

4/-

The SHORT WAVE Magazine

VOL. XXVII

MAY, 1969

NUMBER 3

Everything for the S.W.L.
and Radio Amateur
from

HEATHKIT



Please address
all enquiries to:-

DAYSTROM LTD.

Dept. S.W.2
GLOUCESTER

Announcing another world beater from

THE NEW KW 2000B



SSB TRANSCEIVER: 180 watts P.E.P. 10-160
Metres complete with AC PSU, VOX,
P.T.T., I.R.T./I.T.T.

plus the usual KW Quality and Reliability

- TWO-SPEED VFO DRIVE
- IMPROVED VFO READ-OUT
- NEW, PRECISE METERING
- ATTRACTIVE PANEL LAYOUT

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 Dummy Load, KW
Q Multipliers



Write for illustrated detailed specifications on the KW 2000B; KW Atlanta; KW Vespa Mk II; KW 201; KW 1000 and our list of KW Tested Trade-ins.

K. W. ELECTRONICS LTD

1 HEATH STREET, DARTFORD, KENT

TEL: DARTFORD 25574 CABLES: KAYDOUBLEW DARTFORD

J. B. LOWE

50-52 Wellington Street, Matlock, Derbyshire

Tel.: Matlock 2817 (2430 evenings)

First of all let me apologise for last month's ads—I just went on and on and on. The poor old printer didn't have small enough type to get it all in! Sorry, lads, I'll try and be a bit briefer this month. Concentrate more on flogging. Incidentally some people have asked me "Now look here, Bill Lowe, if the stuff you flog is so damn' good, how come no-one else sells it?" This is a fair question and warrants a fair answer. In the case of Sommerkamp—quite a few people advertise it besides myself. Sommerkamp hold the European Agency and any dealer can order through him. Snags—(1) you have to order in at least dozen lots (2) You have to pay cash in advance and (3) the 50% temporary import levy. These combine to put off the vast majority of dealers. When I first started out and money was tight, I couldn't afford big orders either so I passed on many a Sommerkamp at cost just in order to get cash into the till quickly. That's why at one time a lot of dealers were handling it, they got it from me. Now, I have managed to raise more capital and can buy in bulk and don't have to pass it on to the trade. With regard to Star and Inoue, the position is much the same except that in this case I import directly from Japan and have to order in even larger amounts. From your point of view this is a Good Thing because instead of paying a rake-off to the European Agent, another to the U.K. Agent and a third to the Dealer, you only fork out one massive rake-off to me (Ha, Ha he shrieked, saliva drooling, mine, all mine). Actually my rake-off is not so damn' big. You obviously don't believe that—so will you believe this—I have fixed the selling price high enough to give myself a profit but such a small profit as to effectively prevent the Big Boys from taking over, simply because it is not worth their while. That's why I don't give discounts and also of course, why I can't wholesale to the trade—there just isn't enough profit in it. Enough for one yes, but not enough for two. So, Gentlemen, when you buy your Inoue, you are getting it pretty cheaply. The alternative to what I have done is to fix the price to allow me to supply to the trade at an attractive discount. Then, of course, everyone would be selling it. It would naturally cost you a lot more, but there you go, that's what happens. I haven't done this (good old Honest Bill) simply because I haven't the capital to go into the wholesale business. And if I had, I wouldn't, because there's always someone ready to tell the factory that they can sell more and they should have the Agency, not Bill Lowe and so on and so on. If the profit is big enough, it'll attract the Big Boys and I'm hopeless with a knife. No, I'll just take a small profit and business which doesn't attract the City Slickers. Right, Sir, does that answer your question? So when I say I believe my stuff to be best value I'm not just whistling. Let's look at it—

SOMMERKAMP

The FR-500 receiver. I don't know whether it will bring you Ultimate Performance or Perfection or some such advertising nonsense, but I do know that you won't get a receiver as good at anywhere near the price. It covers top band to 10. Three segments of 10 provided as standard and we have the xtals for the fourth segment: (29.5-30.1) in stock as an optional extra at 35/- if you want it. It has ceramic transmitters for AM. These are the things that some advertisers call "mechanical filters for superb selectivity." This is of course, complete nonsense—they're not bad but they're not proper mechanical filters. A proper mechanical filter 2.4 kc/s. wide with 6/60 dB shape factor of better than 2 to 1 is provided for SSB and for CW this filter is backed up by a single xtal filter. It has a notch filter, switchable sidebands (xtal controlled) $\frac{1}{2}$ microvolt sensitivity, 1 kc/s. readout. In short it is a very good RX indeed and nothing can touch it at £130.

The Companion Tx, the FL-500 is equally as good—it does not however, cover Top Band. This stuff is so well known and popular that I don't have to say any more. The FL-500 is £145.

In the transceiver line, I can show you the complete Sommerkamp range:—The FT-150. Mobile or fixed station. Both 12v. d.c. and 240v. a.c. supplies built-in. All transistor except driver and PA. All bands 80-10, all of 10. For anyone going mobile—quite honestly you don't have any choice. For fixed station, fine, but you are paying for a d.c. p.s.u. you're not using. At all events, here again it is so well known that I need say no more. £215.

The FT-500. Big brother. ("My brother Sylvest' bigga da muss," etc. as the old Music Hall song says). 500 Hairy watts p.e.p. input. Built-in p.s.u. 80 to 10 (all of 10). Gentlemen 10/- a watt. £250. The FT-250. We have the first in the country at the moment (March). Whether we'll have any more by the time you read this, I don't know. Anyway, it's a nice little rig—supplied less p.s.u. at £160. I don't think you'll beat this price. Most chaps can rustle up a p.s.u. (if you can't we can fix you up) and for £160 you get a tip top 9 mc/s. crystal filter rig covering 80-10 (all of 10 of course) with 200W. p.e.p. input. Better than $\frac{1}{2}$ micro volt sensitivity for 10 dB S + N/N ratio. The filter shape factor is an incredible 1.61 to 1 and the size a very compact 13" x 6" x 11" deep, (smaller actually than the FT-150). The tuning, 15 kc/s. per turn is slow enough for anyone and construction is the usual high standard. Better get your name on the waiting list! Price once again, an incredible £160 ready built.

OPTIONAL EXTRAS: There aren't any. All the above Sommerkamp transceivers have fitted as standard:—

VOX, xtal calibrator, independent receiver tuning plus or minus 6 kc/s., and switchable sidebands.

The only thing I can think of to compete with this new Sommerkamp rig is the Inoue IC-700 series.

For £180 you get a complete Rx, Tx and p.s.u. The Tx, although separate uses the Rx v.f.o. and acts as a transceiver with of course, receiver independent tuning plus or minus 5 kc/s.

The Rx is all transistor, 12v. d.c. or 240v. a.c. Single conversion, 9 mc/s xtal filter. FET's widely used. This is a very quiet very sensitive Rx free of birdies which at £85 is real value for money. All I say is—try other Rx's around this price, particularly transistor efforts, then try the Inoue IC-700. If you are a listener hoping to get a licence, you can always add the Tx and p.s.u. later—another £95 and you're on the air. Not only on the air, but on the air with a beautiful signal. The companion Tx is transistor except for vfo mixer, driver and PA (2 x 6146B). I'd like to note that it uses a pair of 6146B's operated for a very conservative 150W. p.e.p. Result—long life, clean signals and no offensive spurs!

If you are thinking of a rig one of the above should fit the Bill. Why not drop in and cast a bloodshot optic over them, take a long butcher's at the circuit diagrams and generally delve. We'll be happy to hook any of them up for you.

Enough of new stuff—let's push some second-hand bits. Actually, we've always got a pretty good stock of s/hand items but it changes so fast we have a job keeping up. Not much point giving details now (in March) because sure as eggs are eggs, the item you want will be sold. However, we've still got a few Noise Generators left. These are beautiful things—plus your audio into 'em, plus the r.f. into your Rx (switchable 43, 75 or 400 ohms). Twiddle the knobs as per complete instructions provided and read off your Noise Figure directly in dB's. We have, however, found one very big snag and that is that these things tell the truth. Old Harry's favourite converter which he lashed up himself and which he swears blind has a N.F. of less than 2 dB turns out, according to these noise generators which I understand are made by Marconi, to be around 4 $\frac{1}{2}$ dB. Now Harry is an expert, he knows far better than Marconi, and quite obviously the Noise Generators are no good. For chaps like Harry we will if you wish, butcher the noise generators to make them read what the heck you like—then you can proudly demonstrate your home made converter with its less than 1 dB N.F. Price £12 10s.

Anyways—lots of s/hand stuff. Drop us a line and we'll send you lists. You will of course, enclose a s.a.e.—a big 'un is best! In the new line, our 2m. converters seem to be catching on. Rather nice 4 valve efforts—twin triode cascode r.f.—I.F. 28-30 mc/s. They require 6.3v. a.c. and 150-200v. d.c. A local V.H.F. fanatic was very dismayed to find they outperformed his latest "state of the art" device, which he had constructed with loving care and which outperformed anything on the market. Not any longer ole buddy!! At £10 you can't go wrong. We also have 15 and 10m. versions with at 5 mc/s. I.F. at £7 10s. each.

SUNDRIES:

Teisco DM-501 dynamic microphone, high impedance	£2 15 0
Plain Morse keys, polished brass with ball bearing pivots	18 6 0
C.W. Practice sets, key plus buzzer	15 0 0
Bug keys	£4 0 0
Katsumi C.W. Monitors, high speed relay, built-in with spare contacts for break in CW	£7 15 0
AR88D manual reprints	15 0 0
VHF/UHF 50 ohm dummy loads	£2 10 0
COLLINS 5 cycle VFO's, one left	£35 0 0
Tubular trimmers, $\frac{1}{2}$ -5pF or 3-15pF 1/- each of 10/- doz. Feed-throughs, 500v. 1000pF screw type, 1/- each or 10/- doz. Standard Belling Lee coax plugs, metal, 1/4, sockets, 1/-, Octal B7G or B9A plugs 2/6 each, SE-05 1000piv 500mA rectifiers, the ones you can trust, 4/6 each, Panel indicator lamps for standard lilliput bulbs, red or green, 2/6 each, Lilliput bulbs 1/- each, PL259 plugs 5/- each, Reducers 1/3 each, sockets 5/- each. I have a very nice line in brand spanning new capacitors. Top quality at junk prices.	

ELECTROLYTICS:

Can type with mounting clips.
100mF/350v., 5/6; 100-100mF/350v., 6/8; 100mF/450v., 7/2;
40-40/500v., 7/3; 100mF/500v., 7/9; 100-100/450v., 13/2.
Minute low voltage types:—
16mF/16v. 8d. each, 7/- doz.; 10mF/16v. 6d. each, 5/- doz.;
100mF/12v. 8d. each, 7/- doz.; 100/12v. 6d. each, 5/- doz.; 33mF/16v. 8d. each, 7/- doz.; 100mF/16v. 1/- each, 10/- doz.

All the lovely new stuff can also be inspected at Alan Whitford's, G3MME, 37, Chestnut Drive, Polegate, Sussex. Telephone No. Polegate 4659, evenings and weekends for those who can't get over to Matlock. If you can't get over to either Alan or myself, send me a s.a.e. and I'll send you my latest lists.

POSTAGE: PLEASE ALLOW LOTS FOR POSTAGE, WE WILL REFUND ANY EXCESS.

73.

The Bandit, VE8DP/G3UBO

AMATEUR ELECTRONICS G3FIK

We are accepted specialists in TRIO COMMUNICATIONS EQUIPMENT and make a point of maintaining exceptionally good stocks of all items in the current TRIO range. The new TRIO TS-510 TRANSCEIVER is now awaited and the sample model which we have demonstrated to various clubs has met with very much interest. This completely new model is an entirely new conception and is not simply a TS-500 which has been given a few extra features. TRIO owners will be very familiar with the quality of TRIO equipment but in the new TS-150 the manufacturers have really surpassed themselves and the construction is not only superb but is equal to that found in equipment of a very much higher price bracket. New features of the 510 include switchable sideband, fast and slow amplified AGC, sidetone, indicated amplified ALC, receiver section pre-selector, provision for CW filter, rock-stable VFO employing FET's, read-out to 500 c.p.s., calibration at 25 Kc/s. points, improved VOX, etc., etc. There are many other points too numerous to mention here and without doubt the 510 represents the result of a most careful design programme and will make a very significant impression on the U.K. SSB market when supplies come to hand. We are already taking orders for the TS-510 and in view of the limitations of the initial delivery, the prospective purchaser would be well advised to write for further details now.

TRIO JR-500SE AMATEUR BAND RECEIVER. £ s. d.
This sensitive and stable receiver is without equal in its price range for superb all round performance and the ease of reception of SSB signals ... 69 10 0

TRIO 9R-59DE GENERAL COVERAGE RECEIVER. This is the set that has no equal when it comes to value for money even allowing for the recent slight price increase ... 42 10 0

Please note that all TRIO equipment supplied by us is fully air-tested before despatch which is by passenger train only to ensure quickest delivery and safest handling. Twelve months guarantee of course and full service facilities on the premises.

TRIO SP-5D MATCHING SPEAKER. Beautifully styled and constructed ... Carriage paid 4 12 6

TRIO HS-4 MATCHING LIGHTWEIGHT PADDED HEADSET ... Carriage paid 6 2 6

We have excellent demonstration facilities for the above equipment which are at the disposal of the caller.

Used equipment. We list below a selection of new items in since our last advertisement.

AR88D RECEIVER. Brand new and fitted with original RCA 5 meter. Complete with manual and trimming tools ... Carriage paid 82 10 0
Matching speaker for above, also brand new ... Carriage paid 4 0 0

RACAL RA-17 GENERAL COVERAGE RECEIVER. This is perhaps one of the most sophisticated receivers in existence with a continuous coverage (without bandswitching) from 500 Kc/s. to 30 megs. A film scale type dial gives enormous band-spread, literally feet, on the Amateur Bands and a 1 Kc. read-out to mention but a few of its outstanding features. In most excellent condition ... 125 0 0

EDDYSTONE S68X RECEIVER. Very good condition and performance ... Carriage paid 57 10 0

EDDYSTONE EC10 RECEIVERS. We currently have three of these in stock priced as follows. Mint condition and complete with mains and battery pack. ... Carriage paid 47 10 0

Very recent model still under guarantee Carriage paid 47 10 0
Again in excellent condition, one small mark on panel. ... Carriage paid 39 0 0

AR88LF RECEIVERS. We have an excellent selection of these from prices as low as £37 10s. and including some receivers fitted with tuning meters. The AR88LF will hold its own with any "D" model as any LF owner knows and to correct any misconception we would emphasise that it has the same HF coverage. All AR88's are fully aligned and air-tested before despatch which is by passenger train. Carriage 45/- plus a refundable deposit of £5 on the special transit case employed. Many other items in stock—full details upon request.

High quality equipment always required—please state price required when writing. Credit facilities on all purchases. Part exchanges. Adequate S.A.E.'s gentlemen please. Excellent parking for the caller.

518-520 ALUM ROCK ROAD, ALUM ROCK, BIRMINGHAM 8.

Telephone: 021-327 1497

IT'S HERE ———

IT'S SPRINGTIME!

AND SPRINGTIME IS ANTENNA TIME



MOSLEY



V-3 Jr.

BACK BRITAIN
Manufactured 100% in England

ELAN	SWL-7
TA-33 Jr.	RD-5
TA-32 Jr.	A-31S
TA-31 Jr.	A-21S
V-3 Jr.	A-310
VTD-3 Jr.	A-210
TD-3 Jr.	

Imported Antenna's

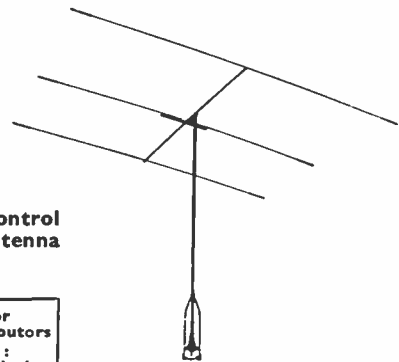
Classic-33	Lancer Mobile
A-203-C	V-4-8
TA-36	A-92-S
TA-33 Snr.	TD-2
TA-32 Snr.	DI-10
V-4-6	RV-4RK
RV-4	

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

Send for NEW HANDBOOK/CATALOGUE containing full details and prices of Antennae and technical information, 35 pages 2/6 refundable on purchase of an Antenna.

Carriage and Insurance Extra

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



ELAN

Telephone: Costessey 2861, orders only

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



TRIO's TS-510 is the definitive instrument especially engineered for complete "SSB ERA" function. It's a high power, high stability product of imaginative design that fully lives up to the renowned "TRIO" name. Extremely stable VFO, a new development that is built around 2 FET's and 13 transistors, guarantees stable QSO's during entire use, an accurate double-gear tuning mechanism and a linear tuning capacitor produce a 1 kHz direct reading on all bands. There's easy tuning in of SSB signals because the TS-510's frequency coverage has been compressed to 25 kHz for one complete rotation of the dial. Sharp cutoff for both reception and transmission is achieved by a sharp factor frequency filter built just

for this 510 series model. Combined with the TS-510's superb features are the distinctive, top quality PS-510 (Power supply and speaker) and VFO-5D (Variable frequency oscillator). With an AC power supply that operates a built-in 16 cm speaker, the PS-510 has been created as an exclusive companion instrument for the TS-510. It can be installed at any location with the PS-510 because the power supply is regulated on or off at the TS-510. The VFO-5D can match the TS-510 in performance and design. Its reading accuracy is unusually high since a double-gear dial covering 25 kHz per revolution is also used, as in the TS-510.



TO: B.H. Morris & Co., (Radio) Ltd. SW
 Send me information on TRIO COMMUNICATION RECEIVERS & name of nearest TRIO retailer.

NAME: _____ AGE: _____
 ADDRESS: _____

TRIO KENWOOD ELECTRONICS S.A. 160 Ave., Brugmann, Bruxelles 6, Belgium
 Sole Agent for the U.K. **B. H. MORRIS & CO., (RADIO) LTD.** 84/88, Nelson Street. Tower Hamlets, London E. 1, Phone: 01-790 4824

PETER SEYMOUR LIMITED

410 BEVERLEY ROAD, HULL, YORKSHIRE

Telephone: 41938

Wanted for cash, modern receivers. Please state your price

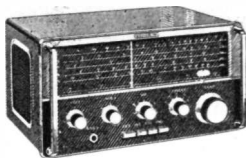
	£ s. d.		£ s. d.
EDDYSTONE 940	85 0 0	MULTIBAND DIPOLE TRAP SETS, with full instructions fully encapsulated, per pair 80-10 metres	2 10 0
SWAN 400, complete with 230XC and 410VFO	195 0 0	TRIO JR500Se crystal-controlled Osc. tunable IF system, full coverage 80-10 metres. Amateur bands only. Two mechanical filters, transistorised VFO, etc. New	68 0 0
KW 2000A, 4 weeks old	195 0 0	<i>Full details of the Drake equipment are available on request.</i>	
HACKET TRANSISTOR PORTABLE, LW plus 550 Kc/s.-30 Mc/s.	25 0 0	SWAN 2 metre transverter, 240W PEP	155 0 0
LAFAYETTE HA700	30 0 0	SHURE 201 microphones	5 10 0
KW VESPA with P.S.U.	135 0 0	LAFAYETTE PF60, all-transistor, battery/mains 152-174 Mc/s.	38 0 0
DRAKE R4A. As new	175 0 0	KW 2000A with A.C. P.S.U.	232 0 0
EDDYSTONE EC10	40 0 0	CODAR AT5 with P.S.U.	25 9 9
K.W. 2000 "G" line. As new... ..	155 0 0	AR88 SPARES, logging dials 5/-; escutcheon (dial windows) 10/-; plus all tubes available.	
VOLSTATIC V.H.F. SKYMASTER, covers long, medium and 108-138 Mc/s. The best aircraft band portable in the U.K. (including carriage)	26 10 0		
TRIO 9R59DE, 500 Kc/s.-30 Mc/s. Immediate delivery	39 15 0		

All items carriage free.

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.

FULL H.P. FACILITIES ON EQUIPMENT OVER £35

ONE THIRD DEPOSIT UP TO 24 MONTHS TO PAY. LET US KNOW YOUR REQUIREMENTS



GEORGE FRANCIS G3TWW

FULL SERVICE FACILITIES ON KW, EDDYSTONE, SWAN, TRIO.

The same excellent service as given by us for last 11 years.

FRANCIS for EDDYSTONE

EB35	£66 13 4
EC10	£53 0 0
EA12	£195 0 0
830/7	£295 0 0

Diacast boxes and dials in stock.

FRANCIS for KW ELECTRONICS

KW2000A	£232 0 0
KW Vespa	£135 0 0
KW201	£110 0 0
New KW Atlanta	£250 0 0

FRANCIS for TRIO

9R-59DE	£37 15 0
JR500Se	£61 0 0
Matching Speaker	£4 7 6

FRANCIS for JOYSTICK

Standard	£4 15 0
De Luxe	£5 19 6
3A Tuner	£3 12 6
4 Tuner	£4 4 0

BRITISH MADE MORSE OSCILLATOR. Transistor, only needs Morse key and battery, 49/11; with pitch control and earphone socket, 59/11.

NO ORDER TOO SMALL

GOODS DISPATCHED BY RETURN, POSTAGE EXTRA

93 Balderton Gate, Newark, Notts.

Tel. 4733; after 6 p.m. 2578
Dialling Code 0636

FRANCIS for SHURE

201	£5 0 0
444	£10 0 0

FRANCIS for PARKAIR ELECTRONICS

Skybandit	£23 10 0
Concorde	£17 15 0
2 metre Tx	£80 0 0

FRANCIS for COAX CABLES

52 ohm, low loss	yd.	2 3
52 ohm, ordinary	yd.	1 10
75 ohm, ordinary	yd.	1 8
75 ohm, low loss	yd.	1 6
75 ohm, twin	yd.	6
300 ohm, twin	yd.	6
Egg Insulators	ea.	6

FRANCIS for SECOND-HAND

Eddystone EA12 as new	£135 0 0
Eddystone 707R overhauled by Eddystone in September	£115 0 0
T.W. 2 metre TX	£15 0 0

★ ————— ★

THIS MONTH'S BARGAIN

EDDYSTONE EC10

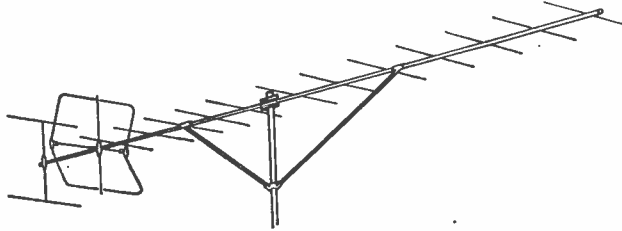
as new £43 0 0

★ ————— ★



AMATEUR RADIO ARRAYS

THE 'Parabeam'



14 ELEMENT YAGI

Parabeam 14 element Yagi for 2 metres. The new Parabeam with increased gain of over 15 dB—and broader bandwidth.

Overall Dimensions :

Length 234"

595cm.

Width 41"

104cm.

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

Aerials Band	Cat. No.	Description	dB Gain over Dipole	Current Price	
10 Mcres	10/4Y	4 Element array with twin crossbar	7.0	19 16 0	
4 Metre	4/3Y	3 Element folded dipole yagi with 1½" boom	5.7	2 17 6	
	4/4Y	4 Element folded dipole yagi with 1½" boom	7.0	3 18 0	
	4/6Y	6 Element folded dipole yagi with 1½"/2" boom	8.7	8 14 6	
	4/8Y	8 Element folded dipole yagi with 1½"/2" boom	10.0	12 13 0	
	4/10Y	10 Element folded dipole yagi with 1½"/2" boom	11.2	17 8 0	
	PM4	Coaxial harness to match and phase two 4m. aerials		1 13 0	
2 Metre	2/4Y	4 Element folded dipole yagi with 1" dia. boom	7.0	1 18 0	
	2/6Y	6 Element folded dipole yagi with 1" dia. boom	8.7	2 8 6	
	2/8Y	8 Element folded dipole yagi with 1" dia. boom	10.0	3 0 6	
	2/10Y	10 Element " Long Yagi " with 1½" boom and braces	13.2	7 2 0	
	2/14P	14 Element " Parabeam " with 1½" boom and braces	15.5	11 11 0	
	2/8	Double 4 slot fed yagis with 1" dia. booms	10.0	3 17 0	
	2/12	Double 6 slot fed yagis with 1" dia. booms	11.7	5 4 6	
	2/16	Double 8 slot fed yagis with 1" dia. booms	12.6	6 12 0	
	2/HO	" Halo " mobile aerial, head only		16 6	
	2/HM	" Halo " mobile aerial with ½" dia. mast		1 1 6	
	PM2	Coaxial harness to match and phase two 2M aerials		1 1 6	
	70 Cm.	70/16	Double 8 slot fed yagis with ¾" dia. booms	12.6	3 18 6
		70/14Y	14 Element folded dipole yagi, multi reflector	16.0	5 2 6
70/18P		18 Element Parabeam yagi with 1½" boom	17.0	5 3 6	
PM70		Coaxial harness to match and phase two 70 cm. aerials		16 6	
Rotators	9528	Automatic Tenn-a liner complete		19 19 0	
	9519	Compass Tenn-a liner complete		14 14 0	
	9523	Rotator alignment bearing-up to 1½" masts		3 17 6	
	9525	Ball bearing guy ring-up to 1½" masts		2 7 6	

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

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

All Aerials fitted with Universal Mast Clamp, Balun and Waterproof Connector Box and Aerials matched to 75 ohms feed impedance.

STOP PRESS

THE NEW "TRIPLE-3" THREE-BAND BEAM FOR 28, 21, 14 MHZ

A superbly engineered 3 Element Antenna using entirely new DESIGN OF TRAPS. With a performance on each band as good as a single band beam. A limited quantity has been allocated for the U.K. Market.

MODEL " TRIPLE-3."

PRICE £60 CARRIAGE PAID.



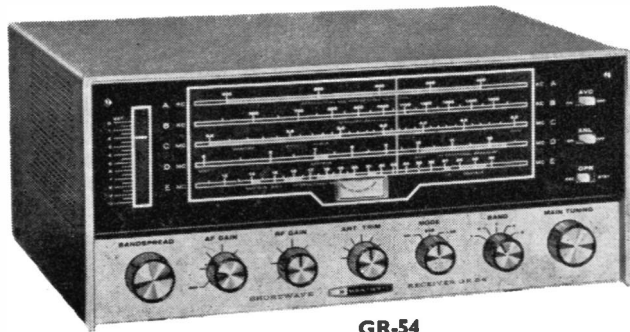
ROTHERSTHORPE CRESCENT, NORTHAMPTON, ENGLAND
Telephone : NORTHAMPTON 62147 (ONO4)

TECHNICAL LATEST PUBLICATIONS

	Post Free
ABC OF ANTENNAS (Foulsham).....	17s. 0d.
ABC OF TRANSISTORS (by G. B. Mann).....	21s. 0d.
AERIAL HANDBOOK by G. A. Briggs (2nd Edn.).....	15s. 9d.
AMATEUR RADIO DX HANDBOOK (by W9WNV).....	42s. 0d.
AMATEUR RADIO (by F. G. Rayer).....	26s. 6d.
AMATEUR RADIO ANTENNAS (by Hooton) Revised Edn.....	36s. 0d.
AMATEUR RADIO CIRCUITS BOOK.....	11s. 6d.
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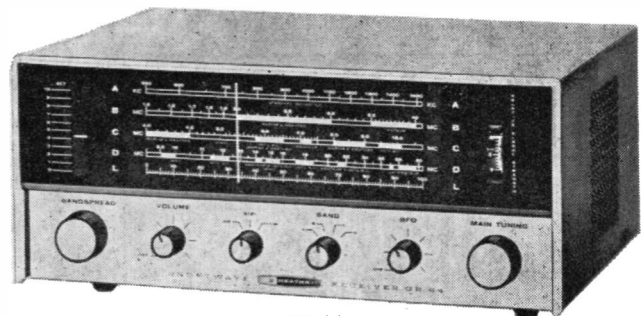
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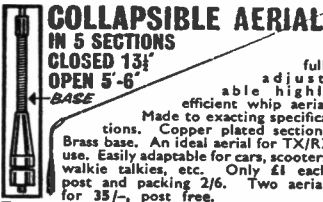
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The SHORT-WAVE Magazine

E D I T O R I A L

Disturbing *The pressure on space in the ether, and the continual drive for more frequencies to meet the ever-increasing demand for new radio-communication circuits and systems, is well known. It has been with us, as a growing menace, for the last 20 years—and even the development of satellite working is doing no more than ease the situation in the commercial field. Indeed, it is now being said these “open” satellite circuits, even though they are on UHF, are susceptible to jamming by ill-disposed adversaries.*

But what is now more menacing is the suggestion, being put forward from some quarters, that at the next parcelling-out of frequencies on an international basis, users should be required to pay for the channels they require. In other words, that the various radio services and systems should be accommodated only on the basis of what they are prepared to pay for in different parts of the spectrum. Or putting it another way: Ether space has now become so valuable that it can no longer be allotted free of charge simply by agreement, at an international convention where the size of each slice of frequency is settled by haggling between the parties concerned.

On the analogy of paying for car parking (which is payment for space used) there is something to be said for the idea of paying for ether space. For one thing, it would tend to curb the present quite immoderate demands of the military (and certain marine and broadcasting services) for reserved frequencies which in fact they seldom if ever use, but insist on keeping available “for eventualities.” Secondly, having to pay for radio space would encourage the commercials to use what they are allotted much more efficiently and economically—more transmitters spend far more time idling to “hold the circuit” than they do in passing real traffic. Thirdly, we might see an end—or at least a reduction—to the proliferation of unnecessary and unwanted broadcasting and TV services, pressed into already over-crowded national and international bands.

How would this affect Amateur Radio? Who can say, until a plan has been formulated for discussion. However, it would seem that if a small ether-usage fee, collected for the international authority, would guarantee us clear bands, free from commercial aggression, most AT-station operators would accept it without demur. After all, the U.K. amateur transmitting licence costs no more now than it did before the last War, and in addition to that most amateurs are paying a great deal more for ordinary radio|TV entertainment licences. While this in itself is no reason why the cost of an amateur transmitting licence should be increased, one feels that it would be acceptable if it resulted in far stricter policing of the ether, in the interests of all concerned.

*Austin Forster,
G6FO.*

NEW APPROACH TO MULTI-BAND BEAM DESIGN

DESCRIBING THE DEVELOPMENT
OF A HIGH-GAIN SYSTEM FOR
10-15-20 METRES

B. D. SYKES (G2HCG)
(*J-Beam Engineering, Ltd.*)

EXPERIMENTING with antennae can be lots of fun, but when the final design must be suitable for mass-production and eventual use in all parts of the world, in all climatic conditions, the "fun" element tends to disappear. Nevertheless, the story of the problems involved and the methods used to achieve final success can still provide entertainment especially as, regardless of the amount of lab. work involved, the final tests must be "on the air."

The basic objective was to produce a three-band beam with a performance on each band as good as a single-band beam. As always with aerial designs, this objective appeared to be quite impossible! A correctly designed single-band beam can be expected to operate satisfactorily throughout the whole of any one band, with the possible exception of 10 metres. The match will normally fall off at the edges of the band, but even this can be compensated for on a single-band beam by suitable reactance compensation. Briefly, reactance merely means the effect of mis-tuning, and normally if, for example, a dipole is operating HF of resonance it will have an inductive reactance, namely it will look like an inductance; similarly, if the dipole is LF of resonance, it will have a capacitive reactance. Now all that is necessary to bring the dipole back on tune is to apply the opposite amount of reactance and, if this reactance can be made to vary with frequency inversely to that of the dipole, then it is possible to provide compensation and the antenna remains on tune over a much larger bandwidth than normal. These principles of reactance compensation may be applied quite simply to single-band beams by the use of stubs, and similar devices, but the possibilities of reactance compensation on a multi-band beam seem almost impossible of achievement and, in fact, most designs of multi-band beams have a considerably narrower bandwidth on any one band than an equivalent single-band beam.

Trap design is the fundamental in all multi-band beams and trap performance may be divided into two parts. First, the characteristics at resonance where a high degree of isolation is required, and secondly, but possibly a more important characteristic and one which is so often ignored, that of trap performance on the bands other than the resonant frequency.

With the idea that it might prove possible to provide a measure of reactance compensation by means of the off-resonance characteristics of traps, various trap configurations were considered. The normal type of trap using a resonant coil and capacitor has reasonable characteristics at resonance, although the bandwidth tends to be inadequate. The performance on other than

the resonant band, however, left very much to be desired and, far from providing reactance compensation, this type of trap was making the situation worse, resulting in very limited bandwidth characteristics of the antenna as a whole. Consideration was then given to the use of a quarter-wave stub, but although the resonance characteristics appeared to be improved and a better bandwidth could be expected, the off-resonance characteristic was still the opposite to that required for successful reactance compensation.

New Approach

The project of a no-compromise beam nearly foundered at this point and designs were actually in hand for a standard type of three-band beam using well-known principles of trap design. Little enthusiasm existed for this antenna as not only did it not meet the specification, but it offered no more than existing commercial designs. The usual British winter weather took a hand here and kept the lab. antenna testing staff indoors with little to do but think, and suddenly the idea came: Why not try a half-wave open stub as a trap? Consideration of the theoretical aspects of this idea showed considerable promise, not only that bandwidth would be adequate at resonance but reactance swing appeared at last to be in the correct direction to provide compensation against the reactance swings of the antenna alone.

Theory indicated therefore that reactance compensation was possible, but to achieve an exact balance in

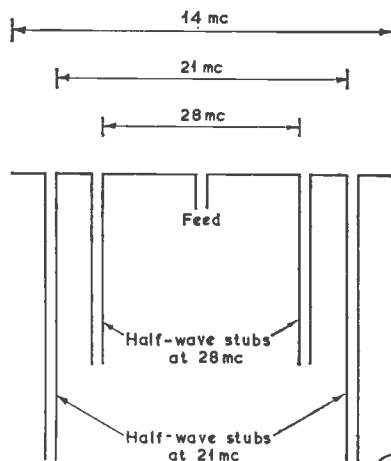


Fig.1

practice was quite another thing. Calculation of the reactance characteristics of the half-wave stub was no problem whatever, but calculation of the feed characteristics of even a 3-element Yagi borders on the use of computer techniques and some practical work seemed to offer a far quicker solution.

Test Procedure

Tests on full-size aerials at 14 mc are expensive and time-consuming and the results, bearing in mind the proximity of the ground and nearby objects, are unlikely to be reliable and repeatable. Tests were therefore carried out at 10 times the operating frequency, namely at 140, 210 and 280 mc. On these frequencies, using a sweep generator, it proved possible to display on a cathode-ray tube screen the complete matching characteristics of the antenna on all three bands simultaneously and thus, not only would it be possible to see the effect of adjustments of the traps at their resonant frequency, but also the effect on the other two bands.

It proved possible to produce a highly efficient 3-element Yagi operating on 140, 210 and 280 mc and measurement of the bandwidth in practice showed that reactance compensation had indeed been achieved on the two lower frequency bands, but not altogether at the highest frequency. The reason for this is, of course, that at the highest frequency, namely 280 mc, the 280 mc trap is behaving correctly as an open circuit and to all intents and purposes, the rest of the system does not exist. On 140 mc, however, both the 210 and 280 mc traps are in series with the antenna elements, although not resonant at 140 mc. The off-frequency trap compensating properties therefore come into play and the match obtainable on the final antenna at 14 mc was almost too good to be true—in fact, better than 1.1/1 from 14.0 to 14.4 mc. At 21 mc, there is still compensation from the 28 mc trap which is in circuit but of course off-frequency, and although the match is not as phenomenally good as on 14 mc, there is still coverage of the entire band at better than 1.5/1. On 28 mc there is no reactance compensation since, as previously stated, the traps have shut off the rest of the antenna, but nevertheless it has proved possible to obtain a match better than 1.6/1 from 28.1 to 28.7 mc. Fig. 1 shows the schematic of how the three-band dipole finally looked using the half-wave traps—see opposite.

Design Considerations

The next problem was one of mechanics on how to accommodate this type of trap to a practical waterproof design. The necessary properties are strength, lightness, resistance to weather and good electrical power factor. No one material is capable of providing all these properties and it proved necessary to use fibre-glass for strength and lightness together with polythene for insulation and good power factor.

The half-wave stub was composed initially of 72-ohm flat-twin transmission line and attempts to place this loosely inside the radiator tube were doomed to failure due to uncontrollable capacitive effects. It was, however, found that the half-wave stub could be wound into the form of a coil without adversely affecting the electrical properties. Unlike a coil, however, there was no large

external field, in fact the winding could be on metal with little effect, or it could be inside a metal tube without the adverse effects which occur when a normal coil is placed inside a close-fitting screening can. The fact that the stub could be fitted into a tube led to the obvious conclusion that the best place for it was *inside* the antenna elements and the final configuration is illustrated in Fig. 2, where there is complete protection against the weather for the stub and the strength of the joint is ensured by the fibre-glass jointing piece—see below.

The mechanical considerations of the final design now had to be considered. A half-wave element on 20 metres is quite simply and logically 10 metres long and the no-compromise design of the traps meant the dipole would in fact be half a wave long, namely 33 feet. This length of element has to be supported in the centre and, assuming it to be made from 1-inch diameter tubing, the total area is just under 3 square feet. The wind pressure at 100 m.p.h. allowing for the circularity of the elements is 25 lbs. per square foot and thus a 1-inch element at 20 metres will have to be designed to withstand 75 lbs. of wind pressure. The total wind pressure on a 3 element array including the cross-boom will be approaching 300 lbs. The obvious method of reducing these stresses is to taper the element, thus reducing wind pressure on the tips where leverage is greatest. Cost considerations dictate that the taper must be in the form of steps and it is convenient on a three-band beam to step the element size down at the point of insertion of a trap. Total wind pressure by this means is reduced to approximately 200 lbs. at 100 m.p.h., but even so, to provide an adequate margin of fatigue resistance, a 2-inch boom is essential.

On 20 metres, a spacing of one-eighth wave-length results in a reasonable sized antenna, but due to the close spacing, the Q is high and the achieving of adequate bandwidth and match is very difficult. With reactance compensation, however, the high Q of the close-spaced beam proved to be an advantage, as is shown by the almost perfect match obtainable throughout the 14 mc band. It was therefore decided to standardise on a spacing of one-eighth wave-length at 20 metres, giving a boom length of some 16 feet, and a spacing on 15 metres of 0.185 wave-length and on 10 metres of 0.25 wave-length. The increase on spacing on the two higher bands is particularly advantageous in this design since, on 20 metres where spacing is closest, there are two traps in use to provide reactance compensation, while on 15 metres, where the effective spacing is larger requiring less compensation, there is only one trap involved, while on 10 metres, where no reactance compensation is possible, the spacing is effectively quarter-wave and a 3-element quarter-wave spaced beam has a dipole feed

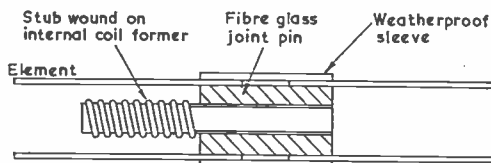


Fig. 2

impedance of virtually 50 ohms with no problems.

The question of a balun was then considered, and although it proves very difficult in practice to measure the difference between an antenna with a balun and one without, the no-compromise discipline definitely dictated the use of a balun, if only to reduce TVI trouble due to radiation off the feeder. The only possible type of balun which would not upset the careful impedance balance which had been achieved was a non-resonant device and design was finalised on the modern ferrite-core balun which could easily be incorporated in a waterproof connector box. A word of warning is perhaps appropriate here in that one particular type of ferrite strongly recommended in some quarters proved to have utterly unacceptable losses which appeared in the form of *heat* and a rising mis-match when power was applied to the antenna! Investigations had therefore to be undertaken into the properties of ferrites and the correct type for this particular application was finally found and in our design both the traps and the balun will withstand continuously 1 kW of CW.

Test Results

Tests of short distance free-space gain showed that the theoretical maximum of 5.8 dB over a single dipole was achieved and it is interesting to wonder how some quoted gain figures for 3-element beams of 8 and 10 dB can possibly be justified. The answer of course is in the *DX gain* of an antenna system which depends mainly upon *angle of radiation*, thus considerable advantages

must accrue from the use of the beam which cannot waste power upwards, as with a long wire or dipole. It is difficult however to justify any numerical statement of this *DX gain*, but there can be no doubt that it exists—in fact tests were carried out using a dipole as a standard of comparison. Locally, tests of gain between the beam and the dipole showed the theoretical beam gain of 5.8 dB, but a daily sked with VK2NN using instantaneous switching between the beam and the dipole proved a consistent three S-points improvement with the beam and this was repeated on similar skeds with WA8BBN. Three S-points is 12 to 18 dB which is theoretically quite impossible to achieve from a 3-element beam, but nevertheless this amount of *DX gain* quite definitely can be obtained.

Since this initial design was a 3-element to cover three bands, it was decided to name it the Triple Three, with the possibility of a family of Triples reaching to Triple Fours and Triple Sixes in the future. Doubts exist on whether it will be possible to achieve the same amount of reactance compensation with a 4 and 6 element beam and in any case, lots of headaches are in store from the mechanical standpoint in that a 6-element must have a wider spacing than one-eighth wavelength, with consequent problems in boom design which will undoubtedly need to be larger than the present two-inch, bringing in all the attendant problems in the design of new fittings.

Sincere thanks are due to VK2NN, WA8BBN and G3OUJ for their patience in providing the other end of the final test range, where business became pleasure!

INTERESTING NEW OSCILLATOR

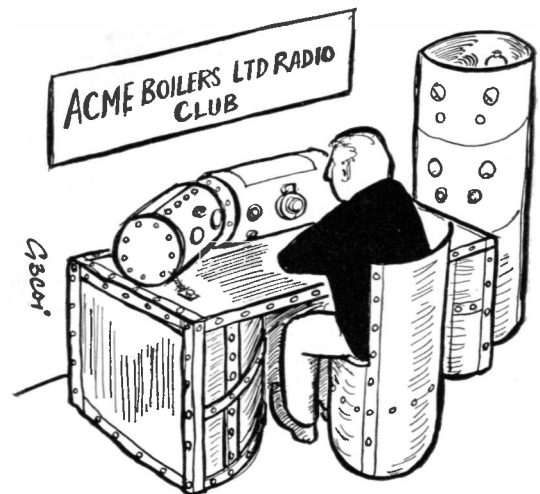
The Specialised Components Division of The Marconi Company has recently developed a new high-stability oscillator having remarkable characteristics. Known as the Type F3180, it is little larger than a matchbox and provides a completely self-contained frequency source in the range 10 to 20 mc. The F3180 oscillator will operate over a temperature range between 50° below freezing and the boiling point of water, with a frequency change of only a few cycles at 14 mc.

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Those who order from our extensive Book Lists—appearing in every issue of *SHORT WAVE MAGAZINE*—can be sure of expeditious handling of their business. We aim to despatch on the day your order is received—or, at the very latest, the day after.—Book Sales, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

THE "NEW QTH" PAGE

This has appeared in *SHORT WAVE MAGAZINE* every month for more than 20 years. It has listed the holders of new call signs recently issued, and the changes of address of AT-stations as they have occurred. It is from the "New QTH" entries—as well as from numerous other sources—that, over the years, the U.K. section of the international *Radio Amateur Call Book* has been compiled. The "New QTH" page in *SHORT WAVE MAGAZINE* is



DESIGN FOR A CW TRANSCEIVER

CIRCUIT DETAILS — GENERAL LAYOUT AND CONSTRUCTION — ALIGNMENT, TESTING, OPERATION AND SOME RESULTS

Part II

T. HARRISON (GM3NHQ)

GOING on from Part I of this article, in the April 1969 issue of SHORT WAVE MAGAZINE, we come now to the practical details. As regards constructional layout, as in the writer's case this can be perfectly straightforward. His result can be seen in the photographs—and see p.89, April—which show the 21 mc Tx/Rx assembly with the side, top and bottom panels removed. The whole rig is easily accommodated on a chassis 11in. by 10in. in plan, using the block system of construction—taking each section as a separate unit, more or less to the block schematic on p.87, April.

Tag strips were used extensively throughout, because the units were intended not only for home-station working, but also for portable operation under field-day conditions, this requiring fairly robust mechanical work. Let us now consider in more detail the various stages of the Transceiver. The circuit has been broken up into "blocks," since the design lends itself to construction and testing in single sections. The prototype of these units was in fact built on separate sub-chassis to enable each stage to be constructed with the minimum of toil.

RF Amplifier and 1st Mixer Stages

The schematic diagram for these stages is shown in Fig. 2. The RF stage V1 takes an EF183, the gain of which is controlled by altering the cathode bias via VR1, R4 being fitted to limit the current through V1 with the gain set at maximum. V2A, B is the ECF80 first mixer. The triode section V2B operates as an overtone

oscillator to give 17.25 mc output from a 5.75 mc FT-243 crystal, Xr. The oscillator output is capacity coupled to the mixer grid via C13, a "gimmick" capacitor of 2 inches or so of twisted wire. The mixer output of about 3.8 mc is taken to the second mixer by coax cable and link coil, L6 (see Fig. 3, p.144) to prevent stray pick-up and break through. The grid tuned circuits of both stages are returned to the receiver muting line via R2 and R8, while R1 and R9 form a voltage divider which prevents both stages being

Table of Values

Fig. 2. RF Amplifier and 1st Mixer Stage

C1, C3, C4, C5, C6, C8, C10, C11, C12, C15	= .01 μ F, disc cer.	R6, R11	= 22,000 ohms
C2, C7, C9, C14	= 25 μ F, s/m	R7	= 3,300 ohms
C13	= 2 μ F, see text	R9	= 470,000 ohms
R1, R2, R8	= 220,000 ohms	R10	= 150 ohms
R3	= 49,000 ohms, 5w.	R12	= 22,000 ohms
R4	= 270 ohms	R13	= 57,000 ohms
R5	= 33,000 ohms	R14	= 15,000 ohms
		VR1	= 1500-ohm potentiometer
		Xr	= 5750 kc xtal, FT-243, see text
		V1	= EF183
		V2	= ECF80

Table of Coil Data

- L1: — Two turns interwound with L2.
- L2, L3, L4 — 7 turns 26g. close-wound on $\frac{1}{8}$ in. dia. former.
- L5 — 26 turns 26g. on $\frac{1}{8}$ in. dia. former, tapped 8 turns from grid end.

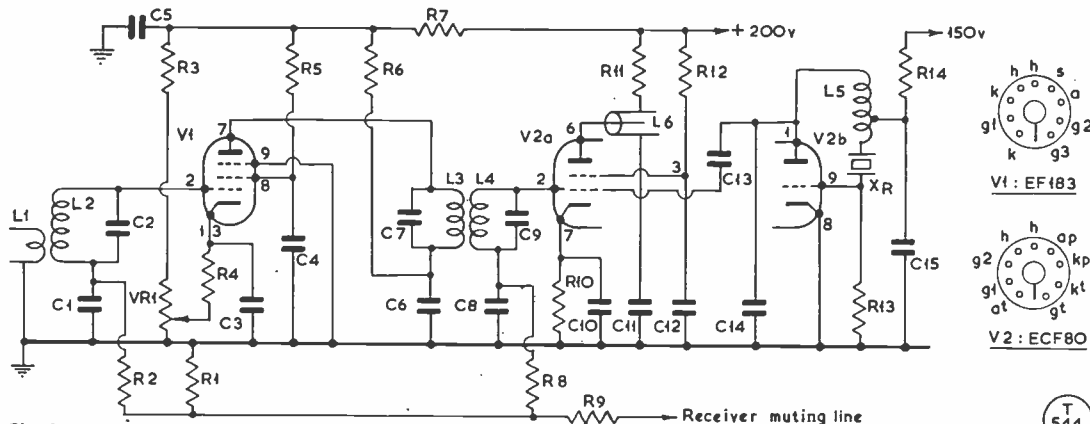


Fig. 2

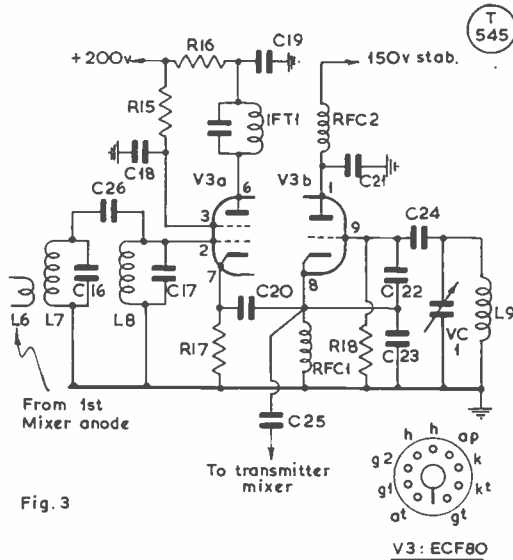


Fig. 3

completely cut-off by the muting voltage, to allow monitoring of the transceiver keying.

Second Mixer and VFO

Fig. 3 is the schematic diagram for the second mixer and VFO. V3A, B is an ECF80, the tetrode section acting as the mixer stage, the triode section being the VFO for both the receiver and transmitter. The Colpitts circuit is used for the VFO, although each constructor will no doubt have his own ideas. The mixer input circuit is arranged in the band-pass configuration, coupling between L7, C16 and L8, C17 being via C26, a 5 μμF capacitor. First mixer output is link coupled to L7 by means of L6. Second mixer output at 470 kc is taken off at IFT1. Cathode coupling is used between the mixer and VFO through C20, mainly because the Colpitts VFO lends itself to this type of coupling. The VFO is the standard Colpitts circuit with C22, C23 providing the capacity feed back tap across the VFO tuned circuit VC1, L9.

Second IF Amplifier

Fig. 4 (opposite) shows the schematic diagram of the 2nd IF amplifier stage. Only one stage of IF amplification is indicated. This, however, uses a high gain EF183 and has proved adequate for the author's needs. High-gain valves have a tendency to inspire oscillation, and it requires great care in both design and construction to produce a stable amplifier. In the writer's case a small screen was fitted across the EF183 valveholder to prevent capacity coupling between grid and anode across the valveholder, and, in addition, it was found that decoupling the anode circuit directly to the screen grid, instead of to earth, helped in reducing this tendency to oscillation. IFT1 and IFT2 are coupled together in a bandpass circuit in an attempt to produce a fairly flat band width of about 10 kc, to allow effective use of the "Receiver Offset Tuning" system—discussed in Part I,

Table of Values

Fig. 3. Second Mixer and VFO assembly

C16, C17 = 220 μμF, s/m	VC1 = 140 μμF, var.
C18, C19, C21 = .01 μμF, disc cer.	R15, R18 = 47,000 ohms
C20, C22 = 47 μμF, s/m	R16 = 3,900 ohms
C23 = 680 μμF, s/m	R17 = 1,000 ohms
C24 = .001 μμF, s/m	RFC1, RFC2 = miniature RF chokes
C26 = 5 μμF, s/m	V3 = ECF80

Table of Coil Data

L7, L8	— 50 turns of 26g. on ½ in. dia. former
L9	— 40 turns of 26g. on ½ in. dia. former

April issue—without introducing any noticeable loss in sensitivity over the BFO tuning range.

Product Detector and AF Stages

The product detector shown in Fig. 5 uses two OA71's in a double diode circuit taken from the ARRL Handbook and while this does not contribute any gain to the receiver, it has proved perfectly satisfactory. The BFO injection is via C32 to the diode junction. The ECL80 AF stage is fairly straight forward. The only points worth noting are R24, C30 which are fitted to suppress any tendency for the ECL80 to burst into HF oscillation, and the large value of cathode decoupling capacitor, C37. This latter should be at least 150 μμF to ensure that the cathode is effectively grounded to AF. The ECL80 provides sufficient output for headphone operation but should loudspeaker reception be required, it may be necessary to fit say an ECL86 in this stage.

BFO Stage

This is shown in Fig. 6 (p.145) and is quite con-

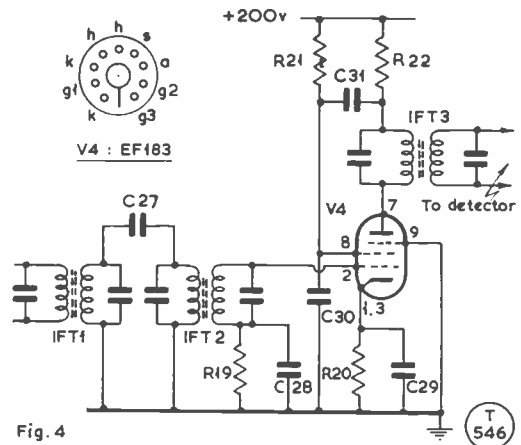


Fig. 4

Table of Values

Fig. 4. Second IF Amplifier Stage

C27 = 5 μμF, s/m	R21 = 71,000 ohms
C28, C29 = .01 μμF, disc cer.	R22 = 22,000 ohms
C30, C31 = .001 μμF, disc cer.	IFT's 1, 2, 3, = 470 kc
R19 = 51,000 ohms	V4 = EF183
R20 = 330 ohms	

ventional. L10 is one winding from a 465 kc. IF transformer, with the tuning capacitor removed. The BFO frequency is altered ± 5 kc by VC2, and the injection voltage is taken off the grid end of L10.

Transmitter Mixer and Driver Stages

Fig. 7 on p.146 is the diagram of the transmitter mixer and driver stages comprising V7, an ECF80, and V8, an EF183. The triode section of the ECF80 operates as an overtone oscillator at 17.72 mc and output from this is capacity-coupled to the mixer section grid via C48, while injection voltage from the VFO is coupled to the mixer cathode through C60. The required mixer output of 21 mc is tuned by L12 C51. The overtone oscillator grid resistor, R36, is returned to the transmitter keying line, decoupled through C46. The mixer is not keyed, thus avoiding a fluctuating load on the VFO output.

The driver stage has a parallel-tuned grid circuit, L13, C53, which is mutually coupled to the mixer anode circuit, L12, while the driver is transferred to the PA grid by a *pi*-network, which helps in reducing harmonics. In the author's equipment it has not been necessary to neutralise the PA stage, probably because of the fairly large capacitance from PA grid to earth, C58. No provision has been made for varying the driver output since, with the component values shown, it has been possible to get sufficient drive from the EF183 to run the PA stage up to 50 watts. The driver stage is also keyed, the driver grid being returned to the keying line via R41 and decoupled through C54.

PA Stage

The 6146 PA stage is as in Fig. 8, p.148. As previously mentioned the grid circuit is *pi*-coupled to the driver and the author used parallel tuning in the plate circuit, mainly to save space. There is, of course, no reason why *pi*-coupling should not be used between PA and aerial if desired. The PA screen is fed from the 150 volt stabilised-line while grid bias is set by VR4, which is returned to the keying line. Connecting VR4 between the negative bias supply and the keying line ensures that the full cut-off voltage of around -200 volts is applied to the PA grid when the key is open, thus avoiding any

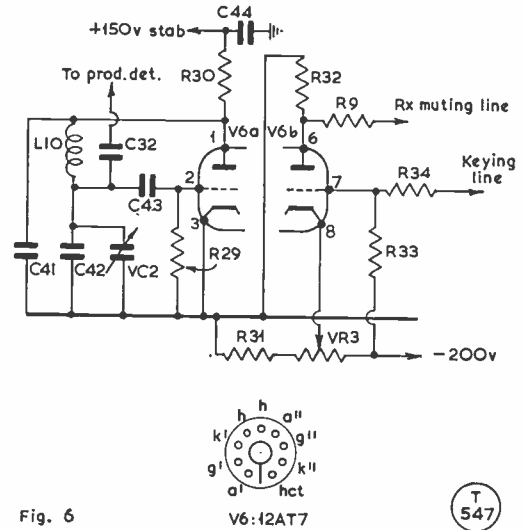


Fig. 6

Table of Values

Fig. 6. BFO Circuit for Transceiver

C41 = 270 μ F, s/m	R29 = 150,000 ohms
C42 = 82 μ F, s/m	R31 = 12,000 ohms, 5w.
C43 = 150 μ F, s/m	R32, R33 = 120,000 ohms
C44 = .01 μ F, disc cer.	VR3 = 5,000 ohms, w/wound
VC2 = 25 μ F, air spaced	V6A, B = 12AT7
R9 = 470,000 ohms (see Fig. 2)	

standing current through the 6146, while the control bias returns to the optimum adjusted figure when the key is closed. The author found that the PA stage generated a little noise if complete cut-off was not obtained, this noise being passed on to the receiver through the PA tank circuit and the T/R switch. PS1 and PS2 are anti-parasitic chokes fitted as a precaution against parasitic oscillation of the PA stage.

T/R Switch

The ARRL Handbook suggested the T/R switch design of Fig. 9, p.148. V10 is a 12AT7 twin triode, one half of which acts as an amplifier, the other as a cathode follower. The two sections are coupled together through the tuned circuit L16, C68 which resonates at the band of operation. The 12AT7 input is capacity-coupled directly on to the aerial socket via C64 while the cathode follower output is returned to earth via the link coil L1 on the receiver RF stage grid coil. When L16, C68 is tuned to the 21 mc band the T/R switch in fact contributes a little

Table of Values

Fig. 5. Product Detector and AF Stages

C32 = 15 μ F, s/m	R25 = 470 ohms
C33, C34, C36 = 470 μ F, s/m	R27 = 2,200 ohms, 2w.
C35, C38 = .01 μ F	R28 = 100,000 ohms
C37 = 150 μ F, 25v. elect.	VR2 = 500K potentiometer
C39 = 0.1 μ F	LFC = standard pentode o/p xformer
C40 = 8 μ F, 350v. elect.	V5 = ECL80
R23, R26 = 220,000 ohms	
R24 = 33,000 ohms	

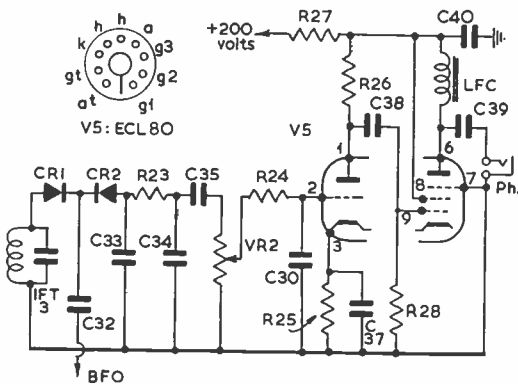


Fig. 5



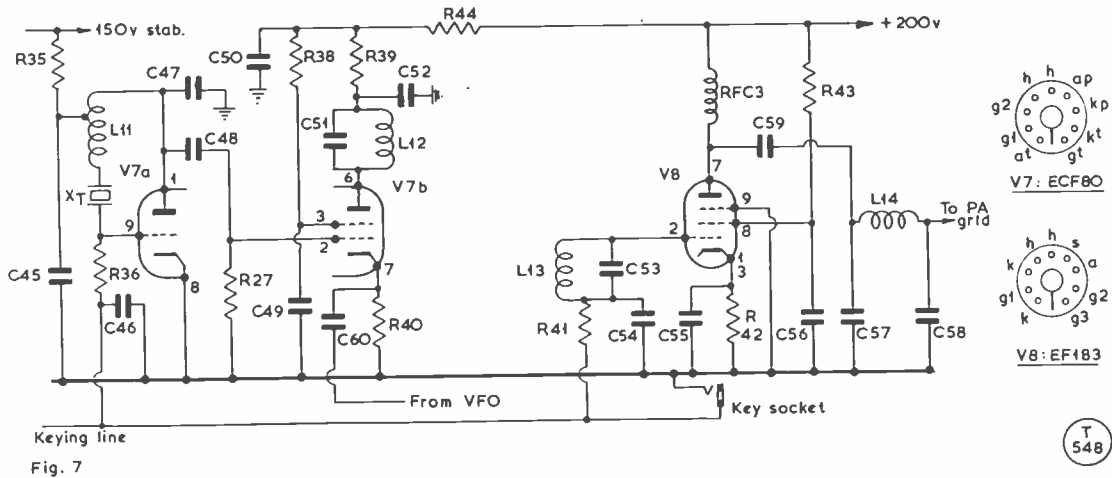


Fig. 7. Transmitter Mixer and Driver circuitry.

gain to the receiver, which is this circuit's main advantage over most other similar switch designs.

Keyer Stage

The circuit shown in Fig. 6 may cause some confusion since it shows the anode of V6B returned to earth via R32. The cathode, however, returns to the negative bias line and the circuit in fact arranges for the keyer anode to go negative with respect to earth when the valve takes current, and this negative voltage is applied to the grid circuits of the first two receiver stages to mute these when the transmitter is keyed. The keyer stage is switched on and off by varying the potential applied to the keyer grid via R31, R32, this potential being nearly 200 volts negative when the key is open, falling to a much lower negative voltage when the key is closed. Setting up of this stage is discussed in the "Testing and Operating" section.

Testing and Operating

There are a number of ways in which this unit can be set up and put into operation, depending on the test equipment available. For instance, the crystal-controlled converter could be set up and fed into, say, a normal communications receiver before testing of the transmitter section was started. The author, however, is a strong believer in "starting at the speaker and working towards the aerial" and this procedure was in fact adopted. The various "blocks" of the circuit were individually set up and commissioned in the following order:—

- (1) Detector, AF and Output Stage
- (2) 2nd IF Amplifier
- (3) VFO and 2nd Mixer
- (4) RF and 1st Mixer Stages
- (5) BFO and Keyer
- (6) Transmitter Mixer and Driver Stages
- (7) PA Stage
- (8) T/R Switch

The equipment at GM3NHQ for testing and alignment includes a multimeter, grid dip oscillator/absorption wavemeter, signal generator (of doubtful accuracy) and

Table of Values

Fig. 7. Transmitter Mixer and Driver Stages

C45, C46,	R36, R38,	R41 = 47,000 ohms
C49, C50,	R39 = 3,900 ohms	R40 = 1,000 ohms
C52, C54,	R42 = 220 ohms	R43 = 33,000 ohms
C55, C56 = .01 μF disc cer.	R44 = 3,300 ohms	RFC3 = miniature RF choke
C47 = 20 μμF, s/m		Xt = 5906-6 kc xtal, FT-243
C48, C51,		V7A, B = ECF80
C53 = 10 μμF, s/m		V8 = EF183
C57 = 25 μμF, s/m		
C58 = 75 μμF, s/m		
C59 = .001 μF, s/m		
C60 = 100 μμF		
R35 = 10,000 ohms		

Table of Coil Data

L11	— 26 turns on ½ in. dia. former, tapped 8 turns from crystal end.
L12, L13	— 25 turns 26g. on ½ in. dia. former, spaced ¼ in. between windings.
L14	— Ten turns 26g. on ½ in. dia. former.

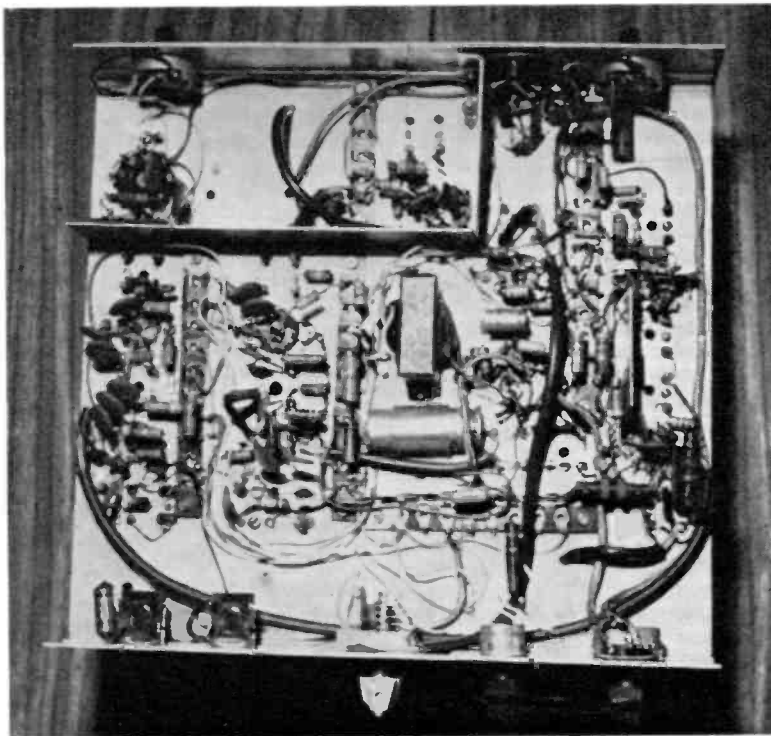
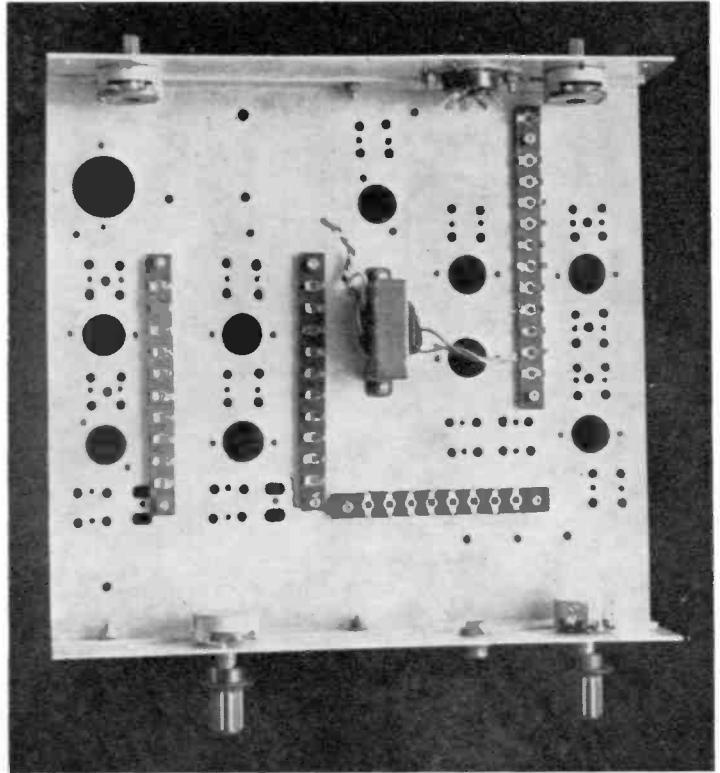
a rather beat-up R.1155.

The first section to be set up was the detector and AF stage, Fig. 5, p.145. Some trouble was initially encountered with HF oscillation of the ECL80, but this was cured by connecting R24, C30 at the grid pin of the ECL80. The main source of trouble, however, is feedback via the common cathode and this should be effectively de-coupled to earth by C37 which should be at least 150 μF. Screened cable is of course used for the AF gain control leads to avoid AC pickup from the heater wiring, etc. The detector and AF sections were tested by feeding a modulated 470 kc signal into IFT3 (Fig. 4) but if no signal generator is available touching the junction between IFT3 and CR1 with a short aerial wire should produce some sort of noise at the headphones, and will prove that the stages are at least alive.

The second IF stage initially had a tendency to oscillate when the IFT's were peaked but this was cured by fitting a small screen across the valvholder and de-coupling the anode resistor R22 to the screen grid connection instead of directly to earth as is common

[cont'd p.148

The drilled chassis for the Transceiver, with tag strips, speaker transformer and gain controls mounted. The preset pot. next to the power-plug socket is the muting valve setting control, VR3; the preset pot. next to the octal hole is VR4, for setting PA bias.



Construction on the prepared chassis as shown above. Screened lead is used for the AF gain control wiring and coax connects the BFO tuning condenser, VC2, to the BFO coil. Coax is also used to transfer the VFO output to the transmitter mixer.

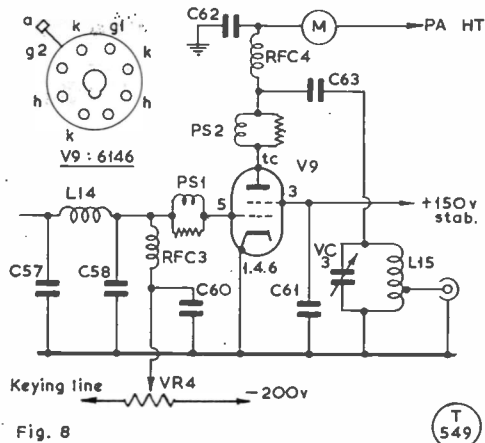


Fig. 8

T 549

Table of Values

Fig. 8. The PA Stage, 6146

C60, C61,	RFC4 = RF choke to carry
C62 = .01 μ F, disc cer.	100 mA, Eddy-
C63 = .001 μ F, s/m	stone 1011, or
VC3 = 50 μ F, air-	similar
VR4 = 500K	L15 = For 21 mc, 7t. 20g.
potentiometer	tapped 2t. from
PS1,	ground end
PS2 = Parasitic suppres-	V9 = 6146
sors, 5t. 26g. on	
47-ohm 1w.	
resistor	

practice. Alignment of the three IFT's is not too critical at this stage in the proceedings since the exact 2nd IF channel depends on the precise difference between the transmitter and receiver crystals. It is sufficient at this stage roughly to align the three IFT's to about 470 kc to check that IF amplifier and detector stages are working and final alignment can be left until the whole unit is functioning.

The VFO was the next stage to be tackled, Fig. 6. Needless to say care should be taken in constructing the VFO since this governs the quality of the transmitted signal in addition to tuning the receiver. The component values shown should result in a T9 note and the correct frequency coverage. The note and frequency coverage were checked on the R.1155. Once the VFO is going satisfactorily, the 2nd mixer grid coils can be roughly peaked around 3.8 mc. Final peaking will follow when the whole transceiver is going.

The receiver crystal oscillator (Fig. 2) was next set up, again using the R.1155 to check for oscillation frequency. A milliammeter inserted in the 150-volt supply line to the oscillator gives indication of oscillation, the core of L5 being adjusted to produce a dip in the milliammeter reading. Before starting alignment on the 1st mixer and RF stages the receiver muting line should be earthed by shorting out R1. The circuits can be roughly lined up initially by using either a modulated signal generator or even a short length of wire connected to link coil L1 to act as a pickup. Final alignment is best left until the whole unit is ready to go, as all the receiver

and transmitter tuned circuits are stagger-tuned to give an even response over the CW section of the band.

The BFO can next be got going and the frequency should be set to about 470 kc with VC2 at the half-mesh position, by adjusting the core of L10. Once again final adjustment of frequency is left until the transmitter stages are working.

Adjustment of the keyer stage is simple. First of all the short is removed from R1 at the receiver RF stage, then a voltmeter is connected across R32 (Fig. 6), measuring the keyer anode voltage with respect to earth. With the key open, VR3 is adjusted until a small voltage is developed across R32, indicating that V6B is conducting. VR3 is now backed to cut-off. In this condition V6B is cut off with about -200v. bias applied to the grid through R33. If the key is now closed, R34 is connected to earth causing the effective bias on V6B to fall to some new figure determined by the voltage divider R33/R34. V6B now conducts and in so doing develops a negative voltage across R32, which is applied to the RF and 1st mixer stages to mute the receiver. Thus, the transmitter is switched on and the receiver muted simply by pressing the key. The actual muting level is set by the voltage divider R1/R9 (Fig. 2) which applies a proportion of the voltage across R32 to the V1, V2 grid circuits. If the muting level is to be increased, simply reduce R1.

Transmitter Testing

This completes the preliminary testing of the receiver circuits and the transmitter stages can now be set up. During the initial testing and alignment of the transmitter stages it is helpful to have the screening cans removed from the various tuned circuits to allow an

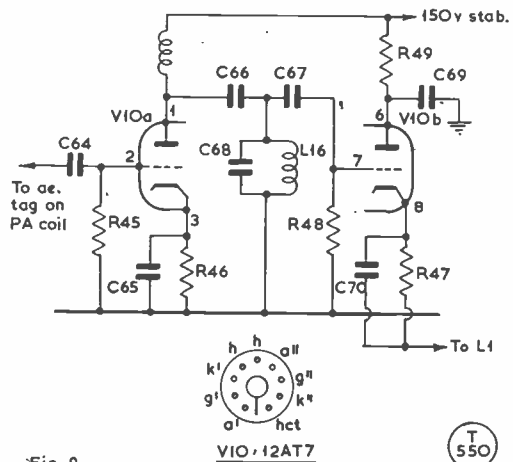


Fig. 9

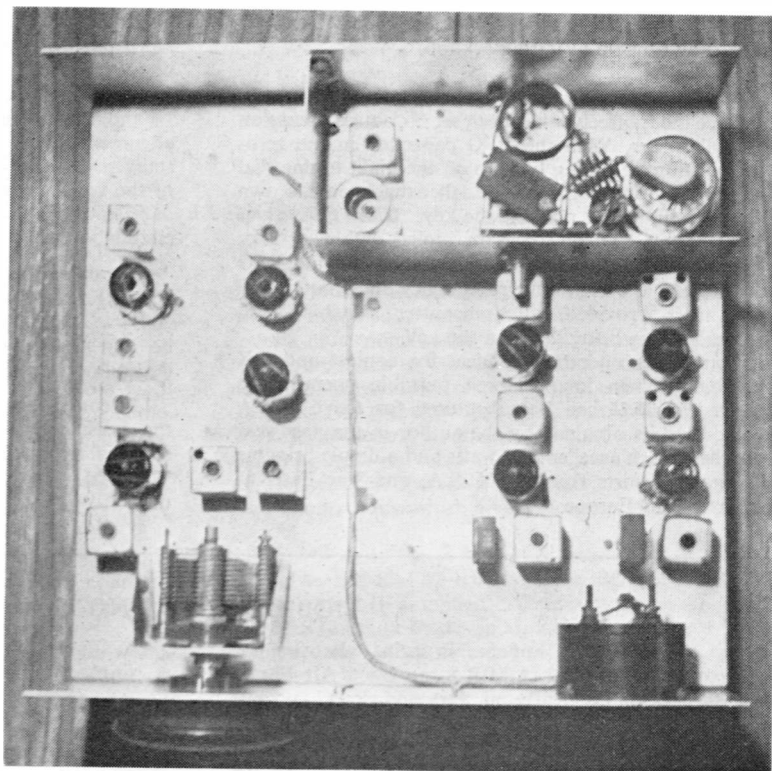
T 550

Table of Values

Fig. 9. Suitable T/R Switch for Transceiver

C64, C67 = 47 μ F, s/m	R46, R47 = 220 ohms
C65, C69 = .01 μ F, disc cer.	R49 = 1,000 ohms
C66 = 100 μ F, s/m	L16 = 15 turns 26g. on
C68 = 20 μ F, s/m	1/2 in. dia. former
C70 = .001 μ F, cer.	V10A, B = 12AT7
R45, R48 = one megohm	

Looking down into the CW Transceiver—the PA stage is in the screened compartment at upper right. This screening is carried into the sub-chassis space—see lower photograph on p.147.



absorption wavemeter to be used for tuning up.

The transmitter crystal oscillator (Fig. 7) is first set up, by adjusting the core of L11 for indication on the wavemeter, or on a milliammeter in the 150v. supply to V7A. It is important that the core position gives reasonable output with reliable, chirp-free starting, since this stage is the only oscillator keyed. A sluggish crystal here will result in a chirpy signal. Surplus FT-243 crystals are used in this unit and if possible several should be purchased for the transmitter oscillator frequency and the most active one selected. It is very much worth while to pay special attention to this point.

Adjustment of the mixer and driver stages simply requires peaking of L12, C51 and L13, C53 to the 15-metre band using the wavemeter and adjusting the core of L14 to produce maximum drive for the 6146 stage with RFC3 in Fig. 8 disconnected from VR4 and connected to earth through a milliammeter. The PA anode and screen voltages should be removed for this preliminary alignment. If the PA drive current obtained is very low, it can be increased by connecting the VFO coupling capacitor C25 (Fig. 3) to the mixer grid. In this case, R40 (Fig. 7) will have to be by-passed with a .01 μ F disc ceramic capacitor. When starting work on the PA stage (Fig. 8) the bias on the 6146 grid should be set at maximum by adjusting VR4, before connecting anode or screen supplies, otherwise a heavy current may be drawn by the 6146, with disastrous consequences. Once this is done, however, the key can be closed and the bias reduced until the 6146 draws about 50 mA. The PA tank condenser VC3 is now adjusted for a dip in anode current.

If the aerial (or dummy load) is then connected, the PA current should rise to about 50 mA and the PA power can be increased to maximum by further reducing the 6146 bias voltage.

The last stage to be commissioned is the T/R switch and this requires only peaking the tuned circuit L16, C68 to the middle of the 21 mc band.

Final Adjustments

Now follows the final alignment of the whole unit. The BFO is first set to the exact frequency required. With the BFO capacitor at mid-range, close the key and adjust L10 core so that zero beat is obtained on the transmitter signal heard through the receiver muting. The BFO is thus set to the exact second IF channel. The three 470 kc IFT's can be aligned simply by tuning any transmission heard to zero beat and peaking for maximum signal. In fact, the author staggered the settings slightly to produce a 10 kc wide passband on the 470 kc IF strip.

The next step is to tune to a station around 21025 kc and peak L2, C2 and L7, C16 on this signal. Then tune in a signal around 21150 kc and peak L4, C9 and L8, C17 on this. Finally, tune to around 21075 kc and peak L3, C7 and L16, C68 at this frequency. These settings should result in an even receiver response over the CW section of the 21 mc band.

The transmitter circuits are set up in a similar fashion for an even output over the band with L12, C51 peaked at 21025 kc; L13, C53 at 21150 kc; and L14 peaked at 21075 kc. The PA tank circuit can be preset at 21075 kc

or in the preferred section of the band—or it can be made fully tunable by fitting a knob.

Operation

Once the transceiver has been set up, actual operation is child's play. With the BFO capacitor in the zero-beat position all tuning is done on the main tuning dial and any station heard can be called back on his own frequency simply by pressing the key. If the transceiver operator calls CQ, he tunes for replies within ± 5 kc or so of his own frequency by searching on the BFO control, and the transmitter frequency stays put. Full break-in is provided, all transmitter switching and receiver muting being done on the key.

Transceiver operation is ideal for contest and DX working. When low powered portable operation is required, a 2E26 can be substituted for the 6146 PA valve. Results obtained by the author in the past year or so have been excellent, 25 watts and a dipole bringing very good reports from the U.S.A. and Far East, as well as round Europe.

As mentioned at the beginning of the article—in the April issue of the Magazine—the author has used this design on the other HF bands and Table 1 (on p.88, April) gives the crystal, VFO and IF channels for the 14 and 28 mc bands. The same procedure is used for alignment, the HF and 1st IF tuned circuits being staggered to give an even response over the CW section of the band. AM operation requires only the addition of a suitable modulator and re-alignment of the tuned circuits to the appropriate section of the band in use.

Power supply requirements are: 6.3v. at 4 amps; 150v. DC stabilised at 30 mA; 200v. DC at 50 mA; and 200v.-ve for bias and keying. The PA anode supply can be anything between 300 and 600v. DC at 100 mA, depending on the power output required.

In conclusion, the author would like to acknowledge the assistance of the ARRL *Handbook*, for providing some of the circuits, and several contributors to SHORT WAVE MAGAZINE, for some of their ideas used in this unit.

MOBILE RALLY NOTES

By the time this appears in print, the first of the season's Rallies — A.M.R.S. at Lydd Air Show, and the Midlands Rally at Drayton Park — will have happened. We hope to have reports and photographs of these and all other Rally events as they occur, so that the "Mobile Scene" feature (to be started next issue) can be kept going through the Rally Season. Organisers are asked to note accordingly, letting us have their material, including photographs (any of these that can be used are paid for) as soon as possible after the meeting.

There is one non-event to mention. Saltash have informed us that, regretfully, they are unable to mount a Mobile Rally this year.

And we are also asked to make it clear that the Northern Amateur Radio Mobile Society's event on May 18 will be held as detailed here, and *not* at the venue previously announced.

Following are the Rallies notified to date:

May 11: Scunthorpe Amateur Radio Club Mobile Rally at Grange Farm Hobbies Centre (ex-Civil Defence Hq.), with Top Band talk-in operating from 11.0 a.m. — S.M. McCann, G8CFT, 21 Collum Avenue, Scunthorpe, Lincs.

May 18: Northern Mobile Rally, at Moor Grange County Secondary School, Parkstone Avenue, Leeds 16, opening at 12 noon. Approach from Leeds Ring Road, West Park (A.6120) and if from the east take third turning on right after crossing the A.660, Leeds-Otley. If coming from the west, first left after passing under the railway bridge. Talk-in will be provided on Top Band, and possibly on 4m. as well. There will be the usual Rally attractions, and some new ones, also a trade show, with refreshments

available on site.—D. Binns, G3MG1, 80 Gipton Wood Road, Leeds, LS8-3AQ.

May 18: Thanet Radio Society Mobile Rally, King George V Memorial Park, Ramsgate, with talk-in on Top Band and two metres, signing G3DOE. The SRN4 Hovercraft operating from Pegwell Bay will be an additional attraction.—R. T. Trull, G3RAD, 1 Approach Road, Broadstairs, Kent.

June 1: For the YMCA 125th anniversary celebrations, at the Sports Centre, Melrose Close, Loose, Maidstone, Kent, signing GB3YMC/A on Top Band and two metres, AM/SSB. A big effort is being made to ensure that this Rally will be specially interesting and successful.—W. E. B. Kent, G3YCN, 72 Bower Mount Road, Maidstone (57634), Kent.

June 1: Amateur Radio Mobile Society (A.R.M.S.) annual Rally—location to be announced.

June 29: West of England Mobile Rally, at Longleat, Wilts.

July 6: Annual Mobile Rally at South Shields, Co. Durham.

July 13: Worcester Club annual Mobile Rally.

July 27: Pudsey & District Radio Club Mobile Rally, at Allerton High School, Leeds 17. Talk-in on all regular bands.—M. S. Gaunt, G3WGW, QTHR.

August 17: Annual Derby Mobile Rally.

August 31: The G3VGG, Bromsgrove & District Amateur Radio Club, Mobile Picnic.

August 31: Preston Amateur Radio Society Mobile Rally, at Kimberley Barracks, Deepdale Road, Preston, Lancs.—G. Wright, 56 Queensway, Bamber Bridge, near Preston.

THE EDDYSTONE 740 AND 750 RECEIVERS

NOTES ON CIRCUITRY, COVERAGE AND ALIGNMENT OF POPULAR VALVE DESIGNS

F. G. RAYER, A.I.E.R.E. (G3OGR)

DETAILS of particular receivers are generally of interest to the many who look to the second-hand market for inodestly priced equipment. The Eddystone 740 and 750 are not often to be seen offered in large numbers—presumably on the grounds that those who have them wish to keep them. But they are obtainable fairly regularly, and the details here should go a long way towards clarifying what are their circuit features and other details.

S.740 External

This adopted the popular Eddystone design with semi-circular scales and the dimensions are approximately $16\frac{1}{2} \times 10 \times 8\frac{1}{2}$ inches high. The whole assembly is extremely rigid, as with all Eddystone receivers. The wrap-round cabinet can be released by four screws and taken off, leaving the panel and chassis with its attached side runners, so that it can be turned upside-down without damage. The cabinet has a lift-up lid. (See picture p.155.)

Four bands give continuous coverage from approximately 485 kc to 30.6 mc. The three higher frequency bands are calibrated in megacycles, as follows: 30.6-10.5; 10.6-3.7; and 3.8-1.4 mc. The lowest frequency band is calibrated in metres from 205m. to 620m.

Two large knobs provide band selection and tuning. The other controls are on/off-tone, RF gain, BFO pitch, and AF gain. Three toggle switches are for Noise Limiter, AVC/BFO, and send/receive (or standby with heaters on and HT on some stages). There is also a panel outlet for phones.

At the back are two octal sockets. One allows the use of an external power supply, to run from an accumula-

tor. The other is for the usual Eddystone S-meter, or similar home-built accessory. There are two aerial sockets or terminals, and an earth terminal. Balanced feeders are taken to the two aerial sockets. For end-fed or other unbalanced systems, one aerial terminal is earthed. This gives good general results with all aeri-als. With some aeri-als a tuner or Z-match may increase signal strength on some frequencies, in the usual way.

The receiver operates from 110v., 200/230v. mains, via a mains transformer giving isolation of the chassis.

Valve Line-Up

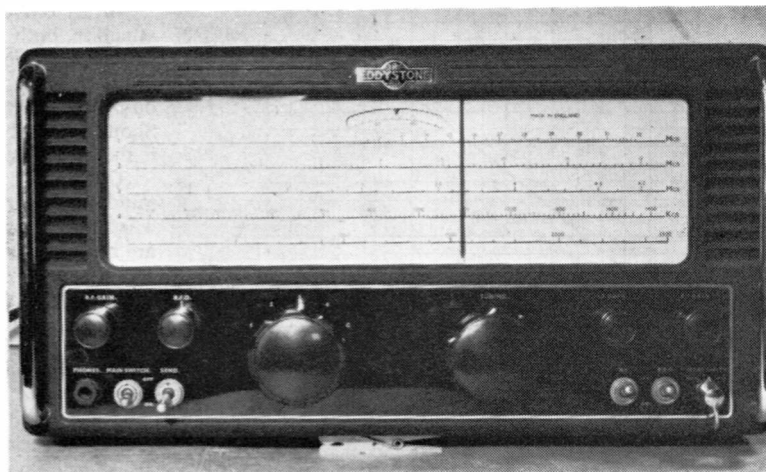
Valves are EAF42 RF amplifier, ECH42 oscillator/mixer, EAF42 IF amplifier, EAF42 pentode 1st AF stage, and EL42 output, diodes in IF and 1st AF stages being employed for detection and AVC bias. The BFO stage takes an EAF42, and an EB41 double diode is fitted for noise-limiter and S-meter circuit. The full-wave rectifier is an EZ40.

Fig. 1 is a block diagram of the circuit. Output is for a $2/3$ ohm speaker. Inserting the phone plug mutes the speaker. (See p.152.)

Tuning Considerations

These are always very important. The actual tuning mechanism has a ratio of about 140:1, flywheel loaded, with sprung gears. The general-coverage type dial, with its four scales, cannot of course give frequency readings to fine limits within narrow limits, such as an amateur band. This is overcome to some extent by a "band-spread" scale driven through sprung gears and visible in a window to the right of the main scales. Readings

The Eddystone 750 Rx. The four horizontal scales are each about 12 inches long. A rotating dial appears in the central window and, for accurate logging, is read in conjunction with the lowest horizontal scale. With an S.750 in good order, very accurate calibration is possible and the re-setting accuracy is high.



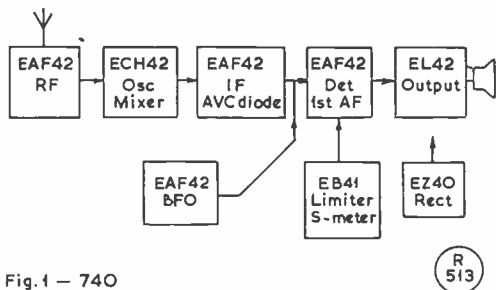


Fig. 1 — 740

Fig. 1. Block schematic of the Eddystone S.740 receiver, which is discussed on p.151.

here are used in conjunction with an 0-9 scale on the dial, so that each of the four bands, or any sections of them, can be logged on a 0-900 basis.

With correct alignment, frequency readings on the four general coverage scales can be very accurate. This allows easy finding and tuning of any amateur band.

When frequencies are to be read to narrower limits on the receiver, the band-spread dial readings can be logged against the pips of a 100 kc crystal marker, in a similar manner to that described with the 750. This gives additional frequency resolution within any chosen bands. The actual band-spread scale degrees for the various amateur bands were found to be as follows: 1.8-2.0 mc, 94; 3.5-3.8 mc, 34; 7.0-7.1 mc, 12; 14.0-14.35 mc, 21; 21.0-21.45 mc, 25; 28.0-29.7 mc, 35.

Performance

Quoted sensitivity is better than $10 \mu\text{V}$ for a 15 dB signal-to-noise ratio, though a signal of $2 \mu\text{V}$ could be read with the actual receiver used. With a 450 kc IF and one RF stage, images begin to show up on the higher frequencies, as would be expected. The listed image ratio is 15 dB at 30 mc, and naturally improves with lower frequencies. In practice, this means that strong signals 2/IF away from the wanted frequency have virtually no practical effect on the 7, 3.5, and 1.8 mc

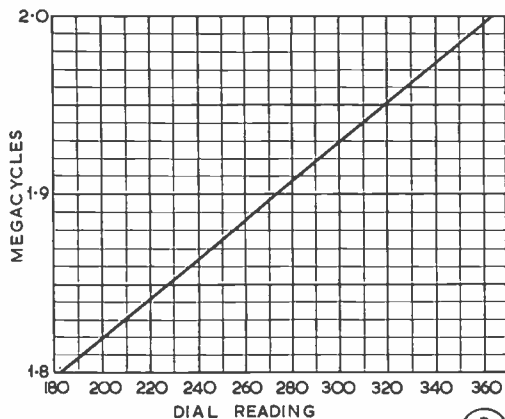


Fig. 2

Fig. 2. How a calibration graph can be constructed—see text. This must of course be done for receivers individually, as explained on p.154.

bands, but can become troublesome on 14 mc from the broadcast 19-metre band. They also arise on 21 and 28 mc, of course. (The effect of this type of interference depends to some extent on the time of day.) Also, on 28 mc there are few transmissions to cause 2nd channel trouble, while 21 mc is at some times relatively free, for the same reason. A pre-amplifier for the HF bands (to put another tuned circuit ahead of the mixer) could be a worth-while addition for the enthusiast bent on improving results.

Selectivity is given as 30 dB at 10 kc. This, like the sensitivity and image rejection, agrees with that quoted for the more modern Eddystone 840. In practice, it means that operating the 740 side by side with a highly selective (and more costly) receiver, occasions show up when the need is felt for more selectivity. Yet despite this it can only be said that the 740 brings in most signals satisfactorily and has an excellent all-round performance.

The BFO switch and pitch controls operate in the usual way. SSB can be resolved by turning down the RF gain, and having AF gain at maximum. As with all non-SSB (straight detector) type receivers, this is something to be acquired by practice with the needful adjustments. BFO coupling was found to be extremely low, from a lead adjacent to the detector diode circuit. This can be increased by substituting a few turns of insulated wire round this lead, and is desirable for better SSB performance.

Modifications

Since these details are for a receiver in original condition, it is not proposed to go into possible modifications. An external RF pre-amplifier has been mentioned. An IF crystal filter would not prove too difficult to incorporate. An S-meter circuit can be used as for the 750. In a 740, actually used at this station for some time, the only modification made was to remove the small "740" plate filling an opening opposite the band-spread dial, and fit a tuning indicator. This was operated from the AVC line in the usual way.

Alignment

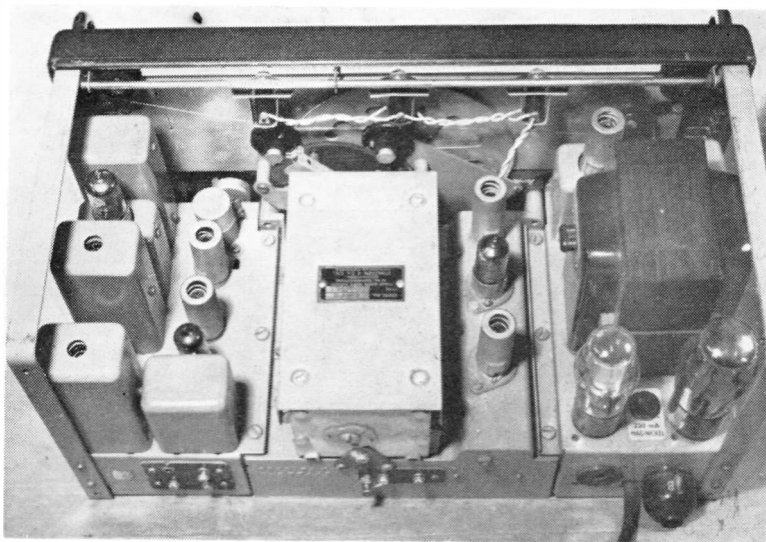
In an old or second-hand model, this could need attention, both for best results and close agreement with the scale markings. The IF is 450 kc and not over $80 \mu\text{V}$, 30% modulated input, should be required for 50 mW output into a 2.5 ohm load fed from the LS sockets. Should any valves be suspected, a meter test will show if they need replacing, perhaps due to lost emission.

Oscillator coils are at the front, mixer coils in the middle, and aerial coils at the back, and can be reached when the bottom cover plate is taken off. The HF ranges are nearest the switch.

If necessary, adjust the oscillator coil cores for correct dial readings on bands and frequencies as follows: (1) 12 mc; (2) 4 mc; (3) 1.5 mc; and (4) 550 kc or 545.5m. Similarly, adjust oscillator trimmers for: (1) 28 mc; (2) 9 mc; (3) 3.2 mc; and (4) 1200 kc or 250m. Repeat as required for best calibration.

Aerial and mixer cores are peaked at similar frequencies to those for the oscillator cores, and trimmers are adjusted on 28 mc for Band 1, 9 mc for Band 2, and

Inside the 750. Mains transformer, rectifier and voltage regulator are to lower right, with the BFO assembly (valve on can) towards the panel. RF, mixer and 1st oscillator valves are to the right of the gang tuning-pack (boxed). At extreme left, the cans are 1st IF (nearest panel), 2nd osc. with valve on top, 2nd IF, 3rd IF. Sockets on rear chassis drop are for PU, speaker, aerial, Ae/E, S-meter and external power supply, if required. The general assembly underside resembles that of the 740—as shown below.



so on. On the HF band, check that the oscillator is HF of the signal frequency, *e.g.*, the image arises when tuning the receiver 900 kc LF, or the generator 900 kc HF.

If alignment is nearly correct, it can be completed with the pips from a 1 mc/100 kc crystal marker. Or for amateur band purposes it may be convenient to use the transmitter VFO, or VFO/buffer stages, adjusting the cores at 14, 3.8 and 1.8 mc, and the trimmers at 28, 7 and 3.5 mc. Signal input to the receiver must be kept well down.

THE EDDYSTONE 750

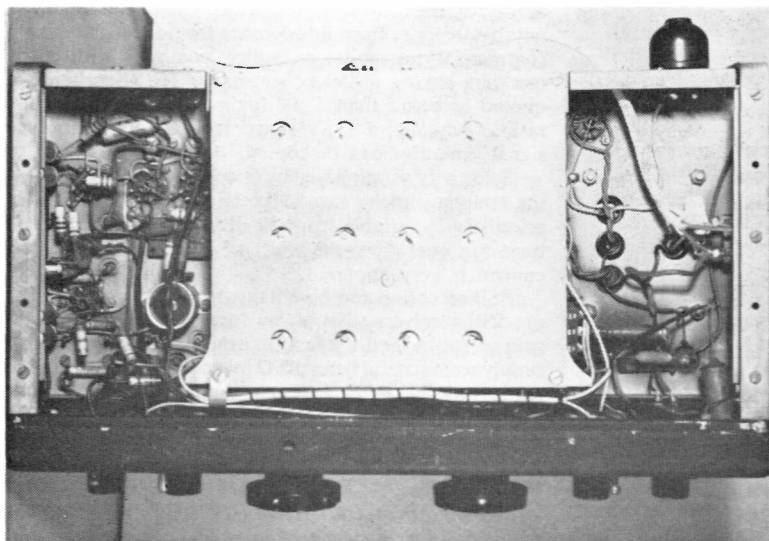
Continuing with the 750, these notes should be of interest to owners of the 740 and 750 receivers, or to those who are thinking of purchasing such equipment in used condition. The 750 is a double-conversion superhet,

with variable selectivity, and capable of an extremely good performance.

750, External

This design embodies the long horizontal scales used for many Eddystone receivers. Each scale is about 12in. long, and each of the four bands is directly calibrated in frequencies. Ranges are: 32-12 mc; 12.4-5 mc; 4.5-1.7 mc; and 1465-480 kc. This is continuous coverage except for the gap left around the 1st IF of 1620 kc, for which a trap is sometimes desirable.

Dimensions of the 750 are approximately $16\frac{3}{4}$ x 10 x $8\frac{3}{4}$ inches high. The cabinet has a hinged lid, and is removable in the same way as for the 740. Back sockets or terminals provide for connecting a balanced or ended or unbalanced aerial system, a 2/3 speaker, and a



Underneath the Eddystone S.740 Rx, showing die-cast coil box with twelve individual trimmers, for the aerial, mixer and oscillator circuits. The cover plate is removed by taking out five screws, to reach the adjustable coil cores—see text.

pick-up or other audio source for which amplification is required. Octal sockets on the back allow the use of an S-meter, or optional external power supplies such as an accumulator and HT unit.

Front controls are RF gain, BFO pitch, bandswitch, tuning, IF gain, AF gain, mains on/off, Noise Limiter, BFO and a "send" or standby switch leaving heaters on. There is also a variable selectivity control, and a socket for headphones. Inserting the phone plug silences the speaker.

The receiver normally operates from 110v., or 200/240v. mains, with its own power supply, and the internal mains transformer gives isolation of chassis from the mains circuit.

Tuning Arrangements

The tuning control has a flywheel, and the reduction ratio is about 150:1. Amateur bands and other frequencies are clearly marked on the appropriate horizontal scale.

More accurate determination of frequency within a narrow band is possible by using the mechanical band-spread dial. This is centrally placed, and operated through spring-loaded gears. In a 750 which has been used by the writer for some years the band-spread dial reads from 0-2500, in conjunction with a scale on the bottom of the horizontal dial plate. (However, different numbering appears on some of the maker's literature.)

To determine frequency in an amateur band, dial readings can be logged against the pips of a 100 kc crystal marker. Fig. 2 shows calibration at 1.8, 1.9 and 2.0 mc marks by this method, so that a graph can be drawn, from which other frequencies in the band can be read with reasonable accuracy. One such graph would be required for each amateur band. Naturally, the one in Fig. 2 would *not* be expected to be absolutely correct for another receiver.

A mechanical band-spread system of this kind is also useful during normal tuning and operating. The listed number of band-spread divisions for various bands are as follows: 1.8-2.0 mc, 182; 3.5-4.0 mc, 364; 7.0-7.3 mc, 91; 14.0-14.35 mc, 39; 21.0-21.45 mc, 45.5; and 28.0-29.7 mc, 208.

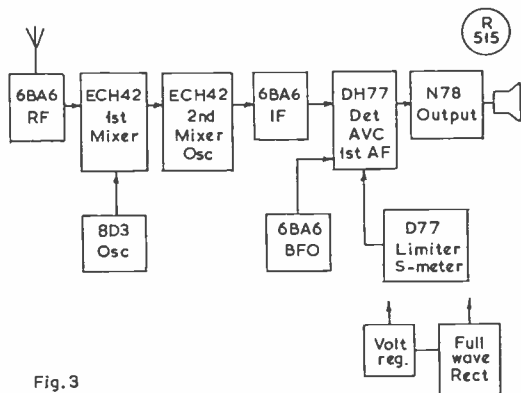


Fig. 3

Fig. 3. Block diagram of the well-known Eddystone S.750, which for years has been a popular general-coverage receiver, capable of an excellent performance—see text.

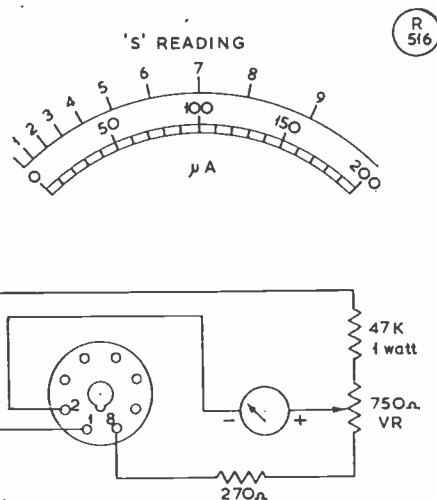


Fig. 4

Fig. 4. Suggested circuitry and scaling for an S-meter suitable for post-war Eddystone valve receivers.

Valve Line-Up

The valves fitted, and their function, correspond to the following: 6BA6 RF amplifier; ECH42 1st mixer with 8D3 oscillator; ECH42 2nd mixer/oscillator; 6BA6 85 kc IF; DH77 for detection, AVC and 1st audio amplifier; N78 output stage; VR-150 regulator for oscillators and 1st mixer; 6BA6 BFO, D77 noise limiter and S-meter valve, with a 5Z4G full-wave rectifier.

Fig. 3 shows stages in the 750. This combination is capable of exceedingly good results.

Performance

As the 1st IF is at 1.62 mc, 2nd channel or image interference seems in use to be totally absent. The quoted image rejection is 40 dB at 30 mc, and naturally even greater on lower frequencies. On 14 mc there is a notable freedom from interference from those 19m. band commercial transmissions which come in with many receivers having a 460 kc or similar IF. Sensitivity is quoted as better than 5 μV for a 20 dB signal-to-noise ratio. Actually, a 1 μV signal from a laboratory-type signal generator can be copied.

Selectivity is variable, by mechanical adjustment of the coupling in the two 85 kc IF transformers. Listed selectivity is variable from 30 dB to 60 dB, at 5 kc off tune. In operation, the effect of moving the selectivity control is very apparent.

SSB reception can be obtained in the usual way with pre-SSB receivers (that is, by turning back RF and IF gain controls), and the fact that the BFO has a regulated supply seems useful here. BFO injection is to the detection diode through a 20 μF capacitor, and the receiver behaves in quite a practical manner for this mode of reception.

IF Alignment

Correct alignment naturally becomes very important with this type of circuit. It should be carried out with

Front panel appearance of the Eddystone 740 Rx. Tuning scales are on glass, back lit. The 0-100° mechanical bandspread dial is visible at upper right of scales; this, with a small 0-9° central scale, gives 0-900 degrees for logging. The receiver front panel, with all controls, is a permanent fit to the main chassis, and the cabinet draws off from behind. See p.153 for an underside view.



the selectivity control at maximum. (At minimum selectivity, a band-pass double hump will become apparent.) With injection of a 85 kc, 30% modulated, signal at the 2nd mixer grid, an input of 280 μ V should give 50 mW output into a 2.5 ohm load substituting for the speaker. The 85 kc IFT's are those with the moving links.

A 1.62 mc signal can now be injected at the middle section of the tuning capacitor, with the bandswitch at G (gram). The 1st IF cores are then adjusted, and also the 2nd mixer oscillator coil core, if necessary. This is in the can under the ECH42. Output at the speaker terminals should be 50 mW with an input of 5-10 μ V at 1.62 mc.

With correct adjustment, the S-meter reading of a stable signal should not fall off when moving the control from minimum to maximum selectivity, when originally tuned in accurately at maximum selectivity. There should be a notable reduction in noise or nearby signals, however. Lost sensitivity through slight errors in alignment are more likely to become apparent when selectivity is increased.

RF and Oscillator Side

If required, oscillator cores are adjusted at 13 mc for Band 1; 4.7 mc for Band 2; 2 mc for Band 3; and 550 kc for Band 4, for correct dial readings. Trimmers are set up for 30, 11 and 4.2 mc, and on 1350 kc. These should be repeated as necessary.

The aerial and mixer signal-frequency cores are then peaked at about the lower frequency for each band already mentioned, and the trimmers are adjusted at the higher frequencies given.

As mentioned for the 740, alignment signals can be taken from a crystal marker. There is also no objection to aligning specifically at amateur-band frequencies, if desired. These calibration points can be obtained from a crystal, or the transmitter VFO, signal strength being kept well down. As example, the core of Range 1 may be adjusted at 14 mc, and the trimmer at 29 mc. In a

similar way, Range 3 can be trimmed at 3.8 mc, and the core adjusted at 2 mc.

Additions

Modifications or changes seem rather superfluous, except for an external S-meter (obtainable as a standard Eddystone accessory). Should sensitivity seem low after attending to the points mentioned, probably the best thing is to test each valve for emission, in or out of the receiver. Do not overlook the rectifier.

Fig. 4 is a circuit which allows the S-meter to be plugged into the brown back socket. (An octal plug must be present in the other optional power socket as some circuits are completed by strapped pins.) With a 200 μ A meter, S1 to S9 may occupy the positions shown in Fig. 4. Because of the series diode, set the meter pointer mechanically a little below zero, then adjust the potentiometer VR until it reads zero with the aerial terminals shorted to chassis and IF gain at maximum. It was found that satisfactory results could be obtained from the small, popular "ready calibrated" type of 1 mA S-meter.

The 750 is a particularly good general-coverage receiver, and is much used as the IF/AF amplifier for VHF converters, for which its wide tuning scale provides accurate calibration. In this duty, its variable selectivity and adjustable IF gain are particularly useful.

THE OVER-60's NET

Those who are retired, or are otherwise gentlemen-of-leisure — as we all hope to be some time and in some fortunate way — might find it interesting to search across Top Band at 3.0 p.m. clock any day to find out what is happening on the "Over-60's Net." Of course, at that sort of time on that band, range is somewhat restricted — but if you are in Yorkshire, you could get in on it. For some more information, get in touch with: Albert Field, G3TNR, 3 Coppice Avenue, Hatfield, Doncaster, Yorkshire.

LINEAR AMPLIFIER FOR TWO METRES

4CX250B's FOR FULL POWER OUTPUT — DESIGN, CONSTRUCTION AND OPERATION

Part I

A. H. DORMER, C.Eng., F.I.E.R.E. (G3DAH)

THE apparatus described in this article is designed to operate with the two-metre transverter of which details were published in the July and August 1968 issues of *SHORT WAVE MAGAZINE*. It uses a pair of 4X150A valves, but will function equally well with 4CX250B's, or similar types, and can then be conservatively run without labour to give a liberal output on two metres! A design for a suitable power supply and associated control unit are included.

GENERAL CONSIDERATIONS

After some twelve months' experience of operation with the QV06-40A linear for two-metre SSB, the need became apparent for higher power, to combat site limitations and to extend the normal drop-out range, which, from the present QTH, is about 180 miles. Additionally, the design could be arranged to accept input from a small driver unit providing AM, NBFM and CW facilities. Admittedly, a linear amplifier is by no means as efficient as a Class-C anode-and-screen modulated stage, but ample power would be available to enable a healthy carrier to be transmitted with considerable saving in space and high power modulator cost.

VHF tetrodes of the external anode type were an obvious choice for a linear operating at 144 mc, and would produce the required output on all modes. As the transmitter was to be operated remotely, a control unit was required which would combine the functions of circuit switching and monitoring, the latter aspect being supplemented by the addition of the small oscilloscope described in the April, 1969, issue of *SHORT WAVE MAGAZINE* as a permanent feature of the installation.

TRANSVERTER MODIFICATIONS

The QV06-40A transverter required little modification to reduce the output to that needed to drive the linear, which, operating as it does in Class-AB1, wants only a watt or so of input to overcome grid input losses. The first change made was to the screen grid circuit of the QV03-10 buffer amplifier in order to provide a variable drive control, the arrangement adopted involving merely the connection of two 22K, one-watt resistors, one to each end of the existing screen 50K potentiometer, the top one going to HT+ and the lower one to earth. With other circuit changes, full travel of the control enables the linear to be operated between the limits of full output and zero, so that only that power required to maintain communication under a given set of circumstances need be used. At minimum setting of this control, the valve was only drawing 5 mA, and this allowed the unstabilised

voltage on the 280 volt rail to rise, with consequent increase of mixer anode current to some 40 mA or so. To correct this a 47K one-watt resistor was connected between the screen of the mixer and earth, and this holds the anode current, at normal operating levels, to around 25 mA, which is what it should be.

A low-pass filter and Hi-Q break were inserted between the input to the transverter and the SSB prime mover to improve harmonic rejection.

A 75-ohm, 10-watt non-inductive resistor was then connected directly across the output link to provide a stable load on the QV06-40A and to reduce the output. Changes were required to the relay switching system and coaxial sockets and these are described in greater detail later. Finally, the spacing between the mixer anode coil and the grid circuit inductance of the buffer amplifier was increased to an extent which just gave full output from the linear with a flicker of grid current when the drive control was at maximum. This completes the modifications to the transverter.

LINEAR AMPLIFIER

A number of configurations were considered before the design of the linear amplifier was finalised, and the conclusion reached was that the "plumber's delight" type of construction offered the greatest possibilities. Copper tube of the requisite diameter is readily available, dimensions are not inordinately great, good thermal conduction is inherent in the design, and tuning and construction are simple and call for no great mechanical skill. The basic idea is by no means new, although it does not appear to have been adopted very widely in this country. The circuit diagram is as in Fig. 1, opposite.

The transverter output is coupled into the coiled half-wave line grid circuit of the amplifier by means of a single turn link, which it was not found necessary to tune. The grid tuning capacitor, a 15 + 15 $\mu\mu\text{F}$ Jackson split stator, has an Eddystone 5 $\mu\mu\text{F}$ differential condenser connected in parallel with it to enable the output valve currents to be balanced. No grid stoppers were required, but the heaters and screens were decoupled as shown. The differential capacitor requires little adjustment once grid currents are balanced, and so was made pre-set.

A 2K non-inductive resistor is connected across the grid circuit to provide damping and to reduce the effects of variable loading on the preceding amplifier, as under certain conditions a small amount of grid current may be drawn. Anode tuning is by discs with variable spacing. The output coupling circuit is a

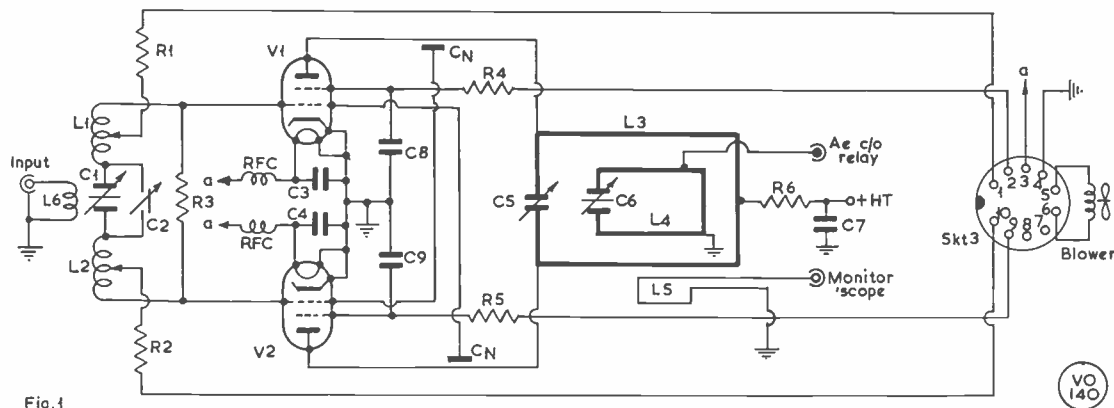


Fig. 1. Circuit of the Linear Amplifier.

Pawsey stub, and this was found to give some 10% more output for a given input than did the more familiar single turn loop. With the dimensions given, the Pawsey stub tuning capacitor is at minimum capacitance for maximum undistorted output, and if other configurations are used, the dimensions of the loop may need change to give resonance at the operating frequency. Neutralising is by crossed grid wires and anode tabs, C_N .

The whole amplifier is contained in a 10g. aluminium box measuring 16½ in. x 10¼ in. x 4½ in., with a separate airtight compartment for the grid components. Grid and anode tuning controls are brought out to the front panel via flexible couplers and polystyrene rod, and the stub tuning capacitor via bevel gears and a Meccano chain drive to give a symmetrical panel layout. All supplies, except the EHT, enter the rear of the grid compartment through plugs and sockets from the control unit, and are then run in screened lead to the appropriate electrode. No decoupling has been found necessary other than that shown in the diagram. The high voltage supply is connected to a separate HV terminal near the anode feed point, flexible, car ignition wire being used for this purpose. RF input and output sockets can be the standard Belling-Lee type, although UHF types are to be preferred. A single-turn link, spaced about 1½ in. from the anode lines, provides the pick-up for the monitor oscilloscope, and is brought out to a Belling-Lee socket at the rear of the chassis. A detachable end to the box permits easy removal of the anode lines and valves, and a separate cover for the grid and anode compartments facilitates installation and adjustment.

Air cooling is required for the valves, the specified amounts at 250 watts anode dissipation being 5.6 cu. ft. per minute at 0.6 inches water gauge for the 4X150A, and 3.8 cu. ft. per minute at 0.3 inches water gauge for the 4CX250B. An Airflow Developments blower Type 40-BTD satisfies these requirements. Although a manometer is not shown as fitted to this design, a simple glass U-tube will suffice should it be desired to keep a continuous check on air pressures. It should be noted that if the exhaust air is restricted by a closed compartment, the manometer return must be made to the compartment and not to free atmosphere. It is

Table of Values

Fig. 1. Linear Amplifier

R1, R2,	L1, L2 = 3½ turns, 12g.
R4, R5 = 200 ohms, ½ watt	copper, 1in. diameter, each 1½ in. long
R3 = 2,000 ohms, 10 watt	L3 = "Yorkshire" copper tube, 1in. internal diameter and two T-pieces of same material. See Fig. 4 for detail (Part II)
R6 = 100 ohms, 10 watt	L4 = Soft copper tube. See Fig. 5 for detail (Part II)
C1 = 15 + 15 μμF, Jackson Bros.	L5 = Loop 1½ in. x ½ in. 16g.
C2 = 5 μμF differential, Eddystone	L6 = Single turn coax link
C3, C4 = 1,000 μμF miniature ceramic	V1, V2 = 4X150A or 4CX250B
C5 = 2½ in. diameter brass discs	Blower = Airflow Developments, High Wycombe, Type 40 BTD
C6 = 8 + 8 μμF split stator, Eddystone	SKT 3 = Belling-Lee, 10-pin
C7 = .001 μF, 10 kV wkg, Dubilier	
CN = Neutralising. See text	
RFC = 32 turns No. 22g enamelled wire on ½ in. diameter polystyrene rod	

strongly recommended that the special air system sockets with ceramic chimney and built-in screen by-pass capacitors be used with these valves as, although they will fit a standard Loktal type socket, this does not ensure cooling for the base of the valve, and catastrophic failure may result.

The heater voltage specified for these valves is 6.0 volts and not 6.3 volts. The higher figure will considerably reduce the life of the valve, and this voltage should be applied for at least thirty seconds before the application of other electrode potentials. The blower must be on whenever the heater volts are applied. Screen grid protection is given by 50 mA fuses, or a relay could be used, to prevent the screen dissipation rising above 12 watts. A further safety measure, a common supply for anodes and screens, makes it impossible to apply screen volts without anode volts—the surest way to wreck these valves in a very short time. If separate supplies must be used, then interlocks should be provided to ensure that the correct timing sequence is preserved. Screen current may be negative under certain, quite normal, operating

[cont'd. p.159

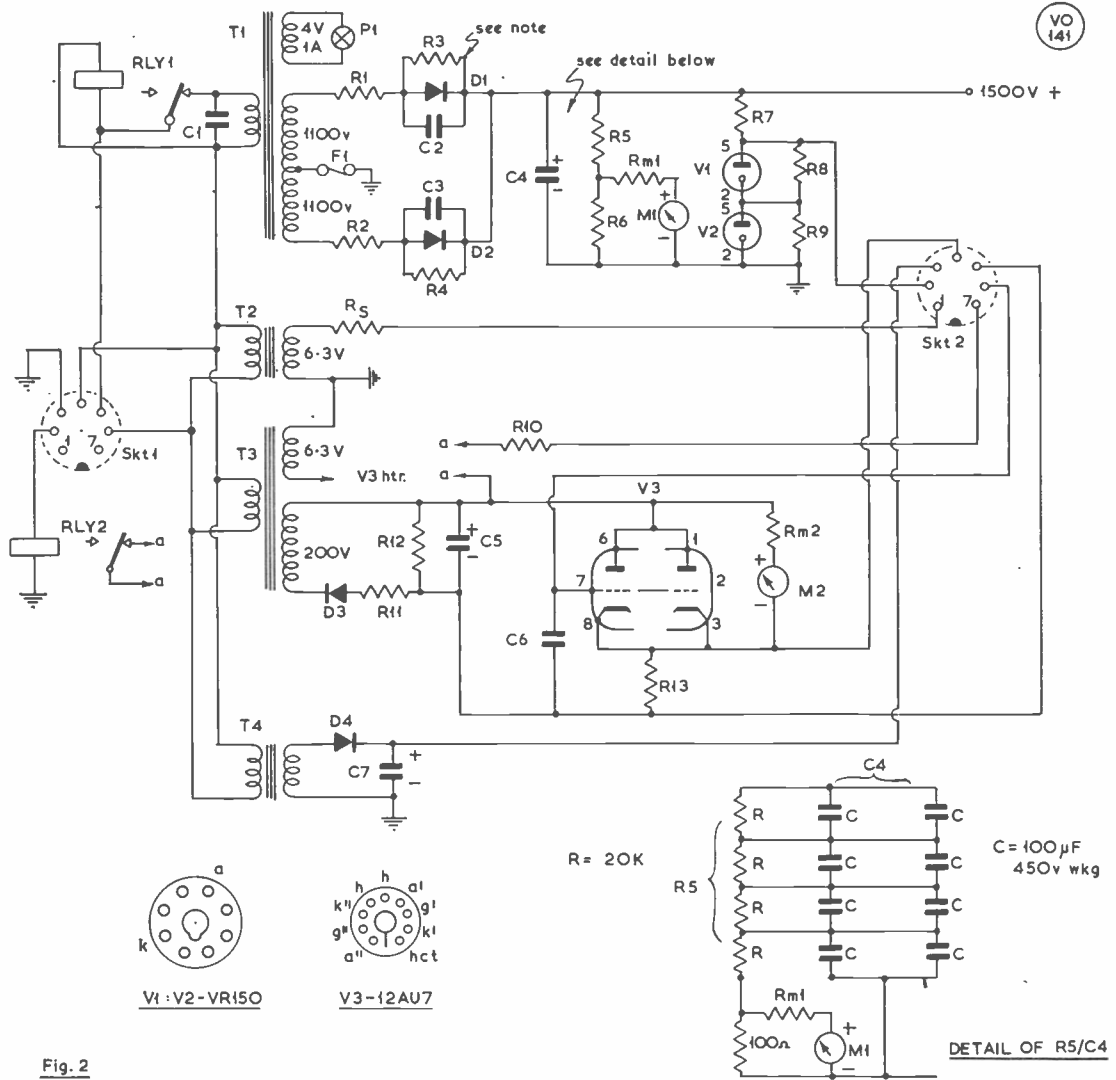


Fig. 2

Table of Values

Fig. 2. Linear Amplifier Power Supply

R1, R2 = 30 ohms, 10 watt	R3, R4 = 6,100,000 ohms, 1/2 watt	R5 = 4/20,000 ohms, 20 watt	R6 = 100 ohms, 1/2 watt	R7 = 40,000 ohms, 50 watt	R8, R9 = 47,000 ohms, 2 watt	R10 = 18,000 ohms, 1/2 watt	R11 = 22,000 ohms, 1 watt	R12 = 100,000 ohms, 1 watt	R13 = 27,000 ohms, 1 watt	Rs = adjust to give 6.0 volts at heater pins	Rm1 = adjust to give FSD = 2kV on meter used	Rm2 = adjust to give FSD = 200 volts on meter used	C1 = 0.2 μF, 1,000 volt wkg	C2, C3 = 6/01 μF ceramic, 750 volt wkg.	C4 = 8/100 μF 450 volt wkg	C5 = 200 μF, 275 volt wkg.	C6 = 0.01 μF, 250 volt wkg.	C7 = 100 μF, 50 volt wkg.	D1, D2, D3, D4, = BY-100 (14 in all)	M1 = 1 mA FSD	M2 = 500 μA FSD	RLY1 = 1-pole 1-way, 5 amp. contacts, OMRON Mk. 1	RLY2 = 2-pole 2-way, STC 4190 GD (Henry's Radio)	T1 = 2,200 volt CT, 600 mA, 4v. 1A.	T2 = 6.3 volts 6A.	T3 = 200 volt 50 mA, 6.3 volt 1A.	T4 = 24 volt 1/2A Henry's Radio MT 102 AT	SKT1 = 7-pin Belling-Lee —male plug	SKT2 = 7-pin Belling-Lee —female plug	F1 = 750 mA cartridge fuse	LPI = 4 volt panel lamp	V1, V2 = VR-150	V3 = 12AU7
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conditions. For this reason, a current path must be provided between screen and earth either by using gas stabilisers or a bleeder resistor. If an electronically regulated supply is used, it must be of the *shunt* type and should be capable of passing 15 mA per screen.

POWER SUPPLIES

The circuit of the power supply is shown in Fig. 2 and is quite straightforward, with the possible exception of the cathode follower bias supply. For those who may wish to vary the design to make use of available components, the following pointers may help. Whilst the transformer specified has a centre tapped secondary of 2,200 volts, a 500-0-500 volt type of appropriate power rating could be used and the rectifiers connected in a bridge circuit to give the required output voltage, but if this is done it should be remembered that the p.i.v. rating of the rectifier chain should be greater than 1.4 times the r.m.s. voltage of the whole secondary and that, since the DC power that a given transformer is rated to handle is constant in both configurations, the load current rating should be reduced by 50%. The value to be assigned to the series surge limiting resistors is often quoted as about 15 ohms per diode, but this takes no account of the impedance of the transformer secondary. A convenient figure to use for the centre-tapped secondary, full wave rectifier case is that the value of the surge resistor should be equal to the load resistance (output volts over output current) divided by 100, and in the case being considered, this gives a figure

of approximately 30 ohms. The peak repetitive current is some 3.5 amps and the surge current about 40 amps, both well within the ratings of the BY-100 rectifiers, which are 5 amps and 50 amps respectively. The total p.i.v. across each leg of the rectifier chains can be as high as 1.4 times the total secondary voltage of the transformer (in this case nearly 3,100 volts) and this calls for a minimum of four BY-100's per leg, but a safety margin must be allowed, and for this reason six diodes per leg are specified. The parallel resistors can be anything between 100K and 500K ohms and the capacitors should be non-inductive ceramics of a working voltage greater than the p.i.v. across each diode, and should be matched to within 10%. C1 across the transformer primary should have a value of three times the magnetising current in amps, or 0.2 μ F in this instance. Since the discharged smoothing capacitors represent a dead short to the rectifiers at the instant of switch-on, there is a limit to the total capacity that can be used with diodes of a given surge rating, and the 50 μ F specified is a compromise which gives a ripple of just over 1% and good voltage regulation without exceeding the BY-100 surge ratings.

The cathode follower bias supply is a worthwhile device as it provides a ready means of deriving a variable negative voltage at low impedance, such as is required for any linear amplifier. The potentiometer is brought out to the control unit for ease of adjustment.

(To be continued)

EXPEDITION TO THE ISLE OF MAN

CAMBRIDGE UNIVERSITY

WIRELESS SOCIETY

GD6UW, MARCH 17-24, 1969

M. PRITCHARD (G3VNQ)

THE annual expedition to the Isle of Man by members of C.U.W.S. did not materialise last year when it was found that the Board of Trade would no longer give permission for 24-hour use of their station on top of Snaefell for VHF work, as it was being converted for automatic operation. Because of this, the expedition this year was a purely HF-bands affair, although VHF was not entirely forgotten.

The expedition began on Monday, March 17 when the four expeditioners—G3TPF, G3UEW, G3VNQ and G3WKB—assembled on the pier-head at Liverpool. Our A.40, which has been loaded at Southport on the previous day, was driven on to the boat for the four-hour crossing, and later that afternoon, after a complicated ferrying operation between Douglas and Peel, we arrived at Ballawattleworth Farm, on the outskirts of Peel. We put a 40ft. pole up in one of the fields; this had been brought over in 10ft. sections and we were amazed when the thing went up absolutely straight first

time! As it was fairly late the actual erection was accomplished illuminated by car headlamps. We hauled up the 40m. dipole and went inside to unpack the equipment. One of the attic rooms had been allotted to us for setting up the stations, and after the coax feeder and an earth wire had been brought through the window, the Sommerkamp equipment was plugged in and G3UEW was pounding away on 40m. CW, signing GD6UW.

Next day the "W8JK" aerial for 20m. was erected, as well as a 240 foot wire for the LF bands. We were very fortunate in having a large field available for aeri— in fact, this was the main reason for abandoning the boarding houses in Douglas where previous C.U.W.S. expeditions had stayed.

From then on, we were operational on all the HF bands, since the 40m. dipole could be used on 15m., and a 10m. dipole could also be taken up the pole. GD6UW was mainly active on the DX bands using the recently-acquired Sommerkamp FR-500 and FL-500 which are the property of the Society, and GD3VNQ kept to 160m. and 80m., using the G3VNQ-G2DAF Mk. II transmitter and the EA-12 receiver borrowed from Eddystone. The stations were set up adjacent to one another in the same room and were frequently operating simultaneously. Despite this we did not have too much trouble with interaction between the two rigs—in fact, the main difficulty was when both stations were operating phone, as it was then essential for both operators to wear headphones to avoid "crosstalk."

It did not take the rest of the party very long to

discover that G3UEW (who had put the aerials together in Cambridge) had cut them all for resonance at the CW end of each band. Perhaps because of this we found a certain amount of difficulty in working outside Europe on SSB—although we were getting S9 reports from the States on 20m., the European QRM was S9 plus. For this reason, a lot of the DX QSO's in the first few days were made on CW.

LF-Band QRN

On 160 and 80m. we suffered rather badly from a nearby power line. This line could be heard making frying noises all day long from a distance of about 100 yards, and we learnt from some of the GD locals that they have similar difficulties all over the Island. Nevertheless, GD3VNQ was very popular on 160m. SSB, and on CW during the Grafton contest. G3WKB was on 160m. SSB one night when the chair he was sitting on fell apart in the middle of an over. It says a great deal for his operating skill, that he managed to carry on the QSO while everyone else was trying to stop laughing . . . Despite the noise level, GD6UW succeeded in working ZB2AY on 160m. CW, but a sked with VO1FB on this band unfortunately failed.

On the HF bands the greatest problem was in trying to avoid Europeans in order to work stations further afield. G3TPF, who classifies himself as a "metre-wave man" and normally ignores frequencies below 100 mc, was introduced to the wonders of 20m. Sideband. He proceeded to work hundreds of Europeans all day long—we think the thrill of actually working out of the country went to his head.

Conditions on Ten

Towards the end of the week, conditions on 10m. improved and this band became the best one for working out of Europe during the afternoon and evening. When GD6UW first appeared on Ten using SSB, a string of W6's, alerted by their 2m. DX net, suddenly appeared and we could probably have continued with them until the band went dead if it were not for the eventual call for dinner.

Although the expedition had no VHF equipment this year, G3TPF had decided to come so that he could make an inspection of possible VHF sites for the next expedition. Thus, on the Friday we decided to have a day off from radio and set off in the A.40 on a tour of some of the highest accessible points on the Island. This was rather hair-raising at times as the Island had just come through a patch of very bad weather and many of the mountain roads had snow piled high on both sides. (Readers may remember that during the week of the expedition the ITA mast at Emley Moor collapsed due to heavy icing.) In fact the road past Snaefell was completely blocked and a detour *via* Laxey was necessary; here we saw the mountain railcar setting off for the summit of Snaefell, probably carrying the Manx Radio engineers whose aerials had also been damaged in the bad weather. Our tour of the Island ended very pleasantly at the home of GD3FBS, who had invited us round for tea.

Our time on the Island came to an end all too soon, and the final QSO was made on the Monday morning, 24th, prior to packing everything away. Next day we



Members of the C.U.W.S. expedition to the Isle of Man this Easter vacation—left to right: Dave Topham, G3WKB; Malcolm Pritchard, G3VNQ; and Brian Pope, G3UEW, while Steve Cripps, G3TPF, took the picture—all members of the University, keeping the G6UW tradition going.

sailed away from the Isle of Man on a glorious sunny morning, giving us a delightful panoramic view of the whole Island, including the snow-capped summit of Snaefell. Until then almost everything had gone according to plan but on the boat calamity struck when we found one of the leads to the A.40's starter had come adrift. This necessitated a "clutch start" by Steve as he drove the car down the ramp off the boat at Liverpool, followed by a drive through the Liverpool traffic in which the car fortunately did not stall.

Log Record

Looking back over the logs, it is fair to say that we had a reasonably successful expedition this year. GD6UW made 437 contacts of which 163 were with American stations. A total of 53 countries was worked during the week, as well as all W call areas and VE's 1, 2, 3, 6 and 8. Some of the more exotic call signs we came across were XE1TQ (20m. CW); 5A3TK (G3SYA) on 20m. SSB; XW8BP (10m. CW); and MP4BBA, 6W8DY, 9J2RV, HS1AF and SV1AE (Socrates at Athens) all on 10m. SSB. GD3VNQ made 214 contacts mainly on the LF bands.

We would like to express our thanks to the following who have helped the expedition: To Stuart Meyer, W2GHK who is handling the QSL's for GD6UW (cards for GD3VNQ, send *via* G3VNQ); to Eddystone Radio for the loan of an EA-12 receiver which was used mainly on the LF bands where we were very grateful for its excellent CW performance; to G2CUZ, of Ainsdale Radio Club, for the loan of poles and aerial accessories; to the resident amateurs on the Isle of Man for their friendliness and hospitality; and finally to Mrs. Corkish of Ballawattleworth Farm for putting up with four enthusiastic radio amateurs for a whole week.

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

CONDITIONS, by and large, have been pretty fair during the month under review. However, as always, the spring manages to exert a strong pull against the shack—and the glorious weather over the Easter Bank Holiday must surely have reduced activity at many U.K. stations. Not just by the fact of being out in the fresh—if you disregard the petrol fumes—air, but in addition by being asleep in the armchair as a result of the evening coolness.

Scanning the Bands

Our highest DX allocation, at 28 mc has, as one of its main interests, the unexpected, with sudden openings and closings, DX coming back at 59+ to a CQ on an apparently dead band, and then disappearing, with, above all, the possibility of "working the world on a bit of wet string" when conditions are right. Most of these manifestations have shown up during the month on Ten metres.

Let G3NOF (Yeovil) pick up the story: In the mornings, 28 mc has opened to VU about 0730, followed by VK6 around 0900, the latter sometimes still being audible as late as 1300z. During this period the fading has been very noticeable, and Don found it was necessary to keep a running check to establish just what was in fact going on. Some Africans were there during the afternoon but the North Americans fell off and were not heard on several days. Some evenings gave good signals from South America. In terms of SSB contacts, it all boiled down to QSO's with CP5AK, CP5EP, FG7XX, HK3RQ (who was hurt on the HKØTU expedition, sustaining broken ribs), HR5AC, HS3DR, HS3EP, HS3RF, HI8XKS, JA2DSA, JA2MB, KG6ARV, KR6EL, KR6JT, KR6KN, KR8EA, KZ5JW, MP4BHL, MP4BHS, MP4TAF, VK's, VS6CO, VU2GGB, WA7ASA (Arizona), YA1AR, YBØAB, ZL3RB, ZS's, 4X4JU, 4S7PB, 7Z3AB, 9X5AA, 9Y4DX

and 9J2's. However, AP2MR, UAØLEH (in Zone 19) and VS6AD all contrived to get off the hook.

From SSB turn now to CW, in this case used by G3VDL (Chalfont St. Giles); his tally, with 60 watts to a dipole, included 5H3, MP4BFO, MP4BBA, MP4BEU, 9V1PB, ZS3AW (for whom the cards are routed via DJ3KR) VS6AA, ZD5X and UM8AP.

Next on the clip comes Maureen, G3XVC (Dartford), who had herself a ball on 28 mc with someone else's call, a KW-2000A Tx and Mosley TA33 beam during the recent YL/OM shindig; she ran up 200 contacts all over the world, which

made a pleasant change from the daily chores, plus the problems involved in getting the /M gear and the 40-watt HF band rig both perking properly.

Talking of YL's, G3VPS has been using sex as a means of making his QSO's more interesting—yes, it's true!—simply by saying he had to "QRT shortly as he had a date with a mini-skirt." Even stations having a very sketchy knowledge of English immediately reacted with interest and the QSO promptly blossomed. Only one snag; the YL can't seem to understand why Peter is usually a little late for his date. Ah, well, if she marries the man

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

Station	Countries	28 mc	21 mc	14 mc	7 mc	3.5 mc	1.8 mc
W6AM	348	131	140	347	116	54	7
G3DO	336	196	232	329	90	83	9
G2DC	335	169	307	327	165	110	20
G3NOF	312	170	209	296	34	39	2
G3LZQ	254	138	155	201	72	38	8
G3IAR	221	126	161	193	91	73	12
G3IGW	204	127	152	168	122	86	42
G3KOR	163	40	57	135	52	39	23
G3NYQ	147	35	70	107	40	30	21
G3VDL	142	57	103	100	52	27	—
G3PQF	157	103	46	91	84	54	12
G3VPS	116	20	34	91	50	36	14
G3MDW	116	47	66	88	20	15	7
9H1BL	126	80	45	84	40	39	—
G3SED	128	20	18	62	43	39	38
G3IDG	122	74	89	55	27	19	11
G3EJA	106	100	23	51	22	12	2
G3WJS	61	—	8	47	35	40	14
G3WPO	72	11	13	43	45	21	21

Note: Placings this month are based on the "14 mc" Column.

she'll find out, for sure. Turning from fancy to fact, G3VPS made CW contacts on Ten with UM8, VO1, VP8HJ, VS6, XE, 9H1 and 9J2, all between 1400 and 1500 GMT.

Over to G2HKU (Sheppey) who was on CW to work 5Z4KO, 9J2MX and VS6AA; turning the function switch to SSB resulted in a QSO with SV0WV (for whom QSL via K9CSM).

On the other hand, SV0WN asks for his QSL's via K3EUR, reports G3XYP (Navenby); David worked them on all the three HF bands and was, at the time of writing seeking a contact on Forty. Other 28 mc entries in his log included CR8AI, HL9KQ, HL9UU, HS3DR, VP8KL, VQ8CG, ZD8JW and 5N2ABG.

At 9H1BL, the path back to the U.K. has been excellent on Ten for most of the time, and also to W—the latter so much so that on one occasion Alan was able to work all W call areas in twenty-five minutes.

The indoor dipole at G3XTJ (London, N.13) seems to have been doing its stuff very well indeed, to judge by the list Edwin compiled. CW gave JA's, LU1BB, MP4BBA, MP4BEU, HL9KQ, PY6FI, UA0's, UW0LH, UH8's, UI8BI, VE3BS /VP9, VO2JM, VP8HJ, VR2DK, VS6AA, VS6AI, VK3XB, VU2VZ, XE2KS, XW8BP, ZD5X, ZS3AW, 5H3KJ, 5Z4KL, 5Z4SS, 9J2MX, 9J2VB, 9J2XZ and 9M2LN, while on SSB the yield was CR71Z, HS3DR, MP4BHG, VK6KM, VS6AL, VU2GGB, VP8KD, 5N2ABG, 9J2VX, 9J2XZ and 9L1KZ. So—who needs an outdoor aerial for ten metres?

Here and There

While support for the Tables has usually been pretty fair, although a bit slack at the start of a new season, it is noted that this year the Zones-and-Prefixes Table has not received many entries, for the year commencing January 1, from people who were "regulars" the previous year. Thus, the new entries are not being given a run for their money—which, after all, is what Tables and Ladders are all about. Please, then, can we have some more readers going through their logs from the beginning of the year and putting in entries in time for the deadline next month.

Changing tack a little, 9H1BL seems to have his doubts about the

G3KFE "invisible wire" aerial trick. Alan reckons he put one up and it looked just fine till "some twit of a bird" saw it and sat on it; now, he claims, people are always tripping over bits of it in the grass. A likely yarn, too—those birds must have claws like sidecutters, and in any case people should not be on the grass! Seriously though, the one at this QTH has managed to survive a full season of winter snows, gales and what-have-you, and is still up; and what is more, nary a sparrow has attempted to sit on it although they certainly can see it.

On a different subject yet again, the Easter period, from April 5 to 11, was down for an expedition to Andorra by F3KT, F8YY and ON5FD (who already have held the calls PX1KT, PX1YY and PX1FD); however, for this trip they had not, at the time of their letter to us, been told what the new calls would be—the prefix, of course, is changed. Cards, direct to the three bods concerned, or through the Bureaux, or to ON5FD, Post Box 72, Brussels 8, Belgium. Frequencies were to have been 14025 or 21025 kc CW and 14240 or 21305 kc SSB. However, at the time of writing, your conductor had not heard them and had not had any reports of their presence on the bands. One hopes that all is well and QSO's are in fact being made because, quite apart from the problems of getting to Andorra, there still remains on arrival the difficulty of radiating a decent signal from a very unpromising location radio-wise, with only rudimentary power-supply facilities. Several previous Andorran expeditions have foundered on the fact that—while this tiny mountain state seemed a romantic and interesting place from which to operate—the local situation had not been properly reconnoitred beforehand. This would have disclosed that not only is it necessary to have the transport to take the gear, but also to provide everything else as well—including tents to sleep in, a P-E generating set and the fuel for it, with iron rations to tide over the first day or two. And even all this presupposes that the right permissions from the appropriate authorities have been obtained well in advance.

There is no doubt the five-band DXCC exercise has stirred up a lot

of new activity, and many have been wondering how long it would take to get there and, of course, who would make it first. From G3XYP we have it that the first man home was in fact a W4—who completed the set by way of a contact with KW6EJ on Eighty. All that effort must have meant a mighty lot of operating time, and now the chore of writing out the cards—*whew!*

Dundalk branch of I.R.T.S. announce, by way of EI9AV, that they are to have a special-activity station on from the town's Maytime Festival. They will be on all bands 10-80 metres, CW and SSB, from noon to midnight on each day May 16-26, together with talk-in facilities on 70 mc. All contacts will be QSL'd.

Another special-activity effort, this time farther afield, is down for May 10-18, operating 10-80m. once again, this time for 24 hours each day. It will be signing DU2NSJ from the Philippines National Scout Jamboree, and, of course, looking for Scout QSO's.

Fifteen-Metre Doings

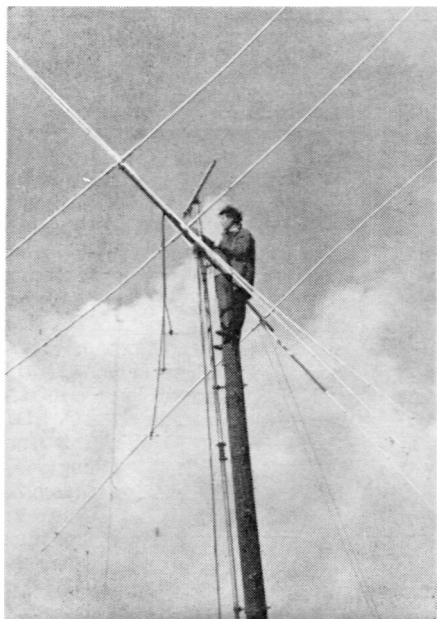
Here G3XTJ opens the batting, with CW contacts to report with UA0MX, UA0KAE, UD6KAB and VS6AA, plus 5N2ABG worked on SSB.

Fifteen for G3XYP meant contacts with HS3ML, HV3SJ, K8IMC /KG6, VK9XI, YB0AAC, YB0AB, 7Q7WW, 9M2DQ and 9V1PD, all on SSB. By contrast, G3VPS used mainly CW, with QSO's in that mode booked in against stations in UJ8, VK, VO1, VS6, VQ8CC, VE (including his first VE4 and VE7),

FIRST YEAR OPERATOR'S LADDER

Call	TOP BAND ONLY		
	Counties CW	Counties Phone	Countries
G3XTJ	59	52	13
GM3YCB	1	57	9
G3XVC	37	24	11
G3XDY	67	19	14
G3XTL	67	—	14

Note: A first entry for this table must be accompanied by a statement of the date of first licensing. The same county may be claimed for both Phone and CW. Placings will be by taking a different column each month; this time it is based on the "Counties Phone" column.



Raising a three-element Quad for 10-15-20 metres. On the right, the chaps doing the ground work, and on the left the job as finalised. This array, at the station of G3OFN (Redruth, Cornwall) is built up from 14ft. fibre-glassed bamboo, on a 2in. boom. It is finished in light blue, to match the sky—but even that does not camouflage it entirely!

ZB2, 5H3, 5Z4, 9H1, 9J2 and 9V1. As far as SSB was concerned the only contact of note was with a UL7.

Another CW addict is of course G3VDL, who used his dits-and-dahs to work MP4BEU, ZD5X, 9V1PA, 9V1PB, 9V1PD, 5H3KJ, 5H3LV, VS6AA, 8P6BU, ZL and VK.

The note from GM3JDR (Golspie) very nearly missed us this time, because Don addressed it to "SHORT WAVE MAGAZINE, BUCKS." and the letter went to Slough before being redirected to the right quarter. Bucks. is a mighty big county, one of the largest. The fact that the G.P.O. found "Short Wave Magazine," Buckingham, as the correct delivery point is a credit to them. (Since GM3JDR shows no return address, they would have been quite justified in throwing his missive into the dead-letter box!) However, we got it, and Don mentions the difficulty he had in finding HKØTU when every other station seemed to be commenting on how easily they were worked—he must have picked the wrong time. On the other side of that particular coin, the Gus Browning station, wherever it has been, has proved to be a consistently good signal and, as always, operated by an artist at the game. SSB contacts were made by GM3JDR with 6W8AW, ZL1AJU, ZL4BK,

KL7GHF, W1 to WØ, VE1-7 and loads of JA1-Ø. More time was spent at the LF end, where VK4TY, PY's, VQ8CP, VQ8CPR, PZ1BF, ZS6FE, VK's, UL7's, UA9, UAØ, CO2BM, ZB2BS, MP4T, 5Z4's, 9V1's, LX1CO, 4U1ITU, all W and JA call areas, and VE1-7 were booked in.

The problem of TVI makes operation from G3NOF virtually non-existent on 21 mc, as it does for the vast majority of U.K. operators working normal hours—it is said that in the Verulam Club, which must be one of the largest in the country and is in an area of reasonable TV field strength, there is *not a single member* who is free from TVI on the HF bands.

As early as 0730, VK's, ZL's and sometimes JA's have been noted on the long path, with the short route opening up to the same areas around 1000. For G3NOF, gotaways included HL9UU, KR6JT, VU2DK, YBØAAG; among those actually worked were JA's, KH6CQW/KG6, MP4TAF, VK's, ZC4HS, VS6AA and 5Z4LS.

Twenty Metres

G3DO (Sutton Coldfield) comes in here, and mentions an increase in his score of countries by working VKØWR (Heard Is.) on 14 mc—not just a new one for the band, but also an all-time new one. Doug. has

his TH6 Triband beam atop one of those G3BXI towers, which is all motorised, and by when this is in print will surely be stirring up the LF bands as well for the first time for some years, with inverted-Vees.

Very much of an early bird is G2AYQ (St. Agnes, Cornwall) who is usually on between 0600 and 0700z. Using a G5RV aerial and NCX-3 barefoot, Ted's bag included the following: VK's, ZL, 5W1AS, KW6EJ, 6Y5SR, K4JPE, W5ZDW, G3ODO/P/KL7, KØJPL, KH6ABQ, WØ's, and W6's.

A first report comes in from G3XIV (Portchester) who started by being operational mainly on Top Band, but did have a little try-out on Twenty, which resulted in CW exchanges with K1OOJ, UR2KAW, UC2LM and YV1AD.

Both modes are used by G2HKU, and Ted mentions CW with VK3ZM, plus SSB with VE4SD, 5A1TL, KH6SP, W7CVD (Arizona), ZL2KP, ZL3JQ and ZL3SE, all around 0700z.

All this is backed up by the usual careful examination and report from G3NOF. Don found 20m. quite exceptional early in the mornings, with the Pacific, VK and ZL good from around 0630. The VK's seemed to peak around 0730, fade, and peak again at 0830, with some being raised as late as 1030. The short path has also delivered the goods from S.E. Asia and VK/ZL between 1800

and 2000. Gotaways included FB8ZZ, FP8CS, HL9US, KC4USB, KC4USN, KC4USV, KS6CQ, KS6DD, KJ6CF, KX6DD, KX6FO, VRIQ, VR4EL, VR4EZ, VR6TC, 5W1AS and 9V10I. Brought to book, also SSB, were DUIZAF, DUIFH, FO8BO, FO8CG, FL8DG, FL8MB, FY7YD, HS3AL, HS3RF, KH6AFN, KL7ESA, KR6YZ at 1800, MP4MBJ, PJ6AA, TAIRF, VP2LB, VP8KO, VQ8CCR, VU2BX, VS6DR, WØACT (S. Dakota), WAØSYB (Colorado), ZD8HL, ZL's, 6W8AU, 6W8DY, 9M2RH and 9Y4BFC.

Quite a short list from G3VDL, who obviously spent more time on 21/28 mc, but nonetheless managed to find VS6AA, ZD5X, 9V1PA,

Reporting the HF Bands

and ZL, all of course on the key. At G3VPS CN, UA9, and 9M2 were worked on Sideband, while the key gave him MP4B, UL7, UAØ, VO1, VE, VP9, VK, VS6, ZL, 5H3, 5Z4, 3AØ, 9H1, 9V1 and 9J2.

Twenty for G3XYP was quite interesting, and AP5HQ, HL9WJ, JT1AG (for Zone 23), OHØAA, SUI1MA, YK1AA, 3AØCU, 5R8AO, 8R1J and 9M2EV, all helped to make it so. VR6TC has been heard several times on 14225 kc SSB, Wednesday mornings, and has been a wonderful signal peaking to well over the S9 mark.

Only three contacts are reported by G3XTJ, who worked CW with JA5BJC and VEØMD, while SSB yielded the comic report of R5S1 from TI2BW—which just goes to prove these S-meters are wonderful things.

On the /MM Front

Three maritime mobiles writing in again—it's becoming quite a habit.

First, G3JFF writes to say that after a spell ashore he is off to the Far East, with good chances of a stay at Singapore, from whence he hopes to re-activate his 9V1HU and 9M2MA calls. In addition, Mike will be paying visits to VS6, JA, VK, ZL, 5Z4 and possibly other spots, and hopes also to be signing /MM on occasion in between.

G3VDO is R/O on the m.t. *London Independence* and is licensed for operation on 40, 20, 15 and 10 metres, with a Sommerkamp FT-DX100, plus the FL2000 linear. At the time of writing he was about to leave the Persian Gulf, going round South Africa and up into French waters. Ian is always interested in trying to work back to the U.K., if only to hear about the state of the Wx; he has a regular sked time 7.20 p.m. BST, Fridays and Mondays, on 14300 kc with chaps in his home-town of Blackburn. As for QSL's, these should be sent to his home QTH—as in the 1969 *Callbook*—where his mother is acting as QSL manageress.

G3UOF—of the tanker *British Judge*—reports on his SWL activities. (He has since got his /MM ticket through.) On March 8, 14 mc showed a great crop of interesting DX from the U.K. point of view, when the ship was south of Pakistan, east of Muscat and Oman. These included ZS5FT, calling "CQ G" and getting no takers; KH6GLY likewise, after calling "CQ EU." The following day gave SSB from MP4TCE fruitlessly calling CQ, and XW8CS likewise. By March 20, Mike was off Western Australia, where a quick fifteen minute listen to Forty was taken, yielding fat signals from JA's, K6, and HM1DH—the time, 1430 to 1445z.

Eighty and Forty

9H1BL has been on 3.5 mc quite a bit, and finds in general conditions to Europe are pretty fair, albeit with fits and starts. The only time 80m. is quite unusable is when some character comes on "running 2 kW to a keyed klaxon fed into a seven-element drainpipe" as Alan describes it!

Both Eighty and Forty are covered by means of an inverted-Vee trap dipole at G3VDL. The former band gave contacts with 9H1BL and VE's using this set-up, while 7 mc showed 6Y5ES, MP4BEU, VP9BK, 9H1BL, 4X4NWJ, ZB2BR (who gives his card address as via W6GZI) YV5CVE, UV9 and UL7.

G2HKU stuck to SSB on Eighty and worked 4X4UF, MP4TAF, CT1MW, CT2AS, 9K2BV, GD3FXN and UA9's, all around 2200z, plus TG9EP at 0716z. As for 7 mc, CW resulted in 9H1BL and PY7AWE, and SSB in GC3ULZ and 4X4UF, all around 2200z.

Eighty is preferred at G2AYQ, except when things are NG, in which case, as already recounted, a move is made to 14 mc. All contacts were logged in the early-morning period, 0600 to 0700z, and included WB2NCS/P/VP9, VE1UA, YV5JT, ZL2BCG, ZL2GJ, CO2DC, VP7NH, K2KAP and VE2WM, using the NCX-3 and G5RV aerial.

TOP BAND COUNTRIES LADDER

Station	Confirmed	Worked
<i>Phone and CW</i>		
G2NJ	98	98
GM3UVL	98	98
G3APA	97	97
G2HKU	95	95
G3SED	93	95
G3WPO	80	86
G13WSS	76	85
G3WQQ	74	87
G8HX	72	81
G3VLX	70	91
G3WJS	56	83
G3RFB	55	78
G3IDG	55	61
G3XTL	53	67
G3XDY	44	70
G3XTJ	39	69
G3VPS	27	53
G3XGD	25	54
<i>Phone only</i>		
G2NJ	98	98
G3VGB	82	91
G3WPO	69	76
G3MDW	67	82
G3PQF	64	77
G3RFB	36	47

(Failure to report for three months entails removal from this Table. Claims may be made at any time. Six months of "Nil" reports will also result in deletion.)



Station of SM7ANB, Lyckeby, Sweden, who runs a 500-watt CW transmitter, and 200w AM phone, all home built. His receiver is a Hallicrafters SX-177 and the aerials available are a 3-element beam, a long-wire and a vertical arrangement for 40 metres. The DX score stands at 299 countries confirmed. Nils is one of Sweden's leading DX operators

The Top Band Tale

This divides, as usual, naturally into two parts. On the one hand the activities of the county-chasers, and on the other the real DX news.

We hear from DOTM that VP7NY was active on Top Band during the CQ 160-metre CW contest; if anyone from G worked him, the QSL card awaits—at the usual DOTM address, of course, which is Box 7388, Newark, New Jersey, 07107, U.S.A.

The HK0TU expedition, as many will be aware, nearly hit disaster in attempting the landing on Malpelo, and two men went overboard, one of whom having to be taken to hospital. As if that was not enough, the generator was lost in the dark and took an hour to find, and the rig that had been taken specially for Top Band would not work due to a dud aerial relay. Hence, after the long-wire had been put up—all 700 feet of it—in the dark, W4VPD had his rig "borrowed" from its intended use and fired up on Top Band. Various contacts resulted, and W1BB, after all the troubles mentioned last time out, managed to get his hundredth

country into the log.

VP2KK was KV4FZ operating from St. Kitts, on March 13-14. Herb made a total of 52 Top Band DX addicts happy, including W1BB, who thereby added to his score and made it 101 post war, 104 all-time. Gus Browning tried Top Band from ZD3A, but here the story was not so happy, insofar as, although he heard W1BB, no actual QSO resulted; Gus was heard in this country at 579 by G2CFV at least. When Gus and Steve joined up and went to Rodrigues, Steve looked after the 160-metre end. Only one actual QSO is known to have been made, with VQ8CCR working G3XAQ at 2321 on March 25. W1BB was again unlucky—VQ8CCR logged "hrd W1BB in QSO on 1803, 229" at precisely the time that W1BB thought he was actually in QSO with VQ8CCR! Hard luck on W1BB, indeed.

Turning to the less rare stuff, of which there has been plenty of detail and interest in the reports, let G3XVC have first chance—she mentions working ZB2AY at 589 for a new country, and getting 56 with her AM from G1SAHS and G1SAMS

on their Fermanagh exercise. In the short time during which she has been able to be on the band, Maureen added seven new counties on CW, plus 5 more on phone, all of which shows up as a rise in the tables accordingly.

For your scribe, the month was once again a tale of not much time for activity, but the short periods during which it was possible to be on yielded quite a rich harvest: G3UEC, GB2GM in Wigtown, Bute, and Inverness, GW3YGH for Carmarthen, and GW5YC/P in Merioneth made a pretty rich haul for a total operating time of about a couple of hours!

G3PQF (Farnborough) has been putting land drainage into his garden, which has made a bit of a mess of his earth radial system as well as reducing his activity somewhat. Nevertheless, your scribe heard him in the middle of one of the pile-ups, putting out a signal more or less as strong as usual. Dave has paid more attention to CW of late, and has worked 17 counties this way during 1969.

It may be recalled that G3XAP (Stowmarket) threatened, last

autumn, to put up a 300-foot vertical. This was done, using a balloon, with co-operation of Phil's employers, who allowed him to use the factory site, and also supplied the hydrogen and the mains power. However, complications arose, first because the ATU that was available was not able to cope with the 300 feet, and so a SWR of quite phenomenal magnitude was offered to the transmitter and receiver. Then the 888A's product detector went on the blink, and a spare receiver had to be hurriedly pressed into service. Just to crown it all, sudden spurts of noise were knocking the S-meter straight up to S9+10, and keeping it there for minutes at a time. The latter was a bit odd, insofar as a tour of investigation during the preparatory period with a receiver for possible noise sources had shown nothing. When finally traced it was found to be coming from an 80 h.p. motor. Incidentally, during odd quiet periods, PY1NEW and W1BB were both heard; during the noise spasms, G3UJE stood by on the channel and OSP'd reports from a whole host of G's who queued up for a contact. G3XAP was assisted in all this by G3TAQ.

At G3VLX (Sidcup) the aerial remains as before, but of late an SSB exciter has been used to feed it, and even more recently the HRO has been replaced by an FR-100B. During the Grafton contest, SSB leg, Deryck was absolutely astounded to find twenty takers, including four GW's and three GM's, to one CQ, all of which were peeled off in twenty minutes. GD3VNO and GM3YCB were both nailed during the month to bring the score up to 91, although, sadly, the confirmations only total 70.

GD3VNO also brought joy to the soul of G3XTL (Warsop) who worked him for a new county and a new country. Oxford also was attended to, by working G8IB, who sent along the card forthwith, to clear the G3XTL decks of English counties. It now looks rather as though it is a matter of waiting for the expeditions to come along and provide the others.

Cyril of G13WSS (Co. Down) has no new ones to add to his total this time, although several are new to SSB. Stations of most interest to him were EI4AN in Co. Cavan;

GD3VNO, both SSB and CW; plus at least the Wigtown stop of GB2GM.

Top Band is favourite with G3XIV, although he works the other bands, because a little more digging and listening is called for to enable one to raise the DX. Nine new ones were notched up this time, including EI9BG for a new country and Co. Clare.

G2HKU upbraids your poor old scribe for omitting, in his preamble last month, to mention those obnoxious so-and-so's who persist in trying to tune up with a long-drawn groan, right on top of a QSO—why can't they go away and gargle some place else? Ted found GM3PIP and PAØPN on SSB and on CW worked GM3PIP again, also OL1AKG, OL2AIO, OL6AKP and DL1YA, all around 2200z.

"Not quite so active as the previous month" is the general tenor of the G3XTJ letter in the context of his Top Band activities. Nevertheless, Edwin worked GC3ULZ/P for Jersey for a new one, G3VOD (Oxfordshire), GM3WFJ and GD3VNO. The high spot of the period was undoubtedly the bringing to book of ZB2AY for a thirteenth country, after several near misses. The signal from this station has been so consistently strong that G3XTJ wants to know why the 9H1's and ZC4's do not give 160 metres a go.

To the latter question comes the answer, from 9H1BL—he has no gear for the band, on the transmitting side. Alan does listen, though, and hears quite a few G's at good strength, and to ZB2AY at 59+ picking them off one by one. 9H1BL is only too glad to listen for any Top Band signals on request; contact him at 11 Ascot Flats, St. Peter Street, Malta, G.C.

Technical Points

Readers may chuckle somewhat at this, but it has to be admitted that a fault on the G3KFE receiver has been "bugging" him for months now. The symptom was a drift, of about 500 cycles on Top Band, substantially less on Forty but generally noticeable at odd times on all bands. Having drifted this amount in a matter of a couple of

seconds or so, it would sit there for a while, maybe a few minutes, maybe less, maybe up to an hour or more, before it decided that now was the time to embark on the return trip, which it again accomplished over a few seconds—not instantaneously.

Oscillators on this receiver are all fed from a stabilised 150-volt line, and it was noted the Rx was quite stable with respect to RF/IF gain control settings. However, all the oscillator bottles were taken out one by one and put through their paces on a valve tester. They all tested OK, but to be on the safe side the first local oscillator was replaced, as was the stabiliser, the BFO valve, and the rectifier. Still no joy!

As recounted last month, the rig has recently been moved into the garage, and, of course, heat had to be provided. This gave it all away, as it was established beyond all shadow of doubt that the receiver drift occurred immediately after the thermostat on the 2 kW fire switched over. Measuring the mains with an ordinary meter on the appropriate range failed to show any visible change of voltage, and the whole length of lead from where the mains comes into the house to where it enters the receiver is less than ten feet of hefty cable. However, suspicion still lay there, and so the car battery was hoisted into the shack, heaters fed from the battery while HT came from the usual circuitry. Result—no drift when thermostat operated or released. Final solution, to this problem was to connect the receiver mains supply through a constant voltage transformer. But G3KFE still wants to know why the transmitter remains unaffected by all this when supplied by the same mains from the same lead?

Sign-Out

So there you have it for another month; and a mighty interesting one it has been, at that. For next time, the deadline for your letters and Table entries is May 12, and the address is CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. And to be sure, please check the envelope before you drop it through the slot in the box! 73 de G3KFE—have a good Whitsun.

VHF BANDS

A. H. DORMER (G3DAH)

ON the whole, a fairly quiet month for DX with one or two lifts of just sufficient amplitude and duration to raise hopes, but without any real extended tropo. working to be found. On several occasions, the 70 cm. band proved to be the most productive of longish distance contacts. For example, the night of April 8 saw some fine Continental signals from PAØ and ON when two metres was very ordinary. There appeared to be little North/South working over any great distance, but with the high pressure area centred over the eastern North Sea and moving away, this is not perhaps surprising. As usual, ON4HN was putting in a massive signal for most of the evening, and G6NOX/T was reciprocating with a picture into Belgium. Incidentally, one hopes that Jeremy will find a solution to the problem of what to do if the projected runway construction at Stansted goes ahead—at the moment, it looks as if he is right in the middle of it, and that 64-element array will be a bit of a flying hazard!

On the lower VHF frequencies, G3JVL (Hayling Island) copied the Rhodesian beacon station on 50.046 mc for the first reported reception in this country. Propagation was by TE rather than F2; signals were 559 between 1915 and 2225z on March 20. This was followed on April 4 by the reception at 599 of ZS3B on 50.040 mc. First logging was at 1350z and at 1425z ZS3B

was heard in contact with ZB2BC. It is reported that the ZS is building for 70 mc reception, and this should be something to aim for! G3JVL has a four-element beam for 6 metres and the converter is a BFY90 RF stage and 3N140 mixer.

Barometric pressure over the centre of the country remained fairly high during the period, around 1020 mB, with the exception of a low of 985 mB during March 13-14. The high, which accounted for the good weather and conditions over Easter, showed as 1025 mB, and during the March Aurora the level was constant at 1020 mB.

The March Aurora Opening

Undoubtedly, the excitement of the month on VHF was the appearance of an Aurora over the night of March 23-24. The first warning came on Friday, 21st, when there was a fade-out on the HF bands from 1330z to 1415z. At sunset on that day, a large sunspot was visible to the naked eye, and there was a

significant increase in solar noise on two metres. Under normal circumstances—if such a specific term can be justly applied to such a variable phenomenon—one could have expected VHF radio auroral effects to have been observed some 27 hours later, but not so in this case. It was not until early on the Sunday evening, March 23, that auroral signals were first heard on four metres, and not until 8 p.m. or so that any significant *Ar* propagation was observed on two metres. Not unexpectedly, there was no response for 70 cm. Initial contacts on Four were between EI/GI/GM, but the duration seems to have been very short and the intensity limited, even in those latitudes. There is no doubt that this evening of March 23-24 was the two-metre man's day (or night). From 8 p.m. onwards, SM/OZ/DL contacts were made easily from all over the country, but by 9 p.m. there were indications that this was to be one of the shorter displays as signals became much weaker, openings spasmodic and

THREE-BAND ANNUAL VHF TABLE
January to December, 1969

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G3DAH	9	1	43	12	10	1	76
G3LAS	20	1	36	4	—	—	61
G2AXI	13	1	30	5	4	1	54
G8APZ	—	—	29	4	12	2	47
G8AUE	—	—	28	2	14	2	46
G8BMD	—	—	28	4	8	2	42
G3COJ	—	—	24	3	11	1	39
G8ADP/A	—	—	28	2	6	3	39
EI6AS	—	—	22	12	—	—	34
G3AHB	—	—	20	4	3	1	28
G8APJ	—	—	19	3	4	1	28
G8AUN	—	—	22	6	—	—	28
GC8AAZ/P	—	—	22	4	—	—	26
G3EKP	8	4	7	3	—	—	22
G8ARM	—	—	—	—	14	4	18
G3TDH	16	1	—	—	—	—	17
G8BJC	—	—	11	1	—	—	12

This Three-Band Annual Table shows total claims to date from the year commencing January 1st, 1969. Claims should be sent as here-to-fore to: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Summaries by bands will be published at suitable intervals. It should be noted that contacts supporting claims for this Table must be made from one QTH only.

QSO's subject to rapid and severe fading. In the South at least, it looked as if it were all over. However, by 2200z the effect re-appeared at good intensity and over a wide area. In the space of just 30 mins. the following countries were logged at G3DAH : G, SM, OZ, SP, EI, GI, GW, GM, DJ/DL, PAØ and ON. Signal levels varied from 55A to 59A+, with the transmission from GM3TFY in Midlothian the strongest and most consistent. Still later in the evening, LA and F were added to the list. *Ar* contacts were still being made at 0400z on Monday morning, 24th, although by that time activity was very low and the Auroral effect intermittent.

While the two peaks followed the predictable pattern, the duration of this Aurora was unusually long, about eight hours, compared with the more customary three hours or so, and it is but infrequently that effects are observed as far to the southwest as Cornwall (G3GZJ) and as far south as Rheims (F9FT). The beam heading in the South was just N.E. for most contacts, more northerly therefore than was the case for the previous two Aurorae in February, and this optimum heading changed but little during the whole of the event. No recurrence was observed later on the Monday, but weak effects were noted on 4m. on Tuesday 25th and Wednesday afternoon for short periods.

To give a more complete picture of what happened, following are com-

ments and representative extracts from logs of operators at widely dispersed locations.

From EI5BH—Athlone, Co. Westmeath: "Certainly there were a lot of fireworks with the wickets falling like nobody's business. At approximately 2100z, the conditions pointed to a general Aurora, just as before, with GM and G appearing. The effect came in spells of about twenty minutes every hour, but after 2300z they changed and Continentals were coming through well. Just after 2400z I got the first bite with SM7BZX and heard quite a few more. By 0140z I was thinking of giving up, but just after that I was called by SP1JX and got 57A. He was followed by PAØFAS and DM2DBO (near Berlin) and altogether thirteen stations were worked. Early in the evening with the beam north-east, only G and GM could be worked, but swinging it further North got me further and further into the Continent. Stations worked were: G3LTF, G3GGS, G3NOH, G3LQR, G6OX, G3LLE, SM7BZX, GM3TFY, GW2HIY, SP1JX, PAØFAS, DM2DBO and G3DAH."

From EI6AS—Dublin: "I usually check the BBC 1 TV from Belfast for any signs of an Aurora, because on February 11 and 27th there were pronounced indications that something was afoot. On the Sunday evening there didn't appear to be any definite patterning, just a fuzzy trace at 2230 hrs. Heard EI5BH on

SSB and EI7AF on CW. I put out a CQ and then heard G3GZJ (Redruth, Cornwall) at terrific strength and that started the ball rolling. The beam heading was between NNE and ENE and needed the usual prodding to find the best direction for a given bounce angle. Stations worked were: G3GZJ, G3BHW, G3DAH, PAØMS, G3CCH, PAØFAS, G2UN, SP2RO (for the first EI/SP contact on Two), G3USB, PAØPCD, DL1SN, G3FRV, G3TIR, G3LTF, SP1JX, G3NOH, SM5BSZ, SM6AEK, SM6PU, OZ6OL, DJ5BV, ON4TQ, DJ6YD, GM3TFY. Others heard were EI5BH, EI7AF, F9FT, G3NEO, GW2HIY, DK1AH, DL7RI and OZ5NM."

From GM3TFY—Midlothian: "In my experience it was by far the best Aurora since the one which coincided with the VHF NFD on September 3, 1966, and the best I have heard as far as Continental DX is concerned. I have no idea when the *Ar* effect first became apparent on two metres, but I know I nearly missed it altogether! I generally try to check the band in the late afternoon and in the evenings. Most of the minor Aurorae seem to occur in the late afternoon and then fade out, while the major ones continue on into the evening. On this occasion I checked the band at 2330z and the party seemed to be going with a swing then, so I hastily joined in and tried to make up for lost time. For about the next hour, the semi-locals such as G and EI were the strongest signals, with OZ and PA much weaker. Later on, most of Europe seemed to be coming in at similar strength and it was equally as easy to work DJ/DK as G. At 2345z I was called by SP1JX, followed by SP2RO, who gave me 59A. By 0330z everything had died down. No Aurora was visible. One slight disadvantage of the CW zone is that with so many people sending QLH after CQ's, everyone with a VFO gravitates down to that end and QRM is rife in the bottom 20 kc or so. The Tx here runs 90 watts to a pair of crossed ten-element Yagis, which allow the polarity to be switched from horizontal to vertical or circular by changing the phase of the feeders. It appears that a horizontally polarised signal comes back from the Aurora still almost

LIST OF FRENCH DEPARTMENTS

1	Ain	32	Gers	64	Pyrénées (Basses)
2	Aisne	33	Gironde	65	Pyrénées (Hautes)
3	Allier	34	Hérault	66	Pyrénées (Orientale)
4	Alpes (Basses)	35	Ille-et-Vilaine	67	Rhin (Bas)
5	Alpes (Hautes)	36	Indre	68	Rhin (Haut)
6	Alpes-Maritimes	37	Indre-et-Loire	69	Rhône
7	Ardèche	38	Isère	70	Saône (Haute)
8	Ardennes	39	Jura	71	Saône-et-Loire
9	Ariège	40	Landes	72	Sarthe
10	Aube	41	Loir-et-Cher	73	Savoie
11	Aude	42	Loire	74	Savoie (Haute)
12	Aveyron	43	Loire (Haute)	75	Ville de Paris
13	Bouches-du-Rhône	44	Loire-Atlantique	76	Seine Maritime
14	Calvados	45	Loiret	77	Seine-et-Marne
15	Cantal	46	Lot	78	Yvelines
16	Charente	47	Lot-et-Garonne	79	Sèvres (Deux)
17	Charente-Maritime	48	Lozère	80	Somme
18	Cher	49	Maine-et-Loire	81	Tarn
19	Corrèze	50	Manche	82	Tarn-et-Garonne
20	Corse	51	Marne	83	Var
21	Côte-d'Or	52	Marne (Haute)	84	Vaucluse
22	Côtes-du-Nord	53	Mayenne	85	Vendée
23	Creuse	54	Meurthe-et-Moselle	86	Vienne
24	Dordogne	55	Meuse	87	Vienne (Haute)
25	Doubs	56	Morbihan	88	Vosges
26	Drôme	57	Moselle	89	Yonne
27	Eure	58	Nièvre	90	Belfort (Territoire)
28	Eure-et-Loir	59	Nord	91	Essonne
29	(N) Nord-Finistère	60	Oise	92	Hauts de Seine
29	(S) Sud-Finistère	61	Orne	93	Seine St. Dennis
30	Gard	62	Pas-de-Calais	94	Val de Marne
31	Garonne (Haute)	63	Puy-de-Dôme	95	Val d'Oise

entirely in the same phase. Food for thought—do all those phone-only people realise what they are missing? Surely, here at least, CW remains effectively unchallenged! Stations worked were: EI7AF, G3CCH, G3DAH, PA0KQWY, G3GZJ, G3LTF, G3USB, OZ9OT, OZ5NM, SM6AEK, G3NOH, G3TIR, SM7DKY, DJ6YD, DK1KOA, OZ6OL, EI5BH, SP1JX, SM5BSZ, SP2RO, DJ5BV, LA8WF, PA0MS, SM6BTT, EI6AS, PA0FAS and ON4TQ.” (And a very nice bag, too!)

From GW2HIY—Anglesey: “Was idly checking over the TV channels at 2300z and there was Ch. II with a stronger Ar signal than the direct one. Got on the band at about 2330z and found 144 to 144.5 mc was like Twenty on a Sunday morning! Heard LA9WF and OK1AWL at 33A, and DC6JM calling OH2NX. Beam heading was 10° East of North, and at times the EI’s were stronger by the direct tropo. path than they were on Aurora. Altogether one of the strongest openings for a long time, but did not hear any other GW’s on. Stations worked were: G2UN, G3DAH, PA0CSL, F9FT, SP1JX, SM7BZX, SP2RO, G3BHW, DK1KOA, PA0PCD, G3TIR, EI5BH, SM6AEK and OZ6OL. Stations heard: EI6AS, GM2DRD, G3NEO, PA0KVA, SM7DKY, DL1SN, G3FRV, OZ9PZ, DK1AH, G3NOH, DC6JN, OK1AWL, DJ6YD.”

From G3GZJ—Redruth, Cornwall: “Your (G3DAH) signal was Ar although a number of stations heard/worked had a mixture of Ar and normal characteristic, particularly G3CCH, G3NEO and G3LTF, no doubt due to the good tropo. conditions prevailing at the same time. I was able to anticipate the Aurora as the previous evening just before sunset I could clearly see a large sunspot. Auroral signals appeared about 2300z, quite suddenly, and remained until about 0230z with many carriers over S9. Did not hear SM, LA, OZ or DJ. Stations worked were: G3CCH, EI6AS, GM2DRD, SP2RO, G3RXY, GM3TFY, PA0KQWY, G3DAH, EI2A, SP1JX, G3LTF and G3TIR.”

From G3LTF—Galleywood: “Signals first went auroral at 2015z. Bearing at this time was 45° east of North.

GM2DRD was also heard strongly at 2115z from a direction 30° west of true North. No G’s were auroral although some Northern stations could be heard via tropo. By 2130z the effect had folded almost completely, but at 2150z it returned strongly and rose rapidly from noise to +15 dB in about two minutes. At 2200z the two-metre Aurora returned very strongly and suddenly, as if switched on, from a bearing of 45° east of North, where it remained until 0140z, when it backed to 15° East. Many local G’s had strong Ar characteristics, although G3LQR, 60 miles north was only partly so. I know that PA0EZ worked OH2NX. Here, stations worked were PA0IB, PA0EZ, PA0KVA, GM3TFY, EI6AS, EI5BH, SP2RO, DK1KOA, DJ7RI, DL7HG, OZ9OR, OZ5NM, OZ7LX, SM5BSZ, SM6BTT, G3CCH, G3GZJ. Stations heard were: PA0MS, PA0HMS, PA0FAS, PA0KQWY, PA0PCD, GM2DRD, ON4TQ, EI2A, LA8WF, F9FT, DK2ZF, DL1SN, DJ6YD, DL9DL, DC6KT, DJ5BV, OZ6OL, OZ9OT, OZ3GW, SM6AEK, SM7BLO, SM6PU, SM7DLV, SM6CYZ, SM7ZN, SM7BZX, OZ6OL, OZ9OT, OZ3LW, G3NEO, G2UN, G3USG, G3LLE, G6OX, G6NB and G3UQK.”

From G3TIR—Crawley, Sussex: “Experienced an auroral opening for the first time! The beam heading was 25° east of North and signal strengths were generally around 57A, although GM3TFY was 59A at times. SM6AEK was heard calling an Italian station, but nothing heard of him here. The most consistent signal was GM3TFY, who was still going strong at 0345z. Stations worked: EI6AS, GW2HIY, GM3TFY, G3GZJ, SM5BSZ, OZ3GW, SM6AEK, SP2RO, DK1KOA, DK2ZF. Heard were: PA0FAS, ON4TQ, G3FRV and G3NOH.”

From G3DAH—Herne Bay, Kent: “Auroral effects were first logged at 2000z, on Sunday, March 23. Not very strong or wide-spread, and SM provided by far the best signals. By 2100z nothing auroral was being heard at all, but signals suddenly re-appeared at 2200z and were far more intense and widespread. These conditions persisted through until 0400z (Monday 24th), by which time

TWO METRE FIRSTS

G/DL	G3DIV/A-DL4XS/3KE	5/6/50
G/DM	G6NB-DM2ABK	27/10/58
G/EA	G2JF-EA1AB	11/6/64
G/EI	G8SB-EI8G	23/4/51
G/F	G6DH-F8OL	10/11/48
G/GC	G8IL-GC2CNC	24/5/51
G/GD	G3GMX-GD3DA/P	29/7/51
G/GI	G3DA-GI2HML	29/6/49
G/GM	G3BW-GM3OL	13/2/49
G/GW	G5MQ-GW5UO	22/10/48
G/HB	G6OU-HB1IV	12/9/53
G/LA	G6NB-LA8RB	29/6/53
G/LX	G5MR-LX1AS	23/7/55
G/OE	G3HBW-OE1WJ	4/1/60
G/OK	G5YV-OK1VR/P	27/10/58
G/ON	G6DH-ON4FG	25/9/48
G/OZ	G3WW-OZ2FR	1/6/51
G/P	G6DH-PA0PN	14/9/48
G/PX	G2JF-PX1QX	16/6/64
G/SM	G5YV-SM7BE	1/6/51
G/SP	G5YV-SP6CT/P	28/10/58

GC/DL	GC3EBK-DL3VJ/P	22/3/53
GC/EA	GC2TR-EA1AB	11/6/64
GC/EI	GC2CNC-EI2W	8/10/51
GC/F	GC2CNC-F9OK	17/11/53
GC/GI	GC3EBK-GI3GX/P	14/9/56
GC/GW	GC2FZC-GW8SU	16/6/54
GC/ON	GC3EBK-ON4BZ	4/3/53
GC/OZ	GC3EBK-OZ2FR	2/3/53
GC/PA	GC3EBK-PA0HA	16/7/55

GD/EI	GD3DA/P-EI2W	30/7/51
GD/GI	GD3DA/P-GI2FHN	29/7/51
GD/GM	GD3DA/P-GM3DA/P	29/7/51
GD/GW	GD3DA/P-GW5MQ	28/7/51

GI/DL	GI3GXP-DL1SE	5/1/56
GI/EI	GI3GQB-EI2W	13/6/51
GI/F	GI3GXP-F8MX	31/7/57
GI/GM	GI2FHN-GM3OL	1/7/49
GI/GW	GI2FHN-GW3ELM	8/7/49
GI/HB	GI3GXP-HB9RG	7/10/60
GI/ON	GI3GXP-ON4BZ	5/1/56
GI/OK	GI3GXP-OK1VR/P	27/10/58
GI/OZ	GI3OFT-OZ3CE	3/12/62

GM/DJ	GM2FHH-DJ1XX	29/5/55
GM/EI	GM3BDA-EI2W	12/6/51
GM/GW	GM3OL-GW2ADZ	10/5/49
GM/HB	GM3HLH-HB1RG	4/8/57
GM/LA	GM2FHH-LA7AE	6/7/58
GM/ON	GM3EGW-ON4BZ	21/11/53
GM/OZ	GM2FHH-OZ2IZ	18/6/57
GM/PA	GM3EGW-PE1PL	22/4/53
GM/SM	GM2FHH-SM6ANR	22/7/55

GW/DL	GW5MQ-DL4XS	22/9/51
GW/EA	GW3MFY-EA1AB	27/3/65
GW/EI	GW2ADZ-EI8G	19/4/51
GW/F	GW2ADZ-F3LO	14/5/50
GW/HB	GW2ADZ-HB1IV	14/9/53
GW/ON	GW2ADZ-ON4YV	13/5/50
GW/OZ	GW2HIY-OZ5AB	14/6/59
GW/PA	GW2ADZ-PA0HA	13/5/50
GW/SM	GW2ADZ-SM6QP	1/7/53

EI/DL	EI2W-DL3CJ/P	29/8/52
EI/F	EI2W-F8MX	9/8/56
EI/HB	EI2A-HB9QQ/P	26/9/66
EI/ON	EI2W-ON4BZ	21/9/51
EI/OZ	EI2W-OZ5AB	14/6/59
EI/PA	EI2W-PA0FC	10/10/53

activity, and Aurora, were both virtually non-existent. Intervals of up to twenty minutes at a time were observed when all signals disappeared, except for G's who could be heard *via* normal tropo. G3CCH and G3NEO were good examples of this. F9FT was auroral from Rheims throughout, as was G3GZJ, who was putting in a tremendous signal for most of the time. Stations worked from G3DAH were: SM5DS, SM6BTT, DJ7RI, EI6AS, GW2HIY, SP2RO, GM3TFY, EI2A, G3GZJ, PAØFAS, OZ5NM, SM6PU, SM5BSZ, DK1KOA, PAØMS, PAØFAS and EI5BH. Stations heard: G3LTF, G3NEO, G3CCH, G3USB, G6OX, G2UN, G3FRV, G3NOH, F9FT, GM2DRD, LA8WF, SPIJX, SM6AEK and DJ6YD."

Several readers have asked for an explanation of the degraded CW note heard under *Ar* conditions. Without going into great detail it may be said that signals, reflected off the Auroral curtain, are scattered and/or modulated by the oscillation of the Aurora—giving rise to multipath reflection effects—and that Doppler frequency shifts are introduced, which render the reception of AM signals virtually impossible, and reduce the T9 CW note to a rough growl. SSB can be used under *Ar* conditions—as witness the contacts by G3BA and G3LTF recently—and AM voice is *sometimes* possible on four metres. Radio auroral effects occur in the E-layer at some 60 miles above the surface of the Earth, and at about 20° latitude from the geomagnetic poles. Experiments with tilted antennae have shown that there is no significant reflection from streamers and curtains in the visible Aurora, which at times extends up to 500 miles or so. For a more detailed explanation of Auroral effects readers are referred to the "VHF Bands" feature in the December 1969 issue of SHORT WAVE MAGAZINE.

Lessons to be learned from the logs and comments—which have been quoted *verbatim* to bring out the points—are that local TV reception is a very good indicator of abnormal propagation conditions in any part of the country, and that it pays to look North before retiring for the night.

* * *

It was appropriate that the RSGB Lecture Meeting on March 28 should have been devoted to propagation at VHF, with particular emphasis on anomalous effects. Flavell, G3LTP, opened the proceedings with a succinct exposé of geomagnetism. He was followed by Newton, G2FKZ, who suggested to a somewhat sceptical audience that he had in fact laid on the March 23-24 Aurora (as already discussed here) as a prelude to his presentation on propagation by that mechanism! After explaining the generally-held view of the causes of radio *Aurorae*, he went on to elaborate on recent discoveries, which suggest that not all these manifestations have a direct solar origin, and that some (particularly those which occur during daylight hours) can be traced back to disturbances in magnetic fields much closer to the terrestrial environment. Years ago, G2FKZ was a regular correspondent to this feature, and in terms of GDY worked on two metres, his totals still stand high.

Hayter, G3JHM, wound up the proceedings with news of the latest achievements on 50 and 70 mc, and dealt with the various forms of sporadic and allied propagation modes affecting those bands.

VHFCC Awards

Awards this month go to G8AYN, G3WRD and G8BGR, all for operation on two metres—Congratulations!

Roger Whitbread, G8AYN, operates from a QTH in Croydon, Surrey, where he is 425 feet a.s.l. His equipment consists of a QQV03-10 PA running 15 watts to an 8-element *J-Beam* at 20 feet. The receiver is an FET converter tuning 30-32 mc into an AR88. The converter has a 2N3819/MPF102 cascode front-end and a 2N3819 mixer. G8AYN will shortly be on the air with 90 watts to a QQV06-40A on Two and is still very active on 70 cm. His total of stations worked on Two since starting up on that band is 235, and on 70 cm. is 108, although the QSL rate appears to be down in the 60% range.

Bob Richardson, G3WRD, is probably as well known for his portable working from the Isle of Sheppey as he is when operating from the home QTH at Chiswick,

London, W.4. The rate at which he was knocking off the PAØ's last summer had to be heard to be believed. The home site is but 23ft. a.s.l., and suffers from severe screening, though Hangar Hill in the West has proved to be an excellent /P site. Bob keeps a battery on charge at all hours, and if it looks as if there might be an opening on Two, is up and away on to the Hill in a flash for the DX. He runs a TW Communicator and a 6-ele Yagi when operating portable. The main rig is a QQV03-20A PA running 30 watts input, modulated by a pair of 807's in Class-B, zero bias. The beam is a 10-ele *J-Beam* at 50 feet, and the receiver a 6CW4 converter tuning 28-30 mc, into an AR88. He finds the QSL return rate very good, particularly from G8/3 stations.

G8BGR, Bill Curtis, operates from Farnborough in Kent and has clocked up 111 stations worked on two metres since activities began. His transmitter is home-built and has a QQV03-20A in the final with 20 watts input; the receiving set-up includes a 6CW4 converter feeding into an AR88. The antenna, at 18ft. above ground, is an 8/8 Yagi, the QTH being 400ft. a.s.l. Though Bill's principal interest is in two-metre contests, a 70 cm. rig is under construction and should be finished shortly. Current effort is towards improvement to the aerial system.

Charts and Tables

The increasing use of *Department* numbers in CQ calls by French stations has prompted the inclusion of a table listing these in numerical order. The geographical locations are usually shown on maps of France, but only rarely do the numbers appear on them. This list will enable you to locate the F station you are hearing or working.

The Table of "Two-Metre Firsts" has been revised and brought completely up-to-date from the latest information. It would be appreciated if readers who have additional or contrary information would write in so that the record can be suitably modified, if required. In due course, a Table will be published showing 70 cm. "Firsts" on the same basis.

Enquiries are still being received about the basis for claims for the Three-Band Annual Tables and for

the VHFCC Award. For both these purposes, contacts must have been made from one QTH only and cannot be a mixed bag of /P, /A, /M as well as operation from the fixed station. Similarly, if the QTH is changed, it will be necessary to start over again from the new location. The reasons for this ruling must be fairly obvious.

DX-Expeditions

Just a reminder that the G3BA/G3BHT tour of GM starts on Saturday, May 24 and continues till Sunday, June 1. Times of operation are 1900 to 2300 local daily on 145.9 mc for AM, CW and FM, split frequency working, and every hour on-the-hour for SSB on 145.41 mc. G6CW and G3OZP are the anchor men on 3652 kc, 1830 and 1900 local each evening, through whom sked changes and various administrative matters can be discussed. Skeds can still be arranged through either G3BA or G3BHT, *QTHR*, with s.a.e. A morning session 0730-0830 local has been included, because conditions are usually a bit up at those times. As a matter of interest, the expedition equipment was exercised from near Stratford over Easter. Tests were very satisfactory and augur well for a successful foray.

The expedition to GW by the Verulam Radio Club, noted in the February issue, has now been finalised. Starting date is August 2, and counties to be visited are: Flint, Caernarvon, Denbigh, Merioneth, Montgomery, Cardigan, Pembroke and Carmarthen, in that order and for one day in each. SSB frequency is 145.42 mc, with CW on 144.098 mc. Reception is for all modes, but *no AM* transmitting gear will be taken. Callsign is GW3VER/P. Skeds can be arranged with G8BNR, *QTHR*, for evenings after 8 p.m. Incidentally, he has already received one request for a sked from an unusual quarter—OE6AP, who operates from a site two miles up in the Austrian mountains near Vienna. This could well be "on," given reasonable conditions, and would be another "First" on Two.

Beacons

A 70 cm. beacon operating on 433.81 mc has been set up at the Sutton Coldfield TV station and

should be a very useful pointer to propagation conditions on that band. The output is five watts from a transmitter (constructed by G3HBW) feeding into two "ruggedised" *J-Beams* 8/8 slot-fed Yagis at 300 feet up the TV mast. Beam headings are true North and South East, and reception in Herne Bay (at 127 miles) is 559 under average conditions. Until a suitable keying device for GB3SC is received, and full permission obtained for the use of that call, the beacon will identify as G3SUT, the call of the local Ariel Radio Group. (Thanks, G3BA.)

GB3VHF is now back on the air and fully operational again. The writer was surprised by the use which Continental stations make of this facility, judging by the number of requests for information which have been received over the air during the few weeks of non-operation. We in this country are not the only ones who suspected our converters when the signals disappeared. It is understood that the withdrawal of the beacon from service was necessitated by equipment and environmental changes.

News Item

23 Centimetres: Brian Pickerell, G8ARM of Blackheath, London, has now got six counties on this band following a contact with G2FCA in Middlesex, and is chasing G8AEJ of London who has nine. His station consists of a low-power transmitter which is all-transistor up to 216 mc, and then goes EC88 doubler, EC88 driver into a DET-24, followed by a box cavity for 23 cm. with a 2C39A in the final. These four cathode-heated type valves are now the only ones in use at the station, as even the power supply for them comes from a solid-state inverter. For reception, Brian has a slightly-modified version of the G8AOL double-conversion converter, and his antenna is a scaled-down 18-element Parabeam. Best DX so far has been G8AUE in Derbyshire at 135 miles. If all goes well, G8ARM should be operating /P on 23 cm. during the 1296 mc contest on May 24. And good luck to him.

G3XPT, Dereham, Norfolk, now has a transmitter for the band, and is building a converter. He would

welcome cross-band contacts.

Two metres: A new world record for E-M-E on two metres has been set up by the QSO between ZL1AZR and SM7BAE. No details are available of the equipment in use in New Zealand, but SM7BAE has 160 elements (16 x 10-element Yagis), which must be about the ultimate for this band! The previous record was held by W2NFA at Crawford Hill and VK3ATN.

The *ARTOB* launching arranged for April 7 does not seem to have been a conspicuous success over here. No reports have been received for reception in this country, and certainly nothing was heard of the transmissions at this QTH (Herne Bay).

G3XSK, Lowestoft, Suffolk, had one literally out of the blue on April 4; he was idly tuning the two-metre band just after lunch, thinking that there was very little activity and put out a CQ. To his surprise, he was called by K6QKL/Air Mobile, on his way to the States from Germany. Signals were at 5 and 9+40 dB all the time from 35K feet at 500 m.p.h. in 53°N, 03°E. After they had signed, it was Bedlam! PA, ON and G stations were all calling frantically, which suggests that there are usually more people listening than there ever are transmitting. Ken bemoans the fact that so few of the VHF men seem to beam towards the Norfolk area despite the fact that there are now some 15 two-metre stations active in that district. He runs 18 watts to a QV03-10 with a 4/4 slot at 25ft., and has had a QSO with DK2AM in Wilhelmshaven, so he is getting out all right. G8BYV in Swanton Morley, Norfolk, is having the same sort of trouble—lack of contacts—and is looking for QSO's on Monday evenings after 8 p.m. His frequency is 145.297 mc and he is on 433.299 mc on Seventy.

G3XFQ will be moving in July from Chatham, Kent, to Farnborough, Hampshire, but will continue to be active on the band. He expects to be travelling a great deal in the Middle and Far East, but does not anticipate too many two-metre contacts from those places!

G3CCH in Scunthorpe, had trouble with the driving arm of the MS antenna during the bad weather

recently, but is now all ready to go again. He is maintaining meteor-scatter skeds with OH2BEW on 144-103 mc; they get pings and short bursts only, although both operators are quite convinced that the contact is on. OH2BEW reports that the recent Aurora was quite visible from his QTH.

Over the Easter holiday, G8BIS and G8AMG had a successful sortie to Clee Hill in Shropshire. They worked 42 stations in 25 counties in all, with the best DX as G3EHM in Stoke-on-Trent. (G8AMG is cleaning up his climbing boots for the expedition to Snowdon, of which more anon.)

G6CW (Nottingham) now has 149 different stations clocked up on two-metre SSB. John worked a newcomer, G3TKB, the other night, and with GD3FOC coming up on the band with reasonable power very shortly, the 150th should not be far behind. Whatever the personal feelings may be about SSB, there is

certainly a lot of it about. G8BBY, Rugby, will be joining the SSB club shortly, with a pair of 4CX250's and an antenna on an 80ft. tower, so he should have a certain effect! G3RMB, near Coventry, is now putting out a (one watt) SSB signal which gets him 56 in Herne Bay. Beam is a 10-ele Yagi and QTH is 600ft. a.s.l.

G3VPI, Ipswich, Suffolk, just out of hospital, is on the air again, although still at home. Best wishes, Eric. G3EMU (Canterbury) is organising another "Foxhunt" for May 11. Meeting place is the Motorway Café on the M2 and the time 1430 local. Further details may be had from him on receipt of an s.a.e.

Much /M activity during the Air Show at Lydd in Kent on April 6. Some 250 mobiles turned up for the event, which took place during the splendid weather over the Easter holiday. The two-metre talk-in station ran a Heathkit Two'er to

a four-element beam fixed N-W and was operated by G3OIZ, G8CCO and G8BEB. Apart from a certain amount of QRM from the car park and the PA system, all went very well.

Mullards have introduced two new high-gain n-p-n silicon planars for VHF mobile work. These are the BLY83 for AM, and the BLY84 for FM, the former giving seven watts output on 144 mc.

Contests

Weekend May 3-4 is the period for the 144 mc (Portable) Contest, and May 24-25 for the 432 mc event.

Deadline

Deadline for the next issue is **May 10**, and the address for news, claims and comments is: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now and 73 de G3DAH.

MINI-MOBILE Mk. IV

Some Correction Notes

R. J. Hulbert (G3SRY)

THE article in the February issue of SHORT WAVE MAGAZINE contained some errors, which need to be corrected.

In the introduction on pp.743-744, reference was made to alternative PA stages. These were not shown and are now given here. Fig. 104 is a suitable circuit for paralleled AUY10 transistors, operating Class-C; component numbers refer to the Mk. IV circuit, Fig. 1, p.745, and new items are identified, with values. Preferably, the two transistors should be fairly well matched.

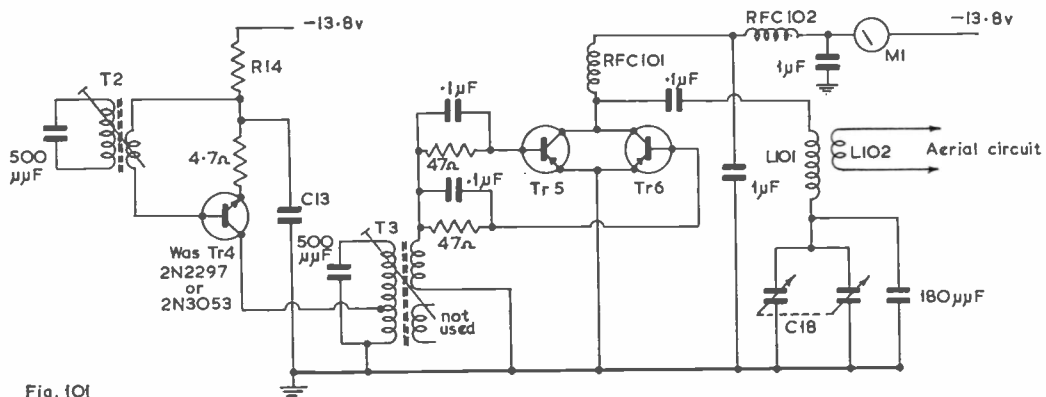


Fig. 101

Fig. 105 here is suitable for BD111/121/123 transistors; it is simply an "upside down" version of the 2G240 arrangement, to suit n-p-n devices. The circuit of Fig. 106 should prove very popular, since it takes three BFY50, or 2N3053, transistors in parallel; these are inexpensive, and readily obtainable. Care should be taken to ensure that the three specimens used have similar gain, otherwise the peak collector current rating of one may be exceeded. A large heat sink is essential for this configuration.

Under the heading "Faults in the Mk. II Transmitter," p.744, February, para. 1, it was stated that the Mk. III PA circuit was given in Fig. 1. In fact, Fig. 1 as shown on p.745 is the complete Mk. IV transmitter. The Mk. III PA is now given here as Fig. 101. This circuit functions well, and should prove of interest for

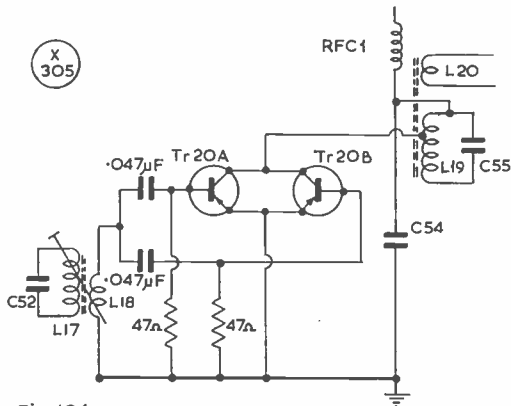


Fig. 104

Fig. 104. Suitable PA circuit for parallel AUY10's.

experimental purposes.

Main Circuit Diagram, p.745: There should be a connection between the top of R78 and the line joining "net" on S3A to "Op," S3B. This diagram does not indicate that cores are fitted to L14, L15, L16, L17. As the circuit is drawn, a single earth point is shown for the entire RF section—this would almost certainly cause instability, or even FM. The individual earth point technique must be employed as far as possible, as suggested by Fig. 3, p.750. In the table of values for Fig. 1, on p.744, C43 should read μF , and C57, C59 given as $1000 \mu\text{F}$ (12v. electrolytic); insufficient capacity here will produce violent audio instability. Tr26, Tr27 should have been shown as gain-coded *mauve*, this colour indicating gains in the range 500-700. If lower-gain transistors were to be used results would be quite different.

Transmitter Section, p.746: Para. 3 should read "silvered mica capacitors also have a positive temperature coefficient, typically +30 p.p.m." Also further into the same paragraph should be read "The types used in the Mk. IV prototypes were -150 p.p.m."

Receiver Circuit Diagram, Fig 2, pp.748-749: With reference to the Q-multiplier, the lower end of C24 should go to the collector Tr9, and not as shown. Also, cores are fitted to all coils.

Values, Fig. 2, pp.748-749: Though VC1, A, B, C, is given twice, naturally there is only one three-gang tuner. The Weyrad coil P51/1 should read L13.

Modulator Frequency Response: Reference C62, the sentence should read "Treble lift can be obtained by reducing the value of C62, but this should not be below $100 \mu\text{F}$." C62, with R77, form an RF filter for the microphone input circuit.

Fig. 4A, p.752: For L14, the upper end should go to spill 3, and the lower to spill 1.

Fig. 4B, p.752: Though all connections are correct,

Fig. 101. Mk. III PA and driver circuit. L101, 50 turns 22g. enamelled, close-wound on 1in. dia. paxolin former. L102, 3 to 6 turns 22g. p.v.c. RFC101, RFC102, as RFC1 for Mk. IV. Other values as for Mk. II version—see "Short Wave Magazine," August 1965. Transistor 2N2297 to be fitted with T05 cooler.

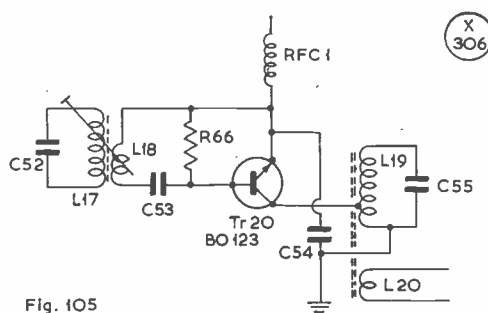


Fig. 105

Fig. 105. Circuit for PA using paralleled BD111, BD121, BD123—see text.

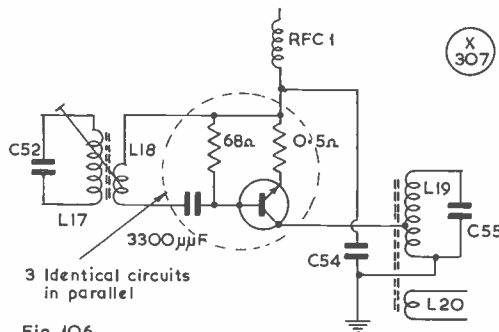


Fig. 106

Fig. 106. Suggested PA circuit for three BFY50 or 2N3053 transistors in parallel—see text.

spills 1 and 6 are wrongly numbered. They should be transposed.

Fig. 4D, p.752: The collector tap for Tr20 should be at 3 turns from the cold end (junction C54, RFC1).

Fig. 5, p.753: The coil data omit reference to cores; these are fitted to all three assemblies, and operate in the upper half of the former.

And on p.754, the heading "LF Amplifier, TR3/4" should read IF Amplifier.

The foregoing should put matters right—and the author would like to acknowledge the many helpful and interesting letters from readers.

AMERICAN CITIZENS' BAND

It seems there is a suggestion that the U.S. CB activity should be moved higher in frequency, to the area 72-76 mc (between their TV Chs. IV and V). This could be implemented by issuing all new CB licences for this band, and requiring that existing licensees (using the 27 mc band) move themselves up into the new region within a specified period.

The CB problem in the States has become even more acute by reason of the fact that—despite the 5-watt power limitation—there are now a number of commercial linears on offer to CB operators, capable of powers up to 200 watts p.e.p. And it seems that the FCC can do nothing about it!

SPECIALLY ON THE AIR

Following is the current list. It will be noticed that in nearly every case a special call sign has been allocated. This is granted on application to the Post Office and is "for duration only"; it is intended for those stations either on an expedition or to be operated for some public occasion. Insertions in this space are free, should be set out in the form shown here, include the name/QTH of a responsible contact-man and be sent, as a separate item, to: Editor, SHORT WAVE MAGAZINE, BUCKINGHAM.

GB3NS, May 2-3: For the Newark & Nottinghamshire Agricultural Show, one of the largest of its kind in the country, when it is hoped to be operating AM/CW/SSB on all bands 10 to 160 metres. R. Wallwork, G3PAW, Magnus Grammar School, Newark-on-Trent, Notts. The station is being put on by the School, at the invitation of the County Education Authority.

GB3BEK, May 3-4: For the 700th anniversary celebrations of the Beaconsfield Charter Fair, organised by the local group to work AM/SSB on the 10-160m. bands, and AM on 4 metres. D. C. Chapman, G3NGK, 64 Heath Road, Holts spur, Beaconsfield, Bucks.

GB3LFI-GW3VKL/A, May 11: To be set up at Lavernock Point, near Cardiff, and on Flatholm Is. in the Bristol Channel, by members of Barry College Radio Society, to commemorate Marconi's first wireless transmission across water, on May 11, 1897. Project has the assistance of R.A.F. Station St. Athan and Atlantic College. A special QSL card will go to all AT-station operators working Lavernock (GB3LFI) or Flatholm Island.—D. H. Adams, GW3VBP, College of Further Education, Colcot Road, Barry, Glam., South Wales.

G3SRA, May 17: For Chingford Community Centre annual gala and open day, with a demonstration of general activities and a number of side-shows. Visitors welcome and talk-in on 160m. and two metres (G3RJI/M).—E. Johnson, G2HR, 35A Woodland Road, Chingford, London, E.4.

GB3NB, May 17-24: Pudsey & District Radio Club expedition to the Norfolk Broads, running a Heath HW-100 and operating all bands 10-80m., SSB.—M. S. Gaunt, G3WGW, *QTHR*.

G3XLH/A, May 24-26: Station to be provided by Fulford Amateur Radio Society for a big Scout *tamasha* (or beanfeast) locally.—G. W. Kelley, G5KC, 9 Cornwall Drive, York, YO1-4LG.

GB3FRE, May 27-June 7: In conjunction with the Fermanagh Festival Fortnight, from the Town Hall, Enniskillen, Co. Fermanagh, Northern Ireland, operating on the 10-80m. bands, possibly also Top Band and two metres. A special QSL card is being offered for all contacts.—S. MacMahon, G18AWF, 10 Church Street, Enniskillen, Co. Fermanagh, N.I.

GB3YMC/A, June 1: At the "Y" Sports Centre, Me'rose Close, Loose, Maidstone, in connection with their Mobile Rally on that day, and as part of the YMCA Anniversary Celebration. QSL's via W. E. Kent, G3YCN, 72 Bower Mount Road, Maidstone, Kent.

GB3FC, June 5-7: Station to be provided by staff members in connection with the Forestry Commission exhibition in Bush Estate, Edinburgh, for the 15-20-80-160m. bands. A special QSL card will be issued for all contacts and reports. Organiser: W. A. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Cophthorne, Shrewsbury.

GW3YBA/A, June 21: At Ynysygharad Park, Pontypridd, for a large Scout gathering at which the Chief Scout is to be present. Operation will be on 80m. AM and 20m. SSB, and contacts with Scouts or other Scout stations will be specially welcome.—C. M. Parry, GW3PHH, 34 Cae'r-Gwerlas, Tonyrefail, Porth, Glam., South Wales.

GB3RCS, June 28-29: Operated by the Royal Signals Amateur Radio Society, to coincide with the annual Signals Reunion weekend. Two stations are being put on the air, to cover all bands 10-160m.—R. A. Webb, G3EKL, *QTHR*.

GB2MHW, June 29: Operated for the British branch of the Loyal Order of Moose, from Winscombe, Somerset, to work the Moose Convention station K9VWJ/9, at Mooseheart, Illinois, U.S.A. Licensed brothers interested and able to help with equipment or operating are asked to get in touch with: Bro. R. F. Vowles, G3PFD, 14 Railway Terrace, Fishponds, Bristol (659515), BS16-4LP.

GB2HRH, June 28-July 6. For the occasion of the Investiture of the Prince of Wales, at Caernarvon Castle on July 1st, station will offer SSB contacts on all bands 10 to 160m. Schedules are invited in all parts of the Commonwealth, and particularly with Welsh-speaking operators. Details (include s.a.e., pse) from: J. G. Evans, G3WET, 22 Sheerifoot Lane, Four Oaks, Sutton Coldfield, Warwickshire, England.

GB3WRA, September 6: Operating from the annual Wycombe Show on The Rye, High Wycombe, Bucks., running all bands 4m. to 160m., AM/CW/SSB. Visiting amateurs will be specially welcome.—A. C. Butcher, G3FSN, 70 Hughenden Avenue, High Wycombe, Bucks.

PAYMENTS THROUGH GIRO

For the convenience of those operating Giro accounts and who may have transactions with us, we have opened a Giro A/c through which payments can be made, free of charge. Our account number is 547 6151.

WATCH THOSE CLICKS

USING AN OSCILLOSCOPE

E. JOHNSON (G2HR)

THE classical method of reducing key-clicks is to slow the rise-time of the carrier by means of an inductance in series with the key, and shunting the contacts with a condenser and resistor. Although recommended values of components may be used, it is often a matter of trial and error to achieve a "soft" note. A compromise must often be effected, as if rise and decay are too long, fast keying speeds may be difficult to read. It is customary to make a "harder" make than break.

Apart from the annoyance clicks can cause to other users of the band, thumps on your neighbour's TV will not be appreciated, and in severe cases it may upset the synchronising pulses, causing "tumbling" of the picture.

Oscilloscope Display

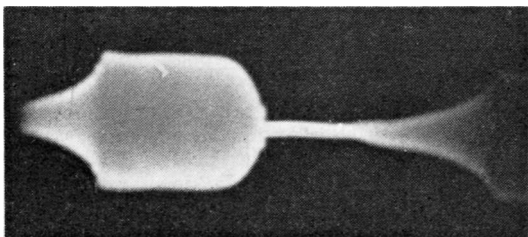
One of the easiest methods of seeing what is happening is to show the wave-form on an oscilloscope. It is fairly certain that few amateurs have the facilities of a long-persistence cathode-ray tube, but this need not deter one. The writer recently purchased a Katsumi Electronic keyer, type EK-9X, and found that both dot and dash repetition rate were very consistent. It was therefore very simple to synchronise the characters on an oscilloscope. It was thought that the key could be set at maximum speed, probably unreadable except by a very small minority, but at least this would prove if the keying were far too "soft."

Interpretation

Photographing the wave-form presents problems. In order to obtain a sizeable picture on a 35 mm. camera, a 3 diopter close-up lens was used. Owing to the low actinic value of the light, maximum aperture of $f\ 2.8$ was necessary, and unless the display is well centred, small depth of field will show up owing to tube curvature, overall focussing being degraded. Development of the film can be prolonged for maximum contrast, as we are not concerned with tonal range.

As can be seen from the photograph, the shape is not ideal, but in practice no clicks are evident, and it is evident that the make is harder than the break, but not sufficient to cause trouble.

The X-axis datum line can be seen between the dots, and should not be confused with the keying character.



The "broadness" is due to enlargement of the print.

The inductance, taken from the junk-box, is of unknown value, but probably of the order of a few Henrys, and the resistor and condenser 2200 ohms and $2\ \mu\text{F}$ respectively. The latter appear unusual values, and will give a time-constant of 4 milli-seconds. However, the results are satisfactory, and bears out the value of trial and error. The small initial "squareness" is difficult to explain, but could be due to contact bounce. In practice no deleterious effect is apparent.

POINTS OF INTEREST

In the February and April issues of SHORT WAVE MAGAZINE we had some notes on the radio installation of the *Queen Elizabeth II*. It could also have been mentioned that her callsign is GBTT—this having been the call of her honoured predecessor the *Queen Mary*.

* * *

Our ZS *confrères* have an amateur licence examination very similar to the R.A.E. At their last sitting, in November, 1968, there were 49 candidates, the pass-rate being 63.5%. The highest percentage mark is given as 95%, and the lowest 26.6%. (From "Radio ZS," February, 1969.)

* * *

The latest R.A.I.B.C. statement of accounts, for the year to December, 1968, shows that donations totalled £314; that grants to members (including the provision of equipment) came to £336; and that cash assets stand at £330.

PLEASE HELP US

By sending correspondence to the right address. Anything to do with advertising, subscriptions, orders for books and changes of address for "New QTH's" (if you are a direct subscriber) should go to: Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

Anything else should be addressed to SHORT WAVE MAGAZINE, BUCKINGHAM. We still get a certain amount of Editorial matter sent in to our London office — reports for the activity features, articles offered for publication, and so forth. Of course, these items always find the right slot in due time.

But if you post your report, or send your letter, for one of the regular activity features, to arrive in London on the Friday or Saturday, it could be the following Tuesday before it fetches up in the Editorial Dept. out in Buckingham.

For immediate attention involving the Editorial Dept., your letter should be addressed to: SHORT WAVE MAGAZINE, BUCKINGHAM. That is all the address needed when writing to us.



SHORT WAVE LISTENER FEATURE

FUTURE OF R.A.E. COURSES — SOME ADVICE ON THE NEXT SITTING — IDEAS AND COMMENTS FROM READERS ABOUT AMATEUR-BAND LISTENING — NEW ENTRIES FOR THE HPX LADDER

By *Justin Cooper*

BY the time this issue hits print, the last run-up to the R.A.E. will have commenced for hundreds of eager would-be transmitting amateurs. It is well, then, to realise that in many parts of the country this year could see the last time a formal course covering the syllabus is provided by the local Education Authority. The cuts being forced on these authorities at pistol-point by Central Government are such that "hobby" or recreational classes are being very severely cut or even cut out, and the "out-of-county" student population—which in many places makes the difference between having sufficient to run a class and not—virtually abolished, even on vocational courses. What it all means is basically that much more will need to be done on an informal basis by clubs and groups over the country, and they will have to give some recognition to the fact that the chap who formerly took the course for pay is unlikely to feel very keen on working for nothing—and so the whole position needs to be thought out in the coming months.

On a happier note, it is only right that we should devote a little of this issue to the exam. itself, and ways and means of deploying knowledge to gain marks. It is not too much to say that to guarantee success in the first part of the paper one should have an idea of the subject-matter involved under the heading of interference, and be able to recite by heart the whole of the transmitting licence. This is simply for the reason that almost invariably the first question is most simply and quickly and correctly answered by quoting the relevant paragraphs word-for-word. The right quotation is a guarantee of full marks, and a few collected on interference do the rest as far as Part I is concerned. Part II is the technical part, and here there are usually some alternatives; in other words, more questions on the paper than are required to be answered.

Clearly it is impossible to pass by answering one question perfectly in the three hours; by the same token one is *most likely* to pass if all the questions which are compulsory and the correct number of questions elsewhere are *attempted*. If one allows ten minutes at beginning and end for reading the question paper *thoroughly* and going over the completed script for a final check, then we can say twenty minutes per question is about the form. Ration yourself to just that and no more for each question on the paper. And finally, watch the English! More marks are lost each year, the

writer is sure, by sentences and phrases which contradict each other than ever are lost by the chap who just doesn't know the syllabus.

And may all of those entering this time who read this column come through with flying colours.

The Letters

Here we have one letter which cries out to be brought to the top of the pile. *E. Kronquist* is a pensioner in *Liss, Hampshire*, who wants to make contact with others of similar interests in the same area, either licensed or otherwise. He lives at Trees, Rogate Road, Liss; and one suspects he is going to pass R.A.E. and Morse and have a callsign of his own before the year is out!

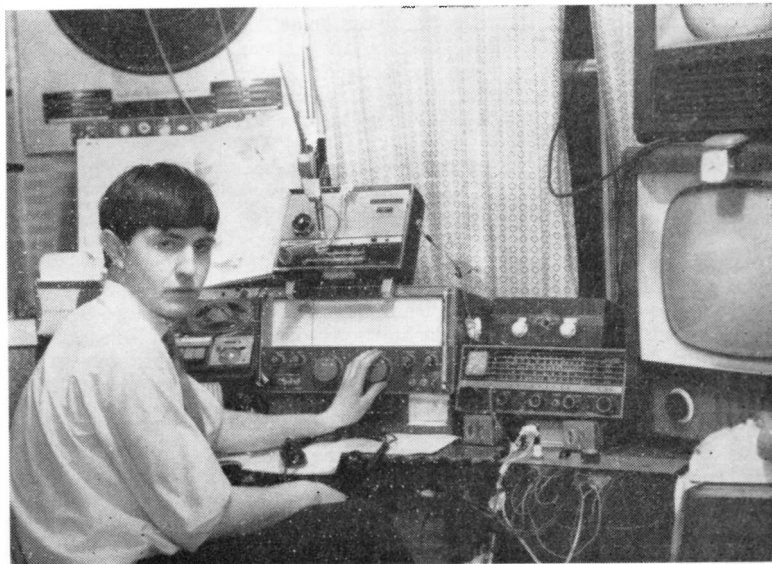
E. Allsop (Leicester) is in the throes of trying to decide which receiver is for him—lucky chap!—and seems to be settling on the Trio 9R-59. As a matter of interest, he has started the way he intends to go on, and already at this early stage he finds himself reading CW at up to 15 w.p.m.

Talking of CW, *Jim Dunnett (Preston)* now has to replace Jim Dunnett (Singapore) in the tables—which results in a nose dive to 202 prefixes CW. Sad to say, the old AR88D took a bit of a beating on the way home from 9V-land, which is a shame considering the work and attention that has been lavished on it just prior to return.

How to keep the technical knowledge, or recover it after a period away from radio is rather worrying *M. Ashley (Southampton)* who passed R.A.E. a couple of years ago, and has forgotten so much that he feels a bit of a fraud in applying for a ticket. Quick answer to that is read some, build some, and above all think some—and it will all come back. As for whether to take a G8 while studying Morse, it is such a personal thing that your conductor would offer no advice. Whether you have G3 or G8 or whatever, that call is unique, as is the thrill the first use of it brings.

Mike Toms (Ilford) has a much longer letter than usual, thanks to time on his hands, the result of falling down a flight of stairs at work, and then catching a dose of 'flu. Let us hope that he is vertical once more by the time this piece is in print. Mike refers to Neill Taylor's question last time out on ADT-140 transistors, and reckons AF117 or OC170 are near enough in most applications; although it could well be added that some

SWL G. J. Smithies, 4 Sunny Cliffe, Highcliffe, Brighouse, Yorkshire, has a pretty comprehensive receiving layout—and a very nice aerial system to go with it, consisting of dipoles for the 10-15-20-40m. bands, and a 300ft. long-wire.



fiddling with the values of the resistors making up the bias networks would probably be needed.

John Struthers (Hawick) heard a "UII1MSA" on 14 mc one morning, and wonders about it—J.C. too! Seriously though, in the absence of solid information to the contrary he should be regarded as Ungood. An interesting—and this time genuine—QSO which was heard concerned a gaggle of W's experimenting with narrow-band slow-scan TV on Twenty, and commenting on the quality of the received signals with an SSB link. This one is there quite often on Saturday evenings around 1900 clock on 14.29 mc.

Somebody sent a nice letter with several queries on HPX from Vereker Drive, *Sunbury-on-Thames*—and forgot to sign or identify himself! Incidentally, our unknown has fallen into the trap of thinking the "starting score 200" means we give away 200 before you start collecting prefixes. Sorry, but we mean, as ever, that you have got to hear a couple of hundred of them *before* you are eligible to send in your first entry. The position as regards /M stations is pretty clearly covered by Rule 2 as given in the March issue, p.44.

Having a bit more spare time, P. Taylor (London, S.E.26) used it to advantage to check over all the gear and the aerials. Nonetheless, there is a sizeable increase to be recorded in the Ladder.

A really fishy one has crept into the list of B. Geary (Leicester) in the form of "AC4AC." As far as your scribe is concerned, he knows of only two good AC4 calls; one was AC4YN way back before the War, who is incidentally still around signing G5YN with a cracking SSB signal from home-brewed gear, and the other was that AC4RF, Bob Ford, who wrote an account of his adventures with the Chinese in a thrilling book called *Captured in Tibet*. AC4RF, obviously, ceased operating when the Chinese took over that ill-used country, and since then, all but twenty years ago, there has been no legit. activity from AC4.

I. Poole (Leeds) will shortly be parting company with

us, as he hopes shortly to have a nice new callsign of his own. In preparation for this, work is being forced ahead on a SSB exciter, which uses a couple of 6U8 valves and a 6CL6. On the 19 Set, yet another valve has been slung out, this time the 6B8, which has been replaced by a double-diode product detector, leaving only three of the original bottles remaining.

The discovery that 8½ feet of wire works better as an aerial for Top Band than 60 feet has startled R. C. Waterman (East Lothian). Probably what is happening is that the receiver is blocking on big signals heard on the long aerial, thus swamping out a lot of other stuff. The cure lies in always driving the receiver with as little RF gain as can be, opening up now and again to see if any weak ones are about, on the best and most gainy aerial that can be contrived. A variable attenuator in the aerial circuit is another solution that is beginning to be recognised in amateur circles as being very good.

* * *

As always, we have a crop of new entrants to the HPX Ladder, and there are various interesting points about the letters.

D. Harris hails from Bath, and wonders why we don't run a variation of HPX on a points basis for Zones and Prefixes. Good idea, this, although we aren't going to adopt it for two reasons: One is that the essential reference data requirements would go up quite considerably as far as the listener is concerned, and as so many HPX'ers are schoolboys or pensioners—almost as many as those of the ages in between—this extra cost could be an embarrassment to them. This being the case, would it not be fair to say that we would have a high proportion of entries containing errors, and so it follows that our own checking system would have to be tightened up so much that there just would be no time left for J.C. to get on the air himself—and that's not fair!

Way back in 1937 K. Kyezor (Perivale) was first bitten by the bug, and he has been at it to a greater or

lesser extent ever since; however, last year he settled down at his present QTH, lashed out on an HA-500, and now makes his first entry in the Ladder. All he lacks now is an aerial—at present there is a length of copper tubing four feet long over a door frame which does the duty.

On the other hand *M. J. Wigg (Ferndown, Dorset)* has two receivers—Heathkit RG-1 and Eddystone EC-10, together with a whole gaggle of aeriols both inside and outdoors, the main and favoured one being a hundred-footer.

M. J. Quintin (Wotton-under-Edge) lives in a first-floor flat and has fifty feet of wire which runs through two bedrooms and a landing in order to stretch out the length; this is tacked to a PR-30X preselector and a Trio 9R-59 receiver.

G. Braund (Maidenhead) queries the status of the /A and /P stations insofar as HPX is concerned; the use of these suffixes does not have any effect on the prefix, and hence cannot be part of HPX claims. One could argue that the /M and /MM chappies should also be excluded, but here there is the point that to operate with either of these one has to have a separate extra licence.

No less than four receivers are sitting in the shack of *J. Martin (Christchurch)* who has been a reader for several years. John has all these coupled through an Aerial Tuning Unit to a selection of wires in the garden.

More than one aerial is also the case with *P. Smith (Chesterfield)*, who has a vertical, and an end-fed, but tells us nothing about how he feeds them into his Trio 9R-59.

* * *

Although he is still just fourteen, *S. Palmer (West Wickham)* has been around, in the Amateur Radio context, for three years, and is now set up with a pair of 132-foot aeriols and an HRO. Steve is mainly interested in Top Band DX on SSB, although, as his list shows, he doesn't miss much on the other bands.

A new entrant with questions is *C. Price (Bolton)*, who comes into the table at 203, with CR-70A Rx and PR-30 preselector, which collects its input from an aerial 160 feet long connected at the centre. Christopher is interested in the QSL side of the game, and wants to know a bit more about it. First, then, who to send a card to? In general, to DX stations, and in particular to DX that is doing something odd—for instance, not getting any replies to his calls, or coming in at an unusual time for his location and the band in use, or having some trouble with his gear; a report in any of these cases is directly helpful. In the case of an ordinary DX station where none of these conditions apply, it is still necessary to make it helpful, which means reporting on his signals over a period of time, comparing them with others from the same area on the band at the same time—or noting the absence of them, and so on. Quite enough to fill the blank backside of the card, in fact, apart from the pretty bit on the front! As for sending them, they can either go direct or *via* Bureau; the former is usually best, particularly if you can include an s.a.e. However, to organise an s.a.e. needs a supply of the appropriate stamps (which is not always easy) or of IRC's—in other words, International Reply Coupons, which can be bought at any Post Office, and are exchangeable at the other end for local postage stamps.

Yet another operator of a CR-70A-plus-PR30 combo is *J. Brackenridge (Maybole, Ayrshire)*, who has been logging for about nine months now, although since he only heard of HPX in January most of his loggings were of countries rather than prefixes. This was put right very rapidly, and an entry duly goes in, at 204.

S. Pitt (Hornchurch) is not really a new correspondent because he is now at his third letter—the first went astray, the second entry could not be accepted in the absence of its predecessor, and the third one contains the full list! Stephen mentioned the benefits of club membership last time, and now adds the name of the group to which he belongs—Havering and District. In his shack sits a Trio 9R-59, a B44 Mk. II, and VHF converter, so listening can be on any band from 1.8 mc through to 144 mc.

HPX LADDER

(Starting January 1, 1960)

SWL	PREFIXES	SWL	PREFIXES
PHONE ONLY		PHONE ONLY	
S. Foster (Lincoln)	1020	P. Levitt (Workop)	318
D. Rollitt (Navenby)	977	Rev. D. Brewster (Oxford)	310
A. W. Nielsen (Glasgow)	916	D. Moule (Frinton-on-Sea)	304
J. Singleton (Hull)	889	S. M. Phillips (Dukinfield)	303
G. J. Smithies (Brighouse)	837	S. Jassel	
B. Gary (Leicester)	712	(Newcastle-on-Tyne)	301
M. G. Toms (Ilford)	700	P. Taylor (Sydenham)	297
J. Fitzgerald (Gt. Missenden)	693	R. C. Ray (Bushey Heath)	296
M. A. Lount (Leicester)	689	K. Haywood (Manchester)	295
C. P. Davis (Leicester)	685	S. Cole (Newport, Mon.)	294
R. G. Preston (Norwich)	679	P. Brown (Isham)	290
R. Allisett (Guernsey)	672	R. W. Jones (Bristol)	292
D. Skidmore (Derby)	671	K. Kyezor (Perivale)	291
I. Poole (Leeds)	653	M. Timms (Aylesbury)	287
W. Moncrieff (Hampton)	637	J. W. Struthers (Hawick)	286
N. Hembrey (Northiam)	610	S. Cullane (Harrow)	285
R. Woods (Slough)	602	D. Bushell (Cirencester)	281
J. P. Scragg (Stockport)	590	C. R. Adams (Manchester)	273
C. J. A. Morgan (Wallsend)	550	D. Nobles (Isham)	269
G. Dover (Nottingham)	541	N. Crampton (Romford)	262
N. Whiting (Leeds)	529	D. Fromberg	257
R. Bagwell (Frimley)	527	J. Marchmont (Sharnbrook)	255
K. Plumridge (Southampton)	525	C. Burrows (Gidea Park)	253
D. Hembrey (Northiam)	526	P. Gould (Tiptree)	253
L. Harwood (Wirral)	501	M. J. Wigg (Ferndown)	249
H. M. Graham (Harefield)	498	C. Jones (Mold)	244
D. Reynolds (Dudley)	492	D. J. Porter (Harrow)	243
G. Ayton (Sunderland)	483	D. Browning	
R. Walters (Etwall)	467	(Bishops Stortford)	239
S. Haseldine		S. Palmer (West Wickham)	226
(West Bridgford)	462	N. P. Taylor	
M. Pipes (Derby)	459	(North Wembley)	223
D. Robinson		G. K. Upton (Nottingham)	223
(Birmingham, 26)	458	P. N. Butterfield (Wakefield)	222
D. Palmer (Fareham)	456	M. J. Quintin	
J. E. Jenkinson (Oxford)	452	(Wotton-u-edge)	220
M. Broadway (Chelmsford)	447	R. A. Eva (Birmingham)	218
L. Rowland (Birkenhead)	446	D. J. Harris (Bath)	217
N. Peacock (Tonbridge)	439	A. Vest (Durham)	211
D. S. Henry (Edinburgh, 4)	433	P. Wilkinson (Exeter)	209
G. Braund (Taplow)	429	P. Smith (Chesterfield)	208
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Mrs. G. E. Austin (Bearsted)	412	(Maybole, Ayr)	204
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J. Seddon (Manchester)	397	S. Osborne (Derby)	203
R. C. Waterman (E. Lothian)	385	W. Rees (Newport, Mon.)	203
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CW ONLY

(NOTE: Listings include only recent claims. Failure to report for two consecutive issues of "SWL" will entail removal from the Table. Next list, July issue, for which the deadline will be May 16.)

This nice-looking array of equipment (and cards) belongs to one of Japan's leading SWL's, who has 313 countries confirmed. His SWL registration is JA1-3619, name of Noby, in Tokyo. Though some of the QSL's in view would not be much in the way of DX to us, they would undoubtedly be of great interest from where he is.



Not often that we hear from Northern Ireland, but *G. Braithwaite (Belfast)* fills the gap. He has been keen on radio for several years, and makes his entry in the CW list, as he says "the noises on the Phone bands scare the daylight out of him"—a sentiment your J.C., phone man in the main, though he may be, cannot but echo.

The Lafayette HE-30 is favoured by *P. N. Butterfield of Sharlston Common, Wakefield*, and at the time of writing a preselector was being cooked up to put in front; it should be working by the time this is in print, and helping to bring up the totals.

D. J. Browning (Bishops Stortford) wants a list of contests and similar events which are open to SWL's—*Wow!* Perhaps the only way to do this is to read every publication in the world dealing with Amateur Radio, and even at that, half the events would be noted too late for participation! For that, one can only blame the organisers. They do not seem to realise that for full coverage in the world radio amateur press, they need to send out details at least three months before the event is to take place!

A new correspondent not particularly interested in HPX is *Richard Nicholls, 13 Abbey Road, Narborough, Leicestershire*. Richard is 15, and wants to hear from other SWL's of the same age, so that he can gauge his progress against theirs, and discuss matters of mutual interest.

* * *

Back now to "the regulars" of whom the first is *T. J. Bucknell (St. Albans)* who at the moment is busy altering things in the home, and so has little time for the receiver—but we rather gather that the gear is itself part of the move, which should mean an improvement in facilities.

Inactivity in the HPX line is explained away by *R. Walters (Etwell)* in saying that he has in fact spent more of his time on VHF and in the construction of a transistor receiver.

That "AC4AC" character penetrated the receiver

of *M. A. Lount in Leicester*, and was joined by another funny calling himself "DC8DC"—the receiver was so shocked that a valve gave up.

Re-aligning a receiver is an exercise that really needs care and skill, as *C. Burrows (Gidea Park)* found out the hard way—no signals audible after "the improvement"—but, wisely, he set out to learn from his mishap by "following the book" with results that have pleased Chris no end. There are really two methods applicable: One needs either the full range of test gear, or the other, only applicable to a receiver which is *almost* on the button, this being the touch-up requiring care, skill, experience and patience. Having tried the latter and then measured the result against instruments, J.C. is certain it works, *but* it should never be attempted by someone who has the job in hand for the first time.

The 5L prefix is queried by *R. A. Fowler (Marlow)*, who heard 5LØXX/MM, operating Twenty during a recent contest. 5L is a possible prefix for Liberia, and has been for quite a while now, so this particular station may well be a good one, particularly as the zero seems to indicate a /MM call in the Liberian licensing system.

C. Garcia (Worthing) sent in a list for the HPX Ladder, but missed the deadline last time round; in addition it rather looks as though he had not seen, at the time he wrote, the full Rules which we published in here in March, so we can probably expect a revised list fairly soon.

Comments last time on the odd fault in the receiver of *H. M. Graham (Harefield)* have not yet forced him to investigate the internal economy of his Eddystone 840C, at least until the fault gets rather worse so that he has a sporting chance to track down the trouble. Nonetheless, H.M.G. is still booking them in quite happily, apart from one or two odd queries. One such is the status of all the F1's in the *Call Book*, since none have been heard. Easy—VHF types, like our G8/3's. The other one is not quite so easy, and is the meaning of the /X tagged on the end of a YU callsign. YU2CB/X has been heard several times. This one could possibly

be for Portable—perhaps someone has information?

Changing from a beam to a vertical, and getting an ear down to the 21/28 mc bands have both pleased *C. Shearing (St. Agnes, Cornwall)*. This question of the usefulness of the vertical aerial for DX reception (or, indeed, transmission), is one where the whole trick lies in getting a good earth system. If one remembers that radio and light waves are similar except in terms of frequency, one can imagine the vertical aerial by standing a pin on a mirror; the image of the pin is seen in the mirror, and this simulates the correct condition of use of a vertical aerial. However, if there is no silvering on the mirror, then no reflection is visible. Similarly with our aerial—we have to make quite sure we have our reflected image in the ground, and we feed the thing at the junction of the aerial and its reflected image at ground level. Given good earthing, and correct setting up, the vertical usually tends to improve on low-angle radiation to DX at the expense of the high-angle stuff which brings in the QRM.

K. Plumridge (Southampton) returns to the fray after moving house, and at the same time has replaced his Mini-Clipper receiver by the Codar CR-45, although the former remains available as a stand-by.

A completely revised list comes in from *C. J. A. Morgan (Wallsend, Northumberland)* after a bit of a battle in making it tally correctly with his check-list. Charles agrees heartily with *S. Culnane* about the use of CW in finding DX on Top Band. When he used to listen on Phone he heard plenty of GDX but precious little else outside the U.K.—but once CW was mastered quite a lot of other stuff was collected, with KV4FZ as best. As for Twenty, Charles finds it in great shape—so it ought at this stage in the sunspot cycle!—and remarks particularly on the signal from 6W/W4BPD. Yes, there is no doubt at all, Gus is a superb operator.

* * *

Playing chess is a new interest with *R. Allisett (St. Peter Port, Guernsey)* who finds it even more tiring than battling with the QRM on Eighty! Dick wonders if there is anything against playing chess over the air. As to that, J.C. has not heard of it for years, although at one time there was a group doing so; memory would suggest that it was all of fifteen years ago, and that a ZS was the prime mover in the exercise.

Now to *Norman* and *David Henbrey* at *Northiam*,

SWL's PSE NOTE!

Closing date for the next "SWL," in our July issue publishing on June 27, is May 16. This may seem early but it is in fact the latest date we can allow, having regard to all the other work that has to be done in preparing each issue. For every appearance of "SWL" (which comes out in alternate issues), a certain number of letters come in too late for coverage. This is as much a disappointment to us as it must be for the correspondents concerned. If you miss May 16—and, really, there is no reason why you should!—the next date after for "SWL" (in the September issue) will be July 11, and surely there is no reason why you should miss that! The address is simply: "SWL," Short Wave Magazine, Buckingham.

where once again *Norman* has a nil report, but *David* goes up a few in the tables. However, all is not lost, as a new pole is due to go up soon, and with the driving test passed at the first time of trying things will no doubt start to happen in the near future.

Another nil report from *Charles Ekberg (Grimby)*, who has not listened since last November. Again this is not due to lack of interest, but simply the fact of limited time available and the determination to pass the Morse Test; at least three hours each week are being given to practice, and in this context Charles mentions the help he has obtained from G3HSC and his Rhythm Morse Course.

N. Crampton (Romford) finds that when the DX bands are in good shape they are usually plastered with W's; fair enough, but it is often the case that under these conditions things can be improved by cutting back on the RF/IF gain of the receiving system, since any overload often reduces the apparent selectivity quite markedly.

Although the R.A.E. has already been passed by *C. Adams (Cheadle)* he still has a lot of QRM, what with A-Levels, Morse practice and driving lessons. As far as preparations for getting on the air are concerned, *Colin* has a Top Band rig in the brew, and has made the CR-100, as he says, "go like a bomb."

Within a couple of hundred yards of a personal QSO was the score with J.C. and *Rev. D. P. Brewster*; but, alas, things militated against it, and so the nearest we got was a natter on the telephone before *David* returned home to *Oxford*. However, the *Brewster* score in HPX goes up to 310.

Also from *Oxford* is *J. E. Jenkinson*, who has been paying attention to Eighty of late. Like many another, he has noticed what a lot of extra activity has been provoked on the LF bands by the advent of the Five-Band DXCC by stations that would otherwise have stuck quite firmly to the HF allocations.

D. Palmer (Fareham) bewails the lack of prefixes in his list, considering that it has been going on for six months; however, Morse is being persuaded to go down on the paper at the specified speed, with help from G3VXM, G3XUF and G8AYL. In addition, a steel pole at twenty feet now carries both 2m. and 4m. beams, and the two aluminium sticks which previously each carried one of them are now to be "fished" to make one Big Pole, which can then be used to hold up a nice big Inverted-Vee for Top Band.

Nice to hear that *R. Bence (Cardiff)* is up and doing again, although for the present listening time has been somewhat restricted, as his list shows.

From *M. Pipes (Derby)* comes an interesting question; he heard an HG8 on 28 mc, and wonders why this apparently VHF-only call was audible. The point here is just what is classified as VHF. Internationally, the range of VHF is 30-300 mc, and so 28 mc is clearly somewhat of a borderline case. Operationally, during sunspot minima the 10-metre band is more akin to VHF than HF, though at the peaks it becomes an international DX band—as indeed does that U.S. allocation around 50 mc on occasion. Thus, there are arguments both ways, though few administrations allowing VHF-only call signs permit their use on Ten.

9E3USA is queried by *D. Moule (Frinton-on-Sea)*, but should raise no problem; it is a special call which the

lads of ET3USA use now and again in competitive activities to stir the bands up—and very effective it is, at that!

One of the select few with an entry in both Phone and CW Tables is *A. Vest (Durham)*. For receiver, reader A.V. now runs an Electronics transistorised general-coverage tuner, which is used to drive the Mk. III IF strip of the same make, which in its turn is pushed into an AF amplifier of unknown origin but considerable noisiness. The latter is shortly to be superannuated in favour of something rather more suitable, and the result should be a pretty useful receiver.

N. Peacock (Tonbridge) is one of those who queries the identity of your J.C., and his callsign. N.P.'s guess is as wide of the mark as all the others—and, in any case, we have no intention whatever of saying more than that Justin Cooper is the compiler of this piece!

Things have been a trifle thin as far as DX goes for *T. W. Hyder (Southampton)* as he has recently moved house; in the move, his Joystick got lost and an indoor 21 mc dipole yielded only hordes of W's. However, another Joystick has now been obtained and that will serve until better weather enables a closer look to be made at the possibilities of an outdoor skywire. On the receiver side, the HRO has been replaced by an AR-88, and it is proposed to run the two side-by-side for a few months and evaluate performance in terms of knock about use on the bands, one against t'other. Results of this exercise should be of interest.

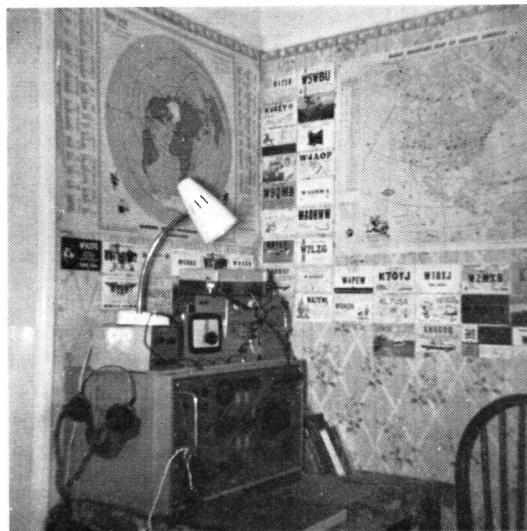
* * *

There, for the moment, you have it. Various readers wrote in with Table entries, other than those actually mentioned in the piece, and all have been taken in. Till next time—May 16, addressed "SWL," SHORT WAVE MAGAZINE, BUCKINGHAM—when we hope to be reading and enjoying your letters once again, look after yourselves, and take advantage of the good conditions. *73 de J.C.*

SOME ADVICE FOR BEGINNERS

For years, we have been advocating that those starting to take an interest in radio amateur activity — whether as SWL's beginning to listen round the DX bands, or aspiring to a transmitting licence — ought to join the local Club. It is by personal contact with enthusiasts already having experience that most can be learnt about Amateur Radio, in the quickest and easiest way. Each month in SHORT WAVE MAGAZINE there appears a list of active Clubs — see p.184 in this issue. But because all Clubs do not report for "Month with The Clubs" in every issue, you should look back over the last three months or so of the *Magazine* to find out whether there is a Club in your neighbourhood.

If there is not, then it might be a matter of forming one locally. The best way to start a Club is to put an advertisement in, or write a letter to, your local newspaper. Editors of local papers want this sort of thing, and will always give it space. Then, when three or five people have been brought together, you write to us to say that a Club is being formed. The publicity that we can give could



The SWL station of Derek Moule, 5 Bemertow Gardens, Kirby Cross, Frinton-on-Sea, Essex, who stands at 304 in the HPX ladder. His Rx is an R.107, a very useful surplus type, with a modified RF-24 Unit as a converter for 10-15m. coverage. His best DX band is 15 metres, for which Derek has a dipole, with a 66ft. wire for the other bands.

mean that some more would be brought in — perhaps a few holding callsigns — and from there you go on, a new Club bubbling with enthusiasm.

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"... keep a pretty extensive log record here ..."

THE MONTH WITH THE CLUBS

By "*Club Secretary*"

(Deadline for June Issue: May 9)

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

A LARGE number—possibly even a majority—of Clubs and groups around the country have some equipment kept permanently on their premises, often quite expensive transceivers. If enquiries were made about insurance, or discussions held with the local police Crime Prevention Officer, many of these Hq. would be found to be a "gift" to a would-be vandal or thief—there have been several bad cases recently. At the same time, the professionals in the art of keeping thieves at bay could most likely point out the less obvious sources of weakness, and indicate ways and means of dealing with the problem. This is a matter where committee-members should take action as a matter of urgency, not only to protect the interests of members, but also to avoid risk of contravening the terms of their Club licences.

The Reports

Regionally this time, in five groups, namely South of England; Wales and West; Midlands, North of England and Scotland; national and international groups; and all clubs in the London Telephone area.

Turning first to the groups catering for a scattered membership, let us first consider the *Ex-G Radio Club*. This is for anyone of U.K. birth and holding a British licence but living in foreign lands. Naturally, a large proportion of the membership is in the U.S.A., but there are in addition others scattered all over the globe. They keep in touch by way of the regular *Ex-G Club Bulletin*, and their nets on Twenty. Look for them on Sundays, 14346 kc, at 1900z, when U.K. stations are specially invited to participate.

Also using the net as a means of keeping in touch are the members of *RAIBC*, who have theirs on Tuesdays at 1000 clock, Wednesdays at 1400, and the Cheshire Homes net on Thursdays at 1400, all around 3700 kc. This group is split into two halves, the members proper, who are those interested in Amateur Radio but disabled in some way or blind; and supporters, those who "make the club tick" by helping the members with getting on the air, keeping them on, and generally helping out. This help can be anything from the more obvious needs like helping someone with R.A.E., down to the less obvious but equally important matter of collecting a receiver or transmitter donated to the Club and taking

it to someone who has been organised to get it going; or to taking it from where it has been serviced to where it is to serve; less obviously still, just being made aware of someone in the locality who would appreciate a visit and a good old yarn about Amateur Radio. How G3LWY does all the organising as well as coping with a family and writing the *Newsletter* each month always amazes your scribe!

From the Hq. of the *Royal Navy* group we hear that since the rules were altered to cover members of the merchant navy and foreign navies, the membership has taken quite a leap upwards, with no less than fifteen countries represented on the books. A new hon. sec. takes over, as indicated in the Panel, to whom all enquiries should go. Again there is a *Newsletter* and a weekly net, the latter being at 1800z on 3720 kc each Wednesday.

Wales and the West

An area which seems to be more active in our context of late. *Saltash* are at Burraton Toc H Hall on May 16 to hear a talk about the Oscilloscope and its uses, and on the 30th to review the progress of the 144 mc project. May 2 is "away," as they have an outing which will end up at the Royal Hotel, Horsebridge, near Tavistock. Mobiles will be active for guidance as may be needed.

Rhyl have recently had a talk by *Verob Electronics* on the uses of Veroboard, and another aimed specifically at the beginners, but sadly, we have no knowledge of the May doings; for this reason it is necessary to refer you to the Hon. Sec.—see Panel, p.184.

By contrast, *Rhondda* have concentrated in their note on the June events; June 2 for an open Social Evening at the R.A.F. Association place at Treorchy, and an exhibition station which is being laid on at Ynysygharad Park, Pontypridd, on June 21, when a large group of Scouts foregather to welcome the Chief Scout. The station will sign GW3YBN/A using AM on Eighty and SSB on Twenty, and looking out for QSO's of Scout interest.

Chippenham have a weekly session—Tuesdays—at Chippenham High School for Boys in Hardenhuish Lane. May sees a talk on Fault-finding by G3XFA on the 6th, while on the 13th a D/F exercise is planned. On the 20th they move temporarily to the Queens Hotel,

Box, so there is enough room to entertain all the Bristol gang and their ladies and any unaffiliated amateurs or SWL's who may be interested. Details from the hon. secretary at the address in the Panel. May 27 is on the slate for G8CFB to talk about Vintage Receivers. Chippenham members were saddened recently to learn of the sudden death of their member and friend, G8CCT. The group sent a tribute and was represented at the funeral.

Next meeting for Exeter will be on May 6 (venue to be notified to members, but it will *not* be St. Sidwells), for which Reg Ward, G2BSW, has arranged a talk and demonstration on Edystone receivers, amateur and commercial. The meeting after will be on June 3, at St. Sidwells again.

The Hereford group can get into their new premises—beneath the City Police station!—any evening they like. Attendances at recent regular meetings have been much improved and they now have their own Club call, G3YDD. The AGM (for which 25 members turned up) resulted in a change of secretary, but we have not been given his QTH. Next meetings are May 2 and 16th, at the new Hq.

Venue for the Wessex chaps is The Cricketers' Arms, Windham Road, Bournemouth, on the first Friday of each month and the Monday 17 days later, opening at 7.30 p.m. As the club-room itself is not on licensed premises, there are no restrictions on junior membership.

The new secretary for Cornish is J. Farrar, G3UCQ; their next meeting is on May 1, for a talk on the Post Office Radio Service; they are taking part in Field Day in June; for June 29 a coach trip to the Longleat Mobile Rally is mooted; and on July 27 they run their own meeting-for-the-mobiles, at Truro.

Over in Cheltenham, the local Group have a full programme for the year, including D/F hunts and portable activities. Next meeting is on May 1, 8 p.m., at the Great Western Hotel, Clarence Street, to hear about (and see) the very fine range of Rascal commercial equipment.

Southern England

The usual couple of meetings are down for Maidenhead—on May 5, when *Vero* are to do the talk on uses of Veroboard, with the informal on May 20. Both are at the Victory Hall, Cox Green (as far as we know)—but better check with G3FVC (as Panel), as he forgot to mention the venue this time!

Thanet seem to be a thriving group. They have May 2 for a session on R.A.E., while on the 9th they are going to Wye College to hear G3LTF lecture on VHF. May 16 is set by for a discussion of last-minute points for the Mobile Rally on May 18. May 23 gets four of the members going—they are each to give a short talk. Bring-and-Buy is the theme on the last evening in the month, on the 30th—which sounds much nicer than the usual

“Junk Sale!”

Southdown have their Hq. at the Victoria Hotel, Latimer Road, Eastbourne; here they are to assemble on May 5 to hear a talk on Receiver Alignment, which is to be given by either G3LFZ and/or G3MME.

At Verulam they are always “with it,” a trait which in large measure accounts for their continued position as one of the best-known clubs, and the most successful, in the South of England. May 7 is down for a talk by G5AJH on Weather Picture Reception, entitled “Satellite Fax” which is, incidentally, the last time the lads will be gathering at Cavalier Hall in the foreseeable future. May 21 sees them move into their new home—they have taken over the Council Chamber in St. Albans Town Hall! A film show is being presented on this evening by G3NCK, including “The Phoenix Tower” and “Cook Straits Story” which is about cable-laying.

A new departure for Reigate is the holding of informals at various members' homes. Details of these are always obtainable from the Sec.—see Panel, p.184. As for the “main” meeting, at the George and Dragon, Cromwell Road, Redhill, on May 7, details of this were not finalised at the time of writing—but your scribe will lay a small bet that this will be dealt with in due course!

At Shefford there is an hon. sec. who is a model for every one as far as regular reporting is concerned, with all the essential information presented so that even your “Club Secretary” can grasp it in a fraction—for which, thanks! May 1 is down for a Q & A session plus a Surplus Sale, the Questions and Answers being by way of last-minute aid to the R.A.E. aspirants. On May 8, Dr. R. W. Williams will talk about some recent developments in Industrial Electronics, and on the 15th Field Day preparations are to be completed. May 22 is down for a demonstration and night-on-the-air with a KW-2000A, G3ITP doing the honours on this one. Rounding off the month is Ross Baldwin, who has Direction Finding Techniques as his theme. All these at the Church Hall, Amphill Road, Shefford.

St. Martins Court, Kingston Crescent, Woodthorpe Road, Ashford, Middlesex, is the Hq. of the Echelford crew. This is not too easy for a newcomer to locate, and so the hon. secretary has had a map printed which he would be pleased to send to anyone proposing to become a member. At the same time he could advise on the latest programme, which at the time of writing is not to hand.

At Mid-Herts they are showing at the “Contact '69” Exhibition being mounted at Welwyn Garden City on May 17. The following day they are out on a Pedestrian D/F Hunt at Codicote. The normal meeting is down for May 8 at Welwyn Civic Centre, when the well-known *Vero* lecture will be given.

At Bishops Stortford the committee have arranged for a talk by G3GGK and G3EDD on gear they have reviewed in recent years. This one is on May 19 at the

“Short Wave Magazine” was established in 1937, is still entirely independent, enjoys the support of radio amateurs throughout the U.K., and goes to all English-speaking countries overseas.

British Legion, which is in Windhill, Bishops Stortford. Visitors and friends all welcome.

According to *Mid-Sussex Matters*, of the Mid-Sussex Amateur Radio Society, next meetings are on May 7 and 22nd, when the constructional contest comes up. The April newsletter itself contains some interesting items: Letters on Club 4-metre activity—a discussion called “the American Scene”—the first part of the transcription of a lecture on the G5RV aerial—and some important reminders about the regulations on flying kites and balloons for supporting Top Band aerials.

From the Surrey Radio Contact Club's *Monthly News* we get it that they held their 319th meeting (actually, the 28th AGM) on April 15, but there is no information about arrangements for May.

Purley report a full house for their recent junk sale, resulting in a very welcome addition to Club funds. Next meeting is on May 2, and after that they have a full two-day dummy run for NFD! The construction of Quads for 10-15-20m. is proceeding apace—and the

hope is that they will get them airborne successfully! The meetings following are on May 16 and June 6. According to the latest issue of *Splatter*, of their 101 members, 47 are licensed, of whom nine are G8/3's.

The Wheatsheaf sees the Dorking group on May 13, for an “informal,” and on the 27th they are at the Surrey Yeoman for a junk sale—both open at 8 p.m.

London Area

Here it is convenient to make the limits the places where members refer to phone numbers in the London STD area. Cray Valley are top of the clip, and here we have a slight change to notify in that for the moment all meetings are being taken at the Congregational Church Hall, Eltham, London, S.E.9—during May and June, at least—whilst the other place is being redecorated. May 1 is down for the main meeting—and once again it is being done by *Vero Electronics*. May 15 is the other date, and here it is a Natter Nite.

Names and Addresses of Club Secretaries reporting in this issue:

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 MIDLAND: R. Partridge, G3SCG, 42 Maxstoke Road, Sutton Coldfield, Warks. (021-354 5921).
 MID-SUSSEX: E. J. Letts, G3RXJ, 87 Meadow Lane, Burgess Hill (3552), Sussex.
 MID-WARWICKSHIRE: J. F. Coggins, G3TFC, Market Corner, Baginton, Warwickshire. (Toll Bar 3688.)
 NORFOLK: M. J. Cooke, 76 Falcon Road West, Sprowston, Norwich, Nor.73.R.
 NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogdens, Halifax (44329), Yorkshire.

NORTH KENT: P. T. Baber, 64 Latham Road, Bexleyheath, Kent. (01-303 8655.)
 NOTTINGHAM: K. W. Viles, 27 Cresta Gardens, Mapperley Rise, Nottingham, NG3-5GD.
 NUNSFIELD HOUSE: N. J. Gregory, G3LCV, 21 Back Lane, Chellaston (3516), Derby.
 PETERBOROUGH: D. Byrne, G3KPO, Jersey House, Eye, Peterborough.
 PUDSEY: P. Conway, G3XLV, 10 Tyersal Grove, Tyersal, Bradford (64220), Yorkshire.
 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.
 REIGATE: D. Thom, G3NKS, La Collinette, 6 Bracken Close, Copthorne (2165), Crawley, Sussex.
 RHONDDA: C. M. Parry, GW3PHH, 34 Ca'er-Gwerlas, Tonyrefail, Porth, Glam.
 RHYL: H. Douglas, Harrow, 7 Fforde Ffynnon, Prestatyn.
 ROYAL NAVY: K. Randall, G3RFH, H.M.S. *Mercury*, Leydene, Petersfield, Hants.
 SALOP: W. Lindsay-Smith, G3WNI, 22 Kingswood Crescent, Copthorne, Shrewsbury.
 SALTASH: J. A. Ennis, G3XWA, 19 Coombe Road, Saltash, Cornwall.
 SHEFFORD: M. B. Goodwin, G3WKR, 16 Roe Close, Stotford, Hitchin, Herts.
 SILVERTHORN: D. Standley, G3XSA, 212 Westward Road, Chingford, London, E.4.
 SOLIHULL: J. Lester, G3VXV, 173 Damson Lane, Solihull, Warwickshire. (021-705 3060.)
 SOUTH BIRMINGHAM: R. A. Brice, 60 Coraline Close, Chelmsley Wood, Birmingham, 37. (021-770 4265.)
 SOUTHDOWN: L. E. Tagliaferro, 9 Tugwell Road, Hampden Park, Eastbourne (54244), Sussex.
 SPEN VALLEY: N. Pride, C8BSE, 100 Raikes Lane, Birstall, Leeds. (Batley 3925.)
 STOCKPORT: D. I. Lunn, G3LSL, 4 Farnham Avenue, Macclesfield (7903), Cheshire SK11-8LT.
 STOURBRIDGE: B. Kennedy, 14 Wynall Lane, Wollescote, Stourbridge, Worcs. (Lye 3608.)
 SURREY: A. R. Morrison, G3KGA, 33 Sefton Road, Croydon, Surrey, CRO-7HS.
 SUTTON COLDFIELD: A. W. Ferneyhough, G8AVH, 114 Endhill Road, Kingstanding, Birmingham, 22C.
 THANET: J. Barns, G3BKT, 93 Crescent Road, Ramsgate.
 VERULAM: W. C. Dennis, G3NCK, 129 Colney Heath Lane, St. Albans, Herts.
 WESSEX: A. G. Emery, G8AVE, 7 Brunel Drive, Preston (3177), Weymouth, Dorset.
 WESTMORLAND: N. Stanley, G3UEC, 9 Castle View, Sedgwick, Kendal, Westmorland.
 WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton.
 WORCESTER: R. L. Avery, G3TQD, 24 Alexander Avenue, Droitwich (3943), Worcs.



Taken on the occasion of the annual dinner, on March 8, of the Torbay Amateur Radio Society—the members of the committee of this flourishing and active Club, which has done much for Amateur Radio in the South-West. Seated, left to right: G3NOD, G2CWR (president), and standing, left to right: G3VTO, G3LHJ, G3MEP, G3BBF (chairman), G3VNG (hon. secretary), G3NBR and SWL D. Weston. For the dinner itself, 85 members and guests were present.

Acton, Brentford and Chiswick next, where May 20 is being devoted to making *quite* certain nothing slips up on Field Day, at 66 High Road, Chiswick—but when the lads actually come to set up the NFD station *someone* will have forgotten something, for sure!

Over at Silverthorn they have a place in Friday Hill House, Simmons Lane, Chingford, E.4. However, at the moment we have no idea what is fixed for May—we seem to be a little out of phase with their publicity, momentarily—so it is suggested that contact be made with G3XSA, as in Panel.

Hq. to the Edgware lads is at St. George's Hall, 51 Flower Lane, Mill Hill, London, N.W.7. On May 10, an opportunity is being taken to combine business with pleasure, by setting up the field day gear at a demonstration that is being laid on for the Scouts at Camrose Avenue, Edgware. As for May 12, this is the night for the Constructors' Contest—everything welcome even if not completely homebrew or out of a kit.

Annual General Meeting, says the programme for the North Kent crew, on May 8. Venue, as always, is the Congregational Church Hall, adjacent to the Clock Tower. Bexleyheath, starting sharp at 2000z.

For Civil Service, their big event will be on May 28, when H.R.H. The Duchess of Gloucester is to open the new pavilion for the Civil Service Sports Club, out in Chiswick, W.4. The radio group will have G3CSR on the air for the occasion, using mainly AM on 80m./160m. and two metres, with speaker extensions out to the public enclosure; it is also hoped to work into the U.S. if 10m. is open. A good array of gear is being assembled and on Tuesday, May 27, there will be a dummy run—just to make sure it all works! It is hoped to introduce Amateur Radio to many more members of the Civil Service as a result of this exercise. The C.S.R.S. meetings continue as usual, on the first and third Tuesdays of each month and, as the Club Rx has now been re-vamped, country members of the Society should be easier to work.

Scotland, Northern England and Midlands

Top of the heap here is Mansfield, who are as usual getting together at the New Inn, Westgate, Mansfield, on the first Friday in each month. The hon. secretary passes along the tip that Jodrell Bank are accepting visits daily through to October 31. There is a small

admission charge per head, and the open hours are 1400 to 1800. When all is seen there are facilities to buy books on matters of interest, and a tea room. Details from the following address: Concourse Building, Jodrell Bank, Macclesfield, Cheshire, SK11-9DL. This one should be of interest to many groups thinking in terms of a day out during the summer months. Tnx, G8HX.

On May 1, G3KEP judges the Swindon Cup of the Spen Valley group, while on May 3, there is the annual dinner (six courses!) with a film to follow. All the details can be obtained from G8BSC, at the address shown in the Panel on p.184.

Another of those lucky clubs who seem to possess a permanency in the hon. sec.'s chair is at Bromsgrove, where the present incumbent has held office ever since the writer has been doing this piece. They get together on the second Friday in each month, and for May the *Vero* lecture is on the slate. Whit Monday will probably be the best time to find them, as they are to put on a station at the Bromsgrove Rovers FC annual fete—and everyone in Bromsgrove will know how to find that!

Back up North again, this time to Stockport, where G3LSL notes that as a result of mentions in this column he has been approached by five people in the last couple of months with a view to joining. Everyone is asked to note the change of Hq., to the Brookfield Hotel, Wellington Road South, Stockport. May 14 should be a very useful evening with Mr. Cunningham of Associated Semiconductors discussing "Components." May 28 is down for a "Mystery Evening" and for the details it becomes necessary to contact G3LSL—see Panel.

Coventry are out to make full use of that KW-2000 of theirs; night-on-the-air appears thrice on their May list, on the 2nd, 16th, and 30th. In between there is a lecture-demonstration of Trio equipment by G3FIK, on May 9, while May 23 is down for the tape-and-slide of "The World at their Fingertips." For further information, contact the hon. secretary.

Three dates are down for May in Wolverhampton, the first two at Hq. May 5 is the Annual Constructional Contest and May 12 a Natter Nite at Neachells Cottage, Stockwell Road, Tettenhall. Finally, on May 19 comes the annual dinner and presentation of trophies, at the Black Horse Hotel, Thompson Avenue, a venue which has proved very popular in the past.

Worcester get together at 35 Perdiswell Park, Droitwich Road, Worcester, every Wednesday and Saturday evening. Highlight of the month is a members' Photography Competition on May 21. Odd, isn't it, how many amateurs are keen photographers.

No doubt about it, Hereford and Oxford are ousting Rutland for the title of "rarest English county"—which is why Solihull will be discussing ways and means of organising a one-day trip to Oxford to do something about it. May 20 is the date of the discussion, at the Old Manor House, 126 High Street, Solihull. Visitors are always welcomed.

Midland's hon. editor is all bolshie and wonders whether anyone ever reads his *Newsletter*—yes, your "Club Secretary" looks forward to it! Third Tuesday in each month is the booked evening, at the Midland Institute in Margaret Street, Birmingham. May 6 is to see a demonstration by the Heathkit people of their Hi-Fi and amateur band equipment, at the Birmingham

TO GET INTO THE NEWS

Club Scribes and Secretaries should note these dates: May 9, for the June issue; June 6, for July; and July 4, for August issue. Pse note also that reports must include the name/QTH of the Club secretary, for inclusion in the address panel. Address for "Month with The Clubs" is simply: Club Secretary, Short Wave Magazine, Buckingham.

and Midland Institute, Margaret Street, opening at 8 p.m. They hope for a large attendance at what should be an interesting event. On May 20, the normal meeting will be devoted to TVI/BCI, dealt with by G3JID.

Not far away from Birmingham is Redditch, where the Old People's Centre in Park Road is the venue for the East Worcs. crowd. May 8 it is, and G3BMY talking and playing tape while discussing "Contest Operating."

A new committee has come into office at Lichfield, and so no programme has yet been organised; however, that does not prevent us from saying that they are in session on the first Monday and the third Tuesday of each month, and the booking is made at the Swan Hotel, Bird Street, Lichfield, Staffs.

Old Group Re-Formed

What used to be known as the Derby Short Wave Experimental Society has restarted, and is now known as the Nunsfield House Community Centre Amateur Radio Group. Quite a resounding title, and in the first five months they have had quite a resounding success. A grand prize draw to raise funds for the restart produced enough to spring a KW-2000A, a KW Match and a KW Ezee-Match for the Club station, G3EEO, which was a pleasant surprise for the members. In addition they have a newsletter going and already nearly fifty members have enrolled. Room 8 on Friday evenings is the place to look for them at the Community Centre, and a programme of events is laid down for the coming months.

Another Friday group is at Westmorland, where the lads have Hq. at 24 Park Road, Milnthorpe, Westmorland, each week. May 4 will see them out on a field day of their own, with 1.8, 3.5, 14 and 144 mc stations operational from a site near Burton in Kendal, from 1100 clock.

Peterborough have recently changed their name to "The Peterborough Radio and Electronics Society" which widens their horizon a little. Every Friday they foregather at the old Windmill on the London Road—ideally situated, so they say, between the pub, the carpark, the railway, and a garage!

Recently the Mid-Warwickshire crew had an AGM, and there were some committee changes to give the younger element a chance. For all the latest details on the May programme, which is not to hand at the moment of writing, we refer you to G3TFC—see Panel, p.184.

Back to the North now. Bradford are looking forward to hearing their member 7Q7LZ, Andrew Pomfret, talking about "Life in Malawi" on May 6. This one

is at Hq., Bradford Technical College, Great Horton Road, Bradford 7. Later in the month, namely on May 20, it is hoped to have a visit to the Home Office Communications Division at Kippax.

A slight reshuffle took place at the Fulford AGM recently, and the new hon. secretary has his name down in the appropriate slot in our Panel. May 24/26 weekend is when the chaps are to put on a station for a big Scout *Tamasha* (Hindustani for beanfeast); they will be signing G3XLH/A for this event. Normal meetings are every Tuesday at 7.30, but for the venue details we have to refer you to the new Secretary.

The South Birmingham boys will meet on May 7, at the Scout Hut, Pershore Road, Stirchley, Birmingham, at 8 p.m., to hear G3JFL giving a talk on the ever-present topic of BCI/TVI, in connection with which K.W. Electronics, Ltd. have loaned their TVI kit. All interested are invited to what should be a very useful and informative discussion.

Northern Heights report that the slides for the W1BB "Mk. II lecture" were stolen while out on loan, and are having to be replaced—by G3MDW himself when he visits Stew Perry, W1BB, in person on Sunday, May 4; they hope to be on 21350-21400 kc, looking for U.K. contacts, in particular G3OMM, Mary Shaw of Halifax, his friend and helper (G3MDW is chair-bound). On May 7, the Club is to visit Manchester Airport, and May 21, G3IBN will talk on Aerials—always an interesting subject.

This may not be quite the right geographical area in which to place Norfolk Amateur Radio Club—who meet at the Brickmakers' Arms, Sprowston Road, Norwich—but it is as near as we can get this time. Their next sessions are down for May 5 (film show); May 12 (informal); and May 19 (discussion on aerials).

Going quite a way to the north-west from Norwich, the Salop Amateur Radio Society signs G3SRT and they are now embarking on a solid programme of summer-like events—starting May 1 with setting up and testing the Club station; on the 8th they visit the ITA at Lichfield; on either May 15 or 22nd they go to the Shire Hall, Shrewsbury, and also see the radio-communication systems at the County Police and Fire Service Hq's. On May 29, there will (possibly) be a portable/mobile operations exercise in the Shrewsbury district.

The Amateur Radio Club of Nottingham operates from the Sherwood Community Centre, Mansfield Road, Woodthorpe, and has meetings scheduled for May 1, discussion about increasing membership locally; 8th, a film show on computers; 15th, described as "general activity"; and on the 22nd, introduction to Sideband. They have their own licence, G3EKW, and a 16mm. projector available. The report also mentions that of their five members who took the December R.A.E., five passed—so there is a noticeable increase of G8/3's!

Derby have no less than six events arranged during May. On the 4th, 2m./P; 7th, surplus sale by auction; 14th, getting started on 4m., and the problem of TVI; 17th, exhibition and demonstration, with G3ERD/A and G2DJ/A, at Morley School carnival; 21st, second D/F practice; and on the 28th, a talk on Developments at Oaklands Observatory. Unless otherwise indicated,

all meetings start at 7.30 p.m. in Room 4, 119 Green Lane, Derby. A point of particular interest in the report is that they recently had a demonstration, by G3FGY, of the ex-R.A.F. R.1084—those who know will remember it as a battery-operated, coil-changing Rx for ground-station work on long-distance HF circuits, and one of the best receivers of its kind ever produced.

We are informed that the May meeting for Stourbridge will be on Tuesday 6th, 7.30 p.m. at their Hq., Longlands School, Stourbridge, when the subject will be Some Aspects of VHF. Their own station G6OI should by now be fully operational.

For Pudsey, the big event looming over the horizon is their first Mobile Rally, on July 27—in the meantime they have meetings weekly each Wednesday in May, covering a useful range of subjects, including R.A.E.

Sutton Coldfield will be running a demonstration station at a local grammar school, and besides that have their regular get-togethers on the 2nd and 4th Mondays each month, at the Club House, Coles Lane—that on the 12th being a Trio demonstration by G3FIK, while on the 26th the Club project (a crystal calibrator) will be engaging the attention of several members.

Deadline

Will be Friday, May 9, *latest*, for the June issue—and please don't miss it. All reports for this feature to: "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM. Have a good Whitsun.

BARRY GOLDWATER, K7UGA— PHONE PATCHER

Senator Barry Goldwater, K7UGA (Scottsdale, Ariz.) one-time Republican candidate for the U.S. Presidency, is in every sense a fully active AT-station operator, with a very fine installation. His latest outside erection is a log-periodic aerial, pivoting on a 77ft. mast, which also carries "Long John" arrays for 10-15-20-40m. Rotation of this massive system through the whole 360° takes four minutes. At the present time, main operating activity at K7UGA is in phone-patch working between servicemen in Vietnam and their homes in America. This procedure — which has always been accepted under the U.S. regulations, but would be quite illegal over here — has now been officially recognised by the Defence Dept. as a legitimate ploy, for which MARS (the "Military Affiliate Radio System") can expect to obtain full Service backing. This is very important to those concerned, because hitherto MARS stations — on the air from most U.S. bases, including those in this country — have had to provide their own equipment and facilities.

In this context, it is interesting to note that K7UGA, working as an individual operator, makes up to 600 phone-patch QSO's in a month. And he might have been President of the United States!

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.

G3WPO, A. L. Bailey, 5 Erin Way, Burgess Hill, Sussex.

G3XGG, H. D. Innes, 387 Hull Road, Woodmansey, Yorkshire, E.R.

G3XSB, P. Ball, 5 Cliffe Farm Drive, Sheffield, S11 7JW. (Tel. Sheffield 66212.)

G3XSJ, K. R. Brooks, 72 Nicholls Lane, Winterbourne, Bristol, BS17 1NE.

G3XSM, D. P. Matthews, 18 Queen Anne's Gardens, Enfield, Middlesex.

GW3XSM, D. P. Matthews, c/o Amateur Radio Society, Swansea University, Singleton Park, Swansea, Glam.

G3YBM, R. H. Mitchell, 91 Cants Lane, Burgess Hill, Sussex. (Tel. Burgess Hill 3851.)

G3YCC, F. W. Lee, 8 Westland Road, Kirkella, Hull, Yorkshire, E.R.

G3YCO, E. J. Horne, 168 Staines Road East, Sunbury-on-Thames, Middlesex.

G3YDD, Hereford Amateur Radio Society, c/o I. Cooper, Old Civil Defence HQ, Gaol Street, Hereford.

GM3YEH, B. J. Beggs, 9 Barward Road, Galston, Ayrshire.

G3YEQ, L. E. Miller, Spring Cottage, Butchers Lane, Mereworth, Kent.

G3YEX, S. W. Corbett, 69 Murrell Close, Edgbaston, Birmingham, 5.

GW3YFD, W. T. Hewitt, 15 Knights Green, Flint, Flintshire. CH6 5DE.

G3YFJ, J. J. Hunter, 23 Sturdee Gardens, Jesmond, Newcastle-upon-Tyne, NE2 3QU.

G3YFN, C. I. C. West, 20 Widnes Place, Benton, Newcastle-upon-Tyne, Northumberland, NE12 8HN.

G3YFP, S. Bottomley, 203 Smith House Lane, Lightcliff, Halifax, Yorkshire.

G3YFS, D. F. Haver, 15 Regent Drive, Loose, Maidstone, Kent.

G3YGC, E. Elliot, 3 Grindelton Grove, Burnley, Lancs.

G3YGD, D. Brown, 3 Southern Avenue, Burnley, Lancs. (Tel. Burnley 22646.)

G3YGE, J. Okos, 103 Rectory Road, Burnley, Lancs. (Tel. Burnley 28927.)

GW3YGH, A. W. Hughes, 94 Penygroes Road, Blaenau, Ammanford, Carmarthenshire.

G4OG, D. C. Gordon, The Garden House Hotel, Folkestone, Kent. (re-issue.)

G8BUR, A. Marshall, 33 Brookbridge Lane, Datchworth, Herts.

G8BWU, R. H. Dowson, Moat Lodge, Moat Hill, Birstall, Yorkshire. (Tel. Batley 2667.)

G8BYT, C. G. McGee, 10 Queensville Road, Clapham Park, London, S.W.12. (Tel. 01-674 5332.)

G8CBJ, D. C. Donnison, 306 Philip Lane, Tottenham, London, N.15.

G8CBV, J. D. Morris, 14 Brook Drive, Kempston, Bedford.

G8CCI, B. R. Abrams, 12 The Tennis, Cassington, Oxford, OX8 1EL.

G8CGO, M. A. North, 205 Cherry Orchard Road, Handsworth Wood, Birmingham 20.

G8CKM, P. J. Parker, 44 Westbury Road, Heath Farm, Shrewsbury, Shropshire.

G8CMH, J. M. Ruscoe, 14 Highlands Road, Bamford, Rochdale, Lancs.

G8CMI, J. Mather, 6 York Road, Torpoint, E. Cornwall. (Tel. Torpoint 496.)

G8CMU, M. J. Adcock, 3 Hall Drive, Finedon, Wellingborough, Northants. (Tel. Finedon 284.)

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G3CLA, J. L. Matthews, 14 Bellevue Road, Billericay, Essex.

G3CUH, E. H. Butcher, 315 Dorset Avenue, Readers Corner, Great Baddow, Chelmsford, Essex.

G3DNF, G. J. Bennett, 52 Whinmoor Crescent, Red Hall, Leeds 14.

G3FPK, N. A. S. Fitch, 40 Eskdale Gardens, Purley, Surrey. CR2 1EZ. (Tel. 01-668 5582.)

G3FZG, A. Treanor, 10 Briar Bank, Stanwix, Carlisle, Cumberland.

G3JSJ, D. Pritchard, 1 Dane Mead, Hoddesdon, Herts.

G3JUY, A. Mallinder, 9 Old Mill Close, Grove, Wantage, Berks. (Tel. Wantage 4177.)

GD3KHE, G. E. Hayes (ex-G3KHE), 11 Central Drive, Onchan, Douglas. (Tel. Douglas 6636.)

G3LXA, B. Ziff, Bingham Lodge, Bingham Place, London, W1M 3FH. (Tel. 01-935 0617.)

G3MXO, D. V. Walters, 433 Bordesley Green, Birmingham, 9.

G3NDJ, C. R. Delhay, 58 Balsdean Road, Woodingdean, Brighton, Sussex, BN2 6PF.

G3NDK, R. K. Webb, 9 Abbey Close, Tattersall, Lincoln.

G3OYW, Dr. I. Sykes, 6 Cedar Drive, Dursley, Glos., GL11 4EB. (Tel. Dursley 2951.)

G3PBZ, L. Hingley, 36 Wesley Avenue, Cradley, Halesowen, Worcs.

G3RSJ, R. H. Williams, 2 Maltings Garth, Thurston, Bury St. Edmunds, Suffolk.

G3SIG, Amateur Radio Club, 39th (City of London) Sig. Regt., c/o 31 Princess Avenue, Warsop, Mansfield, Notts.

G3TKN/A, V. C. Lear, St. Vincent, Meadow Close, Whitwell, Ventnor, Isle of Wight. (Tel. Niton 537.)

G3VMB, P. A. W. Cooper, 42 The Osiers, Braunstone, Leicester, LE3, 2XN. (Tel. Leicester 896213.)

G3VMJ, J. Peters, 41 Whitehall Gardens, Duxford, Cambridge.

GC8AAZ, L. D. Woolf, 9 Sunshine Terrace, Bagatelle, St. Saviour, Jersey, C.I.

G8AWO, R. R. Gray, 18 Old Rectory Drive, Hatfield, Herts.

G8BLH, J. McDonald, 16 Halton Crescent, Greasby, Wirral, Cheshire.

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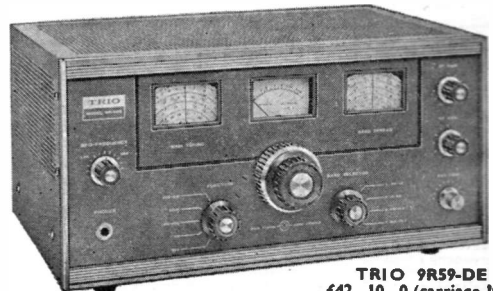
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WANTED: Mobile/Portable transistorised receiver, must cover at least 80/160m., such as Codar T.28, etc., or home-built job.—Cooke, 76 Falcon Road West, Sprowston, Norwich, Norfolk, NOR.73R.

SALE: Two BC-625's, complete, at 50s. each. BC-221 frequency meter, with calibration chart and mains PSU, £10. Crystal Test Set, £5. Noise Generator, £5. Four QV06-20's, 70s. Four E810F's, £5. Three E180F's, 30s. Crystals for 452.5, 453, 453.1, 454. 457.5 and 456.9 kc, 15s. each.—Rings Cox, West Forest (Wokingham, Berks.) 5649.

FOR SALE: Heath equipments: Cheyenne Tx MT-1, coverage 10 to 80m., CW/Phone, 90 watts, price £27; RF generator IG-102 (similar RF-1), £8; Capacitor Tester IT-22, 70s.; VTVM, similar V-7A, £8. Also 1.75 kVA transformer, 2 kV-1 kV-0.1 kV-2 kV, £6. Heater transformer for 866's, 2/2-5v. c.t. at 10 amps, tested 7.5 kV, 30s.; two 866's with ceramic bases, 10s. each. All or near offer.—Donald, GM3SKS, 5 Woodrow Circus, Glasgow, S.1, Scotland.

SPRING-CLEAN Sale: Cossor Type 1035 DB 'Scope, £15. Leyland Audio Oscillator, £10. ASB-4 UHF receiver, 40s. Pye PTC-114W receiver, 12-volt, 40s. W.S. Type 31, with headset, 30s. SCR-522 Tx/Rx, £5. W.S. Type 48, 10s. BC-733A receiver, with 10 valves, 6 crystals and 6 relays, price 40s. R.5582A receiver, 30s. Radar Tx/Rx Test Set Type 102A, 60s. All carriage extra.—Thorburn, G3WBT, 27 Banklands, Workington, Cumberland.

SELLING: Complete Trio Station, consisting of the TS-500 Transceiver, with VFO-5 and PS-500, brand new. Will accept offers around £180.—Anderson, GM3KXM, QTHR.

DISPOSAL: No offers, an Eddystone EC-10 receiver, as new and in manufacturer's carton, price £38.—Trinick, Rectory House, Skelton, Penrith, Cumberland.

SMALL ADVERTISEMENTS, READERS—continued

COMPLETE AM Station For Sale (owner going SSB): Comprises AR88D receiver, with S-meter, in very good condition; Electroniques QP-166 amateur band Coilpack on chassis, with Eddystone 898 dial, calibrated against BC-221; this uses the Rx for power, so could not split; Panda-120V transmitter, coverage 10 to 80m., runs 150w. CW or 120w. AM phone, in very good condition. Both these equipments with manuals and some spare valves, price £90 together. Also a home-built Tx, using Geloso 4/102 VFO with 807 PA, AM only, very nice appearance but some attention required, £10. Another home-built Tx, for 160m. CW only, needs testing, 60s. And a 30w. audio amplifier, some attention required, 70s. Also many other items—transformers, CRT's, VHF gear, etc., etc., too much to list. Please include s.a.e. with enquiries. Buyers to inspect and collect.—Beavon, G3PPR, 94 Woodthorpe Road, Kings Heath, Birmingham, 14. (Tel. 021-444 6305.)

SELLING: Minimitter 150-watt AM/CW/FM Tx, 10 to 80m., price £25 only. Also BC-221 frequency meter, complete, with stabilised PSU, £18 10s. — Lawson, G4PF, 20 Bent Lane, Leyland, Preston, Lancs., PR5-2HQ.

FOR SALE: An E.M.I. 9677A Vidicon, in maker's carton, price £10; base and Def/Focus coils for it, £5. Also re-entrant PA speakers, 20s.; EAP Cadanza ribbon microphone, £5; Lafayette dual-impedance moving coil microphone, 60s.; 3FP7 Tube, 20s.; Ilford Sportsman Camera, £5. — G3XUS, 62 Lawes Avenue, Newhaven (465), Sussex.

SALE: Converter VHF Type AM-913/TRC, new, £25. Hallicrafters S.36 (the special model), brand new, £35. BC-221AK frequency meter, modulated, complete with PSU and in mint condition, £35. Command Rx, 1.5 to 3.0 mc, brand new condition and in carton, £9. Cowl-gill motor, new and boxed, 75s. Technical Manuals: Co'llins 51J-3, 70s.; Co'llins 75A-4, 60s.; National HRO-60, 50s.; BC-342 (all models), 50s.; National NC-300, 45s.; Hallicrafters SX-115, 40s.; R.C.A. AR-8516L, 85s. All these items plus carriage or postage. **WANTED:** Oscilloscope Type 13A, or USM-38; TW2 Tx; VTVM: TS-505B; HC-6U xtal for 35 mc. (Lancashire). — Box No. 4785, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

FOR SALE: Tuning Forks, by Cambridge Instruments, Ltd., one at 50 cycles (12v. battery input); two at 1 kc, with valve panels, 50s. each.—Cooper, 13 Churchfield Road, Outwell, Wisbech, Cambs.

SALE: Amateur-Band Transmitter Geloso G.212 and Rx Geloso G.209, complete and working, first £55 secures. (Midlands.) — Box No. 4786, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

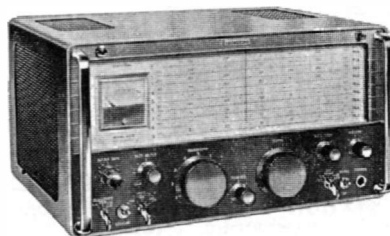
FOR SALE: Minimitter converter, 10 to 160m., IF 1.5 kc, own PSU, in excellent condition, £8. Solartron fully stabilised PSU, 5-valve laboratory unit, 300v. 250 mA or 250v. 120 mA, three AC/LT outputs (two centre-tapped), uncased and unused, with manual, price £5.—Harrison, 25 Wilmount Street, Woolwich, London, S.E.18.

HOLIDAY Accommodation in private amateur household; airport meeting service inclusive. Fully equipped.—Meachen, 9H1R, No. 1 Jasmine Path, Santa Lucia, Malta, G.C.

FOR SALE: Hallicrafters SX-140 receiver, £15. HT-40 transmitter, £10. HA-5 heterodyne VFO, £10. Apply weekends only.—Andrews, 56 Windsor Road, Swindon, Wilts.

EXCHANGE: Yashica 24 twin-lens reflex camera, in mint condition, 12 or 24 exposures on 120 or 220 film, ever-ready case, gadget bag, accessories and complete dark-room equipment, total value over £100. For first-class communications receiver or W-H-Y of similar value, cash adjustment if necessary, s.a.e. for list.—O'Neill, 41 Willoughby Road, Wallasey, Cheshire. (Tel. 051-638 7400.)

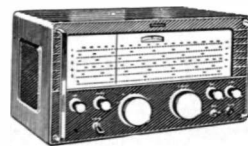
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KW Baluns ... £1. 15 KW Low pass filters ... £4. 14

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Superior performance mobilizing with the G-Whip range of antennae. Lightweight design. Helical wound. New range 160 metre one bander, £7. 19 6. Tribander 10-15-20m., £8. 16. Duo-bander, 160/80m., £9. Single banders, £4 7. S.A.E. for full details.

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TTC C3005 two meter SWR Bridge, suitable up to 200 Mc/s. ...	£6. 6. 6	Labgear Topbander Tx	£16
Mansen FS-1. Field strength meter ...	£2. 5	Eddystone EA12	£150
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Egg insulators ...	£1. 5	KW77 plus speaker	£70
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300 ohm twin feeder	8d. yd.	KW2000A Transceiver...	£165
75 ohm twin feeder	7d. yd.	Eddystone EA12	£150
50 ohm coaxial cable	1. 9 yd.	Eddystone 940	£100
Dipole "T" pieces ...	1. 6	Eddystone EC10	£40
PL259 plugs ...	6. 0	Eddystone 730/4	£100
PL259 cable reducers ...	1. 6	TW160m. Communicator	£27
Semi-Auto-bug keys ...	£4. 10	Eddystone EC10 with A.C. p.s.u.	£40
Tech TE-15. Transistorised GDO covers 440 Kc/s. to 280 Mc/s.	£11. 10	Codar PR30X	£30
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2 metre transmitter for AM/CW with 40 watts D.C. input. Full details for S.A.E.	£60. 15
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PR30X Preselector	£7. 19. 6
T2B 160/80m. Receiver	£15. 17. 6
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RQ10 "Q" Multiplier	£8. 17. 6

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SMALL ADVERTISEMENTS, READERS—continued

SELLING Station on behalf of a "failed R.A.E.": K.W. Vanguard and long-wire tuner, 10 to 80m., £32. Eddystone 740 Rx, with speaker, £20. Shown working (by licence holder). — Rayer, G3OGR. Reddings, Longdon Heath, Upton-on-Severn (2244). Worcs.

SALE: Minimitter MR-44 Rx, half-lattice filter, Q-multiplier, EF183 RF, two EF183 IF, 6BE6 product detector, needs re-aligning, price £15. Labgear LG.300 Tx, new 5763's and 813, with circuit and two spare 813's, £25. EHT/PSU, suit the LG.300. with Parmeko xformer, 1000v. at 180 mA, silicon diodes, voltage metered, £8. Exciter PSU, suit LG.300, Parmeko xformer, output 150v. DC stabilised, 300v. DC and 12/24v. DC, price £4. American antenna relay, with thermo-ammeter, 6/12/24v. DC operation, 25s. PR-30 Preselector, 70s. Pair field telephones Type F, £4. HRO amateur S-meter, new. 35s. All items "or near offer."—Stone, G3JFC, 39 Purrett Road, Plumstead, London, S.E.18.

FOR SALE: For 70 mc, Pye 12-volt Reporter, £6 10s. Also one Murphy and one Hudson base station, for 240v. AC, £10 10s. each.—Austen, 1 Valebridge Road, Burgess Hill (3409), Sussex.

EXCHANGE: G3 in Midlands wishes exchange shack (with income) for something similar in VK2, period or permanent. Full details given and required.—Box No. 4786, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

OFFERING: Lafayette HA-350 amateur-band receiver, 240v. version, cost 75 gns., as new and hardly used, cash offer £48 secures.—Ring Adkins, SWI-3098 (Tring).

FOR SALE: Pair FM transceivers, in very good condition, range about 10 miles. 240v. AC, complete with headsets, etc., price £12 the pair.—Hyatt, 8 Celyn Grove, Caerphilly, Glam., South Wales.

WANTED: Two-metre table-top Tx. SALE: K.W. Vanguard Tx, covers 10 to 160m., AM/CW, £35.—Pickering, GW8CGH, 25 Penybont Road, Pencoed (444), Glam., South Wales.

EXCHANGE or SELL: Genuine offer, "F" registration Anglia Super-1200, September '67, done under 10,000 miles since new, with seat covers, belts, washers, heater, also fog, spot and parking lights, undersealed from new, in showroom condition throughout, price £450, or EXCHANGE for SSB equipment, with cash adjustment either way. Full details, pse. (Glamorganshire).—Box No. 4788, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SELLING: Marconi Signal Generator TF-937 (CT.218), 85 kc to 30 mc, for AM/CW/FM, in excellent condition, with instruction manual and trimming tool, price £58, or near offer. **WANTED:** Manual for R.308.—Ring Gibbon, Windsor 63228 day-time; or Slough 43939 after 7.0 p.m.

SELLING Complete Station: Boxed Eddystone 940 Rx, with Redifon 100w. AM/CW Tx, crated, coverage 40-80-160m., price £100. Spare Tx PSU, £7. 1CP15 miniature CRT, £4. PSU, stabilised HT, £5. Computer logic strips, and other gear, s.a.e. list. (Northumberland.) — Box No. 4791, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: CR-150 with PSU, £18. Aircraft converter (into BC car radio), £5. Free delivery London-Herts. Essex areas. — Harris, G3LWM, The Oaks, Crickfield Lane, Bishops Stortford (2951), Herts.

FOR SALE: Sommerkamp FT-DX150 transceiver, for 10 to 80 metres, in mint condition, with manual and the original packing, price £185, delivered in Southern England.—Box No. 4790, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SALE: K.W. Vanguard, covering 10 to 160m., with built-in LP filter and in excellent condition, price £30, delivered South-East. — Box No. 4792, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

SMALL ADVERTISEMENTS, READERS—continued

WANTED: Single copies of "QST" for May 1951 and November 1953, also "Practical Television" for March 1964; your price paid for copies in good condition. Details required for the following equipment: FTL-17A, FTL-19C or FTL-20B; T-61/AXT-2; T-271/ART-28, or ALT-8. Any manuals, schematics or conversion data on these items, and/or equipments in new or used condition will be bought and collected in England. All replies will be answered and postage refunded. — Box No. 4789, Short Wave Magazine, Ltd., 55 Victoria Street, London, S.W.1.

WANTED: A 4X150A valve.—Saddington, G2FXQ, 59 Hamilton Avenue, Pyrford, Woking, Surrey. (Tel. Byfleet 46341.)

FOR SALE: Sideband Transceiver HW-32A for 20m., complete with microphone, PSU and speaker; this efficient little rig is in excellent condition and, through no fault of its own, has had little use. Will part for £65, or haggle, with free delivery in London/Home Counties area.—Carter, G3PHR, QTHR (Tel. 01-647 1969).

SALE: Eddystone EC-10 Rx, with mains PSU and S-meter, in excellent condition, £38. UHF Signal Generator, covers 70-centimetre band, laboratory standard, £5. Four-metre Signal Generator, £4. Two 6-volt 170 AH accumulators, charged, £6. Buyers to collect or carriage extra.—Knights, G3TQY, Ashar, Cross Road, Tadworth (3247), Surrey.

WANTED: G2DAF Mk. II transmitter, need not be working but should be complete. **SALE:** National HRO Senior, coverage all bands 10 to 160m., with speaker, PSU and manual, £20. Also Panda PR-120V Tx, with manual, £25. Both these in FB condition.—Lester, G3VXV, 173 Damson Lane, Solihull, Warwickshire. (Tel. 021-705 3060.)

FOR Quick Sale: At £6 only, R.1155 receiver, with PSU and amplifier, in excellent working order. —Kaval, 11 Adamsrill Road, London, S.E.26. (Tel. 01-699 7823.)

FOR SALE: R.C.A. AR-8516L, with spare valves and manual, in immaculate condition, £160. Hallcrafters SX-62A, coverage 520 kc to 110 mc, AM/FM, immaculate, £80. Taylor Oscilloscope Type 32A, as new, £25. Codar RQ-10 Q-multiplier, as new, £5. Collector's item: "QST", eight years complete 1945-'53, £8. Manual for SP-600, £4. **WANTED:** Command receivers, all frequencies, must be as new; Hallcrafters SX-42; also SX-28, incomplete or not working. — Wise, 64B Beach Road, Newton, Porthcawl (2276). Glam., South Wales.

SELLING: National HRO-MX receiver, in excellent condition, with four coil packs, PSU and speaker, £22 10s. Eddystone 840A receiver, with S-meter and aerial trimmer, immaculate and as-new condition, £30 10s. Box of new and used valves for current short-wave practice. Complete Leak stereo equipments with FM tuners and Goodman Maxims, brand new. Many copies "Short Wave Magazine." Please write for full details, or call any time evenings, or weekend, for inspection. — Nia, 11 Goldsmith Road, Leyton, London, E.10.

SALE: Transformer 375-0-375v. 5.4 amp (yes, 5.4A) and two 10-Henry chokes, £7. Two XR1-3200-5544 thyratrons, with bases and control transformer, 60s.—Kaval, 11 Adamsrill Road, London, S.E.26. (Tel. 01-699 7823.)

OWNER Gone S-Line, so selling Drake-TR4 Transceiver with AC4 PSU and Shure microphone; seldom used and in mint condition, price £295.—O'Conner, EI3BN, Main Street, Foynes, Co. Limerick, Eire.

SELLING: Ten-metre Tx, complete with PSU, runs 100 watts FM, price £10.—Smith, 2 Saffron Close, Littleport, Ely, Cambs.

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Transistors, A.F. and R.F., 3/9 dozen, post paid.
Transistorized Morse Oscillator Modules. Will drive speaker or phones, 18/9, post paid.
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New and Boxed Mains Relays, 2 pole 2-way octal base, 17/6, post paid.
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Tank Aerials. Three 4" sections making 12', 8/6. P. & P. 5/- any number Bases, 4/6. P. & P. 2/-.
Breasts Sets. Safe for Mobile Operation, 10/-, post paid.
Xtal Insets to fit above Breast Sets, 7/6. P. & P. 9d.
Head Sets. 19 set type or type DLR, 11/-, post paid.
Dry Battery Packs. 72 and 1½ and 1¼, 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.
New Boxed Morse Keys, 5/- each plus 2/- post and packing.
Xtal Lapel Mikes. Complete, 6/6.
Miniature Indicator Lamps, L.E.S. Red, blue, yellow, white. Smart looking, 2/6 each. Less bulbs to fit 12v. or 6v., 1/- each.
B40 Receivers. Air tested, £22, post paid.
SPECIAL OFFER OF MIKES. D x 73 Pizo Dynamic, 32/6, post paid.
M.S.11. Dynamic with Flexible Desk Stand, £3, post paid.
ACOS Xtal (metal), MIC45, 1/2 1/2, 6, post paid.
CM20 Xtal (plastic), 9/6, post paid.
CM70 Xtal Stick with Accessories, £27/6, post paid.
VALVEHOLDERS, B9A and B7G, 8d. each, Octal Ceramics, 1/3.
BY100 Rectifiers, 3/9 each, SM78P Silicones 800PIV 750M/A, 3/9.
Thyristors, 400 PIV 8 amps, 9/5 each.
Jap Vernier Slow Motion Dials. 50 mm., 10/-; 70 mm., 12/6, post paid.
Plugs. Octal, B9A or B7G, 2/6 each.
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