

The

SHORT WAVE

Magazine

4/-

VOL. XXVI

JUNE, 1968

NUMBER 4

KW 2000A SSB TRANSCEIVER

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



KW VESPA Mark II

KW VESPA Mark 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

The KW 201 is now being manufactured with 2 detectors (i) product detector for SSB and CW, (ii) diode detector for AM. The KW 201 has been specifically designed for optimum performance on SSB. 11 ranges give coverage 1.8 mc/s. to 30 mc/s. A mechanical filter gives an IF selectivity of 3.1 kc/s. at 6 dB, and 6 kc/s. at 60 dB. A "Q" multiplier is available giving a variable range of 3.1 mc/s. to 200 cycles selectivity.



KW 1000



KW 201



BUY KW EQUIPMENT IT'S BRITISH

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

Write for illustrated detailed specification on the above and our list of KW Tested, 'Trade-in' equipment.

K. W. ELECTRONICS LTD.

1 HEATH STREET, DARTFORD, KENT

TELEPHONE: DARTFORD 25574 CABLES: KAYDUBLEW DARTFORD

Other KW Products

- KW Antenna Switch (3 position)
- KW E-Z Antenna Match Unit
- KW PEP Meter
- KW Match SWR Indicator
- KW Low-Pass Filters
- KW Trap Dipoles
- KW Balun
- KW Dummy Load
- KW Q Multipliers

Eddystone



BRITISH MADE

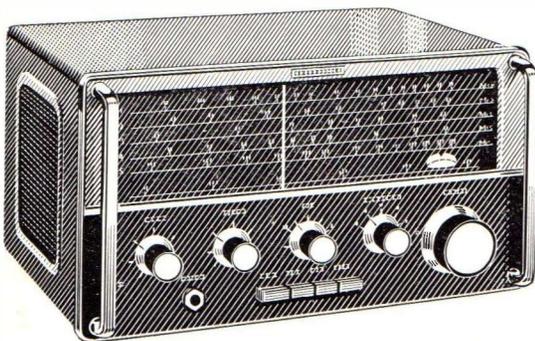
Amateur communications receivers

EA12



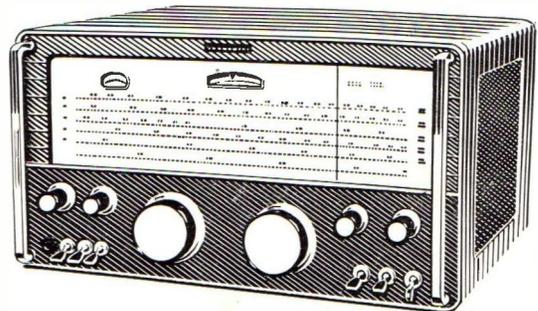
An amateur bands double-conversion superheterodyne receiver, for a.m, c.w, and s.s.b reception. For all amateur channels between 1.8 MHz and 30 MHz in nine 600 kHz bands with 28 MHz to 30 MHz in four bands.

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.

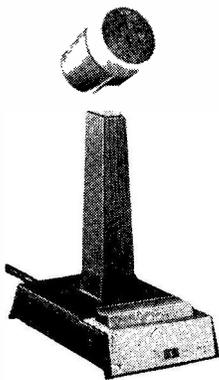
Comprehensive information from your Eddystone distributor or: Eddystone Radio Limited, Eddystone Works, Alvechurch Road, Birmingham 31. Telephone: 021-475 2231. Telex: 33708

A MARCONI COMPANY

LTD/ED551

You can depend on Shure quality MICROPHONES For amateur radio communications

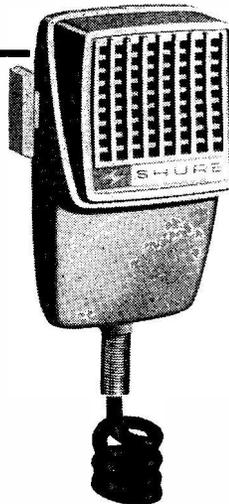
Shure Model 444 Controlled Magnetic Microphone



Specially designed for radio communications, giving optimum performance from single sideband transmitters as well as AM and FM units. Response cuts off sharply below 300 c/s and above 3,000 c/s, with a rising characteristic to 3,000 c/s. This results in optimum speech intelligibility and audio punch to cut through noise interference. High impedance. Dependable under all operating conditions. Complete with switch for instantaneous press-to-talk or VOX operation; finger-tip control bar; long-life switch; adjustable microphone height; sturdy, high-impact base and case; 7 ft. two-conductor shielded cable.

Shure Model 201 Diaphragm Type Ceramic Microphone

- *Provides clear, crisp, natural voice reproduction of high intelligibility
- *High impedance *Ideal voice response and omni-directional polar pickup characteristics
- *No humidity or temperature problems
- *Light, strong and compact
- *Heavy duty push-to-talk (non-locking) switch
- *Frequency response : 200 to 4,000 c/s
- *3-conductor retractable cable.



SHURE Setting the world's standard in sound

SHURE ELECTRONICS LTD.
84 Blackfriars Road, London, S.E.1. Tel.: 01-928 6361

REWARD REWARD REWARD

£20 paid to the person or persons giving information to the recovery of the following:

Swan 500 Tranceiver, Serial No. H289019
A.C. P.S.U., Serial No. Q182709

See elsewhere in S.W.M. for further details.

See the **NEW TRIO TRANSCEIVER.** All complete with A.C. P.S.U. and remote V.F.O. All for ... £199 0 0

PARKAIR ELECTRONICS AIRCRAFT RECEIVERS.

See the Sky Bandit ... £23 10 0
Concorde ... £17 15 0

ALL OTHER TX's AND RX's AS LAST MONTH

SECOND-HAND GEAR

KW VESPA 6146B. Immaculate ... £87 10 0
KW VICEROY ... £87 10 0
DX100U. Very Good ... £65 0 0
G2DAF. Very good ... £40 0 0
AR88LF ... £22 10 0
KW2000. D.C. P.S.U. ... £25 0 0
HALLICRAFTERS SKYRIDER ... £5 0 0
MINIMITTER. Top to Seven ... £20 0 0
6HF5, 39/-; 6146B, 50/-; 12BA6, 10/-; 12BE6, 13/-; 12BN8, 12/-; 69K6, 11/4; 6EW6, 10/-; 6CH6, 10/-; 6CL6, 10/-.

SPECIAL OFFER:

2N706, 2/-; OC44, OC45, OC71, OC72, 2/1; OC81, 2/3; OC83, 2/2; OC170, 3/-; OC171, 4/-; OC26, 7/6; OC35, 14/3; AC126, 2/1; AC128, 2/1; AFI16, AFI17, 2/6; AD140, 11/-; BSX26, 3/-; BSY65, 3/-; BFY18, 3/-; OA202, 1/10; OA81 1/6. Silicons 800piv 750 ma/s. 2/5.

MICROPHONES:

CRYSTAL LAPEL MICS. Only ... 4 0
SHURE 444 ... £9 10 0
SHURE 201 ... £4 10 0
ACOS ... £1 2 6
TTC B1053 ... £6 6 0
TTC CM705 ... £1 10 0
TTC CM705 ... £2 1 3
BM3 with stand ... £2 12 6

COAX CABLES ALL AS LAST MONTH

PL259 PLUGS. Low loss ... 7 6
PL259 MICA ... 4 9
SO259 SOCKETS. Low loss ... 8 6
SO259 SOCKETS. Mica... 4 9

We also stock —HP. LP Filters, SWR Bridges, PEP Meters, Chassis, Resistors, Condensers, etc., etc.

METERS—Send for lists. S.A.E. please.

NO ORDER TOO SMALL

PART EXCHANGES. GOODS DISPATCHED RETURN OF POST.
Postage extra.

GEORGE FRANCIS

G3TWV

93 BALDERTON GATE, NEWARK, NOTTS.

Tel. 4733, after 6 p.m. 2578

J. B. LOWE

50-52 Wellington Street, Matlock, Derbyshire

Tel.: Matlock 2817 (2430 after 6 p.m.)

You've had your ration of pretty pictures for a bit—they're very nice but they cost money and you know me. Parting with money is something I don't do readily. In fact, every time I see a bill I throw myself on the floor. I writhe in agony, mumbling obscenities accompanied by the odd wail, tears streaming down my face as my legs thrash and my palms beat the floor. Quite a performance, boy, I'll tell ya. At one time I used to beat my head against the wall—but these days, well, there just aren't the decorators about. Enough of this nonsense, Lowe—start flogging. You know this Sommerkamp stuff I flog—you're probably not aware of it, but I do keep a complete range of spares—not only spares, but optional extra goodies such as 500 cycle mechanical filters, 5 kc A.M. filters (note that this is a true mechanical filter and an improvement over the 4 kc/s. A.M. filter fitted as standard), 2m. converters expressly designed for the FR-500, the 2m. transverter for the FI-500 (bet you didn't even know there was one!), extra crystals and so on. Damn it, this Sommerkamp stuff must be pretty good when Bill Lowe is reduced to advertising spares. I've sold about 300 Sommerkamps and as many spares to buy a Mars bar! Anyway, if you want to join the happy band of Sommerkamp owners, I would be delighted to take your money. Not only that, but I do like to sell stuff I know I'm not going to have to repair under guarantee. That's why I sell the stuff I do, because repair under guarantee cost me money and you know how I feel about that!! Not so soft as I look, am I?

Sommerkamp prices: FR-500, £130; FL-500, £145; FT-150, £215; FT-500, £250.

Star Line: Customers come and look at it, twiddle knobs and say "Looks terrific, but what's it like, Bill?" I always say "Excellent." The keener Customers who make every penny count, look at it, twiddle, delve inside it, go carefully over the circuit diagram and then say, "Looks terrific, but forget you're a dealer and tell me what it's really like." I always say "Excellent." Like I say, unless I am absolutely convinced a thing is honest value for money, I just will not sell it. The tragedy of being a dealer of course, is that nobody ever believes you. Ah well, never mind. Bash on!

Star SR-700A Rx.: 80 to 10. ½ microvolt sensitivity, 4 kc/s. down to 500 cycle selectivity, notch filter, very stable and accurate VFO, direct readout to 1 kc/s. Beautiful to handle, £115.

Star ST-700 Tx.: 80-10 SSB/CW/AM, 200W. p.e.p. VOX, MOX, PTT, break-in CW, built in CW monitor, ALC. A very, very nice rig indeed, £135.

Star SR-200 Rx.: Top band to 10m. 1 microvolt sensitivity, single xtal filter at 1650 kc/s. for good selectivity and image rejection. Product detector for CW/SSB and diode detector for AM. Amplified a.g.c., built-in xtal calibrator. A very great deal of thought has gone into the design of this and it's a beauty, £40.

Inoue Line: I don't want to push these too hard as the demand exceeds the supply, but here's brief details:—

IC-700R: Rx. 80-10, better than ½ microvolt sensitivity, 2.4 kc/s. selectivity (a beautiful 9 mc/s. xtal filter with a 1.8:1 shape factor). Audio filter for CW, all transistor with FET front end. Either 240v. A.C. or 12v. D.C. built-in. 6½" x 11" x 8½", £85.

IC-700T: Tx. Designed to operate transceive with the 700R. 2-6146B's in the final, VOX, PTT, MOX, RIT. 6½" x 10" x 9½", £80. Companion p.s.u./speaker, £30. The lot, as a package deal, £180. Just where you'd go to beat this little beast I wouldn't know. All I can say is, get your name down for one pronto. Delivery currently 4-6 weeks but improving.

Whilst on the subject of new stuff, I also have the following in stock:—

Fanon 28.5 mc/s. walkie-talkies, £12 10s. per pair; Hansen S.W.R. bridges, £3 10s.; Bug Keys, £4 10s.; Dentsu DA1 electronic keys, £16; Alpha padded low impedance headsets, £2 2s. 6d; Filters, loads of 'em, KVG, XF9A and 9B, 9 mc/s. xtal filters of the highest quality. Mechanical filters, 455 kc/s., 2.1 kc/s., 500 cycles, 5 kc/s. and even 24 kc/s. for VHF/FM. Crystals, 100 kc/s. to mil. spec. These are an extremely accurate xtal (lab. report on each and every one), newly manufactured, not surplus and fit HC6/U holder (HA350, Heathkit, etc., etc.), £2; AR88D manual reprints, 15/- each; Hansen VT300 VTVM, £15 10s. complete with r.f. probe. Transistor Intercoms—useful in the shack. "Charlie, your beer's getting cold!" £3 (must be a good buy at this price!); Tavasu mobile whips, £12 10s. Details of the above new stuff gladly sent on request. I also stock a fair range of components both new and surplus:—

NEW:

Tubular trimmers either ½-5pF or 3-15pF, 1/- each, 10/- a doz.; Feedthroughs 1000pF screw type 1/- each, 10/- a doz.; Disc ceramics, .001, 3/6 a doz.; .01, 5/- a doz.; Standard coax sockets, 1/- each; standard coax plugs, 1/4 each; Plugs (Octal, B7G, B9A), 2/6 each; Electrolytics—brand spanking new can types, complete

with mounting clips, 10mF 350V, 1/8; 20mF 350V, 2/3; 20mF 450V, 2/9; 100mF 350V., 5/6; 100-100mF 350V., 6/8; 100mF 450V, 7/2; 40-40mF 500V, 7/3; 100mF 500V, 7/9; 100-10mF 450V, 13/2. Silicon rectifiers—Current manufacture, NOT surplus, NOT seconds. You can rely on these. SE-05 1000piv. 500mA, 4/6; IS1066 1000piv 750mA., 8/-.

NEW SURPLUS:

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

SECOND-HAND RECEIVERS:

HA-350. Mint ...	£60 0 0	EDDYSTONE 770U	£100 0 0
EDDYSTONE EC10	£38 0 0	HR-22 ...	£80 0 0
TCS12 ...	£12 0 0	HQ170 ...	£70 0 0
TRIO JR500—		SUPER PRO ...	£20 0 0
Demonstrator ...	£50 0 0	EDDYSTONE 750	£45 0 0
B40's. AI ...	£20 0 0	MARCONI CR150	£35 0 0
DRAKE R4. Com- plete with all crystal and mint	£185 0 0	RA17. Choice of 2	£180 0 0
		EDDYSTONE 770R	£100 0 0

SECOND-HAND TRANSMITTERS:

VANGUARD. As		LG300 R.F. Section	£20 0 0
new ...	£45 0 0	HAMMARLUND	
(another at £30)		HX50 ...	£110 0 0
PANDA CUB ...	£25 0 0	HEATHKIT VFIU...	£5 10 0

Test Gear:

Laboratory audio oscillator, a thing of beauty	...	£25 0 0
MARCONI TFI100 V.T.V.M.	...	£25 0 0
MARCONI TF390G. 16-50 mc/s.	...	£20 0 0
TAYLOR Sig. Generator, 100 kc/s. to 45 mc/s.	...	£10 0 0
AVO Sig. Gen. 50 kc/s.-80 mc/s., mint	...	£17 10 0
HEATHKIT 1012U 'Scope. Mint	...	£27 0 0
COSSOR 1045 'Scope	...	£25 0 0

I also have a bunch of tantalum capacitors at very low prices, ½ watt sub miniature resistors (metal oxide types, very nice)—Write for component lists.

Postage: Allow lots (it's always more than you think), I'll refund any left over.

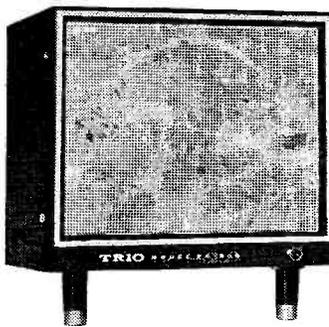
A large s.a.e. will get you a copy of my latest lists.

73,

Bandit Bill,

VE8DP/G3UBO.

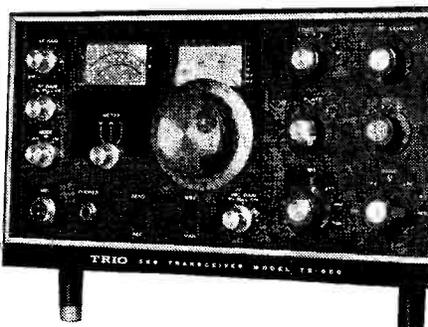
ANNOUNCING A GREAT NEW TRIO SYSTEM



PS-500AC POWER SUPPLY AND SPEAKER

● Utilizes a silicon voltage rectifier to supply the high 900v. requirements of the TS-500 transceiver ● B supply lines requiring 300v. and less are taken from the centre of the capacitor stack and voltage dropping resistors are used in series to form the 200v. and 150v. supplies ● A half wave silicon rectifier circuit is used to obtain block bias voltage of 120v. ● Two 12.6v. 3 amp. secondary windings supply heater voltages for the transceiver valves ● The primary windings are connected for operation from 230v. line sources ● The power supply jack incorporates speaker line terminals, as well as the power transformer primary connections so that AC power switching is made from the transceiver ● Incorporates specially designed 6½in. communications speaker—frequency range 150-5000Hz. ● Size 7½ x 8½ x 11½in.

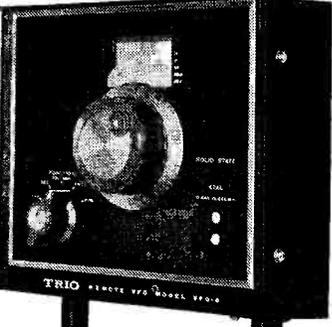
PRICE £38.0.0



TS-500 SSB TRANSCIVER

● Precision, double gear tuning mechanism and linear tuning condenser provides 1kHz direct reading divisions on all bands ● Besides SSB, AM (3AH) and CW communication is provided ● Operates with a max. input of 200W. PEP an SSB and CW. ● Undistorted output more than 1W. ● Covers all amateur bands from 3.5 to 29.7 MHz with a 7 band tuning system in both transmitting and receiving modes ● Double conversion type superheterodyne receiver ● Solid state VFO circuitry assures high stability performance ● Receiver sensitivity 1µV S/N 10 dB (14 MHz), Selectivity 2.7 kHz (-6 dB) 5.0 kHz (-55 dB) ● Xmitter audio freq. 300-3000 Hz (-6 dB) ● Uses 17 valves, 3 transistors and 15 diodes ● New Trio developed crystal sideband filter provides superior shape factor and clear, crisp SSB quality ● Highly effective AGC circuit prevents fading, permits easy reading of signals ● Built-in crystal calibrator circuit works with 500 kHz, 1 or 3.5 MHz crystals ● RIT circuit for fine receiver tuning ● Built-in circuits include VOX, PTT, ALC, RIT, CAL, RF-HV METER, connections for ext. VFO and ALC. ● Used with a remote VFO a special switching circuit permits, in effect, the operation of two transmitter/receivers. ● Power supply from sep. PS-500AC unit ● Size 13 x 8½ x 11½in.

PRICE £165.0.0



VFO-5 VARIABLE FREQUENCY OSCILLATOR

● Equipped with the same high precision double gear dial mechanism and linear variable frequency capacitor as the TS-500, enabling direct reading of frequencies at 1 kHz intervals ● Oscillator frequency range covers all the amateur bands, as the TS-500 ● Built-in crystal oscillator section assures crystal controlled transmitting/receiving ● Unlike ordinary VFO units, this VFO permits four different functions through the utilisation of a "criss-cross" function switching scheme ● Outstanding frequency stability due to cool operating all transistor circuitry, adoption of a Vaccar oscillator circuit and temperature compensation features ● Rugged LC box and solid construction throughout make this unit practically impervious to mechanical shocks. ● All power requirements are taken from the transceiver through a single connecting cable ● Uses 4 transistors and 2 diodes ● Size 7½ x 8½ x 6in.

PRICE £28.0.0

Illustrated technical information leaflet on request

SOLE UNITED KINGDOM AGENTS AND DISTRIBUTORS

B.H.MORRIS & CO. (Radio) LTD

84-88 NELSON STREET, TOWER HAMLETS, LONDON, E.1.

Tel.: 01-790 4824

Please send me full illustrated literature on all TRIO Communications Equipment.

My nearest TRIO stockist is:—

NAME

ADDRESS

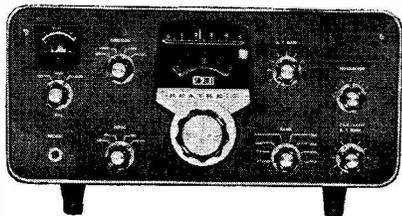
.....

.....

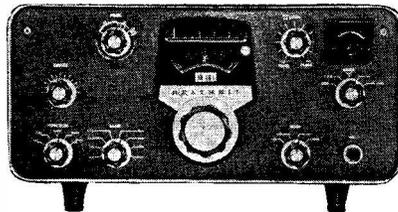
SWM/1

HEATHKIT Amateur Radio Equipment

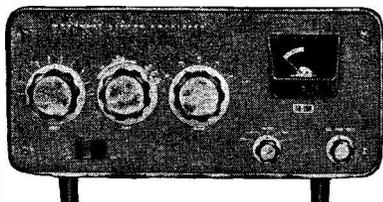
ASK FOR DETAILS OF EXTENDED PAYMENT PLANS OVER £10 (UK only)



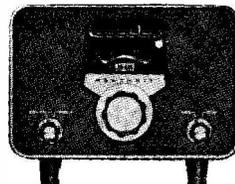
SB-301E Amateur Band Receiver . . . SSB, AM, CW and RTTY reception on 80 through 10 metres + MHz WWV reception. Tunes 2 metres with SBA-300-4 plug-in converter.
Kit SB-301E, 23 lbs. (less speaker) **£140 . 12 . 0** P.P. 9/-
 Ready-to-use **£170 . 12 . 0** P.P. 9/-



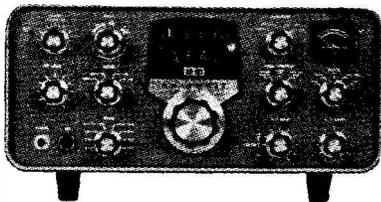
SB-401E Amateur Band SSB Transmitter . . . 180 watts PEP SSB, 170 watts CW on 80 through 10 metres. Operates "Transceive" with SB-301—requires SBA-401-1 crystal pack for independent operation.
Kit SB-401E, 34 lbs., **£157 . 10 . 0** P.P. 10/6
 Ready-to-use **£192 . 10 . 0** P.P. 10/6
SBA-401-1 crystal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



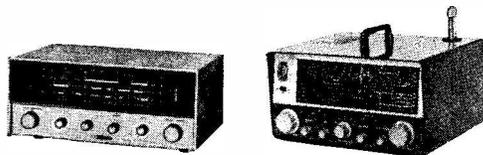
SB-200 KW SSB Linear Amplifier . . . 1200 watts PEP input SSB, 1000 watts CW on 80 through 10 metres. Built-in antenna relay, SWR meter, and power supply. Can be driven by most popular SSB transmitters (100 watts nominal output).
Kit SB-200, 41 lbs., **£120 . 18 . 0** P.P. 10/6
 Ready-to-use **£145 .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



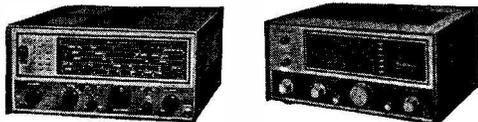
SB-640 External LMO for SB-101 . . . Provides Linear Master Oscillator frequency control or either of two crystal controlled frequencies for a total of five frequency control options. Power supplied from SB-101 Trans.
Kit SB-640, 9 lbs., **£51 . 6 . 0** P.P. 6/- Ready-to-use **£56 . 6** P.P. 6/-



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** P.P. 9/-
 Ready-to-use **£225 . 12 . 0** P.P. 9/-



GR-64 Short Wave Receiver . . . Covers 1 MHz. to 30 MHz., plus 550 kHz. to 1620 kHz. AM band. Many special features for such a modest price. For 115, 230v. 50/60 Hz. A.C. mains operation.
Kit GR-64E **£22 . 9 . 0** P.P. 9/- Ready-to-use **£29 . 9 . 0** P.P. 9/-
GC-1U "Mohican" General Coverage Receiver . . . 10 transistors. 5 diode circuit. Tunes 580-1550 kHz. and 1.69-30 MHz. in 5 bands. 6" x 4" speaker.
Kit GC-1U **£37 . 17 . 6** P.P. 10/6 Ready-to-use **£45 . 17 . 6** P.P. 10/6



RG-1 High Sensitivity General Coverage Receiver . . . High performance at lowest cost. Covers 600 kHz. to 1.5 MHz., 1.7 MHz. to 32 MHz. Full specifications available.
Kit RG-1, 18 lbs., **£39 . 16 . 0** P.P. 9/-
 Ready-to-use **£53 . 0 . 0** P.P. 9/-

RA-1 Amateur Bands Receiver . . . Covers 10-160m. Half-lattice crystal filter at 1.6 MHz. Switched USB and LSB for SSB. Provision for fixed, portable or mobile uses.
Kit RA-1 **£39 . 6 . 6** P.P. 9/- Ready-to-use **£52 . 10 . 0** P.P. 9/-

Showroom : GLOUCESTER, Bristol Road.

HEATHKIT

Please address all mail order enquiries to:—
DAYSTROM LTD., Dept. SW6, GLOUCESTER

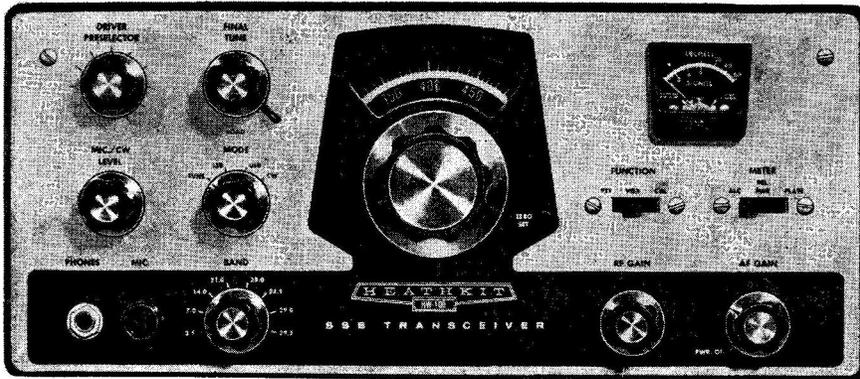
- Enclosed is £ post paid U.K.
- Please send model(s)
- Please send FREE Heathkit Catalogue.

NAME
 BLOCK CAPITALS

ADDRESS

Prices and specifications subject to changes without notice.

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



£125 KIT

EXTENDED PAYMENT PLAN

Deposit £31 16 0

19 monthly payments £5 9 0

Total Credit

Price :

£135 7 0

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-band" 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 kHz. per band segment ● Smooth vernier control of frequency with patented Harmonic Drive™ dial mechanism ● Built-in 100 kHz. 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. **£125 0 0 P.P. 9/-**

Kit HP-13, DC power supply, 7 lbs. **£37 2 0 P.P. 6/-**

Kit HP-23, AC power supply, 19 lbs. **£30 18 0 P.P. 9/-**

Kit SB-600, 8 ohm speaker, 6 lbs. . . . **£10 2 0 P.P.n.c.**

HW-100 SPECIFICATIONS — RECEIVER. Sensitivity : Less than .5 microvolt for 10 dB signal-plus-noise to noise ratio for SSB operation. Selectivity . . . 2.1 kHz. minimum at 6 dB down, 7 kHz. maximum at 60 dB down (3-395 MHz. 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 metres ; 80 watts on 10 metres (50 Ω nonreactive load). Output impedance : 50 Ω to 75 Ω with less than 2:1 SWR. Oscillator feed-through or mixer products : 55 dB below rated output. Harmonic radiation : 45 dB below rated output. Transmit-receive operation : SSB PTT or VOX. CW : Provided by operating VOX from a keyed tone, using grid-block keying. CW Sidetone : Internally switched to speaker or headphone, in CW mode. Approximately 1000 tone. Microphone input : High impedance with a rating of —45 to —53 dB. Carrier suppression : 45 dB down from single-tone output. Unwanted sideband suppression : 45 dB down from single-tone output at 1000 Hz reference. Third order distortion : 30 dB down from two-tone output. RF Compression (TALC) : 10 dB 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 (megahertz). Frequency stability : Less than 100 Hz per hour after 30 minutes warmup from normal ambient conditions. Less than 100 Hz for ± 10% line voltage variations. Modes of operation : Selectable upper or lower sideband (suppressed carrier) and CW. Dial calibration : 5 kHz. Dial mechanism backlash : Less than 50 kHz. Calibration : 100 kHz. crystal. Audio frequency response : 350 to 2450 Hz. 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 ; 6EA8 2nd receiver mixer and relay amplifier ; 6EA8 CW sidetone oscillator and amplifier ; 6GW8 Audio amplifier and audio output ; 12AT7 Heterodyne oscillator 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 with .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. x 6-5/16" H. x 13-3/8" D

DAYSTROM LTD., Dept. SW-6 (Use coupon left)
 GLOUCESTER ENGLAND. Telephone : 29451

Retail Stores : LONDON, 233 Tottenham Court Road. BIRMINGHAM, 17-18 St. Martins House.

PETER SEYMOUR LIMITED

410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone: 41938 (43353 after 7.30)

	£ s. d.		£ s. d.
The New TRIO Transceiver TS.500 , 200W PEP, complete with power supply, speaker and remote VFO, inclusive, is available, ex-stock. Full details on request. Complete ...	199 0 0	TRIO JR500SE crystal-controlled Osc., tunable IF system, full coverage 80-10 metres. Amateur bands only. Two mechanical filters, transistorised VFO, etc. New ...	68 0 0
DRAKE SW4 , with matching speaker, cost £187 new	145 0 0	HA700 , 550 Kc/s.-30 Mc/s. mechanical filter product detector, "S" meter, etc. New ...	37 16 0
DRAKE TR4 , as new, complete with matching speaker and P.S.U. ...	295 0 0	EAGLE DE LUXE SWR INDICATORS , reads forward and reflected power directly calibrated in SWR up to 10-1 plus direct reading RF wattmeter 0-15W, FSD 2-200 Mc/s. ...	9 19 6
NATIONAL HRO500 , recent full works up-dating	550 0 0	DRAKE TR4 . New ...	295 0 0
KW2000A , new with matching P.S.U. ...		MATCHING A.C. P.S.U. ...	59 10 0
KW VESPA ...		MATCHING SPEAKER MS4 ...	12 10 0
KW VICEROY Mark IIIA . Mint condition throughout ...	120 0 0	DRAKE R4B RECEIVER ...	225 0 0
KW VICEROY Mark III . Mint condition throughout	115 0 0	Full details of the Drake equipment are available on request.	
EDDYSTONE 680X , latest model ...	85 0 0	LAFAYETTE HA350 . 80-10 metres, xtal crystal-controlled front end ...	78 15 0
COMMUNICATOR (T. W. Withers), 160 model	50 0 0	EDDYSTONE EC10 . New ...	53 0 0
HALLICRAFTERS SX111 . Full coverage, all bands 80-10 Mtrs. selectable sidebands. 100 Kc/s. calibrator variable selectivity with "T" notch filter, etc. Outstanding value ...	65 0 0	CODAR AT5 with mains P.S.U. ...	20 0 0
SEMI-AUTOMATIC Bug Key ...	4 12 6	HALLICRAFTERS SX122 ...	125 0 0
LEVELL , transistor A.C. Microvolt meter, type TM3A, 15 microvolts to 500 volts in 16 ranges ...	35 0 0	EDDYSTONE E.C.10 with mains/battery P.S.U. ...	40 0 0
VOLSTATIC V.H.F. SKYMASTER , covers long, medium and 108-138 Mc/s. The best aircraft band portable in the U.K. (including carriage) ...	24 10 0		
DENTSU . Fully automatic all transistor electronic keyer, mains or battery input, 2-60 w.p.m. ...	16 10 0	We are now in a position to take orders for the latest G.E.C. Digital read-out receiver, delivery August, £1,248; also the latest Redifon R403.	
TRIO 9R59DE , 550 Kc/s.-30 Mc/s. Immediate delivery ...	39 15 0	FOR fine quality receivers, consult us.	
DRAKE TR3 , 80-10 metres 30W. PEP, non-standard P.S.U. ...	205 0 0	NOTE : Should you wish to part-exchange any good quality photographic equipment, our mail order camera department can quote you on trade-ins. We can also supply any new photographic equipment, and can take into stock items of Amateur Radio equipment, existing H.P. settled.	
MULTIBAND DIPOLE TRAP SETS , with full instructions, full encapsulated, per pair 80-10 mtrs.	2 10 0		

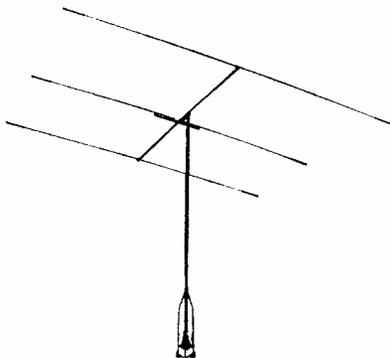
FULL H.P. FACILITIES ON EQUIPMENT OVER £35

25% DEPOSIT UP TO 24 MONTHS TO PAY. LET US KNOW YOUR REQUIREMENTS



WE ARE THE ANTENNA PEOPLE

WHY BUY IMPORTED EXPENSIVE TYPES—
BACK BRITAIN—BUY ANTENNA'S
MANUFACTURED 100% IN ENGLAND



ELAN

- | | |
|-------------|--------------|
| ELAN | SWL-7 |
| TA-33 Jr. | RD-5 |
| TA-32 Jr. | A-315 |
| TA-31 Jr. | A-215 |
| V-3 Jr. | A-310 |
| VTD-3 Jr. | A-210 |
| TD-3 Jr. | TW-3X |

- Imported Antenna's
- | | |
|------------|---------------|
| Classic-33 | Lancer Mobile |
| A-203-C | V-4-8 |
| TA-36 | A-92-5 |
| TA-33 Snr. | TD-2 |
| TA-32 Snr. | D1-10 |
| V-4-6 | R4-4RK |
| RV-4 | |

Rotators, Towers, Polythene cord and rope, Coax cable, Control cable, Twin feeder, SWR indicators and many more Antenna accessories.

Send for our complete Handbook, containing full details and prices of Antenna's and technical information. 26 pages 1/6.

We sell direct or through our distributors
Southern Area :
K.W. Electronics Ltd.
Midland Area :
Swanco Products Ltd.

Carriage and Insurance Extra

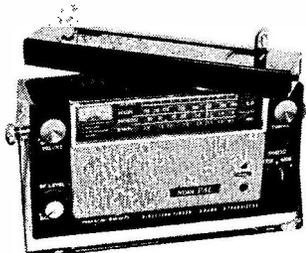


V-3 Jr.

Mosley Electronics Ltd. 40, Valley Road, New Costessey, Norwich, Norfolk Nor. 26K

Telephone: Costessey 2861, orders only

THE BIG FOUR BY NOVA TECH



NOVA PAL

3-band R.D.F. 9 transistors
 190-400 Kc. with rotating ferrite antenna
 550-1600 Kc. and connection for external
 1600-4500 Kc. aerial.
 Suitable for yachtsmen.

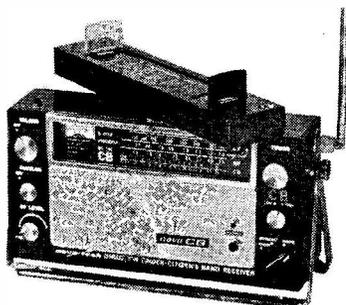
£27.0.0



AVIATOR II

12 transistor 4-band R.D.F./VHF.
 190- 400 Kc. with rotating ferrite antenna,
 550-1600 Kc. 3 removable telescopic whip
 1600-4500 Kc. antennas, twin plug antennas for
 108- 136 Mc. best air-borne reception. Long
 range extendable whip provides
 maximum signal input on the
 ground.

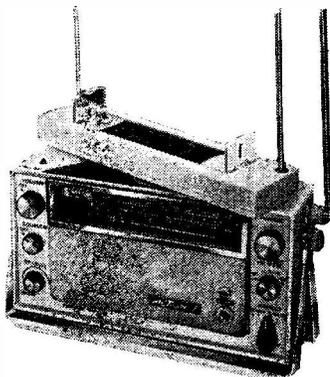
£47.0.0



NOVA CB.

13 transistors 5-band R.D.F./CB.
 190- 400 Kc. With rotating ferrite antenna
 550-1600 Kc. twin-plug antennas and tele-
 1600-4500 Kc. scopic antenna.
 CB low 27 Mc. For CB BAND SQUELCH
 CB high 27 Mc. CONTROL.
 23 channels over 2 Bands.

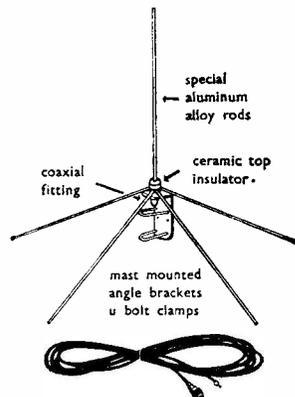
£53.10.0



ACTION

5-Band R.D.F./VHF. AM-FM. 14 transistors
 190- 400 Kc. with rotating ferrite antenna,
 550-1600 Kc. twin plug V.H.F. antennas,
 1600-4500 Kc. telescopic V.H.F. antenna.
 30- 50 Mc. For V.H.F. BAND SQUELCH
 (low AM-FM) CONTROL.
 150- 175 Mc.
 (high AM-FM)

£53.10.0



£7.15.0.

IMPROVE YOUR VHF RECEPTION WITH MODEL NT-4 ROOF ANTENNA

The Nova-Tech Model NT-4 Roof Antenna is designed to provide maximum signal input to your Aviator II. It consists of non-directional antenna cut to the aviation band, 4 drooping radials for positive ground plane, co-axial fittings and 50 feet of matching 52 ohm coax cable.

Units are completely portable and operate on 4 x 1.5v. internal batteries and are covered by our unconditional 10-day money back guarantee

FULL PARTICULARS OF TRADERS TERMS, CREDIT TERMS AND LITERATURE from :

nova tech inc.

72 WARDOUR STREET, LONDON, W-1. Telephone : 01-437 4589

Radio Shack Ltd

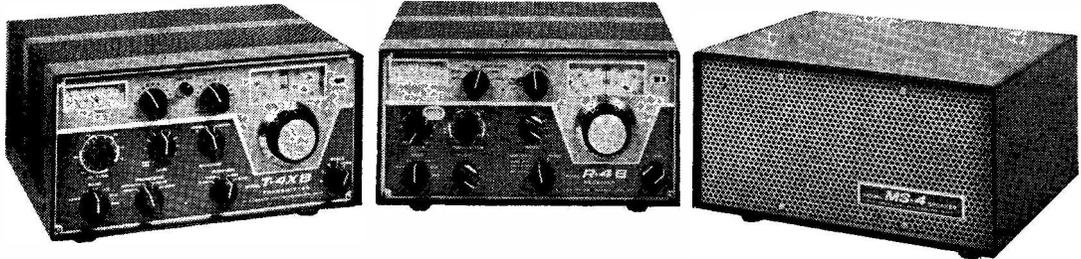


London's Amateur Radio Stockists

Just around the corner from West Hampstead Underground Station

R. L. Drake's Magnificent 4B

T-4XB Transmitter and R-4B Receiver



T-4XB £225.0.0 AC-4 p.s.u. £59.10.0 R-4B £225.0.0 MS-4 £12.10.0

All the rest of the Drake equipment including 2-NT CW Transmitter and the TR-4 transceiver.

Entire range of Hy-Gain and Mark Mobile Antennas amongst the rest of the gear at

RADIO SHACK LTD.

182 BROADHURST GARDENS, LONDON, N.W.6.

Just around the corner from West Hampstead Underground Station

Telephone: 01-624 7174

THE MOST RELIABLE SERIES OF TRANSCEIVERS EVER OFFERED

SWAN EVOLUTION

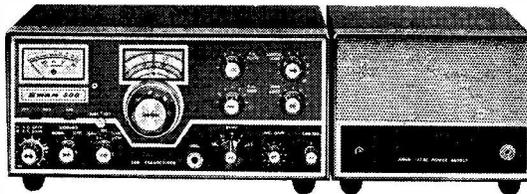
ASK THE AMATEUR WHO OWNS ONE

The new model 500C is the latest evolutionary development of a basic and well proven design philosophy. From the very beginning, with the introduction in 1961 of the first single band SSB Transceiver, Swan has followed a steady course of improvement by evolution. You might think that we would finally reach the point of leaving well enough alone, but with some 18 licensed hams in the engineering, sales and production departments of our organisation, it just isn't possible. Thus, the new model 500C, with greater power and additional features for even more operator enjoyment.

RCA recently introduced a new heavy duty "blast rated" tetrode, the 6LQ6. With a pair of these rugged tubes the final amplifier operates with increased efficiency and power output on all bands. PEP input rating of the 500C is conservatively 520 Watts. Actually, an average pair of 6LQ6's reach a peak input of over 570 Watts before flat-topping!

Further refinement of the famous Swan VFO results in even greater mechanical and thermal stability and more precise dial calibration. Custom made planetary drives, machined to extremely close tolerance, provide velvet smooth tuning.

The 500C retains the same superior selectivity, of course, that we have been offering. The filter is made specially for us by



THE NEW SWAN 500C 5 BAND - 570 WATT TRANSCEIVER

C-F Networks, and it's no secret that it is a better filter than is being offered in any other transceiver today. By moving the I.F. to 5500 KC, and increasing the number of tuned circuits in the receiver, we have achieved substantial improvement in image and spurious rejection. These improvements, coupled with additional TVI filtering, result in what we believe is the cleanest transceiver on the market.

For the CW operator the 500C includes a built-in side-tone monitor. Also, by installing the Swan Vox Accessory (model VX-2) you will have break-in CW operation. Thus, the model

VX-2 now fulfils a dual function, both automatic voice control and break-in CW keying. Grid block keying of a pure CW carrier is employed with off set transmit frequency.

The 500C embodies the Swan's well known dedication to craftsmanship, performance and reliability, with a service policy second to none. When you visit your Swan dealer and look over the 500C, we are sure that you will be glad we couldn't "let well enough alone."

SWAN 500C. Our improved standard model, now in production, 570W ... £263 0 0
ACCESSORIES
MATCHING AC POWER SUPPLY, 230XC ... £65 0 0

PETER SEYMOUR LIMITED

410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone: 41938 (43353 after 7.30)

INDEX TO
ADVERTISERS

	PAGE
Amateur Electronics (G3FIK)	248
Baginton Electronics	245
A. Busfield	244
Charles H. Young	255
D. Cursons	244
Daystrom	196, 197
Derwent Radio	244
Eddystone Radio	<i>cover ii</i>
A. J. H. Electronics	254
Finnigan Speciality Paints	247
G3HSC (Morse Records)	254
George Francis	193
Globe Scientific, Ltd.	245
G.W.M. Radio	248
Halson Electrical Services	254
Hamgear Electronics	247
Henry's Radio, Ltd.	244
A. Imhof, Ltd.	253
Lelante Lectronics	254
J. B. Lowe	194
John's Radio	<i>cover iii</i> , 202
JXK Converters	253
K.W. Communications, Ltd.	252
K.W. Electronics	<i>front cover</i>
Minitenna Products	247
B. H. Morris & Co. (Radio) Ltd.	195
Mosley Electronics	198
Nova-Tech. Inc.	199
N.W. Electrics	246
Partridge Electronics, Ltd.	255
Peter Seymour, Ltd.	193, 198
Radio Shack, Ltd.	193
R. T. & I. Electronics	249
Shure Electronics, Ltd.	193
Small Advertisements	245-254
Smith & Co., Ltd.	202
Spacemark, Ltd.	247
S.S.B. Products	<i>cover iii</i>
Stephens-James, Ltd.	249
Swanco Products, Ltd.	250, 251
S.W.M. Publications	<i>cover iv</i> , 242, 244, 254, 256
Taurus Electrical Services	252
Yukan	244

SHORT WAVE MAGAZINE

(GB3SWM)

Vol. XXVI

JUNE, 1968

No. 296

CONTENTS

	<i>Page</i>
Editorial	203
Six-Band CW Transmitter , by M. A. Sandys, G3BGJ	204
VHF/DX Working by Meteor Scatter , by A. H. Dormer, G3DAH	213
Some Geloso VFO/Exciter Modifications , by C. J. Rees, G3TUX	217
Vertical Aerial Systems for the Communication Bands , by A. D. Taylor, G8PG	219
Book Review—ARRL Handbook, 45th Edn., 1968	222
The Mobile Scene	223
Rally Calendar, 1968	223
Communication and DX News , by E. P. Essery, G3KFE	225
VHF Bands , by A. H. Dormer, G3DAH	231
The Month with The Clubs—From Reports	236
New QTH's...	243

Managing Editor: AUSTIN FORSYTH, O.B.E. (G6FO/G3SWM)

Advertising: Maria Greenwood

Published at 55 Victoria Street, London, S.W.1, on the last Friday of the month, dated the month following.

*Telephone: ABBey 5341/2
(STD 01-222-5341)*

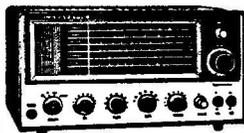
Annual Subscription: Home and Overseas, 45s. (\$6.00 U.S.) post paid

Editorial Address: Short Wave Magazine, BUCKINGHAM, England

AUTHORS' MSS

Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets, with diagrams shown separately. Photographs should be clearly identified on the back. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

© Short Wave Magazine Ltd.



LAFAYETTE HA-500 AMATEUR RECEIVER
HAM Bands 80/40/20/15/10/6 metres. incorporates 10 valves, product detector, 2 mech. filters, S meter. Xtal calibrator, B.F.O. noise limiter. Dual conversion 220/240v. A.C. Brand new 42 gns. Carr. 10/-



LAFAYETTE HA-700 RECEIVER
General coverage on 5 Bands. 150-400 Kc/s., 550 Kc/s.-30 Mc/s. RF stage, AE trimmer, noise limiter, BFO, product detector, electrical bandspread, S meter. 220/240 volt A.C. Brand new 36 gns. Carr. 10/-

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.- £ s. d.
220 Mc/s. Mains operated ... 12 10 0
TE.15 Transistorised. 440 Kc/s.-270 Mc/s. ... 11 11 0

OPEN
9 a.m.—6 p.m.
EVERY DAY
MON. to SAT.

G. W. SMITH & CO. (RADIO) LTD.

3-34 LISLE STREET, LONDON. W.C.2

Phone: GERRARD 8204/9155

PART EXCHANGES WELCOME

ADMIRALTY B.40 RECEIVERS

Just released by the Ministry. High quality 10 valve receiver manufactured by Murphy. Five 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 19 1/4 in. x 13 1/2 in. x 16 in. Weight 114 lbs. Offered in good working condition, £22/10/-, Carr. 30/-, With circuit diagram. Also available B41 I.F.F. version of above. 15 Kc/s.-700 Kc/s., £17/10/-, Carr. 30/-.



CLEAR PLASTIC PANEL METERS

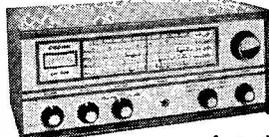
First grade quality. Moving Coil panel meters, available ex-stock. S.A.E. for illustrated leaflet. Discounts for quantity. Available as follows. Type MR. 38P. 1 2 1/32 in. square fronts.



500µA	37/6	5mA	25/-	1A	DC 25/-		
100µA	35/-	10mA	25/-	2A	DC 25/-		
200µA	32/6	20mA	25/-	5A	DC 25/-		
500µA	27/6	50mA	25/-	3v	DC 25/-		
50.0-500µA	35/-	100mA	25/-	10v	DC 25/-		
100.0-100µA	32/6	150mA	25/-	20v	DC 25/-		
500.0-500µA	25/-	200mA	25/-	50v	DC 25/-	500v DC 22/6	150v AC 25/-
1.0-1mA	25/-	300mA	25/-	130v	DC 25/-	750v DC 22/6	300v AC 25/-
1mA	25/-	500mA	25/-	150v	DC 25/-	15v AC 22/6	500v AC 25/-
2mA	25/-	750mA	25/-	300v	DC 25/-	50v AC 22/6	'S' Meter 29/6

Larger sizes available—send for lists

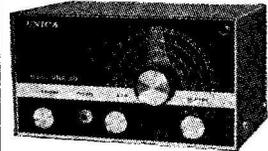
CODAR EQUIPMENT



CR.70 Receiver ... £ s. d.
... 19 10 0

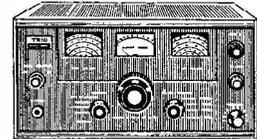
CR.45 Receiver	... 11 7 0
CR.45 Kit from	... 9 10 0
PR.30 Preselector	... 5 10 0
PR.30X (Built in P.S.U.)	... 7 4 0
RO.10 Q Mul iplier	... 6 15 0
RO.10X (Built in P.S.U.)	... 8 8 0
CC.40 Control Unit	... 6 10 0
AT.5 Transmitter	... 16 10 0
T.28 Receiver	... 15 10 0
I2/MS Mobile P.S.U.	... 11 5 0
I2/R.C Control Unit	... 2 7 6
ATS Mains P.S.U.	... 8 0 0
Mini Clipper Kit	... 1 19 6

Comprehensive 152 page illustrated catalogue of Components and Equipment (Contains Discoun. Coupons worth 5/-) 5/- P. and P. 1/-.



UNR.30. 4 BAND COMMUNICATION RECEIVER

550 Kc/s.-30 Mc/s. Incorporates variable BFO. Speaker, Phone Jack. 200/250v. A.C. Brand New £12/10/-, Carr. 7/6.



TRIO 9R59DE RECEIVER
General coverage on 4 bands. 550 Kc/s.-30 Mc/s. RF stage, electrical bandspread, noise limiter BFO, S Meter, 115/230v. A.C. Brand new, £37/10/-, Carr. 12/6.

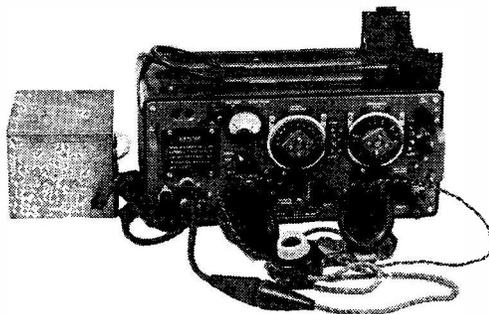
EX-AM CONTROL BOX with two Loxend 7026 24v. D.C. Aerial Change-over Relays. New, 39/6. Carr. 5/-.

BUG KEYS £3 19 6

ELECTRONIC KEYS £16 10 0

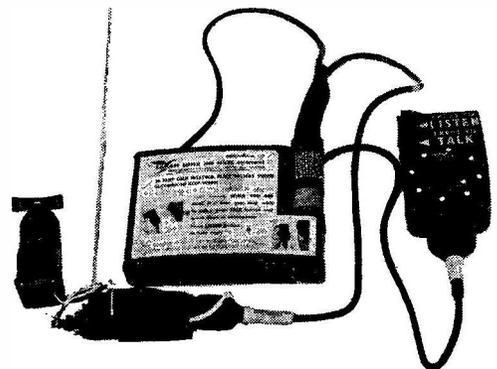
JOYSTICK AERIALS ALL MODELS IN STOCK

ELECTRONIQUES STOCKISTS



TRANS/RECEIVER TWO TWO

This is one of the latest releases by the govt. of an extremely recent R/T set covering 2-8 Mc/s. in two switched bands, containing 13 valves (3 EL32s in Tx output) which can be used for Morse, CW or R/T. Also has netting trimmer, BFO, RF and AF controls, switched meter for checking all parts of set, size 17" x 8" x 12". Power required LT 12 volts D.C., HT 325 volts D.C. Supplied Brand New and boxed with Headphones and Mike also Two Spare Valves and circuit of set. Few Only at £5/10/-, carr. 30/-, New plug-in power supply made by us for either 12 volts D.C. input, £3/10/- or 200/250 volts A.C., £3/17/6.



LARGE QUANTITY OF SARAH V.H.F. TRANS/RECEIVERS

AVAILABLE FOR IMMEDIATE EXPORT

General Information. This set is normally carried in the life jacket of Airmen, it is a complete miniature lightweight radio Trans/Receiver, which is used to give a Beacon plus two-way speech communication in the event of finding themselves in the sea. It comprises a Transmitter-Receiver, a speech unit, a coding unit and a power supply either Battery or Transistor. These three items are permanently interconnected and all units are completely sealed and water tight using a combined speaker/mike, press to talk or listen buttons, fold-up aerial, a total of three valves is used, power required 6-3 volts LT 90 volts and 435 volts D.C. HT. Frequency 243 Mc/s. Transmitter output pulse power—Beacon 15 watts, Talk 3 watts. Supplied in maker's boxes in Grade 1 condition, singly at 45/-, post 5/- with circuit. New batteries if available, 7/6 each.

JOHN'S RADIO

OLD CO-OP, WHITEHALL ROAD, DRIGHLINGTON, BRADFORD
Telephone: DRIGHLINGTON 2732

The
SHORT-WAVE
Magazine

E D I T O R I A L

Neophytes

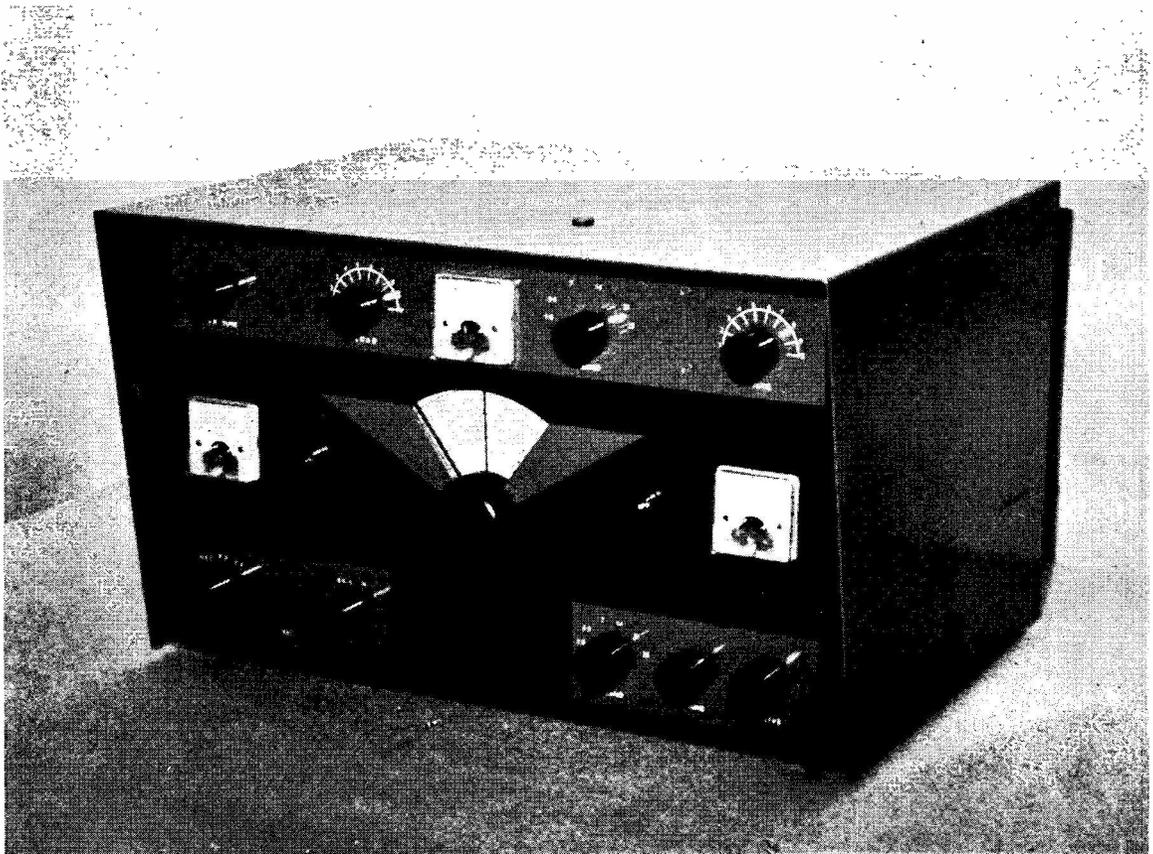
That the subject of a Beginner Licence—as recently discussed in this space—is still live is shown by correspondence lately emanating from the office of the new Postmaster General, Mr. Roy Mason, MP. He writes as follows:

“ I am at present considering the terms under which the licence can be issued and the qualifications we shall require from candidates . . . I aim to have the licence ready in the autumn of this year. Because of the need to consult other interested bodies . . . we shall be hard pressed to achieve this timing . . . I cannot at the moment say whether . . . the holders of this licence will be confined to frequencies above 144 mc . . . ”

These interesting observations were made in reply to an enquiry by Sir Ian Orr-Ewing, Bt., OBE, MP, the Member for Hendon North, who is himself a licensed amateur holding the active callsign G5OG. We are fortunate in having a senior Member like G5OG in the House, with background knowledge and the experience of years of Amateur Radio, prepared to take a stand on matters affecting our interests. In this context (though they are on opposite sides politically) he has the support of Mr. George Wallace, Member for Norwich North, who is himself a keen SWL and whose son holds a callsign.

Our own guess is that the PMG will make whatever announcement he may find possible on the opening of this year's Amateur Radio Exhibition, on October 2. Any further comment before then can only be conjecture.

*Austin Forsth,
G6FO.*



SIX-BAND CW TRANSMITTER

MODERNISED VERSION OF A
STANDARD DESIGN—
INCORPORATING RX PRE-AMP.,
BREAK-IN AND FULLY KEY
CONTROLLED

M. A. SANDYS (G3BGJ)

THOSE who possess an ageing transmitter, the wiring in disarray and the metal work mutilated after numerous modifications, will have felt at some time the urge to tidy the whole thing up a bit. The experienced resist the impulse, knowing that the refurbished product seldom better the performance of the original job! The writer, however, did succumb to this temptation—to the extent of completely refashioning a modern version of his CW transmitter, incorporating the many modifications as orderly features of the new construction. The descrip-

tion herewith, which covers the salient points of the new transmitter, may prove of interest to those home constructors who still have a feeling for the CW mode. In general, constructors are always seeking ideas to adapt to their own needs, rather than complete instructions on building somebody else's conception. Details of construction, therefore, take second place to the design itself.

Circuit Layout

The original Tx at this station involved a two-tier chassis system, with the PA top cap connection protruding into the upper deck, which contained only the π -section matching circuit. This layout, although restricting access to the lower section, was found to give good isolation between input and output and was retained in the new transmitter. The stages appropriate to each chassis will be found in the block diagram, Fig. 1, which shows that basically the transmitter consists of a VFO, followed by two stages of amplification or multiplication (depending on the band switched in) and a PA with clamp-valve protection. The lower chassis contains two power units, a high voltage supply for the PA and a low voltage PSU for the initial stages. The PA feeds into a

conventional *pi*-network in the upper chassis, which also contains a receiver pre-amplifier and its associated power unit. For the sake of clarity the keying and switching has been omitted from the block diagram, and is described separately (p.209).

Power input is 70 watts and the frequency coverage Top Band to ten metres. Provision is made for reducing input to 10 watts to meet 150m. requirements, a facility which is also useful for initial tuning. In the Tx as described, CW is the only mode of operation.

The RF side was made to follow closely the well tried and conventional circuitry of the original CW transmitter, in the reasonable expectation that the performance would be as good, but some of the miniature valves proved less docile than their old-fashioned counterparts! In particular, the VFO and PA required modification. Troublesome aspects are dealt with in the appropriate sections.

General Construction

The constructional method employed is shown quite well by the photographs. Upright lengths of 1-inch angle aluminium are fixed to each corner of the lower chassis, the pair at each side being joined by a length of angle aluminium to form the seating for the upper chassis. This is made as a plug-in unit, employing *Bulgin* "Domina" connectors. (It is fitted with plastic feet to protect the connector pins when the unit is placed on the bench.) A U-shaped cover fits over the complete assembly, the overall dimensions of which are: Width, 15½ins.; height, 9¼ins.; depth, 10 inches.

The VFO Section

The complete circuit diagram is as Fig. 2, pp. 206-207. As will be seen, the VFO follows the pattern

made popular by the Gelo model but differs slightly in the selection of fundamental frequencies. It avoids the Gelo fundamental oscillator frequency selection of 7 mc for output on the 40-metre band, which the writer felt could lead to overall instability. Table I sets out the oscillator coverage given by the three coils, also the frequency-selection required of the succeeding stages to produce the final output drive. Here, straight through-amplification is given only on Top Band, where the risk of overall instability is minimised, both by the lower frequency and the reduced power output. Nevertheless, reasonable steps were taken to ensure that RF energy did not find its way back to the initial stages.

The 3-gang tuning capacitor C3, C5, C7 consists of one 90 µF and two 13 µF sections, and is the type specified by *Electroniques* for their six-band version of the G3RKK transmitter (*SHORT WAVE MAGAZINE*, June-July, 1964). Ideally, the capacity of each section should be no larger than that required to give 180 degrees of bandspread on each range. However, it is possible, if the tuning covers more than the required range, to restrict the capacity swing to the required value by putting in a series capacity. The method adopted for this was temporarily to connect a likely condenser in series and then check the bandspread before making a rigid connection. These series condensers are not shown in Fig. 2, since they will depend on the choice of tuning capacity and coil.

As initially conceived, the VFO valve was a 6AH6, with iron-cored coils and a fundamental frequency of 7 mc for output on 28 mc. But the 6AH6 defied all attempts to produce chirp-free keying and was finally abandoned in favour of the 6AU6, which keyed well but refused to oscillate at 7 mc, necessitating a change of frequency to 3.5 mc!

[cont'd p.207]

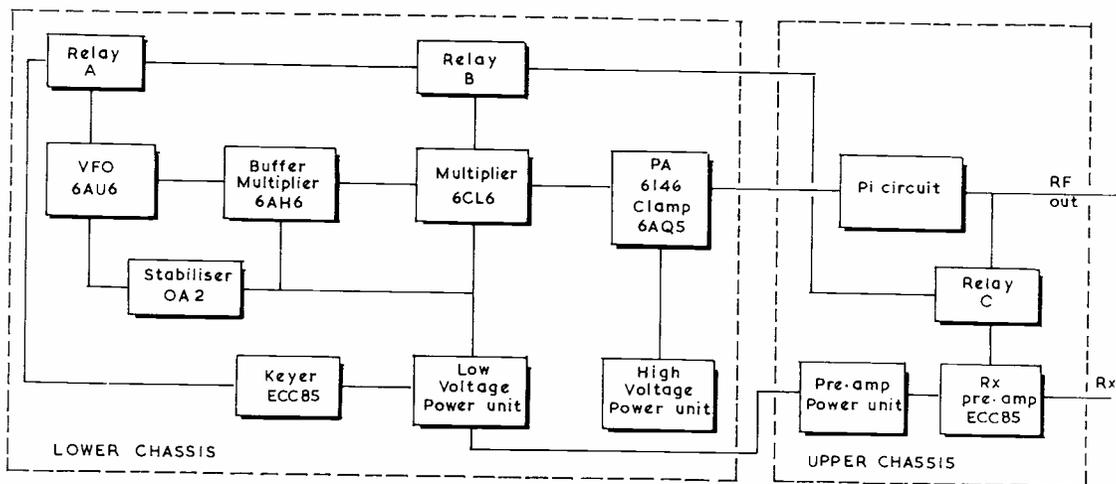


Fig. 1

Fig. 1. Block diagram of the G3BGJ Transmitter.

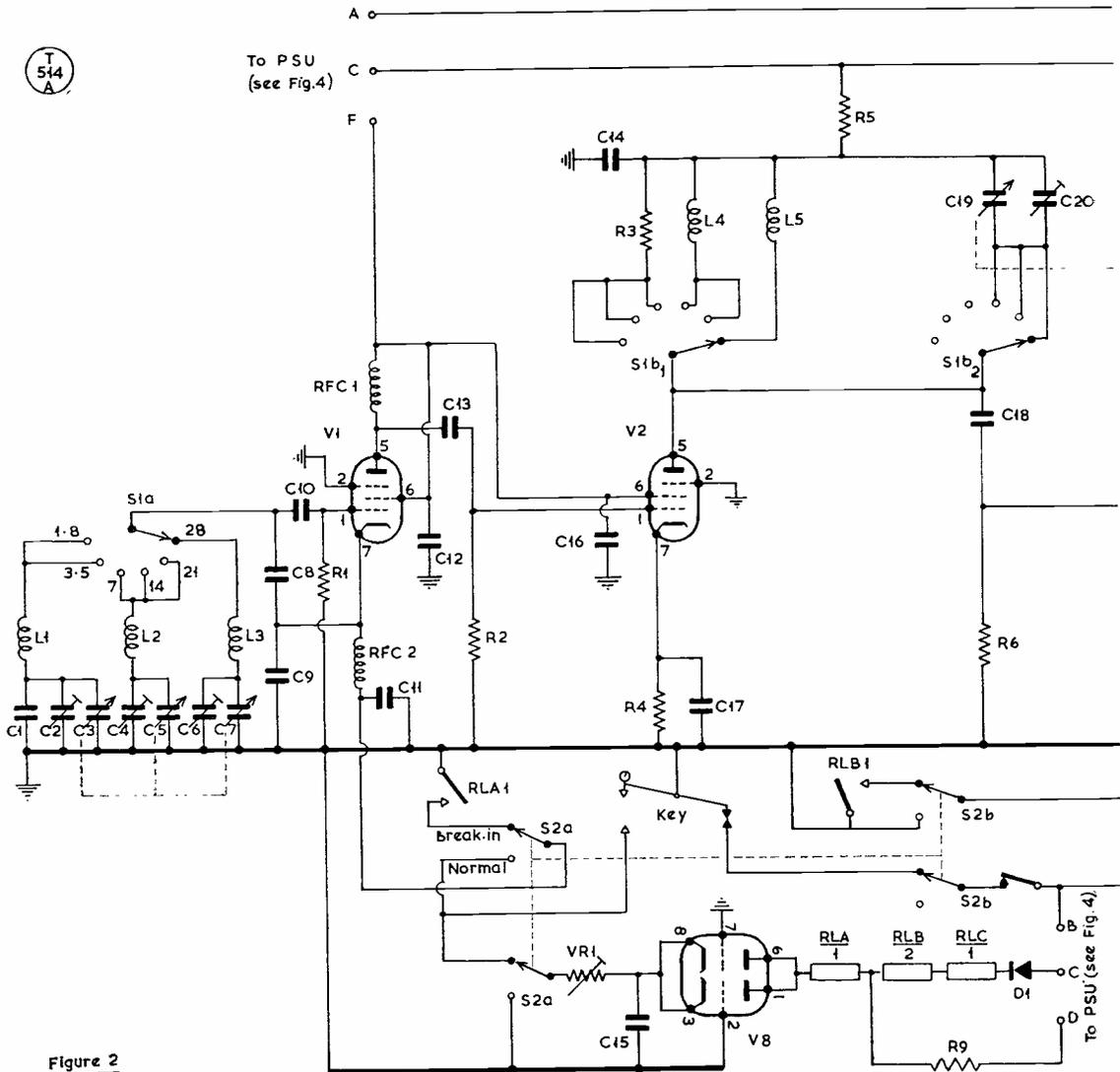


Figure 2

Table of Values

Fig. 2. Circuit of the Transmitter complete

- | | | | |
|---|--|---------------------------------------|--|
| C1, C10 | C25 = 680 $\mu\mu\text{F}$ mica | R12 = 100 ohms, 1w. | S3 = Latch on, push to make, push to break |
| C13, C18, | C28 = 10 $\mu\mu\text{F}$ mica | R13 = 100,000 ohms, $\frac{1}{2}$ w. | D1 = BY100 |
| C27, C37 = 100 $\mu\mu\text{F}$ mica | C29 = 10 $\mu\mu\text{F}$ pre-set | R14 = 68,000 ohms, $\frac{1}{2}$ w. | D2 = Contact cooled metal rectifier |
| C2, C4, | C30, C31 = .001 μF mica | R15 = 50,000 ohms, 20w. | T1 = 6-3, 1.5A htr. trans. |
| C6 = 100 $\mu\mu\text{F}$ pre-set | C33 = 350 $\mu\mu\text{F}$ mica | R16, R19 = 330 ohms, $\frac{1}{2}$ w. | RL A, RLB, RLC = 700 ohms plug-in 2 c/o contacts |
| C3, C5, | C36 = 47 $\mu\mu\text{F}$ mica | R17 = 100 ohms, $\frac{1}{2}$ w. | M1 = 50 mA meter |
| C7 = 3-gang, one 90 $\mu\mu\text{F}$ (C3) and two 13 $\mu\mu\text{F}$ sections. Electronics | C38 = 2-gang 500 $\mu\mu\text{F}$ var. | R18 = 15,000 ohms, 2w. | M2 = 5 mA meter |
| C8, C9, | C40 = 15 $\mu\mu\text{F}$ var. | R20 = 100,000 ohms, 2w. | M3 = 200 mA meter |
| C35 = .001 μF mica | C41, C42 = 16 μF elect. 350v. | VR1 = 500 ohms | V1 = 6AU6 |
| C11, C14, | R1, R2, R6 = 47,000 ohms, $\frac{1}{2}$ w. | VR2 = 50,000 ohms w.w., 3w. | V2 = 6AH6 |
| C17, C22 = .01 μF paper | R3 = 4,700 ohms, 2w. | RFC1 = Gelooso RFC (see text) | V3 = 6CL6 |
| C12, C15, | R4 = 470 ohms, 1w. | RFC2, RFC3, RFC4, RFC5 = 2.5 mH | V4 = 6146 |
| C16, C21, | R5 = 2,200 ohms, 1w. | RFC6 = 1 mH | V5 = 0B2 |
| C23, C24, | R7 = 10,000 ohms, 2w. | S1 = Three Maka-switch 2P6W wafers | V6 = 6AQ5 |
| C32, C34, | R8 = 220 ohms, 1w. | S2 = Two Maka-switch 2P2W wafers | V7, V8 = ECC85 |
| C39, C43 = .005 μF disc cer. | R9 = 1,500 ohms, $\frac{1}{2}$ w. | | |
| C19, C26 = 15 $\mu\mu\text{F}$ var. ganged | R10 = 22,000 ohms, 1w. | | |
| C20 = 25 $\mu\mu\text{F}$ pre-set | R11 = 10,000 ohms, 20w. w.w. adjustable | | |

easier to work with than ordinary transfers. The individual numbers are cut out and held in position with tweezers, the outline of the figure is shaded over with a ball-point pen, which transfers the number to the surface.) A single sheet of *Letraset*, No. 259 8pt. numerals, contains more than enough figures for the purpose.

The Frequency Multipliers

The two stages following the VFO perform the multiplication necessary to arrive at the final output frequency, as laid out in Table I. On the LF bands, V2 functions as an untuned amplifier with resistive load, but on the higher frequency V2 is tuned. It is common practice in many designs involving two stages of multiplication to resonate this stage at a fixed frequency somewhere in the middle of the band. Then, on each side of this frequency the drive will tend to drop off. More ambitious designs overcome this defect by utilising a wide-band amplifier, but inevitably an extra stage is required as the bandwidth can only be increased at the expense of amplification. An alternative method of maintaining the drive over the whole band, and the one adopted at G3BGJ, is to gang-tune the two multipliers. The tracking of two tuned circuits which are harmonically related is quite simple. The bandspread capacity C_B required to cover a range of frequencies f_1 to f_2 is given by:—

$$C_B = C \left(\frac{f_2^2}{f_1^2} - 1 \right)$$

where C is the total capacity across the coil. The same value of C_B will cover the harmonic range, since the expression remains unaltered by multiplying f_1 and f_2 by the same number, provided the value of C is the same in each case. All that is then required to obtain (theoretically) perfect tracking is to equalise the circuit capacities.

To this end a fixed capacity C28 was placed across V3 tuned circuit and a trimmer C20 across the tuned circuit of V2. The trimmer was adjusted simply by trial-and-error, retuning L5 and L11 after each move, to give near constant drive over the entire 28 mc band. The validity of this method may be questionable in a transmitter operating only in the narrow CW sections, but those who work phone as well would derive the full benefit.

One pole of the 2.P6.W "Maka-switch" wafer is used to switch the tuning capacitor C19 into circuit on the HF bands. It will be noted that on 28 mc, V2 is tuned to 14 mc, its original function being to double from 7 mc. With the VFO on 3.5 mc, L4 could also be selected for 28 mc, quadrupling to that frequency on V3.

The PA Stage

The PA is a 6146, one of the very robust HF types, with clamp valve protection and series-C neutralisation. The 6146 can be seen in the screened compartment at the rear right of the lower chassis. It protrudes slightly into an opening in the upper

TABLE I

Coil	VFO range	V2	V3	Final Output
L1	1.75—2	Untuned	Tuned 1.85	1.75— 2
		Untuned	Doubler	3.5 — 4
L2	3.5 —3.588	Untuned	Doubler	7 — 7.17
		Doubler	Doubler	14 —14.35
		Doubler	Tripler	21 —21.53
L3	3.5—3.713	Quadrupler	Doubler	28 —29.7

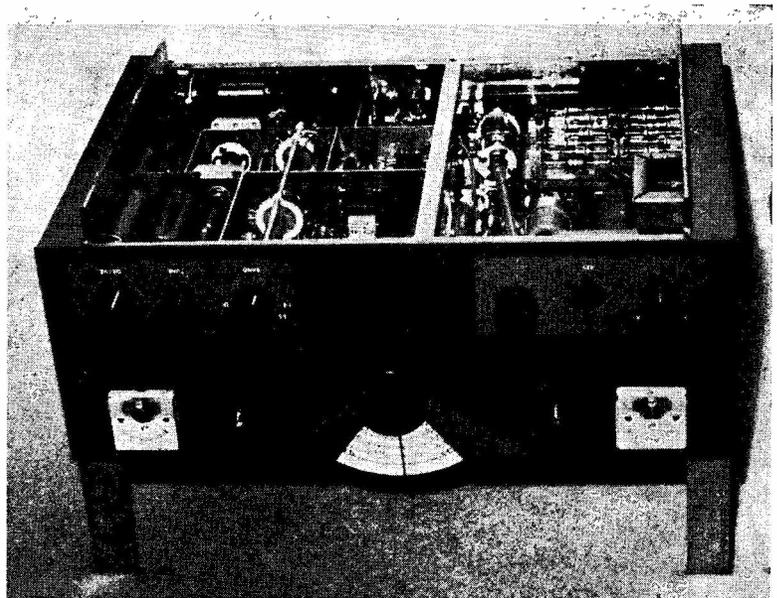
The three VFO ranges and the multiplication given by V2, V3 stages to produce the final output frequency.

chassis where the top cap connects to the *pi*-coupler. The plug to the left of the 6146 screen mates with a socket in the upper chassis and links the neutralising capacitor C29 to C25 in the lower chassis. All other connections are made by two *Bulgin* "Domina" connectors. One socket can be seen in the left-hand seating. The other, not visible in the picture, is in the right-hand seating. Most of the components of the *pi*-coupler can be identified in the view of the upper chassis.

The compartment at the left houses the receiver pre-amplifier, which consists of a grounded-grid amplifier and a cathode follower. This is a useful device well worth including in the initial planning of any transmitter. All too often, it is added as an afterthought. Unlike the normal T/R switch, however, this one is not connected permanently in circuit, the input being earthed by relay C on transmit. The band switch, S4, which selects the tap on the *pi*-circuit coil also operates, *via* a right-angle bevel gear drive, the band selection switch, S5, of the receiver pre-amplifier. Ideally, it should also be coupled to the band selection of the lower chassis, but mechanical complications precluded this. Some difficulty was experienced in obtaining the $\frac{1}{4}$ in. bevel gears—the normal amateur sources, radio dealers and model shops all being tried without success. For the interested reader they can be obtained quite easily at reasonable cost from S. H. Muffett Ltd., Mount Ephraim Works, Tunbridge Wells, Kent.

The neon V5 in series with the PA screen was not included in the initial design. It was assumed that the 6AQ5 alone would provide adequate clamp control and limit the PA current to around 40 mA in the absence of drive. The drain of 40 mA would then have served admirably as the standing current called for by the choke input filter of the high-voltage supply, eliminating the need for a bleeder resistor. In practice, however, the 6146 drew about twice this figure, making a series neon essential (a cathode resistor could be used instead). The standing current was thereby reduced to 10 mA, which was below the minimum drain demanded by the power unit. It was brought back up to about 30 mA by placing the resistor R13 across the neon.

Under-view of the Tx chassis, showing general construction.



To reduce the power input to the PA the short across R11 in the PA anode is removed by the push-button switch S3, which protrudes through a hole in the top of the cover. The method is a bit crude

but suffices for the occasional foray on Top Band, besides being useful for initial adjustments. All tuning can be done on the PA anode and grid current meters. The meter M3 in V3 anode is not essential and was the sole concession to front-panel symmetry.

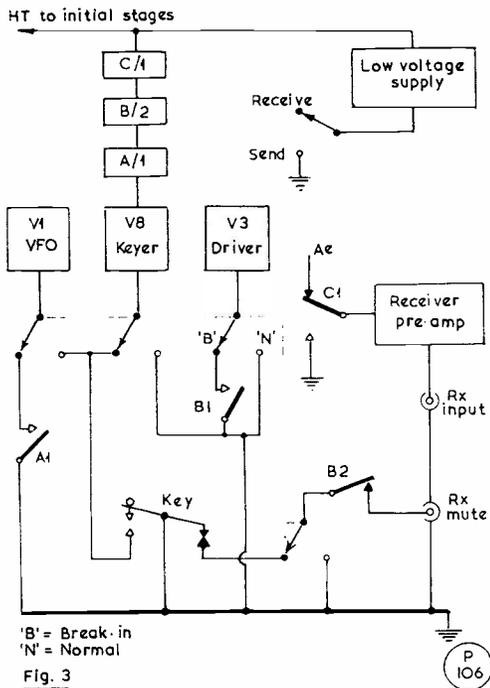


Fig. 3. Switching system for Normal/BK keying.

Keying

Two types of operation are provided by the switch S2, Fig 2, "Normal" and "Break-in." An explanation of the "Break-in" system will be given since the "Normal" mode is a simplified case in which the relays are energised during the entire period of transmission.

The principle of operation is best understood by referring to the block diagram of Fig. 3. On the "Break-in" position of the switch the key is inserted in the cathode of keyer V8, and when the transmitter is switched to "Send," operating the key energises the three series connected relays. The relay contacts perform the following functions:—

A1, keys the VFO; B1, keys the driver; B2, restores reception; C1, earths the receiver input.

A key with back contacts is required. The back contacts open as soon as the key is touched, removing the short across the muting resistor in the receiver, but the transmitter does not radiate when the key makes. A further slight delay is introduced by the operating time of the relay. On lifting the key restoration of the receiver does not commence until B2 completes the earth path through the back contacts. Most receivers employ a muting system in which the cathodes of the IF amplifiers are returned to a higher positive potential in the muted condition. An appreciable time must elapse before the muting voltage is completely established, whereas restoration takes place very quickly. Using the back

key contacts in this fashion provides an extra delay ensuring that the receiver is fully muted before the transmitter radiates.

In the "Normal" position of the switch the key is connected to the VFO, the keyer cathode is earthed and when the transmitter is switched to "Send," C1 earths the receiver input and B2 mutes the receiver. The other contacts are not used. When the transmitter is switched to "Receive" the relays de-energise.

The system therefore offers a choice of either the normal type of amateur operation—no reception during transmission—or full break-in. The break-in is completely click-free but suffers from an increase in receiver noise when HT is applied to the transmitter. The noise is reduced by keying the driver as well, but is still too high for use with very weak signals. To reduce the noise to a very low level all the transmitter stages would have to be quiescent with the key up. Removing the resistor R13 across the neon V5, and using a bleeder resistance across

the PA HT to furnish the required drain, might also reduce the noise reaching the receiver. (This will be done eventually in any case, because on reflection, it would seem to be a more satisfactory method than allowing the PA to idle at close to maximum anode dissipation.)

The use of separate relays instead of a single multi-contact device has the decided advantage of allowing the relays to be placed close to the circuits

Table of Values

Fig. 4. The Power Supply Unit

R1 = 10,000 ohms, 2w.	Ch.1 = 15H 150 mA
R2-R13 = 470,000 ohms, 1/2w.	Ch.1, Ch.2 = 10H 80 mA
R14, R15 = 100,000 ohms, 2w.	T1 = 730v, 120 mA 6.3v.
R16 = 4,700 ohms, 10w.	4A or equivalent
C1 = .05 μ F paper	centre-tapped
1,000v. D.C.	(see text)
C2, C3 = 32 μ F elect. 450v.	T2 = 350v. -0-350v.,
C4, C5 = 16 μ F elect., 450v.	100 mA., 6.3v.
D1-D12 = BY100	5A, 6.3v. 4A
S1 = 2P on-off	Lamps = 6.3v. 3A bulbs
S2 = 4P 3w. ceramic	F1 = 500 mA fuse
rotary	F2 = 250 mA fuse

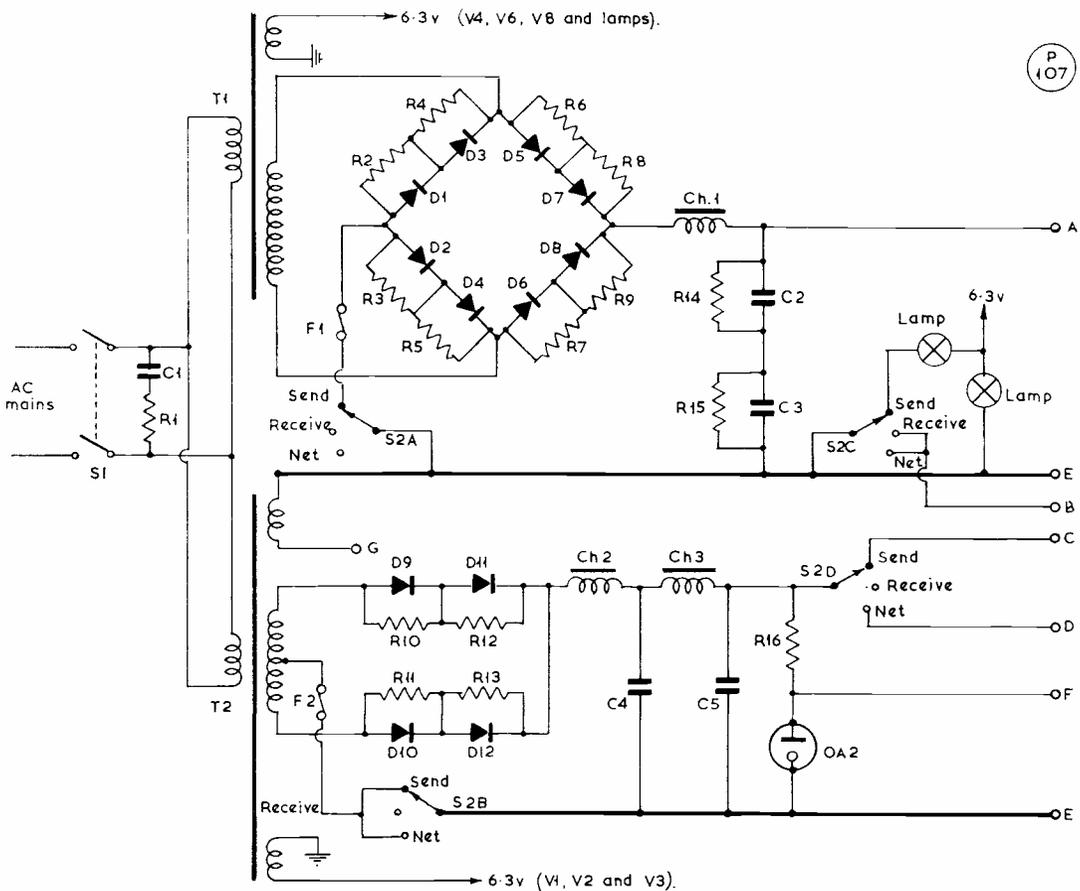


Fig. 4

Fig. 4. Power supply unit for the G3BGJ Transmitter.

TABLE II
Coil Values for the CW Transmitter

VFO	L1	Electroniques SHQ N/PC	Core removed. Recommended value 90 μ H
	L2	Electroniques SHQ L/PC	Core removed. Recommended value 35 μ H
	L3	Electroniques SHQ L/PC	Core removed. Recommended value 35 μ H
Buffer Multiplier	L4	Osmor QO4	Link removed
	L5	Osmor QO3	Link removed
Multiplier	L6	Geloso L3	470 μ F in parallel (not shown in Fig. 2) tuned 1.85 mc
	L7	Geloso L7	All removed from Geloso VFO type 4/101
	L8	Geloso L8	
	L9	Geloso L9	
	L10	Geloso L10	
L11	Geloso L11		
PA Anode	L13	5 turns 18 SWG	Wound on R12
Pi Circuit	L13	5 turns 16 SWG 1in. diam. $\frac{3}{4}$ in. long	Self supporting Tapped 3, 5 and 12 turns from PA end On Paxolin former placed end on to the Codar coil L14
	L14	Codar 81016 22 turns	
	L15	20 turns 22 SWG enam. copper close wound 2in. diam.	
Rx Pre-Amp	L16	Osmor QA8	Link removed
	L17	Osmor QA4	Main winding and link in series
	L18	Osmor QO4	Link removed
	L19	Osmor QO3	Link removed
	L20	Osmor QO2	Link removed
	L21	Osmor QO1	Link removed

they control. The keying of a number of relays, however, does not appear to be common practice. Presumably, the objection is that no two relays have precisely the same operate time. That being so, the obvious course would be to permute all three (they are of the plug-in variety) for optimum results! A form of differential keying would result if the VFO

were to key before the driver, which effect, of course, could also be deliberately introduced by making relay A a high-speed type. Neither of these expedients proved necessary. Actually, a form of this system was tried out on the old transmitter and the writer was confident it would give satisfactory results.

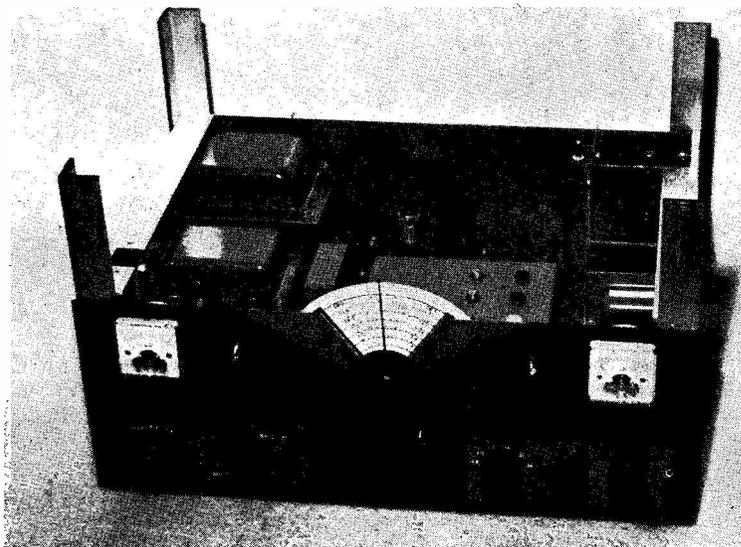
The relays are miniature 700-ohm plug-in types having two change-over contacts and key well with as little as 12 mA. The keyer V8 is an ECC85 with both sections connected in parallel but most other double-triodes would be suitable. The operating current is adjusted by VR1, Fig. 2.

The Power Supply

The power units are shown in Fig. 4 Both use silicon rectifiers and choke input filters. Those aspects of the choke input filter which the amateur should know about are fully covered in the British and American *Handbooks*, whilst many articles have appeared in *SHORT WAVE MAGAZINE* on the use of silicon rectifiers. Some constructors have found that silicon rectifiers are prone to damage by switching surges. So far this unit—it has been in operation about six months—has not suffered any rectifier failures.

What *did* fail was the original high voltage transformer! It was obtained from a firm who undertake to wind transformers to individual specification. The writer ordered a centre-tapped transformer without mentioning that it was to be used in a bridge-rectifier circuit. After several hours of use it developed a partial short between primary and secondary. The firm refused to accept any liability. Good quality centre-tapped transformers have adequate insulation between primary and secondary for this application, as was confirmed by Gardners Ltd., who supplied an exact replacement. Readers who intend to use a bridge rectifier would thus be well advised to ascer-

Another view of the layout of the 6-band CW Tx. The PA and output stages fit above this section—see p.212.



The upper chassis, the compartment at left containing the pre-amplifier and control relay C. The bevel gear drive couples the tank band-switch to the tuned circuits of the pre-amplifier.



tain beforehand that the transformer they choose has the necessary insulation. It is perhaps unnecessary to add that only half the rated current should be drawn from a centre tapped transformer which feeds a bridge rectifier.

Switching

Closing the mains switch S1 brings on all heaters, lights the green "Receive" lamp and supplies the receiver pre-amplifier with HT. The latter is derived from a half-wave rectifier fed from a heater transformer placed back-to-front; R1 and C1 form a surge suppression device. The transmitter is now in the "Receive" condition. Going over to "Send" switches the negative side of each HT feed. This form of switching appears to be very kind to the silicon rectifiers. The "Net" position of switch S2 applies the stabilised voltage to the VFO and also connects the low voltage supply to relay A (point D). The latter provision allows the "Net" facility to be used on "Break-in," only relay A, which keys the VFO, being energised when the key is pressed. The diode D1, Fig. 2, prevents the voltage from also appearing at the anodes of V2 and V3 by the path which exists via relays B and C. A fourth section of the switch S2 earths the receiver mute line on "Receive" and "Net." On "Send" the earth is removed, muting the receiver (if switch S2, Fig. 2, is at "Normal") and lighting the red "Send" lamp. When switch S2, Fig. 2 is at "Break-in," muting will be effected by the back key contacts. The muting on "Normal" is slightly different in the block diagram of Fig. 3, which was drawn to explain the principle of operation.

All the paint work was done with car "touch-up" sprays, which turned out to be an uneconomical process and it would have been cheaper to use *Belco* Brushing Cellulose for the interior metal work.

Before spraying, the surfaces were rubbed down with emery paper and thoroughly cleaned with turps. substitute. The spraying, however, imparts a very nice finish to the front panel, which was initially sprayed blue. The control panels and dial border were then outlined in masking tape and the whole surface was sprayed black. White transfers were used for the lettering.

Due no doubt to the advent of the transistor some high-voltage components seem to have disappeared from the amateur market. Such items as 2500v. DC mica capacitors, ceramic rotary switches and high wattage resistors, all so plentiful after the War, may now be difficult to find in the ordinary advertising, and unless the intending constructor is aware of their last resting place, equivalents will have to be found for some of the listed components.

The two-tier layout may not appeal to everyone and there is no doubt it does add to the work involved. The transmitter took about one year to build, the metal work occupying at least 75 per cent of the time! Constructors who work on a table with hacksaw and file will understand this division of labour! The work could be simplified and the construction time reduced by building the transmitter on a single chassis, for the actual circuitry is straightforward and could safely be attempted by the average constructor. Others might wish to add the facilities they consider desirable—a switched meter to measure more current and voltage points, for instance—but the majority, no doubt, will merely extract those features which could usefully be incorporated in their own design.

The old transmitter on which this description is based is still leading an active life under the call G3PZL. Readers who chance to hear both transmitters on the air will be able to judge if, in this case, the maxim quoted in the first paragraph has been disproved.

VHF/DX WORKING BY METEOR SCATTER

TERMINOLOGY, PROCEDURE,
METHOD, EQUIPMENT AND
EXAMPLE

A. H. DORMER (G3DAH)

Though a certain amount of information and guidance with reference to MS working has appeared in the American radio amateur press, this is the first full discussion on the subject to be published in this country. It will be seen that using meteor showers for working VHF/DX poses interesting problems of its own, including the need to know a little about making celestial calculations. That all this is quite possible is proved by the fact that a number of U.K. and European amateurs have achieved some remarkable DX on the two-metre band.—Editor.

SINCE the early fifties, when meteor scatter signals were first observed on 144 mc by amateurs, interest in this mode of transmission has steadily increased and, with the advent of higher transmitter powers, more efficient antenna systems and more sensitive receivers, many contacts are now being made in the range 500 to 1,500 miles which would not have been possible by other transmission modes.

However esoteric the term "Meteor Scatter" may sound, there is nothing fundamentally difficult about it, although the technique does require efficient equipment and a lot of patience.

This article is intended to explain in simple terms the propagation mechanism involved and to indicate the minimum equipment requirements for a reasonable chance of success. Considering the number of amateurs in Britain who already have efficient equipment for 144 mc, it is surprising that only relatively few have made long-distance contacts using this mode. It is hoped that this short *exposé* will encourage operators not only to investigate the possibilities of Meteor Scatter more closely, but also to attempt the allied technique of communication *via* satellite and passive reflectors.

Meteors

First, let us look at the correct terminology. A "Meteor" is a small particle, usually varying in size comparable with a grain of sand up to about a quarter of an inch across. It can exist singly or in company with many other particles of similar size, in which latter case we have a "Meteor Shower" or "Stream." Under normal circumstances, a particle of this size approaching Earth at high velocity will quickly burn up from the heat generated by friction in its passage through even the low atmospheric densities existing some sixty miles or so above the surface of the earth—that is to say at a height between the top of the E-layer and the lower ionosphere. Light and heat are produced, and the result is the familiar Shooting Star. Those particles which are

not so consumed, but which reach the ground, are termed "Meteorites." Note that a meteorite is *not* a small meteor.

Occasionally, very large bodies pass through the atmosphere and strike the surface of the earth producing large impact depressions, of which the crater some three-quarters of a mile across in the Arizona desert is an example. Such large meteors are termed "Bolides." Sometimes they break up during their passage through the atmosphere and the particles resulting from this explosion are known as "Aerolites."

Meteor Showers

As the earth travels round the Sun it intercepts the path of millions of small particles of dust and stone. Many of these bodies are randomly distributed and widely dispersed and are not, therefore, a recurrent phenomenon. They are accordingly known as "Sporadic Meteors." At certain times of the year, however, the Earth passes through large conglomerations of particles which are themselves circling the Sun in fixed orbits. The occurrences are repetitive and predictable and of such number and extent as to constitute a visual shower or stream. Counts of between fifty and one hundred trails per hour are registered during these periods and these numbers are such that communication is possible using reflections from the ionisation which they produce. Fig. 1 on p.215 shows this pictorially.

Reflections from Ionised Trails

Let it be clear from the start that radio signals are *not* reflected from the meteors themselves, but from the *trails of ionisation* produced by their passage through the upper atmosphere.

Most amateurs are familiar with the E-layer, which envelops the Earth at an average height of sixty miles, and with its function in relation to radio communications in general. Normally, frequencies of 70 mc and higher penetrate the E-layer and travel on out into space. However, if for some reason the level of ionisation in the E-layer increases, then these signals can be reflected. Such an increase in ionisation can be caused by Aurorae, the effect known as Sporadic-E, and by meteors.

Meteors entering the earth's atmosphere burn up and produce a column of ionisation which can be dense enough to reflect signals which would normally pass straight through the E-layer. This column of ionisation disperses by diffusion and through the action of high altitude winds, and so the signal level declines and eventually disappears.

There are two categories of meteor trails. The first is called the "Underdense," and is so named because the ionisation density is too low for complete reflection of the signal, which is scattered rather than reflected. These trails can give short-term reflections which quickly die away and are audible as the familiar "ping." The signal strength from underdense bursts drops off in intensity as the third power of the wavelength, while the duration drops off as the second power. The second category is the "Overdense," and here most of the incident signal is reflected with constant strength until the ionospheric density drops below the critical value. These trails provide strong signals of up to *two minutes* or more in duration.

[over

Thus we see that in the same way as Auroral and Sporadic-E phenomena influence the lower frequencies in the VHF range more than the higher ones, so meteor scatter signals fall off in both strength and duration with increasing frequency. On 144 mc, for example, the duration is about half that on 70 mc, and the signal strength can be 18 dB down. The 144 mc band is about the highest useful for meteor scatter working. At 432 mc both strength and duration are well down. Because the reflection takes place in the E-layer, contacts can be expected only in the range 500 to 1,500 miles using forward scatter.

Using Reflections from Ionised Trails

Calculations have shown the strongest signals should be received from a trail which lies across the line joining the two stations and parallel to the earth's surface at mid-point, but such an occurrence at exactly the right time and place is rare! It is better therefore to find a heading which will give reflections from the greatest number of meteors even though these are not in the optimum plane.

There are two limits to be considered here: One, when the trail is parallel to the earth's surface, and the other when the trail is vertical to it. A good compromise is a trail which is at an angle of 45° to the earth's surface, and in practice it is found that this angle gives an effective balance between signal strength and the number of meteors. However, the scatter-equation also indicates that the signal must hit the trail perpendicularly, and to achieve this the beam heading should be some 10° or so off the Great Circle bearing, although experience has shown that this is not particularly critical. Turning the beam some 20° or so during a burst makes relatively little difference to the signal strength. Both the receiving and transmitting antennae should, of course, be laid off on the same side of the Great Circle bearing.

The vertical angle of the aerial radiation pattern has an important bearing on the distance at which contacts can be expected. Assuming an average height for the trail to be 100 km., the maximum range for zero angle radiation is 1,500 miles, dropping to 400 odd miles for an angle of 14°. An antenna four wavelengths high has a major vertical lobe angle of 27° and would theoretically give a range of about 1,000 miles. These figures are obviously influenced by ground reflections and take no account of secondary lobes. Up to 6 dB of gain can be expected if ground reflected waves reinforce the sky wave.

Timing of Transmissions

The apparent origin of the meteor shower is known as the "Radiant." This is the point in the sky from which the meteors appear and we then only need to know this in order to time the transmissions so that the radiant is in the optimum position for the path that we wish to work. The radiant rises in the east, passes across the sky at a height which is determined by its angle with the Pole Star, and sets in the west. The table on p.94 of the April, 1968 issue of SHORT WAVE MAGAZINE gives details of right ascension and declination of the major meteor showers. The charts in the sketch on p.215 show radiant paths and locations, together

with a worked example for a North/South transmission path.

If the radiant declination and right ascension (Celestial Latitude and Longitude) are plotted, a very simple calculator can be constructed which will trace the radiant path across the sky as a function of time and, knowing that propagation will be optimum when the radiant azimuth is at right angles to the desired path and above the horizon by an angle of between 30° and 60°, an optimum time for a given path can be determined.

There is one other aspect of timing which merits consideration. The procedure outlined above is applicable to the recurrent meteor showers or streams, but there remain the sporadic meteors, trails from which can also be used for communication over long distances. Because of the relative velocities of the earth and the meteors, the greatest number of sporadics occurs at around 6 a.m., exceeding by a factor of three those observed at 6 p.m. when the count is down to 1-3 per hour. So, if you don't want to wait for a predicted shower, early rising is indicated.

Procedures

In Europe, the procedure for meteor scatter contacts has been fairly well standardised. Obviously it can be varied to suit individual tastes, but the following has been shown to work well in practice, and can be recommended.

(a) Each station calls the other for a five minute period using each callsign once only, e.g. G3ZZZ de SM2AAA.

(b) As soon as a signal is heard, a report is included in the next transmission. This takes the form of the letter "S" followed by two figures. The first figure indicates the duration of the signal heard and the second the strength. A special scale is used to indicate duration as follows:—

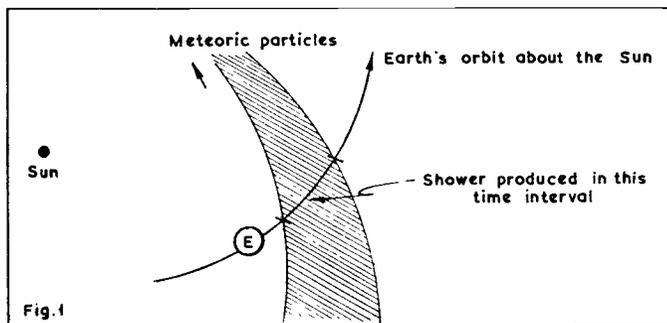
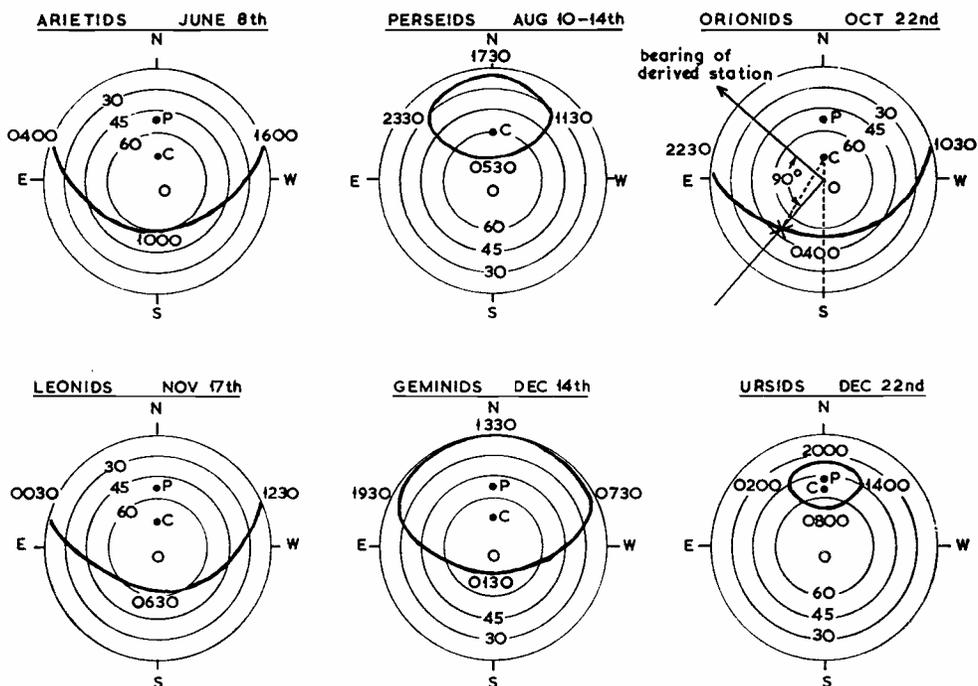
1. Pings.
2. Bursts up to five seconds.
3. Bursts from five to fifteen seconds.
4. Bursts from fifteen seconds to two minutes.
5. Bursts of longer duration than two minutes.

The report should not be the subject of any second thoughts, or confusion is certain. A sample transmission containing a report would be "G3ZZZ de SM2AAA S 24."

(c) As soon as one station has copied both the callsign and the report, the letter "R" is sent at the start of the report, e.g. "G3ZZZ de SM2AAA RS 24."

(d) When the other station has received everything including the "R," he sends the letter "R" for *thirty* minutes after the last signal is heard.

(e) If a station has not copied the report or some other part of the message, but has received an "R" from the other station, then the



Q 372

Fig. 2

Fig. 1

following code is used to inform the transmitting station of what is still needed to complete the contact:—

- ALL — I still need everything
- MC — I need *my* call only
- YC — I need *your* call only
- BC — I need *both* calls
- MS — I need my call and report
- YS — I need your call and report
- SSS — I need my report only

Once a station receives one of the above signals, the missing information is sent until the RRRRR is received. Although this procedure may seem complicated at first glance, it is not so in use, and allows the maximum

information to be transmitted in the minimum time.

Should nothing have been heard from the distant station at the end of thirty minutes, then the chances are that the specified frequencies have not been set with the required accuracy. In such cases, one of two procedures should be adopted. Either the receiver may be swept over above five kc or so for a ten-second period, or the receiver may be tuned in 1 kc increments above and below the nominal frequency on each successive transmission period. The former method is to be preferred. It is an obvious *sine qua non* that an accurate frequency meter should be available.

While most workers in the United Kingdom have standardised on the five-minute cycle, one could use one minute, or even half-minute, cycles, always provided

that the timing arrangements at the two ends were accurate enough. The main advantage of the shorter time cycle is that there is a chance of the QSO being completed during one long burst, but as the time period becomes shorter, the demands on accuracy in all respects becomes more stringent and the longer period may have some advantages. Whichever cycle is selected the requirements of accuracy in *timing* and *frequency* measurement are of paramount importance.

Equipment

As indicated in the introduction to this article, many amateurs will already have all the equipment required to undertake Meteor Scatter communication, but the following summarises the requirements in concise form:—

- (a) As much power as possible, not less than the legal limit for the band in any case.
- (b) A receiver with a noise figure of better than 3 dB.
- (c) A beam as high as possible and in the clear. A ten-element Yagi is adequate, but the feeder must be low loss. A ten-over-ten Yagi would be better so as to keep the vertical radiation angle low.
- (d) A high site is not essential, but it should be clear and quiet.
- (e) A receiver band width of 1 kc maximum.
- (f) Frequency measuring equipment to give an accuracy of ± 500 c/s on both transmit and receive.
- (g) A frequency marker giving 10 kc points throughout the band is desirable but not essential.
- (h) An automatic keyer. This can conveniently be a rotating disc and photo-electric device.
- (i) Plenty of patience!

THEFT BY FRAUD

We were very sorry to hear from George Francis and Bill Lowe—regular advertisers in the *Magazine*—that they had both been defrauded by an exceedingly smooth individual, well dressed and accompanied by a woman. They called at Newark on Sunday, April 28, and departed with a Swan-500 Transceiver (serial H289019) and AC/PSU (Q182709). For this, he gave a cheque which turned out to be a stumer.

The previous Sunday, 21st, they had been to Lowe Electronics, and obtained a Sommerkamp FT-150 Transceiver, the cheque also being worthless.

Giving an address in London, probably false, this precious couple's story was that they were emigrating to Papua (or Australia), mentioning a certain VK5 as being a brother-in-law. The man is about 5ft. 10in., aged 30-35, well built and very plausible. The woman sounds Scottish, 5ft. 8in. in height, with black hair, and also expensively dressed.

The whole matter is, of course, in the hands of the Police, but anyone who in the last few weeks may have been offered gear of the type described should ring Newark 4733 or 2578, or Matlock 2817

The author wishes to acknowledge with thanks the guidance given by G3LTF in the preparation of this article.

Reference

"VHF Meteor Scatter Propagation," Walter F. Bain—*QST*, April 1957.

APPENDIX

The charts on p.215 (Fig. 2) give details of the major meteor showers and the following notes should make clear the way in which they can be used.

- (1) The numbers on the concentric rings are the elevation in degrees of the radiant.
- (2) "P" denotes the sub Polar Star point.
- (3) "C" is the centre of the ellipse which is the plot of the circular radiant inclined to a plane, on that plane.
- (4) "O" is the observer, or your station.
- (5) Station bearings are always laid off from "O."
- (6) Time scales are always laid off from "C."
- (7) The East and West points are reversed because the observer is assumed to be looking up at the sky while on his back with his feet pointing South.

How to Use the Charts on p.215

Assume that a contact is to be arranged from London with a station at around 1,000 miles to the North-east. Taking the *Orionid* shower as an example, draw a line at right angles to the bearing of the station from point "O" (the observer) which intersects the locus of the meteor radiant at "X," as shown. We see that this is within the bounds of 30° to 60° elevation and can now determine the time by measuring the angle XCS, dividing this by 15, and subtracting the answer, which represents a number of hours, from the transit, or culmination, time of 0400. In this case the angle is 37°, equivalent to 2½ hours before transit, i.e. 0130. This is the path midpoint and so the time is not GMT but local time, calculated at one hour for each degree of latitude. In the example, a correction of one hour will be sufficient, thus 0130 midpoint local time becomes 0030 GMT. The schedules should run for, say, one hour on each side of this time. It can easily be seen that the distant station will obtain the same result as he would calculate on the reciprocal bearing. A certain degree of latitude is permissible in choosing times, but signals will peak at midpoint.

Although the curves are plotted to Latitude 52° North, they should be substantially accurate for up to Latitude 60°. No responsibility is accepted, however, for missed QSO's by GM's!

or 2430 (reverse charges) with the information—because both George Francis and Bill Lowe are offering a £20 reward for the recovery of their equipment. It is a reasonable assumption that both transceivers will somehow, somewhere be offered for sale.

LATEST AMATEUR LICENCE FIGURES

We are obliged to the Post Office for the following details: As at 30 April '68, Amateur Sound Licences A totalled 12,785; Amateur Sound B (the G8/3's), 872; the A-licence mobile came to 2,467 and the B's /M, 55; for Amateur TV transmission, VHF only, 185; and for Model Control on their own special frequencies the total was 13,602 (!).

This makes it that the aggregate of U.K. transmitting licences in current issue is 13,657, of whom 2,522 have additional permits for Mobile.

While the licences in issue for Model Control have nothing in common with the *pratique* of Amateur Radio, it is interesting to see how many people are interested in this aspect of radio operation, mainly on the 27 mc band.

SOME GELOSO VFO/EXCITER MODIFICATIONS

SUGGESTIONS FOR IMPROVING STABILITY, HF-BAND DRIVE AND NOTE

C. J. REES (G3TUX)

THESE notes deal with the modification of the GeloSO 4/101 and 4/102 exciter units. The only difference between them is that the 4/101 has a 6V6 driver stage, whereas the 4/102 has a 6L6. The unit possessed by the writer is built into a K.W. "Valiant" transmitter, and is standard equipment for this and their "Vanguard" models.

In unmodified form, the writer's unit exhibited signs of poor note and instability on the HF bands, and the drive it produced was extremely marginal for the 6146 PA. The valves and alignment of the unit were checked, as were the operating conditions, but nothing was found to be seriously amiss.

It was then decided to investigate the GeloSO circuit itself, with a view to improving the apparent shortcomings. It was found initially that a good match from the aerial to the PA materially improved the situation as regards "pulling" of the oscillator, but it was felt that the unit should be independent of this factor.

An investigation of the circuit revealed that the multiplying sequence shown in Table I was being used.

TABLE I

Band	Oscillator Freq.	Buffer Anode	Driver Anode
3.5 mc	3.5 mc	Untuned	3.5 mc
7 mc	7 mc	Untuned	7 mc
14 mc	3.5 mc	7 mc	14 mc
21 mc	3.5 mc	7 mc	21 mc
28 mc	7 mc	14 mc	28 mc

It was evident that this arrangement could result in lack of drive on some bands and did not particularly benefit suppression of harmonics and oscillator pulling. This sequence seems to have been designed to provide maximum bandspread on the dial, rather than the best electrical method of deriving the output frequency. The writer also does not like the principle of running "straight-through," as on the 3.5 and 7 mc bands, because this is usually detrimental to oscillator stability by the pulling effect of the PA. It was decided that better use could be made of the existing circuitry just by a few simple rearrangements. The multiplying sequence was therefore altered as shown in Table II, opposite.

This modification was carried out by rearranging the connections to the bandswitch and substituting a 1.75 mc oscillator coil for one of the 3.5 mc inductances. Counting back from the front of the unit, the coil so substituted is the third one along and is made up by stripping the

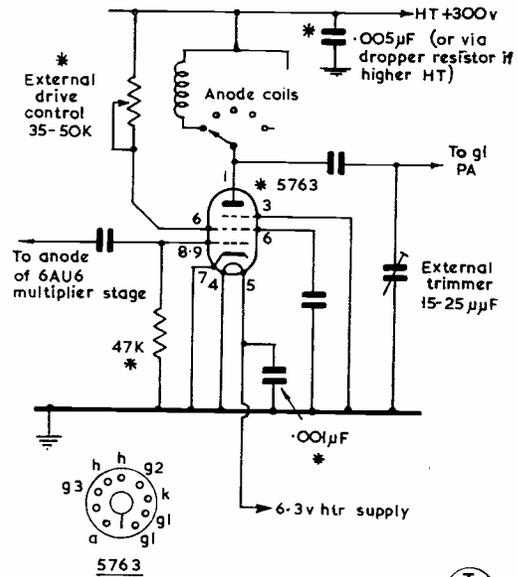


Fig. 1

Fig. 1. The modified driver circuitry. Except where marked, all components are as originally fitted.

original former and scramble winding about 90 turns of 34g. enamelled wire on to it. The necessary connection modifications can be worked out from the tabulation in Table II, and inspection of the unit itself.

It is now also possible to use the unit on 160m. if it can be arranged to switch in a 1.8 mc tuned circuit into the driver anode. This could be done in several ways—substituting 160m. for one of the other bands; installing an additional switch for the driver tuned circuits; or, and perhaps the neatest way, changing the whole bandswitch for a six-way type, which will save any unsightly modifications to existing equipment. Even though the unit would then run straight-through on 160m., as the PA input is only 10 watts, pulling whilst keying should not be any problem.

Initial Results

This modification resulted in an increase of drive on the 14 and 21 mc bands, and a marked decrease in oscillator pulling on all bands except 10 metres. The only detrimental aspect of the modification was that the bandspread on 21 mc was quite severely reduced (and on 14 mc to a lesser extent) but this was not found to be

TABLE II

Band	Oscillator Freq.	Buffer Anode	Driver Anode
3.5 mc	1.75 mc	Untuned	3.5 mc
7 mc	3.5 mc	7 mc	7 mc
14 mc	7 mc	14 mc	14 mc
21 mc	7 mc	7 mc	21 mc
28 mc	7 mc	14 mc	28 mc

VERTICAL AERIAL SYSTEMS FOR THE COMMUNICATION BANDS

MATERIALS, METHODS OF MOUNTING AND A CO-AXIAL DIPOLE FOR TEN METRES

A. D. TAYLOR (G8PG)

VERTICAL aerials are capable of giving very good results on both the LF and HF bands, and they are particularly useful at a station where the space available for horizontal aerial runs is limited. This article gives hints on how inexpensive, readily available ex-Government whip aerials can be used to construct all or part of such vertical aerials, including a novel form of co-axial dipole for the 28 mc band. Besides their use as vertical aerials, whip sections put together in the way to be described can also be used to construct rotary dipoles and simple Yagi arrays for the HF bands.

Selecting Whips

Most of the readily available ex-Govt. whips fall into two categories. Twelve foot, 3-section whips (often called "ex-tank whips") are commonly available, and a certain number of dealers offer a similar 16ft., 4-section whip. Both these are particularly useful as they are strongly constructed and the number of joints is kept to a minimum. A second commonly available model is 11 feet long and made up from a number of sections

about 18 inches in length. A multi-strand steel wire is usually run through the sections to keep them together when the whip is dismantled. This model is not so useful for LF-band applications, but it can be put to good use at 21 and 28 mc. A much heavier (and more expensive) 16-foot whip, *ex* the U.S. Army BC-610 transmitter, occasionally appears on the market, but because of its weight and cost it is not covered in this article.

The most suitable items for the purpose are the 12 and 16 foot assemblies mentioned at the beginning of the previous paragraph.

Making Up a Given Length

When used by the Services, the push joints between the whip sections provide both an electrical and a mechanical joint. As far as permanent amateur aerials are concerned, they should be treated purely as a means of *mechanically* linking the sections together, the electrical connections being made by the method to be described later. This is electrically far more efficient, and it allows considerably increased flexibility in using various combinations of whip sections to make up a given length. For example, if two 12-foot whips are available, one can be assembled in the normal way, then the base section of the second can be firmly wedged into its lower end to provide an overall length of about 15 feet. As the two remaining sections of the second whip can be put together to make a length of approximately 8 feet, the two whips now provide the basis for, say, the radiator elements of a 14 mc ground-plane and a 28 mc ground-plane. Where specific lengths are required which are not a multiple of four feet, spare sections can be cut as necessary and jointed by the method which will now be described.

[over

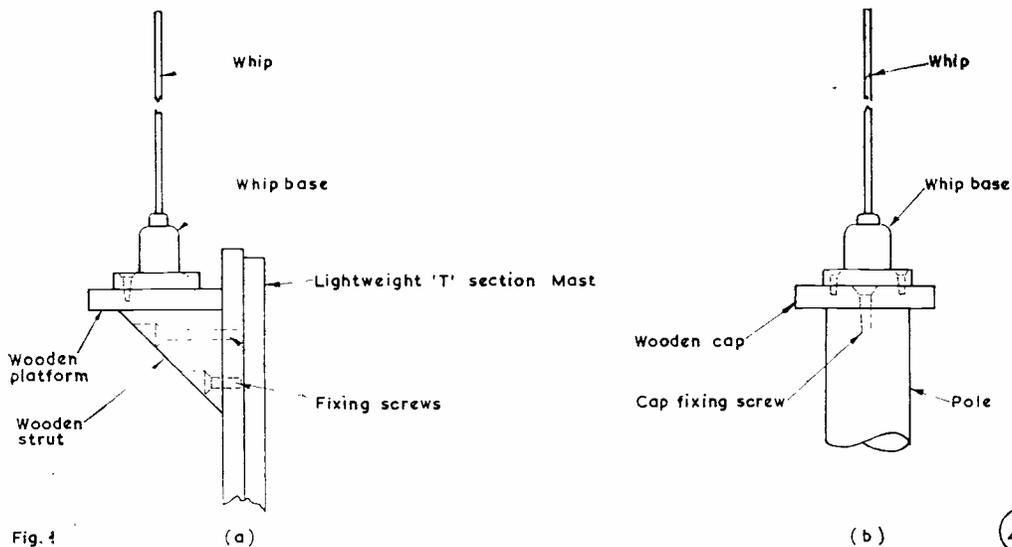


Fig. 1. Method of securing Whip base to mast or pole.

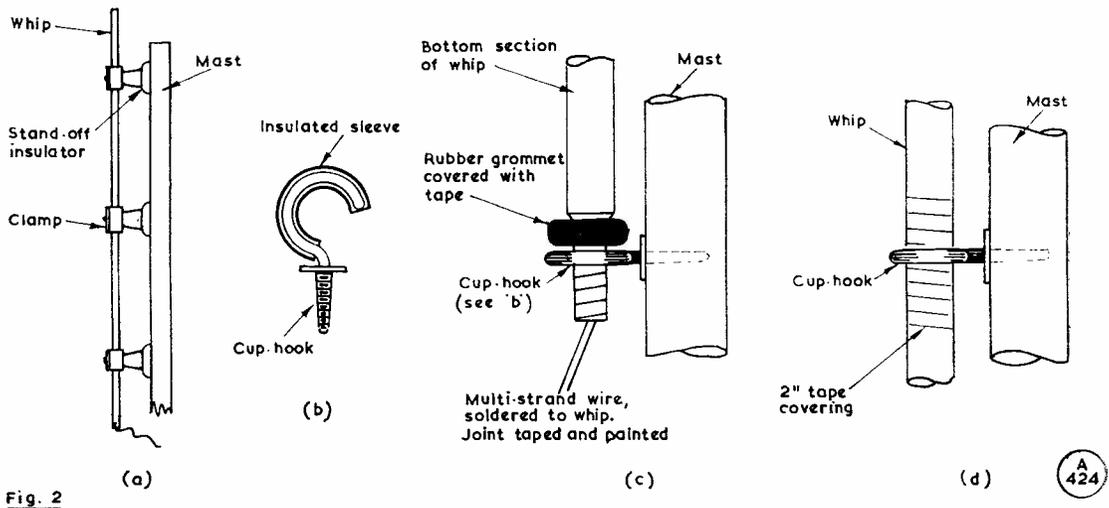


Fig. 2. Two ways of mounting a Whip when it overlaps the mast.

Electrical Joints

The whip sections are made of steel which is then copper plated and painted. Provided fine sandpaper is used, the paint can be removed easily, leaving exposed a bright copper surface which is very easy to tin for soldering. It is essential to use *fine* sandpaper and not to apply too much pressure, otherwise the copper plating itself may be scraped off. An ideal tool for the job is one of the cardboard nail files sold by chemists and beauty-aid shops. These consist of a stout card which has very fine sandpaper on one side and a coarser grade on the other. To make the connection, first ensure that the two whip sections are pushed firmly into each other so as to provide a really firm mechanical joint, then use the sandpaper to clean an area about one inch long and half an inch wide on each section at the point where they meet. Next, carefully tin the cleaned areas with a hot soldering iron, then strip the outer covering from about four inches of plastic-covered lighting flex and cut off the four inches of stranded conductor thus left care. Double the stranded conductor back on itself at the centre, tin it, then carefully solder it between the two tinned patches on the whip sections. When the solder has cooled, rotate the whip sections through 180 degrees and repeat the process to make a second connection. Connections of this type ensure that the ohmic resistance of the joint is kept to a minimum, a point of great importance at the lower frequencies where the aerial may only represent a small fraction of a wavelength. The efficiency of LF band aerials can be still further improved by soldering one end of a length of light, plastic covered flex to the top of the whip, running it down to the bottom and soldering it to the whip again at that point. The flex should be taped to the whip at 3 foot intervals.

If an aerial base is used, it should be regarded purely as a means of mounting the whip mechanically, the actual electrical connection being made by carefully

soldering a suitable conductor to the bottom of the lowest section.

Weather Proofing

To ensure long life, the whole assembly should be thoroughly weatherproofed. When the soldering is completed each joint should be well covered with tape, then the whole whip should be given two coats of paint. In most instances mid-green outdoor paint will harmonise well with the surroundings and help to make the whip inconspicuous. If the top section is open at its upper end, a wooded plug should be inserted before painting is begun.

Hints on LF Band Verticals

Whips up to 12 feet in length can be mounted at the top of a light wooden mast, provided it is guyed, or on the top of a pole. Under these conditions the amount of movement will not be excessive, even in gale force winds. Light masts are usually constructed from lengths of wood having a square or rectangular cross-section. The simplest method of mounting a whip at the top of such a mast is to make a small wooden platform, supported by a wooden strut, and screw this to the mast near the top as shown in Fig. 1 (A). The whip base is then mounted on the platform. A solid base should be used, as flexible rubber bases are only suitable for very short whips. If a self-supporting pole is used, the whip base can be screwed directly to the wooden weather-proofing cap at the top of the pole. The cap used should be an inch thick and four 2-inch woodscrews should be used to secure it to the pole head, as shown in Fig. 1 (B), p.219.

When whips in excess of 12 feet in length are made up, some overlap between the whip and the mast which supports it will usually be necessary unless an exceptionally rigid whip happens to be available. The exact amount of overlap will depend upon the type of whip sections used and the actual location of the station. The

writer regards his own location as being in the "worst case" category, as wind gusts in excess of 100 m.p.h. occur in winter. Under these conditions an overlap of 6 feet is allowed between a 20-foot assembly made up from "tank whip" sections and a 22-foot guyed mast of lightweight construction. With this amount of overlap the sway at the top of the whip is acceptable, even under gale conditions. This is very important, as excessive sway can break the whip or even bring the mast down.

Most handbooks suggest that the method shown in Fig. 2 (A) be adopted when mounting a whip on a mast with an overlap. It involves the use of stand-off insulators and clamps, and is an excellent method if suitable stand-off insulators happen to be available. Unfortunately, they rarely are! Anyone who has acquired a few of the heavy duty stand-off insulators used to support copper tubing runs in a marine radio installation can use them with complete confidence, but the lighter type of stand-off sold for amateur use is usually just not strong enough for the job.

An alternative and inexpensive method used by the writer is illustrated in Figs. 2 (B), (C) and (D). The materials required are several cup hooks, a few inches of plastic outer covering stripped from a length of 3-core mains cable (used as sleeving), a rubber grommet of suitable size and a roll of plastic insulating tape. The method of securing the base, which should be done first, is illustrated in Fig. 2 (C). A rubber grommet of suitable diameter is slid over the bottom of the lowest whip section and pushed up until it butts against the

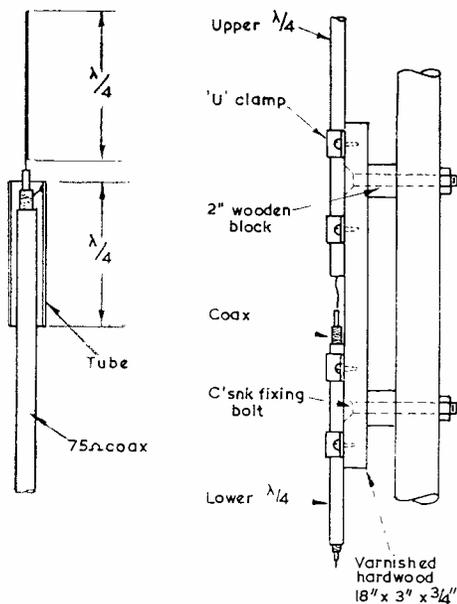
shoulder where the whip section increases in diameter. The multi-strand wire which will form the lower part of the aerial is then soldered to the bottom of the whip section and this joint and the grommet are covered with a layer of tape which is then painted. The jaws of a cup hook are then opened out with pliers until the joint will go through them easily, and the hook is screwed into the mast and a length of insulated sleeving is slipped over it. The bottom of the whip is then put into the hook and pushed down until the grommet butts against the hook, after which the hook jaws are tightly clamped around the whip with a pair of pliers, the jaws of which have been covered with rag to prevent damage to the sleeving. The remaining cup hooks should be fitted at about 18-inch intervals using the method shown in Fig. 2 (D), the last one being placed about 2 inches below the top of the mast. They must be clamped around the whip tightly, using the method already described. The end result is a really rigid mounting for the whip.

The lower part part of the aerial should consist of a length of heavy, multi-strand cable. This can be brought down clear of the mast if desired and anchored to a stake two or three feet from the bottom. An inexpensive source of suitable cable is the 60-foot aeriels issued as an accessory for the PCR range of Govt. surplus receivers.

Coupling methods and earth systems are outside the scope of this article, but the importance of the earth system cannot be over emphasised, particularly when considering LF band vertical aeriels.

Ten Metre Co-Axial Dipole

A conventional ground-plane aerial may be beautiful to the eyes of its owner, but it hardly adds to the appearance of a residential area! A further disadvantage is that it must be fed with 52-ohm co-axial cable, which is not so easily obtained as the 75-ohm variety. The co-axial dipole, in which the radials are replaced by a quarter wave tube which has the feeder running through it, gives the same performance as a conventional ground-plane, but with a 75-ohm feed point impedance. It is also much more inconspicuous when erected. The basic construction is shown in Fig. 3 (A). When contemplating the erection of such an aerial for ten metres it occurred to the writer that thin coax cable of the type used for electric guitar connections was small enough to pass through the centre of the two bottom sections of a 12-foot "tank type" whip. When put together these two sections were a few inches too short to resonate at the required frequency, so a suitable length cut from a spare whip section was pushed over the narrow end and soldered into place, thus making the length a quarter wave. The other half of the dipole was made up in a similar manner. As the centre of a dipole is a low-voltage point, the two halves were joined together mechanically by making suitable clamps from strips of dry, well varnished wood as shown in Fig. 3 (B). Once this was done the feeder was soldered into place and the open ends of the whip sections were sealed with *Bostik* strip to prevent water getting in. The lower end of the thin co-axial cable was made off into a female connector and this in turn was connected to a male connector on the end of a heavier cable leading back to the shack. To prevent undue strain on these two connectors the



(a) Schematic (b) Centre section and mounting assembly

Fig 3

A 425

Fig. 3. Construction of the co-axial dipole for 10 metres.

two cables were clamped to the supporting mast on either side of the connection.

Conclusion

A 36-foot high LF band vertical is in use on 80 metres at G8PG. Despite a rather indifferent earth (two 30-foot radials and a 4-foot rod) the results compared with the 90 foot horizontal aerial previously used have been an eye-opener. There is no doubt at all about the difference, particularly at distances over 800 miles.

A ten metre co-axial dipole is also in use, the bottom of the lower half being about 12 feet above ground. Despite the fact that it is within 8 inches of a brick wall for more than half its length, it is giving really excellent DX results when fed from a 20 watt CW transmitter.

This is the first time that the writer has experimented seriously with vertical aerials for amateur-band use, and there is no doubt that the time and effort involved have proved well worth while.

BOOK REVIEW

ARRL RADIO AMATEUR'S HANDBOOK,
45th Edition, 1968

ONCE again the time comes round with the difficult task of reviewing the *Radio Amateur's Handbook*. Since 1926, when it first saw the light of day, ARRL have kept this book up to date with continuous revisions and additions, which have made it and kept it an essential part of the fabric of Amateur Radio.

This year one notices at once a marked change; the cover design which has been in essence the same for thirty years or more has been altered completely (to your reviewer's regret). Inside, one observes that the Editorial chair has passed from Byron Goodman, WIDX, to Doug DeMaw, WICER, and a major revision has been undertaken throughout. The spirit is unchanged; there is still the same clear and sensible approach to the difficult problem of writing a handbook to cater for all readers from the novice to the full-blown professional, but there has been an enormous revision. It is indeed a credit to the new Editor that there has been no falling-off in the overall standard, and we must congratulate him.

Looking inside, one is faced with the difficulty that so much has changed that it is almost impossible to pick out all the new material. In the SSB chapter a version of the circuit which appeared in the RSGB *Amateur Radio Circuits Book* is given a chance to demonstrate that a transistorised Vox unit can be made to work; and incidentally the circuit, as compared with the original, has an error corrected as well as being shown to be useful for the CW man. An SSB transceiver for 3.5 mc makes its bow this year, and will surely provide the basis for quite a lot of home-construction.

In the chapter on receivers, the regenerative

preselector and the 80/40 metre converter disappear, along with the HB-67 five-band receiver, and an FET converter comes in. As for transmitters, a transistor five-watt job appears, together with some very useful notes on modulating transistor rigs; the four-band fifty-watt device becomes a five-band transmitter, the additional band being 28 mc, and the 75-watt transmitter, using a 1625 PA, has been replaced by one with a 6HF5 and incorporating a built-in reflectometer. FET's appear in this chapter also, with a rather nice VFO which can be used either at 1.8, 3.5, 5 or 9 mc, details being given for all these ranges—the latter two would be extremely handy for anyone contemplating SSB.

Integrated circuits make their appearance in the section on Morse code transmission, in the form of the micro-TO keyer, which is accompanied by a valve-and-relay add-on unit to enable such keyers as the Heathkit to be used with those transmitters for which they are not normally considered suitable. This one also provides facilities for connection to a tape-recorder for automatic CQ-sending if desired.

And so it goes on; FET converters for VHF, another for Top Band mobile use—wherever one looks one notes differences. Summing it all up, it can be said that while the book is still the same in approach it is largely new in content and would be a most valuable addition to the shelves in any shack where the operator is at all interested, not only in construction for its own sake, but in keeping his station as efficient as possible. Few could afford to be without it on this basis alone.

The ARRL *Handbook* runs to more than 600 fully illustrated pages of text, contains much tabular matter relating to valve and transistor types, is fully indexed, and includes a catalogue section covering most of the current commercial amateur-band equipment available in America.

It is an interesting fact that the ARRL *Handbook* has now sold more than *four million* copies, all over the world, since the 1st edition (copy of which we still possess) appeared in November, 1926—and that it is now ranked 17th in the list of non-fiction best sellers in the United States.

Editorial Note: The ARRL *Radio Amateur's Handbook*, 45th Edition (1968), is available at 50s. in strong paper cover, or 60s. bound buckram hard cover, post free, from stock, of the Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TOP BAND IN AUSTRALIA

The VK's are, of course, licensed for the 160-metre band but it may not be generally known that the frequency area allocated to them is 1800-1860 kc, with PA inputs up to 150 watts. Our information is that Top Band is not much used in Australia. Because of their much greater point-to-point distances, most contacts are what we would regard as DX. There are some outstanding 160m. VK operators—notably VK5KO (Fulham, S. Aust.) who tries for the real inter-Continental DX. He has been heard and worked from the U.K.—see p.163, May issue.

THE MOBILE SCENE

RALLY NOTES AND NEWS—MOBILE

LICENCE FACTS AND FIGURES—

REMARKABLE /M-DX ON TOP BAND

With seven Rally events having already taken place, and no less than 16 yet to be played off — two additional meetings are entered in the Calendar herewith—this is undoubtedly the busiest Rally season yet in the 13 years of mobile activity in the U.K.

According to the latest Post Office figures, as at April 30 last there were 2,522 British amateurs licensed /M — this being out of 13,657 U.K. licences in issue at the same date, in the A+B categories. Thus, the proportion of mobiles continues to show a healthy increase—actually 131 in eight months, there having been 554 new A+B U.K. licences issued in the same period. Put in another way, it means that nearly 19% of all British amateurs now hold the additional facility of a mobile licence.

Not so encouraging is the recent report of the Amateur Radio Mobile Society—said to represent the mobile interest in the U.K.—which shows not only a decrease in membership but also that, of the 2,522 licensed U.K. mobiles, only about 375 are members of A.R.M.S.! Not surprisingly, the committee of the Mobile Society expresses itself as “disappointed.”

* * *

The North Midlands Mobile Rally at Drayton Manor Park, near Tamworth, Staffs., on April 28, in fine weather, was again a great success. The organisers were the Midlands and Stoke-on-Trent Amateur Radio Societies, acting jointly, with G3KPT in charge of organisation and G5PP acting as chairman. The estimated attendance of actual mobiles was something like 500—about 450 /M's actually signed in—and by mid-afternoon they must have had some 2,500 people in the grounds. The most distant visitor was G3NJA (Torbay A.R.S.) and the prizes for mobile installations went to G3OOQ and G8FU. The event attracted a good range of trade stands, of varying degrees of radio interest, and the general impression is that good business was done and all present enjoyed a well-managed Rally in an attractive setting, with something for everyone to do.

* * *

A most interesting report from G3NXV/M (Birmingham) describes how—when stuck on the M5 with a flat tyre, at 0200z on April 16—he had a Top Band contact with ZC4RB, the mode being SSB/M. Though of course actually stationary, G3NXV/M was using his regular mobile rig. Such a QSO on 160m. is a great credit to both ends—the distance is a good two thousand miles!

Mobile Rally Calendar, Season 1968

June 15: (Saturday). Annual Air Day at Royal Naval Air Station, Lee-on-the-Solent, Hants., (H.M.S. *Daedalus*), with GB3RN of the R.N. Amateur Radio Society providing talk-in on 1910 kc, 70.26 mc and 145.3 mc. Ample car parking facilities, and attractions include a static exhibition of Fleet Air Arm equipment, also a flying display by some of the latest aircraft operating with the Royal Navy. Information and details: C/R/S M. J. Matthews, R.N., G3JFF, Amateur Radio Society, H.M.S. *Mercury*, Leydene, Petersfield, Hants.

June 16: Hunstanton Annual Rally (on the Norfolk coast).

June 30: Amateur Radio Mobile Society's Annual Rally, being held this year on the U.S.A.F. Base at R.A.F. Mildenhall, Suffolk. It is one of the largest American Air Force bases in the U.K. Take the A.11 Newmarket—Thetford and look out for the 5-way roundabout at Barton Mills. The “Bull” there is one of the best stopping places in the area and was much frequented by 3 Group bomber crews during Hitler's War. On this A.R.M.S. occasion, entry to the Rally will be on the basis of the purchase of raffle tickets at the gate. There will be the usual A.R.M.S. rally attractions, with Sylvia as mistress of ceremonies.

June 30: Annual Mobile Rally at Longleat Park, Warminster, Wilts, organised by Bristol Group assisted by the Bristol Amateur Radio Club.

June 30: Pembroke Radio Club Rally at Regency Hall, Saundersfoot, near Tenby, West Wales, with talk-in on 1876 kc and 144.35 mc—R. J. Wilcox, GW3TSH, 33 Treawen Road, Pembroke Dock, Pembs.

July 7: South Shields Mobile Rally, the ninth in their series, put on by the South Shields & District Amateur Radio Club.—Organiser, Derek Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.

July 6-7: Cheltenham Festival Rally, arranged by Cheltenham Amateur Radio Society and local RSGB group members, covering a wide range of tastes and interests, to coincide with the Cheltenham Festival of Music, which for years has been one of England's intellectual occasions. As regards arrangements for radio amateur visitors, there will be a dinner on Saturday evening, July 6 (price 25s.) at the Lilleybrook Hotel, Charlton Kings (just outside Cheltenham, on the Cotswolds side) bookings to be made with G3LDA/G3MOE, *QTHR*, 14 days in advance, numbers limited to 80 persons. Overnight accommodation can be booked direct with the Hotel, *Cheltenham 25861*, at 14 days' notice as the Festival imposes a heavy load on the local tourist accommodation, Caravan and camping facilities, at 5s. per night, on Cheltenham Racecourse, a fine site for VHF or /P operation, can be arranged at three days'

notice with G3MOE, *QTHR*. Rally talk-in stations will be: G5BK, 1925 kc, AM; G3MOE, 3725 kc, SSB; G3OLN, 70·26 mc, AM; and G8ML, 144·4 mc, AM. Cheltenham is a lovely town, and whether you go there by car or caravan, to stay for the day, a weekend or the full week of the Festival, you can be sure of an enjoyable visit. Full details as to the programme, charges and accommodation arrangements from: J. H. Moxey, G3MOE, 11 Westbury Road, Leckhampton, Cheltenham, Glos. (Tel.: *Cheltenham 24217*, or *STD 0242-24217*.)

July 14: Annual mobile picnic organised by the Reading Amateur Radio Club. Details: L. F. Taylor, 58 Nightingale Road, Woodley, Reading, Berks. (*Further information July issue.*)

July 14: Mobile Rally to be arranged by the Colchester Group at Colchester Zoo—with “new faces in front and behind the bars!” Talk-in will be by GB3ZOO on the 2-4-160m. bands. Information: V. Levitt, Park Street, Stoke-by-Nayland, Suffolk

July 14: Second Mobile Rally put on by the Worcester & District Amateur Radio Club, at the Hill County Secondary School, Upton-on-Severn, one mile west of the town, with adequate local sign-posting. There will be trade stands, an amateur TV demonstration, model aircraft display, raffles and competitions, with ample cover in case of bad weather. Talk-in will be given on 2-4-160m., and the Rally will start at 2.0 p.m. Details from: R. L. Avery, G3TQD, 24 Alexander Road, Droitwich, Worcs.

July 21: Cornish Amateur Radio Club's annual Rally at Pentire Headland, Newquay, Cornwall, with talk-in on 4-80-160m. Hon. Secretary: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.

July 28: Saltash & District Amateur Radio Club annual Mobile Rally, to be held this year at Saltash Grammar School, Wearde Hill, Saltash, Cornwall, with the facilities and attractions of recent years.—Hon. Secretary, J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.

August 18: Torbay Amateur Radio Society Mobile Rally, at Dartmouth, South Devon.

August 18: Derby & District Amateur Radio Society eleventh annual Mobile Rally at Rykneld Schools, Derby, as in previous years.—T. Darn, G3FGY, Chairman and Hon. Rally Organiser, 1 Sandham Lane, Ripley, Derbys. DE5-3HE.

August 25: The Swndon Club's annual event at Lydiard Park, near Swindon, Wilts.

September 2: Peterborough Mobile Rally, with boat trips on the river and an exhibition stand of antique wireless apparatus. Talk-in station G3DQW will be operating on 1980 kc from 1.0 p.m. Rally enclosure is the river bank car park near the swimming pool, with plenty of free parking space. Ideal for a picnic in a sylvan setting. Information and details from: D. Byrne,

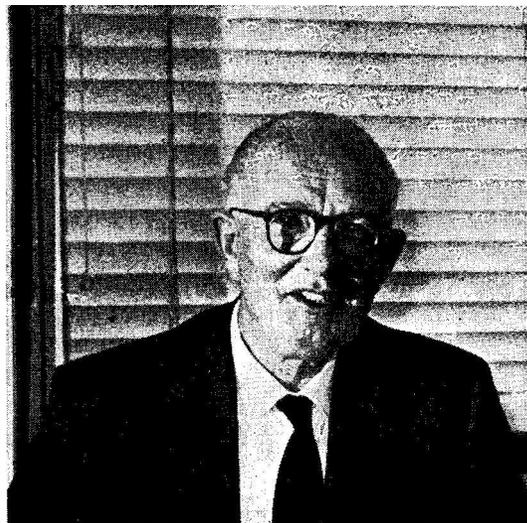
G3KPO, Jersey House, Eye, Peterborough.

Closing date for reports and information to appear in the July issue: *Monday, June 10*, addressed “Mobile Scene,” SHORT WAVE MAGAZINE, BUCKINGHAM.

YOU CAN NOW SIGN AT 20's

A particularly frustrating and incomprehensible ruling by the G.P.O.—that when working CW, operators in the U.K. should sign over at not more than 12 words per minute—has now been ameliorated and brought more into line with current practice. The maximum sign-over speed (that is, when making the usual procedure calls at the beginning and end of a CW transmission) is now 20 words per minute. It does not matter how fast (or how slow) you go during the actual message exchanges, provided you do not exceed 20's on signing over.

As a sidelight on this, it is probably fair to say that the G.P.O. may now have reached a stage where they are hard put to it to find competent telegraphists capable of giving the amateur Morse Test! The reason for this, of course, that whereas at one time every local post office had staff telegraphists to operate the normal telegram service, which was all by hand-sent Morse, that is something long in the past. It is now done by telephone or teleprinter. Forty years ago, when taking your Test for an amateur licence, it was always by appointment at your local head post office—where some kindly official operator (who could probably send and receive at 40's with either hand and copy straight on to a typewriter) would give you an hour or so's practice before putting you through the 12 w.p.m. Test!



On p.115 of the April issue of “Short Wave Magazine” the retirement was announced of Arthur Edwards, G6XJ, after 40 years' service under the Eddystone banner. Though closely concerned over all that time with the manufacture and marketing of amateur-band receivers and short-wave components, this is one of the few photographs of him—taken on his retirement as director of Eddystone Radio, Ltd.—that has ever been published.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

ONE would hardly think—at this stage in the development of Amateur Radio—that the AM-versus-SSB argument would still be a serious factor in Top Band operation. But it seems there are SSB operators who avoid 160 metres for local QSO's, because of the number of snide remarks from confirmed AM users who say they just cannot resolve the stuff at close range.

Your scribe has never experienced such a problem, although the number of SSB users locally is quite high—but then his Eddystone 888 has the positions of the BFO marked for upper and lower side-band, and also the correct position to bring the audio filter right on the nose of the IF selectivity when the latter is peaked. However, when doing some tests with a mobile receiver recently this inability to resolve big SSB signals was

encountered. It was realised to be due to the receiver design, in that the first RF stage was not tied either to the AGC line or the manual gain control. Lifting the bottom of the cathode bias resistor from earth and connecting it to the RF gain control line turned out to be the complete solution. Time taken: Just as long as the iron needed to warm up, plus three minutes and the time to slip the Rx back in its cabinet. With the amount of SSB on 160 metres these days, such a mod. becomes more or less essential anyway.

Reverting from things technical to things topical, the biggest source of QRM during the period under review seems to have been not the steamroller signals on the bands but rather the mower roller on the lawn! However, let us take things as they come, starting with the Ten-metre clip.

Ten Metres

G3WDW first, from Leeds, who mentions doing some tests with G3UFB, who was walking away from him with a transistor transmitter; in between the test contacts, using a K.W. Vanguard on the QRP position (so as to avoid TVI) into the Top Band wire, John managed QSO's with PY1AEQ, ZS4KC, LU5XE and 9Q5QA, getting AM reports between RS-57 and 59. This is the sort of thing that makes Ten so fascinating, especially when it happens on an apparently dead band.

Your conductor gained the impression that not only had 10m. passed its seasonal peak, but that the standard overall has remained poorer than last year—an impression rather confirmed by the letter from G3NOF (Yeovil). Don mentions an almost complete absence of W's, apart from a few W4's around 1800, although the Central and South Americans have been better during the afternoon and evenings. Contacts—all SSB—were recorded with ET3REL, FS7RT, HC1PC, KV4AD, LU's, VP2GLE, VP8's, VQ9DH, W5, W6, ZC4RB, DZ7DI, ZS's, 5Z4LG and 9Y4VS, while EA0AH fell off the hook.

G2HKU (Isle of Sheppey) has hard words to say about these new-fangled prefixes, which he avers must be taken from an American "Toob" manual! This time it is the 4A's, who are XE's in disguise, of course. ZE1WPC—of whom, more anon—was found one day booming in, with nobody else around, and Ted also took in ZC4RB and ET3FMA, the latter pair on SSB.

As far as G3LZQ (Brough) was concerned, ten metres was erratic and no contacts are specifically mentioned, except one which we read as being 28 mc, when John was trying out a QRP rig. After coming on specially for the Saturday night in the USSR contest, in the hope of working Zone 23, he had the Tx working on 8 watts when JT1KAA

SIX-BAND DX TABLE
(All-Time Post War)

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc
G2DC	335	169	306	327	163	108	20
G3DO	334	188	231	327	90	83	9
G3NOF	310	153	201	294	34	39	1
G3LZQ	246	199	153	194	71	38	8
G3IGW	204	123	152	167	122	86	42
G8DI	186	80	132	163	77	46	8
G3IAR	192	81	125	171	64	56	—
G3VDL	130	45	93	95	45	22	—
G3IDG	121	71	87	54	27	19	11
G3NYQ	147	35	70	107	40	30	21
G3MDW	115	46	66	82	20	15	7
G3PQF	138	80	42	69	84	49	8
G3SED	85	2	18	55	38	32	37
G3WJS	50	—	—	40	22	35	11

Note: Placings this month are based on the "21 mc" Column.

appeared at 599. No option but to call him, with the low-power machinery hooked to the beam—and back he came first time with a 579 report. So G3LZQ goes to 40 Zones in the Table.

All the QSO's mentioned by G3NYQ (Otley) were, except for a /M one on Top Band, made on SSB. The basic rig accounted for PY's, ZS's, ZC4's, CR7IC, ZE1CS, CX7AP, VP8, LU's, 5Z4LG, ET3REL, OD5's, 5LZ2RL (Liberia), VQ9JW, VU2KX, 9G1KT, EAØTU, TJ1AL, VK, ZL and JA, while the mobile rig gave contacts with 9J2BK, ZC4's, SVØ, ET3, W's, VE, VU2KX, W6, 9H1, ZS, OX3CJ and VQ9DH. So ten metres has been alive!

Fifteen-Metre Reports

At the top of the pile a photostat of one of the jumbo-sized cards from GB5QM, the *Queen Mary* when on her voyage to her last resting-place in California, sent in by G2YX (Aldridge) who worked GB5QM /MM on 21 mc. G2YX was also pleased to receive a copy of a local newspaper showing a map of the voyage with a few of the QSL's superimposed, in which his and G3MOE's are visible.

G3DO (Four Oaks) managed to add one to his score for the 15m. band with 9N1MM, and in addition contrived to hook 4S7PB, HS3TM, and MP4MAY, with a gotaway in the form of DU7RZ.

"A great band, this," says G3NYQ, who managed ZD3F, VP2AA, CR4BC, VK's, ZL's, 9H1's, 9J2BK, KV4FC, most W districts, 5H3JL, 7XØAH, 9X5AA, DU1FH, MP4MBC and MP4TCE, using the fixed gear; on the mobile side there was VK/ZL, VS9MB, 9M2NF, ZD3F, VP2AA, 9H1R, PX1PA, VK9WD, CR6's, LU, ZS, MP4's and a gotaway in KX6EJ.

Last month G3LZQ was away, which explains his absence from this space—and since he has been back he has found fifteen metres rather like the curate's egg. CW accounted for DJ5JK/CT3, and all USSR call areas, while SSB yielded MP4MBC, MP4BGE, 5W1AS, 6Y5GB, OX3MT, PK1SH, KR6RL and KX6GJ.

Rather a similar sentiment seems to lie in the lines from G2HKU, who did not work a lot, although

XW8BP on CW gladdened his heart by producing the 40th Zone after twenty years of trying; XE1AX was also a good signal.

G3NOF reports several morning openings around 1000 to the Pacific, and KW6EJ and KØILI/KG6 have often been heard over the short path, with JA's coming in short-path at the same time, in quantity. As for contacts, JA's, KW6EJ, VP2MK, VU2BK and W6's were booked in, but the bait laid was not sufficiently alluring to trap XW8AX or YJ8BW, although the latter was audible from 1000 until 1242. A rather interesting point is that YJ8BW, during the period he was audible, was working North Europeans and some G's, all of whom were north of the line London-Gloucester. This just goes to show how "selective" the skip conditions can be.

G3AAQ found the most interesting way of getting at the VK's was at the local cricket match—as his letter is dated May 12 and written from Kidderminster one does not need to guess *which* match!—and rushed back to send his report in with only 15 minutes to spare to catch the post. During the month 21 mc CW gave contacts with XW8BP, CO2BB, and JA6CHR, plus SSB for SVØWB—all new ones, while the gotaway list included VU2ADW, VU2LN, (both CW) YV1AD, 9Q5, CR6DI and CX1AAU, the last four being SSB. This little lot, mark you, all with the /M rig!

Old Faithful—Twenty

Here we kick off with G3NOF, who found VK's in the mornings, together with good signals from the West Indies, Central and South America, plus, on a few mornings, the West Coast U.S. stations. SSB gave contacts with EA6ITU, IØART, IZ6KBD (Ponza Is.), KH6GDQ, OY7ML, U18LC, UWØIH in Zone 19, VK's including VK200/M, VP1PV, VP8JG, WA4TPU/AM over the North Atlantic, W5VBQ (New Mexico), W6's, WA7FIG (Arizona), XW8AX, ZC4RAF, ZD8Z, ZE1WPC, 4A1FFA and 9VILK. A couple of comic characters—probably both emanating from the same piece of wire—were "QQ7A," giving QTH as "Gunda Island" or "Ganzo Is." to various stations, also "ZAIASST," asking for QSL's

via Box 10, Tirana—are also mentioned by Don.

G2HKU is temporarily off his regular sked with ZL2KP, who lost his beam in the same gale that drove the ferry *Wahine* into trouble in Wellington Harbour, as reported in the papers recently. ZL2KP has an exposed QTH right above the spot where the ship struck, and afterwards found his tower levered three feet from the vertical by the wind, and the tubing of the beam a tangled mess, involving a major reconstruction job. G2HKU worked W3KAK/MM, XE1CE, TI6HO, HC1RR (who said he had been a priest in South America for 25 years) and, for a new one, HC5DR.

One rather gets the impression that G3LZQ has recently given Twenty SSB a good going-over, to judge by the length of his list. Taking the short CW one first, there are HK3RQ, JT1KAA, and all USSR call areas, while SSB gave 8P6, VP1, VP2, VP7, VP8, VP9, 6Y5, 9Y4, assorted 4A1's and XE's, several CP1's, HP, HR2BOB, TG9, YS1ACS, YN2RAC, TI2, PJ3CL, PZ1BF, PYØBLR, OA4, ZF1GC, FP8CS, FG7XL, ZP5JB, a large assortment of CE, LU, HK, and HC stations, various KL7's, KL7DNC (Umnak Is.) and G3ODO /KL7, KH6's, VE6 and VE7, TU2AX, EP2MR, SVØWS, YK1AA, G3WMZ/5A on AM, a crop of VK's and ZL's, plus "one startled W3 who called CQ on 14115 mc SSB."

A definition—given by G3NYQ—would describe Twenty as the "hard grind band," which is indisputable. But it has also to be admitted that this is also the pay-dirt area, as an inspection of the six-band table scores would reveal. John did

ALL-BAND ZONES AND PREFIXES TABLE

Starting date: January 1, 1968

Station	Zones	Prefixes
G3LZQ	40	240
G3SED	24	110
G3AAQ/M	21	183
G3PQF	19	141
G3IDG	19	66
G3WJS	15	171
G3VPS	11	134

manage to take hold of 5Z4KL, ZC4MO and SV1CE, albeit the R.A.F. ARS net on 14200 kc, controlled by MP4BBA each Sunday at 1500z, escaped him; after the R.A.F. ARS net itself closes the members work non-members who call them. Turning to G3NYQ's fixed-station score, we find 9J2BK, KH6, HKØBKW, CT2AA, CP5AD, HV3SJ, JX6RL, KR6, VP8, MP4BBA and MP4TCE gracing the log.

Most of the operations of G3SVK/A were in "another place," as devotees of Top Band will be aware, but he did spend a little time pondering over the difference between "GM" and "G" in terms of making the blighters come back before he put his fingers into the pie and pulled out CE3HVL, HI3JWP, PY1MIT, VE8RCS and ZP3AL. Heard but not raised were YN1, 8R1S, 6Y5, VP2V, 9G1GF and YV.

Sad story indeed from G3WJS (Dorchester) who says "rig blew up one morning, soldering into blew up the same afternoon; G3WJS reduced to tears and Top Band!" No further comment is appropriate, just sympathy.

G3UDO (Croydon) refers back to the correspondence here last month, and explains that what he is griping about particularly are the chaps who have perfectly good QRO (or indeed QRP) rigs, and then cause the things to vomit all over the band just because they over-drive them. These types not only suffer from TVI, but also, as they only do it when transmitting, never hear the noise they make on the band. What say we all declare a "Give lousy reports to lousy signals" Month-in-the-U.K., both among ourselves and to others. It might be amusing—but it is not good just checking the other bloke as OK if you can read him—you have to look round the sides for the crud. G3UDO's list includes PY7VHA, PY2CN, VP9GB, 5A1KW, OX3WX, 4Z4AO, 3A2CP, 3AØEK and 9G1FF during the earlier period and PX1PA, PX1KT, ZC4RAF, MP4TCE, MP4MBC, EL8H, CT2AA, 7Q7LZ, CR6IS, ZD7DI and JA6AFZ during the month under review.

G3VPS comments on the uplifting effect of working some good DX in the morning to one's approach to



G3OLS is owned and operated by Leslie Standaloff, at 7 Whaddon Road, Newton Longville, Bletchley, Bucks., who was licensed in September '60. With an abiding interest in radio since 1922, he went through the "hard and well-disciplined Telegraph School" before becoming an operator at various of the Post Office Coast Stations, working ships. It was from Fishguard Radio, on 600 metres, that he made the last contact (on October 5, 1930) with the disastrous airship R.101, which crashed that night at Beauvais, France. After war-time service as a signals officer in the Royal Artillery, an HRO was acquired—and from this came his progress in Amateur Radio. Naturally, the main operating interest at G3OLS is CW, though Phone is also worked. At present, the gear consists of a TA-12 driving an 813 PA to 120 watts, the aerial being a 45ft. metal mast, base-loaded for all bands. The 160-metre rig is separate, for Phone/CW working with the locals. Now retired from the Post Office at the age of 60, G3OLS is contemplating a rebuild with some new gear.

work for the rest of the day—true enough, but the effect of *not* hooking something good is liable to have the opposite result! G3VPS was moved to this comment by hooking his first W6 to a CQ call made one morning just before setting off to work. In addition OA and LU were taken into the list of new countries, and W's, VE's, PY, 9H1, UA9 and UWØ booked into the log as "background DX." All this on CW with 40 watts to a Panda Cub.

DX-Peditions

Much to take in under this heading, advising of forays in all sorts of places.

First, a letter from G3UGF (Halifax), regarding their next assault on Ireland. This will be from July 28 to August 11, operation being by G3UGF and fellow-conspirator G3UBI. The last time they went over there, eighteen months ago, there was a certain amount of griping about people "not being told in advance"—and since this expedition began to be talked about

they have averaged ten letters a week asking for all the gen. You could save them a little trouble by writing to G3UGF (*QTHR*) indicating your preferences in the way of Irish counties and on what band you require them, and of course, mentioning the mode used; this will enable our heroes, G3UBI and G3UGF, to get themselves organised and prepared to give the maximum of QSO's in the limited time available. In this context, a rather interesting sidelight is that they have broken down the costs of the last trip into a figure of so-much per QSO. To decide whether the next trip is as successful will need the same calculation, using the answer as a figure-of-merit. Incidentally, it brings up a good point about affairs of this sort—when one writes to an operator as the result of hearing he is undertaking an expedition, it is decidedly less than courteous to omit the s.a.e. if a reply is expected.

A DX-pedition of a different sort—the bands will not seem right this summer in the absence of GM5PP/P

from his annual haunts. Bob is going to be signing /W2 at Trenton, N.J. from July 8 to July 20, and from the 20th to 26th he will be Portable W1 at WINJJ in Coventry, Conn. Frequencies 14250 kc and 21350 kc.

The well-known Wirral Group propose to mount a weekend trip to Trawsfynydd, Merionethshire, working Top Band as GW3NWR/P and the HF bands under GW2AMV/P and GW2FOS/P. *Balloons* will (it is hoped!) hold up the aerials for 1·8 and 3·5 mc, with beams, dipoles or long-wires as necessary for the HF bands. Information from G3PXX, 16 Collingham Green, Little Sutton, Wirral.

Anyone wanting Scottish counties should get in touch with G3VGU; he and G3VGT will be in GM from July 27 to August 10, and will be on 160-10 metres *certain*, albeit most operation will be Top Band. Modes will be CW and SSB.

Fourteen Scottish counties are on the Top Band itinerary of G3VAG and G3UQL, between June 28 and July 14. All contacts will be individually QSL'd, and so will *useful* SWL reports. For details of the programme, send an s.a.e. to G3VAG, who will also be glad to deal with any requests for skeds.

Results of DX-Peditions

Quite a lot to report here, too, and we lead off with the EI8BT/M event, in which G6SU (Ryton, Co. Durham) and fellow-conspirators G3MEA and G6CY participated. Using a KW-2000A, a total of 50 countries and all continents were worked, including YS, XE, W, VE, FP8, ET3, CN8, ZS6, CR6, 9G1, 5Z4, ZD8, VK, ZL, OA, PY, JA, XW8 and most of Europe. Quite a nice time out!

G3SVK reports on his Huntingdon trip, which resulted in 340 contacts in 9 countries, the cards for which have now been despatched. A trip to GC is in stew, during July 27 to August 10, giving four days on Alderney and Sark, and three on Jersey and Guernsey, but the details are yet to be finalised. Fred has a few pertinent comments to make on the operation of this sort of an expedition as seen from the "sharp end"—tuning up on the channel (and taking an unconscionable time over it, your scribe would add) is

unnecessary and ill-mannered, apart from the fact that two or three characters doing this make it virtually impossible to read the others calling and so holds the whole show up. Others call in to exchange names, dates, QTH's, "the rig," colour of the XYL's eyes and other irrelevancies, at great length, and have to be dealt with to get them off the channel. So, for GC3SVK/A, one QSO from each location will be the form, and one item of information each way namely, the report. This is all that is needed beyond callsigns. And when you've got your report, QSY well off the channel to let the others get at him.

A *real* DX-pedition was that of W3DWG/VR6 for whom all the QSL's, other than for the U.S., were handled by G3DO; over five thousand QSO's in 140 countries were made from Pitcairn in four months. G3DO has a copy of all the logs from July 22 to October 27, 1967, and can oblige with a card for any outstanding ones, provided an s.a.e. or IRC is enclosed, with a request addressed to his QTH as per any current *Callbook*. Incidentally, Doug mentions that VR6TC is back in business; he was heard recently at 0645z, on his favourite 14220 kc spot.

Too late for mention earlier was a letter from Mollie Henderson, ZE1JE, regarding the operation of ZE1WPC at the World Ploughing Contest; from 0400z April 26 to 2200z April 27 they were operational from the Contest site, and from then until 2359z on May 5, a roster of operators within a 50-mile radius took turns to operate the station. In addition to the QSL, there is a "sheepskin" to be had for hooking ZE1WPC *plus* any five other ZE's, who must have been logged between the start of the operation and 2359z June 30. Log extracts, certified in the usual manner, to "WPC award," P.O. Box 2377, Salisbury. And just for the record, this was the World Ploughing Contest, for which our precious Government refused permission to send British ploughs—because the event was in Rhodesia! Marvellous, isn't it!

Contest Result

Results of the CQ World-Wide Phone Contest for 1967 are to hand. Don Miller, operating as VK2ADY/9,

won the Single-Operator All-Band trophy with a score in excess of five million! However, possibly more worthy was the effort of G3HDA in placing fourth in the same category, and taking the trophy for Top European, without any advantage of a DX callsign—a fine effort, indeed. Another to be congratulated this year is G3AAM, for making the top spot in the Single-Band category on 14 mc. So two of those trophies are where they belong—in the U.K.! As always, the rest of the Midlands group were strongly evident in the results. The leading G's on 28 and 21 mc were, respectively, G2BOZ and G3FKM. In the Multi-Operator Single Transmitter classification one notes G3WYX as leading G, followed closely by G6LF, G3VYG/A, and G3IAR. In the Multi-Transmitter category there was the GB2SM effort, which turned in a score of

TOP BAND COUNTIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NJ	98	98
GM3UVL	90	95
G3VYF	86	88
G2HKU	78	82
GW3PMR	72	78
G3WDW	55	80
G3VMQ	55	73
G3SVK/A	?	68
G3IDG	55	59
G3VTY	54	86
G3WQQ	55	70
G13WSS	45	65
G3VLX	37	61
G3UGF	36	76
G3WJS	21	56
<i>Phone only</i>		
G2NJ	96	96
G3VYF	73	78
G3MDW	57	73
G3VMQ	38	54
G3UGF	36	73
G3PQF	20	51

(Failure to report for three months entails removal from this Table. Claims may be made at any time.)

almost two million. To all of these, and indeed to all who have figured in the final results, our congratulations—this is not a tea-party, but a great man-sized contest, one of the toughest in the Amateur Radio calendar.

The CW results are not yet to hand, but should be available for next time, all being well. Thanks to W1WY of CQ for advance information on the Phone results.

Here and There

G3IDG has his big axe out, and is grinding it ready for action—the cause being the stations he works who, having failed to get his hame, QTH or RST, still end up the over with the words *pse QSL*. After all, to send a confirmation, one has to have something to confirm! Allan suffered this sort of thing from a G, an ON and a W, all on different bands. Your scribe could add to it that 7 mc stations are particularly prone to this sort of flabby operating. Incidentally, Allan recently received his sheepskin from the YLRL for coming out Top CW G in the YL-OM test—well, that was something!

From VE7BHN/WØ, a long and interesting letter comparing things in the U.K. and the States. In his last letter, it may be remembered, Tom mentioned the super-station with which he has to compete, and in particular WØHWH on Castle Rock. It seems they finally met, and tried the super-rig out on 7 mc into the two-element Quad, which gave 579 from G3TLX—incidentally where *is* G3TLX lately—a couple of hours before sunset in Colorado. VE7BHN/WØ had a bit of a shock when *ex*-VQ8CC appeared under his other guise as GM3MBS/WØ at about 9+40. Tom was using the 3C prefix at the time, and the resulting muddle was quite comic for a while. The big signal was explained by the presence of GM3MBS on Lowry A.F.B.—all of a quarter-mile away! By now, Tom will have completed at WØ and be back in Vancouver, where he has to grapple with the aerial problem.

The LF Bands

The comments from VE7BHN noted above constitute just about the only remark on Forty in this month's mail, apart from G2HKU who has been chasing cantons in the H22 contest and finds the HB signals



Not, as you might be thinking, the start of an intrepid flight—but G8TK, with his KW-2000, operating as G3LXP/A from the cockpit of a (static display) Vampire Mk. II, at Salisbury Hall, London Colney. Now privately owned, Salisbury Hall was used by de Havillands as their secret design office during Hitler's War. It was from here that the Mosquito emanated, and an original model of that famous aircraft, with the Vampire and a Venom, is on permanent display. All this was found out by members of the Verulam (St. Albans) Club when visiting there recently. The group in the picture made many contacts on 80m. SSB.

in general to be of extremely fine quality, well operated.

As for Eighty, G2HKU says "not much worked" and someone else "conditions poor," while the rest assess it by default! A pity, in that both bands have DX possibilities far beyond what they are usually credited with, and suffer far less from the TVI bogey.

However, on to Top Band, and a relatively small pile this month; the main news is somewhat negative, in that we hear from G3SVK that although he and G3TZZ heard VK5KO when sitting in the G3TZZ shack, the full contact in fact did not materialise. It seems that G3SVK had a sked up in Rutland which he could not keep, and at the time he was sitting with G3TZZ listening out. The VK was heard, called, and a reply heard and a report—but alas, it was a report for someone else misread in the excitement.

Several people mention ZC4RB and his courteous and competent operating during his recent period on Top Band. It does not seem to be

generally known that ZC4RB worked three of his counties with a /M at the G end of the QSO. The first one was G3NYQ, CW at 0034 on April 7, but the following weekend G3NXV/M worked him in two counties, and on SSB at that! We have no details on the G3NXV gear, but that at G3NYQ/M was a KW-2000A plus DC PSU and the FIF whip.

G3VPS (Wartling) was encouraged by ZC4RB and GM3PPJ for a new county and a new country, plus a GI, G3SVK/A in Rutland and OK/OL, on late evening forays which usually end up with the G3VPS machinery being shifted on to Twenty, after TV hours.

With his Table entry a query from G3WJS, who wants to know whether his forthcoming move to pastures new—complete with half-wave garden for Top Band—means his descent to the bottom of the Table again. The rule here, made many years ago, is that if the move is within the same district (North London, Birmingham, Crewe, for

example) the score stands, but if the move is right out of the area, such as from London to Birmingham, the thing to do is to start again. A reasonable rule, for reasonable people, and that rule will stand. John, as mentioned elsewhere, was confined to 160 metres, and found G3SVK in Rutland and Huntingdon, GW's, GM3OXX, GM3EOJ,

GM3PPJ, GM3TMK in Ross-shire, GM3OUU, GD3TNS, GD3XJR, GI3FFF/P, OE2WG, EI9J, DJ7SW, OK's and a couple of G's in wanted counties.

Richard of G3UGF is yet another one with a bouquet for ZC4RB, this time for a prompt QSL direct—quite a pleasant change from the usual routine.

G3TKN is at the moment in the throes of building a filter-transmitter for Top Band SSB and, having got as far as the driver stage, became impatient and tried it out with a link wound round the driver anode coil. Output was no more than 700 milliwatts, which worked from Wirral right down to the South Coast, and even raised G3SVK in Huntingdon through the pack; so G3TKN is probably wondering whether to bother with a PA.

Nice to hear from Dave, G3PQF (Farnborough) who is on Top Band in the evenings occasionally and finds things very much more interesting after midnight; Dave remarks that, like your scribe, he did not click with ZC4RB (and your E.P.E. would add that G3PQF has fallen off his hook twice of late when he was a very good signal).

GW3WWN (Neath) sends in a note with Table entries, and says he is not very active, but was gratified to land EI2BG on Phone for a new one, and GM3TMK in Ross during the little time he had. Similarly G3WUD, tin-bashing and wiring for his new SSB Tx, who found a PA and ZB2AY, and also got 58 on AM from Frankfurt, just

to satisfy himself the aerial had not fallen down!

Continually digging more copper into the garden is the hobby of G3WQQ (Brighton), who is now going further and adding large quantities of copper sulphate to the ground, in the hope that eventually his earth connection will short out to the English Channel—and then look for fireworks!

A rise for GI3WSS (Holywood, Co. Down) was forecast, and so it turned out to be, with five new counties in two days, thanks to G3SVK in Hunts. and Rutland, GI3FFF for Fermanagh, GM3TSL/P for Selkirk, and GW3LSL/A for Caernarvon. All this is reflected in Cyril's standing in the Tables.

Back to G2HKU; Ted found 160 metres quite good in spite of the static at times. CW was the mode for him, and QSO's were made with OL2AIO, GI3FFF/P, GI3CVH, GM3TSL/P, G3SVK/P, GW4NZ, GW3XGP/A in Merioneth, and OZ2JG.

Deadline

And that about wraps things up for this month. The deadline for the next time is first post on **Monday, June 10**, addressed to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. In the meantime, may the DX come easily and your score prosper. 73.

Deadlines for CDXN in the next few issues will be *June 10, July 8 and August 12*—for July, August and September SHORT WAVE MAGAZINE respectively.

TOP BAND LADDER

(G3V-- and G3W-- stations only)

Station	Counties	Countries
G3VMW	95	19
G3VGR	94	16
G3VYF	88	19
G3VTY	86	13
G3VLT	80	16
G3WDW	80	8
GW3VPL	78	16
G3WUD	74	14
G3VMQ	73	16
G3WQQ	70	14
GI3WSS	65	8
G3VMK	63	17
G3VES	63	16
G3VOK	61	15
G3VSL	60	11
G3VLX	59	9
G3WJS	56	11
GW3WWN	54	7
G3WDG	52	8
G3VPS	43	13
G3VWC	34	7

RECOGNITION FOR GM3BST

It will be remembered by many of our readers that John Tuke, GM3BST, contributed to SHORT WAVE MAGAZINE in January 1964 and October 1966 some entirely original work on the construction of amateur Facsimile Receivers, adaptable for the reception of weather charts from the Wx satellites now regularly circling the earth. He was able to show some remarkable results, quite unique in the amateur context. These were later widely published in the U.S. and came to the notice of the firm of G.E. International, U.S.A., who are the designers of the American weather satellites and contractors to the U.S. Govt.

The upshot was that they invited John Tuke, GM3BST, and his wife, to visit the States on a free tour at the Company's expense, to include seeing the launch of weather satellite *Nimbus III* from Cape Kennedy. We are very glad to know

that John Tuke's work, as processed for original publication in SHORT WAVE MAGAZINE, has had for him this very agreeable outcome. (In the event, *Nimbus III* failed on take-off on May 17, and had to be destroyed.)

TNX TO AN UNKNOWN BENEFACTOR

From various comments we have seen and heard recently, there is a kind and generous "Mr. X" who has been making very acceptable gifts, anonymously, to certain of our juniors who—in the last few months—have been mentioned in one way or another in SHORT WAVE MAGAZINE. This shows an appreciation of our radio amateur youth, who are making a contribution to their own generation far different from the fatuities of "rioting students." We have no idea who this anonymous benefactor may be, but in his quiet way he is helping those who really do deserve encouragement.

VHF BANDS

A. H. DORMER, G3DAH

ANOTHER dreadful month as far as conditions on the VHF bands are concerned. No really decent openings to record with the exception of a couple of minor lifts on Four, one of them coinciding fortunately with the Four-Metre Contest during April 20-21. Even here though, it was only on the Saturday that anything like DX was coming through, and by Sunday morning both range and activity seemed to have dropped off considerably. Continental activity on Two and 70 cm. has been conspicuous by its absence, and even during the *Coupe du REF* over the weekend of May 4-5, it was very hard going, at least from the South, to scratch up a few contacts in spite of the large number of French stations who must have been operating during that time. And this with a pair of 4CX250's to twenty-four elements at 600 feet!

Poor results were also the order of the day during the 70 cm. Contest over the same weekend. During some twelve hours of listening only seven stations were heard at G3DAH, of which six were worked, the best DX being with G3NNG/P near Wantage, Berks. Now, this is not the best of loca-

tions in that, unless there is a Continental opening, operators do not tend to turn their beams to the South-East since activity is low in the area, but with 75 watts to a 14-element beam at 55 feet and an FET Converter, things could have been better to say the least. Best result heard to date is that of G8AMU/P located at Kethurst Hill near Worthing, who had 61 contacts during 16 hours of operation. His own best DX was G8AKE (Leicester).

There was some evidence of Sporadic-E on Four, particularly on May 2/3rd, when ZB2VHF was heard at RS-59 in the early evenings. G4IB (Pembrey) working G3EBF (Harold Hill, Essex) was advised of heavy QRM on the frequency which was quickly identified, to the mutual surprise of both operators, as the ZB2. The signal was peaking to 30 dB over 9, and was also heard in Nottingham by G3FDW at about the same time and strength. QRM from Madrid TV and from the Voice of America FM station gave timely indications of an opening.

Pressure charts for the month show, rather surprisingly, that the 1,000 millibar level has been exceeded for most of the time. During the first week of April the reading was as high as 1,045 mB, tailing off to a steady 1,020 mB until April 21, when a drop to 1,010 mB was observed. Thereafter, pressures of that order have been maintained. The high reading at the beginning of the month was not accompanied by a startling rise in propagation, and this can probably be attributed to the fact that the atmosphere was too dry at that time. It is the humidity of the atmosphere in combination with a good pressure and temperature differential which produces the results we are all waiting for and which are well overdue.

There was a bit of a lift on Two over May 13-14, when G13GXP was worked from Herne Bay at 5 and 6, and G3MPS (Bridgwater, Somerset) at 5 and 9 both ways. French stations were also coming in at good strength on the 14th, as was the Swansea beacon.

Reverting to 70 cm. for a moment, the activity on that band

seems to have dropped to a very low level since Two became available to the G8/3's. Apart from some very strong third harmonics from two-metre transmitters, and GB3GEC, only a few of the regulars have been heard, and this is not altogether due to poor conditions. It would appear that an activity period might be a good thing—something on the lines of the SSB Monday night get-togethers. The difficulty is finding the right night, but as a suggestion, how about Saturdays between 8 and 10 p.m., to replace the Cumulative Activity Contests which have now come to a temporary halt. Let us not forget that if it can be shown that 432 mc is not being fully used, then there could quite well be a successful demand from other agencies, who have for long been casting envious eyes on all those megacycles in a very useful portion of the radio spectrum. A reduction in our allotment, particularly from the /T point of view, would be disastrous.

A new and undesirable feature on two metres these days is the amount of out of Zone operation in the CW portion of the band. How many times does one find a weak carrier at the bottom end only to resolve it finally into a G8/3 testing on Two and using the old 70 cm. driver with the old crystal which brought them into the correct Zone on 432 mc?

VHFCC Awards

Claims for the SHORT WAVE MAGAZINE VHFCC Award are beginning to come in. Special Certificates are being designed and printed and this all takes time, so Awards are not going to be made next week, but receipt of arrival of claims is confirmed to G8AAZ, G3UFS, G3UUT, G3VPI, G3AGN, G8AEJ, G8ADP, G3IMV, G3ILO, G3EJA and G3OZP.

To lend added interest to this Award scheme it would be appreciated if claimants would send in details of their station and operating conditions, on the lines of the information given on p.232 by G8AAZ, so that these can be published in due course.

[over

It is emphasised that it is *not* necessary to send any cards with the initial claim. You must of course have the 100 QSL cards in your possession so that, when asked, you can send any for verification purposes, but hang on to them for the time being.

The first Award to a G8/3 for 70 cm. goes to G8AAZ, Lawrence Woolf, of Wimbledon, London, S.W.19. First licensed for TV operation in 1962 as G3RAX/T, he subsequently became G6RAX/T and then, in 1964 was issued with the present call. It took him about fifteen months to work the 100 stations on Seventy and nearly four years to get the 100 QSL's! Not a very high return rate when all stations were sent cards immediately after the QSO! Altogether he has made about 350 contacts on that band running 35 watts to a QQV06-40A driven by a QQV03-10 via a BAY96 varactor tripler. Antenna can be an eight-over-eight or 14-element Yagi. On the receiving side G8AAZ uses a transistor converter with a BF180 front-end into an AR88. 'AAZ is now active on Two with 15 watts to a QQV03-10 and a four-element beam. Score to date is 110 worked in 35 counties and 7 countries. Let's hope for his sake that the QSL rate is a little better than it was on 430 mc.

Annual Tables

The Annual Table is being published this month for the first time under the new arrangements. So send in those claims—see p.233.

London VHF Convention

The Winning Post Hotel at Twickenham was the scene of the Fourteenth International VHF/UHF Convention and dinner on April 27. Once again the organisers are to be congratulated on an entertaining and instructive event.

The afternoon lecture session was opened by Tom Douglas, G3BA, who reiterated his forceful arguments for VFO control and more SSB on two metres and concluded his talk with block circuit diagrams to show how easy it is to achieve both. Readers who

are interested are referred to his article which appeared in the January, 1968 issue of *SHORT WAVE MAGAZINE*. Tom was awarded the Thorogood Trophy in recognition of his outstanding work on VHF. There followed a presentation by Arnold Mynett, G3HBW, who introduced a subject new to many in his audience—VHF phase locking and LF synthesis—which offers great possibilities for stable operation on the higher frequency bands. The 1962 VHF Committee Cup for home constructed apparatus went to him for his transistor receiver.

Peter Blair, G3LTF, the U.K. end of the recent successful 1296 mc E-M-E contact between the United States and this country (reported in this space last month) reviewed the state of the art and progress to date. His slides showed some of the antenna dishes constructed by amateurs for this work which were extremely impressive in their size and complexity—hardly the thing for a small garden, however. It is most likely therefore that in future E-M-E working will be concentrated on 1296 mc.

Hans Lauber, HB9RG, who also made a successful E-M-E contact on 1296 mc with W2NFA in April, followed G3LTF with an account of related work going on in Switzerland and Germany. Incidentally, Hans brought over with him the new Swiss QRA Locator Map which consists of four sheets and a key and covers a much greater area than the Belgian maps.

After a short break, members of the South Coast VHF Group, led by Don Hayter, G3JHM, and Mike Walters, G3JVL, reported on the construction, operation and reception of ZB2VHF, the Gibraltar four-metre beacon. Don, who is now professionally engaged in radio propagation studies, outlined the Sporadic-E results, and as readers may recall, successfully received the beacon for the first time this year in March.

Vic Hartopp of J-Beams, Ltd., reviewed the design of antennae using slot or folded dipole feed, and Derek Bradford, G3LCK, had some interesting and amus-

ing things to say about JXX converters and noise figures. Time did not permit him to play over the full range of tape recordings he had brought with him to illustrate the points which he made, but those who wished to hear them were able to do so later, and very conclusive they were. Of particular interest was the recording of solar noise.

Dain Evans, G3RPE, who recently made the first cross-channel contact on 13 centimetres with F2FO, brought us up-to-date with the latest news on that band and also demonstrated a simple but stable transmitter.

This concluded the formal part of the proceedings, and after a short break for the raffle, visitors sat down to an enjoyable dinner.

1296 mc Moonbounce

The success of G3LTF (Chelmsford) in the recent 1296 mc E-M-E trials with the Crawford Hill VHF Club has already been recorded, but further information from the American end has now been received. QSO's were completed with G3LTF, HB9RG and WB6IOM on April 13, and with G3LTF and WB6IOM on April 14. Signal strengths at Chelmsford were RST-229 on the 13th and RST-339 on the 14th; Peter got 449 and 349 respectively on those dates. Other G participants were G6XM and G3GWL, but no contacts either way were reported. The Chelmsford report represented +10 dB above noise in a 100-cycle bandwidth using a paramp. The antenna system was a 15ft. dish with crossed dipole feed, and the transmitter ran 150 watts from a pair of 7289A in 180° hybrid coupling arrangement.

Certain unforeseen snags enlivened the proceedings, the first being the unintelligibility of the received signals until it was realised that W2NFA had the FSK phase reversed, mark being on the space frequency, and *vice versa!* A power supply regulator breakdown at that end also

held up things for a few hours on the 14th and this brought in its train some spurious transmissions which were a bit puzzling, and sounded most odd on the tape, as they were spaced from the operating frequency by about 1 kc. There were certain sources of error in the feed lines and relays at Crawford Hill and this led to the estimate that only some 70 watts of RF energy was getting into the antenna at times. It also meant that the system noise temperature could have been as high as 1,000° Kelvin.

Due to the moon angle on the second night, the G3LTF beam looked as if it would foul the garage roof, so in the small hours it became necessary to hack pieces off the supports to obtain the requisite clearance. What with this, and erecting a 14 mc dipole in the middle of the night, there was never a dull moment it seems.

W2NFA will continue to schedule E-M-E tests on 1296 mc exclusively, the next series being in October/November. Since most of the activity is confined to the Northern hemisphere, every effort will be made to arrange the tests over a weekend when there is a positive moon declination and no new moon phase. Anyone wishing to participate in these tests should send two self-addressed envelopes, with IRCs, to:—R. Turrin, W2IMU, Box 45 RR2, Colt's Neck, N.J. 07722. Two bulletins will be issued, one well in advance and the second within a week of the tests.

Modulation

The number of stations using inadequate modulating power on the VHF bands seems to be increasing, and it is difficult to sort out always why. Certainly, there are many cases where the transmitter power output has been increased, perhaps by substituting a larger PA valve, without any related change in the modulator, but this does not seem to account for all those S7 carriers with S3 modulation that one hears. Inadequate gain in pre-amplifiers and bad matching must bear their share of the

THREE-BAND ANNUAL VHF TABLE

January to December, 1968

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3DAH	17	2	31	8	10	1	69
G3LAS	34	3	34	6	—	—	67
G3COJ	—	—	23	2	17	3	45
G8AYN	—	—	13	1	18	1	33
G8AAZ	—	—	13	1	16	1	31

Scores are from January to December. Position overall is shown by the total in the last column. Scores for individual bands will be summarised from time to time to show positions. Entries may be made for a single band, any two or all three. Claims should be sent in as often as possible to enable the Table to be kept up-to-date.

blame, too. The modulator output power requirement of half the carrier power, which must be rigorously applied on the DC bands, is not applicable on VHF. Something more like the same power is required, i.e., 80-90 watts of audio for a 100-watt carrier. It is not suggested that this amount should be used in all cases, but it should be available, since losses at these frequencies can be high.

When discussing modulation one often hears the term "decrement modulation" mentioned, usually in the context of a downward swing noticed on a receiver S-meter, but this is really a misnomer since the term should be more properly applied to a modulation system which varies the carrier amplitude between its steady value and zero. Not very efficient, but it does have its uses. A much better system for getting more power on to the carrier is the "ultra modulation system" which restricts the negative-going peaks of modulation so that the carrier is not interrupted, but allows the positive peaks to swing the carrier level up to 200% or so of its resting value.

The usual 'scope pattern given in the text books for *sine* wave modulation shows the carrier varying between twice the resting value and zero for 100% modulation. All well and good. The carrier is not cut on negative cycles and so no splash and other unwanted harmonics. Assuming a

100-watt carrier and 50 watts of audio, the output power consists of 100 watts in the carrier and 25 watts in each of the two sidebands. But note that the *power* varies as the *square* of either the current or the voltage, so at the peak of the modulation upswing, the instantaneous power is four times the unmodulated carrier power. Suppose it can be arranged that the positive half-cycles increase the carrier amplitude by a factor of four. Then the peak envelope power is sixteen times the carrier power. In the example considered, *sine* wave modulation has been assumed. Ordinary speech waveforms have about half as much average power as a *sine* wave of the same peak amplitude. So for the same modulation percentage, the sideband power with ordinary speech will average only about half the power with *sine* wave modulation, since it is the peak envelope amplitude, and not the average power, that determines the percentage of modulation.

This desirable increase in modulated output can be achieved by careful adjustment of the DC screen volts on the PA and the application of the correct level of audio volts to the screen. Taking the familiar QQV06-40A as an example, the makers recommend that the AF voltage on the screen should be 185 volts peak-to-peak and the DC voltage 250 volts. Screen current will then be of the order of 10 mA. Unless one is very

lucky, the usual series dropper from the modulated HT supply will not meet both these criteria. A circuit which overcomes these difficulties is the familiar cathode follower. By taking the PA screen connection to the cathode load resistor and by applying to the grid of the cathode follower independently variable DC and AF potentials, a suitable balance can be arrived at which will give an increase in the amplitude of the positive half-cycles of the modulation with the negative half-cycles still just meeting the carrier zero level. It is *not* recommended that this adjustment be made without an oscilloscope to view the final waveform.

The effect of this process can be enhanced by applying a small amount of the modulated HT to the screen of the driver valve. A resistor of some 10K connected between the screen of the PA and the screen of the driver will usually produce about the right amount of audio.

It is necessary also that the amount of drive applied to the final should be correct. Too much drive will shorten valve life and not enough will frequently produce the effect known as "downward mod." So let's have some 5 and 5 signals rather than all those 3 and 7 apologies.

DX-Peditions

G8APX had to alter his holiday arrangements after the publication of the proposed sked dates and this apparently caused some alarm and despondency. He was unable to visit the Newcastle area as he had hoped. He called CQ on numerous occasions, and eventually raised G8AFN who was /A at Longframlington. Signals were 5 and 9 both ways. Contacts were also made with G8AZY, G2BDQ and G4LX. On April 19 at Spinningdale, on the A.9 just south of Golspie on the northern side of the Moray Firth, he had to call on two metres instead of 70 cm., but was heard by GM3ODP (Black Isle), who alerted GM8AGU and GM3WML on the south side of the Firth, and GM3JFG (Invergordon). Good

QSO's resulted all round, but an attempt to work GM3JFG whilst mobile ended less than a mile from Spinningdale as soon as height was lost. '8AGU and '3WML, plus GM8AZS (Elgin) also worked GM8APX/M on both two metres and seventyccms while he was at Hopeman on the cliff tops. On the 23rd GM8AGU kept in QSO while GM8APX/M got as far south as Grantown, 22 miles away, the interesting point being that the Dava Moor mountains were in between them.

Another Highlands expedition, this time with G3UQL and G3VAG (Wivenhoe, Essex) at the helm. They plan to tour GM with two-metre gear during the period June 28 to July 14, operating from fourteen of the least populated Scottish Counties, one evening in each. Enquiries for details of sites, dates, frequencies, etc., to G3VAG, *QTHR*. Firm skeds are offered.

Jersey again this year! Good news from Peter Martinez, G3PLX (Portsmouth) that an expedition sets out on June 8 returning June 21, with gear for Four, Two and 70 cm. Hotted-up converters will be taken, all with noise figures better than 4 dB, and some pretty hotted-up operators too, including G3OUF, G3OHH, G3PMJ and G3TEY. Frequencies are 70.41 mc, and as near as possible to 144.100 mc. The 70 cm. frequency will be three times the two-metre frequency. Skeds welcomed on any band and can be arranged through G3PLX at Flat 6, Purbrook Gardens, Purbrook, Portsmouth, Hants. Latecomers can contact Peter at *Waterlooville 51372 (STD 07014)*.

Perhaps not strictly a DX-pedition, but Sandy Morton, of the British Amateur Radio Teleprinter Group, advises that he now has the call GM8BJJ and is hoping to promote some activity from the rather rare county of Buteshire in the near future. The QTH is about 25 feet above sea level and 25 yards or so from the water's edge. No trouble getting a good earth—just throw out the anchor! Portable and mobile activity is going to be possible at a site 400 feet a.s.l.

with a perfectly clear take-off to the South—nothing for miles and miles. He is looking for a TW Communicator or something similar, and also circuits for SSB on Two. Any offers? The address, for those who may be able to help, is: 4 Mount Stuart Street, Millport, Isle of Cumbrae, Buteshire.

Further gen on the G3VPK trip to Northern Ireland. Dates and locations are now as follows:—July 14, *Antrim*; 15th, *Londonderry*; 16th, *Tyrone*; 17th, *Fermanagh*; 18th, *Armagh*; and 19th, *Down*.

Operation will be during 1900 till 0100 BST with sked times between 2100 and 0030 BST—convenient for those who suffer with Ch.5 TVI! A sked list will be circulated during the last week of June, so the final date for fixing them up is June 21, by s.a.e. to G3VPK, *QTHR*.

More news also on the G3UBI/G3UGF expedition to GI. Firm sites and dates are now as follows:—Armagh, July 29-31; Londonderry, August 1-3; Fermanagh, August 4-6; Tyrone, August 7-9; Down or Antrim, August 10.

Operation on Two from 1800 to 2100 local time, mostly on CW but A3 if conditions permit. Frequencies will be 145.7, 145.8 and somewhere in the CW portion of two metres, depending on the crystal which has yet to be obtained. There is a chance that there will be some operation on 70 cm and 70 mc also. Skeds can be arranged *via* G3UBI at Monks Cottage, Burton End, Stansted, Essex, but they would prefer to freelance. Gear will be 15 watts on Two with a possible increase to 50 watts. Antennae are 14-element J-Beam or 8-element Yagi.

G3PUO advises that another expedition to Andorra is being planned for June 15 to 30th. Operation will be on 70.125 and 70.26 mc, SSB, AM and CW, and on 145.41 mc SSB only. No skeds are being arranged so it is a question of monitoring those channels for a contact. It is very much to be hoped that this effort will succeed where so many others have failed.

General News

Good to hear from Johnny Haydon, G3BLP (Caterham, Surrey). Last contact with him was about 20 years ago. For the newcomers, John puts out an impeccable signal on Two, both AM and CW, and has done most of the things worth doing on that band. He has an outstanding DX record made without the use of SSB, of which he is a something rather less than fanatic supporter. He makes an interesting observation about the allotment of specific sections of the two-metre band for specific functions, pointing out that the CW end of Two is now cluttered with both strong and weak signals which makes working with DX a bit difficult at times and rather negatives the *raison d'être* of the Band Plan. He has a point there.

G3XMZ (Horley, Surrey) after five years as SWL is at last licensed. He was a modified B.44 on

Four and is looking for contacts.

The Ainsdale Radio Club is once again organising the annual local regional VHF contest. Date is August 4, operation in the four and two-metre and the 70 cm bands. Location is Westmorland. Full rules from G2CUZ. *QTHR*.

A loss to the VHF bands with the departure of GM3DIQ (Midlothian) to VE-land in the near future. The loss may be only temporary as, to quote "... and I will make some attempts on VHF to cross the pond at some future date, even if this must be by E-M-E to Peter Blair." Best of luck in the new appointment.

The South East VHF/UHF Group's last meeting heard with interest a talk by Peter Jones, G2JT, on "Aerial Power Tactics" illustrated with practical demonstrations of radiation on centimetric frequencies. The next meeting is at Rutherford Col-

lege, University of Kent, Canterbury on June 21 at 7.30 p.m. when the speaker will be Arnold Mynett, on transistors at VHF/UHF. All interested are welcome.

G3TLE and other local Luton amateurs are trying out a good scheme to increase traffic with EI. The idea is to arrange activity via a 7 mc link for a specific period on a local net frequency of 144.874 mc. Net members then listen for EI signals, reporting any results on the net frequency. These are then co-ordinated and passed back to EI5BH. Knowing who is on and at what time should lead to quite a few contacts which might otherwise be missed.

Deadline

Deadline for the next issue is **Saturday, June 8**. Address is—"VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now and *73 de G3DAH*.

SPECIALLY ON THE AIR

Further entries for this space—see p.112 April issue SHORT WAVE MAGAZINE for details—should reach Editor, Short Wave Magazine, Buckingham by *Monday, June 10*, for the July issue.

GB3RHE, May 31-June 3: Organised by South Shields & District Amateur Radio Club for the Rotary Club Hobbies Exhibition at Gosforth Park Race Course, Newcastle, over the Bank Holiday weekend, Friday, May 31 to Monday, June 3 (excluding Sunday). Activity will be AM/SSB on all bands 10-160m.—D. Forster, G3KZZ, 41 Marlborough Street, South Shields, Co. Durham.

G3VGG, June 3: Exhibition station put on by Bromsgrove & District Amateur Radio Club for the local Rovers' Fête, operating on the 20-40-80-160m. bands.—J. Dufrane, 44 Hazelton Road, Marlbrook, Bromsgrove, Worcs.

GB3LRS, June 5-8: For the "Leisure 68" Exhibition at Granby Halls, Leicester, at which some 36 clubs and societies in the neighbourhood will be represented. At the last such event, in 1966, a total of 18,000 people visited the show. It is hoped to operate GB3LRS, of the Leicester Radio Society, as a typical AT-station.—N. Tomlinson, hon. secretary, Leicester Radio Society, 33 Merton Avenue, Leicester. LE3-6BF.

GB2LO, July 8-20: Organised by the Radio Society of Great Britain in connection with the City of London Festival, using equipment (loaned by K.W. Electronics, Ltd.) to operate SSB only on the 10-80m.

bands.—Sylvia Margolis, p.r.o. RSGB, 95 Collinwood Gardens, Clayhall, Ilford, Essex.

GB2LAD, July 13: For the Air Day at R.N. Air Station, Lossiemouth, provided by the Moray Firth Amateur Radio Society and operating on 20 and 80m., CW and SSB. Visitors welcomed to the flying display and the static exhibition.—C. Hollins, 66 Lossiemouth Road, Bishopmill, Elgin, Moray, Scotland.

GB3NEW, August 5-10: To be provided by the local College of Further Education Radio Society for the Welsh National Eisteddfod, to be held this year at Barry, South Wales. This is the first time Amateur Radio will be represented at this internationally known event. Further details later.—D. H. Adams, GW3VBP, College of Further Education, Colcot Road, Barry, Glam., South Wales.

NATIONAL SOCIETY MEMBERSHIPS

It may be regarded by some as rather astonishing that—on the latest available figures—only 60% of U.K. amateurs are members of the Radio Society of Great Britain. In fact, the ratio of RSGB transmitter membership to the total of British licences in issue has been showing something of a decline during the last few years.

However, the RSGB position is proportionately a good deal better than that of the American Radio Relay League (ARRL), the U.S. national society. Of the 293,000 licensed American amateurs, only 81,000 belong to the ARRL—less than 37%, and even this is said to "show an increase in ARRL membership for the year 1967."

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for July Issue: June 7)

(Please address all reports for this feature to "Club Secretary," Editorial Dept., SHORT WAVE MAGAZINE, Buckingham.)

ONE of the fashionable ploys lately for a club activity is the "Club Constructional Project." This ranges from group building of a converter to the really ambitious lads who completed a Side-band Tx. Your scribe was talking to a friend a few days ago who has recently returned from a longish trip to the United States, and the discussion turned to this matter of projects, and how our W opposite numbers view them. It seemed the local group to which he had belonged over there set out to build a flea-power rig on one of the VHF bands for each licensed member; the crystals were all set up so that all were listening and transmitting on the same frequency, and each rig was fitted with a squelch circuit. Thus, whenever one went in the shack, one turned on the tiny rig at the same moment as one turned on the light, and then forgot about it—but every other Club member who was in his shack was available at the touch of a button. So—if you wanted to tell Old Joe that the ZA he has wanted for years was sitting on Twenty you could do so, with no interruption from the presence of the rig. The squelch is the key to the whole thing, as every station would use this so that only the locals would open the thing and so no other signals or receiver noise would appear in the speaker. Such a scheme, in this country, would appear to be a natural for the 70 mc band, or even 28 mc at times of low sunspot activity. Circuitry and costs could be simple, and the project would not only help the programme of the Club, but almost certainly result in a more united group.

But enough—the reports, once again in regional groupings, since this way seems to be quite popular.

Scotland and the North

Last month we mentioned **Halifax** and their being outside the Halifax area—and promptly received the expected *riposte* from G3MDW on behalf of the **Northern Heights** lads, who claim that every self-respecting amateur within fifty miles of Halifax is a member of Northern Heights anyway! "Club Secretary" has no intention of refereeing, but confines himself to the safe statements that Northern Heights and Halifax are both good and lively groups, and giving their programme. For Halifax, June 14 is the AGM, with kick-off at 8 p.m.; for the summer there are no formal meetings but events will be more along the lines of demonstration stations and similar activities. For Northern

Heights, the matter is a little more complicated, with June 5 booked for a visit to the Manchester Radio Club, and on the 15th a station to be operated at the Halifax Charity Gala, while at the meeting of the 19th G3TPW will be talking about a transistorised transmitter. July 3 will be set aside for a talk on Colour Television by a member of the staff of the Baird TV people.

Rotherham next, and here we are to say that they get together every Monday evening at the Victoria Club, Victoria Hall, Masbro', Rotherham. On June 30, the lads are having a picnic afternoon, with transmitters going on Top Band and 144 mc, from 2 p.m. until about 6, using the Club call sign G3OAM.

On to **Bradford**, who have recently had a "Surplus Equipment Sale," which was very successful, and for June can look forward to an informal meeting on the 4th, a nice weekend out on June 8/9 at NFD, with an inquest on what went wrong to follow up on June 18; finally, on June 25, a visit to the Airport at Yeadon should prove of interest.

A **New One—Cleveland A.R.S.**—has been formed, with its Hq. at the RAF Association Club, Newcomen Terrace, Redcar, where they are in session each week on the Tuesday evening, with the start time for 7 p.m. The Hon Sec.—see Panel for his address—would like to hear from other Secretaries about the activities they lay on, so that he can get a feel for the sort of things that will go down well. So—write to him, chaps!

Hull always seem to have a programme as long as your arm, and this time is no exception, with NFD preparation and G3PQY on Oscillators, both slated for June 7, NFD itself G3OHT on Colour Television on June 14 and G3AGX talking about Radio Control on June 28. All that leaves a gap—June 23, when they try to be serious for a while, and discuss their future outdoor activities. Hq. is about the only thing we have not yet mentioned, and that is at 592 Hessle Road, Hull.

A private room at the George Hotel is the venue at which the **Bury and Rossendale** chaps foregather on the second Tuesday of each month; which gives June 11 as the date this time, and the W1BB tape-and-slide lecture is the attraction.

Not very often that we hear from the Scottish groups, and so more of a pleasure; albeit **Lothians** make up for the others by being one of our most regular reporters. June 13 should be noted in the

diary as the date for a *Giant Surplus Sale*, and the all-important **AGM** occurs on the 27th.

Some groups only appear in these columns at MCC-time, or about a year, but we know of their existence and health from other directions. In this category comes **Moray Firth**, who have an Hon. Sec. who says he will only report when he has gems of news or nothing better to do! Hq. is at 42 East Church Street, Buckie, where they are to be found each Monday evening. Currently, the programmes put on each evening are aimed at assisting the younger element, several of whom are actively preparing for an attack on the R.A.E. The Club station is off the air at the moment thanks to a weird fault that has so far remained elusive, so if a new member or visitor wants instant popularity, he knows what to do. Looking forward a little, to July, they will be assisting at the display at R.A.F. Lossiemouth, by way of a station signing GB2LAD on the HF bands; July 13 is the date for this one.

Pudsey seem to be doing fine with their new Club; membership is now up as high as 56, with a good programme arranged, so for all the dope, all you have to do is to contact the Hon. Sec. at the address in the Panel.

That warning to visitors to bring their own paintbrushes is not now needed at **Culcheth**, where the decorating is at last over in favour of lectures and activities. June 14 is the day, and the subject Transistor Fundamentals, to be dealt with by G3XDM.

Wales, Midlands and the East

Quite a large and ill-defined area, this, but having advantages in that it enables your poor old scribe to avoid revealing his lack of geography!

Right at the top of the clip, we have a letter from the **Welsh Radio Club** who have no meetings organised formally for May-June owing to a small change-around in the organisation, but nonetheless they are ready and active to welcome potential new members in the area of Newport, Mon.

Norfolk Challenge is as much of a pleasure this time as ever; from it we find in June that the normal date on the 3rd is passed owing to the Bank Holiday, and G3PTB is pressed into service to give a talk on Inductors on June 17; the month is nicely round out by a Radio Panel Game on the 24th. Meetings are held at Brickmakers Public House, Sprowston Road, Norwich.

Sad to say, the Hon. Sec. of the **East Worcestershire** group gave us the May programme in error; but it tells us well enough that the venue is the Old People's Centre in Park Road, Redditch, on the second Thursday in each month, and we can add to that a rider that with the wealth of talent that exists in the area the group can hardly fail to be first-class.

The third Tuesday in each month is the normal date for the **Midland (M.A.R.S.)** boys, but there is so much in the way of extra-mural activities going on that it would be well to check the latest



At the annual dinner of the Cornish Amateur Radio Club on April 27, for which they had a total attendance of 42, the compiler of their "Link" newsletter, G3WPK (left) was presented, appropriately enough, with a pen, suitably engraved. He received this from Edna Cooper, G3UGO, who is president of Cornish A.R.C. At right is G3VGO, this year's Chairman.

state of things with the Hon. Sec. before going to the Midland Institute, Margaret Street, Birmingham 3.

Conveniently, **Coventry** have dates on June 7, 14, 21 and 28, at their temporary Hq. with the City of Coventry Scout Headquarters, 121 St. Nicholas' Street, Radford, Coventry. Obviously, the June 7 date is for Field Day preparation, but on the 14th they are in for a real treat—the lecture to be given by Mr. H. G. Miles on Satellites and Space Probes. June 21 is going to be used to give the Club rig an airing, while on the 28th it is the fresh-air treatment for them, when they go out Direction-Finding.

The **Rhyl** lads get together on the second Tuesday of each month at their Clubroom, which is off Windsor Street, Rhyl. For all the latest information, a line to the Hon. Sec. is probably the best play—see Panel.

Pressing on with the business, it will be recalled that last time **South Birmingham** were missing—but they have come back to date, so that your scribe has the pleasure of two copies of *QSP* to read. From them, we glean the details of the June business. A Junk and Surplus Equipment Sale, on June 5, at the Socuts Hut, St. Stephen's Parish Hall, Pershore Road, Birmingham 29.

Not a hundred miles away from the South Birmingham area is **Sutton Coldfield**, who have June 10 as the formal meeting and June 24 as the natter-session; but the difficulties of finding lecturers at this time of year leaves the topic very much "in the melting-pot."

[over

Help!

Various mentions of **Peterborough** in these columns of late months have all been in connection with old radio equipment—and now for another one. Has anyone got any of the *square* section wire used for receiver wiring in the 1920's, with which they can properly rewire some vintage models, ready for their exhibition entitled "Wireless in the 1920's" which commences on September 2. The need is urgent, and so far none has been found, so if anyone can help, *please* contact the Hon. Sec.—see Panel below.

The first and third Wednesday in each month is a routine which is adhered to by the **Wirral** lads for their meetings; and for June this means one session getting things sorted out for NFD, and

to other deciding what went wrong and who forgot the receiver. No hard feelings though—there is a DX-pedition lined up for them on June 22/23!

Thursdays are the days the **Salop** lads look out for; two of them are set aside for outings, and on June 13 the trip is to the R.A.F. station Cosford, arriving there at 7.30 p.m. As for the other one, it is to the Midland Electricity Board Control Room, Ditherington, with arrival again timed as 7.30. To fill in the remaining weeks in the month, the Old Post Office Hotel, Milk Street, Shrewsbury, is the spot for a good old ragchew.

Near the middle again, to **Mid-Warwickshire**, who are at 28 Hamilton Place, Leamington Spa. Monday, June 10, is the date for a Grand Junk Sale, with visitors specially welcome. The other Monday evenings will be used for general rag-

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London, W.3.
 A.R.M.S.: N. A. S. Fitch, G3FPK, 79 Murchiston Road, London, E.10. (*LEYtonstone 6700*.)
 BRADFORD: W. G. Scarlett, G3RXS, 12 Otley Road, Eldwick, Bingley, Yorks.
 BRIGHTON (Technical College): R. A. Bravery, G3SKI, 7 Cope Hill, Brighton BN1-5GA (*506418*).
 BRITISH RAIL: H. A. J. Gray, Eleven, Swanton Drive, East Dereham, Norfolk.
 BISHOPS STORTFORD: A. Stanley, G3WUR, 43 Havers Lane, Bishops Stortford.
 BURY & ROSSENDALE: A. Cooper, G3VVQ, 411 Holcombe Road, Greenmount, Nr. Bury.
 CAMBRIDGE: R. J. Baker, G3USB, 32 Harbour Avenue, Comberton, Cambridge.
 CHESHUNT: N. Invest, 93 Manor Court, Enfield, Middx.
 CHIPPENHAM: N. Cutter, G3PQG, 1 Fossey Close, Colerne, Chippenham, Wilts. (*Box 664*.)
 CIVIL SERVICE: D. McLennan, G3KGM, 52 Pinewood Avenue, Sidcup, Kent.
 CLEVELAND: R. Richardson, Tretoar-Uchef, Avon Close, Skelton-in-Cleveland, Saltburn-by-Sea, Yorkshire. (*Skelton 272*.)
 COLCHESTER: V. Levitt, Park Street, Stoke-by-Nayland, Suffolk.
 CORNISH: W. J. Gilbert, 7 Poltair Road, Penrhyn, Cornwall.
 COVENTRY: C. Jaynes, 20 Belgrave Road, Wyken, Coventry CV2-5AY, Warwickshire.
 GRAWLEY: R. G. B. Vaughan, G3FRV, Tralee, Filbert Crescent, Gossops Green, Grawley (*23359*), Sussex.
 CRAY VALLEY: *Hon. Sec's name and address wanted.*
 CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London, S.E.23. (*FORest Hill 6940*.)
 CULCHETH: A. N. Edwards, 6 Ellesmere Road, Culcheth, Nr. Warrington, Lancs.
 DUNSTABLE DOWNS: G. N. Bath, G3NMZ, 9 Chalton Heights, Chalton, Luton, Beds.
 EAST WORCESTERSHIRE: T. H. Westbury, 49 The Slough, Crabbs Cross, Redditch.
 ECHELFORD: D. Walmesley, G3HZL, 153 Worple Road, Isleworth, Middx. (*POPesgrove 3239*.)
 EDGWARE: G. S. Fitton, G3RAA, 18 Beverley Drive, Edgware, Middx.
 FAREHAM: J. A. Rampton, G3VFI, 23 Oxford Close, Fareham, Hants.
 FARNBOROUGH: D. G. Arigho, G3NVM, 6 Frensham Close, Yateley (*2174*), Camberley, Surrey.
 HALIFAX: R. Millar, G3WLW, 17 Brooklands, Bradley, Huddersfield.
 HEMEL HEMPSTEAD: A. Lex-Arnold, 13 Little Road, Hemel Hempstead, Herts.
 HEREFORD: B. Edwards, G3RJB, 5 Powys Walk, Hereford.
 HIGH WYCOMBE: M. Pemberton, 8 Bowerdean Road, High Wycombe, Bucks.
 HULL: Mrs. M. E. Longson, 4 Chester Road, Wold Road, Hull.
 LOTHIANS: A. J. Masson, GM3PSP, 20 Merchiston Park, Edinburgh, 10.
 MAIDENHEAD: E. C. Palmer, G3FVC, 37 Headington Road, Maidenhead, Berks.
 MID-HERTS: I. Gurton, G8ASP, 28 Bloomfield Road, Harpenden (*3770*).

MIDLAND: C. J. Haycock, G3JDJ, 29a Wellington Road, Handsworth, Birmingham, 20.
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill, Sussex.
 MID-WARWICKSHIRE: J. F. Coggins, G3TFC, Market Corner, Coventry Road, Baginton, Warks.
 MELTON MOWBRAY: D. W. Lilley, G3FDF, 89 Sandy Lane, Melton Mowbray (*3519*), Leics.
 MORAY FIRTH: C. Holland, 66 Lossiemouth Road, Bishopmill, Elgin, Moray.
 NORFOLK: M. J. Cooke, 76 Falcon Road West, Sprowston, Norwich (*46093*) NOR-73R.
 NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (*01-303-8655*.)
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (*44329*).
 NUNEATON: J. Roughton, 42 Severn Road, Bulkington, Nr. Nuneaton, Warks.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
 PUDESEY: B. Gaunt, 1 Fernbrook Place, Leeds, 13.
 PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey, CR4-6DB.
 R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 331 Wigan Lane, Wigan, Lancs.
 READING: M. F. Taylor, G3LFM, 58 Nightingale Road, Woodley, Reading.
 REIGATE: D. Thom, G3NKS, Bankside, 58 Garlands Road, Redhill, Surrey.
 RHYL: A. Antley, GW3UTG, Fairholme, Fairfield Avenue, Rhyl (*1362*).
 RODIN BOYS: R. T. Marchant, G3TAJ, 154 Essex Road, Leyton, London, E.10.
 ROTHERHAM: J. Smith, G3RPP, 21 Hill Top Close, Kimberworth, Rotherham.
 RUGBY: R. T. Craxton, G3IKL, 103 Clifton Road, Rugby, Warks.
 SALOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
 SALTASH: J. A. Ennis, 19 Coombe Road, Saltash, Cornwall.
 SOUTH BIRMINGHAM: W. V. Shepard, 174 Gristhorpe Road, Selly Oak, Birmingham, 29.
 SOUTH DOWNS: L. E. Tagliaferro, 9 Tugwell Road, Hampden Park, Eastbourne (*54244*), Sussex.
 SOUTHGATE: R. Wilkinson, G3TXA, 23 Ashridge Gardens, Palmers Green, London, N.13.
 STEVENAGE: W. P. Sheppard, G3WMA, 83 Spring Road, Letchworth, Herts.
 SUREY: R. Morrison, G3KGA, 33 Sefton Road, Croydon, CRO-7HS. (*01-654-5982*.)
 SUTTON & CHEAM: P. Ball, G3HQT, 55 Maycross Road, Morden, Surrey.
 SUTTON COLDFIELD: A. W. Fernyough, G8AVH, 114 End Hill Road, Kingstanding, Birmingham, 22C.
 VERULAM: J. Thomas, G3RXX, 9 Highland Drive, Hemel Hempstead, Herts.
 WELSH: S. R. Cole, 61 Ebenezer Drive, Rogerstone, Nr. Newport, Mon.
 WEST KENT: R. Trevitt, G3SSE, 28 Delves Avenue, Tunbridge Wells, Kent.
 WIMBLEDON: A. Alexander, 23 Pepps Road, West Wimbledon, London, S.W.20.
 WIRRAL: J. Phillips, G3PXX, 16 Collingham Green, Little Sutton, Wirral, Cheshire.

chewing and taking advantage of the fine facilities we understand they have in their QTH.

The problems of a change of Hq. are tying up the Hereford lads a little as they were, at the time of writing, negotiating with a Council that always takes its time about making decisions. In the meantime they are using the Darby and Joan Club Room, Trinity Hall, Whitecross Road, Hereford, for a Junk Sale on June 7. A check with the Hon. Sec. would be a good thing, though, as there could be a late change of venue.

Continuity

Prior to the inaugural meeting of the Rugby and District group, which took place recently, G3NDM looked up some old newspaper files, and was able to tell the meeting that a Club had been formed there as far back as August 1920, and read a description of that far-off meeting. Imagine the surprise when a Mr. A. Franklin, who had been taking a part in the discussions, rose to say that he was a founder member of both Clubs. Forty-eight years is quite a long time! For the details of the venue and the programme, contact the Hon. Sec. at the address in the Panel for all the up-to-date information—we understand there is a fine Hq. under negotiation.

Not far away is Nuneaton, and the Nuneaton club have an Hq. at the Anchor Inn, Hartshill, near Nuneaton, where they have a club call sign, G3XJU, which is shortly to be exercised. Alternate Thursdays is the routine, which looks rather like 13 and 27 June, although the Hon. Sec. is not quite specific. Judging from recent history, this crowd have something of interest to look forward to each time, with a nice balance between the practical and the theoretical.

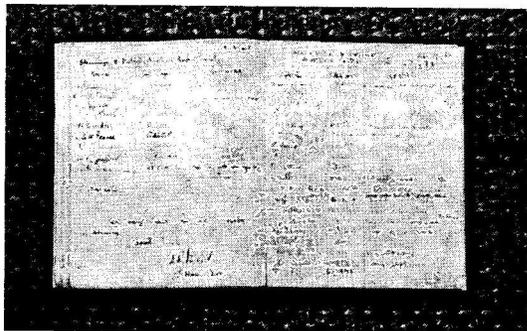
Melton Mowbray next, where they have taken the chance of G3SVK/A being in the county to nail him for a talk, which unfortunately is dated for the next day before we hit the bookstalls. June 6 is the next date on the calendar, when they are off to the Crown Inn, Sproxtton, for the annual dinner.

On to Cambridge, where we have managed to sort out a long-established error in the name of the Hon. Sec. and his address for the Panel. The first two evenings, on June 7 and 14, are, respectively,

SECRETARIES—PSE NOTE!

We must have, with each report every month the name, QTH and c/s (if any) of the hon. secretary. Reports should be concise and complete for the period under consideration, i.e., it should not be left to us to pick up information from previous reports.

The correct address for this feature is: "Club Secretary," Short Wave Magazine, Buckingham. Closing dates for the next few months are, first post Fridays: June 7, July 5 and August 9, for the issues dated July, August and September respectively.



The "memorial book" presented to Stewart Perry, W1BB, by Northern Heights Amateur Radio Society in recognition of his great efforts in promoting Top Band activity and DX throughout the world. His very useful and interesting tape lecture on 160m. operation has gone the rounds of many Clubs in the U.K. Incidentally, the book does actually contain more than 1,000 signatures.

devoted to G3EDD summing up the results of their /M VHF contest, and a trip to see a Synchronon—wonder what they feed it on?—at the University, with G3TAG doing the talking. This leaves June 21 and 28 over for informals at Hq. in Victoria Road, Cambridge.

The Extra-Territorial Set

This heading, as usual, comprises the groups who have no district affiliations, and which indeed are in some cases international. Such a one is A.R.M.S., catering for the needs of the /M fraternity, as well as producing the *Mobile News* publication. The latter is quite good this month, with a very useful piece on the measurement of low resistance—important to the mobile operator wishing to

put out a big signal.

Another is **RAIBC**, who cater so well for the needs and interests of the blind and disabled element in Amateur Radio; membership is in two categories, for the disabled and the supporters who do so much to keep them going on the air. There is a monthly newsletter, *Radial*, which is always a pleasure to read, and regular nets are run on 3.7 mc, on Tuesdays at 10 a.m. and Wednesdays at 2 p.m. Additionally, the Cheshire Homes net comes up on the same frequency at 2 p.m. every Thursday.

British Rail exists for the railwaymen interested in our hobby, either as SWL's or licensed amateurs; at the time of writing there is a proposal to organise a net regularly, which would be a fine thing. All the information on the group can be obtained from the Hon. Sec. at the address in the Panel.

Someone reads this piece each month! This is the surprising part of the note from **Civil Service**, who say they have recruited more members through **SHORT WAVE MAGAZINE** than in any other way. This crowd, which your old scribe has met personally, are very active and have a fine Hq. at the Civil Service Sports Centre, where they can be found in Room 66 on the second Tuesday in each month. The Centre is located in Monck Street, which runs between Horseferry Road and Great Peter Street, close to the Horticultural Halls, which are known to most readers as the venue for many years of the Amateur Radio exhibition.

The London Area

Here our first port of call is **Cheshunt**, who have Hq. in the Methodist Church Hall, where they are to be found on the first Friday of every month. G3TZZ and G8ASE are joint speakers for June, and their topic will be "Oscillosopes."

Sutton and Cheam have so much news in their sheet this time that there wasn't room to put in the June doings, so we have to commend you to the Hon. Sec.—see Panel—and just guess that the date for the June meeting will probably be the 18th.

We are even more up against it when we come to **Surrey**, because here we were aware that the Hon. Sec. was to stand down at the AGM, but we don't know who is taking his place—so, for the moment, G3KGA remains in his accustomed seat in the Panel, to be contacted by potential members or visitors. Hq. is at the "Blue Anchor" in South Croydon.

Really quite surprising—dredging through two copies of the **Southgate** Newsletter we can find the topic for June—a lecture by Trinity House—and the venue, which is Parkwood Girls School, just in rear of Wood Green Town Hall, in Bounds Green Road. *But we don't know the date!* Luckily, a little spot of intelligent guesswork suggests June 13 for what should be a fascinating talk.

Crystal Palace seem to have resolved their problems of Hq. after the Civil Defence shut-down, by a move to Emmanuel Congregational Church Hall,

in Barry Road, East Dulwich, where June 15 will be a Junk Sale. However, at the time of writing it was not confirmed for certain from the Church side, and so a check should be made with the Hon. Sec. beforehand—see Panel for details.

At the next meeting of the **Acton, Brentford and Chiswick** crowd, they will be studying the international scene; DL2AA will be the speaker, taking as his theme the German Amateur Radio Society, DARC. This most interesting effort will be, as usual at Hq., 66 High Road, Chiswick.

Echelford have the last Thursday in each month, at the Hall, St. Martins Court, Kingston Crescent, Woodthorpe Road, Ashford, Middx, which makes it June 27, when they are to hear one of the Tape lectures on **Transmitter Design** and **TVI**. In addition, it is understood there is an outing being organised, yet to be finalised, but which is dated for June 30.

Cray Valley publish a newsletter called *QUA*, which usually contains something of interest; this time they have printed a letter from the GPO to their Hon. Sec., setting out in detail the duties and responsibilities of the holder of the Club call, and the other folk named on the list as operators. One feels this letter should be nailed to every Club station door! As for the programme, that is easy: June 6, at the Congregational Church Hall, Court Road, Eltham, for the formal meeting at which Mr. I. Lever will discuss "Commercial Oscilloscopes." An informal is also run each month at the All Saints Church Hall, Bereta Road, New Eltham; this time it comes up on June 20.

The new cover of *QRK-5* symbolises the fact that it now serves the interests of both **South London Mobile** and **Wimbledon**, who are now, for a time, one and the same. June for them means, on June 7, the Annual Junk Sale, and June 28 for an informal before the camp weekend, which latter takes place in early July. Hq. for the meetings is St. John Ambulance Hall, 124 Kingston Road, South Wimbledon, London, S.W.19.

Yet another group to move home is **Edgware**, who had a fine turn-out for the first evening at the new place, 51 Flower Lane, Mill Hill, to hear G2UV give his talk on the "Sounds of the Twenties," for which the sound of *spark* transmitters had been recreated and recorded. For June, the start of the month is on the 10th, conveniently just after Field Day, which will, no doubt, turn from an informal into a *post mortem*. VHF Frequency Measurements and Power Measurement at VHF are the twin subjects to be taken care of by G3MNO on June 24.

First and third Fridays in each month—but never the fifth! This opening to **Purley's** newsletter suggests someone got his dates mixed. Final arrangements for NFD are to be dealt with on June 7, and the AGM, in the Large Hall, is set for June 21, with all members eager no doubt to volunteer for a job! Purley in the Railwaymen's Hall, 58 Whytecliffe Road, Purley.

The Southerners

Once again a rather vague sort of area. The first one on the clip is **High Wycombe**, who send us results of their recent Club contest; G3RXO, G3JIP and G3SBA took the first three places in the Non-Club category. On the question of where and how they got together, we have no current information, as the Hon. Sec. has things in the pot for June and later—so you'll have to contact him at the address in the Panel.

June 5, at the George and Dragon, Cromwell Road, **Redhill**, sees the Reigate gang in session, the lecturer being, if all's well, G4AR talking about his activities as ST2AR.

On now to **Mid-Herts**, who say their next get-together is at Welwyn Civic Centre on June 13, when there will be a VHF/UHF Brains Trust. As for the *Newsletter*, it must be said that the present compiler knows exactly what to say, and says it very bluntly indeed, which is all to the good.

A few miles up the road is **Stevenage**, where the incumbent live-wire Hon. Sec. reports he has had to give up due to a posting overseas, and so there will soon be a new name on the file. June's programme is greatly bound up with NFD, the two evenings being "Last Details" (June 6) and the following "Post Mortem" (June 20). Both are at the Hawker Siddeley Dynamics canteen, Gunnels Wood Road, Stevenage, which is a very nice Hq. indeed.

Right away on the opposite corner of the area is **Cornish**; in spite of the scattered district this group covers, attendances at the main meetings at the SWEB Clubroom, Pool, Camborne, have averaged *fifty*, no less. On June 6, G3NKE discusses the correct procedure for QSL'ing, followed by G3BHC on Aerials. The VHF group, at the Barley Sheaf in Truro on June 20, have VHF Transverters as their topic, and G3OCB to guide them through the problems. Also at the Barley Sheaf are the SSB section, although we have no details at the time of writing.

Burraton Toc H Club still continues for the moment to be the home of the **Saltash** gang, who have a visit from G3LWH slated for June 14, and on the 28th are out in the open "chasing foxes"—electronic ones, doubtless!

Brighton have two dates on the programme—June 5 and 19th—and on the former it appears the Club station will be given an airing. The other one is an "away" engagement, when they go to join the **Mid-Sussex** crowd at Clayton Windmills (Jack and Jill) which is just south of Hassocks. For the Mid-Sussex boys, the evening earlier in the month at Hq. is to be a mystery one—Marle Place Further Education Centre, Leylands Road, Burgess Hill, is the venue, June 6 the date.

The summer programme of the **Fareham** group is now finalised and from it we note that they propose to run a session at Hq. on June 9, straight from NFD—they must either be *very* keen or else someone has thought this up as a way of making sure the Field Day equipment is all cleared up! On the 16th, the whole day is given over to a

picnic and dummy run for VHF field activity, with wives and girl-friends invited, while on the 23rd an evening of experimental Top Band aerial rigging is planned, to try and find a contest aerial which does its stuff properly; the month is rounded off by a Question and Answer affair on June 30. Just in case the weather turns rough, the Hq. at Portchester Community Centre will be open as usual if necessary. Visitors and prospective members are always welcomed.

Every Tuesday evening the **Chippenham** chaps foregather at the Chippenham High School for Boys, Hardenhuish Lane, where visitors, they like to see, and special arrangements are in force to make sure this is done. Apart from NFD, on June 25 there will be a combined D/F event and barbecue, for which the arrangements for non-entrants to the D/F part of things may be obtained from the Hon. Sec.; and the Chippenham "At Home" Carnival event on June 29 will be graced by a demonstration station using the Club call sign G3VRE.

A change of venue for the **Southdown** lads, who seem to have gone from strength to strength since forming a year ago; the first Annual General Meeting comes up on June 10, at the "Parkfield," Lindfield Road, Hampden Park, Sussex.

A most amusing piece in the **Verulam** sheet this time, giving twenty different—and valid—reasons why a 100 per cent return on QSL cards is *just not reasonably to be expected*; in fact it is remarkable how well the returns *do* come in! Cavalier Hall, St. Albans is the venue, on June 19, when G3RPE, of G.E.C. will talk about 13 cm., and no doubt stimulate thoughts of activity on that band.

Roding Boys next—science and Amateur Radio—where G3JIX and G3TAJ are the leaders, and provide interests and assistance for any boy with a radio bent or scientific interest—and very good work they do, too. The Hq. is Monkhouse Youth Centre, Monkhouse Road, Walthamstow, and they are on the look-out for any one prepared to give them a talk on radio or allied subjects—any volunteers?

Crawley are covered by the description "just south of London," as the lads foregather at Trinity Congregational Church Hall, Ifield, Crawley, where this month they will hear Mike Dransfield talking about SWL'ing in Thailand. This one is on Wednesday, June 26, but the informal precedes it by a fortnight, being on June 12; for details make contact with the Hon. Sec.

A Donkey Derby on June 3 takes place at **Farnborough**, and the lads are putting on a station in connection with the affair, signing G3XCH/A on 80 and 2 metres. A lecture on Communications by Mr. A. L. Stretton occupies June 11, and on the 25th the annual club Construction Contest is played off. All "home games" are at the Model Railway Enthusiasts' Club, 310 Farnborough Road, Farnborough, Hants.

Fortnightly on Fridays, with the proceedings starting promptly at seven-thirty, but after Field Day the **West Kent** group take a rest until June 14; on that evening the entertainment will be by way of

a tape lecture; on the 28th G3SSE-G6SSE/T will be down to earth with his demonstration and description of his home-brew SSB transceiver.

From West Kent to **North Kent**, who are at the Congregational Church Hall, adjacent to the Clock Tower, Bexleyheath, on June 13 and 27, the former being the inevitable NFD inquest, and the latter being down for a Junk Sale.

Bishops Stortford have the use of a room at the British Legion Club, Windhill, Bishops Stortford, which is on the road out of the town towards Much Hadam; there they get together on the third Monday in each month; the programme is now set up until February next year, with something to interest everyone.

A new group calling itself the **Dunstable Downs** Radio Club has been formed, the inaugural meeting having been held at the Star and Garter in Dunstable. Thirty-odd members attended the first evening, including an SWL of forty years standing who had never before met a real live amateur—*Cool!*—but your scribe is ready to lay a small bet the chaps will rectify that situation in very short order! For further details, contact the Hon. Sec., at the address in the Panel.

The regular routine of fortnightly Tuesday evenings continues at **Reading**, with a Constructional Competition on June 4, followed by G3TEB on Video Recording on June 18, both at St Paul's Hall, Whitley Wood, Reading, where new faces are always sure of a welcome.

An Annual General Meeting is set up for June 7 by the **Hemel Hempstead** crowd, at Rucklers Lane Hall, Kings Langley, with another evening at the same venue slated for June 21. It is understood that during the summer the club call, G3WIH, will be active on all bands DC to UHF.

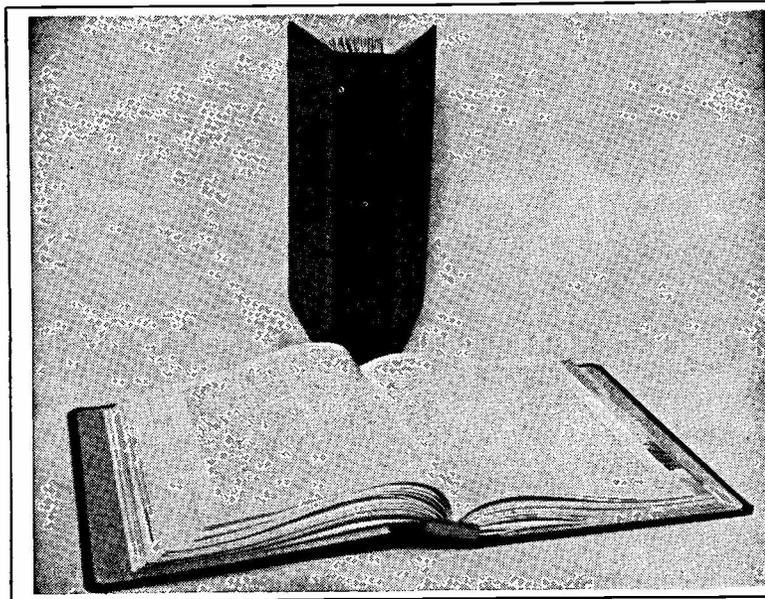
Over at **Maidenhead**, the lads will be sitting down to a most interesting evening on June 3, when Kenneth Alford, G2DX—one of our distinguished old timers—will be giving a talk on "Early Days in Amateur Radio" and illustrating it with bits-and-pieces, which should shake some of the youngsters. The informal evening on Tuesday, June 18, will see the G3WKX 144 mc machinery on the air and looking for QSO's.

A visit to the **Chelmsford** Hq. is planned by the **Colchester** crowd for June 4, to take part in a Quiz with them at the Marconi College, Arbour Lane, Chelmsford. The Science of Colour is the subject of a lecture in the lecture theatre, Sheepen Road, Colchester, on June 12, and on June 19 they go all Practical in Room 40. The references to rooms becomes clearer when it is realised their full title is "North East Essex Technical College and Colchester School of Art Radio Society"—*Wow!*

Club reports were also received—but too late for coverage in this piece—from *Spenn Valley* and *Harrow*, together with more up-to-date items from *RAIBC*, *Crystal Palace*, *Surrey Radio Contact* and *Midland*, already in with reports that were late for last month!

Deadline

And there it is for another month; as always, a most interesting piece to put together. The news for the next one should be of doings for *July*, and should be sent to arrive by first post **Friday, June 7**, addressed to "Club Secretary," **SHORT WAVE MAGAZINE**, BUCKINGHAM. Till then, keep smiling, and keep trying—the members *do* appreciate the Hon. Sec., even if they don't often say so!



CREATE YOUR OWN REFERENCE LIBRARY

by binding copies of Short Wave Magazine in the "EASIBINDER."

The "EASIBINDER" is designed to bind 12 copies of the Magazine as you receive them month by month, eventually providing a handsomely bound volume for the bookshelf.

No need to wait until twelve copies are assembled. As each copy is received, it is quickly and simply inserted into the binder. Whether partially or completely filled, the binder is equally effective, giving the appearance of a book, with each page opening flat.

Strongly made with stiff covers and attractively bound in maroon Leathercloth and Milskin, the binders have only the title gold blocked on the spine.

Price 14s. 0d. post free.

PUBLICATIONS DEPARTMENT
SHORT WAVE MAGAZINE
55 VICTORIA STREET
LONDON, S.W.1

NEW QTH's

This space is available for the publication of the addresses of all holders of new U.K. call signs, as issued, or changes of address of transmitters already licensed. All addresses published here are reprinted in the U.K. section of the "RADIO AMATEUR CALL BOOK" in preparation. QTH's are inserted as they are received, up to the limit of the space allowance each month. Please write clearly and address on a separate slip to QTH Section.

G2DQI, G. A. Lambourne, 41 Pevensey Road, Worthing, Sussex. (re-issue.)

G3ENE, J. B. Wadham, Loders, St. Saviour's Hill, Polruan-by-Fowey, Cornwall. (re-issue.) (Tel. Polruan 307.)

G3WZY, W. Johnson, 14 Tay Close, Manor House Estate, Farnborough, Hants.

G3XFA, R. R. T. Wilkins, 68 New Park Street, Devizes, Wilts.

G3XGF, No. 489 Sqdn. A.T.C., c/o K. A. Reeves, 51 Station Road, Acocks Green, Birmingham 27.

G3XGP, W. H. Bond, M.B., Ch.B., F.R.C.S., 23 Chantry Road, Moseley, Birmingham, 13. (Tel. SOU 1048.)

G3XGY, B. A. Harris, 14 Oxford Square, R.A.F. Locking, Weston-super-Mare, Somerset.

G3XHZ, J. Farrer, 3 Chestnut Close, Bishops Stortford, Herts. (Tel. Bishops Stortford 3406.)

G3XID, D. Mitchinson, 32 St. Aidans Avenue, Grangetown, Sunderland, Co. Durham.

G3XIP, D. J. Aspinall, 216 Kineton Green Road, Olton, Solihull, Warks. (Tel. 021-706-3776.)

GW3XJC, B. S. Luke, 91 Llwydarth Road, Maesteg, Bridgend, Glam. (Tel. Maesteg 3566.)

G3XJJ, W. F. Stratton, 14 Kings-thorpe Grove, Northampton. (Tel. Northampton 39196.)

G3XJN, H. Duncombe, B.Sc.(Eng.), 15 Kingsdown Road, Epsom, Surrey. (Tel. Epsom 21486.)

GD3XJR, M. S. Dickinson, The Whitehouse Cafe, New Road, Laxey, Isle of Man.

G3XJY, J. R. Jardine (G8BAC), Field Head Farm, Balance Hill. Uttoxeter, Staffs. (Tel. Uttoxeter 2234.)

G3XKT, A. E. Beardsley, 14 York Avenue, Sandiacre, Derbyshire. NG10 5HB. (Tel. Sandiacre 2514.)

G3XLF, A. E. Pickup, 17 Middlehurst Road, Grappenhall, Warrington, Lancs.

G13XLK, W. R. Magee, 12 Gilnahirk Avenue, Belfast. BT5 7DR.

G3XLO, B. W. Lowe, 11 Green-leach Lane, Worsley, Manchester. (Tel. 061-790-2871.)

G3XLU, R. W. S. Hewett, c/o Sgts.' Mess, R.A.F. St. Mawgan, Newquay, Cornwall.

G3XLV, P. A. Conway, 719 Scott Hall Road, Leeds 17, Yorkshire.

G3XLW, D. G. Powell, 18 Abinger Avenue, Cheam, Surrey. (Tel. 01-393-5236.)

G3XLY, Mrs. D. Barry, 15 Fairlawn Court, London, W.4.

G3XLZ, J. J. Tozer, 297 Taunton Avenue, Whiteleigh, Plymouth, Devon.

G3XMC, D. J. Brain, 1 Newlyn Walk, Knowle Park, Bristol, 4.

G8BGV, P. L. Selwood, 6 Fairway, Loftin Way, Chelmsford, Essex.

G8BH1, R. C. Swann, 19 Hampton Close, Blackfield, Southampton, Hants.

G8BHV, C. R. Baldwin, 7 Oldbury Court Road, Fishponds, Bistol. (Tel. Bristol 653307.)

G8BKG, D. F. Wright, 26 Befield Road, Etwell, Derby. DE6 6JN. (Tel. Etwell 2856.)

G8BKJ, Chycarne Farm, Troon, Camborne, Cornwall.

G8BKR, J. Woodham, 17 Farington Road, Westbury-on-Trym, Birstol.

G8BKV, L. Mason, 49 Sherrington Road, Ipswich, Suffolk. (Tel. Ipswich 41674.)

G8BKY, R. A. Nicholls, 14 Hollydale Road, Erdington, Birmingham, 24. (Tel. 021-373-8973.)

G8BLD, J. M. Draper, B.Sc., The Rectory, Bramerton, Norwich, Norfolk. NOR.06-W. (Tel. Surlingham 251.)

G8BLN, J. Brand, 15 Ritson Road, Dalston, London, E.8.

G8BMJ, P. Wild, 9 Red Lion Close, Talke, Stoke-on-Trent, Staffs.

G8BMY, M. Goodrich, 26 Frome Road, Chipping Sodbury, Bristol, Glos.

G8BNJ, J. Phillipson, 1 Rochester Close, Warden Hill, Cheltenham, Glos.

CHANGE OF ADDRESS

G3HHT, J. A. Bassford (ex-ZC4GB), 6 W.O.M.Q., Edith Weston, Oakham, Rutland.

G3JON, J. Bell, 30 Alms Hill Road, Sheffield. S11 9RS.

G3LIA, R. J. Rogers, 11 Carol Close, Long Lane, Stoke Holy Cross, Norwich, Norfolk. NOR.55-W.

G3ODI, G. N. Partington, B.Eng., 48 West Way, Broadstone, Dorset. (Tel. Broadstone 4846.)

G3PED, L. A. Crane, 10 Crescent Road, Tollesbury, Maldon, Essex. (Tel. Tollesbury 315.)

G3PUL, F. Yates, 9 Hopkinson Road, Blackley, Manchester 9.

G3RPV, T. J. Venn (ex-ZD8TV), 115 Fore Street, North Petherton, Bridgwater, Somerset.

G3RSV, R. H. Dowsett, H.Q. R.E.M.E. Tech. Services, c/o G.P.O., Singapore.

G3RYY, N. Penketh, Greenways, Bolton Road, Duxbury, Chorley, Lancs.

G3STG, G. A. Griffiths, 3 Lower Lickhill Road, Stourport-on-Severn, Worcs.

G3TDH, R. W. Stevens, 77 Ketton Close, Luton, Beds.

G3UGK, P. R. Cragg, Claregate School, Hatfield Road, Potters Bar, Herts.

GW3VEO, M. L. Jeremy, 18 Beverley Gardens, Ravenhill, Swansea, Glam.

G3VOT, G. Webster, 27 Barkby Road, Sheffield. S9 1JX. (Tel. Sheffield 386841.)

G3WNP, T. Baker, 60 St. Leodegars Way, Hunston, Chichester, Sussex.

G8ABA, C. F. Haywood, 39 Castle Rock Drive, Coalville, Leics.

G8AYZ, I. J. Kyle, T.D., Hillside, Galgorm Gardens, Old Galgorm Road, Ballymena, Co. Antrim.

G8AYZ/A, I. J. Kyle, 102 Malone Road, Belfast 9.

G8HV, J. R. D. Sainsbury (ex-VS9AHE/SZ4HE), 88 Braywick Road, Maidenhead, Berks. (Tel. OMA8-24176.)

AMENDMENT

GM3XHY, C. C. Tinline, Ramornie, Elm Park, Selkirk. (incorrectly printed as "GM3HXY" in May issue.)

ASTRO-MARINE SALES

Eddystone Agents—Codar—Haison—Joysticks—Components.
 D.S.T. 100, Double Conversion, 50 kc/s. to 30 mc/s., with speaker, p.s.u. and manual, £35. Carr. extra £1.
 B.C. 221 Sig. Gen. 125 kc/s. to 20 mc/s., complete with calibration book and manual, £35. Carr. extra 10/-.
 Direction Finder, Type NAV-M, ex. U.S. Navy, unused, with 6v. p.s.u., and manual, £30. Carr. extra £1.
 Pye Service Workshop Rack, Sig. Gen. and Component Tester plus Output Meter, with manual, £15. Carr. extra £1.
 Taylor Valve Tester with built-in Multimeter, Model 47A with manual and valve charts, £12. Carr. extra 10/-.
 Cossor Oscilloscope Model 339 with manual, £15. Carr. extra £1.
 Avo Geiger Counter, complete and working £7/10/-, Carr. extra 10/-.
 Hallicrafters Frequency Standard Type H.T.7, £5. Carr. extra 10/-.
 60 Watt Amplifier, brand new, £25. Carr. extra £1. Model 7 Avo Meter in leather case and Circuit Gen., £10. Carr. extra 10/-.
 Triplet Sig. Gen., 100 kc/s. to 120 mc/s., 110v. mains, £15. Carr. 10/-.
 Sig. Gen., No. 1-130A, 100 mc/s. to 155 mc/s., ex. U.S. Signal Corps, no Xtal, £3. Carr. extra 10/-.
 Aircraft D.F. R.X. No. R116/A with Circuit Gen. 142 kc/s. to 20 mc/s., £3.
 H.P. TERMS—PART EXCHANGES—EQUIPMENT BOUGHT FOR CASH
 45/47 EASTBOROUGH, SCARBOROUGH, YORKSHIRE
 Tel: SCAR. 5402

"DX ZONE MAP"

In four colours, on durable paper for wall mounting, 35in. wide by 25in. deep. Giving essential DX information—bearing and distance of all parts of the world relative to the U.K. The 40 Zone area into which the world is divided for Amateur Radio purposes, with major prefixes listed separately. Distance scale in miles and kilometres. Time scale in GMT. Marking of Lat./Long. close enough for accurate plotting. About 1,000 place names, mainly the unusual ones, and most of the rare islands. Revised to October 1966

Immediate delivery from stock
 Price 14s. 9d.

including postage and special packing in postal tube to avoid damage in transit.

Publications Dept.
 Short Wave Magazine Ltd., 55 Victoria Street,
 London, S.W.1. (01-222 5341/2.)

CATALOGUE

The most COMPREHENSIVE—CONCISE—CLEAR—COMPONENTS CATALOGUE. Complete with 10/- worth discount vouchers FREE WITH EVERY COPY.

- ★ 25 pages of transistors and semiconductor devices, valve, and crystals.
- ★ 150 pages of components and equipment.
- ★ 50 pages of microphones, decks and Hi-Fi equipment.

SEND TODAY 8/6 POST PAID

LATEST EDITION
 240 pages
 6,000 items
 1,000 illustrations



HENRYS RADIO Ltd.
 303 EDGWARE ROAD, LONDON, W.2

(01) 723-1008/9
 Mon.-Sat. 9/6 p.m.
 Thurs. 9/1 p.m.

CURSONS TRANSISTORS

ALL GUARANTEED

- 1/- each. BAY31, BAY50, DK10, OA70, OA81.
- 2/- each. XA101, XA102, OC71, OC72, OC81, OC81D, OC44, OC45, GET16, FST3/1, ACY22.
- 3/- each. OC139, OC140, 2N706, 2N708, 2N2894, BY100, RAS310AF, 2N914, BSY26, BSY27, BSY95A, AFZ12, BFY18, BFY19, BFY26.
- 7/6 each. RAS508AF, CRS3/40, BLY10, BLY11, BUY10, BUY11, ADY22, ADY23, ADY24, OC26.

ZENER DIODES

- 3-9v. to 26v., 1/4w., 3/- each. 1-5w., 4/- 7w., 5/- each.

D. Cursons

78 BROAD STREET, CANTERBURY, KENT
 S.A.E. LATEST NEW LIST

Short Wave Listening

PHILIPS PAPERBACK

SHORT WAVE LISTENING by J. Vastenhou. Size: 8 1/2" x 5 1/2". 107 pages. Numerous text diagrams
 Price 13s. 2d., post free

This book is intended as a guide for the benefit of the increasingly large numbers of regular listeners to short wave transmitting stations and also for radio amateurs who are interested in short wave listening.

The first group includes many emigrants who in their new country are anxious not to lose touch with their homeland, and those who are intending to emigrate and will thus in future have to do much of their listening on short waves. The second group is of those enthusiasts who regard short wave radio as an indispensable medium for the exchange of information internationally in the broadest sense and employ it in order to widen their knowledge of other countries. The book, which deals with the possibilities and problems of short-wave reception on the level of popular science will enable the reader to discover a whole new world of his own.

CONTENTS

- | | |
|---|---|
| Short Waves | Do Any Regulations Exist |
| The Principles of Short-Wave Transmission | Governing the use of Frequencies in the Short-Wave Bands? |
| Practical Short Wave Transmitting | DX-ing in Practice |
| Short Wave Prediction | DX-ing With a Tape Recorder |
| Sources of Interference | DX-ing Using a Frequency Meter |
| The Aerial | Some Commonly Used DX Terms in Three Languages |
| The Correct Choice of Receiver | Transmission of Time Signals at Standard Frequencies |
| Communications Receivers | Some of the More Important DX Clubs |

Available from stock:

PUBLICATION DEPT.
SHORT WAVE MAGAZINE
 55 VICTORIA STREET, LONDON, S.W.1

SCA 63982 **DERWENT RADIO** S.A.E. LISTS

KW, SOMMERKAMP, EDDYSTONE, HALLCRAFTERS, CODAR, LAFAYETTE, TRIO, SHURE, TW, HEATHKIT, JOYSTICK, STAR and many others

- | | | | |
|--------------------------|------|----------------------------|------|
| KW 2000A and A.C. p.s.u. | £232 | TW 2m Transverter | £69 |
| KW Vespa II and p.s.u. | £135 | Eddystone EC10 | £53 |
| KW 1000 Linear Amp. | £135 | Eddystone EA12 | £195 |
| KW 201 Receiver basic | £111 | Sommerkamp FR500 | £130 |
| Star SR 700A | £115 | Codar: most items in stock | |
| Star SR 200. 160-10m. | £40 | Paros 22-TR 3 bands | £120 |
| Star ST 700 am/cw/ssb | £135 | Hansen SWR-3 | 70/- |
| Lafayette HA-350 | £68 | Nova Pal d.f. Rx. | £27 |
| Lafayette HA-500 | £44 | KY-102 bug key | 90/- |
| Lafayette HA-700 | £37 | K-110 swr bridge | £10 |

10m. walkie-talkies, pr. £12 10s. All GAREX p.s.u. kits in stock also YUKAN spray paints, Stella instrument cases.

We would like to hear about your trade-in items large or small.

- | | | | |
|----------------------|------|--------------------|-----|
| Eddystone EC 10 | £40 | Eddystone EB 35 | £44 |
| HR0s from... | £16 | Eddystone 750 | £38 |
| Codar T28 | £13 | Leader LDM 810 gdo | £10 |
| LED impedance bridge | 90/- | Hustler 4BTV | £12 |

28 HILLCREST AVENUE, SCARBOROUGH, YORKSHIRE

YUKAN SO PROFESSIONAL THE SELF-SPRAY YUKAN AEROSOL WAY-

Get these air-drying GREY HAMMER NOW! OR BLACK WRINKLE (CRACKLE) finishes

Yukan Aerosol spraykit contains 16 ozs. fine quality, durable easy instant spray. No stove baking required. Hammers available in grey, blue, gold, bronze. Modern Eggshell Black Wrinkle (Crackle) all at 4/11 at our counter or 15/11, carriage paid, per push-button self-spray can. Also Durable, heat and water resistant Black Matt finish (12 ozs. self-spray cans only) 13/11 carriage paid.

Other Yukan Air Drying Aerosols, 16 ozs. at 15/11 corr. paid includes: Zinc Chromate Clear Lacquer Metalics: Grey, Blue, Bronze and Gold.

SPECIAL OFFER: I can plus optional transferable snap-on trigger handle (value 5/-) for 18/11, carriage paid. Choice of 13 self-spray plain colours and primer (Motor car quality) also available.

Please enclose cheque or crossed P.O. for total amount to:
YUKAN, SW/F, 307a, EDGWARE ROAD, LONDON, W.2.
 We supply many Government Departments, Municipal Authorities, Institutes and Leading Industrial Organisations—We can supply you too.
 Open all day Saturday. Closed Thursday afternoons.

SMALL ADVERTISEMENTS

(“SITUATIONS” AND “TRADE”)

9d. per word, minimum charge 12/-. No series discount. All charges payable with order. Insertions of radio interest only accepted. Add 25% for Bold Face (Heavy Type). No responsibility accepted for errors. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

SITUATION

TV Service Engineer required for new department. Genuine career post for experienced technician, under congenial conditions. — **Eric Parvin, 201 Acomb Road, York.** (Tel. York 78283).

TRADE

SERVICE SHEETS: On Radio, Television and Tape Recorders, 1925-1968 models, from 1s. each by return post, with free fault-finding guide. Catalogue covering 6,000 models, 2s. 6d. Please include s.a.e. with enquiries.—**Hamilton Radio, 54 London Road, Bexhill, Sussex.**

QSL CARDS: Attractive two-colour designs, 25s. per 100. Send s.a.e. for samples. — **G3OYI, 16 Banks, Honley, Huddersfield, Yorkshire.**

QSL Cards: Two-colour, attractive design, variable features, from £3 3s. per 1,000 (inclusive). Send foolscap s.a.e. for samples.—**ARA Press, 46 Moat Avenue, Green Lane, Coventry.**

QSL Cards and Log Books GPO approved, cheapest and best. Prompt delivery — Samples from **Atkinson Bros., Printers, Looe, Cornwall.**

QSL and SWL Cards: From 20s. per 100; 25s. for 250; 37s. 6d. per 500; and 56s. 6d. the 1,000. Post paid. Send s.a.e. for samples (state whether Tx QSL or SWL card required).—**H. Beaumont, G5XV, 8 Ashfield Avenue, Morley, Leeds, Yorkshire.**

HUNDRED-PAGE Illustrated Catalogue No. 17 of Government and Manufacturers' electronic and mechanical surplus, including a completely new section covering the latest semi-conductors and miniature components, with a credit voucher worth 2s. 6d. Send for your copy now, price 3s. post free. The reading alone is worth the money!—**Arthur Sallis (Radio Control), Ltd., 93 North Road, Brighton, Sussex.**

JULY Issue appears **June 28.** Single-copy orders, 4s. post free, should reach us by **Wednesday 26th**, to post on **June 27** for delivery in the U.K. on publication day.—**Circulation Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.**

POWER—Power—Power: Three 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 running small power-tools. Costs only £42 15s. Indispensable for building contractors and all on-site work. Write for full details of this rugged go-anywhere generator.—**Carter's, Dept. SWM, Taco Works, Sycamore Avenue, Burnley, Lancs.**

QSL and SWL cards, from 20s. per 100. Send s.a.e. for samples. — **Raybould, 16 Brookbank Road, Gornal Wood, Dudley, Worcs.**

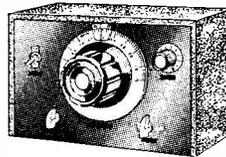
TWENTY-FOOT 1½in. diam. two-section wooden masts, new, only 14s., including carriage. Exceptionally good value!—**Fish, G4MH, 28 Banks Avenue, Golcar, Huddersfield, Yorkshire.**

TRIO! Of course! Only the best at Glasgow Electronic Services, 21 Old Dumbarton Road, Glasgow, C.3.

RADIO SPARES! Of course! Only the best at Glasgow Electronic Services, 21 Old Dumbarton Road, Glasgow, C.3.

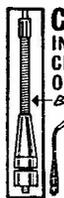
HALSON MOBILE AERIALS! Of course! Only the best at Glasgow Electronic Services, 21 Old Dumbarton Road, Glasgow, C.3.

COMMUNICATION RECEIVER TYPE GDX



Type GDX/25/C. A brand new fully transistorised Communications Receiver that is ideally suitable for mobile operation. Specifications. Four complete ranges. 550 kc/s. to 30 mc/s, covering all Amateur bands, shipping and trawler bands and broadcast bands. A highly efficient double tuned superhet comprising R/F aerial tuning section, AVC and tunable BFO for CW or SSB reception. Operates from a 9 volt battery that fits internally. With speaker and headphone output. Hammer finished robust steel case of pleasing modern design. Size only 9" x 5" x 5". British made. Equal in performance to sets costing three times the price. The set factory built and tested with 12 months guarantee. Complete with handbook, 16 gns. carriage and insurance 14/-. **COD or CWO. ACCESSORIES:** Headphones (moving coil), 19/6, p.p. 5/-; fitted S meter, £2/10/- extra; stabilised mains power pack, £4/10/-, carriage 10/-; de-luxe loudspeaker in matching cabinet, £2/15/-, p.p. 5/-.

This set is now available to the home constructor in kit form. With fully punched chassis, point to point wiring diagram, full step by step instructions, printed circuit boards and pre-aligned IFs. Price: 14 gns., carriage 16/- inc. insurance.



COLLAPSIBLE AERIAL
IN 5 SECTIONS
CLOSED 13"
OPEN 5'-6"

A fully adjustable highly efficient Whip aerial made to exacting specifications. Copper plated sections. Brass base. An ideal aerial for Tx/Rx use. Easily adaptable for cars, scooters, walkie-talkies etc. Brand new in maker's boxes. Only £1 each, p. and 2/6. Two aerials for 35/-, post free.

MORSE PRACTICE OSCILLATOR SET. Complete with "Hints on learning morse" manual. Fully transistorised. In compact case. 19/11, p.p. 3/6.

MINIATURE TRANSISTORISED B.F.O. UNIT

This is a miniature transistorised B.F.O. unit (tunable) that will enable your set to receive C.W. or S.S.B. reception. Compact. Single hole fixing. This small unit will fit anywhere. Complete with fitting instructions, 49/6, post free.

New Component Centre open at this address.



GLOBE SCIENTIFIC LTD Dept. S.W.13.
24 CAWOODS YARD, MILL STREET, LEEDS, 9.

BAGINTON ELECTRONICS

G3TFC	(SALES)	Ex ZC4JC
XTAL CONTROL UNITS. 34 xtals, 3 outputs, 36-495 to 39-74 in 250 kc. steps. 13-54 to 13-99 in 50 kc. steps and 29-697 to 30-597 in 100 kc. steps. 3 valves type CV138. With connection data. P. and P. 4/6		
BE256 TX/RX.	116-132 mc. 5 channels. 12/24v.	£3
LEAR VHF TX.	118-126.9 mc. 90 channels	£25
COLLINS AUTOMATIC ATC.	180L-2	£90
DESGNN BEAM DIRECTION INDICATOR SYSTEM		
6-24v. DC 50-200 ma.	...	£4
CO-AX RELAYS.	N type connector	£2
RT18/ARCI VHF TX/RX.	100-156 mc. 832As.	£8
107 TX.	3829B 2-18.5 mc., meter	£5
107 ATU.	2-18.5 mc., meter, 2000pF variable	£4
TYPE 1815 VHF SIG. GEN.	99-156 mc., AM/FM	£12
BOOM HEADSETS.	150 ohm, 300 ohm E.M. mic.	£3
ROTATORS.	1 r.p.m. 500 lb. in. 12/24v. A.C./D.C.	£3
MARCONI MODULATORS.	90w. 829Bs, Clipper, Filter	£4
2 METRE CONVERTER UNITS.	6AK5's, xtal	£5
State I.F. required between 4-30 mc.		
STR.	12D/100 kc. 140 channels. 118-131 mc.	£100
TF202C.	Impedance Comp. Bridge	£10
BC733 VHF RX.	108-112 mc. P. and P. 12/6	£4
BC433 COMPASS RX's.	200-1750 kc.	£5
XTALS	from 8/-, List 1/- stamps. All prices plus P. and P.	

Specific enquiries only please—S.A.E.

BAGINTON ELECTRONICS (SALES)

MARKET CORNER, BAGINTON, WARKS. (near Airport)
Postal Code CV8-3AP. Tel. TOLL-BAR 3688
Robophone 24 hour service

N. W. ELECTRICS

52 GT. ANCOATS STREET
MANCHESTER 4

CEN 6276

G3MAX

Business hours : 9 a.m.-6 p.m. Tuesday-Saturday
CLOSED ALL DAY MONDAY

Stamped addressed envelope please, for any inquiries.

Receiver Unit R3673 20 to 90 Mc/s. Size 13in. x 8in. x 8in. 10 channel. Motor selected. High quality converter unit into 7.5 Mc/s. iF strip. 19 valves. (13 EF91, 3 EB91, 1 EL91, 1 6J6, 1 EAC 91.) Small blower, 2 relays. Supplied with circuit and modifications. £3 10s., plus postage 10/-. All tested before despatch.

Low Resistance Headphones. 100 ohms, D.C. Brand new, boxed, 7/6. Postage 3/-.

R.A.F. Modulator Ex. TR1986 VHF Transmitter. EF92-EL91-P.P.6C4. Circuit supplied, 15/-, post 4/6.

RF 25 Bandswitched Converter. Pre-set frequency. Excellent component value. Contains: 15, 30pf Philips trimmers, ceramic switch, 1-pole 5-way, 3-bank, 3 $\frac{3}{8}$ x 1" ceramic formers, 3 SP61 valves, 2 $\frac{3}{8}$ " Aladdin formers, standoffs, etc. The complete unit for 7/6. Postage 6/- unfortunately.

CT54. Valve Voltmeter. 4in. Meter. 0 to 480 Volts A.C. and D.C. in 6 ranges. With Multiplier for 2.4 Kv. Range. 0 to 10 Megohm in 5 ranges. Frequency response 20 c/s to 200 Mc/s., with Valve Type Probe. Power requirements 2 x 1.4, 75 and 15 volt. Batteries (not supplied). All tested before despatch. Price with circuits, £10 15s. P.P. 10/-. A.C. power supply components and gen., 28/- Only supplied with valve voltmeter.

BC221. Heterodyne Frequency Meter. 125 Kc/s. to 20 Mc/s. Harmonics can be used for high freq. These are absolutely Brand New in sealed carton. We will open and test on request. Power required 6 volt LT. 150 volt HT., £32 10s. P.P. 10/-.

Coaxial Relays, 'Londex' 24v. D.C. 70 watts. RF at 200 Mc/s. Supplied with 3 plugs (ex-cable), 22/6, plus 2/6 postage.

We still have some items from previous adverts.

G3SMI

SMALL ADVERTISEMENTS, TRADE—continued

LEICESTER G3ACQ: Sphinx, Cannonball, Eagle, Codar, Joysticks, Eddystone 840C, EC-10, etc., Trio JR-500, Trio 9R-59, Components, Sanyo, Goodmans, Armsrong, Garrard, Wharfedale, Nombrex, Sinclair, etc.—Mays, 12-14 Churchgate, City Centre, Leicester, LE1-4AJ. (Tel. 58662).

READERS ADVERTISEMENTS

3d. per word, minimum charge 5/-, payable with order. Add 25% for Bold Face (Heavy Type). Please write clearly, using full punctuation and recognised abbreviations. No responsibility accepted for transcription errors. Box Numbers 1/6 Extra. Replies to Box Numbers should be addressed to The Short Wave Magazine, 55 Victoria Street, London, S.W.1.

WANTED: For rebuilding, incomplete or not working, Hallicrafters SX28, SX28A, S40A, SX-42 or what-have-you? With or without valves, or requiring spare parts. Reasonable price paid and collection arranged. Also require unmodified Hammarlund SP-600, in first-class condition. **SELLING,** at £8, a Minimitter converter.—Wise, 61B Beach Road, Newton, Porthcawl (2276), Glamorgan, South Wales.

SALE: Collins 32V-1 Transmitter, runs 150 watts CW/Phone over 10 to 80 metres, with 110-240v. transformer, all in mint condition, price £35. Geloso G.209M receiver, suitable AM/CW/SSB, coverage 10 to 160m., bandspread, unscratched condition, £25. National NC-100X/A receiver, at £7. Two-ele beam for 10 metres, £7. Inspection invited. — Jamie, G3TKM, QTHR.

FOR SALE: Heathkit DX-100U, £40. HA-30, £10. Lafayette HA-350 SSB receiver, new last October, price £50.—Spriggs, 4 Greencroft Road, Heston, Middlesex. (Tel. 01-570 7890).

SELLING: Eddystone 888 Receiver, with mounting blocks and speaker, in absolutely mint condition, £65. CTX-4 four-metre transmitter, £10. Eddystone EC-10 receiver, in new condition, £38. Neumann stereo pick-up cartridge, £10. (Lancashire).—Box No. 4648, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Hammarlund HQ-180, SP-600Jx or R.C.A. AR-3516L. Have FOR SALE: National NC-190 receiver, with matching speaker, in excellent condition, at £60. Heathkit QPM-1, £5. — Brown, 45 Hawthorn Avenue, Bearsden, Dunbartonshire, Scotland.

WANTED: Good quality factory-built stereo amplifier and stereo speaker system. **FOR SALE:** Cased FM Tuner, with PSU, etc., £3. Record/playback tape amplifier, case for deck, etc., £5. Car radio, 40s. All in good condition and working.—Thompson, 1 Church Road, East Molesey (4503), Surrey.

OFFERING: Collins 75S-3 receiver, at £230 or near. Would consider part-exchange, what-have-you? Maximum exchange £30. (South Devon).—Box No. 4349, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: TW-160 and TW-2 Transceivers, or similar, also Vanguard, coverage 10 to 160m. **EXCHANGE,** any following: Labgear LG.300; Television camera; Bolex ciné projector, with case and screen.—Jones, 3 Bircham View, Eggbuckland, Plymouth, Devon.

OFFERS? Well-known amateur has for disposal Panda PR-120V transmitter, covering 10 to 80 metres, with ATU. Also Radiovision "Commander" receiver, in good order, buyers to collect. What offers? (Cheshire). — Box No. 4650, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: K.W. Vanguard transmitter, covering 10 to 160m., assembled from kit but unused on the air. Also Heathkit reflected power meter. Both together at £30, or offers?—Upchurch, 31 Shanklin Avenue, Leicester (75894).

SMALL ADVERTISEMENTS, READERS—continued

SALE: Eddystone 888A receiver, in mint condition, at £65 or near offer. (South Wales).—Box No. 4651, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: W.S. No. 62, 12-volt portable transceiver, for 1-6 to 10 mc, with manual and some spares, £13. Collins TCS transmitter, with mains PSU and connectors, in mint condition, £12 10s. All this gear unmodified. Also Labgear LG.50 five-band table-top Tx, full BK, £20. HF Signal Generator Type TF-390G, £15. ASB-7 UHF receiver, 60s. Large quantity Type 3000 relays, new.—Ring Kempt, G3NRB, Knebworth (Herts.) 3438.

FOR SALE: New Dural tubing: Three lengths, 10ft. x 1½in. x 1/16in. wall; also four lengths, 6ft. x 1in. x 1/16in.; what offers, or what-have-you? Used Hallicrafters SX-28, price £16. K.W. Balun, for 50-80 ohms, 1:1 ratio, 20s. Low-loss coax, 38ft. of 50-ohm, 20s. Pse send s.a.e. with all enclosures.—Kennedy, 77 Seaview Road, Brightlingsea, Colchester, Essex.

REQUIRED: Good transmitter, suitable for a beginner; also Z-match, SWR Meter, LP Filter, A.W.M.—Pryse, G3WXT, 36 Hart Road, Byfleet, Weybridge, Surrey.

FOR SALE: TW2 Tx, with PSU and xtal, £21. JR-60 general coverage Rx, includes two metres, just realigned and in mint condition, £47. Varactor tripler, 20-watt, £9. Codar PR-30X preselector, with PSU, £4. BC-453, 60s. Also books of radio amateur interest, send s.a.e. for details.—Linton, 11 Talbot Crescent, Hendon, London, N.W.4.

SELLING: Denco Type MT-01 modulated test oscillator, covering 170 to 1600 kc, in good condition, complete with battery and instructions, cost £4, offered at 32s. 6d., post paid.—Box No. 4652, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Marconi Signal Generator Type 6, brand new, £7. Indicator Type CRT-1, 60s. Marconi Test Set Type 385A (audio and RF generator), brand new, £8. No. 48 receiver, 20s. Type 19 Set, with variometer, 40s. Waveform/Pulse Generator Type 51, at £5. Carriage extra. Offers considered. Please send s.a.e. with enquiries.—Hayward, Sunnyfields, Lighthouse Road, St. Margaret's Bay, Nr. Dover, Kent.

WANTED: Comple'e station, covering 10 to 80 metres, SSB preferred. Have Been QRT for 10 years, now want to train spastic daughter, so gear must be reasonably compact.—Underwood, G3ESO, 4 Earls Court Road, Amesbury (3001), Wilts.

SELLING: A Type R.216 receiver, with correct matching PSU, in new condition, with cabling and circuitry, 16-valve job, covering 19 to 157 mc, in five bands on 6ft. 70 mm. film scale, with calibration every 100 kc and excellent mechanical drive, suitable AM/CW/FM, incorporating variable selectivity, crystal calibrator 1.0 and 5.0 mc, with re-setting device, price £42 or near offer, carriage paid. Lafayette mechanical filter, new and unused, original box and data sheets, £9. Electroniques valve-type amateur band front end, new and unused, with data, £10 10s. New Eddystone Type 893 dial, £3 15s. Three transistor portables, 27.005 mc, 60s. pair; 28.8389 mc, £4 pair. Attenuator 75-ohm, new, for Advance signal generator, 10s. Set of Denco transis:or coils, in cans, for Range 3, types blue, yellow, red and white, 7s. 6d. DG13.35 5in. PDA tube, used but good, 10s. CV-1526 2½in. PDA tube, in mu-metal shield and outer case with graticule, new, 20s. Two 5FP7's, 5s. each; one VCR-97, 5s. Enquiries and offers.—Jaques, 47 Newstead Road, Urmston, Manchester.

FOR SALE: Codar CR-70A receiver, in good condition, with matching speaker, headphones and RQ-10 Q-multiplier. Price £18, inspection invited.—Dunn, 3 Gravel Road, Trailer Park, Station Road, Blisworth, Northampton.

You deserve a rest—come down on 2-M !
with these **PRINTSET** Basi-kits from West Germany

28/144 MHz TRANSVERTER TRV4
Basi-kit only £2.17.6.

NEW 144 MHz LINEAR AMPLIFIER LPA-144
Basi-kit only £2.7.6.

144 MHz RECEIVING CONVERTER CRV4
(Uses the TRV4 Transverter's crystal)
Basi-kit only £1.14.9.

14-page Catalogue SP5 describes these and other VHF, SSB, CW (El-Bug) and RTTY kits.

SPACEMARK Ltd. 14 PICCADILLY, MANCHESTER 1 (Tel: 061-237 0817)

THE MINI-TEN

Two element beam for ten metres.

G3XKF The lowest priced two element beam for ten metres available to the Radio Amateur. **G3XKF**

(Quote from Herb Bartlett G5QA) :—

Exceptionally well designed and engineered job and most certainly worth more than the price asked. Tied to a fence immediately worked VPB, ZL worked 5-7-9.

Mini-Ten of all dural construction and all parts cadmium plated, overall length 10ft. 8in., weight : 8½ lbs.

Price only £8/19/6 (Post and Packing 10/-)

Immediate Delivery.

PANDA PR 120v. TX, 80-10, £20 OR EXCHANGE K.W. VALIANT

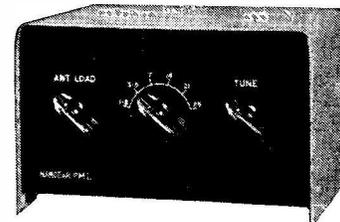
Send S.A.E. (9 x 4) for Illustrated Leaflet to:—

MINITENNA BEAM PRODUCTS

(J. Sharratt)

EDLESBOROUGH, DUNSTABLE, BEDS. Tel. Eaton Bray 297

Recipe for better listening



Take one pentode pre-amp covering 1.8/32 mc/s. completely, add an antenna tuner so that no spicy DX is lost. Pop in a crystal oscillator to check dial calibration every 1 mc/s., plus a built-in power supply, place the whole lot in a small box of modern styling. You will find this unbeatable at £9/18/-, Less Calibrator £6/18/-, Send for leaflets.

HAMGEAR ELECTRONICS
29 CARLYLE ROAD, NORWICH

HIGH GLOSS METALLIC

HAMMERED ENAMEL

"Makes Fantastic Difference to Panels" — say hundreds of enthusiastic users.

"Crackle" pattern appears like magic on wood and metal. No undercoat. Air dries 15 min. to hard glossy finish. Heat, liquid and scratch-proof. Light and dark blue; bronze; silver; green; black.

Send 10/- NOW for trial ½-pt. tin. Colour samples and instructions. Post free.



FINNIGAN SPECIALITY PAINTS. Dept. S.W. STOCKFIELD (Telephone 2280), NORTHUMBERLAND

AMATEUR ELECTRONICS

G 3 F I K

We are pleased to announce that we are now demonstrating the remarkable new **TRIO TS-500 TRANSCEIVER** the latest addition to the TRIO range which has been making such an impact of late. The TS-500 is similarly styled to the well-known JR-500SE and has the same high standard of construction and specification. Unquestionably, this equipment represents the finest value for money on the U.K. market today and is an absolute must for the man entertaining the purchase of SSB gear which is truly complete in specification, of advanced design and styling and of superb performance. P.E.P. is 200 watts (2 x 6146B's) and a completely separate second VFO is included in the package with the same coverage and 1 Kc. read-out as the parent set. **TS-500** complete with matching VFO-5 and matching PS-500AC power supply. Complete and fully guaranteed £199 0 0 Fully illustrated brochure available by return upon receipt of S.A.E.

TRIO JR-500SE RECEIVERS. Still at the old price 59 gns.
TRIO 9R-59 DE RECEIVERS. Also unchanged at 35 gns.
AR88 RECEIVERS. LF Models from £35. Details on request.
AR88 RECEIVERS. In fully aligned and air-tested condition in the following grades:

With cases in original condition	£45 0 0
With resprayed cabinets	£47 0 0
Fitted new cases	£48 0 0

EDDYSTONE 888A. Good condition and first class order. Carriage paid £56 0 0
KW VICEROY MK. IV. In most immaculate, unmarked condition and first class order. Carriage paid £110 0 0
EDDYSTONE 640 RECEIVERS. A selection of these from £16/10 to £25 according to physical condition but all in excellent working order.
KW YESPA MK. I. Complete with FB home-brew power supply. Carriage paid £85 0 0
HRO SENIOR (Octal valves) complete with power supply and five general coverage coils. In outstanding condition. Carr. paid £29 12 6
FL8 FILTER UNITS. Carriage paid 10 6
SOMMERKAMP FR100B RECEIVERS. Brand new. A few only. To clear £105 0 0

Many other items in stock. Your S.A.E. with enquiries please.
 Part exchanges. First class hire purchase facilities available.

518-520 ALUM ROCK ROAD, ALUM ROCK, BIRMINGHAM 8
 Telephone: 021-327-1497.

G. W. M. RADIO LTD.

RECEIVERS

ADMIRALTY B.40. 640 Kc/s. to 30.5 Mc/s. 14 valves. Speaker, A.C. power unit built in. Bandwidth switched 1, 3 and 8 Kc/s. Crystal calibrator. Large vertical calibrated illuminated dial. Circuit diagram, £22/10/-. Also B41 low frequency version, 15 Kc/s. to 700 Kc/s., £10, carriage 30/- per set.

OSCILLOSCOPES. Cossor 339, £10. Miniature type CT52, £20, both carriage paid.

19 SET control boxes, 8/6, all post paid.

R1475. 2-20 Mc/s. Large slow motion dial etc., with original power unit for 12 volts D.C. or 230 volts A.C. Less connecting cable, all connections marked, £10/10/-. Carriage £1.

RECEIVERS PCR1. 900-2000, 200-550 metres, 6-22 Mc/s. No power unit, £6/10/-. Carriage 15/-.

RECEIVERS. Marconi CR100, good working order, £18/10/-. Carriage £1. Marconi CR300, simpler version, complete with power unit for 230 A.C., £13/10/-. Carriage £1.

HEADSETS for 19 or 22 set with mike, used 10/-, new 15/-, 19 set control boxes, 8/6, all post paid.

CRYSTAL CALIBRATORS. No. 10, 39/6, post 6/6.

ROLLER inductor tuners 30 turns 1 1/2" dia., 12/6, post 4/6. Ceramic transmitting switches, 6 wafers 2 1/2" dia. each 1 pole 6-way, 7/6, post 2/6. Ceramic transmitting condensers, Cydon 250 plus 250 pf., 25/-, post 4/6. Parmeko 230 volt transformers 24v. 2a. fused and shrouded, 25/-, post paid.

RECEIVERS R1392/P104 complete, not tested, £4/10/-. Carriage 15/-
R.F. UNITS type 136 (RF27) tunable. Ideal for 4 metre conversion, 35/-, post 5/-.

MAINS TRANSFORMERS, standard tapped input, 340-240-0-240-340 volts at 75 mA., 0-4-5-6-3 volts 2 amps, 25/-, also 240-0-240 volts at 133 mA, 5v. 2a, 6-3v. 2a, 6-3v. 2a, 6-3v. 5a, 35/-, both post paid.

10X CRYSTALS, 100 or 500 kc/s., 12/6, post paid. 19 set rotary power unit 12 volts D.C., 30/-, carriage paid.

METERS. 2 1/2" dia. Round 500 ma., 14/-, 100 volts D.C., 12/6; 50 Mic/amps., 25-0-25 Mic/amps., 500 Mic/amps., 17/6; 3 1/2" dia. Round 50 Mic/amps., 30/-, Ex-equipment 500 Mic/amps., calibrated 0-15, 0-600 volts, 8/6, postage 1/6 per meter.

Spares kits for R209. 7 valves types, 75B1 2 x IT4, 2 x ISS, EF92, IRS and 12 volt 4 pin vibrator, 12/6, post paid.

All equipment offered is complete but not tested unless otherwise stated. Carriage charges quoted are for England and Wales only.

Telephone 9097

Terms: Cash with order. Early closing Wednesday.

40-42 PORTLAND ROAD, WORTHING, SUSSEX

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Urgently, a collapsible mast, Minimitter or similar, at fair price and in reasonable condition.—Hollington, G4GA, 1 Templeton Avenue, Chingford, London, E.4. (Tel. 01-529 5635).

FOR SALE: Complete amateur AM/CW station, comprising Heathkit DX-40U and VFO, £23. AR88D with Q-multiplier, S-meter and 100 kc calibrator, plus aerial c/o relay, £35. Or the lot for £52 10s., carriage extra.—Farrar, G3UCQ, Elm Cottage, Ventonleague, Hayle, Cornwall.

SELLING: K.W. Geloso converter, 10-80m., £12. Also National HRO with nine coil packs and PSU, £18. Or offers for the pair. Prefer buyer to inspect and collect.—M'Gregor, 16 West Craigs Avenue, Edinburgh, 12. (Tel. 031-334 2954).

FOR SALE: Heathkit RG-1 receiver, in mint condition and complete with handbook and set of spare valves, price £28, buyer to inspect and collect.—Pitt, G3VRY, 17 Waldegrave Road, London, N.8. (Tel. 01-888 9482, after 6.0 p.m.).

BARGAIN: Heathkit Mohican GC-1U receiver, in mint condition, checked and aligned by Daystrom, Ltd., price £18 or near offer, buyer to collect.—Burke, 28 Gloucester Avenue, Hurstead, Rochdale, Lancs.

WANTED: Top Band receiver, must be cheap and in good working order.—Johns, Manteg, Penslade, Fishguard, Pembrokeshire, West Wales.

SALE: Heathkit GR-64 receiver, one medium-wave band, three short-wave, new December '67, factory aligned and in perfect condition, price £16.—Dawbarn, 8 Daylesford Close, Parkstone, Poole, Dorset.

WANTED: Spares for Hallcrafters SX-42, band-spread dials, front panel, knobs and S-meter, what-have-you? **SELLING:** Codar PR-30, 65s. T.W. Mini-Halo, 45s. Twelve copies "QST," 1963-65, 20s.—Perrin, 30 Franchise Street, Kidderminster, Worcs.

SELLING: R.208 receiver, coverage 10 to 60 mc, £8. T.W. two-metre converter, IF 4.6 mc, £6. Two Command receivers, Q5'er and 80-metre models, 40s. each. R.1224 Rx, 40s.—Wareing, 29 Clarendon Road, Swinton, Lancs.

FOR SALE: Brand New Trio 9R-59DE, an excellent receiver, bargain at £25 collected, no offers. (Lancs. area).—Box No. 4653, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

TIDYING UP: Garex converter for 70 cm., IF 28-30 mc, as new, a beautiful job, for 12v. supply, but negative earth, £9 10s. TMR-5 with Mk. V 70-cm. converter, working but needs thorough alignment, 12v.+ earth, price £19. Z.12 amplifier, for 12v. supply, gives 10 watts into 3 ohms, in utility case, with volume, treble and bass controls, £3.—Jarvis, G8APX, Royal Masonic Senior School, Bushey, Herts. (School accepts no telephone or callers).

SELLING: Converters VHF, Type AM.913/914, new and unmodified, £36 the pair. BC-221 frequency meter, new, with stabilised PSU and headphones, £28. Hallcrafters SX-28 receiver, excellent condition and performance, with manual, £30. BC-342, new and unmodified, price £22. Command Rx for 1.5 to 3.0 mc, brand new in carton, £10. BC-453 (Q5'er), ditto condition, £6 10s. All carriage extra. **WANTED:** National HRO-50/60T, 51J3/4 or other quality receiver; Oscilloscope Type USM.32; and high-grade VTVM. (Lancs. area).—Box No. 4654, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Xtals, Type FT-243, six at 5.2 mc, one at 8.92 mc.—Elvins, G3WUG, 40 Willow Road, Bromsgrove, Worcs.

RTTY, Urgent. The Canadian Amateur Teletype Group. VE3RTT, again sponsors the Eighth World-Wide RTTY Sweepstakes, taking place over October 5-6. Also join our Nets on 3612.5, 3610.0 or 3630.0 kc every day. Remember October 5-6. Centennial Plus One. RYRY!

SMALL ADVERTISEMENTS, READERS—continued

SELLING: Course for 1st and 2nd Class P.M.G. Certificate, consisting of 30 lessons. Ideal for R.A.E., but no Morse records, price £7.—Stringer, 76 Cuckfield Road, Hurspierpoint (3127), Sussex.

FOR SALE: Lafayette HA-63 receiver, in excellent condition, nearest to £14 secures.—Kelf, 30 Brampton Road, Croydon, Surrey. CRO 6JN.

SALE: Gelo 212 Tx, £32 10s. K.W. Viceroy Mk. II, with PSU, £80. R.209 Rx, Mk. II, for 12v., £10. All items in excellent condition. Haggle/deliver, etc.—G3SCD, QTHR, or ring Louth 2327, office hours.

SELLING: Ciné camera, Kodak Instamatic 8 mm., brand new, with leather case, £20.—Tee, G8UA, 33 Red Lees Road, Cliviger, Burnley, Lancs.

FOR SALE: Eddystone 840C receiver, virtually unused, price £40.—Dade, Dolfinfa, Moelfre Bay, Anglesey, North Wales. (Tel. Moelfre 348).

SALE: Electroniques QP-166 tuner, with Eddystone 898 drive and cabinet, all in mint condition, £11. National HRO-MX receiver, with eight general-coverage coil packs, speaker and PSU, £18. Elizabethan tape recorder, £10. Collaro Conquest record player, £5. Signal Generator, Homelab Type 10, 40s. Crystal Calibrator No. 7, Mk. 1, 20s. Manual for CR-150/3, 20s. Clearing shack: Various meters, valves, transformers, etc., etc. Carriage extra, but prefer buyers collect.—Lockyer, G3OVA, 23 Beechwood Road, Kings Heath, Birmingham, 14.

FOR SALE: R.C.A. crystal calibrated wavemeter Type TE-149, 2500 kc to 20 mc, new in wooden case, with spare parts, new batteries and manual, £15. Crystal Calibrator No. 10, coverage 1.5 to 30 mc, in good condition, with manual, £5. Radio Amateur Examination "Questions & Answers," 1958 to 1967, 25s. complete. G3HSC Morse course, less the paperwork, 30s. **WANTED:** Manual for BC-221 and HRO, also bandspread 160m. coil. P.60 Versatower. 4X250B's, socket and chimneys.—Liming, St. Leonards, Forest Road, East Horsley (3982), Surrey.

SELLING: National HRO, with six coil packs; bandspread for 10-15-20-80m., general coverage for 40m. and Top Band, all in perfect condition, and also including an R.1155, at £35 or near offer.—Holdstock, 41 Crabtree Lane, Great Bookham (4743), Surrey.

SALE: SBE-34 four-band SSB transceiver, in mint condition, price £140. Z-Match for 10-160m., with UHF sockets. £5. Tunable low-pass filter, 50-ohm, £3. Nova Pal transistor Rx, covers 80-160m. bands and includes D/F, mint, £16.—Barry, 15 Fairlawn Court, Acton Lane, London, W.4.

WANTED: Second-hand 24-hour digital clock, for 230v. AC.—Michaelson, G3RDG, 40 The Vale, London, N.W.11.

WANTED: HRO or other good Rx in reasonable condition, for beginner/SWL. Send s.a.e. with details.—Coleman, 6 Lynchets Road, Amesbury, Salisbury, Wilts.

WANTED: Hammarlund HX-50 SSB Tx. Details and price.—G3LGL, QTHR, or ring Cradley Heath (Wors.) 69970.

SALE: R.1116A communications type receiver, 8 valve, coverage 142 kc to 20 mc in seven wavebands, in perfect working order, with large PSU. Price £5 10s. to callers only.—Griffiths, 5 Swanage Road, Small Heath, Birmingham, 10.

WANTED: R.216, S.27, S.36 or similar receiver.

SELLING: S-meter for S.640, mint condition.—Kerley, 23 Rushton Road, Chadle Heath, Stockport (9245), Cheshire.

SALE: Hammarlund HQ-170 receiver, with handbook, price £70. Reason for sale: Going mobile.—Rowlands, 37 Hampton Road, Oswestry, Shropshire.

WANTED: Command receiver for 1.5 to 3.0 mc, also SSB Tx covering 80-160m.—Sgt. Eslor, R.A.F.N.S.U., No. 3 J.S.C., B.F.P.O. 18.

G3LRB STEPHENS-JAMES LTD. G3MGN

NEW! Trio TS-500 Transceiver. Full coverage all bands 80-10m. 200 watts P.E.P., VOX, MOX, IRT, 17 valves, 3 transistors, 15 diodes. Pair 6146B in PA, 1 uv s/n ratio. Precision double gear tuning mechanism. 1 KC direct readout. Double conversion superhet. Solid state VFO. Using new developed Trio crystal sideband filter provides superior shape factor and clear crisp SSB quality. Built-in crystal calibrator circuit. Complete with matching VFO unit for remote transmit/receive facilities. All complete with matching power supply unit in ultra modern styling cabinets. A complete station for only £199 1!

Second-hand Equipment		Trio 9R-59DE Receiver	
LG300 RF Section	£22	Trio JR-500SE Receiver	£68
Eddystone 888A	£65	Trio JR-60, Second-hand	£40
Eddystone 888A	£60	Lafayette HA700 Receiver	£37 16
HA55	£18	Lafayette HA500 Receiver	£44. 2
Sommerkamp FR100 Rx	£100	DRAKE equipment to order.	
Sommerkamp FL200 Tx	£110	2C Receiver	£120
KW Vanguard 80-160 m.	£35	R-4B Receiver	£225
Codar TX Rx	£12	T-4X Transmitter	£225
AR88LF	£37	TR4 Transceiver	£295
Star SR550 receiver	£40		
Gelo 209 receiver	£25		
Drake 2B receiver	£80		
AR88LF	£40		

Sommerkamp Line	
FR500 Receiver	£130
500 cps. Mech. Filter and 160m. crystal extra.	
FL500 Transmitter	£145
FT500 Transceiver	£250
FL100 Linear	£100
FT150 Transceiver	£215

KW2000A with A.C. p.s.u.	£232
KW Vespa Mk. 2 with p.s.u.	£155
KW 201 Receiver	£111
KW E-Z Match	£12.10
Hansen S.W.R. Bridges	£3 10
Paired Headsets	£2. 2. 6
DA Electronics Keyers	£16
Tech. Transistor GDO	£11 10
F5-1 Field Strength Meter	£2 5
Egg Insulators	6d.
Chassis from	3 6
Panel from	1 0
PL259 Plugs, 5/-; Cable reducers, 1/3; 50 ohm co-ax, 1/9 and 4/9 yd. Speakers and cabinets. Knobs. R.S.G.B. Publications.	

H.P. terms and Credit terms arranged. Part exchanges. Carriage and postage extra all items. S.A.E. enquiries please. After sales service.
70 PRIORY ROAD, ANFIELD, LIVERPOOL 4
 Tel.: 051-263-7829. Half day Wednesday.
 We are approximately 1/2 mile from the Liverpool and Everton Football grounds.

R. T. & I. ELECTRONICS LTD.

where equipment is fully overhauled

Hallicrafters SX100, 538 kc/s.—34 mc/s., crystal cal.	£100 (30/-)
Heathkit RA-1, bandspread receiver	£35 (20/-)
Hallicrafters SX 24, 550 kc/s.—43 mc/s.	£25 (20/-)
Hammarlund SP-600-JX, 540 kc/s.—54 mc/s.	£125 (30/-)
Hammarlund HQ-170, bandspread receiver	£120 (30/-)
Eddystone EA-12 amateur bands receiver	£150 (30/-)
Eddystone 770R, VHF, 19-165 mc/s., AM/FM	£120 (30/-)
Hallicrafters S.36A, 28-143 mc/s., AM/FM	£50 (30/-)
KW Electronics KW600 linear amplifier	£90 (30/-)
Heathkit DX-40 transmitter with V.F.O. unit	£35 (40/-)
Hammarlund HQ-110-A, bandspread receiver	£95 (30/-)
Eddystone 888A, bandspread receiver	£85 (25/-)
Star SR-600, bandspread receiver	£72 (30/-)
R.C.A. AR88D, 540 kc/s.—32 mc/s.	£65 (40/-)
Star SR-550, bandspread receiver	£50 (25/-)
R.C.A. AR88F, 75-550 kc/s. and 1.5-30 mc/s.	£42 (40/-)
Heathkit RG-1, 600 kc/s.—32 mc/s.	£33 (20/-)
Marconi CR100, 60-420 kc/s. and 500 kc/s.—30 mc/s.	£30 (30/-)
Lafayette HA-63, 550 kc/s.—31 mc/s.	£20 (20/-)
Eddystone 960, transistorised receiver	£110 (30/-)
Hammarlund HQ145X	£140 (30/-)
Hammarlund HQ180	£110 (30/-)
Heathkit 0.12/U, oscilloscope	£35 (30/-)
Heathkit HQ/10, monitor scope	£30 (20/-)
Heathkit OS/2, oscilloscope	£18 (20/-)
Lafayette HA 350	£25 (20/-)
Lafayette QT 320	£25 (20/-)

ANY MAKE OF NEW EQUIPMENT SUPPLIED—a few examples, which are mainly in stock being:
AVOMETERS, Model 7, Mk. 2, £25; Model 40, Mk. 2, £25; Model 8, Mk. 3, £27; Model 9, Mk. 2, £27; Multimeter, Mk. 4, £10.
BROWN'S HEADPHONES, Type "F", 120 ohms, 2,000 ohms, 4,000 ohms, £3/7/6 (3/6). Type SC1100, noise excluding, high quality, electro-dynamic, low impedance, £6/6/- (3/6).
KW EQUIPMENT, Vespa Mk. 2 with A.C. p.s.u., £128; KW2000A, with A.C. p.s.u., £220; KW201 receiver, £105; KW1000 linear, £128.
GREEN EQUIPMENT, TMR-5 receiver, £35; Mark 5, 2-metre conv., £12.
CODAR, AT5, £16/10/-; 2501S, £8; T28, £15/10/-; PR30X, £7/4/-, etc.
PARTS "Joyride" and "Joymatch". Lists and details on request.
TRIO EQUIPMENT, Receivers JR-60-U, 540 kc/s.—30 mc/s. and 2 metres, £61/19- (25/-). JR-500SE, bandspread £68 (10/-). 9R-59DE, 540 kc/s.—30 mc/s., £37/10- (10/-). 9R-59, 54 kc/s.—30 mc/s., £34/13- (15/-).
 Our latest list of over 50 receivers, and many other interesting items sent free upon receipt of your s.a.e.

CARRIAGE for England, Scotland and Wales shown in brackets.
 TERMS: C.W.O., Approved Monthly Accounts, Hire Purchase and Part Exchange.
R. T. & I. ELECTRONICS LTD.
 Ashville Old Hall, Ashville Road, London, E.11 Tel: 01-539 4986

SWANCO PRODUCTS

LIMITED
G3NAP AMATEUR RADIO SPECIALIST G3PQQ
NEW EQUIPMENT

	£	s.	d.
Sommerkamp F-Series Equipment:			
FR-DX 500 double conversion superheterodyne with crystal-controlled first mixer, 160-10 metres ...	125	0	0
FL-DX 500 SSB/AM/CW transmitter, 240 watts PEP, complete with built-in power supply and antenna relay ...	145	0	0
FL-DX 2000 linear amplifier, 960 watts PEP ...	100	0	0
Sommerkamp FT-DX 150 transceiver, 80-10 metres ...	215	0	0
Sommerkamp FT-DX 500 transceiver, 80-10 metres ...	250	0	0

Swan Line Equipment:			
Swan 500 SSB transceiver, 80-10 metres ...	250	0	0
Swan 350 SSB transceiver, 80-10 metres ...	216	0	0
Swan 230-XC power supply (to suit 500 or 350) ...	49	0	0
Swan 410 VFO and adapter ...	61	15	0

Hallcrafters Equipment:			
SX-130 Communications receiver ...	86	15	0
SX-122 Communications receiver ...	148	5	0
SX-146 SSB receiver, 80-10 metres ...	137	5	0
HT-46 SSB transmitter, 80-10 metres ...	192	5	0
HA-1 electronic keyer ...	42	15	0

Eddystone Radio Ltd.:			
Eddystone EA12 Amateur bands receiver, 160-10 metres...	193	0	0
Eddystone 940 Communications receiver ...	143	0	0
Eddystone 840C Communications receiver ...	70	0	0
Eddystone EC10 receiver ...	53	0	0
Eddystone EB35 receiver ...	62	10	0
Eddystone EB36 receiver ...	56	5	0

Trio Communications Receivers:			
Trio JR-60 14 tubes amateur communications receiver, 540 kc/s.-30 mc/s., plus 142-148 mc/s. ...	61	19	0
Trio 9R59 9 tube communications receiver ...	34	13	0
Trio 9R59DE 8 tube communications receiver ...	39	15	0
Trio JR5005E Amateur bands receiver 80-10m. ...	68	0	0
Trio TS-500 SSB transceiver complete with a.c. P.S.U. and split frequency V.F.O., 80-10m, 200 watts PEP ...	199	0	0

Lafayette Communications Receivers:			
HA-500 Amateur bands receiver, 80-6 metres ...	44	2	0
HA-700 Communications receiver (with product detector) ...	37	16	0
HA-350 Amateur bands receiver, 80-10 metres ...	67	10	0

K.W. Electronics Ltd.:			
K.W. 201 Amateur bands receiver, 160m.-10m. ...	111	0	0
K.W. Vespa Mk. II transmitter (with P.S.U.) ...	135	0	0
K.W. 2000A SSB transceiver, 160m.-10m. (with P.S.U.) ...	232	0	0

Mosley Electronics (Beams):			
TA-33Jr. Triband three element beam ...	27	5	0
TA-32Jr. Triband two element beam ...	19	5	0
TA-31Jr. Triband dipole ...	11	11	0
V-3Jr. Triband vertical ...	8	5	0
TD-3Jr. Wire trap dipole ...	6	15	0
Channelmaster rotators ...	13	13	0
Channelmaster rotators (automatic) ...	18	18	0

Park-Air Electronics Ltd.:			
2 metre transmitter (complete with mic., etc.) ...	80	0	0
Jet Set Aircraft receiver ...	12	0	0
Sky Bandit Aircraft receiver ...	23	10	0
Kurer Aircraft, short, medium, and long wave receiver ...	41	9	6

Swanco/CSE Equipment:			
Swanco/CSE 2A10 solid state transmitter ...	43	7	0
Swanco/CSE 2AR solid state receiver ...	44	0	0
Swanco/CSE type II A.T.M.A. mobile/fixd/portable antenna ...	9	15	0
Swanco/CSE safety mobile microphone, Type MM2 ...	2	17	11
Swanco SP.144 2 metre converter ...	10	10	0
Swanco 100 kc/s. calibrator ...	5	19	6
Halsco Mobile antenna, now all weather, all bands system ...	6	17	6
Extra coils (when more than one band is required) ...	3	17	6
Swanco Quad Spiders (per pair) ...	6	10	0

Echelford Communications Equipment:			
Echelford M1/4 transmitter for 4 metres ...	30	0	0
Echelford M1/4 transmitter (mains or mobile) ...	40	0	0
Echelford C1/4 4 metre converter ...	10	10	0

Full range of Drake Equipment available to order.
Full range of Heathkit Equipment available to order.
Codar Radio Company:

	£	s.	d.		£	s.	d.
CR.70A receiver ...	19	10	0	CR.45RB ...	11	7	0
PR.30 ...	5	10	0	AR5 transmitter ...	16	10	0
FR.30X ...	7	4	0	250 volt P.S.U. ...	9	19	0
R.Q.10 ...	6	15	0	12/MS P.S.U. ...	11	5	0
R.Q.10X ...	8	8	0	12/RC control ...	2	7	6
CC.40 ...	6	10	0	T28 receiver ...	15	10	0
CR.45K ...	9	10	0	Mini-Clipper ...	1	19	6

Partridge Electronics:							
Joystick and ...	4	15	0	Shure 201 ...	4	10	0
Joystick de-luxe ...	5	19	6	Shure 202 ...	5	0	0
Type 3 tuner ...	2	15	0	Shure 444 ...	10	12	6
Type 3A tuner ...	3	12	6	Shure 401A ...	5	10	0
Type 4 tuner ...	4	4	0	Shure 2755K ...	4	2	6
Type 4RF tuner ...	6	6	0				

SECOND-HAND EQUIPMENT
Many items in stock including: LG-50, Tiger TR100, DX-100, SB10, K.W.76, K.W.77, 840C's, etc. Your enquiries please.
Full Service Facilities—receivers re-aligned, transmitters serviced, etc.
Illustrated Catalogue 7/6, post paid.

SWANCO PRODUCTS LIMITED

247 Humber Avenue, COVENTRY
Telephone: Coventry 22714 Hours: Mon.-Sat. 9 a.m.-6 p.m.

SMALL ADVERTISEMENTS, READERS—continued

SALE: Complete mobile rig for 160m., comprising Tx/Rx, PSU and aerial, £10. Modified 18 Set, 50s.—2 Cannons Mead, Stondon Massgy, Brentwood.

SELLING: Heathkit DX-100U, modified for SB-10U Sideband Adaptor, in mint condition, price £45. Can deliver to 100 miles, otherwise part carriage.—Thorburn, G3WBT, 27 Banklands, Workington, Cumberland.

FOR SALE: Eddystone EC-10 receiver, little used, coverage 550 kc to 30 mc, with S-meter, at £35.—Stebbing, 1 Highland Way, Knutsford, Cheshire. (Tel. Knutsford 4629, after 7.0 p.m.).

STOLEN, by false pretences, on Sunday, April 21, one Sommerkamp FT-150 transceiver. A reward of £20 is offered for information leading to the recovery of this item.—Lowe Electronics, 51 Wellington Street, Matlock, Derbyshire, DE4-3GS. (Tel. Matlock 2817, or 2430 after 6.0 p.m.).

OFFERING: Heathkit solid-state mobile PSU Type HP-13, hardly used, suitable for HW-32, SB-101, HW-100, etc. Offers invited, or what-have-you?—G3UFQ, QTHR.

SALE: Two No. 36 Sets, one modified and racked, with built-in crystal preamplifier, the other in original maker's boxes and unused, prices £10 and £8 respectively. Also 230 unused and boxed valves, including 6/QV04-7, 5/813's, 16/5B-255M's, etc., etc., £30 the lot. (North East).—Box No. 4655, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: R.107 Rx, coverage 1-2 to 17.5 mc, mains or 12v. input, clean, working and perfect, £12 or near offer, buyer collects after 6.0 p.m., or weekends.—Neal, 2 Tarn Cottages, Bolton-le-Sands, Carnforth, Lancs.

SELLING: Eddystone 940 receiver, new in March 1968, with plinth speaker, £105. Also Eddystone 840C Rx, in spotless original condition, at £30.—Trent, Busbridge Farmhouse, Godalming (1392), Surrey.

FOR SALE: Type 88 Rx (R.1475), £9. Amplifier Type 1413, complete with PSU, 60s. U.S. Army Oscillator, 70-100 mc. 60s. Waveform/Pulse Generator, Type 51, complete with PSU, £5. Audio Oscillator, 25 cycles to 15 kc, with PSU and output meter, £6. PSU Type 234, input 200-250v., outputs 250v. at 80 mA, 6-3v. at 4 amps, £5. No. 19 receiver, brand new with all attachments, £5. PSU for No. 19 Rx, new, input 200-250v., outputs for Tx/Rx. £4. Brand new control unit Type 704, tuner for Rx Type 1933A, complete with xtals, 40s. Brand new control unit type 381 for R.1933A tuning, complete xtals, 40s, PSU Type 24, for R.216 Rx, 100-250v. AC input, complete with connecting cables, £9. All carriage extra. Please include s.a.e. with enquiries.—Hayward, Sunnysfields, Lighthouse Road, St. Margaret's Bay Nr. Dover, Kent.

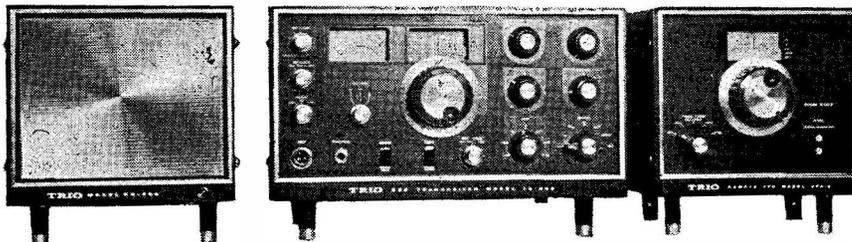
SALE: Trio 9R-59DE receiver, coverage 540 kc to 30 mc. unused and in original carton, price £25.—East, 41 Avenue Close, Avenue Road, London, N.W.8. (Tel. 01-722 7040).

ALL Advertisements above this line were received and acknowledged before May 6. We do not know how many more there will be before this issue closes for press. It is essential to forward Small Ads. in good time to avoid carry-over. Rates for Readers in this space are 3d. a word (minimum charge 5s., giving 20 words to include address), plus 25% extra for bold face (like this) if wanted, and 1s. 6d. for a box number. Draft your notice carefully and forward, with remittance, to: Advertisement Manager, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. If you are in doubt about charging, send a blank cheque marked "not over" the amount of your approximate estimate, and you can trust us to fill it in correctly—many people do!

SWANCO PRODUCTS LTD. of COVENTRY

Stock

The TRIO TS-500 SSB Transceiver



Specifications :—

Bands : 80-10 metres complete.
 Power : 200 watts P.E.P.
 Modes : SSB/AM/CW.
 Ant.: 50-75 ohm.
 Rx Sensitivity : $1\mu\text{V}$ S/N 10 dB.

Price :—

Trio TS-500 Transceiver.
 Trio PS-500AC P.S.U.
 Trio VFO-5 V.F.O.
 All three complete £199

Full details from your Midland stockist:

SWANCO PRODUCTS LTD.

247 HUMBER AVENUE,
 COVENTRY

Telephone : Cov. 22714
 (24 hour service)

Hours : Mon.-Sat.
 9.0 a.m.—6.0 p.m.

SMALL ADVERTISEMENTS, READERS—continued

SALE: Heathkit SB-10U Sideband Adaptor, with cables, plugs, manual, etc. Price £25. Delivery free mainland. — Cammies, 5 Willingdon Place, Granville Road, Walmer, Deal, Kent.

WANTED: Eddystone S.750, S.640 or 680X receiver. **SELLING:** Lafayette HE-30, as new, with a Joystick, price £20, or offers. — Gray, 25 Milbank Road, Darlington (5301), Co. Durham.

FOR SALE: K.W. Vanguard, coverage 10 to 160m. bands, price £30. Geloço G.209 receiver, £30. Carriage extra.—Marshall, G3RKH, 17 Sadler Street, Wells, Somerset.

SELLING: T.W.2 Station: Converter, 4.6 mc IF, Tx running 10 watts, with matching PSU. Price £20, carriage extra. (Hertfordshire). — Box No. 4656, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: T.W. two-metre Communicator, or similar commercial equipment in good condition.—Details and price, pse.—George, G8BID, 1 Fountain Road, Birmingham, 17.

WANTED: Two-metre converter, for IF 28-30 mc; price to include postage/packing. **SELLING:** Nombrex Signal Generator No. 27, in good condition, price £6. — Clark, 62 Waltham Road, Woodford Bridge, Essex. (Tel. 01-504 4984, after 7.0 p.m.).

ASKING Only £85 for a very fine K.W. Viceroy Mk. II Sideband transmitter, covering 10 to 80 metres, using a new pair of 6146B's. Also an excellent KW-77 receiver. Mk. II model, coverage 10 to 160 metres, at £75. Will sell these items separately and deliver free to within 75 miles of Derby. — Write Box No. 4657, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Lafayette KT-340, at £18, carriage extra. — Sangster, 13 Danestone Terrace, Bridge-of-Don, Aberdeen, Scotland.

EXCHANGE: Camera 35 mm. with case, also Russian 10-transistor receiver, FOR mains-type Receiver, 240v., covering VHF and amateur bands.—Sharp, 148 Monks Road, Lincoln.

FOR SALE: Rectifier elements Type 1N2379, 4000v. p.i.v. at 100 mA, new, listed £4 14s., for 6s. each, four for 20s. Miniature double-tuned transistor IFT's, 455-470 kc, $\frac{1}{2}$ in. x $\frac{1}{2}$ in. x $\frac{1}{2}$ in., new, 2s. 6d. each, or four for 8s.—Elliott, Oatlands, Southend Road, Sandon, Nr. Chelmsford, Essex.

COMPLETE SSB Station: Includes K.W. Vespa transmitter, price £95. Send s.a.e. for photograph. Also 40 unmarked copies "Short Wave Magazine," 1962-'68, 1s. 6d. each.—Dale, G3PZF, QTHR, or ring FN-54512 (Orpington).

FOR SALE: Labgear LG.50 Tx, £25; Lafayette HE-40, £11, buyers to inspect and collect Maidenhead, Berks. **WANTED:** Good two-metre converter, also GDO.—Box No. 4659, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Manual for Marconi CR-150/2 receiver, tuning 1.5 to 22 mc. Buy or loan. (Tel. 01-330 5357).—Box No. 4658, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Prop-pitch motor, complete with control board for 240v. input containing low-voltage transformer, reversing relays, transformer and rectifier for Selsyn supply, also two Selsyn units (one mounted with compass dial), the lot for £19.—Lee, G5FH, QTHR. (Ring 021-BRO 1338, after 7.0 p.m.).

FOR SALE: Eddystone 940 receiver, three years old, in immaculate condition and little used, £85 or near offer.—Lamb, 54 Dunbar Crescent, Southport (77529), Lancs.

SELLING: KW-600 linear amplifier, little used, £90. Microphones: Shure Type 444, £5; Foster 50K, £2 10s.; 600-ohm, 30s. — Barry, 15 Fairlawn Court, Acton Lane, London, W.4.

K. W. COMMUNICATIONS LTD.

The most experienced Staff in the Country are wishing to give you the best Service possible.

HY-GAIN ANTENNAE		£	s.	d.
18AVQ	Vertical 10-80m	27	10	0
14AVQ	Vertical 10-40m	16	0	0
12AVQ	Vertical 10-20m	14	0	0
14RMQ	Roof Mount Kit for 14AVQ	5	0	0
12RMQ	Roof Mount Kit for 12AVQ	4	10	0
LC80Q	80m Loading Coil for 14AVQ	4	5	0
TH3JR	3-Element 3 Band Thunderbird Junior	35	0	0
TH3Mk2	3-Element 3 Band Beam Thunderbird 2kw p.e.p.	58	0	0
TH2Mk2	2-Element 3 Band Beam Thunderbird 2kw p.e.p.	35	0	0
204BA	4-Element 20m Beam	58	0	0
203BA	3-Element 20m Beam	42	0	0
153BA	3-Element 15m Beam	24	10	0
103BA	3-Element 10m Beam	20	0	0
BN242	Balun 10-80m (Latest model)	7	10	0

MOBILE ANTENNAE. Halson, Webster, Hustler. Send for Lists

MECHANICAL FILTERS

Kokusai MF455-10CK and MF455-15CK	each	10	0	0
Sideband Carrier C-crystals	each	2	10	0

MOSLEY ANTENNAE

TA33JR	3-Element 3 Band Beam	27	5	0
TA32JR	2-Element 3 Band Beam	19	5	0
TA31JR	3 Band Dipole	11	11	0
V3JR	Vertical 10-20m	8	5	0

CDR ROTATORS

TR10 £16 0 0	AR22R £22 0 0	TR44 £37 10 0	HAM-M £65 0 0
--------------	---------------	---------------	---------------

Carriage extra on all above items

KW Tested Equipment—**ALWAYS CONTACT KW FIRST**
Agents for — COLLINS, SOMMERKAMP, DRAKE, SWAN,
DAVCO, HAMMARLUND, GALAXY etc.

also a large range of "TRADE-IN" EQUIPMENT

KW offer the BEST deal—best terms—best Performance (all equipment Tested to manufacturers' specifications before despatch)—best Service backed by our own long experience in the Amateur Radio Market.

K. W. COMMUNICATIONS LTD.

1a Heath Street, Dartford, Kent. Telephone: Dartford (DA) 21919

SMALL ADVERTISEMENTS. READERS—continued

SALE: R.C.A. AR88D receiver, with headphones and circuitry, £45. Also a National HRO, table model, coverage 50 kc to 30 mc, with headphones, speaker and circuit details, £25. And an RDO receiver, working but less coil boxes, £18.—Smith, G6AAN/T, 1 Rhymer Close, Long Street, Hanslope, Wolverton, Bucks.

SALE: R.1155 Rx and PSU, at £6. Lafayette HE-30 Rx, in very good condition, £17. Tropicalised R.107 receiver, unmodified, £10. PTC-114 4-metre receiver, with PSU, requires alignment, etc., 40s.—Ring Smith, G3SQM, Hambleden 443 (Bucks.).

BARGAIN! Parts for the G3RKK Receiver, every component except the crystal, and metal-work 99% completed with front panel finished. Wiring only to complete. Price £22 or near offer. — Cott, 53 Cecil Avenue, Enfield, Middlesex.

DISPOSING: National HRO-M with PSU and BS coil-packs for 10-15-20-40-80m., also GC, at £18.

Mod. xformer, ex-BC610, 30s. Xformer, 500-ohm into pair TZ40's, 15s. R.C.A. 15-watt amplifier, cased, Type 1220J, £4 10s. Partridge multi-ratio modulation transformer, rated for 75 watts audio, 30s. Minimitter "Miniciter" unit, for five bands, complete, £4. Labgear 5-band turret tuner, rated 50 watts, 40s. Heathkit Balun unit, 70s. Codar Q-Multiplier, Type RQ-10, £4 10s. Eddystone dial, Cat. No. 598, 15s. Also mains-type Woden transformers, s.a.e. details. — Caldwell, G8US, 3 Milton Avenue, Bath, Somerset.

EXCHANGE or SELL: Two 21ft. aluminium scaffold poles, at £5 (undeliverable), or Exchange for a receiver. — O'Connor, 3 Ingle Close, Northway Estate, Headington, Oxford.

WE Accept only advertising of Radio Amateur interest—but this can include exchanges for guns, cars or cameras; houses for sale offered under a call sign; accommodation, holiday or otherwise, where the owner holds a call and gives name, c/s and full QTH; and anything else that is reasonable in the radio context. Each month, we reject some advertising of the other sort, often accompanied by cheques at several times our rate—which is 3d. a word for Readers, minimum 5s., or 20 words. Whatever you may want to buy, exchange or sell—provided it comes under the general heading of radio—send your notice to: Advertisement Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1. We do not guarantee results but we can assure you that you will get the widest possible coverage of the Amateur Radio interest in the U.K. (And please write clearly, using the accepted abbreviations!)

FOR SALE: Commando-2 SSB Transmitter, £100. CM-1 Receiver, £40. Codar PR-30X, £6. Z-Match unit, 40s. — Murray, GM3JOI, 122 Kirke Park, Methilhill, Methil, Fife, Scotland.

SALE: Home-built 150-watt Tx, incorporating G6Loso VFO, 6146 driver, 2/TT21 PA, Modulator 2/807, Coax aerial c/o relay, spare valves, and relay PSU. All at £15.—Handley, G3UQA, 66 Croft Avenue, Penrith (2878), Cumberland.

SELLING: Mullard 3in. Oscilloscope, completely overhauled, price £12.—Henshaw, 15 Grasmere Road, Ellesmere Port, Cheshire.

SALE: R.107 Receiver, at £8. Also Command receivers for 1-5 to 3-0 mc and 6-0 to 9-1 mc. with PSU.—Jackson, 26 Princes Road, East Sheen, London, S.W.14.

EXCHANGE: G.E.C. Stereogram, less than a year old, four wavebands including VHF, listed £85, FOR a Heathkit RA-1 and Codar Pre-selector, or some similarly priced Rx. Details, pse.—Pemberton, 5 Sumner Street, Glossop, Derbyshire.

FOR SALE: National HRO, five coil packs and PSU, in good condition, price £14 10s., buyer to collect.—Bradley, 8 Carlton Avenue, Hornsea, Yorkshire.

TAURUS ELECTRICAL SERVICES

Prop.: G3TGD

Transistor Panels Ex NEW Equipment.

OC35 on Heat Sink, 8/9, post paid.
OC36 on Heat Sink, 9/3, post paid.
Mixed Transistors on Panels with Diodes, etc. Types: BCY30, 2N1500, 2N1499A, MDS31, GET882, 2S103, GET104, OC203, 12 and 15v. Zenitrs, etc. All guaranteed panels with at least 20 transistors, plus various components. All new Bargains at 20/-, post paid.
Silicon Planar Transistors by Fairchild P346 N.P.N. 550 Mc/s. working, 7/6 each, post paid.

600Ω Amplifiers. 19" rack mounted. Mains supply, £3.
Lightweight headsets. 600Ω imp., 9/6, post paid.
Transistors, A.F., 3/9 dozen, post paid.

New Ferrite Pot Cores, 1/6 each or 15/- dozen, post paid.
Transistorized Morse Oscillator Modules. Will drive speaker or phones. 18/9, post paid.

GGV03/12 or 10, 15/-, post paid.
New and Boxed Mains Relays, 2 pole 2-way octal base, 17/6, post paid.
New Nylon Jack Plugs 2/6 Pack Sockets, 2/9 or 5/- pair, post paid.
Tank Aerials Three 4' sections making 12', 8/6, P. & P. 5/- any number. Bases, 4/6. P. & P. 2/-.

Breast Sets. Safe for Mobile Operation, 10/-, post paid.
Xtal Insets to fit above Breast Sets, 7/6. P. & P. 9d.
Creed 7B Teleprinters. Used, £15. P. & P. 30/-.
Creed 7B Teleprinters. As new, £30. P. & P. 30/-.

All spare parts for Creed 7B Teleprinters in stock.
Head Sets. 19 set type or type DLR, 11/-, post paid.
Small Stand-off Insulators by Eddystone, 1/- each.

Dry Battery Packs. 72 and 1½ and 1½, 4/6 each. P. & P. any number 3/-.
New Key Switches. Less knobs, 2/6. P. & P. any number 1/-.
New Small Condensers, Not Junk. 200 for 25/-, post paid.
Multi-Test Meters. 1000Ω/V., 37/6.
Multi-Test Meters. 20,000Ω/V., £37/5/-.

Xtal Label Mikes. Complete, 6/6.
New Boxed Army Type Morse Keys, 5/6, post paid.
JUST ARRIVED. B40 Receivers, £22, post paid.

SPECIAL OFFER OF MIKES. D x 73 Pizo Dynamic, £3/2/6, post paid.
M.S.11 Dynamic with Flexible Desk Stand, £4/12/6, post paid.
ACOS Xtal (metal), MIC45, £1/2/6, post paid.

CM20 Xtal (plastic), 9/6, post paid.
CM70 Xtal Stick with Accessories, £2/7/6, post paid.
VALVEHOLDERS, B9A and B7G, 8d each, Octal Ceramics, 1/3.
BY100 Rectifiers, 3/9 each, SM78P Siliconics 800PIV 750M/A, 3/9.
Thyristors, 400 PIV 8 amps, 9/6 each.

TRANSISTORS
ATTENDING MOST MOBILE RALLIES

26/28 NOTTINGHAM ROAD, LOUGHBOROUGH, LEICS.
Telephone 5131

SMALL ADVERTISEMENTS, READERS—continued

WANTED: R.216 or similar receiver, details please.—Kerley, 53 Dartmouth Road, Paignton (56162), Devon.

FOR SALE: A Mosley vertical aerial, Type RV4, for use from ground level, £12 10s., buyer to collect, or will EXCHANGE for Linear Amp. component parts. Also available pair Wightraps, 10-80m., 25s. plus postage. (Midlands).—Box No. 4660, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: Complete Joystick Type V.F.A. system. Good condition essential.—Neil, 281 North Anderson Drive, Aberdeen, Scotland. (Tel. Aberdeen 44204, evenings).

OFFERING: Drake TR-4 transceiver with MS-4 speaker, including three extra xtals, virtually unused and in excellent condition, one year old, original cost just over £200, at £160 or near offer. (London).—Box No. 4661, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: Zephyr Mk. I convertible, year 1955, in fair condition, would sell or EXCHANGE for good commercial Rx or what-have-you? Canadian Marconi Rx, coverage 1.75 to 5.0 mc, with PSU, 60s. Withers two-metre pre-amplifier, 70s. Minimitter Converter, coverage 1.75 to 30 mc, IF 1.5 mc, at £14 or near offer. Ciné Editor, 8 mm., £7 or offer. Marconi Wavemeter No. 4, 20 to 300 mc, 60s. Ex-Govt. compressor, with hoses, 20s. Beam-pole guy rope holder (leaves mast free to rotate), two only, 2in. and 1½in. dia., 15s. each. Silicon stud rectifiers, DD716A, 400v. 35 amp., 15s. each. Set of metal valves for the HRO, 60s. or offer. TCS-type ATU, 20s. Red-blob ceramic condensers, .001 mF, three a shilling or 80 for 20s. Low-loss coax sockets, BN5/5B, 50-ohm, 4s. each. Mullard LW/MW transistor RF/IF modules, 20s. each.—Davies, 41 Chardmore Road, London, N.16.

FOR SALE: Heathkit Mohican, £28. Pi-coupled wide band exciter, 10-80m., PA 807, at £8. Modulator, 75-watt, £5. ZL Linear Amplifier, with 813 PA, £4. Woden DTM-18 xformer, 60s. Two wire recorders, working £8, faulty £3. Valves: 813, boxed, 30s. E180F, 8s.—Whorwell, 65 John Kennedy House, Rotherhithe Old Road, London, S.E.16. (Tel. 01-237 4604).

BARGAIN: Complete AM/SSB station, consisting of Heathkit DX-100U with aerial c/o relay and SB-10U Sideband Adaptor, and Trio JR-500S AM/SSB receiver. All as new, at £100. Or will separate; DX-100U at £45; SB-10U, £20; Trio JR-500S, £50. Carriage extra, or will deliver up to 50 miles.—Adams, Sue-Marey, Selsley Hill, Stroud (3130) Glos.

WANTED: Joystick aerial and Type 3A Tuner, exchange suggestions welcomed. — Brown, 17 Stanley Street, Galashiels, Selkirkshire, Scotland.

QRT Sale: Very rare 1st edition "Marconi Year Book" for 1913, 40s. "Radio Handbook," 20s. (Postage 4s. 6d.). Carton, 30lbs. of useful components, 40s. Extras for personal collection.—GW3LSB, QTHR.

OFFERS? Rack-fitting Class-B Modulator, rated 200 watts, with speech amplifier, giving quality audio output.—Parker, G3KH, 133 Station Road, Cropston, Leicester, LE7-7HH.

SELLING: Marconi CR-150/3 Rx, covering 2.0 to 60 mc, double-conversion, two double xtal filters, bandwidth variable 100 c/s to 13 kc, a fine receiver with its original PSU and technical manual, £45 or near offer, buyer to collect. Transistorised electronic keyer, Hammarlund HK-1B, range 8 to 50 w.p.m., as new, with manual, £15 or offer. Two 3-speed Morse records, LP's, as new, beginners and advanced, 8 to 42 w.p.m., 30s. each.—G3PDW, QTHR.

EDDYSTONE SHOWROOM



Visit the Eddystone Showroom at Imhofs and see all the popular models on permanent side-by-side demonstration. You can hear and compare the models that interest you and obtain the most expert advice about this range of superb communication receivers and accessories. Same day despatch to any part of the world, tax free for export and free delivery in the U.K. After sales service second to none.

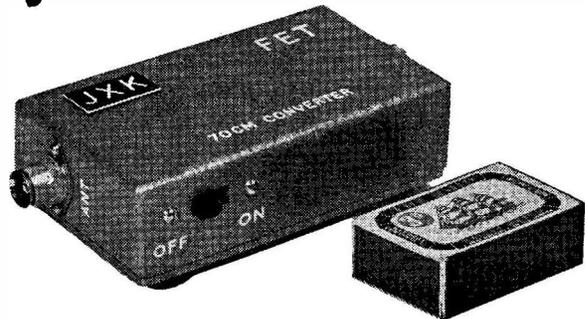
- EB35 — £62.10. 0.
- EB36 — £56. 5. 0.
- EC10 — £53. 0. 0.
- 840C — £70. 0. 0.
- EA12 — £195. 0. 0.
- 940 — £143. 0. 0.
- 830/7 — £295. 0. 0.

Send today for full details

AT IMHOFS

Main Eddystone Retail Distributors for the London Area
 Alfred Imhof Limited, Dept. 11 6.
 112-116 New Oxford Street, London WC1. 01-636 7878
 R46

JXK CONVERTERS



SOLID STATE VHF EQUIPMENT

- ★ 2 metre FET Converter £16
- ★ 4 metre FET Converter £16
- ★ 70 cm. FET Converter £20
- ★ 70 cm. SSB Transverter Converter £18
- ★ 70 cm. Preamplifier £12
- ★ Satellite Band Converter. 136-138 MHz £16
- ★ 2 metre SSB Transverter Converter £12
- ★ 2 metre FET Preamplifier £12

Send S.A.E. for comprehensive illustrated brochure

Post and packing 3/9 per item

JXK CONVERTERS

Peel House, Porters Lane, Ospringe, Faversham, Kent.

A. J. H. ELECTRONICS

Transistor audio strips approx. 750 M/W output when transistors are fitted to heat sink, contains 2, AC154s in P.P. AC113 and OC71, supplied with 1 watt output transformer and connection data. ONLY 17/-.

TRANSISTOR audio transformers driver and output, 1 watt rating suit OC81s, etc. 7/- pair or 4/6 each.

3 gang tuning capacitors 365pf per section with dual reduction 6-1 and 18-1 ratio with anti-backlash gears size only 2" x 1 1/2" x 1 1/2" long spindle, brand new 7/-.

Set 3 transistor double tuned 470 kc/s. I.F. transformers 10/-, 2 gang tuning capacitors 375 + 325 pf with 6-1 reduction drive 2" x 1 1/2" x 1 1/2" brand new 4/6.

F.E.T.s T1S34, brand new 16/6 each.

Mixed bag of silver mica and tubular ceramic capacitors, approx. 120, brand new 8/6 per bag.

Bag of 80 pf \pm 10% (silver mica size 1/2" x 1/2"). 100 for 4/6. Single tuned transistor 470 Kc/s. I.F. transformers O.K. for B.F.O.s, etc., 1/2" sq. x 1/2" long, 2/- each.

Glass fibre P.C. board 5" x 4" x 1/8" thick double sided, ideal for that V.H.F. transistor converter, 1/6 each.

Disc ceramic capacitors 3.3 pf 500 vw, .01 mfd. 12 vw. 1/2" dia. wire ended 4d. each, 3/- doz.; .001 mfd. 500 vw. P.C. type, 2/- doz.

BY100 type rectifiers 800 p.i.v. 750 m/a, brand new 3/- each. Double gang potentiometers 250k + 250k log, 500k + 500k lin. 1" dia. recent manufacture, 3/- each.

Transistor capacitors, .1 mfd. 50 vw., 4d. each, 3/- per doz. Transistor electrolytics, 2 mfd. 6 vw., 4 mfd. 64 vw., 10 mfd. 25 vw., 50 mfd. 6 vw., 100 mfd. 6 vw., 100 mfd. 9 vw., all 6d. each, 150 mfd. 12 vw., 350 mfd. 9 vw., 8d. each, 500 mfd. 9 vw., 9d., 400 mfd. 15 vw., 1/-.

5/16" dia. coil formers in 1/2" sq. can 2" long, contains 4 polystyrene cap. 50, 100, 150pf long leads, 2 chassis mounting clips, tag board, 2 cores, 6d. each, 5 for 2/-.

*5.5pf tubular ceramic trimmers P.C. type ideal for U.H.F. converters silver plated slightly tarnished 6/- doz. or 8d. each.

POSTAL SERVICE ONLY

Minimum Order 5/-.

S.A.E. for Lists.

Postage: under £1 + 1/6, between £1 and £3 + 2/3, free over £3.

59 Waverley Road, The Kent, Rugby, Warks.
Telephone: 71066

SMALL ADVERTISEMENTS, READERS—continued

SALE: KW-2000A with AC/PSU and set of spare valves, in perfect condition and appearance as new, price £175.—Ring Dolan, Oxford 63000, evenings.

FOR SALE: In mint condition, KW-2000 with AC/PSU and KW-600 linear, together with manuals. Prefer buyer to air test and collect by appointment Southend, Essex. Sensible offers only, p.e.—Box No. 4662, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

MORSE MADE !!!

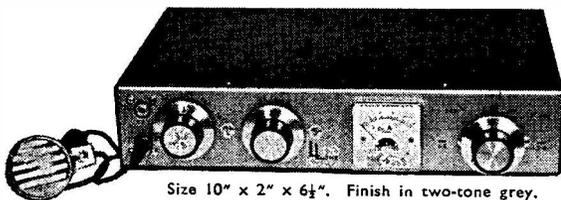
FACT NOT FICTION. If you start RIGHT you will be reading amateur and commercial Morse within a month. (Normal progress to be expected.)

Using scientifically prepared 3-speed records you automatically learn to recognise the code RHYTHM without translating. You can't help it, it's as easy as learning a tune. 18 W.P.M. in 4 weeks guaranteed.

For details and course C.O.D. rings, s.t.d. 01-660-2896 or send 8d. stamp for explanatory booklet to:
G3HSC/JF, 45 GREEN LANE, PURLEY, SURREY.

HALSON MOBILE ANTENNA—THE MOBILE SCENE
The Most Efficient! The Most Unobtrusive! and Base Loaded too
A COMPLETE MOBILE ANTENNA SYSTEM
Complete for one band, £4/17/6 + 3/6 P.P. Extra c. i.s. £3/17/6 + 3/- P.P.
SWR and FSI, £4/19/6 + 3/6 P.P.
Our Agents: K. W.—Kent, N.W.—Manchester,
Chas. Young—Birmingham, Swanco Products—Coventry,
G. Francis—Newark, G. W. Smith—London,
Glasgow Electronic Services—Glasgow C.3.
Or direct from **HALSON ELECTRICAL SERVICES**
DOVER ROAD WORKS, ANSDALL ROAD, BLACKPOOL
Tel. 62740

ALL SOLID STATE
miniature
TOP BAND TRANSMITTER 
for AM and CW use.
THE LELANTE
LYNX



Size 10" x 2" x 6 1/2". Finish in two-tone grey.

10 WATTS. Full collector modulation. Supply required:—12 to 14 volts D.C. High efficiency RF output. High impedance mic input. Stabilised V.F.O. covering 1.8 to 2.0 mc/s. Safe whether deloaded or aerial shorted. Simple to tune and operate. Fitted key and mic sockets.

All this for **£29** Carriage and packing 10/- extra.

LELANTE ELECTRONICS
8 CORDEN AVENUE, MICKLEOVER, DERBY. DE3 5AP
Manufacturers of solid state communication and electronic equipment.

"CALLBOOK"

SUMMER EDITION

Available early July

Limited Quantity Only

Known the world over as the CALLBOOK, this comprehensive reference lists about 297,800 licensed radio amateurs in the United States Directory and 142,800 or more in the rest of the world (contained in the "DX Section"). The listings grow with every issue! In the new U.S. Section, licence classifications are now being shown. Each issue is an entirely new book with revised listings of new licences, names and addresses. The CALLBOOK also includes much incidental DX information. Every amateur operator and SWL needs the latest CALLBOOK to get the most out of Amateur Radio.

DX Listings 42/6

US Listings 64/6

The two together, covering the World, £52/6

Available only from

Publications Dept.,

SHORT WAVE MAGAZINE

55 Victoria Street, London, S.W.1

01-222 5341

Fast Mail Order for the Amateur Radio Enthusiast!

AERIAL EQUIPMENT

TWIN FEEDER. 300 ohm twin ribbon feeder similar K25, 8d. per yard. 75 ohm twin feeder, 6d. per yard. Post on above feeders, 2/- any length.

COPPER WIRE, 14G. H/D, 140ft., 30/-; 70ft., 16/- . Post and packing 3/3. Lengths are approx. only, actually sold by weight.

FEEDER SPREADERS. 6" Ceramic type F.S. 10d. each. Postage 2/6 up to 12.

CERAMIC CENTRE PIECE for dipoles Type AT, 1/6 each. P. & P. 1/-.

2 METRE BEAM, 5 ELEMENT W.S. YAGI. Complete in box with 1" to 2 1/2" masthead bracket. Price: £3 7s. Carriage 5/-.

SUPER AERIAL, 70/80 ohm coax, 300 watt very low loss, 2/3 per yard. 50 ohm 300 watt, 2/6 per yard. P. & P. 2/6.

TOUGH POLYTHENE LINE, type ML1 (100lb.), 2d. per yd. or 12/6 per 100 yds. Type ML2 (220 lb.), 4d. per yd. or 25/- per 100 yds., ML4 (400 lb.), 6d. per yd. Ideal for Guys, L.W. Supports, Halyards, etc. Postage 1/6 on all line.

CALLERS PLEASE NOTE

Our NEW Hours of Business

Mon., Tues., Wed., Fri., and Sat.

9.00 a.m. - 5.30 p.m.

Special

LATE SHOPPING NIGHT

THURSDAY

9.00 a.m. - 8.00 p.m.

NEW BOXED VALVES. 3/6 each, 4 for 10/- . P. & P. 2/-.

Types 6N7GT, 6AB7, 6AC7, 6SK7, 6SF7, 6SH7, 6F7, 956, U10, MSP4, IUS, 6G6G, X22, 958A.

ABSORPTION WAVEMETERS. 3.00 to 35.00 Mc/s. in 3 Switched Bands. 3.5, 7, 14, 21 and 28 Mc/s. Ham Bands marked on scale. Complete with indicator bulb. A MUST for any Ham Shack. ONLY 25/- EACH. P. & P. 1/6.

SHORT WAVE KITS. One valve only, 45/-, phones, ant. and batts, 40/- extra if required. Ideal for Junior op.

VARIABLE CONDENSERS. All brass with ceramic end plates and ball race bearings. 50pF, 5/9; 100, 6/6; 160, 7/6; 240, 8/6. Extension for ganging. P. & P. 2/-.

SEALED RELAYS, 12v. 105Ω Coil Type A, 4 Pole, C.O., 15/-, Type B, 2 Pole, C.O. + 2 Pole Norm. on, 12/6. P. & P. 1/6.



The Widest Range in the Midlands

★ HIRE PURCHASE

★ PART EXCHANGE

CHAS. H. **YOUNG** LTD.

At your service G2AK, G3LAY, G3VFW

Please print your address. No C.O.D. under £1.

'phone 021-236-1635

170-172 Corporation Street,

Birmingham 4

If you DON'T want your
JOYSTICK VFA
 to WORK!

HERE ARE SEVEN BASIC RULES

1. Put it in the WORST POSSIBLE radiating position — it still works?
2. Do not earth the equipment — still working? — ah well —
3. Do not at first tune JOYMATCH ATU on RECEIVE — Flashing over? Voltage? — That'll help —
4. Use an S.W.R. meter in the feeder — That must stop it working!
5. Have other antennas lying in wait — with their feeders — to steal any RF that still manages to get by —
6. Don't use an ATU, or don't tune it properly — That'll prove it doesn't work!!!
7. By obeying Rule 6, at least you'll have fun "entertaining" the neighbours on their TV sets!!!

Only by disregarding these rules (as W6TYP* did), will you succeed in radiating fantastic signals, with all the RF on the fundamental, and none wasted on T.V.I.

*W6TYP (World QRP record holder), worked ZL2 on 7043 khz with half a watt—6,700 miles—using Joystick VFA and 18ft. feeder!!!

Details from leading Radio Amateur Dealers, or direct from:

PARTRIDGE ELECTRONICS LTD. (Dept. SWM6)
 CAISTER HOUSE, PROSPECT ROAD, BROADSTAIRS, KENT

MORE TITLES

Amateur Radio Construction Projects	21/-
Beginner's Guide to Radio (Newnes)	9/-
Beginner's Guide to Colour Television (Newnes)	15/8
Beginner's Guide to Electronics	15/6
Dictionary of Electronics (Penguin)	8/6
Electronic Transistor Circuits (Foulsham)	25/9
Q. & A. On { Audio	10/-
(Newnes) { Electronics	10/-
{ Transistors	10/-
Handbook of Transistor Circuits (Foulsham)	36/-
Introduction to Valves (Iiffe's)	9/4
Radio Astronomy for Amateurs (by Frank Hyde)	31/-
Remote Control by Radio (Philips)	10/9
Radio and Electronic Hobbies (by F. C. Judd, G2BCX)	22/-
Radio Engineers Pocket Book (Newnes)	11/-
RCA Silicon Power Circuits Manual	23/-
RCA Receiving Tubes Manual	23/-
RCA Transistor Manual	23/-
RCA Transmitting Tubes	15/-
Shop and Shack Shortcuts (by W6TNS)	34/6
Short Wave Amateur Radio (by PAØHH, Philips Technical Library)	23/6
Short Wave Listening (by J. Vastenhoude)	13/2
Short Wave Listener's Guide (Foulsham)	13/6
Transistor Transmitters for the Amateur (Foulsham)	22/-

CALL BOOKS

"G's" (1968). 6/7

SPRING EDITION

"DX Listings" £2/2/6

"U.S. Listings" £3/4/6

The two together, covering the World £5/2/6

MORSE COURSES

G3HSC Rhythm Method of Morse Tuition

Complete Course with three 3 speed L.P. records with books	84/-
Beginner's Course with two 3 speed L.P. records with book	60/6
Single 12" L.P. Beginner's with book	50/-
Single, 12" L.P. Advanced with book	50/-
Three speed simulated GPO test. 7" d.s. E.P. record	15/-

MAPS

AMATEUR RADIO MAP OF WORLD

Mercator Projection — Much DX Information — In Colour. Second Edition	8/9
---	-----

DX ZONE MAP (GREAT CIRCLE)

In colour (Revised to October 1966)	14/9
(See S.W.M. page 643, January 1967)	
Black and White only	5/6
(See S.W.M. page 661, January 1967)	

RADIO AMATEUR MAP OF THE U.S.A. AND NORTH AMERICA

State boundaries and prefixes, size 24" by 30", paper	8/6
--	-----

RADIO AMATEUR'S WORLD ATLAS (NEW EDITION)

In booklet form, Mercator projection, for desk use. Gives Zones and Prefixes	16/-
--	------

LOG BOOKS

RSGB Standard Log	7/3
RSGB Log and VHF Contest Log	7/3
RSGB Receiving Station Log	7/3
RSGB Radio Station Log Book	7/3

A.R.R.L.

(Spiral bound)	12/-
--------------------------	------

A.R.R.L.

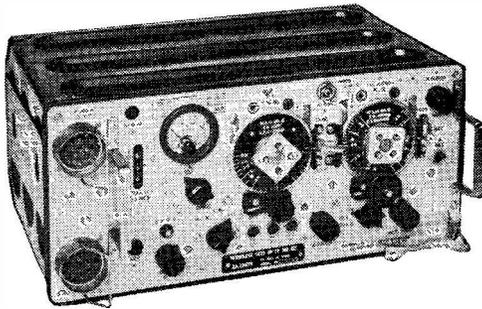
(Minilog) 4" by 6"	5/6
------------------------------	-----

Please see main list on back cover.

Available from **SHORT WAVE MAGAZINE**

Publications Dept., 55 Victoria Street, London, S.W.1 . . . 01-222 5341

(Nearest Tube Station, St. James's Park)



FAMOUS ARMY SHORT-WAVE TRANSRECEIVER MK.III

This set is made up of three separate units (1) a two valve amplifier using a 6V6 output valve; (2) (some only, not built in the very latest models) a V.H.F. transreceiver covering 229-241 Mc/s. using 4 valves; (3) the main shortwave transmitter/receiver covering, in two switched bands, just below 2 Mc/s.-4 Mc/s., and 4 Mc/s.-8 Mc/s. (approx. 160-375 metres) using 9 valves. For R.T., C.W. and M.C.W. The receiver is superheterodyne having 1 R.F. stage, frequency changer, 2 I.F. (465 Kc/s.) signal detector, A.V.C. and output stage. A B.F.O. included for C.W. or single side-band reception. T.X. output valve 807 other valves octal bases. Many extras, e.g. netting switch, quick flick dial settings, squelch, etc. Power requirements LT 12 volts, HT receiver 275 volts D.C., HT transmitter 500 volts D.C., size approx. 174 x 71 x 11 ins. Every set supplied in new or as new condition in carton with book including circuits, only £4 10s. 0d., or Grade 2 slightly used 50s., or Grade 3 used but complete 35s., carriage all 15s. 12 VOLT D.C. power unit (used) good condition 40s., carriage 5s. WE MAKE A MAINS 200/250 VOLT POWER UNIT in louvered metal case to plug direct into set power socket to run (1) receiver, 70s., post 5s.; (2) TX and RX, £6 10s. 0d., post 7s. 6d. A charge of 10s. to unpack and test the receiver of these sets is made only if requested. Headphones and mike new boxed, 15s., post 2/6

V.H.F. TRANSRECEIVER MK.1/1

This is a modern self contained tunable V.H.F. low powered frequency modulated transreceiver for V.T. communication up to 8-10 miles. Made for the Ministry of Supply at an extremely high cost by well known British makers, using 15 midget B.G. 7 valves, receiver incorporating R.F. amplifier. Double superhet and A.F.C. Slow motion tuning with the dial calibrated in 41 channels each 200 Kc/s. apart. The frequency covered is 39 Mc/s.-48 Mc/s. Also has built-in crystal calibrator which gives pips to coincide with marks on the tuning dial. Power required L.T. 4½ volts, H.T. 150 volts, tapped at 90 volts for receiver. Every set supplied complete with valves and crystals. New in carton, complete with adjustable whip aerial, and circuit. Price £4 10s. 0d. carriage 10s.

**FEW ONLY LEFT
WALKIE-TALKIE MK III and CRYSTAL CALIBRATOR No. 9**

This set is housed in a waterproof diecast aluminium case made by Murphy Radio for the Govt. having only reliability and quality in mind. Range 7.3-9 Mc/s. also on side of set is crystal calibrator No. 9 which gives pips on marks provided on the tuning dial. Set uses a total of 5 valves; power required L.T. 4 volts D.C. H.T. 100-175 volts D.C. Sets supplied in NEW or as new condition, boxed, only 37/6, carriage 7/6.



JOHN'S RADIO

(Dept. F)

OLD CO-OP, WHITEHALL ROAD,
DRIFHLINGTON, BRADFORD

Telephone : DRIFHLINGTON 2732

SSB PRODUCTS DERBY



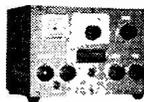
PYRAMID

**SPHINX
MK.II**

(Same size as Pyramid)
160-80-20 m. SSB/
AM/CW. Quality construction throughout.
Built in power supply. (£21 deposit) Part exchanges. £84.0.0 (£1 carr.). Fully assembled.

Just received from one of our many satisfied customers:-3rd May/68. "The decision, as a professional engineer, to buy a Sphinx was its very good layout, workmanship and pleasing appearance. Its performance lives up to my first impressions and I am delighted with it, its ease of operation, the good reports on speech quality I have received, and the fact that it has worked all over Europe, the Middle East, many American states and into Africa in the couple of weeks I have had it. Its 'voice' speaks well for Britain."
G6RK—Nr. BROMSGROVE."

D.A.I. electronic keys in stock, £16/10/- (6/-).
KY.102 bug keys in stock. £4/10/- (4/6).
R.F.45. FIELD STRENGTH meters, only 45/- (2/-); RF40, £4.
DM16HL dynamic mic. and table stand, only 92/6 (4/6).
6146. BRAND NEW and BOXED, only 32/6 (2/3 each, P. & P.).
6HFS. 36/6 each (2/3 each Post). Base 4/6 each (6d. P. & P.).
BM3 Mic's. Few left at 32/- each (4/6).
HA350. 240v. 1/P. 160-10m. + 100 kc/s. cal. Last of stock.
Boxed, new, £82!



CANONBALL

"CANONBALL" TX. SSB/AM/CW. 1.8-2 mc/s. or 3.5-4 mc/s. 12 watts of real punchy signal, for either mobile or fixed. Size 8" x 6" x 6". £38.0.0 (7/6 carr.). This Tx. is ready made. 260v. H.T. 70 mA required.

PRECISION MADE



DELTA

"DELTA" CONTROL UNIT. 240v. A.C. input. Provides AE. co-ax c/o up to 2 mtrs. Many auxiliary contacts, plus 12v. D.C. o/p. £7.5.0 (4/6 carr.).

Assembled Price.



NAPOLEON

"NAPOLEON" S.W.R. BRIDGE. 1-50 mc/s. 80Ω. Sensitivity control. For/rev. switch. £5.5.0 (4/6 carr.)

Assembled Price.

"PI-CHOKE"—1 kW—9/6.



"SILPLUG" 500v., 30/- 750v., 40/-

"SCARAB" Xtal Filters, from £5.19.6.

JUST ARRIVED : TRIO T.S.500 Transceiver with P.S.—500AC and V.F.O.5. 200w. P.E.P. 80 to 10m. FULL coverage. Free! with each complete Transceiver—Dynamic DM16HL Mic. and DSI base. Price: £199. H.P. available!

TRIO REC'S

New models just received!
9R59DE, £39.15.0.
9R500SE, 160 m. to 10 m., £73.5.0.

7A EDWARD ST., DERBY. Telephone: 42909-42961

S.S.B. PRODUCTS—MANUFACTURERS OF FINE QUALITY ELECTRONIC EQUIPMENT!

TECHNICAL PUBLICATIONS LATEST ISSUES

	Post Free
ABC OF ANTENNAS (Foulsham).....	16s. 9d.
ABC OF TRANSISTORS (by G. B. Mann).....	21s. 0d.
AERIAL HANDBOOK by G. A. Briggs (2nd Edn.).....	15s. 9d.
AMATEUR RADIO (by F. G. Rayer).....	26s. 0d.
AMATEUR RADIO ANTENNA HANDBOOK. (by H. D. Hooton, W6YTH).....	25s. 0d.
AMATEUR RADIO CIRCUITS BOOK.....	11s. 2d.
ANTENNA HANDBOOK Vol. 1, by K7GCO (Cowan Publication).....	33s. 6d.
ANTENNA ROUND-UP (by CQ) Vol. I.....	27s. 6d.
ANTENNA ROUND-UP (Vol. 2).....	33s. 6d.
ANTENNA HANDBOOK (A.R.R.L., 10th Edition).....	21s. 6d.
BASIC MATHEMATICS FOR RADIO AND ELECTRONICS.....	18s. 3d.
BEAM ANTENNA HANDBOOK, 3rd Edition.....	33s. 0d.
BETTER SHORT WAVE RECEPTION.....	27s. 6d.
CHART OF INTERNATIONAL FREQUENCY ALLOCATION—GENEVA (Official 10 Kc to 40 Gc), New Edition. 24in. x 16in. wide folding pages.....	35s. 0d.
CQ ANTHOLOGY 45-52.....	18s. 6d.
CQ ANTHOLOGY (1952-1959).....	27s. 6d.
COURSE IN RADIO FUNDAMENTALS (A.R.R.L.).....	11s. 6d.
DICTIONARY OF ELECTRONICS (Penguin).....	8s. 6d.
ELECTRONIC CIRCUITS HANDBOOK Vol. I.....	27s. 6d.
ELECTRONIC CIRCUITS HANDBOOK Vol. II (Tom Kneitel).....	27s. 6d.
FOUNDATIONS OF WIRELESS.....	22s. 6d.
GUIDE TO AMATEUR RADIO.....	O/P
GUIDE TO BROADCASTING STATIONS.....	6s. 9d.
HAMS INTERPRETER.....	9s. 6d.
HANDBOOK OF HAM RADIO CIRCUITS (by W9CGA).....	28s. 0d.
HINTS AND KINKS Vol. 6.....	11s. 6d.
HOW TO BECOME A RADIO AMATEUR (A.R.R.L.).....	11s. 0d.
"HOW TO LISTEN TO THE WORLD".....	27s. 3d.
LEARNING MORSE (Iliffe).....	2s. 3d.
THE MORSE CODE FOR RADIO AMATEURS (R.S.G.B.).....	1s. 9d.
LEARNING THE RADIO TELEGRAPH (A.R.R.L.).....	4s. 6d.
MOBILE HANDBOOK (Published by CQ).....	26s. 6d.
MOBILE MANUAL (Published by A.R.R.L.).....	27s. 0d.
NEW RTTY HANDBOOK.....	35s. 0d.
NEW SIDEBAND HANDBOOK (by CQ).....	27s. 6d.
NOVICE HANDBOOK, Tx and Rx.....	25s. 0d.
OPERATING AN AMATEUR RADIO STATION (A.R.R.L.).....	2s. 8d.
PORTABLE TRANSISTOR RECEIVER.....	3s. 0d.
QUAD ANTENNAE.....	28s. 6d.
RADIO AMATEUR EXAMINATION MANUAL.....	5s. 9d.
RADIO AMATEUR HANDBOOK (A.R.R.L.), 1968.....	50s. 0d. Paper Edition 60s. 0d. Buckram Edition
RADIO AMATEUR OPERATOR'S HANDBOOK (Data Publications).....	5s. 6d.
RADIO AMATEUR CALL BOOK (U.K. only, 1968).....	6s. 7d.
RADIO CONTROL FOR MODELS (F. C. Judd).....	16s. 0d.
RADIO DATA REFERENCE BOOK.....	14s. 0d.
RADIO HANDBOOK (Wm. I. Orr) (17th Edition).....	88s. 6d.
RADIO VALVE DATA (Iliffe), Eighth Edition.....	10s. 7d.
SERVICE VALVE AND SEMI-CONDUCTOR EQUIVALENTS (R.S.G.B.).....	5s. 6d.
SSB EQUIPMENT.....	3s. 3d.
S9 SIGNALS.....	9s. 6d.
SHORT WAVE LISTENING.....	13s. 2d.
SHORT WAVE RECEIVERS FOR THE BEGINNER (Data Pubs.).....	6s. 6d.
SHORT WAVE RADIO AND THE IONOSPHERE (Iliffe).....	11s. 9d.
SINGLE SIDEBAND FOR THE RADIO AMATEUR (A.R.R.L.) (4th Edition).....	26s. 0d.
SURPLUS CONVERSION MANUAL Vols. 1, 2 and 3.....	each 27s. 6d.
SURPLUS HANDBOOK (E. & E.).....	27s. 6d.
SURPLUS SCHEMATICS (Published by CQ).....	23s. 0d.
SURPLUS CONVERSION HANDBOOK (including "Command Sets").....	26s. 0d.
TECHNICAL TOPICS FOR THE RADIO AMATEUR.....	10s. 8d.
TELEVISION EXPLAINED (Iliffe).....	13s. 6d.
TRANSISTOR RADIO HANDBOOK (Editors and Engineers).....	46s. 0d.
UNDERSTANDING AMATEUR RADIO.....	21s. 6d.
VHF HANDBOOK (Orr W6SAI).....	27s. 6d.
VHF MANUAL by A.R.R.L. (New Edition early July).....	24s. 6d.
VHF FOR THE RADIO AMATEUR (CQ).....	30s. 0d.
WORLD RADIO AND TV HANDBOOK, 1968.....	36s. 0d.

Available from **SHORT WAVE MAGAZINE**
 Publications Dept., 55 Victoria St., London S.W.1 • 01-222 5341
 (Counter Service, 9.30-5.15, Mon. to Fri.) (Nearest Tube Station: St. James's Park)