Two were from GW portable stations and two others, particularly welcome, from GI fixed stations. No GM stations were logged, but the GI operators both worked EI4AL/P and EI7AF/P located near Tullamore.

Section A was won by Roger Piper, G3MEH, of Coulsdon, Surrey. His homebrew QQV06-40 rig and a 4-over-4 aerial accounted for 98 contacts, the furthest being with G3NKL near Preston. Runner-up was John Butcher, G3LAS, operating from his new location near Hertford.

Leader in section B was Harry Parkes, G3NZS, assisted by G3OHC, G3PXZ and G3TGL. They made 89 contacts of which only four were within the 50km radius. G3JMB of Margate was their best contact at 275km. Runner-up was a group known as " Billericay Radio Amateurs and others."

Braving the elements in the portable class was Worcester V.H.F. Group, headed by Geoff Tibbetts, G3NUE, and Roger Allen, G3TQZ. They made 71 contacts, all but six of which were beyond 100km. The runner-up, G3VPK, had almost as many contacts but 38 of them were within the 100km radius. G8BGT was his second operator.

No single " best contact " was noted, those made by G3RLE/G3JHM/A, G3RLE/G3WSC, G3OYU/G3NKL and G3NEO/G3WYX/P being of approximately equal distances.

Logs were of a high standard and very few errors were found, but entrants are still urged to make sure that the information given on the cover sheet agrees with that given during each contact. Several stations appear to have transmitted locations in terms of miles while giving them in kilometres on the cover. One leading station lost many points by failing to transmit a QRA Locator to each contact as required by Rule 9b.

A large number of comments were received, mostly in connection with the new General Rules. All constructive suggestions will be considered by the V.H.F. Contests Committee. It is interesting to note that only seven QRA Locator maps were mentioned on cover sheets and of these only three were used exclusively, the others being in addition to other maps such as the Ordnance Survey 10 miles/in.

" Usual congestion 70·1 to 70·25 due to ' tuning low to high.' This shows opposition to band plan. Heard seven consecutive QSOs of a non-contest station and he never reached 70·3." (G3OCC). " These Sunday contests are far too long " (G3LAS). " Used to be on 56 ' Mc/s' so am staging a come-back " (G8LY). " Our ordeal was completely wasted due to the atrocious signal of a local well-known fixed station." (G3GBU/P).

Subject to Council approval, Certificates of Merit will be awarded to G3MEH, G3LAS, G3NZS, Worcester V.H.F. Group and G3VPK. nheck logs from G2WS, G3WBQ, BRS28005 and A5394 are ack-Cowledged with thanks.

A. J. G.

Section A

Posn.	Call-sign	Score	QSOs	Ft. A.S.L.	Aerial	Power
1	G3MEH	12350	98	520	4/4	50
2	G3LAS	12222	88	300	4 ele	45
3	G3RLE	11433	60	500	4 ele	50
4	G3OYU	10395	90	650	6/6	50
*	G3OHH	10136	65	1000	4/4	50
5	G3NEO	5655	42	380	3 ele	50
6	G6HD	3811	60	67	4 ele	15
7	G3NKL	3696	42	380	4 ele	18
8	G3FDW	2288	29	75	5 ele	50
9	G3OCC	2272	55	295	4 ele	20
*	G3PMJ	1836	39	250	5 ele	50
10	G3VSA	1620	41	180	4 ele	38
11	G3HTP	1593	59	100	3 ele	17
12	G3UUT	1182	22	70	4 ele	50
13	G3PUO	1048	31	500	4 ele	40
14	GI3VJS	874	33		4/4	50
15	G8LY	656	22	25	4 ele	42
16	G3VKI	612	30		3 ele	3
17	G5UM	585	15		4 ele	25
18	G3VFD	563	30	75		15
19	GI3WEL	442	22	180	4 ele	10
20	G3UFY	288	23		Dipole	10

* Received late, rule 2.
Disqualified: G3OJE Rule 9b.

Section B

Posn.	Call-sign	Score	QSOs	Ft. A.S.L.	Aerial	Power
1	G3NZS/A	28536	89	850	4 ele	40
2	G3OIT/A	12903	93	400	4/4	50
3	G3JHM/A	10988	73	500	4 ele	50
4	G3WSC	9938	84	480	6 ele	25
5	G3TXB	3895	68	125	4 ele	10
6	G3NGK	2272	46	340	3 ele	45
7	G3TDM	2242	54	150	4 ele	10
8	G3OUL	880	30	230	4 ele	18

Section C

Posn.	Call-sign	Score	QSOs	Ft. A.S.L.	Aerial	Power
1	GW3NUE/P	20868	71	1800	4 ele	25
2	G3VPK/P	11454	65	548	4 ele	12
3	G3RCV/P	7506	83		4 ele	20
4	G3SLJ/P	3666	48	798	4 ele	10
5	G3GBU/P	2503	41	1500	4 ele	15
6	G3VPW/P	1982	28	400	4 ele	10
7	G3WYX/P	1494	19		5 ele	50
8	G3LJR/P	1242	41	300	3 ele	15
9	G3VUM/P	779	24	1690	3 ele	5
10	G3PTQ/P	748	21	415	4 ele	25
11	GW3UCB/P	744	24	1590	6/6	30

Disqualified: G2ASF/P Rule 9b.

LOOKING AHEAD

19 May—Northern Radio Societies' Convention, Belle Vue, Manchester.

Mobile Rallies
12 May—Thanet Mobile Rally, Cliff Top site, Ramsgate.
12 May—Northern Mobile Rally, Harewood Park, Nr Leeds. Please note this date change from 19 May as previously announced.
26 May—East Coast Mobile Rally, Spa Hall, Bridlington.
16 June—Painton Mobile Rally, Bembridge Drive, Northampton.
23 June—RSGB National Mobile Rally, Gilwell Park, Essex.
30 June—11th Longleat Annual Mobile Rally, Longleat Park, Wilts.
6-7 July—Cheltenham Festival Rally, Pittville Park Cheltenham.
7 July—South Shields Mobile Rally.
14 July—Worcester Mobile Rally, details later.
21 July—Cornish Mobile Rally, Pentire Head, Newquay, Cornwall.
18 August—RSGB National Mobile Rally, Woburn Abbey, Beds.
25 August—Swindon Mobile Rally, Lydiard Park.
2 September—Peterborough Mobile Rally, River Bank, Peterborough.
2 September—Peterborough Mobile Rally on Riverside.

CONTESTS DIARY

6-7 April	—CQ WW WPX Phone Contest (see page 177, March)
6-7 April	—(PZK), 3·5-28 MHz, C.W.
20-21 April	—Second 70 MHz (Open) Contest (See page 129, Feb.)
27-28 April	—(VERON), 1·8-432 MHz
4-5 May	—First 1296/432 MHz (Open) Contest
4-5 May	—(RSF), 3·5-28 MHz, C.W.
19 May	—Fourth 144 MHz (Portable) Contest
1-2 June	—(DARC) 3·5-28 MHz, C.W.
8-9 June	—(UBA), 1·8-28 MHz, C.W.*
8-9 June	—National Field Day
23 June	—Second 432 MHz (Portable) Contest
24 June	—Fifth 144 MHz (S.S.B.) Contest
6-7 July	—Summer Top Band Contest
13-14 July	—High Power H.F. Field Day (see page 254)
21 July	—Third 70 MHz (Portable) Contest
3-4 August	—Sixth 144 MHz (Open) Contest
10-11 August	—(DARC), 3·5-28 MHz, C.W.
1 September	—(DARC), 3·5-28 MHz, C.W.*
7-8 September	—(DARC), 3·5-28 MHz, Phone
7-8 September	—V.H.F. National Field Day (provisional date)
15 September	—80m Field Day
21-22 September	—(SSA), 3·5-28 MHz, C.W.
28-29 September	—(SSA), 3·5-28 MHz, Phone
5-6 October	—Third 432 MHz (Open) Contest
12-13 October	—28 MHz Telephony Contest
12-13 October	—Second 1296 MHz (Open) Contest
19-20 October	—11th Jamboree on the Air
26-27 October	—7 MHz Phone Contest
7-10 November	—7 MHz C.W. Contest
11 November	—Seventh 144 MHz (S.S.B.) Contest
16-17 November	—Second 1·8 MHz Contest
1 December	—Fourth 70 MHz (C.W.) Contest

* Restricted to Members only

Radio Amateur Emergency Network

By S. W. LAW, G3PAZ*

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

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

WE have hinted on previous occasions that RAEN has no intention of remaining a static organization. It is now possible that the seeds so assiduously sown may bear some very interesting fruit. For example, many of us are aware that the Civil Defence organization in this country has given yeoman service in the troubled times of yesteryear and that the Government has now decided to decimate the service. As there are many in this country who are not in full agreement with this policy, a movement is on foot to continue the Service on a voluntary basis. This is gaining support in all quarters, and with the existing skills available is sure to be of inestimable value in dealing with all types of civil disaster. Since, however, all communications equipment is Government property, it will no longer be available to these groups. This is where RAEN comes in. True, at the moment, the licence under which we operate only permits a limited number of User Services to call upon us, but moves are afoot in certain quarters to extend our availability to cover a number of other fields. In recent times there have occurred certain emergencies which have not perhaps fallen strictly into the framework of the existing regulations, and to these the authorities have seen fit not to apply the letter of the law in view of the circumstances. It therefore behoves us, as responsible members of the Amateur Radio fraternity to so comport ourselves as to enhance our status in the eyes of the Authorities by demonstrating at all times that we are worthy to take the responsibility of any extension of privileges that may in the fullness of time be granted in the matter of third party communications.

The Committee

The RAEN Committee met at RSGB HQ on 2 March at 11.00. Present were the Chairman, G3BPT, Hon. Secretary E. R. L. Bassett BRS16075, and G3IIR, G6NZ, GM3LTW, G2UK, G3VK and G3PAZ. An apology for absence was received on behalf of G3MBQ, who has unfortunately succumbed to the rigors of the climate after his recent sojourn in the centrally heated environs favoured by his business associates on the other side of the Atlantic. The discussions, as always, were brisk and often to the point. As is often the case, Correspondence and Any Other Business produced as much of interest as the rest of the agenda, and it was 17.30 before the Chairman called a halt.

The RAEN Manual

Some explanation is due to those new members who have not yet received their RAEN Manual. The printing was about to start when a vital part of the machinery chose to break. An order was despatched to the makers for a new part, but the delivery date given was of the order of five months! Those who understand printing will realise that master material is not readily interchangeable to other types of machine once it has been prepared, and the cost of remaking can be prohibitive. Hence the unfortunate delay, for which the Committee again apologize.

Registration

Once again we must draw attention to the necessity for strict attention to the matter of registration. The Committee has been a little surprised to receive correspondence from individuals, and even Groups, who do not appear on the list of registered members. It is rumoured that one such " Group " has even sent in a complaint that its net frequency was in danger of being interfered with by certain (quite legitimate) arrangements! Let us repeat, unless you hold a current Registration Card issued and stamped by the Registrations Officer *you are not a member*. The address is at the head of this page, and a line to G2ABC will put you right.

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

The Lone Member

With the increasing interest in RAEN it is inevitable that some new members may find that their nearest Group is too far distant for practical purposes. Why not do a little canvassing and start a local Group (with the co-operation of any Controller for your County or Area). Five registered members may send an application to the RAEN Committee to form a Group and may nominate one of their number for the post of Controller. The Committee will then ratify the appointment, subject to their approval, and it is then up to the new Group to make such arrangements for their operation as may be suitable for their area. In all such matters the Committee will be only too ready to assist with advice and information.

Liaison

As an example of what can be done in the matter of liaison with a User Service, may we put forward the first-class relations which exist between the Surrey Group and the Police in the area. Not only are the Group's monthly meetings held in the well appointed lecture hall of the Leatherhead Police but arrangements are in hand for members to take turns sitting in on a spare communications console on certain evenings in the Communications Room at Police Headquarters in Guildford (the County Town of Surrey).

RAEN Contest

As promised last month we publish the balance of the Contest results. Where no county is given against the call-sign, no record is yet to hand as to the Group registration.

Transmitting section		
G3AIU	(Surrey)	99
G3MFB	(Surrey)	96
G3GOX	(Surrey)	78
G3LRU	(Surrey)	58
G2AVC	(Surrey)	57
G3SAW	(Norfolk)	57
G3HRK	(Norfolk)	56
G8SM	(Surrey)	56
G6QN	(Surrey)	54
G3VSY	(Norfolk)	50
G3MEH	(Surrey)	48
G3PAZ	(Surrey)	47
G3NLR	(Cheshire)	45
G3PAY	(Norfolk)	42
G3VJK	(Norfolk)	39
G3WPG		39
G3HPR	(Norfolk)	38
G3OPX		36
GW3UUS		33
G3MWV	(Norfolk)	31
G3VDQ	(Cheshire) (XYL)	30
G3OEP	(Norfolk)	26
G3PAI	(Essex)	25
G3JXA	(Surrey)	25
G3KJU	(Suffolk)	22
G3NTV	(Norfolk)	22
G3NHU	(Norfolk)	20
G3JMU	(Suffolk)	20
G3VSV	(Norfolk)	18
G3GVR	(Hants)	17
G3JEQ	(Surrey)	12
G3PHS	(Surrey)	12
G3RQY	(Norfolk)	12
G3SZ	(Norfolk)	11
G6ZG	(Norfolk)	8
G3KTL	(Chesh. nr. Man.)	6
G3LQI	(Sussex)	5
G3VET	(Norfolk)	5
G4KO	(Norfolk)	2

CLUB NEWS

REGULAR FEATURE

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

REGION 1

Ainsdale (ARC).—10, 24 April, 8 p.m., 77 Clifton Road, Southport.
Allerton (Liverpool) (SRHS).—Thursdays, 8 p.m. 3rd Allerton Scout Group Headquarters, Church Road, Woolton, Liverpool.
Ashton under Lyne (AUL & DARS).—Fridays, 7.30 p.m., 6 Stamford Street, Stalybridge.
Blackburn (ELARC).—4 April, 2 May, YMCA, Limbrick, Blackburn.
Blackpool (B & FARS).—Mondays, 8 p.m., Pontins Holiday Camp, Squires Gate. Morse tuition from 7.30 p.m. *New* Secretary J. Boulter, G3OCX, 175 West Drive, Cleveleys, Blackpool.
Bury (B & RRS).—9 April (Surplus Equipment Sale), 8 p.m., George Hotel (Private room), Market Street. The club net which used to take place on Tuesday evenings has had to be temporarily abandoned owing to QRM but Sunday noon still finds many of the club's members in QSO on Top Band. The " Budget Stereo ", lecture which was to have been given at the last meeting had to be postponed until October and so the night was passed in discussion on proposals for a new club room, the Amateur Radio Convention to be held at Belle Vue later this year and ways and means to raise funds in order to purchase a transceiver for the club. Secretary: A. Cooper, G3VVQ, 411 Holcombe Road, Greenmount, Bury.
Chester (C & DARS).—Tuesdays, 8 p.m., YMCA, Chester.
Crewe & District.—6 May, 8 p.m., 80 Albert Street.
Eccles (E & DRC).—Tuesdays, 8 p.m., Patricroft Congregational Schools, Shakespeare Crescent, Patricroft. Every Thursday Club Top Band net 20.30 hours. Recently the Club staged an Exhibition which received favourable comment in the Local Press. This included equipment made by Members from the age of 10 upwards. Secretary: J. A. Jennison, Carr Road, Higher Irlam.

September, 1966, saw the regrettable passing of G3LWQ, a very keen c.w. operator who resided in Southport, Lancs. At the suggestion of VO1FB, who was one of G3LWQ's RAE pupils the Ainsdale Radio Club felt that a fitting memorial would be a Rosebowl, to be won annually by the leading 160m. c.w. station in RSGB Region 1, on NFD. A Rosebowl was obtained and is seen being presented to the RSGB Region 1 Representative, Basil O'Brien, G2AMV, by the Ainsdale Club's Chairman, G8QG. The Trophy is to be known as the Harold Hilton (G3LWQ) Trophy. *(Photo by G3KXC)*

Leyland Hundred Amateur Group.—Weekly net each Thursday at 19.15 GMT (1915 kHz).
Liverpool (L & DARS).—Tuesdays, 8 p.m., Conservative Association Rooms, Church Road, Wavertree.
(NLRC).—12, 26 April, 10 May, 8 p.m., Landsbury House, 13, Crosby Road South, Liverpool 22.
Macclesfield (M & DRS).—9, 23 April, 7 May, 8 p.m., The George Hotel, Jordangate.
Manchester (M & DARS).—Wednesdays, 7.30 p.m., 203 Droylsden Road, Newton Heath, Manchester 10. On Wednesday 21 February the Society welcomed members of the Oldham Rover Mountain Rescue Group, who gave a very interesting and entertaining lecture and slide show on Mountain Rescue. On Thursday 22 February, Members visited the Group's Headquarters where G3IOA gave a return lecture on Amateur Radio, with demonstration by G3JIB. If things have gone according to plan, when this contribution is in print, the Society will have suffered the long dreaded lecture on Radar by the Hon. Sec. on 20 March! G3ETU is due to give his lecture on Power Supplies on 17 April hecklers welcome. GB3BVC is the call sign to listen for on Top Band 19 May when the Society will be Talking-in at the N.R.S.A. Convention at Belle Vue Gardens, Manchester. Hon. Secretary, G. Tillson, G3TJX, 95 Kelverlow Street, Oldham, Lancs.
(SMRC).—Fridays, 7.45 p.m., Rackhouse Community Centre, Daine Avenue, Northenden. 5 April (Activity Night), 12 April (Good Friday, Club closed), 19 April (Activity Night), 26 April (Home constructed equipment contest), 5 May (Activity Night).
North West V.H.F. Group.—Mondays & Tuesdays, 8 p.m., Club Headquarters, Chapeltown Street, Manchester 4.
Preston (PARS).—4 April (S.S.B. by G. Fare, G3OGQ), 18 April (Visit to H.M.S. *Inskip*), " Windsor Castle " (Private Room), St. Paul's Square.
St. Helens (SES).—16, 30 April, 7.30 p.m., I.V.S. Centre, 55 College Street.
Southport (SRS).—Wednesdays, 8 p.m., and Sundays, 2.30 p.m., The Esplanade.
(73 S.S.B. Society).—Tuesdays, 8 p.m., (all commencing with a talk on part of the RAE Syllabus), 73 Avondale Road North, Southport.
Stockport.—3, 17 April, 1 May, Royal Oak Hotel, Castle Street, Edgeley.
Warrington-Culcheth (CARC).—Fridays, 7.30 p.m., Chat Moss Hotel, Glazebury. 12 April (" Practical Uses of WWV " by M. Wise, G3IWE), 10 May (" Getting an extra S Point on Top Band," by A. Rigby, G3FGI), Hon. Sec. A. N. Edwards, 6 Ellesmere Road, Culcheth, Warrington.
Westmorland.—5, 19 April, 3 May, 7 p.m. The Allen Technical College, Sandes Avenue, Kendal.
Wirral (WARS).—8 p.m., Harding House, Park Road West, Claughton, Birkenhead. 3 April (" Modern Electronic Test Equipment," by R. Blain, G3NTI), 17 April (" Remote Tuning," General discussion), 1 May (to be announced). February meetings comprised a Junk Sale and a Lecture, with demonstrations of commercial equipment, by J. Stephens and H. James, G3MCN, of Stephen-James Ltd.

REGION 2

Barnsley (B & DARC).—12 April (No meeting), 26 April (Visit to ITA, Emley Moor), Meeting held on second and fourth Fridays in the month, 7.30 p.m , King George Hotel, Peel Street, Barnsley.
Bradford (BRS).—9 April (" Amateur Radio for Beginners" Tape /Slide by J. Swinnerton, G2YS), 23 April (Surplus Equipment Sale). Within the last two months, they have made more real progress towards Club Transmitting facilities than ever before. Early in January they acquired a good home-brewed transceiver, but permis-

sion from the College authorities to erect aerials still eluded them. In February we received permission, and though details still remain to be finalised, they are at last in a position to go ahead. All being well, 1968 should see (and hear) G3NN firmly established on the bands, providing incentive and, we hope an example to our younger members in a way nothing else can equal. Meetings held 7.30 p.m., Bradford Technical College, Great Horton Road, Bradford.

Halifax (H & DARS).—Fridays, 8 p.m., Sun Inn, Rastrick. Morse classes are held regularly for SWLs. *G3WLW.*

Northern Heights.—10 April (AGM), 24 April (Visit to Richard Allan Speakers, Batley). Meetings held 7.45 p.m., Sportsman Inn, Ogden, Halifax when there are some very good turn ups if the Lecture is sufficiently interesting. Membership is still keeping over the 50 mark. Recent lectures have been one on TVI/BCI by G3TCS and the junk sale by the amount of stuff looks like being a good one. Plans are going ahead for having quite a few demonstrations again this year.

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

South Shields (SS & DARC).—Fridays, 7.30 p.m. Trinity House Social Centre, Laygate, South Shields.

York (YARS).—Thursdays, 7.30 p.m., British Legion Rooms, 61 Micklegate, York.

REGION 3

Birmingham (MARS).—Third Thursday in the month 7.45 p.m., Midland Institute Margaret Street Birmingham 3.

(South).—First Wednesday of each month, 8 p.m., The Scout Hut, Pershore Road, Selly Oak.

(Slade).—Meetings will be held fortnightly in the Committee Room at " The Church House," High Street, Erdington. Meetings commence at 7.45 p.m. Secretary: D. Grant, 85 Stanford Avenue, Great Barr, Birmingham, 22a.

Bromsgrove (B & DARC).—Second Friday in the month, 8 p.m., Co-op Hall, Bromsgrove.

Coventry (CARS).—Fridays, 8 p.m., The Annex to the CD HQ, Canal House, Drapers Fields, Foleshill Road, Coventry.

Dudley (DARC).—5 April (Junk Sale), 19 April (Films). Art Gallery, St James's Road, Dudley.

Hereford (HARS).—5 April (Tape Lecture), Mortimer Hall, Mortimer Road, Hereford. At the February meeting, Sid Boakes, G3HXN of Daystrom Ltd. gave a talk on s.s.b. transmission together with a demonstration of Heathkit equipment. It is regretted that only 24 members managed to attend this meeting.

Leamington Spa (MWARS).—8 April, 28 Hamilton Terrace, Leamington Spa.

Salop (SARS).—25 April (Talk by RSGB President, John Graham G3TR). Old Post Office, Hotel Street, Shrewsbury.

Stourbridge (STARS).—The Library, Longlands School. Despite the " Arctic " weather 16 members arrived for the February meeting, to hear Tom Cashmore's, G3BMY, talk on TVI. Obviously quite a few members had experienced, or were still experiencing trouble with TVI so owing to interest shown a further talk or discussion will be arranged for a future meeting.

Stoke-on-Trent (SoTARS).—Thursdays 7.30 p.m., 2 Racecourse Road, Oakhill, SoT. Two lectures on V.H.F. and U.H.F. reflected the predominant interest in the higher allocations. One was a demonstration of a V.H.F. Triple conversion communication receiver built by G3JWZ, the other was on Klystrons.

Stratford-upon-Avon (SuA & DRC).—12 April (RAE lecture, No. 5 : Tuned Circuits : 26 April (RAE Lecture No. 6: Semiconductors),7.30 p.m., Hall's Croft, Old Town, Stratford upon Avon.

Sutton Coldfield (CSRS).—8 April (" Lasers "), 24 April (Natter Night), 8 p.m., Clubhouse of Sutton FC, Coles Lane, Sutton Coldfield.

Wolverhampton (WARS).—8 p.m., Neachells Cottage, Stockwell Road, Tettenhall.

REGION 4

Burton on Trent (B-o-T ARS).—10 April (Components recognition Quiz with Derby & District ARS), 17 April (D/F Practice G3NFC/P, 7-9 p.m.), 7.30 p.m. Club Room, Stapenhill Institute, Burton on Trent.

Derby (D & DARS).—3 April (Surplus Sale), 10 April (Guests of Burton on Trent ARS), 17 April (Amateur Astronomy—G. Holt, G3ALA), 24 April (Technical Film Show), 7.30 p.m., Room No 4, 119 Green Lane, Derby. The Society's Annual Dinner held at The Derbyshire Yeoman on 17 February, was attended by 147 Members and friends. The President A. G. G. Melville, presented his Trophy to D. Stanley, winner of the 1967 frequency measuring contest, W. A. Mead, G5YY, a past Chairman of the Society presented his Trophy to N. Gregory G3LCV, winner of the 1967 Top Band contest and Founder Member C. Drury (XDB) presented the Founders Trophy to F. Sinclair, G3SYU, winner of the 1967 Constructor's Contest. The general contest which commenced on Sunday 11 February and terminates on the 27 April is providing considerable interest. Operating times are limited to two hours on Saturday evenings and two hours Sunday afternoons the object being to work all Club Licensees. *G2CVV.*

Chesterfield (C & DARS).—24 April (" Fifty years of Radio"—F. C. Ward, G2CVV), 7.30 p.m., Newbold Observatory, Chesterfield.

Grimsby (GARS).—4 April (" Radio Aurora "—Tape Lecture), 18 April (D/F Equipments and NFD arrangements), 8 p.m., Club Rooms, Model Engineering Society, Fletchers Yard, Wellowgate.

Heanor (H & DARS).—23 April (Coffee Evening), 7.30 p.m., Club Room, South East Derbyshire College of Further Education (Heanor Branch), Ilkeston Road, Heanor.

Hunstanton.—Bucket and Spade Party organized by G3JEC, G3SAW and G3ANM will be held on 16 June at Brookes Park Refreshment Rooms Car Park near the Pier. The Talk-in Station G3ANM/P will operate on 160m.

Leicester (LRS).—Mondays, 7.30 p.m., Sundays 10.30 a.m., Club Room, Gilroes Estate Cottage, Groby Road, Leicester.

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

Melton Mowbray (MMARS).—18 April (Films—The Story of a TV Network), 7.30 p.m., St. John Ambulance Hall, Asfordby Hill, Melton Mowbray.

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

Nottingham (ARCN).—Tuesday, Thursday, 7.30 p.m., Room No. 3, Sherwood Community Centre, Woodthorpe House, Mansfield Road, Nottingham.

Peterborough (P & DARS).—5 April (Film Show), 7.15 p.m., Peterborough Technical College, Eastfield Road, Peterborough.

Spilsby Junk Sale, 5 April, 7 p.m., The Bull, Halton Road, Spilsby, Lincs.

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

REGION 5

Cambridge (C & DARC).—5 April (Talk by Chris. Pedder of CUWS), 12 April (Good Friday—Informal), 19 April (Getting Going on 70cm. Introduced by Gerry Jeapes—G2XV), 26 April (Informal), Fridays, 7.30 p.m., Club Headquarters, Corporation Yard, Victoria Road, Cambridge.

Dunstable (DARC).—For particulars of this newly-formed club, please contact Roger Bryant, G3WBC.

March (M & DRAS).—Tuesdays, 7.30 p.m., Old Police Headquarters, High Street, March, Cambridgeshire.

Shefford (S & DARC).—Thursday evenings 7.45 p.m. (Morse Classes 7.45-8 p.m.), Church Hall, High Street, Shefford, Bedfordshire.

Stevenage (S & DARS).—4 April (Aerials—Paul Essery, G3KFE), 18 April (NFD Transmitter Testing and Night on the Air), 2 May (Listeners and Beginners Night. *You* are cordially invited to meet the faces behind the Call-signs, and have a general rag-chew), also Radio Classes on Tuesday evenings 7 p.m., at 21 Cutty's Lane, Stevenage. No formalities so please turn up if interested.

Northern Radio Societies' Association

Belle Vue Convention Manchester.

Sunday, 19 May. Further details will appear in the May issue.

Business Manager: *R. M. Clarke, "Hillside," Quickedge Road, Mossley, Ashton-u-Lyne, Lancs.*

REGION 6

Cheltenham RSGB Group.—Meetings take place regularly on the first Thursday of the month at the Great Western Hotel, Clarence Street at 8 p.m. The April meeting will take place on the 4th, when Mr J. Warner of Racal's will lecture on the latest Racal Receiver, the RA919 (see Tech Topics, Jan.) all are welcome. *G3TVW.*

G.C.H.Q.—Amateur Radio Club, Cheltenham. Open night to be held in the GCHQ, Canteen, Benhall, Gloucester Road, Cheltenham, on Friday, 26 April, commencing at 8 p.m. All are welcome. *G3PEO.*

Gloucester (GRC).—Second and fourth Thursdays in the month (Morse practice included each evening), 7.30 p.m., Lamb Inn, Market Parade, Gloucester.

Oxford (DARS).—Second and fourth Wednesdays of month, 7.30 p.m., Cherwell Hotel, Water Eaton Road, North Oxford. *G3UGO.*

REGION 7

Acton, Brentford and Chiswick (ABCRC).—16 April (General Discussion), 7.30 p.m., Chiswick Trades and Social Club, 66 High Road, Chiswick.

Addiscombe (AARC).—158 Lower Addiscombe Road, (Toch H Hall). During the course of the AGM held on 27 February, S. V. Knowles was elected Secretary, an arduous task for most, but one which will no doubt be carried out successfully in this coming year. *G3UFY.*

Ashford (Middlesex) Echelford (ARS).—St. Martin's Court, Kingston Crescent, Ashford.

Barking (B & DREC).—Every Tuesday and Thursday, 7 p.m., Gascoigne Recreation Centre, Gascoigne School, Morley Road, Barking, Essex.

Bexleyheath (NKRS).—11 April (Weller Electrics, the Art of Soldering), 25 April (Antenna Arrays and the local Planning Authority), 7.30 p.m., Church Hall, Chapel Road, Bexleyheath.

Chingford RSGB Group.—Fridays, Royal Forest Hotel, Chingford.

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

Croydon (SRCC).—16 April, 7.30 p.m. Blue Anchor, South End.

Dorking (D & DRS).—Tuesdays, 9 April, 8 p.m., Wheatsheaf. 23 April, 8 p.m., Star & Garter, Dorking. The film show held in February was a great success and a large audience saw four films, two technical and two of general interest. There were also some slides of the 1967 events, involving the club van. Thanks go to Ralph G3NDF for an excellent evening.

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

East Ham.—First and Third Tuesdays, 7.30 p.m., 12 Leigh High Road, East Ham.

East London.—21 April (" Suppression and Allied Mobile Topics" by John Austin, G3REM), 2.30 p.m., Wanstead House, The Green, Wanstead, London, E11.

Edgware (E & DRS).—Alternate Mondays, 8 April (" Sounds of the Twenties" by W. E. F. Corsham, G2UV), 22 April (" Three Valve QRP 160/80m Transmitter/Receiver " by G. W. Salvidge, G3WDB), 8 p.m., *New QTH* St George's Hall, 51 Flower Lane, Mill Hill, London, NW7. Watch for the weekly Top Band net on 1870 kHz at 2115 GMT after G3SJE Slow Morse Transmissions. Reports of SMT would of course be appreciated by G3SJE.

Gravesend (GRS).—Third Wednesday, 8 p.m., RAFTA Club, Overcliff Road.

Guildford (G & DRS).—26 April, AGM (Note change of date). Guildford Engineering Society in Stoke Park.

Hampton Court (TVARTS).—3 April (Film Evening) 7.30. 1 May (" Setting up Linear Amplifiers " by D. White, G3JKA), 7.30 p.m., Cardinal Wolsey, Hampton Court.

Harlow (DRS).—Tuesdays and Thursdays, 7.30 p.m., Mark Hall Barn, First Avenue.

Harrow (RSH).—Fridays, 8 p.m., Roxeth Manor School, Eastcote Lane.

Havering (H & DARC).—10, 24 April, Rucklers Lane Hall, King's Langley, Romford.

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

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

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

London U.H.F. Group.—4 April, (UHF Aerials " Parabeams v. Stack Arrays "), 7.30 p.m., White Hall Hotel, Bloomsbury Square, Holborn.

Loughton.—5, 19 April, 7.30 p.m., Loughton Hall (nr. Debden Station).

Maidenhead (M & DARC).—16 April, 7.30 p.m., Victoria Hall, Cox Green, Maidenhead.

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

Norwood & South London (CP & DRS).—20 April (Await QTH!)

Paddington (P & DARS).—Thursdays, 7.30 p.m., Beauchamp Lodge, 2a Warwick Crescent, W2.

Purley (P & DRC).—First and Third Fridays, 8 p.m., Railwaymen's Hall, Side Entrance, 58 Whytecliffe Road, Purley.

Reigate (RATS).—First Wednesday each month, 7.45 p.m., George & Dragon, Cromwell Road, Redhill.

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

Scouts ARS.—4 April (Visit to G.P.O. Tower), 18 April (Visit to H.M. Training Ships on the Thames). Baden Powell House, Queensgate, South Kensington, SW7.

Sidcup (CVRS).—4 April (AGM), 18 April (Natter Nite & G3YLX), 2 May (" Metal on the Kitchen Table," by C. Spreyer, G3OCC), 7.30 p.m., All Saints Church Hall, Bereta Road, New Eltham. On 7 March Arthur Milne, G2MI, President of the CVRS, presented in his usual vivid manner a description of his North American tour conducted last Autumn. The talk was illustrated with colour transparencies which in turn made the evening that much more enjoyable. *G3VLX.*

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

Southgate Radio Club.—11 April (Talk by John Clarricoats, O.B.E., G6CL, on " International Amateur Radio"), 7.30 p.m., Parkwood Girls School (behind Wood Green Town Hall).

St Albans (Verulam ARC).—3 April (Informal meeting), 7.30 p.m., Cavalier Hall, Watford Road, St Albans.

Sutton & Cheam (SCRS).—16 April, 8 p.m., The Harrow Inn, High Street, Cheam.

Welwyn (Mid Herts ARS).—11 April, 8 p.m., Welwyn Civic Centre, Welwyn.

Westminster (CSRS).—16 April (AGM), 6 p.m., Room 66, Civil Service Recreation Centre, Monck Street, Westminster, SW1. *We have been asked to point out that the CSRS is not associated with the Science Museum and that CSRS members do not operate GB2SM.*

Wembley (GECARS).—Thursdays, 7 p.m., Sports Club, St. Augustin Avenue, North Wembley. This Club is now open to non-GEC employees by invitation. Telephone ARNold 1262 first.

Wimbledon (W & DRS).—12 April (Aerials, Talk by Moseley Ltd.), 26 April (Ragchew), 8 p.m., St John's Hall, 124 Kingston Road, South Wimbledon.

REGION 8

Beachy Head (Sussex Coast) (SARS).—First Monday in the month, Beachy Head Inn, Beachy Head, Sussex. Recent events have included a film " North Sea " on 4 March followed we hope on 1 April by a talk entitled " Single Sideband " by G3MME. One of many interesting points mentioned in a letter from Secretary Leslie Taglioferro, was the figure of 20 club members attending Hastings College of Further Education with the view of sitting the May RAE. Total membership of this club, formed only a year ago now stands at 110!

Broadstairs (TRS).—5 April (" Illustrated talk on visit to the United States " by Arthur Milne, G2MI) 6 April (21st Annual Dinner & Dance).

Canterbury (EKRS).—Details of future meetings from D. N. T. Williams G3MDO.

Crawley (CARC).—10 April (Informal) details from G3FRV), 24 April (" V.H.F. Weather " by C. Newton, G3FKZ) 8 p.m., Trinity Congregational Church Hall, Ifield. An attendance of over 100 members and friends were present at the highly successful Annual Dinner and Ladies Evening held at Crawley on the 23 February. The guest of honour was RSGB President, John Graham, G3TR, who is also Chairman of the Crawley Club, Ron Vaughan, G3FRV took the Chair for the Dinner and had the pleasure of presenting a specially inscribed electric clock to John, marking his election as RSGB President. Other guests included RSGB General Manager and Secretary with their ladies and many officers and members from neighbouring clubs. *G3FRV.*

Maidstone (MYMCA, ARS).—Wednesdays " Y " Sports Centre, Melrose Close, Cripple St., Loose, Maidstone. Classes for RAE and Morse Test also take place at the same address on Friday at 8 p.m.

Medway (MARTS).—8 April (RSGB Tape Lecture) 22 April (" Chassis Bashing Talk " by G3TXJ).

Mid-Sussex (Mid SARS).—4 April (" Printed Circuits " by G3PEQ) 7.45 p.m., Marle Place Further Education Centre, Leylands Road, Burgess Hill, 17 April (" Informal " at the QTH of G3PEQ). Further details from G3RXJ.

Worthing (W & DARC).—Tuesdays, 9 April (RSGB Tape Lecture entitled " Aerials "), 8 p.m., Rose Wilmot Youth Centre, Littlehampton Road, Worthing.

REGION 9

Bristol RSGB Group.—Wednesday 24 April (" SWR and Impedances Bridges " by V. Newport, G3CHW), 7.30 p.m., Beckett Hall, St. Thomas Street, Bristol 1. The February meeting was attended by 54 in all, including visitors, some from Cheltenham, who enjoyed a talk on U.H.F. by Bill Scarr G2WS who displayed a vast array of home built equipment. *G3PFD.*

Bristol (BARC).—Mondays and Thursdays, 7.30 p.m., University Settlement, 41 Ducie Road, Barton Hill, Bristol 5. See March issue for details of D/F Hunt's starting in May. *G3WLZ.*

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

Cornwall (CRAC).—First Thursday in each month, 7.30 p.m., South Western Electricity Board Social Centre, Pool, Camborne, Cornwall. 4 April (AGM followed by " How the Link is produced " by Peter King, G3WKP). *G3NKE.*

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

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

Exeter RSGB Group.—First Tuesday in each month, 7.30 p.m., George & Dragon, Blackboy Hill, Exeter. *G3HMY.*

Plymouth (PRC).—First and Third Tuesdays in each month, 7.30 p.m., Virginia House, Bretonside, Plymouth. The Club has a new Secretary, Dave O'Gara G3UQF and the Chairman is Ted Fallon, G3SGV. This lively Club welcomes anyone in the area. The Annual picnic is booked for 4 August at Yelverton. *G3UQF.*

Saltash (S & DARC).—5 April (" RAEN " by County Controller, Ted Bowden G2AYQ), 19 April (Talk to be arranged), 3 May (Visit to Decca Transmitting Station at Kingsbridge, Devon), 7.30 p.m., Burraton Toc H Hall, Warraton Road, Saltash. 28 July, Saltash Mobile Rally. *G3SN.*

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

Taunton RSGB Group.—17 May, 14 June, 12 July 7.30 p.m., Lecture Theatre, Taunton Technical College. *G3WNV.*

Torquay (TARS).—Every Tuesday and Friday, 7.30 p.m., 27 April (AGM), 7.30 p.m., Club Headquarters, Bath Lane, Rear 94 Belgrave Road, Torquay. *G3VNG.*

Wells (WARS).—Mondays, 8 p.m., EMIE (Wells) Sports and Social Club, Chamberlain Street, Wells. *G3MQQ.*

Weston-super-Mare (WsM ARS).—First Friday in each month, 5 April, 3 May, 7.30 p.m., Westhaven School, Ellesmere Road, Uphill, Weston-super-Mare. A very interesting talk by G3UKK on the snags one encounters aligning Communications Receivers was well demonstrated for all to see at the March meeting. April meeting will be a talk by Jimmy Smith, G3HSR on his home built S.S.B. Transceiver. *G3GNS.*

Yeovil (YARC).—Wednesdays, 7.30 p.m., Park Lodge, The Park, Yeovil. A course is being run for the RAE by G3XFW. *G3NOF.*

REGION 10

Blackwood (ARC).—This Club meets on Fridays at 7.30 p.m. It is now housed in a new building which has a club station and workshop facilities. RAE courses are a function of the Club, which is operating an amateur station at the St Mellons Model Engineering Society exhibition at Duffryn Junior School, Stow Hill, Newport, Mon., from 13-20 April. The address of the Club is Blackwood Amateur Radio Club, off High Street, Blackwood, Mon.

Barry College of Further Education (ARS).—Meets at the College of Further Education, Colcot Road, Barry, on Thursday Evenings at 7 p.m. Operates a club station with call GW3VKL, and has available electronic test gear appropriate to such a parent institution, together with constructional facilities.

Cardiff (RSGB) Group.—8 April (Illustrated talk " Amateur Radio in Jamaica," by F Hattemore, G3WSH ex 6Y5FH), 7.30 p.m., TA Centre, Park Street, Cardiff.

Llanelli Boys Grammar School (ARS).—Society meetings are held on Friday afternoons at 3.30 p.m., to which all interested amateurs are invited.

Pontypool (ARC).—Meets on Tuesdays at 7 p.m. in the Educational Settlement, Rockhill Road, Pontypool, Mon.

Pembroke (ARC).—Friday, 26 April, Defensible Barracks, Pembroke Dock, Pembs.

Rhondda (ARS).—Monday, 29 April, will be an Open Night to which all radio amateurs in South Wales are invited, and will take the form of a Social Evening. The Clubroom will be open for practical and instructional activities on Monday, 15 April. Address of all meetings is Pencelli Hotel, Treorchy, and the Society Secretary is Mr Cyril Parry, GW3PHH, 34 Cae'r Gwerlas, Tonyrefail, Glam.

University College, Cardiff (ARS).—All enquiries to be sent to the Secretary, Students Union, Dumfries Place, Cardiff.

REGION 11

Rhyl (R & DARC).—9 April, Silver Band Room, Windsor Street, Rhyl. During the meeting on 13 February more than a dozen receivers were tested enabling direct comparisons to be made between those costing £100 plus and £5 government surplus units. An extremely interesting and enjoyable evening, reported Martin Rushton, Asst. Hon. Secretary.

REGION 13

Edinburgh (LRS).—11 April (" Colour TV," by Mr Spankie, BBC), 25 April (" Air Traffic Control "), 7.30 p.m., YMCA, 14 South St Andrew Street, Edinburgh.

REGION 14

Ayrshire (AARG).—3 April, 17 April, 7.30 p.m., Peter Bowling Club, Craigie Road, Ayr.

Auchenharvie (A & DARS).—4, 9, 11, 16, 18, 23, 25, 30 April, 7.30 p.m., Auchenharvie Community Centre, Stevenston.

Glasgow University (GURC).—5 April, 7.30 p.m., Engineering North Building, University of Glasgow.

Greenock (G & DARC).—5, 19 April, 7.30 p.m. Arts Guild, Campbell St., Greenock.

Lowland Royal Signals (LRSARC).—23 April, 7.30 p.m., 21 Jardine Street, Glasgow.

Mid-Lanark RSGB Group.—19 April (NFD Preparation and Junk Sale), 7.30 p.m., YMCA, Brandon Street, Motherwell.

REGION 15

Bangor (B & DARS).—First Friday of the month, 8 p.m., Silverstream Unionist Hall, Bangor, Co Down, N.I.

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

REGION 16

Chelmsford (CARS).—First Tuesday of the month, 7 May ("Application of Micro Circuits in Amateur Equipment " by Gilbert Newnham, G3PDK), 7.30 p.m., Marconi College, Arbour Lane, Chelmsford.

Norwich (NARC).—8 April (Informal), 15 April (Junk Sale), 22 April (Informal), 29 April (Gee Five plus Three), 7.30 p.m., Old Lakenham Hall, Mansfield Lane, Norwich.

REGION 17

Basingstoke (BARC).—Third Saturday in the month, 20 April ("Transistors Applied to Amateur Radio" by Chris Cory, G3MEV), 7 p.m., Chineham House, Reading Road, Basingstoke.

Chippenham (C & DARC).—Tuesdays, 9 April (No meeting), 10 April (Visit to Swindon ARC), 16 April (D/F Hunt in Chippenham Area), 30 April (AGM followed by RSGB Tape and Slide lecture entitled " Radio Aurora "), 7.30 p.m., Chippenham High School for Boys, Hardenhuish Lane, Chippenham, Wilts. Eddystone Radio Company were guests on 28 February when a number of goodies were the subject of a lecture. *G3PQG.*

Farnborough (F & DARS).—9 April (Talk by RAEN Representative), 23 April (Informal), 7.30 p.m., Railway Enthusiast's Clubrooms, 310 Farnborough Road, Farnborough, Hants.

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

Maidenhead (M & DARC).—First Monday in the month (Informal), Third Tuesday in the month (Informal), 7.30 p.m., Victory Hall, Cox Green, Maidenhead.

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

Reading (RARC).—Second and Fourth Tuesday in the month, 8 p.m., St Paul's Hall, Whitley Wood, Reading, Berks.

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

Southampton University (ARC).—Thursdays, 8.30 p.m., Union Bar, The University, Southampton. Future events include a visit to Bristol Telephone Exchange, but no dates are given. During the past months, "slowly and surely progress is being made over the new shack—the old shack having finally been demolished amidst nostalgic tears from those of us who remember it!" reports secretary Anthony Cross, G3WEA.

Swindon (S & DARC).—Alternate Wednesdays, 10 April (Construction Competition), 24 April (Visit to Plessey Semiconductor Division), 7.30 p.m. Penhill Junior School, Swindon.

MEMBERS' ADS

These advertisements are published free of charge for the benefit of members. The number of words is limited to 32, not including the address and telephone number. We must receive the advertisement at RSGB Headquarters by the first of the month for the following month's issue, typed or printed on a standard postcard or the form at the back of the issue. It must be accompanied by the current postal wrapper, the address, of course, agreeing with that in the advertisement. No advertisement obviously pertaining to a business can be accepted here, but these can be submitted in the usual way for classified advertisements.

The RSGB cannot accept responsibility for errors, or for the quality of equipment offered for sale in Members' Ads. We advise members to enclose a stamped, addressed envelope when replying to advertisements.

CR100/8 mod. In mint cond., complete with spares and manual, £25 Will deliver up to 100 miles. W. J. Robinson, 296 Myton Road Warwick.

Codar CR70A communications RX. 560 kHz–30 MHz, two speed vernier drive, s.s.b. c.w. a.m. "S" meter a.v.c. e.t.c. Four months old, as new, £15 secures, buyer collects. M. Ramsey, 47 Sedgwick Road, Bishopstoke, Nr Eastleigh, Hants.

Labgear Top band, car radio converter £3, can post. 12 element, 2m beam 10s. Williamson 10W hi-fi amp., £3. 30 in. table mounting rack 10s. A. B. Whatman, G2BQ, Stanley Mount, Houghton, Preston, Lancs.

Elizabethan c.w. TX 80–10m, 120W with p.s.u. both in working order. Cash offers about £10 carriage extra or exchange radio, photographic gear or w.h.y.? D. R. Durham, G3SIR, 3 Dobbin Close, Covingham, Park, Swindon, Wilts.

AR88D new cond., re-aligned, overhauled, re-wired p.v.c., trimming tools, speaker, headphones, spare set of valves, instruction manual, " S " meter, will deliver 50 miles, £45. Eagle RX60. 500 kHz–30 MHz, new condition, £12, instruction manual. F. Gerrard, 50 Hadfield Road, Hadfield, Via Hyde, Cheshire. After 4.30 p.m. Glossop 3933.

Murphy 12 in. TV, BBC and ITA, ideal as monitor for TVI or second set, good condition, recently overhauled, £5 o.n.o. B. Lonnon, Four Oaks, 116 Pinewood Green, Iver Heath, Bucks. Iver 1409.

Partly built converter, 13 × 9 × 9 in. fitted 4-7BA holders and stabilized p.s.u. with valves, black crackle cabinet and panel, untouched 50s. (post 9s) offers for three 12 ft. lengths ¾ in. dural tube, collect. R. L. Castle, 7 Caxton Road, Wimbledon, London SW19.

R107 RX in moderate cond., complete with packing case, circuit and spare valves, £10. Can deliver in West Riding. Wanted, Bug key at reasonable price. J. T. Webster, G3WDW, 133 Argie Avenue, Kirkstall, Leeds 4.

R206 RX £20, 560 kHz–30 MHz in six overlapping bands, a.f. r.f. gains, b.f.o. a.v.c. and bandwidth switches, noise limiter, a.f. filter, AE trimmer, excellent cond. Buyer collects. J. K. Butterworth, The Vicarage, Street Lane, Gildersome, Morley, Nr Leeds, Yorks.

Offers for RX60N RX unwanted gift, unmarked £15 o.n.o. Taylor 127A perfect £5. Telequipment S31 scope £25 o.n.o. Wanted HRO bandspread coils and components for 9 MHz s.s.b. phasing or filter, all correspondence answered. M. C. Foden, G3UPA, 19 Fairfield Rise, Meriden, Coventry, CV7 7NP, Warks.

Wharfedale super 10/RS/DD, 10 in. full range l.s. £7 10s. G & D 2M20 2m 50W TX with 12V d.c.–d.c. converter, £38. All as new. M. Harrison, 11 Castle Green, Weybridge, Surrey. Weybridge 47112.

Recording Barograph for sale. In perfect order, ideal for v.h.f. fanatic. £9 o.n.o. Will deliver 30 miles. J. D. Heys, G3BDQ, 418 The Ridge, St Leonards on Sea, Sussex.

LG300 plus twin mod/p.s.u. 150W all bands. Perfect cond., £50. Trio JR60 RX 550 kHz–30 MHz plus 142–146 MHz. Amateur bands, bandspread, two years old, as new £40. P. Parker, G3UAP, 23 St Michael's Close, Rough Common, Canterbury, Kent.

Lafayette HA230 communications RX, 240V a.c., as new in original carton with manual, £21. Carriage paid for quick sale. Gillett, P/O Alinora Crescent, Goring by Sea, Worthing, Sussex.

Given away! XTAL controlled 20, 15 and 10m converter—a mod RF24—to the purchaser of a BC348 double superhet with 85 kHz Q5'er, p.s.u. £16 16s. plus carriage. D. Byrne, G3KPO, Jersey House, Eye, Hodney Road, Peterborough. Peterborough 351.

Stereofying—must dispose modern eight valve radiogram, in hefty prehistoric cabinet with new UA15 autochange, 5W output amp, Jason Tuner with magic eye—might appreciate re-alignment!—for measly £10. Buyer collects. R. W. Shuttleworth, 72 Outram Road, Croydon, CRO 6XF, Surrey.

Complete SWL station. Mosley CM1 RX plus Q multiplier, Codar PR30X preselector, Joystick aerial, all excellent condition. £48 the lot o.n.o. Will split and deliver 30 miles of Winchester. P. Baxter, Sunnyside, Morn Hill, Winchester, Hants. Winchester 4984.

Lafayette KT320 for sale same as HE30 excellent condition, a.n.l., a.v.c., m.v.c., b.f.o. Q multiplier. Electrical bandspread, buyer must collect view evenings/weekends, price £20. Wanted cheap working AR88. Apply N. Mason, 60 St. Mary's Crescent, Ruddington, Notts.

Spectrum analyzer model TSX-4SE, 20 MHz i.f. £50 o.n.o. GEC communication RX. 150 kHz–30 MHz £25 o.n.o. Redifon v.h.f. a.m./f.m. transceiver suit conversion to 4m, £15 o.n.o. all working. K. Mintern, G8ATP, 3 Rollo Court, Battersea, London, SW11.

Radio H/B Editors and Engineers, three months old, 55s. M. J. Faulkner, 35 Abbey Way, Farnborough, Hants.

Factory built Heathkit SB400 s.s.b. TX spotless. £170. New KW2000A with l.s /p.s.u. £180 plus carriage. D. Boffin, Woolstone, Nr Faringdon, Berks.

Hamgear PMI unpowered version, £4. Sinclair Stereo 25 new, £5 both plus postage. R. Garlick, 135 Rookhill Road, Pontefract, Yorks.

BC453's Q5'ers, Type 3 p.s.u.'s, TU5B a.t.u.'s, mod. units, all at £2 each. German RX E10K 8 in. cube 3 to 6 MHz. Beautifully made £4. Several RX's believed to be around 70 MHz £1 each. F. Powell, G3SEL, " Wits End " Don Lane, Lower Odcombe, Yeovil, Somerset.

U.H.F. Tuner, 12V ex Perdio Portorama, with i.f. and a.f. stages, some attention needed, £3. " Monarch " RX, 500 kHz–30 MHz very utility, £7. W. H. Jarvis, G8APX, Royal Masonic Senior School, Bushey, Herts.

Xfmrs, Woden 750-0-750V 250 mA, 5V 500 mA, 50s. Two 115V, 1250-0-1250V 400 mA, pair 40s. Thermador 10V 8A, 10V 10A, 20s. Chokes, 5-25H 250 mA, 12s. 6d. 45 H 120 mA, 10s. A. H. Mason, GM6MS, 390 Kings Park Avenue, Rutherglen, Lanarks, Scotland.

Labgear 160 Twin TX £13, Codar T28 RX £10. Most parts for G3RKK RX, Philpotts Cabinet uncut chassis, QP166, e.t.c. £15 or separate Joystick and a.t.u. £3. Wanted Eddystone 750, H. Julian, G3UFX, 1 Hervey Terrace, Shotley Gate, Ipswich, Suffolk.

KW Viceroy Exciter 180W p.e.p. 80–10m recent manufacturer's overhaul, £50, will deliver Greater London. L. W. Belger, G3JLB, 108 Whitehall Road, Gravesend, Kent.

QST's 1962, '63, '64, 10s. per year, buyer collects, M. E. Bazley, G3HDA, 22 Lea Green Lane, Grimes Hill, Wythall, Nr Birmingham, Warks.

Eddystone S640 RX, manual, l.s., " S " meter, no mods, performs well, £20. Wanted AR88D cabinet, " S " meter and any other spares. R. Reynolds, G3IDW, Orchard Collage, Hook, Swindon, Wilts.

Minimitter Mercury 150W TX, 80–10m, £25. NO12 TX 35W, 160–20m, £8. Both good condition. Prefer buyer inspects and collects. A. W. Rx, G3RYF, 17 Forest Drive, East, Leytonstone, London, E11.

Hallicrafters S40B, 540 kHz–44 MHz, b.f.o. and b.s. and l.s. in beautiful cond., and perfect alignment with set of spare valves, £18. J. A. Judge, 2 Rockall Drive, Simshill, Glasgow, S4. 041-MER 0681.

R107 RX in good working and external condition, completely overhauled at a cost of £10—new mains xfmr and capacitors e.t.c.—asking £12 10s. S. Burfoot, 84 Mayhill Road, Barnet, Herts.

6 ft. rack with two p.s.u. £12. Electroniques QP166 front end, £10. Transistor f.m. front end and i.f. strip, £5. 813, £1. Base 5s. 17 in. 110° c.r.t. with coils and xfmr's, £10 lot new. L. Allen, G3AAH, 14 Frampton Close, Bourneville, Birmingham 30.

PCR3 RX, six valves s/h medium wave and 2·5–23 MHz. Complete with a.c. p.s.u. l.s. b.f.o. and 160m mod. Good condition, £7 o.n.o. Buyer collects. B. W. Lowe, 11 Greenleach Lane, Worsley, Walkden, Manchester. Walkden 2871.

KW2000A with a.c. and 12V d.c. p.s.u.'s new 6146As, £195 o.n.o. Newnes *Radio and TV*, 14 vols mint £25 o.n.o. 829, 832, 5s each. D. E. Knowles, 92 Dicksons Drive, Chester, Cheshire.

Canonball TX £20, EC10 £30 both little used, will deliver 150 miles. Delta coax relay £3. R1155 and built in p.s.u. and speaker £4. Buyer collects or accepts by post. 15 Claremont Avenue, Clitheroe, Lancs. Clitheroe 3869.

Panda PR120V, Heathkit Mohican fitted XTAL calibrator, £15. G4ZU Minibeam £5 all o.n.o. Delivery 25 miles otherwise buyer collects or pays carriage. L. J. N. Kirkby, G3BRJ, Trefaes, Westells Road, Yelverton, Devon.

KW2000 with a.c. p.s.u. £150, also d.c. p.s.u. for mobile use £15 KW600 Linear £90. Studio Tape recorder £15, SWR Indicator £3. Shure mic £3. A. Thomson, G3ORT, 10 Leysings, Castlemayne Basildon Essex. Basildon 43912.

Reasonable genuine offers invited for LG50 TX and Eddystone 840C RX in excellent cond., together or separate. Prefer buyer collects. C.w. DX includes W6, VK, ZE, LU, with 5RV. G. K. Adams GW2BOU, Stella Maris, Roilly Park, Barry, CF6, 8RP. Glam. Tele. 2703.

HRO five g.c. coils l.s. p.s.u. £18. Wavemeter with mod, £7. Meters, valves, transistors, XTALs including one pair each FT243, 5955, 5500, 5485, 5030 kHz. Clearing Shack, must sell, SAE list. D. A. Shepherd, G3LCS, 35 The Crescent, Haversham Estate, Wolverton, Bucks. Wolverton 3379.

Swop xfmr Admiralty 1000V centre tapped 160 mA, 4V centre tapped, weight 15 lb. for repairable PCR1, 2, or 3 RX or class D wavemeter. Need XTALs 100, 1000, 8333. 11000 kHz and FT241A ch 53, 54 H. W. J, Lucas, 4 Parrens Road, Earith, Huntingdon.

Valves. 4/65A, 2C39A, 30s. each. Also 12AT7, EF80, 6SN7, 6SK7 EF50, 10F1, PL81, ECL80, PCF80, EB41, ECC81, PCC84. Six to your assortment for 10s. G. A. Jeapes, G2XV, 165 Cambridge Road, Great Shelford, Cambs.

Three element 20m, home brew beam as ARRL H/B. £10 o.n o., buyer collects. Five met. balloons, two 250 grms, three 100 grms, 30s. plus postage. D. L. Smithdale, G3UJS, Police House Snettisham, King's Lynn, Norfolk.

AR88LF and l.s. plus Panda Cub TX. Both in excellent working order, QSL's to prove it! Will deliver, within reason. £45. P. Sandiford, G3STF, 18 Bucknalls Lane, Garston, Watford, Herts.

DX 100U little used £30. 160m table top TX £7. 160m mobile TX and control panel—*SWM* Nov. '62, £3. 813's £1. PRTZ40. 15s, UM2 30s, Prefer buyer collects. H. B. Bird, G3OUQ, Green Roofs, 344 Coventry Road, Hinckley, Leics.

BC348 RX no p.s.u. working slight fault £7. Mullard 5–10 with pre amp as new, £9. J. Baldwinson, 33 Cherry Close, Tulse Hill Estate, London, SW2.

PR30X, £4, R220 RX with H/B, £2 10s., 38 ft. high 2 in. dia. mast with one rotary guy ring, £9. UM3 used, £2. 807 driver xfmr 15s. plus p.p. L. France, GW3PEX, 8 Conway Drive, Pant Farm Estate, Cwmbach, Aberdare.

Radio Periodicals, Cheap. *RSGB Bulletins* approx. 100 copies, *SWM* 74 copies, *PW* 117 copies, Radio Constructor 53 copies all clean—most as new. Offers plus carriage to: F. W. Ainsworth, G3KIA, 2 Westgate Avenue, Holcombe Brook, Ramsbottom, via Bury.

HA 350 s.s.b. RX with XTAL cal, three months unconditional guarantee. Cost £82 10s., sell £65. Compact fully metered p.s.u. 750/350/150/GB/6·3V £8. RCA cabinet l.s. 50s. P. J. McConnachie GM3CRY, Bonfield Road, Strathkinness, St Andrews, Fife, Scotland. Strathkinness 219.

Q5'er BC453, unmodified, 55s. pair Raytheon RK20A unused 60s FL8 filters, 10s. Meters mc and thermo, large variety from 10s. s.a.e. list. Polarised relays. 120+120 ohm 20s. all carriage extra. S. A. G. Cook, G5XB, Little Orchard, Gallows Tree Common, Reading, Berks. Kidmore End 2195.

TW converter, beam, rotator, indicator and p.s.u. for 2m. RX 20–90 MHz. 10 ch tunable, needs mods. Wanted R216. RX or g.c. RX. H. Earnshaw, 104 Hunter Street, Middleton, Manchester.

XTAL Calibrator No. 10. 10–100–1000 kHz with instruction book 80s. XTAL 10X, 3505, 3570, 3575, 3580, 3585, 3595, 3605, 3635, 3687, 3690, 3703·6, 3720, 3725, 3740 kHz 7s. 6d. each. W. H. Fletcher, G3NXT, Holmdale, Martin, Lincoln.

Modified Cossor 1035 double beam 'scope, rebuilt in new hammer finished case with ventilation grills, with new graticule and spare c.r.t. £20. N. Etheridge, 288 Elm Park Avenue, Elm Park, Hornchurch, Essex.

Going transceiver—offers for Tiger 200 in first class cond. Brownlow 1 Widdicombe Way, Brighton. Brighton 65704.

Exchange 12 bore double barrel shot gun and case in good condition for Communications RX, Mains or battery, Mohican preferred. R. Williams, 204 Dysart Road, Grantham, Lincs.

Owing to poor health, must clear workshop, eight RX's 1155, 1392, 1132 e.t.c. 10 valve 'gram chassis, 6, m, sl, s2, S3, 10m, valve tester 115V Rotary converters, e.t.c. s.a.e. list. A. G. Gaunt, 12 Potslands, Leeming Bar, Northallerton, Yorks.

XTALs FT243, 945, 7089, 7012 kHz, 4s. Brown A type telephones, adjustable 4000 ohm 30s. Two 813s new £2. both £3 10s. Relay 4 pole c/o 12V coil, 10s. H. B. Nield, G3GOA, 9 Prime Close, Walberton, Arundel. Yapton 369.

Exchange 35mm s.l.r. outfit. Argus FI·7 58mm Sekor lens, 1 sec to 1000th, coupled cds light meter, F2·8 135mm tele lens, filters, lens-hoods, e.t.c. Mint condition. for tape recorder or communications RX. S.a.e. details. C. G. Washington, 24 Westbrook Avenue, Margate, Kent.

Labgear LG300 TX 80–10m c.w. with 75W p.s.u. £25. Codar RQ10X Q multiplier, self powered, £5. Both v.g.c. Buyer collects. A. B. Mabbutt, G3ILL, 20a Gratton Terrace, Cricklewood, London, NW2.

Minimitter 150W a.m./c.w. TX, 3·5 –30 MHz, good condition, space wanted, £40 o.n.o. HRO dial and drive 25s. MB150 tank unit, 15s. plus carriage. J. G.Wardhaugh, G4LA, 20 Hallgates, Hexham, Northumberland.

Hallicrafter S20R, £15. Newnes *Radio TV Servicing* 16 Vol. to 1966, mostly mint, £24. S. E. Janes, G2FWA, Hillside, Bushcomb Lane, Woodmancote, Cheltenham, Glos. OCH 267 2229.

Heathkit DX4OU good cond., £21. Codar station control unit CC/40, £5 5s. *RSGB Bulletin* Dec' 65 to Dec. '67. *SWM* March '63 to Feb. '68. Sell in one lot or offers. R. B. Palk, G3RDU, 18 Everest Drive, Seaton Devon.

LG300 with matching mod and p.s.u. immaculate cond. £50 o.n.o. 45 ft. self supporting tower £12. Wanted Collins TCS12 RX. H. M. Irvine, GI3TLT, Fernrock, Ballyree, Bangor, Co. Down, NI.

Eddystone 740 RX, with manual, £20. 1224 RX 1–10 MHz, 2V battery valves, £3. N. Curtis, G3UPC, 46 Hollybank Road, Hythe, Southampton.

CR100, b.f.o., a.n.l., and S meter, £16. Buyer collects. Wanted H/B for AR88LF for loan or purchase. M. Smith, Wilson Hall Farm, Nr. Melbourne, Derby. DE7 1AF Mel. 2580.

RG 1U, XTAL Cal, £30. Heath capacitor meter £10, both as new. HE40 RX, 550 kHz–30 MHz, £11. Pye portable auto stereo, R. player, £12. RAE Correspondence, £6. G. T. Darcy, G3XGR, 54 Home Farm Road, Birkenhead, Cheshire. Arrowbrook 2587.

Labgear LG300 TX with rack mounted mod and p.s.u., £35 o.n.o. Buyer inspects and collects. F. Parsons, G3MIX, 96 Blackmoor Lane, Maidenhead, Berks. Maidenhead 26723.

Valves. Two KT88, £1 each, two KT66, 10s. each, two 6L6 7s. each. Paper capacitors, six 4 uF 1000V d.c. 3s. each, five 4 uF, 800V d.c. 2s. each. L. Hickingbotham, G3HZG, 95 Oakenshaw Road, Redditch, Worcs. Redditch 4130.

Hammarlund HQ170 RX with 240V a.c. xfmr. Perfect order and condition. Monitoring control. Guaranteed one month £75. 4m 15W TX' high level mod metered all stages, only £6. C. V. Taft, 239 Hagley Road, Edgbaston, Birmingham 16. Edg 1825.

RCA LM1 equipment, 32353A stabilized solid state p.s.u. UCAL61 circuit analyser. 32302 remotely controlled a.t.u. 22774 remotely controlled a.t.u., 32331A enclosed morse keys, with filter, all above as new, unused, M. J. P. Evans, 4 Gower Crescent, Baglan, Port Talbot, Glam.

144 MHz transverter, 100W complete parts including p.s.u.-less two 6CW4—see *QST* Jan. '66, £12. TU5B heavy duty switch 7s. 6d. each Dural ele (2) 21 MHz beam, £2 10s. 2 in. magslip TX 15s. C. Olley, G3AIZ, 157 Wanstead Park Road, Ilford, Essex.

KW2000 last production series one year old. Unmarked and indistinguishable from new. Just returned from factory check. With Shure mic and KW low pass filter. £160. Parsons, 90 Maesycoed Road, Heath, Cardiff. Cardiff 68768.

Shack clearing. Again silly prices, 10·7 MHz i.f. strips new transistorized £4. TS184, 70cm wavemeter, mint, plus bits, £12 10s. TF390 sig gen going, £5. V.h.f. and other bits. Agiflex Camera outfit. M. C. Osment, G8AIP, 116 Parsonage Leys, Harlow, Essex.

Eddystone 840A in excellent cond., first offer over £25 secures. Wanted H/B or information on B40 RX. Write or call in evening R. Woodley, 63 Station Road, Romsey, Hants. SO5 8DP.

Complete shack clearance. AR88LF, £25. H.f. 150W a.m. TX sections details on request. Wilcox-Gay v.f.o. £4. 2 kW 230/110V. Isolating xfmr—brute!—£5. and plenty more. Lists available. Please add carriage. McCagherty, 12 Lennox Avenue, Belfast, BT8 4LA. Belfast 649758.

McCoy silver sentinel filter, £10. G2DAF RX £20. Remote beam direction indicator £2. Wanted HW32A, transceiver, cash and carry. R. C. Whelan, 504 City Road, Birmingham 17.

KW Viceroy TX 160–10m. Excellent cond. complete with l.p.f. aerial relay, p.s.u. and manual, price £75 o.n.o. Would consider exchange for good coverage RX. G. F. Firth, 61 Heights Lane, Bradford 9, Yorks.

HRO p.s.u. mod. with fuse, a.c. lead, screened 4 wire cable and plug, £1. Buyer collects. A. J. Solomons, G3ICT, 70 Fairholt Road, Stoke Newington, London, N16.

Moving House, must sell all! stabilized p.s.u., u.h.f. wobbulators, TV monitors 'scope displays. No reasonable offers refused! S.a.e. details. G8AKA QTHR.

KW500 linear—spare 813—mint, few hours only, £45, AR88LF—with manual, £30. Codar AT5 TX with new a.c. p.s.u., £17 10s. o.n.o. Manuals for BC610, S27, NC100A. offers. M. Williams, GW3LCQ, " Dwyros," 12 Penrhos Avenue West, Llandudno Junction, Caerns.

10·7 MHz XTAL filter, STC type 445LQU14B ± 7·5 kHz at 6dB, ± 25 kHz at 80dB. Ex equipment offers? Wanted 70cm TX or tripler. A. L. White, The Cottage, Seaham Hall, Seaham, Co Durham.

Exchange one unmodified BCC69D transmitter/receiver for a high band type G. S. T. S. Evans, G3VGO, Tryfan, 9 Praze Road, Newquay, Cornwall.

SEVERAL MEMBERS' ADS HAVE HAD TO BE HELD OVER THIS MONTH. THESE WILL BE PUBLISHED IN THE MAY ISSUE.

WANTED

A charge of 4s. is now made for "Wanted" advertisements. Please make cheques or postal orders payable to RSGB.

G3BK—" Mark "—Liverpool. Will this c.w. operator let me have a supply of s.a.e. I will then gladly send him his QSL cards. From the licensed G3BK, 28 Regent Avenue, March, Cambs.

B2 TX/RX, Exchange 2m or 4m Reporters. H. E. Smith, G3POY, 7 Ascot Close, Borough Green, Sevenoaks, Kent. Borough Green 3485.

One Marconi CR100 surplus RX in mod. condition. J. S. Puttock, 38 Lingfield Avenue, Kingston, Surrey.

Urgently required the servicing manual or cct with component values for an army R209 RX to buy or borrow—postage refunded. A. J. Humphriss, 14 Fosseway Crescent, Tredington, Nr Shipston on Stour, Warks.

" Text book on Wireless Telegraphy " vol. 1 by Rupert Stanley, published by Longmans Green, 1919 or earlier edition, also *73* Magazine Nov and Dec. '65 and books on cryptography. State prices. T. P. Allen, GI6YW, 62 Balmoral Avenue, Belfast, N.I.

Jason W11 wobbulator or f.m. sig. gen. M. A. Sanders, G3RVW, 31 Mortimer Hill, Tring, Herts.

Three valves type 2E26. M. Firth, 48 East Street, Lightcliffe, Nr. Halifax, Yorks.

Heathkit SB10U in good order with manual up to 100 miles from my QTH. R. B. Simpson, G3UWE, 30 Heathlawns, Catisfield, Fareham, Hants. Fareham 5479.

Second hand Eddystone 898 dial in good cond., but at reasonable price. Not more than about £3. C. I. Thomas, 127 Earlshall Road, Eltham, London, SE9.

Prop pitch motor. 70cm converter. Mobile aerial with loading coils for 160, 15 and 10m bands. Will buy or swap for my items listed in For Sale column. L. H. Bower, 57 Broughton Crescent, Wyke Regis, Weymouth, Dorset.

TW 2m Communicator or TW 2m TX, also Eddystone 888A RX. Must be in good condition. All letters answered. Price including carriage to J. B. Holmes, G3SMO, 99 Coneygrey, Spinney, Flintham Newark, Notts.

G.P.O. or similar type single or double headset with carbon mike. Your price paid. Replies to P. W. Purle, G8AKD, 27 West Mead, South Ruislip, Middx. 01-841 5045.

KVG or McCoy 9 MHz with carrier XTALs. D. Forster, G3KZZ, 41 Marleborough Street, South Shields, Co Durham.

SSB TX, Sommerkamp, Viceroy or similar mint cond., demonstration if poss. Price and details to C. Howes, Kneesworth, Royston Herts.

Command RX, 3–6 MHz any mods are OK. Must be working and in good order. J. Walker, 16 Himley Road, Clayton Estate, Manchester, 11. Lancs.

TW Twomobile RX in good cond. also XTALs for 2m band and lower end of 4m. All letters answered. W. G. Harbinson, 10 Deramore Park, Belfast 9, N1.

To buy or borrow, ARRL Hints and Kinks, vol. 5 and 6. Selling Jap Bug Key, never used 45s. H. Buttress, G3VHL, 130 Elan Avenue, Burlish Park, Stourport on Severn, Worcs.

Pre-War editions of *A Guide to Amateur Radio*. P. H. Greenswood, G2BUJ, 32 Pound Lane, Pinehurst, Swindon, Wilts.

TX. Small table top type, multiband, stable with circuit diagram, H/B, v.f.o. preferred. Good tidy homebrew OK. Up to say £7 10s. G. P. Jones, G3UZZ, 53 Lebanon Park, Twickenham, Middx.

I.f. of Admiralty RX B21B—Marconi, also any other alignment tips. or info. W. T. Sutherland, 47 Great King Street, Edinburgh.

Motor for Grundig TK12 Tape recorder or scrap TK12 if motor windings, serviceable. G. E. Smythe, G3HZO, 58 Ross Road, Wallington, Surrey. Wallington 3443.

Government of Malawi

REQUIRES

TELECOMMUNICATIONS ENGINEER

on contract for one tour of 24-36 months in the first instance. Commencing salary according to experience in scale (including overseas addition) £1135 rising to £1905 a year. A supplement of £100 a year is also payable. Gratuity (free of Malawi tax) 25% of total salary drawn for tour of 30 months or over or 15% for a tour of 24 but less than 30 months. Outfit allowance £30. Free passages. Liberal leave on full salary. Generous education allowances. Quarters at low rental. Contributory pension scheme available in certain circumstances.

Candidates, preferably aged 25-45 years, must have at least 5 years experience in either of the following branches of telecommunications engineering, after completion of two years' approved training; Carrier and V.H.F. Equipment; HF Radio and A.R.Q. Equipment. They must possess at least one appropriate City and Guilds Certificate. Previous overseas experience and experience in training and supervision of subordinate staff would be advantageous.

Apply to CROWN AGENTS, M. Dept., 4 Millbank, London, S.W.1. for application form and further particulars, stating name, age, brief details of qualifications and experience and quoting reference M3B/62648/R.C.

Government of Swaziland

REQUIRES

TELECOMMUNICATIONS TRAINER

For the Posts and Telecommunications Department, on contract for one tour of three years in the first instance. Commencing basic salary according to qualifications and experience in scale Rands 2340 rising to Rands 3204 a year (£Stg.1365-£Stg.1869) plus Inducement Allowance Rands 318 rising to Rands 450 a year (£Stg.159-£Stg.225). Gratuity 25% of total salary drawn. Free passages. Liberal leave on full salary. Quarters provided at low rental (or allowance paid in lieu). Generous education allowances. Contributory pension scheme available in certain circumstances.

Candidates must possess a City and Guilds Intermediate Group Certificate or equivalent. Experience in another African Telecommunications Service would be an advantage. The duties will involve the training of local students in theoretical subjects up to level of 1st Year City and Guilds in Engineering Service, Elementary Telecommunications Practice, etc., and the supervision of the practical application of elementary Telecommunications practice in laboratory and field.

Apply to CROWN AGENTS, M. Dept., 4 Millbank, London, S.W.1. for application form and further particulars, stating name, age, brief details of qualifications and experience and quoting reference M3B/61561/R.C.

Government of MALAWI

REQUIRES

RADIO TECHNICIAN

to serve as Inspector of Police (Signals) on contract for one tour of 24-36 months in the first instance. Commencing annual salary according to experience in scale rising to £1590 (including overseas addition). A supplement of £100 a year is also payable. Gratuity (free of Malawi tax) 25% provided a tour of at least 30 months is served, otherwise 15%. Outfit allowance £30. Free passages. Liberal leave on full salary. Generous children's education allowances. Contributory pension scheme available in certain circumstances.

Candidates, up to 45 years, should have at least 5 years practical experience in radio, preferably in a Police Force or the armed forces. Preference will be given to candidates who possess City and Guilds Intermediate Telecommunications Certificate or equivalent. A good knowledge of transistor circuitry, multi-channel carrier telephone equipment and/or diesel plant and petrol/electric alternators would be an advantage.

Apply to CROWN AGENTS, M. Dept., 4, Millbank, London, S.W.1., for application form and further particulars, stating name, age, brief details of qualifications and experience, and quoting reference M3B/64949/

Government of KENYA

REQUIRES

ASSISTANT TELECOMMUNICATIONS ENGINEERS

for the Police Department, on contract for one tour of 24 months in the first instance. Commencing basic salary according to experience in scale Kenya Shillings 21,000 rising to K. Shgs. 27,780 a year (£Stg. 1225-£Stg. 1620) liable to Kenya Income Tax. In addition an allowance, normally tax free, ranging from £Stg. 720 to £Stg. 816 a year will be paid by the British Government direct to an officer's bank account in the United Kingdom. Gratuity 25% of total salary drawn or 45% if no overseas terminal leave taken. Free passages. Accommodation provided at moderate rental. Generous education allowances. Outfit allowance. Contributory pension scheme available in certain circumstances.

Candidates, up to 50 years of age, must have served an approved apprenticeship and possess the City and Guilds Telecommunications Technician's Certificate or equivalent. They must have had at least five years' experience in Telecommunications engineering including considerable practical experience with fixed, mobile and portable Telecommunications equipment operating in the H.F. (including S.S.B. and I.S.B.) and V.H.F. (AM and FM) bands and associated aerial and mast installation plus a knowledge of transistorized and modern equipment. A knowledge of V.F. Multiplex equipment is essential and experience in Radio Teleprinter equipment would be an advantage.

Apply to CROWN AGENTS, M. Dept., 4 Millbank, London, S.W.1., for application form and further particulars, stating name, age, brief details of qualifications and experience, and quoting reference M3B/61095/RC

CLASSIFIED ADVERTISMENTS

RATES: Private advertisements 3d. per word, minimum charge 5s.

Trade advertisements 9d. per word, minimum charge 12s.

Please write clearly. No responsibility can be accepted for errors.

Post to SAWELL & SONS LTD., 4 LUDGATE CIRCUS, LONDON EC4

SITUATIONS VACANT

SALE

COLLIN'S 75S-3 with manual, cable, mint condition. Owner's spare receiver very little use. £200: Manual's AR88D, SX28A. SCR211M, NC100, Hallicrafters HA2, SX101A, RCA-8516L (35/-) Johnson Invader 200, NCX 3, NC300, HRO 60, Bow TX 5100-B and 515B-B. All originals 20/- each plus postage. Box V7363.

KW2000A + A.C. PSU (18 months old) £190; KW1000 (6 months) £100; Antenna system: MP-33 (9 months), AR22R Rotator (18 months); 32 Foot Tower (ladder attached); cables including 250 feet RG8U; £75 the set; Digital Clock (Model 201) £9; Z-Match £5; 2 KW L.P. Filters Chan. I (1 72 ohms and 1 52 ohms) £2 each; Complete Station for £360—inspection invited.—M. M. Bibby, Halla, Leckhampstead, Newbury, Berks.

JAP VALVE voltmeter £7 10s., 2x 813 with bases 30s. each, 2x 866A 10s. each, Transformers: 1600-0-1600 500mA £3, 1000-700-0-700-1000 250mA 50s. 813 heater £1, 266a heater £1. 2½ in. meters 200 mA, 500 mA, 25 mA, 10s. each. M. Cox, 3 Regina Drive, Walsall, Staffs.

G. WHIPS. Helicals for Mobile/P. Read A.R.M.S. Test Report "Mobile News" Feb. 68, then order one. G.-WHIPS GW3DZJ QTHR.

FOR SALE (continued)

20 FT. 1½ dia 2 section wooden masts. To clear 12/6 *inc. post.* The new "Tavsu" mobile antenna's in stock. Send for Lists. G4MH, Jim Fish. 18 Town End, Golcar, Huddersfield.

AERIAL GUYS, HALYARDS. Green polypropylene rope ¾" circ., over ½ ton B/S, 3d. ft. post free. C.W.O. to G3JMG, 14, Wessex Rd., Horndean, Portsmouth.

QSL CARDS. 15/- per 100, plus postage. S.A.E. Sample. GW3LXI, 43 Monkton, Pembroke, S. Wales.

METALWORK.—All types of cabinets, chassis, racks, etc. to your own specifications.—Philpott's Metalworks Ltd. (G4BI), Chapman Street, Loughborough.

100 PAGE illustrated catalogue No. 17 of Government and manufacturers electronic and mechanical surplus, also a complete new section of the latest semi-conductors and miniature components, includes a credit voucher for 2/6. Send for your copy now. Price 3/- Post Free. Arthur Sallis (Radio Control) Ltd., 93 North Road, Brighton.

QSL CARDS: Two-colour, variable design, attractive from only £3 3s. per 1000 (inclusive). Send foolscap s.a.e. for samples to ARA Press, 46 Moat Ave., Green Lane, Coventry.

POWER—POWER—POWER.—3 independent electrical outputs on each model. The NEW Carter Champ Generator weighs only 12½ lbs. but gives BIG performance. Ideal for lighting, battery charging and small power-tools. Indispensable for radio enthusiasts. Write for full details of this rugged go-anywhere generator to: Carter's, Dept. R, TACO Works, Sycamore Avenue, Burnley.

FREE QSL samples, excellent range at right price. Log books 7/-.—Bailey and Co. Greenfield Place, Weston-s-Mare.

SERVICE SHEETS. Radio, Television, Tape Recorders 1925-1968 by return post, from 1/- with free fault-finding guide. Catalogue 6000 models, 2/6. S.a.e. enquiries.—Hamilton Radio 54r London Road, Bexhill, Sussex.

QSL CARDS. G.P.O. approved log books, cheapest, best, prompt delivery. Samples.—Atkinson Bros., Printers, Looe, Cornwall.

SEMICONDUCTOR SPECIALS. P Channel, F.E.T.S., 5/-. N. Channel F.E.T. MPF105, 8/6. Silicon Unilateral Switches similar to D13D1 or D13P1, 6/- all with short data sheet. Silicon double diode, 100 PIV 100 mA, 1/6. Surplus 2N2926 transistors, 1/6 each, 12/- dozen. Plastic Silicon Rectifiers (BY127) 1000 PIV. 500 mA, 3/- each, 30/- dozen. M.A.D.T. 100 mc/s PNP Transistor SB078, 2/6; General Purpose NPN Transistors (300 Mc/s) 12/- dozen. Transistor Tuning Condensers with S.M. drive 100 + 100 PF, 240 + 240 PF, 370 + 180 PF. All 4/6 each. Transistor I.F. Transformers, round type, 1/-. Square type, 1/6, double tuned, 2/6. B7G Valve Holders less skirt 3/- dozen, B9A Valve Manufacturers reject PNP and NPN Transistors, 100 for 10/-, 250 for 20/-.—J. BIRKETT, 25 The Strait, Lincoln. Phone 20767.

MULLARD 5-20 amplifier, with Partridge O.P.T., £18; Bench P.S.U., variable 150 to 480V at 250 mA, 6·3V 8A, with built-in charger, 5 amp., for 12V battery, metered, neat case, £7 10s., new Garrard magazine tape-deck, 3¾ in./sec, £10; Redifon R50 rack mounted receiver, 8 bands, excellent order, £60. Woden U.M.3 transformer, £4; large rotary inductor, 30/-. 30, 60 and 100 watt transformers for transistor mobile/portable DC supplies, s.a.e. for details, 60 watt transistor P.S.U. 12 to 300V DC, £6 10s. Various others—details on request.—G3LGK, 21 Dale View, Ilkeston, Derbyshire. DE74LD.

KW2000 AC. PSU good condition. First £140, o.n.o. Late model. Buyer collects.—W. Bilton, G3TYY, 7 Neap House Road, Gunness nr. Scunthorpe, Lincs.

WANTED

WANTED.—All types of communications receivers, test equipment, tape recorders, amplifiers, etc. Prompt cash payment.—Details to R. T. & I. Electronics Ltd., Ashville Old Hall, Ashville Road, London, E.11 (LEYton 4986).

WANTED FOR CASH. Certain types of scrap relays and contact springs from G.P.O. type relays. S.a.e. to "Lanco" 76 Sedgemoor Road, Willenhall, Coventry, Warks.

EARLY FLEMING diode and/or Magnetic Detector for W6YPM wireless museum. Offers initially to: G3IDG, 96 George Street, Basingstoke, Hampshire.

EDUCATIONAL

RADIO, City & Guilds, R.T.E.B. Certs., etc., on "Satisfaction or Refund of Fee terms. Thousands of passes. For full details of exams and home training Courses (including practical equipment) in all branches of Radio, Electronics, etc., write for 132-page Handbook—*Free.* Please state subject. British Institute of Engineering Technology (Dept. 200K), Aldermaston Court, Aldermaston, Berks.

BECOME " Technically Qualified " in your spare time, guaranteed diploma and exam., home-study courses in radio, TV servicing and maintenance. R.T.E.B., City & Guilds, etc.: Highly informative 120-page Guide—FREE! Chambers College, Dept. 864K, 148 Holborn, London, E.C.1.

SERVICES OFFERED

XTAL SERVICE

Your Xtals ground and etched to your required frequency ± ½ KHZ. Any pressure type (EG. FT243) processed at small cost dependent on shift required. Min charge 5/- for up to 2KHZ Shift-10KHZ 6/- 20 KHZ 7/- etc. Give exact shift required if possible. FILTER PACKAGES SUPPLIED (a) Selected Pairs plus carrier for half-lattice filters with optimum separation 24/-. (b) Two pairs plus carrier for constructors of 2 x ½ lattice filters carefully selected for similar Pole/Zero spacing and etched to match. To order at £3 plus postage. State upper or lower sideband. G. A. Day, 18 Bushey Ave., Petts Wood, Orpington, Kent.

CAPACITY AVAILABLE

PROTOTYPE or short run turning/milling etc., and sheet metal work capacity available.—C. G. James Electronics (G3VVB), Staines Road, Feltham, Middx. 01-570 3127.

MISCELLANEOUS

NORWEGIAN HOLIDAYS. By the sea, south coast. Rooms fully equipped for two or three persons. Hot and cold water, electric cooking and heating. TV room, bathrooms, rowing boats, fishing tours with motor boat. SSB station. From only £5 per room.—Ragnar Gustavsen LA7PA, Risør.

ORDER your American White Broadbreasted Turkey for Easter from GI3UJH 3/3 per lb. killed and plucked. Postage extra C.O.D.—J. Gillmoor Nelson, Carland, Dungannon.

ISLE OF WIGHT, bed-breakfast and evening meal. Large TV lounge. Also four-berth caravan, electric and flush toilet. G3RND, Bridgecourt Farmhouse, Godshill. Tel. 606.

NORTHERN MOBILE RALLY, Harewood Park near Leeds. Please note change of date: 12th May. Further details from: D. Binns, G3MGI, 80, Gipton Wood Road, Leeds 8. (Tel: Gledhow 426).

BED & BREAKFAST or all meals, all farm produce. Modern Bungalow, Homely atmosphere, children welcome, car space. Mary Farrar, " Delamar " St. Hilary, Marazion, Nr. Penzance.

4-BERTH Holiday Caravan, East Runton, Norfolk. Pleasant site overlooking sea. 5 minutes walk shops and beach. Excellent sites mobile/portable operation. G3HKK, 11 Newstead; Hatfield, Herts. Phone 64973.

PATENTS and TRADE MARKS.—Booklet on request. Kings Patent Agency Ltd. (B. T. King G5TA, Mem. RSGB, Reg Pat Agent).—146a Queen Victoria Street, London, E.C.4. Tel. 01-248. 6161. 60 years' refs.

HOLIDAYS. 17 comfortable rooms, full pension 14-16 gns. week. Bed, breakfast, 37/6d. licensed. Operational 10-15-20-80m. s.s.b. Overlooking sea at the famous Leas. Brochures, G3NVA, Rhodesia Hotel, Folkestone. Phone 53712.

CENTRAL SOMERSET, on Polden Hills. G5DW offers accommodation in an ideal centre for V.H.F. sites, historic, and beauty spots. Large lawns, and lounge. Mostly home produce. Stamp for brochure. Cheddar View Guest House, Ashcott (Tel. 251) Bridgwater, Somerset.

PROFESSIONAL MAN (21), Public School and Cambridge, seeks accommodation in or near Edinburgh, from October. Keen DXer. Room for beam an advantage. Share flat? Offers or suggestions please to Box No. V7362, c/o *Radio Communication,* 4 Ludgate Circus, E.C.4.

CLASSIFIED ADVERTISEMENTS

ORDER FORM

Please insert this advertisement in Radio Communication.

Rate 3d. per word, minimum 5s. Box nos. cost 1s. 6d. extra, which includes forwarding replies. Trade advertisements should be submitted by letter.

NAME (BLOCK CAPITALS) .....

ADDRESS .....

.....

.....

DATE ..... *SIGNED* .....

Classification .....

Box. No.

Yes ☐ No. ☐

POST TO SAWELL & SONS LTD., 4 LUDGATE CIRCUS, LONDON, EC4

MEMBERS' ADS

ORDER FORM

A charge of 4s. is made for Wanted advertisements only.

This form may be used for one free advertisement with a maximum of 32 words excluding your address. It is necessary that this form be accompanied by the wrapper from this issue. See Members' Ads. for further details.

NAME (BLOCK CAPITALS) .....

CALL-SIGN, BRS or A no. .....

ADDRESS .....

.....

.....

DATE ..... *SIGNED* .....

Classification

For Sale ☐ *(free)*

Wanted ☐ *(4s.)*

POST TO RADIO COMMUNICATION, 28 LITTLE RUSSELL STREET, LONDON, WC1

INDEX TO ADVERTISERS

RSGB PUBLICATIONS

RSGB PUBLICATIONS

RSGB

World At Their Fingertips (De-Luxe)	48/–
(Paperback)	14/–
RSGB Bulletin Bound Volume (1967)	31/6
Radio Data Reference Book (new edn.)	14/–
Amateur Radio Call Book (1968)	6/7
Radio Amateurs' Examination Manual	5/9
Service Valve Equivalents	5/6
S.S.B. Equipment	3/6
Morse Code for Radio Amateurs	2/–

ARRL

Antenna Book	21/6
Course in Radio Fundamentals	11/6
Hints and Kinks	11/6
Mobile Manual	27/-
Radio Amateur's Handbook	50/-
Radio Amateur's Operating Manual	11/6
V.H.F. Manual	22/–
Single Sideband for the Amatuer	26/–
Understanding Amateur Radio	21/6
The Radio Amateur's License Manual	5/9

CQ

Antenna Handbook Vol. 1	33/6
Anetenna Roundup	27/6
Antenna Roundup Vol. 2	33/6
CQ Anthology 1952–59	27/6
CQ Anthology 1945–52	18/6
Mobile Handbook	26/6
Sideband Handbook	27/6
RTTY Handbook	34/6
Shop and Shack Shortcuts	34/–

73

Care and Feeding of a Ham Club	9/–
Parametric Amplifiers	17/6
Simplified Maths for the Hamshack	5/6
V.H.F. Antenna Handbook	18/–

RADIO PUBLICATIONS

Beam Antenna Handbook	34/–
Better Shortwave Reception	27/6
Cubical Quad Antennas	25/6
Electronic Construction Practices	26/–
S-9 Signals	9/6

EDITORS AND ENGINEERS

Radio Handbook	88/6
Transistor Radio Handbook	46/-

MISCELLANEOUS

Basic Electricity (*Dover*)	25/6
Basic Electronics (*Dover*)	23/6
Basic Theory and Application of Transistors (*Dover*)	13/–
Dictionary of Electronics (*Penguin*)	8/3
Dictionary of Radio and TV (*Newnes*)	38/–
Electrons, Atoms, Metals and Alloys (*Dover*)	19/6
Foundations of Wireless (*Iliffe*)	22/6
Guide to Broadcasting Stations (*Iliffe*)	6/8
How to Listen to the World	27/–
Hams' Interpreter	9/6
Improve Your Short Wave Reception (*World Publications*)	19/6
Matter and Light—The New Physics (*Dover*)	16/3
Outline of Radio and Television (*Newnes*)	34/6
Radio Amateur Ops. Handbook (*Data*)	5/6
RCA Linear Integrated Circuit Fundamentals	22/6
From Semaphore to Satellite (*ITU*)	75/–
Short Wave Listening (*Iliffe*)	13/3
Short Wave Receivers for the Beginner (*Data*)	6/6
Short Wave Radio and the Ionosphere (*Iliffe*)	11/6
Short Wave Antennas (*World Publications*)	10/6
Transistors in Practice (*World Publications*)	30/9
Understanding Television (*Data*)	40/–
Wireless World Diaries, 1968, black, blue or red	6/9
Wireless World Radio Valve Data (*Iliffe*)	10/6
World Radio TV Handbook	43/–

LOG BOOKS

RSGB Standard Log	7/3
Receiving Station Log Book	7/3
Mobile Mini-Log	4/–
RSGB V.H.F. Contest Log Book	7/3
V.H.F. Log Book	7/3
Martin's Log Book	22/6
RSGB Radio Station Log Book	7/3

SUNDRIES

Easibinders, round backed, gold blocked, for Radio Communication	16/6
Easibinder Year Stickers (1965, 1966 or 1967)	1/6
RSGB Countries List	1/3

MAPS

Admiralty Great Circle Map	10/6 (*in tube*)
UK Counties Map	5/-
QRA Locator Map	7/– (*in tube*)

MORSE COURSES

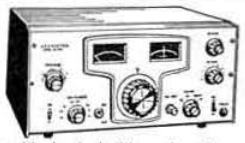
G3HSC Rhythm Method of Morse Tuition Complete course: two 3-speed L.P. records and one E.P. record + books	84/–
Beginner's Course: one 3-speed L.P. and one E.P. + books	60/6
Beginner's L.P. (0-15 w.p.m.) + book	50/-
Advanced L.P. (9-42 w.p.m.) + book	50/–
Three speed simulated GPO test, 7 in. d.s. E.P. record	15/–
RSGB Morse Instruction Tape (900 ft.)*	36/–
RSGB Morse Practice Tape (450 ft.)*	20/9

* Also available on C60 and C90 Cassettes.

Prices include postage. Stamps and book tokens cannot be accepted.

28 LITTLE RUSSELL STREET
LONDON, WC1

Printed in Great Britain for the RADIO SOCIETY OF GREAT BRITAIN, New Ruskin House, Little Russell Street, London, WC1
by The Garden City Press Limited, Letchworth Hertfordshire.



SPECIAL OFFER!

LAFAYETTE HA-350 10-80 METRE AMATEUR RECEIVER

- Mechanical Filter for Exception Selectivity
- 12 Valves Dual Conversion
- Automatic Noise Limiter
- Product Detector for Selectable Upper and Lower Sideband Reception
- Complete with Crystals for 80, 40, 20, 15 and 10 Metres
- 100 kc/s Crystal Calibrator and Crystal BFO
- "S" Meter-Calibrated in "S" Units 1.9 and to +40 db

A limited quantity of these fabulous receivers are available which were made for 115 volt A.C. only. Offered Brand New and guaranteed at a much reduced price

ONLY

£67.10.0

Suitable 115/230 volt transformer 24/-

UNR-30 4 BAND COMMUNICATION RECEIVER

Covering 550 Kc/s-30 Mc/s. Incorporates variable BFO for CW/SSB reception. Built in speaker and phone jack. Metal cabinet. Operation 220/240v. A.C. Supplied brand new, guaranteed with instructions. Carr. 7/6.

£12 10 0.

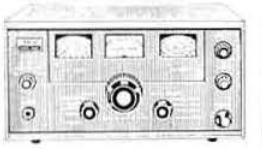
LAFAYETTE MODEL HA-500 SSB/AM/CW 80 THROUGH 6 METRE RECEIVER

New outstanding Ham Bands only receiver covering the 80/40/20/15/10/6 metre bands. Incorporates 10 valves, product detector, two mechanical filters, S Meter, dual conversion on all bands, crystal calibrator, B.F.O. noise limiter, aerial trimmer, I.F.s. 2,608 Mc/s and 455 kc/s. Output 8 ohms and 500 ohms. Operations 220/240 volt A.C. Supplied brand new and guaranteed with handbook. **42 Gns.** Carr. 10/-. 100 kc/s crystal, 35/-.

NEW LAFAYETTE MODEL HA700 AM/CW/SSB AMATEUR COMMUNICATION RECEIVER

8 valves, 5 bands incorporating two MECHANICAL FILTERS for exceptional selectivity and sensitivity. Frequency coverage on 5 bands 150-400 Kc/s, 550-1,600 Kc/s. 1.6-4.0 Mc/s. 4.8-14.5 Mc/s., 10.5-30 Mc/s. Circuit incorporates R.F. stage, aerial trimmer, noise limiter, B.F.O. product detector, electrical bandspread, S meter, slide rule dial. Output for phones, low to 2KΩ or speaker 4 or 8 ohms. Operation 220/240 volt A.C. Size 7in. × 15 in. × 10 in. Supplied brand new and guaranteed with handbook. **36 Gns.** Carr. 10/-. S.A.E. for leaflet.

TRIO 9R-59DE



Brief spec: 4 band receiver covering 550 Kc/s to 30 Mc/s continuous and electrical band spread on 10, 15, 20, 40 and 80 metres. 8 valves plus 7 diode circuit. 4/8 ohm output and phone jack. SSB-CW, ANL, variable BFO, S meter, sep. band spread dial, IF frequency 455 Kc/s, audio output 1.5 W, variable RF and AF gain controls. 115/250 V A.C. Mains. Beautifully designed. Size: 7in. × 15in. × 10in. with instruction manual and service data. **£37 10 0.** Carriage 12/6.

TRIO JR-500SE AMATEUR RECEIVER

Covers all the amateur bands in 7 separate ranges between 3.5 and 29.7 Mc/s. 7 valves, 2 transistors and 5 diodes plus 8 crystals: output 8 and 500 ohm and 5000 ohm phone jack. Crystal controlled oscillator, variable BFO, VFO, AVC, ANL, S meter, SSB-CW, stand-by switch, special double gear dial drive with direct reading down to 1 kHz. Remote control socket for connection to a transmitter. Audio output 1 watt. 115/250 V A.C. Mains. Superb modern styling. Size 7in. × 13in. × 10in. with instruction manual and service data. **£59.** Carriage 12/6.

CATALOGUE

- ★ ELECTRONIC COMPONENTS
- ★ TEST EQUIPMENT
- ★ COMMUNICATIONS EQUIPMENT
- ★ HI-FI EQUIPMENT

We are proud to introduce our first comprehensive catalogue of Electronic Components and equipment. Over 150 pages, fully illustrated, listing thousands of items, many at bargain prices. Free discount coupons with every catalogue. Everyone in electronics should have a copy. 5/-. P. & P. 1/-.

Send today

5/- P&P 1/-

ADMIRALTY B.40 RECEIVER

Just released by the Ministry. High quality 10 valve receiver manufactured by Murphy. 5 bands 650 Kc/s-30 Mc/s. I.F. 500 Kc/s. Incorporates 2 R.F. and 3 I.F. stages, bandpass filter, noise limiter, crystal controlled B.F.O. calibrator, I.F. output etc. Built-in speaker, output for phones. Operation 150/230 volt A.C. Size 19¼in. × 13¼in. × 16in. Wght. 114lbs. Offered in good working condition. **£22.10.0.** Carr. 30/-. With circuit diagrams. Also available B41 L.F. version of above. 15Kc/s-700Kc/s. **£17.10.0.** Carr. 30/-.

R209 MK. II COMMUNICATION RECEIVER

11 valve high grade communication receiver suitable for tropical use. 1-20 Mc/s on 4 bands. AM/CW/FM operation. Incorporates precision vernier drive, B.F.O. Aerial trimmer, internal speaker and 12v. D.C. internal power supply. Supplied in excellent condition, fully tested and checked. **£15.** Carr. 20/-.

CLEAR PLASTIC PANEL METERS

First grade quality, Moving Coil panel meters, available ex-stock. SAE fo. illustrated leaflet. Discounts for quantity Available as follows. Type MR. 38P. 1 21/23in. square fronts

"S" Meter..	29/6	10mA	.. 25/-	1A DC	.. 25/-
50μA	.. 37/6	50mA	.. 25/-	2A DC	.. 25/-
100μA	.. 35/-	50mA	.. 25/-	5A DC	.. 25/-
250μA	.. 32/6	100mA	.. 25/-	3V DC	.. 25/-
500μA	.. 27/6	150mA	.. 25/-	10V DC	.. 25/-
50-0-50μA	.. 35/-	200mA	.. 25/-	20V DC	.. 25/-
100-0-100μA	32/6	200mA	.. 25/-	50V DC	.. 25/-
500-0-500μA	25/-	300mA	.. 25/-	100V DC	.. 25/-
1mA	.. 25/-	500mA	.. 25/-	150V DC	.. 25/-
2mA	.. 25/-	750mA	.. 25/-	300V DC	.. 25/-
5mA	.. 25/-	1-0-1mA	.. 25/-	400V DC	.. 25/-

Post extra. Larger sizes available—Send for list.

15V DC	.. 25/-
50V AC	.. 25/-
150V DC	.. 25/-
300V AC	.. 25/-
500V AC	.. 25/-

R.C.A. AR88 SPEAKERS

Eight-inch, 3 ohm speakers in metal case. Black crackle finish to match our 88 receivers. Brand new and boxed with leads, **59/6** Carr. 7/6.

GRID DIP METERS

KYORITSU. 360 Kc/s-220 Mc/s. Mains operated ..	£12 10
Lafayette Nuvistor 1.7-180 Mc/s. Mains operated ..	£12 10 0
TE.15 Transistorised. 440 Kc/s.-220 Mc/s.	£11 11 0

EX-AM CONTROL BOX with two Londex 7026 24v. D.C. Aerial Changeover Relays. New. **39/6.** Carr. 5/-.

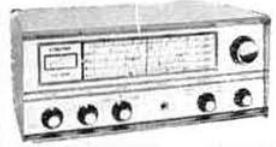
BUG KEYS
£3 19 6
ELECTRONIC KEYS
£16 10 0

ELECTRONIQUE COIL PACKS

GC.166 QF166	£14 14 0
GC.166T. HB166T ..	£18 18 0

I.F. Strips also in Stock.

CODAR EQUIPMENT



CR.70A RECEIVER	£19 10 0
CR.45 RECEIVER	£11 7 0
CR.45 KIT FORM	£9 10 0
PR.30 PRESELECTOR	£5 10 0
PR.30X (BUILT IN PSU)	£7 4 0
RQ.10Q MULTIPLIER	£6 15 0
RQ.10X (BUILT IN PSU)	£8 8 0
CC.40 CONTROL UNIT	£6 10 0
AT.5 TRANSMITTER	£16 10 0
T.28 RECEIVER	£15 10 0
12/MS. MOBILE PSU	£11 5 0
12/RC. CONTROL UNIT	£2 7 6
AT.5 MAINS PSU	£8 0 0
MINI CLIPPER KIT	£1 19 6

JOYSTICK AERIALS

Revolutionary variable frequency aerials with a variety of different matching units suitable for receiving or transmitting and covering medium and short waves.

STANDARD JOYSTICK—£4 15 0

DE-LUXE JOYSTICK —£5 19 6

TUNING UNITS

TYPE 2A	£3 15 0	TYPE 4RF	£6 6 0
TYPE 3	£2 15 0	TYPE 4H	£3 10 6
TYPE 3A	£3 12 6	TYPE 4H/RF	£6 6 0
TYPE 4	£4 4 0	TYPE 6RF	£3 19 6

Open: 9 a.m.-6 p.m. Every day Mon. to Sat.

G. W. SMITH & CO. (RADIO) LTD.

3 and 34 LISLE STREET, LONDON, W.C.2 **GERRARD 8204/9155**

Part exchanges welcome

IF UNDELIVERED Return to:— RSGB, NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, WCI

IF UNDELIVERED Return to:— RSGB, NEW RUSKIN HOUSE, LITTLE RUSSELL STREET, WCI