

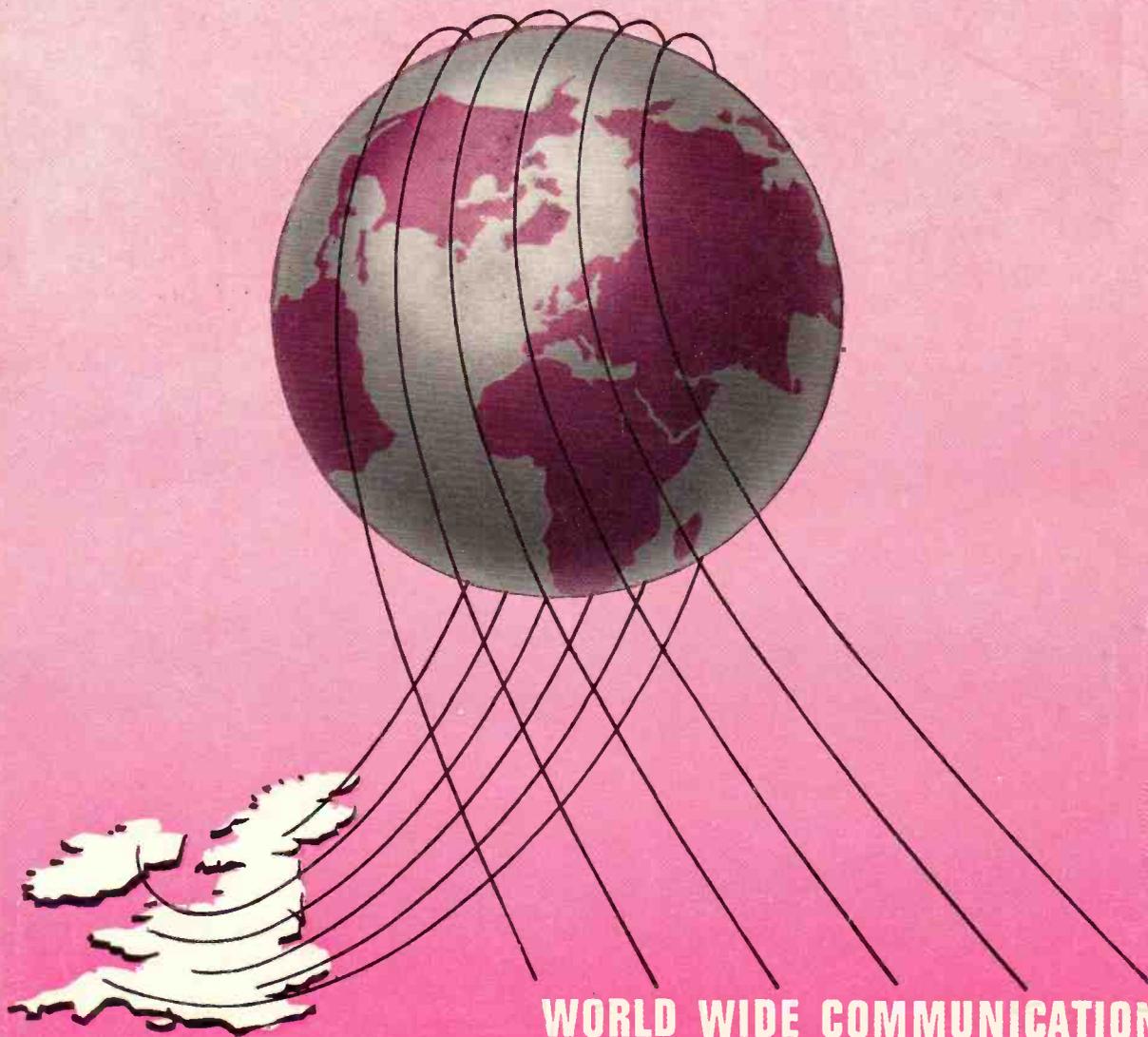
30p

The SHORT WAVE *Magazine*

VOL. XXXII

DECEMBER, 1974

NUMBER 10



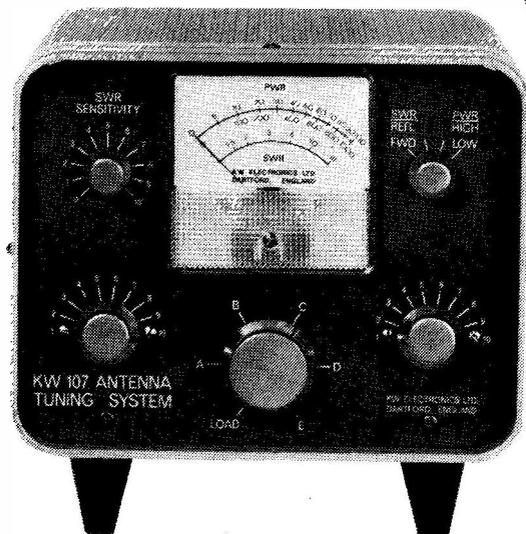
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KW 108
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THE WORLD'S NUMBER ONE

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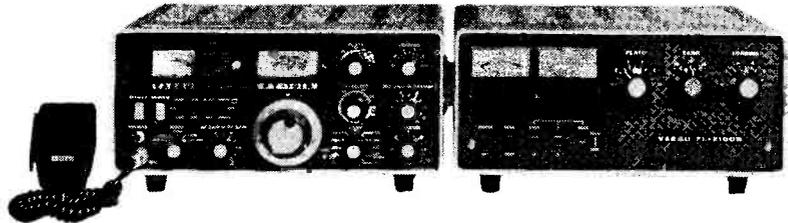


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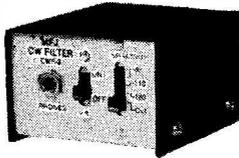
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The Directors of the Company wish to make it known that WESTERN ELECTRONICS (UK) LTD. is a fully independent company and is not associated in any way whatsoever with any other concern.

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YAESU—YOUR ASSURANCE OF QUALITY—introduce NEW MODELS - TO ENLARGE STILL FURTHER THE WORLD'S FINEST RANGE THE FT-201 10-80m. AC/DC TRANSCEIVER



Features

- ★ Built-in AC/DC PSU
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- ★ 1 kHz readout
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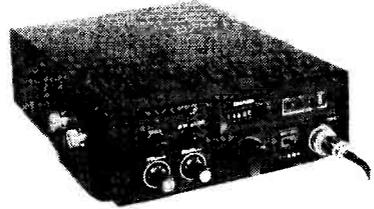
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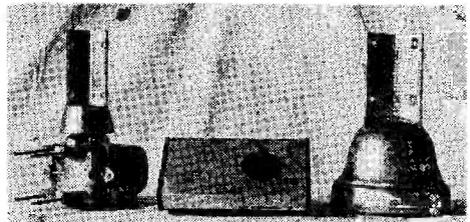
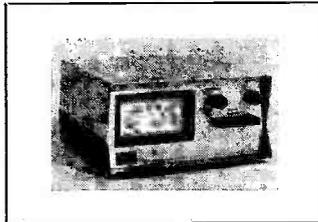
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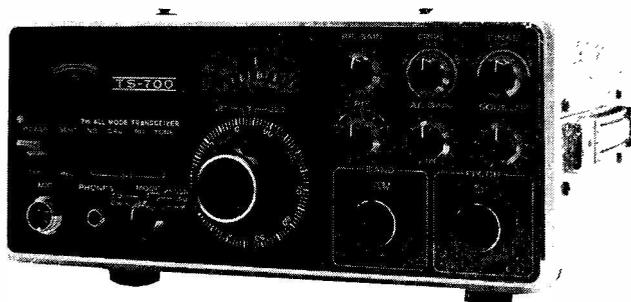
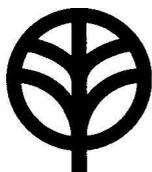
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ALL MODE OPERATION AM, FM, USB, LSB, CW

POWER OUTPUT 10w. MINIMUM

DUAL POWER SUPPLY 240/120v. AC 50/60Hz AND 12-16v. DC

It is obvious from the basic specification that the TRIO TS700 is a totally new concept in 2 metre amateur gear. What is not obvious are the reasons why the TS700 is the finest 2 metre transceiver available today. For example:—

- (1) The AM transmission (and the TS700 is the only medium priced rig to offer AM) is true double sideband, and *not* SSB with re-inserted carrier.
- (2) The PA and driver transistors have been chosen for optimum linearity in all modes. Both driver and PA run from a 20v. supply to set a new standard in low intermodulation distortion for semiconductors. The 20v. is derived from a TRIO patented DC inverter which runs even when using the 12v. DC input.
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- (5) Dual ratio gearbox giving 25 kHz/TURN and 100 kHz/TURN means rapid tuning across the band together with superb bandspread for those weak SSB signals.
- (6) Front panel one knob tuning of all 2 metre tuned circuits for transmitter *and* receiver gives optimum gain and low spurious outputs. No broadband compromises in TRIO equipment.

There is so much more to say about the TS700—why not call us if you want more detail. We will be happy to send a complete specification on request.

Remember, you *must* see and try out the TS700 before considering any other 2 metre transceiver. There is really no comparison.

PRICE **£300** (VAT exc.)

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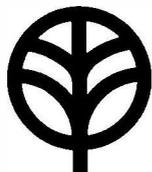
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*TRIO exclusive. Built-in speech compression for that extra DX punch—without distortion, due to amplified ALC system.

See it soon, or drop us a line for details. You'll be hearing them on the air from now on.

AND A FEW OF THE REASONS WHY YOU WILL WANT TO OWN IT :—

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Built-in 12 volt DC power supply

Built-in VOX with adjustable gain, delay and anti VOX

1 kHz dial readout

Ultra stable FET linear VFO

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Built-in RIT circuit and RIT indicator light

8 pole crystal filter

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Provisions for optional CW filter

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Completely solid state except final section.

Compact, low current, reliable, with heater switch for mobile receive-only operation

Built-in cooling fan

Accessory external VFO and accessory

external speaker

Built-in speaker

Modern styling and functional design.

Modular construction

Amplified ALC

TUNE position increases tube life

Maximum TVI protection

Built-in fixed channel operation (4 channels) with indicator light

Provisions for use with a VHF transverter

Full metering

Selectable SSB

Selectable AGC operation for different modes

VFO indicator light

Built-in selectable ALC action for speech processing

Carrying handle

Rugged 6146 type final tubes

Internal cross-channel operation

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Developed from the well-established ETM-2. Printed circuit, 11 transistors, 6 diodes. Ratio Control. Single paddle. Speed control, 8-50 wpm. Sidetone oscillator. Almost-inaudible sealed reed relay. Grey case 4" x 2" x 6". Powered by four ZM9 mercury batteries available world-wide. (Price includes batteries.) Well-engineered keying lever, fully adjustable gaps and tensions.

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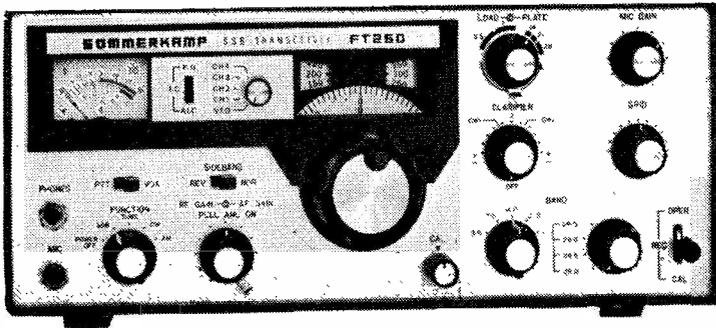
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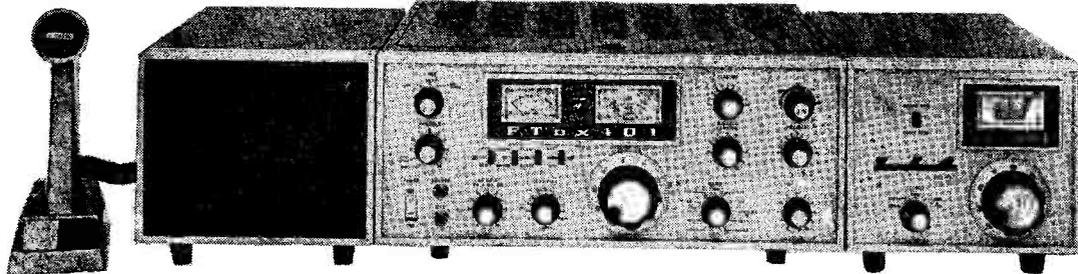
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YD-844

SP-401

FT-401

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Cat. No.	Description	Gain	Impedance	Price
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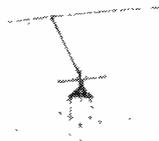


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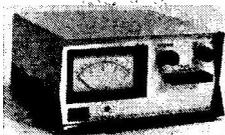
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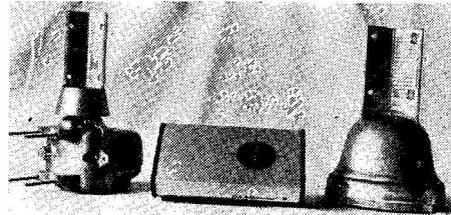
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ADVERTISERS' INDEX

	Page
Aero & General Supplies ...	569
Amateur Electronics (G3FIK) ...	518, 519, 560
The Amateur Radio Shop, G4MH (Huddersfield) ...	576
Ashley Dukes (Honda) ...	566
Bagington Electronics ...	565
B. Bamber Electronics <i>back cover,</i>	<i>573</i>
J. Birkett ...	561
British National Radio School	563
C. & C. Electronics ...	568
CJL Ltd. ...	569
I. N. Cline ...	568
Communique ...	527, 528, 529
Datong Electronics Ltd. ...	569
Derwent Radio ...	571
Doram Electronics Ltd. ...	517
G1 Amateur Supplies ...	565
G3HSC (Rhythm Morse Courses) ...	573
G.W.M. Radio ...	570
Hamgear Electronics ...	575
Heath (Gloucester) Ltd. ...	532
D. P. Hobbs Ltd. ...	572
K.W. Communications Ltd. <i>inside front cover</i>	<i>524, 525, 563</i>
Lowe Electronics ...	524, 525, 563
S. May (Leicester) Ltd. ...	572
Microwave Modules Ltd.	520
Mosley Electronics ...	526
North West Electrics ...	574
Partridge Electronics Ltd.	521
P.M. Electronic Services ...	573
Radio Shack Ltd. ...	534
R.T. & I. Electronics Ltd.	567
Shure Electronics ...	559
Small Advertisements ...	570-576
Solid State Modules ...	566
Southern Surplus Merchants	572
South Midland Communications Ltd. ...	530, 531
Spacemark Ltd. ...	526
S.S.B. Products ...	574
Star Short Wave Club ...	572
Stephens-James Ltd. ...	562
S.W.M. Publications <i>inside back cover,</i>	<i>565</i>
Telecommunications Inter- national Agency Ltd. ...	564
Telford Communications ...	567
T.M.P. Electronic Supplies	566
J. & A. Tweedy Ltd. ...	571
Waters & Stanton Electronics	521
Reg Ward & Co. Ltd. ...	575
Western Electronics Ltd. ...	522, 523
W. H. Westlake ...	570
Chas. H. Young, Ltd. ...	568

(GB3SWM)

Vol. XXXII

DECEMBER, 1974

No. 374

CONTENTS

	Page
Editorial ...	535
Communication and DX News, <i>by E. P. Essery, G3KFE</i> ...	536
Compact Indoor Ground-Plane Aerial, <i>by H. C. Bailey, G2CUI</i> ...	541
Crystal-Mixer VFO, <i>by W. G. Johnson, G2BJY</i> ...	543
Product Detector for The Eddystone 730/4, <i>by D. A. S. Drybrough, G8HEV</i> ...	544
Another Approach to Speech Processing, <i>by K. W. Perfect, G3FIK</i> ...	545
Dual-Channel Monitor, <i>by D. E. Knowles, Tech. (CEI), G3UVA</i> ...	547
An Audio/Video Modulator, <i>by B. Kennedy, G3ZUL-G6AGT/T</i> ...	548
Producing Semi-Conductors, <i>by I. B. Poole, B.Sc. (Eng.), G3YVW</i> ...	549
The Month with The Clubs— <i>From Reports</i> ...	551
VHF Bands, <i>by A. H. Dormer, G3DAH</i> ...	555
New QTH's ...	558

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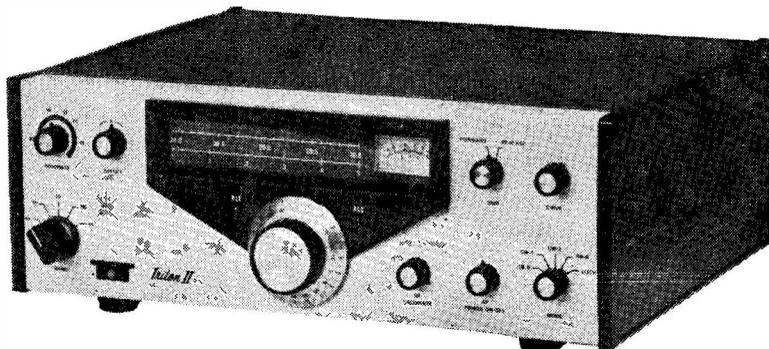
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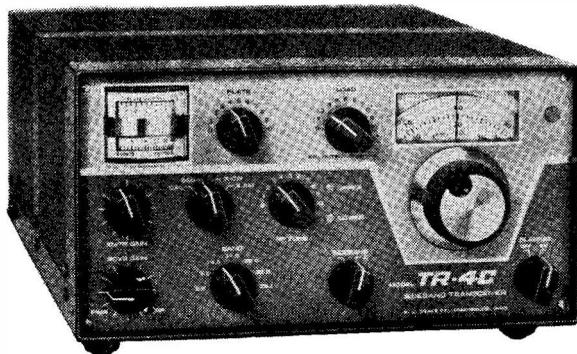
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The **SHORT WAVE** *Magazine*

E D I T O R I A L

BOOKS FOR CHRISTMAS

This is the season of the year for finding presents and it is said that there is nothing better than a book. Our regular advertising offers a wide choice for those interested in any aspect of Amateur Radio, listed on the inside back cover of this issue, under various classifications. All prices quoted are post free, and in most cases despatch can be same-day.

It is also said that a lasting present could be a year's subscription to SHORT WAVE MAGAZINE itself. This costs £3.75 for a year of 12 issues, post free. All orders, with remittance, to: Publications Dept., Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H 0HF.

AMATEUR BAND MONITORING

An impressive compilation in the IARU Summary of Monitoring Information, meaning intruders on the amateur bands. Of the 1170 intrusions listed on the 7-14-21-28 MHz bands, no less than 718 were positively identified. The band worst afflicted by transmissions that ought not to have been there was Twenty (590 intrusions) and the worst offender was the USSR (396 transmissions within our band). This highly informative document, listing the transgressions in detail, band by

band, for the year 1973 is available at £1 from the Region I Co-ordinator, IARU Monitoring System, 73 Mexborough Avenue, Leeds, LS7 3ED, Yorkshire. Our congratulations go to the several international Amateur Radio organisations who have assisted in compiling the information.

SPACE POLLUTION

In addition to the 3000+ known objects now in orbit round Earth, the latest are producing unexpected (and unwanted) side effects by reason of splash-QRM over the frequencies of particular interest to radio astronomers—particularly in the 11 cm. and 18 cm. bands. The trouble is that the noise-signals from the distant sources with which radio astronomers are concerned are very much weaker than the interference created by transmitting satellites, *e.g.*, the Wx body SMS-1 on 18 cm. and the ATS-6 which relays educational TV programmes on 11 cm. over remote regions. The interference is so bad that radio telescopes can hear these satellites even when they are on the "blind side" of Earth. The 11 cm. band is that on which noise-signals from quasars, pulsars and distant galaxies are being studied.

*To All our Readers and our Trade Friends,
Every Good Wish for
CHRISTMAS 1974*

*Austin Forsyth
G6FO*

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

THE alert reader may have noticed a certain plaintiveness in our preamble last time out; suffice it to say that the weather *did* in the end let up for long enough for the LF-band aerial to go back again, and, indeed, to receive a try-out on the bands.

However, since then, time has precluded much listening, leave alone operating—and when a quick turn round the bands was taken, there didn't seem to be much going on anyway. But, of course, there is always the consoling thought that we must by now be pretty near the bottom of the trough in the sunspot cycle, after which things will improve—and these years in the doldrums have caused DX'ers in general to spend time (and money!) on improving their ability to work DX under poor conditions which must inevitably reflect betterment all round as the bands open again.

On a different tack, it was pleasant to spend the Saturday at the Leicester Show, and to have nattering sessions with various folk who write in to, or read, this piece each month.

Top Band

Some points were brought up in the post, and to the writer personally at the Show, as regards our Top Band ploy.

Looking at the position South of the border for a moment, we have first the plaint made by G8DYC who considers it to be all a deep-laid plot to remove easy counties from the list for the benefit of the London gang! But it wasn't anything like that—Derbyshire, Nottinghamshire, and Bedfordshire all appeared in the first draft proposal and fell off somewhere along the line as we tried to form an alphabetical list and hammer out a scoring system. The loss was not noticed in the checking process, either, something for which your conductor alone must take the blame.

However, when we come to Scotland, the situation seems a bit more difficult. On this subject we have letters from GM3YOR (Kirkcaldy, Fife), G4AKY (Croydon) and GM3OGJ (Sauchie, Clackmannanshire), and they all seem to present different angles from those shown on the map which we chose as a reference, the 1975 *Geographia*.

First, the titles for the Regions printed on this map have to be equated to the alternative titles used elsewhere, as follows, with the *Geographia* map titles first in each case: *Highlands*, Highlands; *N.E. Region*, Grampian; *W. Region*, Strathclyde; *E. Region*, Tayside; *Central Region*, Central; *S.E. Region*, Fife and Lothian; *Borders*, Borders; *S.W. Region*, Dumfries and Galloway. This is the list as quoted by G4AKY. However, GM3OGJ and GM3YOR generate a bigger problem when they state that the position of the Kingdom of Fife (the title still given to the area by GM3YOR) is out of line with the map. GM3YOR says that Fife remains a "Region" in its own right, so that the Lothians part would also be a region—but GM3OGJ goes further and says that in addition Kincardine is put in Tayside instead of Grampians region—and the map gives the Regions, their titles and their territories, as we quoted them last month. So . . . who is right?

G3KFE has already made noises to his local library for a copy of the Carpenter Report and any other documents which might help to resolve the up-to-date situation; they are not yet to hand. Therefore, in the meantime, we will take it that Fife is a region in itself and similarly with Lothians—when we publish what we hope will be the definitive, final, list, and see the situation, any adjustments to the scoring needed can also be made by entrants.

G4AKY also puts in a request for the inclusion of the *City of London* itself as separate and additional to Greater London. Looking at a suitable reference book we see that, historically, we would have to take the City of London and the City of Westminster to be at all fair; one would be pretty easy and t'other mighty difficult, but on balance it is felt that the Greater London definition adequately covers them.

Quite a few people seem to have begun an interest in this Top Band activity, and in addition there has been some more long-haul stuff about, notably during the *CQ WW Contest*.

G4AKY comments on 4X4UR heard during the contest, dishing out RS54 reports to all over Britain, the while his own signal was a handsome 59. G3LYW and GM3YCB were trying to get a contact going between WIHGT and 4X4UR which did not quite come off—but it was rather surprising to hear WIHGT on a frequency of 1847 kHz for this purpose instead of the usual 1803-ish area.

GM3YOR also operated for a while during the contest on Top Band and seems to have accounted for most of Europe as well as 4X4UR; he then changed bands and had a go at the easier stuff as we will relate elsewhere.

G2BJY (Walsall) likewise enjoyed himself on Top Band, and puts in a score which ought to give many of the chaps with tiny gardens food for thought—considering that the G2BJY patch is so small it is a remarkably efficient aerial he must have dreamed up. On a different channel Geoff was a bit needled about the SSB being used down at the CW end of the band during the contest. This is indeed a difficult one, and needs much forbearance. Basically, it is true that our informal band-plan puts CW at the LF end and Phone at the other; but when countries like PA and JA have what amount to spot-frequency allocations it would be churlish to, in effect, deny them the chance to chase DX on Phone. Probably there are only three weekends in the year when such a situation need be accepted by virtue of world-wide contests involving Top Band Phone, plus on rare occasions early in the mornings the odd chap trying to work inter-continental DX on Phone. There is no justification whatever for Phone *inter-G* working and local nattering at the LF end of the band. Similarly, of course, there is the very difficult situation that arises when some DX stations have only a patch at the HF end of the band with which to try and work into the U.K. and Europe. What is needed all round is a lot of give-and-take in both directions when the band is open for inter-continental DX *anywhere* in the band, be it Phone or CW.

G3ANQ (Wimbledon) recalls that 25 years ago, he and G3EJN set out to beat the QRM using QRP working right through the Phone stuff on Eighty, and he feels that, with both Top Band and Eighty being so vulnerable to further encroachment by commercial traffic, we should not run away from the QRM but fight through it whenever it is in the slightest degree possible; he could, with the help of the audio filter work right through the heart of a QRO phone station, with only the slightest shift of frequency—a few hundred cycles at most—to give a clear beat in the AF filter; but a chirpy signal is *hopeless* under these conditions. If lots of us brewed up QRP for the LF bands it would do a world of good in itself, G3ANQ reckons, and one of these MFJ active audio filters, type CWF-2BX, on the receiver in addition to the crystal gate or whatever, would be a mighty help.

SSB for G2HKU (Sheppey) meant his contacts with DL0PG, PA0ABM, PA0HIP, PA0PG, and PA0PN; CW accounted for DK3FQ (for the latter's first G on Top Band), OK3KFF, OK3KVE, PA9ACN/P, ZB2CJ and GW5TW. Ted noticed an odd effect, an echo rather like 144 MHz Aurora, on Top Band around 2200z on October 14, when OE, HB and DL were all coming in at good strength.

G3XTJ (Palmer's Green) has returned to the fold; he found conditions varying between excellent and mundane, but managed to hook GD3FXN, GD3HQR, HB9H, OH1NK, OH2BM, OH2BO, OH2KA, 4U1ITU and 4X4UR. WIBB/1 was heard in QSO with VP8NP around 0230z with the VP8 peaking RST 569; WIHGT, VX1KE and W2PV were also good signals. ZD3X was reported as audible in U.K. around 0500z, and 9H1BX was being called although Ed—and your scribe for that matter—were under the impression that Top Band had been withdrawn. As for the 4X4 operation this was a special licence and 4X4UR was in for the contest; he was 59 to Ed most of Saturday morning, but was having severe QRM problems which made him unable to hear the weaker stations calling him.

G4AYS (Burton-on-Trent) says he will put in his entry using CW only, on 1844-79 kHz crystal-controlled, using QRP of 600 milliwatts. Being a night-shift merchant Albert says he intends to seek his prey mainly around 0600 to 0700z—we will be very interested to see how his results show up. Already he had attracted the attention of arch-QRP specialist G2NJ, who notes that G4AYS has already worked at this power level to OLIARA, OLIARH, G13YFY and GD3FXN, which suggests that G4AYS with his milliwatts can get all round the country without much trouble.

Peter at G3ORP (Maidstone) remarks that—Murphy's Law again—not a single cheep has been heard from the LF-end "Hi-Fix" since we mentioned it last time out! It must be psychic influence, or something! W2DEO, W2UEZ, W1MZ/3 and GD4BEG were the best of the month, the W's on CW and the GD on SSB, all around 0030z; but although KV4FZ, 9H1BX, 4X4UR and PY1RO were all heard in the contest on SSB and at good strength, they could not be caught no matter what the bait used.

Farewell

The death has been reported, at the early age of 53 years, of Jim Christie, GM3FXM, on September 27 last. GM3FXM was a very fine Top Band operator, as many of those who have worked the

band in NFD or MCC will know; he put Kirkcaldy Club "there or thereabouts" several times in MCC, and subsequently did the same for Glenrothes, always by dint of first-class operating rather than the possession of a big signal. He was an active member of the F.O.C. The cremation was in Kirkcaldy, and was attended by a large gathering of relatives, friends and fellow radio-amateurs.

Eighty Metres

A first letter comes in from G3KDV (Brixham), who reckons the South-West is hardly ever represented in CDXN and proposes to do something about it—good for him! G3KDV works all bands, homebrew on 160, and 80-10 metres by way of a Trio TS-510, which gives no TVI despite being run without an ATU into dipoles—lucky chap. Aerials are a bit of a problem, in a small space, although the said small space is admirably located at 200 feet a.s.l and in the clear. For Eighty the aerial is a dipole, which for half of its length is an inverted-Vee with feedpoint at about 35 feet; the rest of it goes around the garden anywhere it will fit, almost at ground level—but it worked ZL4E on CW on two successive mornings just prior to his letter.

If you get your copy of the *Magazine* "on the button"—which you should if your newscaper is on top of his job—then you may well run across GB3RSG. This is a Scout event, namely the opening of the new Hq. of the 1st Rolleston Scout Group by the Chief Executive Scout Commissioner for Great Britain, Mr. K. Stevens. All contacts will be QSL'd by way of a suitable "special" card. The station, we understand, is to be operational over the two days November 30 and December 1, and we wish them plenty of contacts to demonstrate Amateur Radio on this auspicious occasion.

G2NJ (Peterborough) continues to notice the QRP goings-on, and this time reports that G3CEL is still doing well, although his skywire has had to have its end tied to a fence, thanks to the winds of autumn, to enable him to work G2NJ and G5NX; G5IC is another who is using QRP and getting lots of fun out of a couple of watts.

A plea from G3YRR (Grimsby) which could be applied to any of our bands, but seems to have particular point on Eighty—he says, when signing—Ruddy well sign! All we can say is "Amen to that."

Slow-Scan TV on 80m. comes up for mention this time, by G3ZPA (Bletchley). Dave points out that, in addition to the well-known 14,230 kHz spot, SS/TV can be heard on 3,640 kHz on Sunday mornings at 0800z onwards (and also on 144-280 MHz most weekday evenings). Those who were at the Leicester Show, we could add, may well have had their interest whetted by seeing the working monitor showing a slow-scan picture developing and thus giving them a better idea of what it is all about.

Eighty for G2HKU divides itself into three distinct activities,

namely QRP at one watt CW, which yielded contacts with G3DNF, at last (see last month's piece on this one!), also G12DZG, GW4CMW and SP6RE. Then, 90 watts of SSB—real QRO, this—toppled 9H1BX and QRO CW at the 75-watt mark gave UA9WS, UL7IH, and VE1ZZ. A nice spread of activity, and it sounds as though those lantern-batteries on the QRP rig are still holding out!

With so many mentions of QRP on Eighty, perhaps this is the place to revert to the letter from Rev. G. C. Dobbs, G3RJV in the October column, p.417. George has received about 20 replies so far, and there seems to be lots of enthusiasm for QRP about which has not yet indicated interest. G3RJV can count one more, at least, in G3KFE, who will be filling in George's little questionnaire just as soon as he gets CDXN off his plate and his noise-bridge firing on all cylinders, hopefully during the coming weekend. It has been suggested that, say five watts, should be taken as the "top whack" for this purpose; G2NJ has offered a trophy for some sort of QRP activity, to be decided upon, on an annual basis, and there is thought of a regular newsletter. Will all who are interested in promoting the wider use of QRP on the bands please get in touch with G3RJV to help him get this thing off the ground; he can be reached at 61 Park Street, Cleethorpes, South Humberside.

A series of trans-Atlantic QRP DX tests will be held on each Saturday and Sunday during February and March, 1975, writes G8PG (Wirral). Times will be 1130 to 1230 and 1600 to 1700 GMT, using frequencies between 14060 and 14065 kHz. DX stations will call "CQ DX QRP" during the first five minutes, European stations during the second 5 minutes and so on, in the style of the 160m. DX tests. Good U.S. participation has been promised. Reports of two-way QRP contacts and DX QRP calls heard can be sent to G8PG, *QTHR*, so that a co-ordinated summary can be produced. For the purpose of these tests QRP is taken as ten watts or under. If conditions are right two watts will produce good transatlantic signals.

Forty Metres

G3ORP first, and Peter seems to have used only CW. We note contacts with W1VW, VE1BCZ, WA1STN, W1PL, K4GSU and W2GXD.

For G3KFE, time did not permit of much in the way of an inspection of the band, but the bottom few kHz were looked at now and again; on some occasions DX was there and workable, but on others it was so dead as to bring the gear under suspicion—but no, it was possible to do a check which showed effectively zero losses right through the pass-band and up to 30 MHz before the attenuation got going—so it *must* have been conditions!

G2BJY has had a minor snag with his conversion to pastures new,

John Douglas, G2CAS, 15 Pannal Ash Drive, Harrogate, North Yorkshire, can get his power from the wind—a wooden propeller 7ft. long by 5in. wide, with metallic edge protection, drives a 135-watt six-volt dynamo to keep a heavy-duty battery on charge. An inverter steps the output voltage up to 12v. This can be used for QRP working and for emergency house lighting, with a 500-watt 120v. 60 Hz AC unit also available for higher powers—but G2CAS says that "it is pretty heavy on the batteries"! On the mechanical side, a tail-fin keeps the propeller slightly offset into wind, with deflecting springs set to give protection against over-speeding. A lever system enables the wind-charger to be put into a neutral position when it is not required or the wind speed is excessive for safe operating.



in that the assistance promised to him in the raising of his pole had to defect. Geoff recounts hearing G3TLX (who used at one time to write in) tearing away with a fast CQ, then coming down to 12's, and again to 5's, before going back to 30 w.p.m. G3TLX was called by DJØDM, but didn't get it, so Geoff popped in and gave the DJ a call. It proved to be a nice long 30-minute QSO with YL Coleen, who was sending, and clearly receiving, code, in a most expert manner, to shame most of the OM's.

G2HKU deployed his SSB on Forty to hook up with YV1BI, YV5MO, PJ9JR, VP2MSU for a new county, UK9AAN and 4X4UR. CW yielded a lone contact, with SVØWEE (Crete) who left there on October 16, to return to K8APP.

G3KDV uses his 80-metre inverted-Vee, already described, on Forty, by disconnecting the outer halves, so that it resonates in that band and with this simple arrangements, has worked Stateside on CW quite happily.

Now On Twenty

Upending the pile this time, we thus come to G3KDV again, who now turns to dipoles for this band and Fifteen, at only 12ft. of height. In this way, 14 MHz yielded CW with JA3KHQ, JA1OCA, JR1USV, VP2EY, VE3GAS, KØLWJ/HK3, FYØBHI, KP4AXM, VK2EW, VK3TG, VK3AFY, JW8IL (Bear Island); CV4C, VE1ADV and VE1AUW were also worked on SSB. Earlier sessions had produced KZ5BA, LUICA, JY8LC, HS4AFD, HP1JV, HC2DX/8 (Galapagos Is.), VP8KF, 8R1N, CX5BT, 9M2DQ, 9S4CH, FM7AD /FS7, ZD8MH, 5T5ES, JX8LC, 9L1MF, 9Y4MH, FG7AP, ZL4CO and CO2CY. Not a bad little haul, that.

Next is G2BON (Aldridge), who starts with a strong plea for the extra use of Ten for local nets, particularly after dark, as a means of spreading the load and of ensuring the band is occupied—the only real defence we have against encroaching commercials. His HW-100 was mainly aimed at Twenty, and into a G5RV aerial at 25 feet, the site being 700ft. a.s.l.; results were HX1TA, CT3AR, VP2VBH, VU2CBW, CT2BN, CR6JL, PJ9JR, VP2EEA (Anguilla), VP2AB (Antigua), VE4XJ, and VP8NP—this last, Tom says, thanks to the help of G2YX without whom he would not have landed him. Although he has 132 countries up since the DX chase was entered again, G2BON reckons he would be nearer 300, had he connected with all those lovely goways! As it is, for the 132C, only 97 QSL's are to hand, three being needed for the DXCC certificate to be obtained.

Bishops Stortford must be thicker in DX-minded amateurs than any other comparable town, what with G5VT, who sits about as near the top of the DX pile as anyone can be, plus G3RGA steadily climbing up the ladder, and now G3DNQ. Don bears an illustrious name in the DX world, anyway, the same as G3NOF—and after 22 years away from the game, the interest was rekindled in an odd way. Years ago the old ET-4336 puffed out the RF, and the "sniffing" was done by a BC-348. Then came a move from GM, 15 years in G3KFEville and a slight rekindling of interest—in VHF. Don dropped in to Bill Lowe at Matlock, to buy what he calls "one of these two-metre telephone things" (!), and instead the sight of all that nice gear caused the bug to bite again, and he came away with an FT-501 and a three-element beam—much nicer than a telephone call through a repeater! The first 60 QSO's resulted in 47 new countries, so the old flair is still there, even though now the rig sits by the favourite armchair instead of in the old-style shack of years ago. (Imagine a fireside adorned by a BC-348 and an ET-4336!). One of the more interesting 14 MHz contacts was with KV4AA, with whom long ago G3DNQ ran a regular sked—the break here was just 24 years and three weeks.

Top Band Counties

October — September

Callsign	AM	CW	SSB	Points
				Claimed
G2BJY	—	90	—	90
G4AKY	—	46	16	62
G4AYS (QRP)	—	26	—	26
GM3YOR	—	—	17	17

Each county may be worked once in each mode. AM contacts count three points, CW two points and SSB one point, a maximum of six points per county. AM contacts made by changing from SSB after establishing contact are not allowable, neither are cross-mode contacts.

Starting date October 1, 1974. Closing September, 1975.

Another QSO was VE3CQU/AM—"Antenna is only a bit of wire—but it's 33,000 feet up!"

Still talking in terms of DX, 3D6AJ, who used to be known as G3UUK, writes to say how hard it is to find U.K. stations to work, partly due the noisiest power-line in Africa just 50 yards away; he is just on the border of Swaziland and South Africa. Incidentally, his YL Gaeleen is also operational, her call being 3D6AK.

Last time round we had G5AIU reporting his results, now we have GMSAIW (Denny) from the other end of the U.K. His equipment includes a Drake T4X, with Drake 2B receiver, plus a TH-3JR, up on the roof; and from a far-from-ideal QTH, there are 200-plus countries accounted for so far. The SSB crop for this time includes AP2KS, CR6WW, EA8ET, EA8FS, EP2DB, EP2DO, EP2KS, FP8DH, H18XAW, H18XKP, HL9WI, HS2AIG, JA6LLO, KL17HR /KL7, KP4AXM, KZ5BC, LU2DNC, ODS5C, PJ2RR, PJ9JR, PJ2IAR, VE6KF/SU, TI1K, UL7BAB, UK7LAH, UK7GAL, UJ8JGJ, UK9ABA, UA9EG, UK9OAZ, VE8RCS, VK5ON, VP2GMB, VP2MSU, VP5WW, VP7BC, VU2DK, XU1DX, XV5AB, YBØABK, OE2NWL/YK, YV5BBU, YV5EED, YV1YC, ZD3U, ZD3X, 3A2GX, 4M6AW, 4W1GM, 6W8FP, 9H1CW, 9Y4NP, 9Y4VU and numerous W/K's, VE's and Europeans. However, with a rig like that, it would be a shame to give CW a miss, and so that mode was used to tangle with UØ6II, UL7BAG, UL7BAN, UL7TF, UK7EAE, UH8HAS, U18CD, U18IR, UM8MAR, UJ8JAU, UV9BD, UA9ABV, UA9CAM, UA9CAV, UA9CCL, UV9BT, UAØLAK (Vladivostok), VK5LA, W6's, W7's, ZL2GW and ZL2IR.

Once in a while a familiar handwriting re-appears, in the shape of G3UOL (Coventry); Bill still runs his Viceroy Mk. IIIA, Gelooso receiver, and KW trap dipole, with which 14 MHz SSB came up with CR6WW, DJ6QI/P/CT3, EP2DO, FP8AA, KZ5BC, OJØMA, PJ2CW, PJ9JR, TI1K, UK7LAH, UK7PAL, VP2EEA, VP2MSU, VP5WW, VU2LK and S24LW. Conditions G3UOL rates as pretty mixed, with some good periods—but hoping things will pick up as we get into winter.

GM3YOR did not just work Top Band during the contest, but also tried Twenty and Fifteen. SSB was the mode on 20m, and the results included 4W1GM, THK, VP2MSU, YV4TI, YV5EET, CX7B, CV4O, PY1FI, PY7NS and a clutch of W's.

Last time round we mentioned how G4CXM seemed to have found an accommodating landlady at Bristol, where he is studying; now, believe it or not, Ray has got the rig there, and a 14 MHz dipole erected, with the 18AVT/WB only awaiting some effort to get it airborne, and then—Heaven help the innocent DX'er who strays into G4CXM's receiver! Meantime, some operation was undertaken during the CQ WW Contest under the Worcester Club call, G8JC; although working DX was fairly easy, the essential multipliers were not, though they were certainly about. So far 14 MHz CW from the new QTH has resulted in U18OAA, UP2BBX and W1JJC, while SSB revealed PY2CK, 9H5D, CT2JAM, ODS1O, IC8HBR, IZ3GZI, IZ2ZGP, JA2CP, ZS6BOY, VE3EZT and FC2CD.

Quite a few of the 'chasers this month remark on the sad deterioration of operating standards on Twenty, and G2HKU even went so far as to get hot under the collar about it—on November 1, during his ZL3SE sked, when the latter was about S4, no less than three of the Italian stations came up on top, and all called CQ at once thereby not only lousing-up the G2HKU QSO but themselves as well. When they went over, Ted made something in the general nature of a comment on their ancestry and the provenance of their rigs, for several generations back, in particular their receivers and ears. Result—Silence! And, G2HKU admits, he also felt better afterwards; and so he should. Actually, that early-morning sked each day with ZL3SE and ZL1VN seems to have been the sum total of the G2HKU 14 MHz activity, so maybe those Wops are getting him down.

On 21 and 28 MHz

GM3YOR takes the stand first, reporting SSB contest QSO's with KP4AST, VP9GD, PT2ZBS, VP2GMB, VP2E, VP2KJ, VP5WW, ODS5C, VU2DK, 4Z4EU, ZD3X, EA8JJ, FYØBHI, 9Y4NP, H18XKP, PJ9JR, ZS1OU, LU2AFH, 5T5CJ and some W's.

G3DNQ tackled SSB on 15 metres and found 9J2KP with a rich Cornish accent (not the first holder of this call, incidentally), IJ2J/P (from the midst of a traffic jam in Milan, while in his wife's 2CV Citroen(!), GB6CF (Agalega), ZE1BP (an old buddy from GM days), ODS5C, VP2EY, CT2BN, 3B8DN, 5B4BL, CR6EM, CR7IZ, JH3EWI, ZF1WV—while the CW was almost entirely W's. As for Ten, it was largely a matter of listening to the beacons—a grand idea for telling what the band conditions are really like, reckons G3DNQ—and one contact of note, with 4W1AF. It is an instructive way to think of G3DNQ's long lay-off the air to recall that this is the first time he has even used 21 MHz—it wasn't allocated to us when he packed up!

A sudden rush of blood to the head is the only way in which your old scribe can account for G2BON—Tom actually left his beloved Twenty for long enough to work WA2SPL on October 5!

That dipole at twelve feet was quite good enough to enable G3KDV to knock off SSB contacts with PT2ZBS, WA2CBX, VP2E, VP2MSU, VP7BC and K5AJ during the period under review.

Please, when QSY'ing, say which way, and how far, you are going, appeals G3YRR to those stations who are not in a great king-sized pile-up; Charles accepts that the bloke at the sharp-end of a pile-up really has no option but to get lost if he is to stay in business, but for the others—just be reasonable! On a different theme, Charles notes the very fine 21 MHz openings on October 12, with mid-afternoon W6, W7, W5, W0 all worked—several of each—and later, in the evening, he was actually being called by VE6's! Others to be popped into the poacher's pocket included KV4, 9J2, KP4, TI and many others of lesser interest.

Still continuing with his YVMM collecting, and with the QRP game, is G2NJ. Nick notes that YV5NB/MM has been heard on the band, when the latter was near Nigeria; on the QRP front a good QSO was with TF3AX, Reykjavik, when the latter was using two watts.

Tail-end Charlie on this section of the bands is G3XTJ, who looked in on the contest, and made his number with A4XFE, CR6OR, CR6OZ, CT2BN, CV4C, EL2J, FG7XL, FY0BHI, LU8AJG, M1C, OD5IO, UF6VAD, VP5WW, VP7BC, VS6DO, VU2DK, 4W1ED, 6W8FP and 9L1JT.

Here and There

Several people have made nice comments about the G3KFE Linear recently written-up in these pages, for which thanks. G2BON, who says that his DX secret is not to go after the big signals with all the world chasing 'em, but to hunt around for the little weak ones, using low power and simple aerials—chaps who get a kick out of working out to their idea of DX with their simple gear. A good point, and possibly helping to get the QSL percentage up a bit in the long-term, too. However, Tom admits to times when a bit more steam would be of help, and wonders whether to build the 'KFE linear of put a beam up at forty feet. For this writer's money, a beam every time, and better still, both beam and linear. After all, the beam will bring up the received reports and help to get rid of QRM coming in off the back of the polar diagram. No linear does anything for received signals!

This business of Ten being dead comes up again, by way of G4CXM who noted that it was open to VK/ZL, Africa, Asia, and the Americas during the *CQ WW Contest*—yet again a question of people getting on and using it, particularly at weekends. It would not be a bad idea if we had a few Sunday-morning quick sessions, just to stir up some activity and get things rolling again; or even, a full-blooded 28 MHz contest.

On an entirely different line, G4CXM also wonders whether others have noted the 14 MHz habit, both morning and evening, of apparently closing, and then, some ten minutes later, or as long as twenty minutes, it re-opens for a spell of first-class DX before finally shutting down. Yes, and it must mean that the Earth's rotation, rather than a fall in ionisation is the cause of it all. Yet another of those fascinating quirks of propagation.

GMSAIW makes a brief comparison with operating conditions

over here; his only gripe is the universal habit of those 2 kW Italians with their awful splatter—George is being kind when he says they sometimes spread ten kHz! Certainly they have far outdistanced, in terms of sheer nuisance value, anything in the way of those creepy-crawly chirping things the Iron Curtain countries used to produce. Perhaps the Italian authorities should be pressed by the rest of the world's amateurs to do something about it.

A real old-timer is G2ARX who had his interest sparked off by an article in the *Model Engineer* in 1913, describing the making of a spark coil and coherer; he was a founder member of Stockport Club back in 1920, and is still active, with SSB gear on the HF bands, mainly Twenty, plus AM activity on 144 MHz. We've come a long way from that spark coil and coherer with which G2ARX started—and a long way since 1922 when 2ARX was first taken out.

Contests

Advance warning of the B.A.R.T.G. Spring RTTY Contest—it is set for 0200z March 22 through to 0200z March 24, 1975. It seems to be a rather similar event to previous ones, and it has always been well supported by the RTTY types. Details can be obtained from Ted Double, G8CDW, who is *QTHR*. Incidentally, if you work 25 countries two-way on RTTY, the group have a "Quarter-Century Award" which you can claim as you send in your entry. And, if you work all six continents on RTTY in the contest, then a claim for WAC may be made, and the confirmation from the contest logs will be sent on to *RTTY Journal* who then issue the Award.

One which we should all try to support is the ARRL Ten-Metre event on December 14, starting at noon GMT, and running through to 2359z December 15. W/K stations send RS(T) and state (or province in the case of VE). Others use RST plus a three-digit number from 001. Score two for a completed QSO or four if you work a Novice. Multiplier will be, for those of us outside U.S.A./Canada, the sum of the American States worked, VE call areas, ITU Regions, and DXCC countries—so it is a truly world-wide contest and not just a "work the W's" affair. The initial contest last year was well supported, and showed a lot of activity, and the same should happen this year. Try and get on for an hour or two at least, and add to the general activity level.

Forthcoming Activities

ST2AY is *ex-ZB2AY* and *ex-ZD8AY* and is operational on all bands. He is understood to be coming up on Top Band—on Thursdays at 2310, Fridays at 0010, 0110, and 0210 GMT; he calls CQ on 1827.5 kHz, and listens out on 1800-1808 kHz.

Bear in mind that for Oscar VII (now in orbit) the ten-metre action will be centred on 29.45. CW should use 29.455 MHz to 29.495 MHz, the beacon aboard will be on 29.5 MHz, and the other modes, RTTY, SS/TV included, run 29.4 to 29.455 MHz. The up-link centre frequency will be 145.9 MHz.

KC4NI will be over and done with by the time this reaches print; the intention was that they would get on for the back-end of the CQ-WW CW leg, and stay for about five days. As for Tokelau, ZM7AH sticks at his task of clearing up the demand; present plans are for him to stay till just before Christmas, and during that time he may be heard on Top Band, around 1810 kHz, 1875 kHz and 1910 kHz.

At the time this hits the bookstalls, VP8MS should be on from South Georgia, until around December 7, on present information.

Also during the first week it will be worth while cocking an ear in the general direction Trinidad, where we hear that a PY1ZAE may be active for a couple of days.

In the planning stage is an expedition by VS5MC who hopes to activate Spratly (of blessed memory!) by operating from Barque Canada Reef—this is targeted to around the late-December period, but not certain as yet.

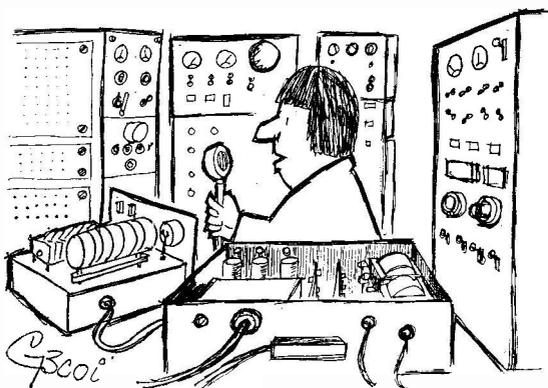
Perhaps a New Year treat—along with the bills! is an operation from Chad, probably under the call TT8AC, by *ex-XV5AC*.

That YL DX-pedition to Chatham did some fine work, and carried on after the contest concluded; it was possibly a "dummy run" for a future DX-pedition to the Kermadecs, may be in January.

For the prefix-hunters, 3Y3CC and 3Y5DQ will be on from Ellsworth Land running from mid-November through to the latter end of January; try looking for them on Twenty, around 14040, 14140 or 14340 kHz.

Finale

We seem to have to run out of space; so some QSL addresses are being held over till next time round. For our next, the deadline will be a bit tight, at December 9. The address is as usual "CDXN," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK18-1RQ. And, meantime, your conductor's Best Wishes for Christmas.



“ . . . What I like about Top Band is the simplicity of the gear . . . ”



General view of the Hall for the Amateur Radio Retailers' Association annual Exhibition at Leicester, October 31 to November 2. This picture was taken at about 3.0 p.m. on the Friday. There were 30 Trade Stands and the total attendance was over 6,000. By the Saturday afternoon several of the exhibitors had sold out of all they had brought with them. The Exhibition was again an unqualified success.



Brian Rix, G2DQU (centre) was the guest at the Doram stand at Leicester on October 31. He drew the prize vouchers for a competition sponsored by Doram, the Leeds firm specialising in by-return mail order in the field of electronic components, kits and accessories for the amateur. With G2DQU (of the Whitehall Theatre, London) are, left, Mr. Frank Chable, Doram's managing director, and Mr. Don Turner, a director of the parent Company.



The organisers of the ARRA Exhibition were G3TED, of Taurus, Loughborough (left) and Tom Darn G3FGY. They now have the experience of three shows to draw on for the future.

COMPACT INDOOR GROUND-PLANE AERIAL

DATA FOR THREE BANDS

H. C. BAILEY (G2CUJ)

THE author has for some time been experimenting with various types of indoor aerials for the 14, 21 and 28 MHz bands. The requirements were that they should be (a) small and compact and (b) could be built in a roof space or loft—and if erected outdoors would be inconspicuous. An article on an unusual VHF ground plane aerial stimulated some more ideas. This VHF aerial was first described by J. M. Boyer in 1963 and consists of a broken ring mounted above an earth mat or another continuous ring at earth potential. The aerial is known as the D.D.R.R. (Directional Discontinuity Ring Radiator) and when in a horizontal position is vertically polarised.

It was desired to use wire for the elements. Because of the difficulty of constructing a suitable framework to support a ring-shaped aerial it was decided to try out an equilateral triangular (delta) shape on a simple frame of strip wood.

Basic Design

The basic design as eventually evolved is shown in Fig. 1. The radiator is a triangle of wire broken at one corner and spaced above a continuous triangle (the ground plane). One end of the radiator is coupled to the feeder by an inductance and variable capacitor and the outer braid of the feeder connected to the ground plane wire. Details of the wire lengths, coils and variable capacitors are given in Table A. The wire lengths are those found to be optimum after a number of tests and are about 25% longer than the normal ground-plane for each band.

Construction

A wooden framework (Fig. 2) was made from 1½ in. x ½ in. wood strip and the spacers from half-inch wooden dowel rod. The measurements for each band are given in Table B. Holes are bored through the dowel spacers ½ in. from each end just large enough to pass the wire through. Thread the ground-plane wire on first and join the ends together at corner "A" leaving 3 in. surplus for connection to the feeder. Next, thread the radiator wire on, starting at the same corner spacer, leaving about 3 in. for connection to the coil. The free end of the radiator wire should finish a few inches from the corner spacer and should be supported by an insulator fastened to the spacer rod. The tapped coil and variable capacitor are mounted on a small piece of hardboard screwed to the wooden frame near the spacer dowel at corner "A." Connect the tapped coil to the radiator wire and to the capacitor. The inner conductor of the 75-ohm coaxial feeder is connected to the other side of the capacitor and the outer braid to the ground plane wire. A radial wire must also be attached to the ground-plane wire. The metal inserts from cable connectors were used to make the various connections, enabling any necessary adjustments to be easily made.

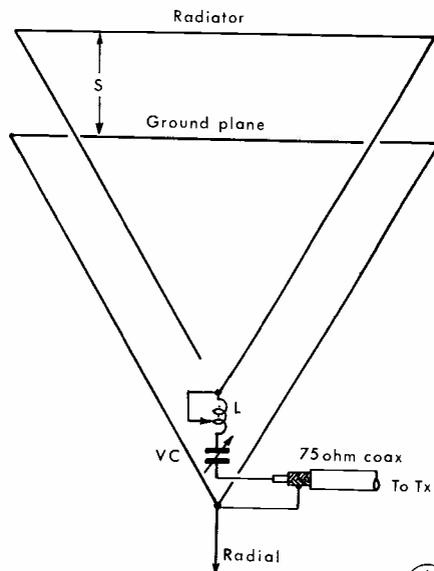


Fig. 1 BASIC DESIGN

TABLE A

Band MHz	Total length of wire		Radial	(S) Spacing	Variable Capacitor pF
	Radiator	Ground Plane			
14	20' 6"	21' 0"	17' 0"	7½"	200
21	13' 9"	14' 0"	12' 6"	4½"	150
28	10' 6"	10' 9"	8' 6"	3½"	100

Notes: Coils—use a 15-turn tapped coil (16g. enamelled wire, 8 t.p.i.) on one-inch former for initial tuning and then substitute a self-supporting coil with the required number of turns. Variable capacitors should be wide spaced transmitting types. Maximum capacity not critical. Length of wire for ground plane element includes 3 in. for feeder connection.

Tuning

One unusual feature of this GP aerial is the coil and capacitor tuning network. The reason for this arrangement is that the radiation resistance of a normal ground plane is comparatively low and when the radiator has a number of bends and brought very near to the ground plane wire the radiation resistance is extremely low, probably less than one ohm. The matching network overcomes the problem of feeding the aerial and 75-ohm coax was used with the prototype.

An SWR bridge is needed when tuning this aerial. Tune up the Tx on the selected frequency in the usual manner. Connect the coax feeder through the SWR bridge to the Tx. No ATU is necessary. Feed in a little RF and tune the aerial variable capacitor to obtain the

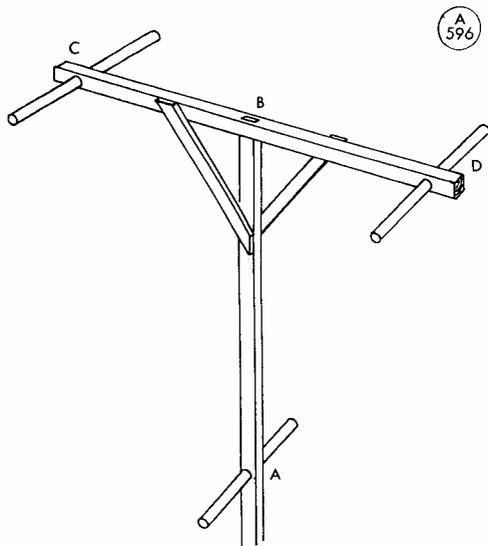


Fig. 2 SUPPORTING FRAMEWORK of wooden construction

TABLE B

Band MHz	Frame ($1\frac{1}{4}$ " \times $\frac{1}{2}$ " wood strip)		$(\frac{1}{2}$ " dowel)
	A — B	C — D	
14	6' 2"	7' 1"	8 $\frac{1}{2}$ "
21	4' 2"	4' 9"	5 $\frac{1}{2}$ "
28	3' 2"	3' 8"	4 $\frac{1}{2}$ "

Notes: The three dowel spacers are fixed through holes bored one inch from the ends of the frame. Spacers are bored $\frac{1}{2}$ in. from each end to thread the wire through. The length A—B may be extended as shown if it is desired to mount on a pole or mast.

lowest SWR. If the SWR is high try adjusting the tapping point on the coil and varying the tuning capacitor until the lowest SWR is found.

The prototype for the 14 MHz band was tuned up at 14.2 MHz and the SWR obtained was 1 : 1 and without alteration to the aerial tuning the ratio was 1.05 : 1 at 14.35 MHz and 1.3 : 1 at 14.0 MHz. When the best tapping point on the coil has been found a coil with the required number of turns can be substituted for the

tapped coil, thereby avoiding any losses in the shorted section of coil.

Results So Far

The writer is only able to operate on the air for occasional sessions of one or two hours either morning or afternoon, when activity on the HF bands is not usually very high. Also, due to the present propagation conditions, testing has, so far, been confined to the 14 MHz band. The aerial has been suspended horizontally across a first floor room at picture rail height with the radiator wire nearest to the ceiling. This allows free movement in the room and also is convenient for tuning and/or adjustment. The radial wire runs around the floor of the shack. The attitude of the aerial, horizontal or vertical does not appear to make any difference to signal reports.

An analysis of the first 170 QSO's, using a transceiver running 180 watts p.e.p. on SSB, gives a total of 33 countries worked including JH, JX, OY, W1, W2, W3, VE8, 9N and a /MM off San Remo. A breakdown of the

signal reports gives 62 x S9, 44 x S8, 31 x S7 and 33 x S6 or less; 51 CQ calls produced 41 QSO's. These reports are comparable to those obtained on the same band in similar conditions with an inverted-V trap dipole aerial. Experiments will be continued with the same type of aerial on the 21 and 28 MHz bands when conditions improve.

Conclusions

This type of aerial does work and gives good results. Some of its advantages are:

- Is compact and requires little space compared with the orthodox type of aerial. A 7 MHz compact groundplane would require a triangular loop with only 12ft. sides.
- Easy to construct,
- Measurements not too critical,
- Simple tuning—no difficulty in obtaining 1 : 1 SWR and wide band width,
- If erected outdoors looks like an unusual Band I TV aerial but would require a more substantial framework to withstand strong winds,
- Does not require an ATU or balun,
- Is omnidirectional,
- Cost is low.

There is scope for further experiments with this basic design. Circles or squares of wire may give better results. Other methods of feeding the aerial can be tried, e.g. tapping the feeder between the radiator and the ground-plane wires. No doubt there are many variations that would be devised. Anyway, try the aerial and see what you think.

To keep in touch with the world of Amateur Radio, read "Short Wave Magazine" regularly —

Independent, Unsubsidised and now in its 32nd volume.

CRYSTAL-MIXER VFO

BASIC CIRCUIT DESIGN FOR CW BK

W. G. JOHNSON (G2BJY)

THE writer, having listened to some fine "break-in" CW operation on 14 MHz, came to the conclusion that this was for him, and as a first step to this end, a crystal mixer VFO was designed and built.

Perhaps at this point one should very briefly outline the technique involved. Consider a basic multi-band CW rig; it starts with a VFO, runs through a string of multipliers, and ends in a PA, which is always energised either at VFO frequency (not good practice but often done, especially for Top Band) or at a direct multiple of VFO frequency. Such a system has drawbacks: First, because the output is at a harmonic of the drive frequency, to work break-in one must either screen the VFO to an almost impossible extent to avoid its harmonics radiating enough energy to be heard as a heterodyne in the receiver, or one must key the VFO itself, which *must* lead to clicks or chirps in consequent demanding sequence-keying to keep them at home, this in turn implying that the clicks will almost certainly be painfully audible in the station receiver.

Secondly, and in many ways more important, is that energy from the PA will surely tend to find its way into the VFO, so that, at worst, there will be instability, and at best, the output frequency will "pull" as one tunes up the PA into the aerial. Thirdly, both drift and pulling effects are multiplied by the number of times the PA frequency exceeds the VFO frequency. For example, a VFO on 1.750 kHz might have a drift from cold of, say, 500 Hz, which is tolerable as a warm-up drift; multiplied by sixteen to come out at 28 MHz, this VFO would drift *eight kHz*, which is quite definitely *not* acceptable!

Mixer-VFO Technique

The idea of the so-called mixer-VFO is the answer to all these problems, although very rarely used until the greater stability requirements of SSB transmission made people realise how useful such extra stability in both receiver and transmitter could also be on CW.

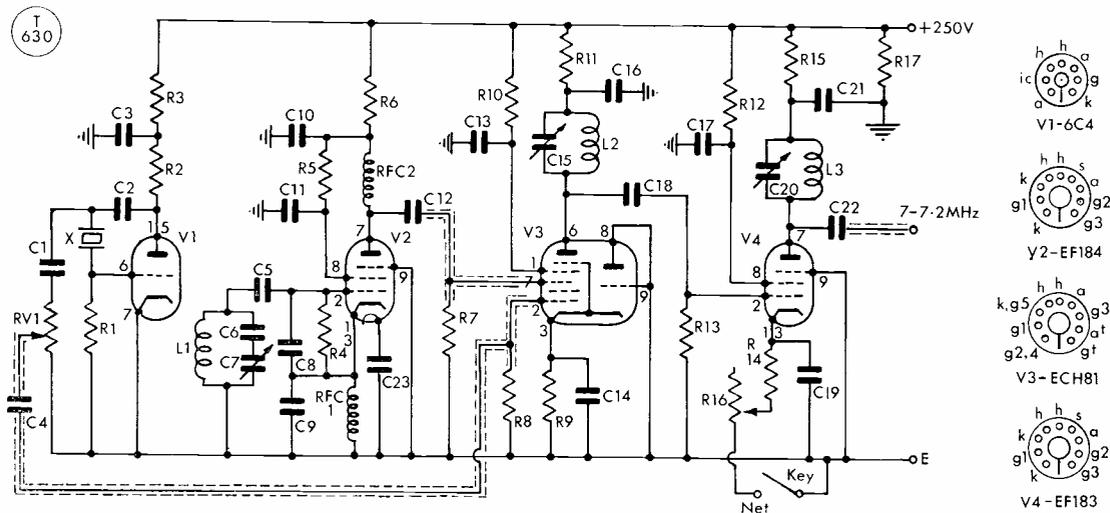
Basically, one takes two oscillators such that when mixed together in a suitable circuit, the output signal selected comes out directly on an amateur band. Such a combination could be a 9 MHz oscillator and a VFO covering 5.0 to 5.5 MHz. When mixed, if one takes the sum-frequency output the coverage is 14.0 to 14.5 MHz, whereas taking the difference output of the mixer results in 4.0 to 3.5 MHz, the dial tuning the band "backwards," as it were. In either case, the keying of the mixer removes any signal at the output frequency thus making break-in possible without keying the oscillator, while tuning up will not cause pulling as the PA RF is nowhere near

Table of Values

Mixer-VFO Circuit

- | | |
|---|--------------------------------------|
| C1 = .001 μ F, mica | R6 = 51,000 ohms |
| C2 = 0.1 μ F, mica | R7, R8 = 100,000 ohms |
| C3, C10, C11, C13, C14, C16, C17, C19, C21 = .005 μ F, disc ceramic | R9, R14 = 330 ohms |
| C4 = 68 μ F, mica | R10 = 27,000 ohms |
| C5, C6 = 220 μ F, mica | R11, R15 = 5,100 ohms |
| C7, C15, C20 = 100-300 μ F | R16 = 10,000 ohms, linear taper |
| C8, C9 = .001 μ F, silver mica, close tolerance. | R17 = 22,000 or 27,000, 10w. |
| C12, C18, C22 = 100 μ F, mica | RV1 = 25K ohms, carbon track, linear |
| R1 = 51,000 ohms | L1, L2, L3 = see text |
| R2, R3 = 33,000 ohms | RFC1 = 5 mH |
| R4, R4 = 10,000 ohms | RFC2 = 2.5 mH |
| | X = crystal, see text |
| | V1 = 6C4 |
| | V2 = EF184 |
| | V3 = ECH81 |
| | V4 = EF183 |

(All resistors 1-watt hi-stab unless otherwise specified)



Circuit of the Crystal-Mixer VFO

the frequency of either oscillator. As for drift, if both oscillators drift in the same way, the output is at the sum of the two levels of drift, *e.g.* 200 Hz only if both oscillators drift 100 Hz; but if the drift is in opposition, one may well end up with less drift than that in either oscillator.

Against all this, one must admit the output will be low, but this can be dealt with simply by adding a stage of amplification.

Construction

Mechanically, the unit goes on a chassis measuring about $8\frac{1}{2} \times 5\frac{1}{2} \times 2\frac{1}{2}$ inches deep, and a front panel of $8\frac{1}{2} \times 6\frac{1}{2}$ in. On this panel is mounted the VFO tuning capacitor and its slow-motion drive, also RV1, R16 (which serves as the drive control to the transmitter), the netting switch and an open-circuit jack socket.

Now to the circuit. V1 is a Pierce oscillator at, in the prototype, 5514 kHz, its output to the grid of V3 being adjustable by RV1, with the circuit values chosen so as to hold the power in the crystal down to a minimum as modern "rocks" aren't meant to be as beefy as their old-time counterparts. V2 is the VFO part of the circuit and tunes from 1450 to 1800 kHz, giving plenty of overlap, using the Colpitts oscillator; C6 is to pad down C7 to a suitable value. Output from both V1 and V2 is quite low; RV1 is set to bring the output of V1 to the same as V2, about one volt at the respective grids of the mixer V3. Output of the mixer is selected to the required frequency by L2-C15, and so presented to the amplifier V4, to come out at 7.0 to 7.2 MHz for 14 MHz operation.

Mechanical layout now: V1, V2, and V3 run from front to rear of the chassis, with tuning capacitor C7 to their right as seen from the front panel. This leaves room nicely for V4 and L3 to sit on the left, near to the output socket on the back drop of the chassis.

L1 has 100 turns of wire, 20g. enamelled, on a one-inch former. In the original, L2 and L3 were two halves of one of the Pye strip IF transformers, each with ten turns added. Alternatively, one of the noval-based plug-in coil-formers could be used, screened by a skirted valve holder as the base and an ordinary valve-can surround; in the latter case it will have to be grid-dipped on to the band, to tune with the 100 $\mu\mu\text{F}$ trimmers. Indeed, a grid-dipper should be to hand anyway, to save much laborious fiddling before "finding the band." One wonders how we ever managed before the GDO was invented! (*Denco* Range 4 coils should "hit the band" nicely.)

Setting-Up

Plug a length of about a yard of co-ax cable—the length should be enough to reach the input socket of the transmitter—with one end into the output socket and the other end near the aerial socket of the receiver. Set the receiver accurately to 14.000 MHz. Unplug the crystal from the unit, and switch on and allow to warm up. Tune the VFO, and the 8th harmonic of the VFO on 1750 kHz should be found near minimum capacity. Insert the crystal, and tune further down until the—much stronger—second harmonic of the 7 MHz mixed output can be heard in the receiver. Trim L2 by C15, and L3 by C20, for maximum output. It may well be

found that this last adjustment can be given a further slight improvement once the completed crystal-mixer VFO is plugged into the mating transmitter.

Results

Once set up as described the unit was put into service and has given no trouble. For the cost of one capacitor and the crystal, the rest being out of the junk-box, a unit has been constructed which gives one the ability to net first, tune second and still know one is accurately on the desired frequency; and of course anyone who has used break-in CW will not easily revert to the crude methods normally used. Add to that, the unit has proven reliable in service and gets its T9x reports. Altogether, a pleasure to build and a greater to operate.

Conclusion

Not all of us can afford, or have the wish for, commercial equipment: but with this unit driving into a single multiplier stage and PA, one can have world-wide communication on full break-in CW, made out of a few bought parts, the innards of a junked TV set for the valves and small parts, some scrap metal for the chassis, and a power-supply. The whole station, apart from the receiver, could go together for less than a tenner and a few hours of work.

PRODUCT DETECTOR FOR THE EDDYSTONE 730/4

IMPROVED CIRCUIT

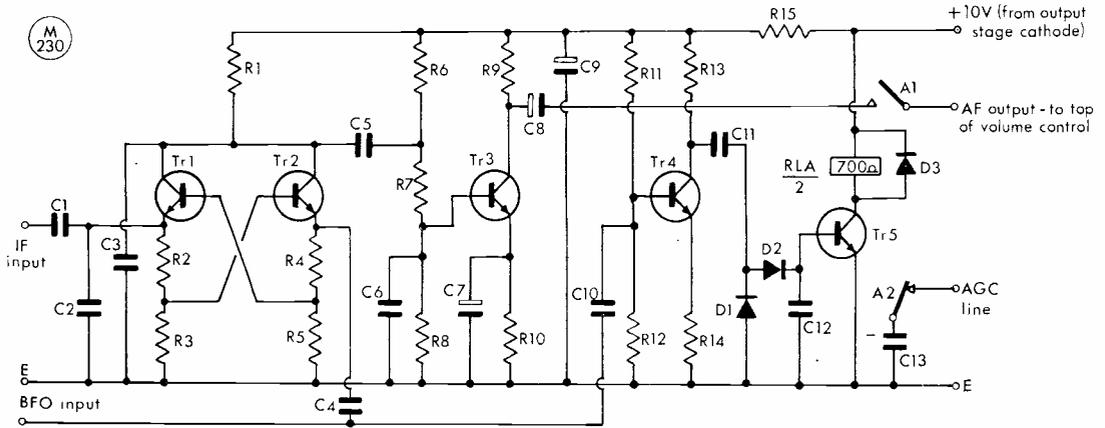
D. A. S. DRYBROUGH (G8HEV)

THE circuit for a product detector for the Eddystone 730/4 receiver—published in the March 1974 issue of *SHORT WAVE MAGAZINE*—suffered from one or two minor difficulties. One was that of modifying the band-width switch to accommodate the new wiring and the other was the restriction of the SSB mode to one band-width. Some complaints have also been received about low audio gain. A new circuit is presented herewith which meets all these objections.

The cross-coupled mixer circuit with one audio amplifying stage is retained, with added gain in the amplifier to boost audio output. The values for R2, R3, R4 and R5 are not critical, nor is the collector load, R1.

To avoid the need for any external switching it was thought that the BFO itself should switch in the product detector, and this has been achieved by adding an isolator/amplifier stage, Tr4, for the BFO voltage. This feeds a voltage-doubler rectifier, D1 and D2, and the positive signal produced turns on Tr5 which operates a miniature relay A/2. One contact switches the audio output from Tr3 to the top of the volume control and the other adds C13 to increase the time constant of the AGC line.

The whole unit can be made up on a piece of *Vero-board* not exceeding $4\frac{1}{2} \times 2.5$ ins. and the relay must be less than one inch above the board. This assembly can then be inserted in the set alongside the coil box and



Improved SSB Product Detector for the Eddystone 730/4 Receiver

parallel to the bare HT line and is held in by a clip fixed under one screw in the coil box cover. The leads feeding in the IF and BFO voltages should be screened, but the audio lead is short and needs no screening. The DC supply voltage is taken from the cathode of the output stage as before. If a great deal of time is to be spent on SSB it might be an improvement to increase the existing cathode resistor from 680 to 820 ohms, but this is not necessary for normal use of the set.

Table of Values

Product Detector for the 730/4

C1, C4,	R10, R13,
C10, C11 = .01 μ F	R15 = 1,000 ohms
C2, C6 = .005 μ F	R11, R12 = 33,000 ohms
C3 = .022 μ F	R14 = 270 ohms
C5, C12,	D1, D2,
C13 = .33 μ F	D3 = 1S130, or equiv.
C7 = 16 μ F, elect.	Tr1, Tr2,
C8 = 4 μ F	Tr3, Tr4,
C9 = 125 μ F, elect.	Tr5 = BC 108, or similar
R1, R9 = 5,600 ohms	RLA = Min. relay, 700 ohms, two c/o
R2, R4 = 470 ohms	
R3, R5 = 2,200 ohms	
R6 = 330,000 ohms	
R7 = 47,000 ohms	
R8 = 150,000 ohms	

ANOTHER APPROACH TO SPEECH PROCESSING

SYLLABIC COMPRESSION WITH LOW-PASS FILTERING

K. W. PERFECT (G3FIK)
(Amateur Electronics U.K.)

THE benefits of a well-designed and efficient speech processing system are appreciated by many amateurs today, but for those who have not given much thought to the subject, the following advantages are well worth consideration:

- (1) An immediate significant increase in effective radiated power with a minimum of modification to existing equipment,
- (2) The outlay of a far smaller sum in the achievement of this when compared with the purchase of a proprietary Linear Amplifier,
- (3) The space saving gained by the incorporation of a speech processor in comparison with a Linear Amplifier,
- (4) The saving in running costs compared with a Linear Amplifier which at today's

rates for electrical power is a point well worth taking into account.

Practical Problems

The foregoing sounds a little too good to be true and experience has shown that some unsophisticated non-RF type speech slippers/compressors, whilst apparently achieving these aims, only do so at the expense of

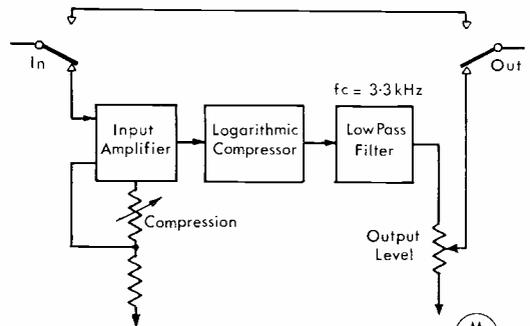
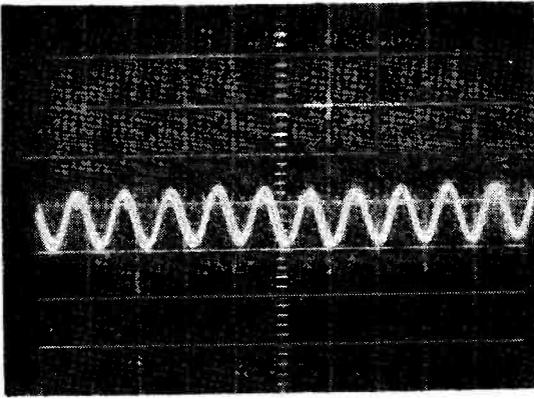
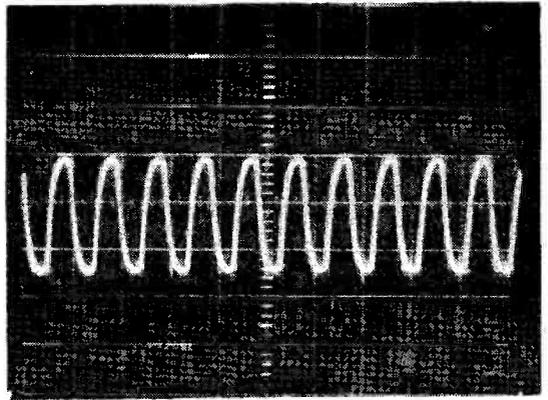


Fig. 1

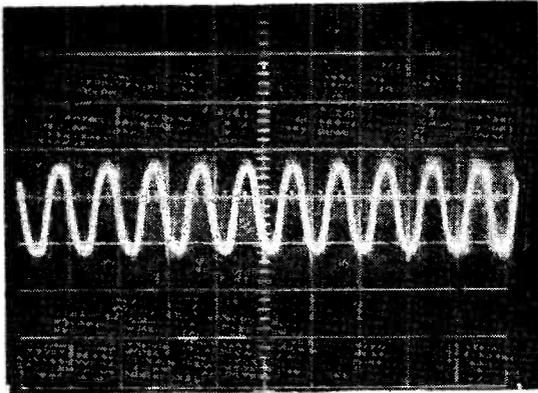
Fig. 1. Block schematic of the Planet 808 Compressor



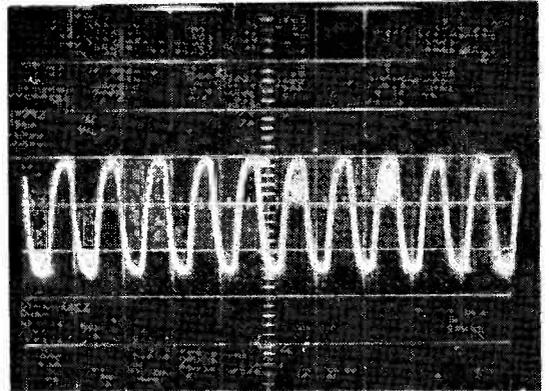
(A) With zero dB compression



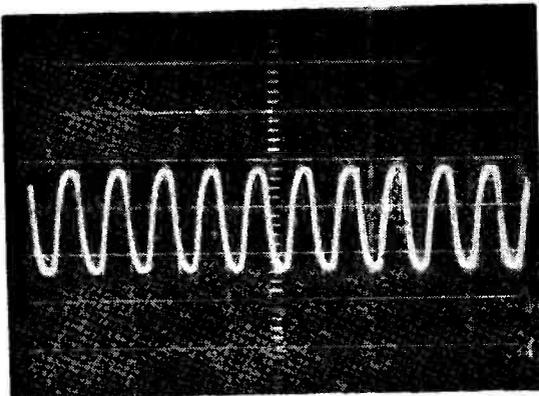
(D) Compression at 30 dB



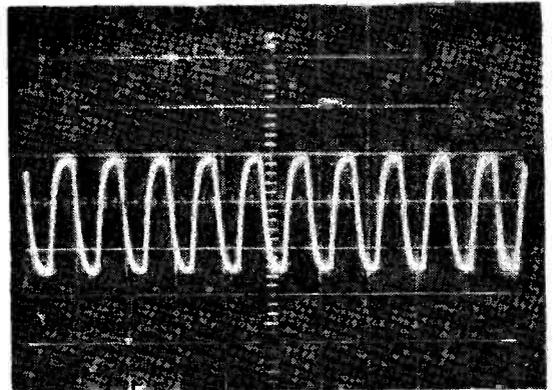
(B) With 10 dB compression



(E) Showing 40 dB compression



(C) 20 dB of compression



(F) With 50 dB compression

All curves taken with trace at 1v./cm with 1000 Hz input.

signal quality which in extreme cases can be severely degraded. Admittedly, at low signal levels, distortion can be kept to an acceptable degree, but this quite obviously negates the very object of the exercise.

Taking all this into consideration, it was decided to produce a design which meets the requirements of the ideal speech processor without the complications encountered in RF speech processing, with the resultant problem of production costs. Considerable design effort was expended to this end and the results of this have been incorporated in the recently introduced *Planet Model 808*.

The design utilises a logarithmic (syllabic) compressor followed by an abrupt cut-off low-pass filter. By the combination of these two features a valuable increase in talk-power can be realised with a perfectly acceptable level of distortion.

Test Results

The photographs show the waveforms achieved with this system, which employs an instantaneous logarithmic compressor circuit applied to a 3·3 kHz filter having a cut-off rate of 60 dB/decade, as in Fig. 1. The resultant distortion over a comprehensive range exceeding 40 dB is typically 5 per cent, this level being completely acceptable due to its lack of high-order harmonics, as the waveforms confirm. On-the-air tests indicate a practical gain approaching 10 dB with a circuit which, due to its relative lack of complexity, is capable of quantity production at an economic level. The inherent design of the circuit largely obviates the problem of flat-topping, which is a serious disadvantage commonly encountered with simple speech clippers.

Conclusions

For the operator who requires to improve his effective

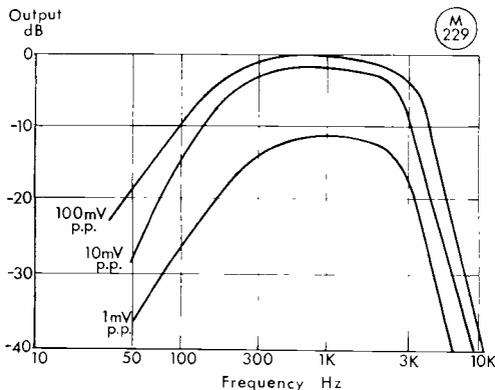


Fig. 2

Fig. 2. Typical Input/Output characteristics of the Planet Speech Processor

radiated power significantly without incurring odious comments upon the quality of his transmission the circuit evolved will certainly be satisfactory in every respect. Furthermore, due to the economies effected by careful design, the cost will not be inordinate. Whilst all designers are naturally biased in favour of their own efforts and the author makes this statement conscious of the fact that it must be applied without exception, "the proof of the pudding, etc." is a very relevant factor and extensive on-the-air tests have brought some excellent and most gratifying reports from completely non-partisan fellow operators.

DUAL-CHANNEL MONITOR

RECEIVER REFINEMENT

D. E. KNOWLES, Tech. (CED), G3UVA

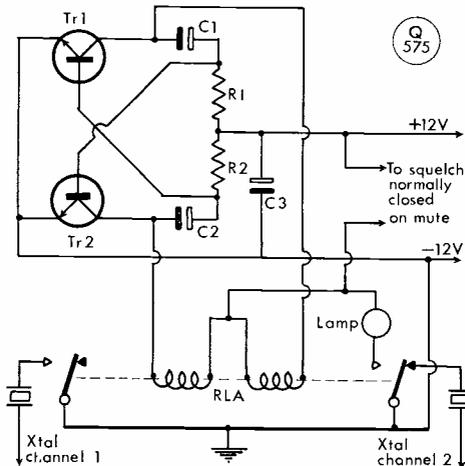
DUE to there being much two-metre activity on a local net channel, it was felt that some form of search receiver would be useful. This would enable two channels to be monitored, *i.e.*, 145·00 MHz plus one other frequency. A Pye PTC-3002 base station was to hand so it was decided to use this equipment rather than modify the main 2-metre receiving set-up. As the most convenient arrangement would be to have the search receiver muted, the modifications were drawn up to achieve this.

First Trial

The normal method of using more than one crystal is to connect the unused crystals to ground so it seemed that a relay could be used to ground each crystal in turn. It is quite simple to activate a relay; a flip-flop type of circuit will operate a small low-current relay. A simple change-over type was tried first; the antenna relay from a Pye receiver will work on 9 volts.

The circuit will need a load for the second transistor,

and for this a 6-volt lamp is suitable—it can also function as a panel lamp which flashes to give an indication that the



Circuit of the Monitor Unit, for which values can be: C1, 100 mF, 50v.; C2, C3, 100 mF; R1, R2, 10K; Tr1, Tr2, BC108 or similar; RL, double-coil miniature relay, see text; and Lp, 12-volt.

receiver is searching.

However, this system proved to be unsatisfactory, as the requirements were that the receiver would lock on to a signal appearing on either of the two channels. To obtain this facility the two contacts on the squelch relay, closed when the audio is muted, are connected in the supply line to the search unit. This means that when a signal appears on one channel the receiver squelch relay will operate, thereby breaking the supply to the search unit, which will then stay locked on the channel until the signal ceases. Without a signal the squelch relay operates and the supply is restored to the search unit, returning it to the automatic condition.

It will be apparent that with an antenna change-over relay the device can only lock on to one channel (the one connected to the relay in the rest position). To overcome this a double-coil miniature relay was used, the type which will rest in either position depending on the coil last energised. If such a relay is not available two separate change-over types can be used, bearing in mind that these

should be of a type enabling the connections to be kept short.

Practical Application

In the present set-up the unused contacts on one relay are connected to an indicator lamp which flashes when the unit is operating. With a 12-volt supply the relay used flicks 40 times per minute, which is quite long enough for the squelch to function and allow the relay to lock on.

The supply for the unit can be taken from a voltage doubler circuit, suitably smoothed, off the heater circuit or the receiver.

Using small components quite a compact module can be made up taking up very little space and it should fit inside most receivers.

The receiver can be made to lock on to either channel by increasing the squelch control setting (when the audio is on the search unit is inactive), or by fitting a push-button across the squelch relay contacts which should be held in until the relay selects the desired channel. The circuit shows the method of connecting the relay. It is worth experimenting with it.

AN AUDIO/VIDEO MODULATOR

FOR PA SCREEN CONTROL

B. KENNEDY (G3ZUL-G6AGT/T)

THIS article describes the construction and setting up of modulator suitable for a 70 cm. transmitter utilising a QQVO3-20A, QQVO6-40A—or valves of the 4CX or 4X type. There are many 70 cm. operators (actual and pending) who the author feels are put off having a shot at amateur television (A/TV) for a variety of reasons. This article is intended to demonstrate that it is a relatively simple matter to sound and video modulate a 70 cm. signal.

Circuit Considerations

In conventional amplitude modulation the input frequencies are usually of the order of 60 Hz-3.5 kHz and vary at a syllabic rate between these two values. In a video signal comprising of synchronisation pulses and video information the signal can lie between the frequency levels of DC and 3 MHz (in the case of 405 lines). This introduces quite an obvious problem, *i.e.*, no transformers can be used in the modulator. This calls for the use of DC coupling throughout with the consequent loss of peak power since a 100% amplitude modulated signal has a peak power twice that of the carrier but a video signal of the same level (known as peak white) has a level equal to that of the carrier. Therefore, the signal level is varying between zero and full carrier output at a rate of anything up to 3 MHz.

Circuit

The author makes no excuse for the use of valves. Having tried transistor modulators and found them susceptible to any voltage spikes that may be on the line, the inherent problem of DC coupling already explained

can cause the transistors to go down without even a puff of smoke for your money.

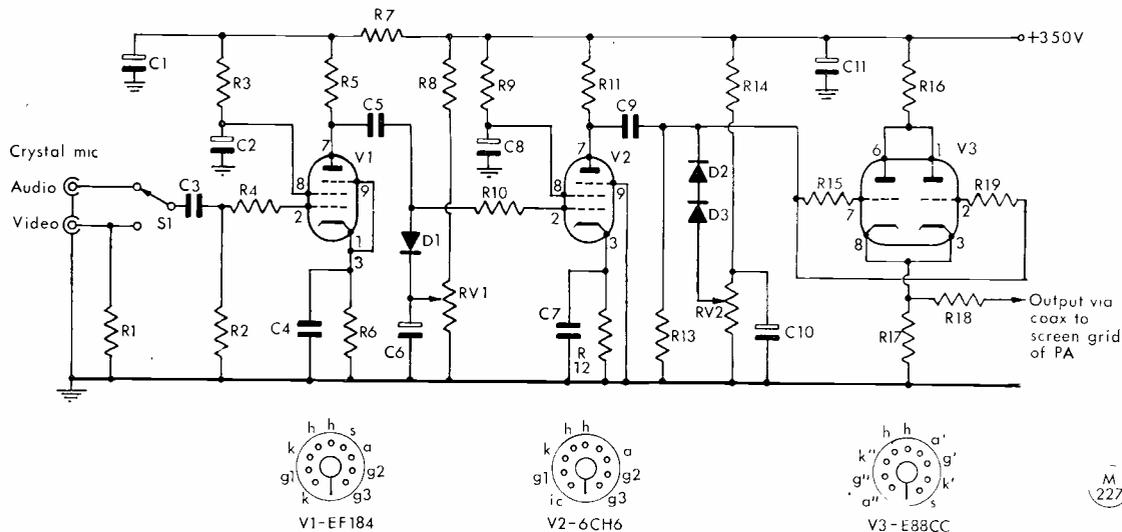
The vision source, which must be capable of producing 1v. into 75 ohms impedance (this level being that which most CCTV cameras produce) is fed to the input socket terminated in 75 ohms. From here it is voltage amplified and eventually passed to a low-impedance phase splitter arrangement. The output from this feeds a voltage, varying in sympathy with the applied video (or audio), to the screen grid of the PA stage of the 70 cm. transmitter.

Construction

The author has found that the best approach is for the constructor to imagine he is building a very hi-fi amplifier. The prototype is built in a chassis measuring $6\frac{1}{2} \times 4 \times 2$ in. Front panel controls are the switch for audio/video, the camera and microphone being permanently connected to the modulator and the switch selecting either camera or microphone input, also the bias control and the carrier insert control. It is essential that the 100-ohm resistors R4, R10, R15, R16, R18 and R19 be mounted as near to the valveholder pins as possible.

Setting Up

To prevent instability the PA of the 70 cm. transmitter must be decoupled both at video and audio frequencies. This is simply accomplished by connecting both an 8 μ F and a .01 μ F capacitor each from the HT feed to the PA and ground (be sure the electrolytic is adequately rated for your particular supply voltage). With all supply voltages on and the modulator switch in the video position (camera output to modulator video input) and with the carrier insert control RV2 to zero (no RF from PA) video modulated RF will appear from the transmitter. Monitor the RF output and slowly increase the bias control RV1 from zero when a point will be reached when the RF output increases, continued



rotation of the control will eventually cause a decrease in output. It is at the position just before the RF output decreases that the control should be left. Switch to audio and check that the carrier control on rotation brings the RF output from zero to full. Set the control such that 70% of full carrier is being produced and modulate when the RF output will increase in sympathy with your voice. This is in fact screen grid modulation and due to the absence of transformers and the use of DC coupling will produce audio of a good hi-fi quality. On returning to the video position remember to turn the carrier insert control RV2 to zero.

A considerable number of these modulators have been built in the Midlands area and each time they have been first starters and produced very satisfactory results.

Video | Audio Modulator

Table of Values

Circuit of the Audio/Video Amplifier

C1, C11 = 32 μF, 450v.	R6 = 270 ohms, ½w.
C2, C8 = 16 μF, 450v.	R7 = 22,000 ohms, 5w.
C3, C9 = 0.1 μF	R9 = 15,000 ohms, ½w.
C4 = .005 μF	R11 = 10,000 ohms, 10w.
C5 = 0.47 μF	R12 = 470 ohms, ½w.
C6 = 250 μF, 16v.	R13 = 10 megohm, ½w.
C7 = 470 μμF	R14 = 100,000 ohms, ½w.
C10 = 10 μF, 63v.	R17 = 10,000 ohms, 5w.
R1 = 75 ohms, ½w.	RV1,
R2 = 1 megohm, ½w.	RV2 = 5K pot'meter
R3 = 10,000 ohms, ½w.	D1, D2 = OA81
R4, R8,	D3 = BY100
R10, R15,	V1 = EF184
R16, R18,	V2 = 6CH6
R19 = 100 ohms, ½w.	V3 = E88CC.
R5 = 3,900 ohms, 5w.	

PRODUCING SEMICONDUCTORS

NOTE ON MANUFACTURING PROCESSES

I. B. POOLE, B.Sc. (Eng.), G3YWX

IN the past comparatively little has been written about the techniques used in making semiconductor devices. As transistors, diodes and many other such semiconductors are now in everyday use it was thought that some information on the subject might be of interest. This article only sets out to give a brief and very basic introduction to what is an extremely complicated subject.

Refining of the Basic Semiconductor

Semiconductor devices in general, and especially field effect transistors (FET), require a very high degree of purification of the raw materials to enable them to operate well. This was one of the major factors holding back the development of the transistor, and it was the reason why the field effect transistor did not appear until the 1960's,

though the FET effect was appreciated in the late 1940's, when the transistor was discovered.

The method used commercially to refine the semiconductor is known as zone refining. This was developed by Pfann at the Bell Laboratories (U.S.A.) in 1938. The idea was so simple that he assumed it must be widely known, and accordingly he did not publish anything about it for ten years!

Zone refining is based on the fact that impurities are generally either more or less soluble in the solid semiconductor than the liquid. Therefore if a bar of, say, germanium is passed through several RF heating coils (see Fig. 1) the impurities will collect at either end. This assumes that the semiconductor is moved slowly enough for the impurities to diffuse uniformly throughout the liquid. The molten zones are generally about 2 cm. long and 10 cm. apart, with five zones in all.

This is simple enough for germanium, but silicon is quite a different problem. This is because at its melting point silicon will combine with its container. The solution to this was, of course, to dispense with the container (see Fig. 2). The system may seem rather unstable, but it does



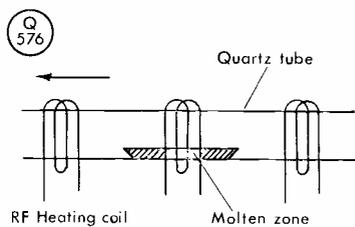


Fig.1 Zone refining of Germanium.

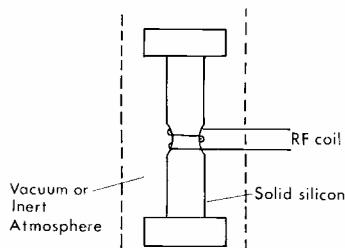


Fig.2 Zone refining of Silicon

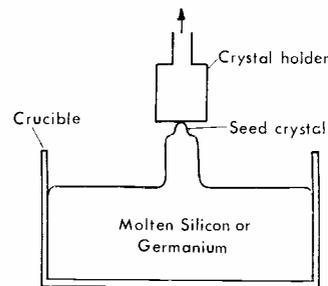


Fig.3 Apparatus for growing Crystals

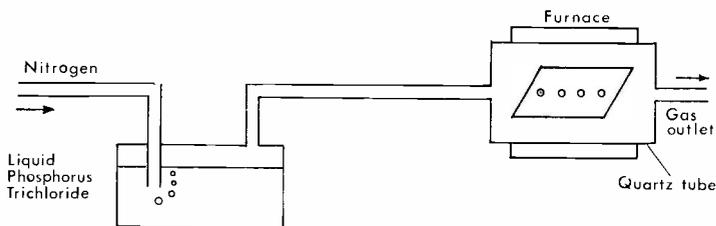


Fig.4 Diagram of a Typical Diffusion Apparatus

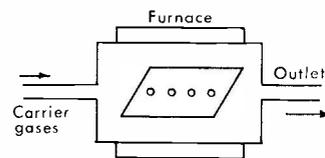


Fig.5 Typical Epitaxy Apparatus

work provided that the rod diameters are kept below about one centimetre and as there is only one molten zone the RF induction coil has to be swept down the rod several times. The impurity levels using this process can easily be reduced to one part in 10^{10} .

Crystal Growing

To make semiconductor devices, crystalline silicon or germanium is required. Unfortunately the semiconductor obtained from the zone refining is polycrystalline and unsuitable for making transistors. Single crystals are produced using the Czochralski process—which is in fact not as complicated as the name may suggest.

The molten semiconductor is held in a quartz-lined or graphite container for silicon or germanium respectively (see Fig. 3). This is to keep contamination to a minimum. Then a seed crystal, which has to be correctly orientated, is placed so that it just touches the surface of the molten material. The crystal is then slowly pulled, and the "main crystal" forms below. It is at this stage when *p* or *n*-type dopants are introduced to give the substrate of the devices the correct properties. One interesting point is that the rate of pulling of the crystal can be used to get some control over the uniformity in the doping.

Using this technique crystals up to 25 cm. long and 2 cm. wide can be made. These are then cut into slices which are then polished using a diamond paste.

Control of Impurities

In most semiconductor devices there is at least one *p-n* junction, the only exception probably being the Gunn diode which consists just of a piece of *n*-type gallium arsenide. Therefore one has to have some means of controlling the doping type and concentration. This is usually accomplished either by diffusion or epitaxy. There

are other methods such as ion implantation which are possible, but they are not generally used in mass production.

(i) *Diffusion*: This method of producing *p-n* junctions works inwards from the surface. The dopant, which is usually in vapour form, diffuses into the substrate. Generally this is done at high temperature. Fig. 4 shows a typical system used for diffusion. Using the chemicals shown a phosphorus diffusion into the slice is obtained, the nitrogen just acting as a carrier gas to get the phosphorus trichloride vapour around the silicon slices in the correct concentration.

One of the great advantages of this method is that numerous slices each containing many devices can be done at the same time, thus making mass production very cheap and easy once the initial setting up has been done.

(ii) *Epitaxy*: Instead of diffusing the impurity into the substrate this method actually builds new layers of silicon on to the substrate. (The word epitaxial means "arranged upon.")

The apparatus used for epitaxy is very similar to that for diffusion (see Fig. 5). The gases used are silicon tetrachloride to transport the silicon, and minute quantities of either phosphine or borane to give the required type of silicon. Using epitaxy one can grow several layers of different conductivity types on top of one another.

One of the drawbacks of this technique that at the temperature used (around 1200°C for silicon) diffusion also takes place giving rise to difficulty in predicting the exact thickness of layers.

This is only a short introduction to what is a very complicated and interesting topic. For those who are interested in further reading there are several modern books on transistors and materials science which will give a far more detailed account of the processes involved.

THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for January issue: December 5)

ONCE more we join the merry-go-round of the Radio Club movement, this time to report the doings laid on for December—looks like summer is almost over!

Many groups like to keep a library going for the use of members, and, this being the case, we are very pleased to have a letter from Martin East, of 41 Avenue Close, Avenue Road, London, N.W.8, to say that he has a complete set of issues of *SHORT WAVE MAGAZINE* for January 1970 right through to December 1973 inclusive, which he is prepared to dispose of to a Club (or reader) who would be prepared to either collect them or send the necessary postage.

MCC — 1974

As this was going down, the first leg of the annual Magazine Club Contest was being played off. Activity seemed to be reasonably good, with some very well-operated stations knocking off the contacts—G3YMF for Grimsby being particularly noteworthy in this respect. The band was quiet in terms of ambient noise and conditions appeared to be no more than fair, though EI and GM were getting through to the South.

Remember that the closing date for the receipt of logs is Monday, December 9, and that they must be set out strictly in accordance with Rule (7), p.439, October. Result of this year's MCC will appear in the February issue of *SHORT WAVE MAGAZINE*, due out on January 31, 1975.

Down Your Way—South

Our first call in this area is at Reigate, who have their informal session on December 3 at the "Marquis of Granby," Hooley Lane, Redhill. As for the main meeting, this will be on December 17, the venue being the St. Marks Church Hall, Alma Road, Reigate, for the Annual Construction Trophy, which will this year be judged by members of the near-by Crawley group.

Bedford are now in the United Services Club, The Broadway, where they can be found every Thursday. December 5 is down as "Dave's Evening." Dave being G8HGW. G3LWJ takes the stand on the 12th, to talk about home-brewing the G2DAF rig; Vintage Radios provide a contrast indeed on December 19, and lead up to the (provisional) date for the Club dinner. And, of course, the group can get together on Boxing Day through the eighty-metre net.

Another group who have a Club Net is at Stevenage, theirs being on 144.78 MHz on Monday evenings. The Top Band D/F Hunt takes place on December 5, and on the 10th there is an informal get-together at the Hawker Siddeley Dynamics works in Gunned Wood Road, Stevenage.

For Bishops Stortford the venue is the British Legion club in Windhill, and the date December 16. One has no "gen" on what is proposed for this session, but doubtless something will have been thought up.

Watling Community Association, 145 Orange Hill Road, is the home of the Edgware group; they have a D/F event at 2.30 on Sunday December 1—check with the secretary at the last minute on this one, lest weather or support be less than propitious. December 12 sees a Junk Sale, and December 26 is scrubbed.

Perhaps the best indicator of the worth of any club is the proportion of the enthusiasts in the area who are members—Maidenhead must be near the top of the tree by this criterion since they have a membership of 35 licensed types, plus two passed R.A.E. and sweating it out on Morse, and another two in for the next R.A.E.—out of a total membership of not much over forty and in such a catchment area it speaks volumes. December 5 sees G3COJ giving a talk on Solid-State Transmitter Design, and December 17 the judging of the Home Construction Cup by G3TDR, plus the presentation of the society's HF and VHF awards, and of the Club Activity Contest certificate. Refreshments, as usual, provided—but bring your own sugar!—at the British Red Cross Hall, The Crescent, Maidenhead.

Dunstable Downs secretary G8JIS missed the boat last time, along with several others, owing to a packet of mail being delayed several days. However, from his letter we can see their Hq. address to be Chews House, 77 High Street South, Dunstable, and that they fore-

gather each Friday, with a general routine of alternating lectures, etc., and "between weeks" of an informal nature.

On to the Library, Cheam, where we find Sutton & Cheam on December 17, when G3LCH will talk about "Hot Semiconductors" by which he means valves!

A Junk Sale and Christmas Party is set down for December 15 at Crystal Palace. This Saturday-evening session starts at 8, the Club QTH being Emmanuel Church Hall, Barry Road, London S.E.23.

The last "proper" meeting of the West Kent group is on December 13 at the Adult Education Centre, Monson Road, Tunbridge Wells. They have "between weeks" at the Drill Hall, Victoria Road, on the other Tuesdays, namely December 3, 17 and 31.

As general policy, Mid-Sussex alternate between a formal lecture and an informal evening, each month, using alternate weeks. We notice December 5 as the date when G3GRO will discourse on receiver alignment by various methods, "from wet-finger to wobulator" as it is neatly described. The informal this time is devoted to a Film Show, with the film that the Ciné Society have made of the Mid-Sussex radio club activities through the year—which might be a source of inspiration for other Clubs thinking of ways of recording their doings. Incidentally, the authorities at the Marle Place Further Education Centre have said that meetings must close by 2200—so members and visitors are warned that in future a prompt start will be made at 1945 so that the lecturer can be given a 2000 starting time.

Southgate nowadays have their Hq. at the Scout Hq. in Wilson Street, where the December meeting is, as usual, the AGM—so all members are to make a special effort to attend.

On to Cray Valley, who have the first and third Thursday as their dates each month, at the Eltham United Reformed Church Hall, 1 Court Road, London S.E.9. It is normal for the first session of each month to be devoted to some sort of talk, film show, or whatever, and for the other one to be a natter-meeting.

Every Friday is Silverthorn night, at Friday Hill House, Simmons Lane, Chingford, where they are active on all bands from Eighty to Two Metres.

For Acton, Brentford & Chiswick there is a demonstration, by G3LBQ, of his Trio TS-515 transceiver; this is on December 17, at Chiswick Trades and Social Club, 66 High Road, Chiswick.

There is only the December 9 date to remember in the Echelford timetable, as the other one would have fallen on Boxing Day. On the 9th, there is a Receiver Appreciation Exhibition, G3SAZ doing the co-ordination work. The Hq. is at St. Martins Court, Kingston Crescent, Ashford, Middx.

Another group who have only one December meeting is Chiltern, their alternate date having landed on Christmas day. Thus it is Tuesday, December 10, and as usual at the Ernest Turner works, Totteridge Avenue, High Wycombe, and is given as an informal.

Milton Keynes will be at Lovat Hall, Silver Street, Newport Pagnell, on December 9 for a Mullard Film Show; and there is also a Social Evening with the YL/XYL fraternity invited, at the Old George in Stony Stratford on December 6. Secretary G8HUH would like to hear from any aspiring CW merchants who would care to join a Morse class at Wolverton Tech. College.

No meeting on December 5, says G4BNI of Maidstone YMCA, but the beginners' class on December 13 is still on, as is the December 20 date, when the Club competition for the VK2QQ trophy. And, of course the December 27 date is also given a miss.

December 2 will be a treat for the Brighton Technical College group, as they will be visiting the closed-circuit TV studio in the Pelham Street building—the December 16 meeting returns to the normal Room B7, Richmond Terrace, venue.

At Verulam the Annual General Meeting is down for December 18. The venue is, as usual, the Market Hall, St. Albans.

On the second and the fourth Thursdays in each month the United Reformed Church Hall at Bexleyheath Clocktower resounds with Amateur Radio talk, this being the time and place to meet the North Kent chaps. This is the normal routine, and for December this gives us the 12th as the day for the Junk Sale, and the 26th for the other meeting—though the latter, being Boxing Day, is being passed over.

Nationals

First of these is the Royal Air Force reporting by way of their Club newsletter *QRV*. The current issue has enough material of interest to fill a copy of *SHORT WAVE MAGAZINE*, and it is well produced, with circuit diagrams coming out quite clearly. For details of this group, the categories eligible for membership, and what it has to offer, contact the hon. secretary—see Panel.

Next we come to the Royal Signals radio amateur group. Again we see a very well produced Newsletter, *Mercury*. This one is maybe a bit more "social" and a bit less "technical" in its orientation. Again there is quite a range of services offered to the members; details from

G3DPS, as Panel below.

Radial is another newsletter, this time the one from R.A.I.B.C.—the invalid, blind, and bedfast crowd. In this Club there are three membership grades, the most important of course being the one that covers all those who are incapacitated in one way or another. Then come the local representatives, who are the active types and who make a point of being available to help any members in their area; and finally the great mass of Supporters—and about everyone should come into this last category, at least!

The Methodist Church is represented in Amateur Radio by W.A.M.R.A.C., keeping members in touch by way of nets and the bi-monthly newsletters—membership is in fact open to those of all Christian denominations.

A new one now! Colleague G3FKE, in his DX feature mentioned, back in October, the feeling for the formation of a QRP Club. Activity since then indicates such a Club will be a viable proposition, and they are now on the lookout for more members; the qualification can be basically stated as being an interest in QRP operating and what it

can achieve. For details contact the acting hon. secretary at the address in the Panel.

Some years ago, it may be recalled, there were two National airlines; now politics has made them one, called **British Airways**. A tentative grouping has been made with a view to starting a national net, from Sunday, January 5, 3680 kHz, 1100 local time, although it is understood that a certain amount of local activity is already going on. The idea would be to cater for members of British Airways and anyone interested or employed in the civil aviation game. Net controls will be alternately G3BEA (the old BEA club call) and G3NAF, which belongs to the original BOAC Speedbird club. Details from the address in the Panel.

Back to the services, this time to the Royal Navy. The Newsletter cover picture shows a group of VK's around their member G3LLK during his visit to Sydney—one of those in the picture was perhaps better known as G6XJ, of Eddystone fame. The Navy seem to have their own particular formula for a good newsletter, and, again, there are various services one can obtain from membership.

Names and addresses of Club Secretaries reporting in this issue :

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 ROYAL NAVY: Lt. P. Gadsden, G3MTP, c/o Royal Navy Amateur Radio Society, H.M.S. *Mercury*, Leyland, Hants.
 ROYAL SIGNALS: Capt. (TOT), J. Cooper, G3DPS, Royal Signals, Blandford Camp, Blandford Forum, Dorset.
 SILVERTHORN: C. J. Hoare, G4AJA, 41 Lynton Road, South Chingford, London, E4-9EA (01-529 2282).
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 STOCKPORT: G. R. Phillips, G3FYE, 6 Ross Avenue, Davenport, Stockport, Cheshire.
 STRATFORD-ON-AVON: J. Morgan, G3YIK, 21 Quiney's Road, Stratford-on-Avon, Warks., CV37-9BW.
 SUNDERLAND: P. Barker, 15 Buttermere Street, Grangetown, Sunderland, Tyne and Wear, SR2-9NJ.
 SUTTON & CHEAM: A. Keech, G4BOX, 26 St. Albans Road, Cheam, Sutton, Surrey.
 TORBAY: M. Yates, G3UIQ, Top Flat, 23 Waverley Road, Newton Abbot (3025), Devon.
 VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford, Herts.
 WAMRAC: L. Colley, G3AGX, Micasa, 13 Ferry Road, Wavne, nr. Hull, Humberside, HU7-5XU.
 WEST KENT: M. Stanton, G4CCQ, Sweetbourne Cottage, Hastings Road, Lamberhurst (393), Kent.
 WHITE ROSE: Miss C. Wade, G4CUY, 74 Cow Close Road, Leeds, West Yorkshire, LS12-5PD.
 WIRRAL: H. I. Crofts, G3DLF, 3 Barmouth Road, Wallasey, Merseyside (051-638 2515).
 WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton, West Midlands, WV3-7LX.
 YORK: K. R. Cass, G3WVO, 4 Heworth Village, York, North Yorkshire.



The Amateur Radio Club of Nottingham hold meetings at Woodthorpe House, Mansfield Road, on Thursday evenings, with their own station G3EKW available for working the world. Here we see G3VUT (operating) with G4DLR at lower right. Standing, left to right, are G4DCI and G2FUB, with SWL's Lowe, Wragg and Lee. When this picture was taken, they were having a three-way QSO on Twenty with GMA4FJ/P and VP8NO, an ex-member of the Nottingham Club.

Mobile in a different way—on wheels—is the qualification for membership of A.R.M.S. catering for the /M side of Amateur Radio. They have an assistance bureau to collate details of members' problems with their cars, there are awards to be won for various aspects of mobile operating and quite a good newsletter at regular intervals. For details, refer to the Panel for the address of the secretary.

Westerlies

On Friday evenings each week the Shirehampton (Bristol) group foregather at their Hq., Twyford House, High Street, Shirehampton. Their latest achievement is to have 25 out of their fifty members taking the local R.A.E. course—even allowing for those who fall by the wayside this should give them a sizeable boost in the proportion of fully-licensed members next year!

Members of Torbay are, it seems, a bit annoyed at being left out of this piece for the past couple of months. This is explained by one of their letters not arriving at all and the other being in the packet of mail which went astray for several days, and as a result arrived too late for inclusion. However, this does not alter the fact that the group seem to be still going on as strongly as ever at their QTH, Bath Lane, 94 Belgrave Road, Torquay. For December we notice they have a Christmas party down for Saturday, December 14, involving a Quiz session with the Exeter and Plymouth groups—details from G3UIQ at the address in the Panel.

The ATC Hut, Colleton Hill, is the home of the Exeter formation; December 9 is down for a talk about his Power Meter-cum-Dummy Load by G4BQH, and it is understood that they also have a public-house meeting on the fourth Monday of each month.

For Cornish the main group meeting is on December 5, at the SWEB Club Room, Pool, Camborne; the main talk will be on "Operating Procedure" by G3XFL and G3VWK, followed by a "potted talk" by G3XFL on Safety in the Shack. In addition there is a fortnightly meeting of the West Cornwall section at the Guildhall in Penzance.

North and Scotland

Please, when writing to this piece, for Pete's sake, say *which group* you represent! It may sound impossible, but it is surprising how often it happens that a letter comes in which is obviously a Club report, with no mention of the Club to which it refers! These missives are usually signed by a "Someone" describing himself as "PRO!"

First call is on Bolton—but we were only able to deduce this by the happy accident of the scribe's mention of his predecessor in office which gave the clue! They get together once each month at the

Clarence Hotel, Bradshawgate—for dates and details, drop a line to the secretary, as Panel.

Bury and Rossendale next, from their hideout at the Mosses Community Centre, Cecil Street, Bury. Although they are to be found there any Tuesday evening, the formal group meeting is always the second Tuesday in each month, the December formal being set aside for the AGM. On the informal nights there is R.A.E. and Morse tuition available.

South Manchester are "at home" on Friday evenings at Sale Moor Community Centre, Norris Road, Sale. December 6 is a club quiz; December 13 a Night-on-the-Air, and December 20 a Christmas Party. The December 27 date is down as "no meeting." In addition to all this there are the VHF and D/F sections, at the club shack, Shady Lane, Manchester 23.

For Grimsby a new Secretary has taken over, and he is at the moment cooking up a programme for next year. The general principle is that they have a get-together on alternate Thursdays, with some Morse tuition available at each session. Lectures, D/F Hunts, visits, junk sales and similar activities are planned, for details of which, and of the venue, you should contact G8JIN at the address in the Panel.

Instead of their usual place at the Polytechnic, the Sunderland crowd intend to have a change on December 17; thus, if anyone wants to make contact, ask the secretary (as Panel) for details.

December 18 is a big night for the Star Club in Leeds, as they are having a guest of honour, a party, eats-and-drinks, and a trade stand—all this at the New Inn Hotel, Bramley Town Street, Leeds 13.

Our next comes from the nearby White Rose Club, who live at 63 Town Street, Armley, Leeds 12. They have their party on December 11—and to make sure they go one better than the Star chaps, they are even running their junk sale on the same night in the upstairs room of the White Horse next door!

A "good turn-up at meetings" still goes on, reports G3MDW of the Northern Heights crew. They have their place at the Peat Pitts Inn, Ogden, Halifax where, on December 4, they have G3USH on Hi-Fi, and a Ragchew on December 18.

Over the Border now, to Lothians, and their Hq. at Riddles Court, Lawnmarket, Edinburgh. Here they foregather on December 18 for a Quiz. It should be noted that this group make an early start, at 7 for 7.30 p.m.

Hull make their usual entry by sending a copy of their poster—and what a good publicity idea one of these must be, put up in the local Library and similar places. They are at home on Friday evenings

at 592 Hesse Road, Hull, which, we note is near the flyover—the details to hand are, alas, those for November, but it is notable that each week there is something of interest.

Every Thursday evening continues to be the form at York, and the Hq. remains at the British Legion Club, 61 Micklegate. Some excitement was caused by the lads having their picture in *SHORT WAVE MAGAZINE* recently—"fame at last," did someone say!

At Stockport, December 11 sees them all attending the AGM, which will be taken, as usual, at the Blossoms Hotel, Bramall Lane/Wellington Road South. Incidentally, their *Newsletter* carries a most interesting correspondence which purports to refute some comments on VSWR by G3VA—but in fact both chaps are right, and what they now need is to take thought and see *why* they are both right even though apparently in opposition! This scribe will admit to having wasted all of an hour of valuable typewriter time on this particular conundrum; if the membership reacted in like manner, then the exercise was well worth while in the context of club life as well of technical learning.

Midland

Here we call first at Wirral, who have meetings at the Sports Centre, Grange Road West, Birkenhead, on the first and third Wednesdays in each month. Unfortunately, the newsletter to hand at the moment carries the programme forward only to the end of November, so we cannot say what the Christmas treat will be—why not turn up and see?

South Birmingham next: They make an early start for Christmas, when they get together on December 4—as well as the party games there will be a Surplus Equipment Sale. Venue for this one is Hampstead House, Fairfax Road, West Heath, Birmingham, 31.

At Hereford they find quite a lot of interesting things to do—look for them on December 6 and 20, at the Civil Defence Hq., County Control, Gaol Street, Hereford.

A first issue of their *Newsletter* comes from Dudley where they get together on the second and fourth Tuesdays—a change from past form, this, be it noted—at the Central Library, St. James Road. Their letter having been penned straight after the AGM, we must say that the programme is still being planned; but past form suggests that the planning will be good.

Midland also have just gone through an AGM, so again we have to note that the programme is still in the planning stage. They get together at the Birmingham and Midland Institute in Margaret Street—for dates and latest details, contact G3ZKQ—see Panel.

At Coventry a new secretary reports; he says the group can be found on any Friday evening at Baden-Powell House, St. Nicholas' Street.

Wolverhampton put all the vital information on the inside front cover, where readers—and your conductor!—can find it immediately. From this we notice they are going to be at Hq. on Mondays, December 2, for a talk on Weather Phenomena—the 9th for a Natter Night—the 16th for a talk on the fascination and frustration of contest operating—and the 30th for a committee meeting. That leaves December 23, and on this evening it is understood they will be going out to a local hostelry—"pub" to we plebs!—for a little Christmas-something.

There is only one meeting shown on the timetable for Slade, as their second normal date would have fallen on Boxing Day. Thus they will be at Church House, High Street, Erdington, on December 14, for a talk on 1296 MHz. An interesting point is that on this Club's notepaper, the heading gives not only the address but also the National Grid reference—handy for getting yourself to a meeting if you are a stranger!

One thing your scribe very much likes about the Cheltenham RSGB group newsletters is that there is almost invariably a little technical note of great interest—the current one refers to the marvellous effects of changing the germanium diodes in TV ratio detectors (or SSB balanced modulators!) for silicon types such as the 1N914 or 1N4148 series, which can be made to balance far better, resulting in the disappearance of many "sound on vision" faults without touching the TV tuner alignment at all! To return to our muttons, this group gets together on the first Thursday of each month at the Royal Crescent Hotel, Clarence Street, Cheltenham.

Last time out, the hon. secretary at Solihull offered his farewells to us—but he didn't get off the hook that easily, as in the event he was re-elected at the AGM. Meet the membership, and said hon. secretary, at the Manor House, High Street, on December 17.

We don't often hear from the Stratford-on-Avon but that does not



At Chiltern they have a Club stand, designed and built by G3SQM, which can be set up when they are making an appearance for some public occasion. Their own call signs are G3CAR/G8CAR and G3CAR/A was hard at it for MCC in November. In this picture are G3SQM operating, with G3TRY (right) doing some monitoring.

mean they are languishing—far from it, we are told. Their next meeting is by way of a special, with G3HAZ imported to tell them all about the Oscars; new members and visitors always welcome.

They seem never to use the same venue twice running at Spalding—however, they will be at the "Ship Albion" on December 6 with the Annual Social Evening and Junk Sale, not to mention a trade stand by John Birkett. The admission charge of 10p includes refreshments, and there will be the usual raffle going as well.

Nunsfield House (Derby) advise that they have full use of Room 9 for a shack-cum A/TV studio, and Room 7 for their normal meetings every Friday evening. Nunsfield House is in Boulton Lane, Elvaston, Derby.

Only a note of the change of secretary comes in from North Staffs.—but no doubt he will be glad to make a start by answering your queries as to what goes on and where.

The familiar fist of G4AFJ appears next, he being the scribe at Nottingham, who get together on Thursdays at Sherwood Community Association, Woodthorpe House, Mansfield Road. He sounds faintly startled to report that over the past year his membership figures have risen from about 30 to no less than sixty—good for them. As to the gatherings, they pursue the normal routine saving only for missing December 26.

Finale

That's it for another month—the last time this year, so it behoves us to wish all our readers, and in particular all correspondents to this piece, a Seasonal Wish, for themselves and for the group they represent.

Our first outing for 1975 requires a deadline of December 5, absolutely latest—and if you can get the news in earlier please do so, to help us with the Christmas rush of mail and its consequent delays. As ever, it should be addressed to "Club Secretary," *SHORT WAVE MAGAZINE*, BUCKINGHAM, MK-181RQ.

Auroral Aftermath

A NUMBER of reports on the October aurorae arrived too late for inclusion with the general synopsis in last month's "VHF Bands", but the event was of sufficient general interest to summarise some of them here.

GD3UMW/A made 203 contacts in the two phases of the October 13 affair, all on 2m, and all but ten on CW. He ran a 6-40A PA and a 10-ele. Yagi, and worked all the usual prefixes plus OH and UR2 and—to his delight—a GD and a bunch of G stations, who are normally screened from him by mountains in spite of his 500ft. elevation at Kirk Michael. He noted the first phase as starting around 1500z and finishing at 1900z and for the next 30 minutes was only getting weak T9 scatterback. The second phase started at 2245z and went on until after 0300z with the aurora visible at 2100z. He describes his eight pages of log as "Auroral DXtasy"—and why not?

G18EWM in Co. Antrim, got into the aurorae on October 13 and 20 and was delighted to receive a tape from a Dutch listener with a recording of his signals. With the universality of small tape recorders these days, this seems a novel and perhaps instructive idea.

G3OHH in Mow Cop found that 4m. was better value from a DX point of view than was 2m. as he heard no Continentals at all on the higher frequency band, and his opinion was shared by G3JYP. In spite of its proximity, he found GB3SU to be continuously auroral. Best DX on 4m. was GM3ZBE (Aberdeen) who was 5 & 9A much of the time.

In Haverfordwest, GWKGD got most of his DX contacts from GM between 1350z and 1713z, when the *Ar* effect disappeared. Optimum beam heading was 20° East of North. He also recorded the *Ar* effect on October 20 when GM was again coming through Tone A, but much weaker than on the previous Sunday.

G4CXP (Carnforth, Lancs.) logged the October 13 activity between 1350z and 1730z during which period he made 45 contacts, mostly with GM. In spite of a careful watch during the evening, and up to 0130z, nothing more was heard. On October 20, the aurora appeared between 1500z and 1610z, but was much weaker and no Continentals were logged.

GM4CXP (Roxburgh) comments that during the opening on October 13 he worked G, DL, F, PA, ON, SM, EI and OZ between 1340z and 1813z, and heard, but could not work, LA, UC2, DM, GM, GW, GI and GD. There was a repeat performance on October 20 between 1420z and 1620z which appears to have been much weaker, and only GM and G were worked, and GD heard. On the 13th, GM6XI had good contacts with Germany, Holland and scores of G's, using his Liner-2. Charlie Sherrit, GM3EOJ, worked 18 countries and had 88 contacts during the two phases!

GM3ZBE turns in an interesting report on conditions in Inverurie at this time with G, SM, LA, GI and DL worked on 2m. and on 4m. he netted a string of G's and one GD. He says that Gdansk Radio was at S9 +20 dB! His phone contact with G3FDW was a bit unusual in that signals were swinging between very distorted and pure auroral "whisper" type copy. Although he had a go on 432 MHz, nothing unusual was heard there. The pile-up on his 2m. frequency had to be heard to be believed and he wishes that

VHF BANDS

A. H. DORMER—G3DAH

he could have used his 12-001 w.p.m. CW, which would have multiplied his score by a factor of 10. There was apparently a pronounced Doppler shift HF during the second phase, about 2 kHz, and those experienced enough in these phenomena to recognise it quickly shifted LF and made contacts.

A final note: It would be greatly appreciated by the scientific chaps who analyse these phenomena if reports could include the QRA Locator of the receiving and transmitting station as well as call signs—not that we shall have room to publish them, but they will be sent on to the right quarter after we have extracted our piece.

DX-Pedition

An excellent feedback report on the University College of North Wales A.R.S. (GW3UCB) DX-expedition to GM during September 14-22 has been received from Paul Cooper, G4BRT. This was specifically planned as an 70 cm. venture, although 2m. was used as a link channel. The antenna comprised four J-Beam 46-ele. Multibeams arranged in a box configuration at a height of 25ft. or 35ft. depending upon wind force at the time of erection. A masthead pre-amp. consisting of a K6001 transistor, fed a *Microwave Modules* converter. Receivers were an FT-101 for co-channel operation and an EC-10, with down converter, for tuning the rest of the band. The overall system noise figure was about 2.5 dB. The Tx delivered 400 watts p.e.p. from a pair of 4CX250B's. Double-conversion was used in the valved transverter, the SSB input being 28-30 MHz, and the IF at 129-131 MHz, the mixing frequencies of 101 MHz and 303 MHz being derived from the 101 MHz source in the receive converter. The FT-101 provided the LF SSB and a *Datong* clipper gave a useful (10 dB) increase in average transmitted power.

Sites visited were: Mull of Galloway, *Kirkcudbright*, *Lanark* (Green Lowther), *Duns* (*Berwick*), *Fifeshire*, *Kincardineshire* (Cairn o' Mounth), *Kilsyth Hills* and *Dumfries*. They had to skip operation from Broad Law on September 17 due to mechanical failure of the transport vehicle, although they have since learned that several

operators have reported hearing them from there!

There did not appear to be any lift in conditions during the trip, except for a limited opening on September 19 during which they raised G3JXN (London), so they were pleased to be able to receive GB3SC every evening, giving welcome assurance that all was well with the Rx set-up. None of the sites was exceptionally good, although from the logs, they did best from Kirkcudbrightshire (25 QSO's) and reasonably well from Lanark (23 QSO's). Only three GM contacts were made, GM8BKE in Glasgow and GM3OXX and GM3DIJ (both Edinburgh)—which is an indication of the low level of 70 cm. activity up there.

Our thanks go to G8DMJ, G4AJW, G8HZV and G4BBT for mounting this very well planned foray, which had all the appearance from the word "go" of being successful, and so stimulating interest in 70 cm. operation. They ask that we record their appreciation of the efforts made by all those who kept skeds with them. Good show!

Two-Metre Channels

As readers of his Column who have studied the IARU Region 1 band plan will know, 144-60 MHz and 145-30 MHz are allocated to RTTY. This is nothing new, of course, and, in fact, the use of 144-60 MHz for RTTY dates back to the early 1960's. In those days, due to stability problems in receivers, it was the practice to use AFSK (audio frequency shift keying) but now that receivers are becoming more sophisticated and reliable there is a trend towards the use of FSK (frequency shift keying) in view of its greater efficiency and lower liability to cause interference to users of adjacent channels.

The introduction of FM transceivers has given rise to a problem in that many of these have been sold in this country equipped, amongst other frequencies, with xtals for 144-60 MHz and, although this frequency is no longer allocated for simplex FM, operators continue to use this channel with the result that RTTY transmissions are interfered with. In a number of instances, of course, the user of the transceiver is not aware that QRM is being caused as an AFSK signal could be well below the squelch level of the transceiver and yet provide good copy at a properly equipped RTTY station—an FSK signal, especially DX, would not even be detected on the transceiver due to the lack of a BFO.

A3 and F3 users on Two should, therefore, try to avoid the frequencies concerned. It would be helpful also if purveyors of "Black Boxes" ceased fitting at least 144-60 MHz as one of the standard crystals. The RTTY fraternity do not operate anywhere else in the band so let's play fair.

Contests

Results: The Jubilee VHF/UHF Contest attracted some 77 entries, much the same as last year, and although there appear to be sharply divided opinions about the wisdom of mixing VHF with UHF in other than the VHF/NFD event, there can be little argument that this does provide a useful dry run for the major effort in September each year. Leader in *Zone A—North* was G3SEK, with a comfortable margin over GD8EXI. The latter's result was particularly praiseworthy in that he ran 2m. only, and even 'SEK used only 2m. and 4m. *Zone B—Midlands* was carried off by G3JQA/P, who are fast making

THREE BAND ANNUAL VHF TABLE
January to December 1974

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL Points
	Counties	Countries	Counties	Countries	Counties	Countries	
G3NHE	55	6	74	18	56	11	220
G3DAH	51	8	63	18	35	9	184
GD2HDZ	40	6	80	13	32	7	179
G5DF	44	7	65	16	37	6	175
G4AGE	29	4	67	11	42	8	161
G3XDY	28	4	72	12	20	8	144
G8EOP	—	—	66	13	39	10	128
G3OHH	40	7	56	11	12	2	128
G3FIJ	30	4	44	13	15	4	110
G3BW	—	—	65	10	22	4	101
G4CZP	—	—	79	14	—	—	93
GM3ZBE	20	3	47	12	4	6	92
GW8FOL	—	—	75	16	—	—	91
G4AEZ	15	2	46	11	13	3	90
GW8FKB	—	—	77	10	1	1	89
G4BMM	8	2	45	11	19	4	89
G8GHZ	—	—	67	10	9	1	87
G8HBQ	—	—	61	9	12	3	85
G3SHY	15	3	27	6	23	5	79
GM4CXP	—	—	67	12	—	—	79
GW3KGD	—	—	64	15	—	—	79
G8GNE	—	—	40	10	23	3	76
G2AXI	21	3	32	8	9	1	74
G3AHB	—	—	55	10	7	1	73
G8ECO	—	—	49	9	12	2	72
G8DGR	—	—	52	11	4	1	68
GW8BXQ	—	—	52	12	1	1	66
G4DHF	—	—	56	9	—	—	65
G8FMK	—	—	25	2	33	3	63
G1EWM	—	—	52	9	1	1	63
G8FWB	—	—	51	10	—	—	61
G8HHI	—	—	51	10	—	—	61
G8GGP	—	—	50	9	—	—	59
GW8HVP	—	—	48	8	—	—	56
G8EKP	21	7	15	4	2	2	51
G8FUI	—	—	35	8	5	2	50
G8CBU	—	—	42	5	—	—	47
GW4BXE	12	2	20	11	—	—	45
G8HQA	—	—	37	7	—	—	44
G4DNJ	—	—	32	5	5	1	43
G8GLS	—	—	36	6	—	—	42
G8BBP	—	—	37	5	—	—	42
G8GXE	—	—	29	5	1	1	36
GW3XJQ	—	—	27	9	—	—	36
G3FKP	—	—	29	2	—	—	31
G8HYH	—	—	27	4	—	—	31
G8BPJ	—	—	23	2	1	2	28
G3SXX	—	—	21	6	—	—	27

Notes:

- Claims should be on the basis of the *OLD* county boundaries until December 31, 1974.
- The Tables show claims to date from January 1, 1974 and will close on December 31, 1974.
- From January 1, 1975 the new county organisation for England and Wales will be used in the compilation of this Table. Throughout 1975, Scottish counties as existing will be unchanged.
- Claims should be sent to "VHF Bands", *SHORT WAVE MAGAZINE* BUCKINGHAM, MK18 1RQ.

a name for themselves in the contest milieu, followed by G3LRS/P. The Dunstable Downs Club carried off the Zone C—*East & London* without the help of 23 cm., which was a little surprising in view of the UHF expertise available among their members, and G8BQX/P, operating on 2m. only, held second place. The Southampton Group took first place and the Newbury & District boys second in Zone D—*South & West*, and both used all bands.

The Lichfield A.R.S. went to GW as GW3WAS/P and took first place in Zone E—*Wales*, followed by the Albright & Wilson chaps under the call GW3OXD/P. One entry only was received from N. Ireland, G18HXY, so he leads in Zone F. For Scotland Zone G was headed by GM3ZSX/P who, although only operating 4m. and 2m., produced the highest combined score of the contest, his 1,198 points on 70 MHz contributing significantly to this result. GM4CDN/P chased, but could not catch him.

The July 70 MHz Open was split into two sections, Fixed and Portable, and there was a goodly entry for both. GC3WMR/P (Jersey) was a fairly easy winner, in spite of his comparatively low power, over GW4ABR/P. and G3JYP just made it over G3NHE in the Fixed Section.

The July 432 MHz Open was won by G8AGU (/P in Devon) and, as was noted in this Column, was an outstanding signal for much of the time. Runner-up was GW4ABR in Radnor.

Whether as a result of predetermined strategy or whether entirely fortuitous, it is perhaps worth noting that the leaders in these events did not complete the greatest number of QSO's for the highest points score. There must be food for thought here. Is it better to be selective and go for the best DX initially, filling in with the semi-locals towards the end of the contest, or try and work everything as it comes? The answer may well determine choice of location and operating procedures.

The 144 MHz QRP Contest produced some surprisingly long-haul contacts, of particular note being that between GM8FVC/P (Inverness) and G8ASI (Herts.), a QRB of 671 km. Since the GM submitted a log for the contest, (ASI did not) and was using one watt or less, this must be reckoned as very near the watts/km. record for 2m. under normal propagation conditions. G4CIZ/P led by a comfortable margin over GW4BXD/P.

The Grafton Radio Society VHF Contest was won easily by G8EOP with G4ANS as the runner-up. G8INN/A got an award for the leading score from a station first licensed within the six months prior to the event.

Reports: Propagation continues to be poorish for the 4m. and 70 cm. Cumulatives, although things perked up a little for the 432 MHz SSB contest on October 20, when PA, ON and GB were all worked from Herne Bay. A score of 30 contacts should be good—GW3UCB/P had 23 at 1203z.

Similar propagation conditions bedevilled the 2m. CW event on November 2/3, and were probably the cause of the apparent low level of activity on that occasion. Forthcoming Events: The pace has slowed right down now with only the 144 MHz Fixed station event on December 8 before the start of the New Year.

Claims & Awards

"The end is nigh", as they say. It is

timely to recall that the Annual VHF Tables end on December 31, 1974 and re-open immediately on January 1, 1975. Final claims must arrive by January 10, 1975, the reader deadline, for us to be able to include them in the final totals and get the results into "VHF Bands" for February, 1975.

The 1975 Tables will be on the revised basis, i.e., they will recognise the new county organisation in England and Wales. In the case of Scotland, the new organisation into Regions and Districts is not due to be introduced until April, 1975, and here we shall pursue the same policy as we did for England and Wales in that throughout the whole of 1975 we shall use old GM county nomenclature and boundaries. During the year, a decision will be taken as to whether to work on the larger or smaller administrative entities in that country, and you will be given plenty of warning. At the moment, it would appear that a multiplicity of Districts would be unwarrantably difficult to administer and that Regions are the things to go for.

One other word on the subject of the Tables. Please, if you are going to put in an entry, start off as early in the year as possible and amend monthly without waiting until December to push in a claim for 250 points! The reason for this should be quite clear: The Tables are meant to be competitive and to encourage activity. Regular entries enable an operator to concentrate on a band, or where he is falling behind the leaders, and this is likely to increase the traffic on the band where it is most needed.

Some GM Notes

GM4CAU is pressing on with the construction of new equipment for the Lerwick two-metre beacon, GB3LER. Readers may recall that he has already completed most of the logic sections and he now reports that the PSU is complete and that the Tx is under development.

GM8BZX has received a note from DK3JUG reporting that the Hamburg and Altenburg repeaters will not be changing over to 600 kHz spacing until mid-1975. GM4CLH (Edinburgh) continues to press on with his 2 watts of SSB on 2m, but found that this was a bit low for working via the recent aurora. He has a 150-watt linear completed and this, with a revised antenna system, should do him a power of good.

GM3BQA was obviously trying to beat his own record during the Leicester Show at the end of October. He, in company with GM3DIE, GM8GEC and GM8HXM left N. Berwick at 0630z, did the Show, loaded up the car with goodies at the end, and were back in Berwick at 0400 the next morning! The Glenrothes Club are transmitting Slow Morse on 145.80 MHz each evening at 1930z and GM3OLK (ex-VU2OLK) is doing much to help the new recruits to the Club to get going on VHF.

The Leicester Show

The Leicester ARRA Show was again a big success—not only in that we, as radio amateurs, were able to see and purchase those goodies which are not normally carried by the High Street radio shop, but also for the traders, who report a larger volume of business, and who were barely able to conceal their smiles all the way to the bank.

On the VHF side, Telford Communications were showing their 2m. solid-state "Multimode" transmitter, the TC-10, which

retails at £145 (appropriate?) and offers 10 watts out on A1, A3H and F3 and 25 watts p.e.p. of A3J, thus competing favourably with the Limer-2. It is VFO-controlled to cover most of the two-metre band, carries one xtal-controlled channel on 144.2 MHz for SSB calling, and incorporates an adjustable tone-burst generator on FM for repeater access. It can be either mains or battery operated, and the modular construction makes for easy servicing. The 9 MHz SSB generator panel and the 10 watt PA can be purchased separately.

The speech clipper manufactured by Datong Electronics has already been described in *SHORT WAVE MAGAZINE* (October issue) and a very convincing display of the advantage of using this device was to be seen and heard on their stand. Though £50 may seem a lot of money for a clipper, it does offer a 10 dB increase in average talk-power and it could cost considerably more than that to add another stage to your Tx transmitter.

Microwave Modules had on display their solid-state 70 cm. transverter, first introduced at the Dundee Convention, and noticed in last month's "VHF Bands". Five watts of SSB on 432 MHz for £65 seems reasonable enough and they are just about ready to go into full production.

Some of the Japanese Inoue gear shown by Thanet Electronics looks a good bet if you are thinking of going 2m. mobile. The IC-22 offers up to 22 channels, xtal-controlled capability and the firm will fit a tone-burst generator for you. Basic transceiver with three channels fitted is £109. The IC-225, at just under £200, has 80 channels at 25 kHz spacing throughout the band, all derived from a synthesised source, and a useful facility for repeaters giving a 600 kHz offset at the flick of a switch.

Burns Electronics have introduced a new tone-burst generator, the TBG-2, giving a choice of three frequencies suitable for accessing VHF repeaters, and which operates in conjunction with the station Tx p-t-t switch. Associated with this instrument is the transmitter timer, the TT-1, which can give a visual or audible warning of impending shut-down of the repeater system if the "over" is too long (more than 50 seconds in the case of the U.K.).

News Items

Twenty-Three: G3JVL (Hayling Island) has now got his 20th county on the band by a QSO with G3NHE (Sheffield) and is looking for GD2HDZ, who is preparing for his advent on the band—he expects to have SSB available soon, as the 70 cm. SSB Tx is just about complete, and little remains to be done on the 3 cm. gear. GD2HDZ has a sked with PA0SSB every Wednesday evening on 1296.2 MHz, at 1930z. This should be one to look out for as Jan runs 600 watts of CW/SSB and puts an S9 peak signal into Hampshire.

G3KMS had four contacts over 200 km. during the VHF/UHF contest. He can usually hear GB3DD at 5 & 6 from Stoke-on-Trent. If propagation is a bit down, he relies upon the third harmonic of GB3SC, which comes up near the channel to help in locating it! During this contest, G3LQR in Suffolk worked DC0DA with QRK around S2. Pity that the French operators have lost the 23 cm. band—it could have made quite a difference to the scores. G4BBR (Cheltenham) hopes to have SSB on 1296 MHz very shortly.

Seventy: G4BBR (Cheltenham) now has 400 watts p.e.p. available from a pair of 4CX250B's and is usually QRV on Sunday mornings. He is willing to make skeds. His gear is to be used by the Golden Valley VHF Contest Group (GW4ABR/P) during the next contest season.

Two: SK6AB is a call well-known to many on 2m. via tropo. or aurora. The Club is now looking for M/S contacts with a station in the West of the British Isles or in Eire. They run high power, fast CW and have a four-speed recorder available. Correspondence should be addressed to: SK6AB, PO Box 25049, S-40031, Goteborg, Sweden. The *Quadrants* are due in early January!

G8HQQ is now G4DNJ, Stevenage and runs a Limer-2. He has a linear under construction and will shortly be up on 4m. also. G8DJZ (Guildford) lays claim to the record for QRM to the maximum number of TV sets—his two-metre signal got into the mast-head wideband amplifier for two blocks of nearby flats and effectively removed TV programmes on all channels for 80 goggle-box watchers until the Post Office came along and fitted the filter. Any further claims of this nature should be sent to the Guinness Book of Records!

Four: G4AEZ (Enfield) now has 5 watts p.e.p. from an all solid-state transverter. He used a Siliconix dual-Fet balanced mixer, LM371 amplifier followed by VX3866, 2N4041, 2N2876 and 2N4128. He offers skeds from Middlesex before the county disappears at the end of the year in our Table reorganisation.

Val

We much regret to have to record the passing of Bob Munday, G5MA (Great Bookham, Surrey), of a heart attack, at the age of 76 years. He was one of the original partners in the Quartz Crystal Company (Q.C.C.) established in the mid-War period. Bob Munday himself had been active on two metres since the opening of the band in 1948 and was one of the very first GM/P operators, making regular excursions into Scotland to activate the GM counties, from which there was very little two-metre activity in those days. He was an outstanding exponent of the art of CW.

OSCAR VII—At Last!

Launching was successfully achieved at 1711z on November 15. Period of the orbit appears to be about 115 mins. but at the moment of writing the exact parameters have not been determined—they will be published here as soon as available.

It already seems that the 70 cm./2m. repeater is not functioning correctly. The beacon signal on 435.1 MHz is coming through as it should. The 2m./10m. repeater was to be switched up on November 17. More news next time out.

Deadline

And so we put the wrappers on for another month. Because of the usual major delays and the distractions of the Season, it is going to be difficult to get this piece out in time for the January 1975 issue—so please let us have all you want to see there in print by not later than Friday, December 6. For the February issue, the closing date will be January 10, 1975, also the latest by which we can accept last entries for the Annual Three-Band VHF Table, closing on December 31. Address "VHF Bands", *SHORT WAVE MAGAZINE, BUCKINGHAM, MK18 1RQ. Vy 73 de G3DAH.*

NEW QTH's

This space is for the publication of the addresses of holders of new call signs, or changes of address, in EI, G, GC, GD, GI, GM and GW of stations not already listed. All addresses published here will appear in the U.K. section of the American "CALL BOOK" in preparation. Please write clearly and address on a separate slip to QTH Section.

EI9CN, L. McGriskin, C.Eng., M.I.Prod.E., 16 Avondale Park, Dundalk, Co. Louth, Eire.
 G3FWU, L. O. Richardson (ex-MDSLRL), Meredew, Bredhurst, Gillingham, Kent, ME7 3JW. (Tel: 0634 (Medway) 35261.) Re-issue.
 G4CQQ, R. W. Taylor (ex-G8GBF), 8 Park Avenue, Markfield (2694), Leicester, LE6 0WA.
 G4DFO, S. J. Wainwright, 17 Cheltondale Road, Solihull, Warks.
 G4DFT, R. W. Perrin (VE3FVN), 150 McLaren Street, Apt.915, Ottawa, Ontario K2POL2, Canada.
 G4DFW, I. W. J. Howell, 5 Roundhouse Lane, Exmouth, Devon.
 G4DQG, T. Gagnon, 17 Addison Road, Hove, Sussex.
 G4DGY, D. M. W. Boulton, 26 Lakewood Road, Chandlers Ford (66048.) Eastleigh, Hants., SO5 1EW.
 G4DHH, D. H. Hall, Heathcote, Dark Lane, Stoke Heath, Bromsgrove (3619), Worcs.
 G4DIC, R. Phipps (ex-G8HSX), 47 Dean Road West, Hinckley (36811), Leics.
 G4DIW, C. J. Fryerman, 35 Laburnum Crescent, Parkside, Seaham, Co. Durham, SR7 7UW.
 G4DJY, C. P. Steeden, 2 Brighton Avenue, St. Annes-on-Sea, Lytham St. Annes (725119), Lancs., FY8 1XQ.
 G4DJR, J. Handley (ex-G8HWE), 37 Money Road, Caterham (43369), Surrey, CR3 5TF.
 GW4DJW, A. G. Whitehouse, 37 Heol-y-Goron, Leeswood, Mold, Clwyd.
 G4DKC, T. Smith, 9 Harcourt Drive, Canterbury, Kent, CR2 8DP.
 GM4DKH, K. A. Hastie (ex-GM8GJH), 44 High Street, Jedburgh (2214), Roxburghshire.
 GM4DKL, G. W. A. Pople, 57 High Street, Invergordon (981-251?), Ross-shire, IV18 0DG.
 GM4DKO, J. Fraser, 74 Polwarth Terrace, Prestonpans, East Lothian, EH32 9PU.
 G4DKQ, J. C. Loughlin, 39 Thirlmere Close, Frodsham, Warrington, Lancs., WA6 7NA.
 G4DKU, A. J. Medland, 75 Byron Road, Weston-super-Mare, Avon, BS23 3XA.
 G4DLK, L. H. Jones (ex-G8DLK), 7 Netherwood Road, West Kensington, London, W14 0BL.
 G4DLL, C. Edmundson, 21 Bogs Lane, Starbeck, Harrogate, North Yorkshire, HG1 4DY.
 G4DLP, R. L. Stoddon, Rose Cottage, Arkholme, via Carnforth, Lancs., LA6 1AU. (Tel: 0468 21678.)

G4DLZ, W. G. Taylor (ex-G8GBG), 8 Park Avenue, Markfield (2694), Leicester, LE6 0WA.
 GM4DMK, W. G. Armstrong, Harestanes, Ancrum (253), Jedburgh, Roxburghshire.
 G4DMY, J. C. Old (ex-G8FSX), 7 Trelawney Road, Camborne, Cornwall, TR14 7LN.
 G8HFO, T. Bennett, 22 Llandoverly Close, Over, Winsford, Cheshire.
 G8HVM, G. P. A. Worrall, 58 Witherford Croft, Solihull, Warks., B91 1TX.
 G8IUI, Torbay Amateur Radio Society, Bath Lane, Torquay, Devon.
 GW8IQY, J. H. Chapman, 33 Dee View Road, Greenfield, Holywell, Clwyd.
 G8IVX, P. D. Clarke, 26 Woodfield Road, Solihull, West Midlands, B91 2DN. (Tel: 021-705 4220.)
 G8IYK, R. S. Sayers, 140 Wolverley Court, Woodside, Telford, Salop, TF7 5QY.
 G8IYU, R. H. S. Taylor, Shereton House, Maplehurst, Horsham, Sussex.
 G8IZK, M. J. Leach, 27 Derry Park, Minety, Nr. Malmesbury, Wilts., SN16 9RA.
 G8IZY, S. Eldridge, 13 Shelley Close, Pound Hill (3368), Crawley, Sussex, RH10 3BX.
 G8JAI, A. N. Livesley, Bedfordgatehead, Barbon (276), via Carnforth, Lancs., LA6 2LJ.
 G8JAW, B. S. Heed, 39 Deeds Grove, High Wycombe, Bucks., HP12 3NT.
 G8JAX, R. D. Heed, 39 Deeds Grove, High Wycombe, Bucks., HP12 3NT.
 G8JBR, B. L. Goddard, 2 Greenfield Park, Portishead, Bristol (848140), BS20 8NQ.
 G8JBZ, P. J. Bradbury, 36 Newstead Road, Abbey Hulton, Stoke-on-Trent, Staffs., ST2 8HX.
 G8JCE, H. L. Rushton, Hawthorn Lodge, North End Road, Yapton (551526), Arundel, Sussex, BN18 0DU.
 G8JDQ, K. Few, 35 Whitton Close, Swavesey, Cambridge, CB4 5RT.
 G8JDV, A. S. Kessler, Verant Villa, 147A Wigton Lane, Leeds, LS17 8SH. (Tel: 0532 684781.)
 G8JDX, D. J. Gregory, 108A Looseleigh Lane, Crownhill, Plymouth, Devon, PL6 5HH.
 G8JEH, S. Withnell, 18 Russell Square, Chorley, Lancs., PR6 0AS.
 G8JER, R. P. Rawle, M.P.S., 8 Derwent Close, Macclesfield, Cheshire, SK11 7XS. (Tel: 0625 26088.)
 G8JHU, M. I. Jago, 21 Greenfields Avenue, Alton, Hants.
 GM8JDX, D. G. Gilmour, 24 Huntly Avenue, Giffnock, Glasgow, G46 6LW.
 G8JKN, W. L. Barnes-Rickers, 11 Inchbrook Road, Kenilworth (54903), Warks., CV8 2EW.

G8JLN, P. J. Davies, 14 Saville Road, Blackpool, Lancs., FY1 6JP.
 G8JLP, J. E. Calver, 14 Samson Road, Hellesdon, Norwich (410689), NOR.67.M.
 G8JND, A. Stoakes, 45 Belmont Road, Ilford, Essex, IG1 1YW. (Tel: 01-518 0151.)

CHANGE OF ADDRESS

G3ZY, J. R. Tweedy, The Cedars, Roughton Lane, Woodhall Spa (52793), Lincs.
 GM3BXL, R. P. Liddell, 12 Dunure Crescent, Bonnybridge, Stirlingshire, FK14 1EG.
 G3ENB, W. E. Gates, 16 High Mill Drive, Scarborough, North Yorkshire, YO12 6RN.
 G3HHT, J. A. Bassford, 1 Weston Road, Edith Weston, Oakham, Leics., LE15 8HH.
 G3HSP, A. F. Ward, 4 Boscombe Avenue, Grays, Essex.
 G3KPO, D. Byrne, Alverstone Manor Hotel, 32 Luccombe Road, Shanklin, Isle of Wight.
 G3LXB, Rev. J. L. R. Crawley, The Vicarage, Lorton Road, Cockermouth (3269), Cumberland, CA13 9DU.
 G3LNV, J. McGuire, 14 Wolsley Road, Kingston Hill, Stafford, ST16 3XN.
 G3LTF, P. K. Blair, Little Pooles, 1 Potter Street, Harlow (415051), Essex.
 G3RIR, N. Ackerley, 122 Sherbourne Avenue, Nuneaton, Warks., CV10 9JF.
 G3STG, G. A. Griffiths, 21 The Grove, Asfordby, Melton Mowbray, Leics.
 G3WJN, R. Hassell-Bennett, 654 Evesham Road, Crabbs Cross, Redditch, Worcs., B97 5LJ.
 G3XFZ, Dr. G. K. Laycock, 54 Arundel Drive, Fareham (5725), Hants., PO16 7NS.
 G3XWH, R. Horton, B.Sc., Hallaton, Garlands Road, Leatherhead, Surrey. (JA at St. John's School, Leatherhead.)
 G3YQO, D. M. Kirkwood, Sgts. Mess, R.A.F. Hendon, Aerodrome Road, London, NW9 5JA.
 G3ZFZ, G. Gibson (ex-DL5YO), Killerby High Cottage, Kirkby Fleetham, Northalerton, North Yorkshire, DL7 0TR.
 G4JH, W. V. S. Williams, 21 Shermanbury Road, Worthing, Sussex, BN14 7HR.
 G4AVB, D. G. Simmons, Great Haywood Boarding Kennels, Tolldish Lane, Great Haywood, Stafford, Staffs., ST18 0RA. (Tel: Little Haywood 594.)
 G5RP, E. Wake, College Farm House, West Hendred, Wantage, Oxon., OX12 8RP.
 G16YM, City of Belfast YMCA Radio Club, Brunswick House, 7 Brunswick Street, Belfast, BT2 7BL, Northern Ireland.
 G8AXE, G. W. F. Jones, 91 Fieldhead Avenue, Bury, Lancs., BL8 2LZ.
 GW8BPG, R. E. Viney, 10 Heol Merion, Barmouth, Gwynedd, LL42 1LA.
 GM8BQY, R. McLennan, 69 Stewart Terrace, Northfield, Aberdeen, AB2 5SX.
 GW8EMI, R. W. Gulliver, 8 Yew Tree Grove, St. Athan, Barry Glam.

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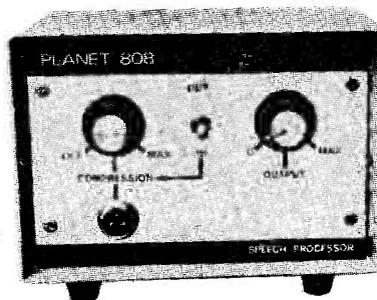
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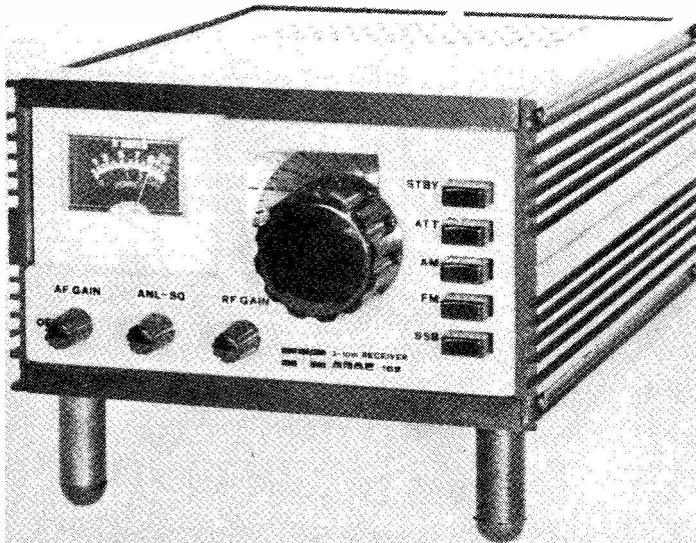
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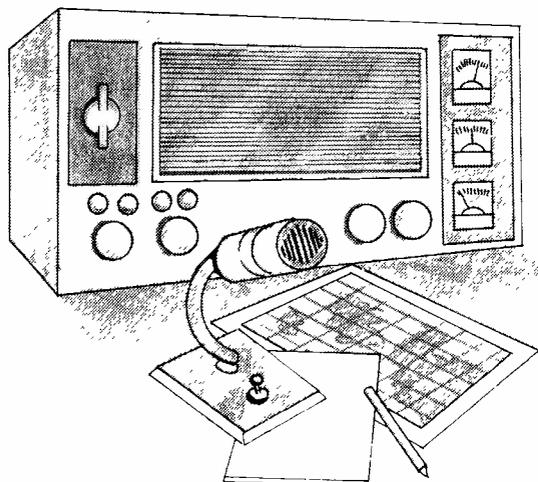
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3396	3403	3404	3410	3411	3417	3419	3431	3432	3438	3445	3473	3481	3488	3855	3868	3869	3876	3883	3889	3897	3904	3911	3918	3924	3925	3932	3938	
3939	3946	3966	3973	4002	4118	4310	4365	4432	4467	4481	4654	4668	4674	4688	4709	4730	4744	4751	4758	4765	4786	4800	4807	4814	4821	4828	4843	
4952	5000	5010	5025	5092	5119	5133	5140	5147	5154	5161	5224	5231	5238	5252	5259	5266	5273	5280	5287	5294	5301	5320	5324	5328	5332	5337	5341	
5345	5349	5354	5362	5366	5375	5379	5383	5388	5465	5506	5521	5524	5551	5589	5611	5619	5649	5668	5910	5920	5934	5952	5956	5964	5971	5984	5985	
5986	6084	6089	6091	6093	6106	6110	6121	6125	6132	6136	6143	6145	6165	6171	6182	6187	6198	6210	6221	6332	6337	6376	6387	6410	6415	6432	6480	
6488	6495	6498	6502	6506	6509	6516	6521	6532	6552	6554	6559	6567	6589	6598	6604	6607	6611	6619	6627	6632	6649	6657	6662	6677	6686	6721	6732	
6743	6820	6937	6994	7129	7157	7167	7171	7177	7210	7270	7311	7319	7326	7341	7356	7364	7371	7379	7386	7394	7401	7409	7424	7431	7439	7446	7461	
7491	7500	7533	7542	7552	7557	7562	7566	7567	7572	7577	7582	7583	7587	7600	7616	7633	7664	7683	7685	7700	7716	7733	7766	7850	7866	7883	7950	
8116	8133	8183	8150	8166	8266	8333	8350	8349	8357	8360	8366	8387	8402	8409	8410	8417	8432	8447	8454	8484	8516	8845	8854	8862	8871	8930	8953	
9096	9285	9293	9302	9310	9319	9327	9336	9344	9353	9361	9370	9378	9395	9404	9412	9413	9421	9432	9461	9487	9519	9781	9815	9837	9845	9863	9868	
9871	9873	9883	9893	9937	9962	kHz.																						
10021	10037	10062	10087	10112	10137	10158	10162	10187	10212	10237	10262	10287	10437	10465	10486	10513	10549	10908	11250	11500	11550	11859						
12287	12312	12337	12362	12387	12412	12437	12412	12487	12512	12537	12562	12587	12612	12637	12662	12712	12737	12750	12762	12787	12837	12900						
13062	13075	13087	13112	13137	13162	13187	13212	13222	13227	13229	13237	13250	13262	13272	13275	13304	13312	13337	13350	13387	13412	13425						
13437	13462	13487	13500	13540	13590	13640	13690	13729	13739	13740	13747	13749	13750	13769	13779	13789	13790	13799	13809	13840	13890	13940						
13972	13990	1412	14250	14480	14416	14560	14750	14762	14787	14812	14848	14887	14898	14912	14937	14948	14962	14987	14998	15000	15012	15037						
15048	15062	15087	15098	15112	15137	15148	15162	15187	15198	15212	15237	15248	15250	15262	15287	15294	15298	15311	15337	15344	15377	15511						
15512	15537	15544	15561	15562	15577	15587	15594	15611	15612	15637	15662	15686	15712	15725	15737	15762	15772	15837	15887	15912	15937	15962						
16837	18247	18250	18372	18431	18497	18662	18747	18872	18997	19122	19247	19372	19497	19622	19747	19872	23620	23720	23820	24620	24720	24820						
25020	28000	31200	31225	31250	31265	31300	31325	31350	31375	31400	31425	31450	31475	31500	31525	31550	31625	31650	31675	kHz.								

HC6U X 24 FOR 144-146 MHz. 6001 6021 6024 6031 6039 6046 6068 6069 6075 6076

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5649	5654	5659	5671	5680	5691	5692	5695	5697	6510	6537	6540	6552	6557	6567	6590	6612	6627	6640	6642	6652	6657	6662	6664	6667	6677	6679	6672
8841	8842	8845	8854	8862	8871	8879	8896	8930	8932	8916	8947	8967	8973	8983													

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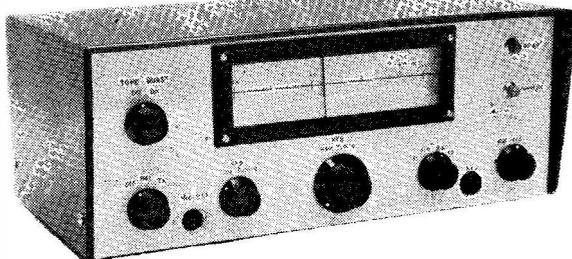
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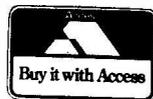
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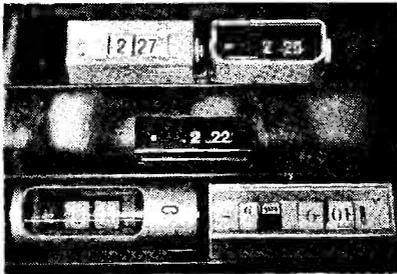
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9432	9447	9471	9448	9451	9461	9479	9481	9477	
9482	9487	9493	9513	9526	9531	9546	9552	9555	
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9632	9652	9653	9656	9658	9685	9686	9703	9711	
9720	9762	9814	9816	9823	9864	9882	9883	9979	
9968	9975	9990	9991						
10 MHz									
	10092	10175	10199	10279	10401	10678	10737		
11 MHz									
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12175	12177	12347	12355	12419	12470	12424	12529	12554	
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CQ de G4AYG: I want a Vibroplex Key. What say someone, please.—Elsworthy, G4AYG, QTHR.

SALE: Drake R4-B receiver, in excellent condition, price £160, delivery by Securicor. — Allaway, G3FKM, 10 Knightlow Road, Harborne, Birmingham, B17 8QB. (Tel: 021-429 3200).

MAGAZINES Wanted: "RSGB Bulletin," Oct. 1964. "QST" Oct. '71. "73 Magazines" for Jan.-March '64, and March-May-June-August 1966. — Jesson, G4CNY, 181 Kings Acre Road, Hereford. (Tel: 0432 3237, evenings).

SELLING: Eddystone 840C receiver, general coverage communications type, 480 kHz-30 MHz, with speaker, in excellent condition (been in store), bargain at £42.—House, 10 Leigh Close, Kenilworth, Warks. (Tel: 54556 after 6.0 p.m.).

FOR SALE: HW-100, with PSU, £120. "Homebird" electronic organ, bass pedals require attention, price £100 or near offer. Mullard high-speed valve tester, requires attention, with manual, £15 or offer.—Sparrow, G3JKN, QTHR, or ring Denham 2229.

WILL Do anything legal to get a Vibroplex key—even part with cash.—G4AYG, QTHR.

WANTED: SB-101/2 with Spkr./PSU. Electrical condition immaterial. All letters answered.—Brown, 242 Little Waking Road, Waking, South-end, Essex.

SALE: Minimitter 150-watt transmitter, coverage 10 to 80m., in mint condition, £20. Also AR88LF receiver, mint condition with manual, £25. Buyers collect.—Kirkwood, GM3VMG, 31 Morton Road, Ayr (0292 60870), Scot'and.

SELLING: RTTY—Creed Teleprinter Model 7E, in excellent condition, price £20. Delivery by arrangement.—Michaelson, G3RDG, QTHR, or ring 01-455 8831.

SALE: Eddystone EA-12 receiver, mint, £140. SAT-5, 250S PSU, in excellent condition, with handbooks, £25. Sentinel two-metre converter, IF 28 to 30 MHz, £10.—Barker, 372 Gosbrook Road, Caversham, Reading, Berks.

FOR SALE: Yaesu FR-50B receiver, in mint condition, coverage 160-80-40-20-15-10 and two metres, at £75.—Ring Lunn, Hythe (Hants.) 2000, after 7.30 p.m.

JANUARY Issue: To appear January 3, single copies at 36p post free will be despatched first-class mail on receipt from printers. Orders by December 31, with remittance to: Circulation Dept., Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

HAVE You got a Vibroplex Key, If so will you write to me — I will part with £s.d., To get a Vibroplex key!—Elsworthy, G4AYG, QTHR.

OFFERING: Liner-2, Pye "Cambridge," Creed RTTY gear, RQ-10X, Joystick VFA and other items For Sale. Send s.a.e. for details. — Ellis, G8HI0, 13A Lower Edgeborough Road, Guildford, Surrey, GU1 2DX.

WANTED: "G2DAF"-type Rx and Tx. For Sale: Bird Line VHF wattmeter with four dummy loads, £15. Sets of three PCB's for Dolby stereo, £2 per set.—Barber, G3NEF, 11 Bolley Avenue, Bordon (2121), Hants.

FOR SALE: National HRO, PSU and six coil packs (480 kHz to 30 MHz) in reasonable condition, £14.—Wylie, G8BGH, 84 Holts Lane, Poulton-le-Fylde (7349), Lancs., FY6 8HW.

SALE: One dozen 1-in. diameter 3-ft. interconnecting mast sections, £6 including carriage.—Sibley, 3 Morecambe Road, Brighton, East Sussex, BN1 8TL.

SELLING: Spacemark SS/TV monitor, £105. Decca colour TV CV.25, £85. M.M. 70 cm. converter and tripler, both in box with relay, £30. Dummy load, 50-ohm, £4-50. Group C46 TV multibeam, £4.—Ring Menday, G4CXL, Weybridge 47385.

FOR SALE: Bendix BC-639A VHF receiver, 10-valve superhet, coverage 100 to 155 MHz, just overhauled (no PSU, needs 180/240v. HT, 6-3v. 3-5A heater AC) weight 38 lbs., with manual, £10. Crystal test set Type 193A, 230v. AC operation, weight 18 lbs., £8. Both plus carriage. (South Devon).—Box No. 5377, Short Wave Magazine, Ltd., 55 Victoria Street, London, SW1H-0HF.

SELLING: Heathkit RA-1 receiver, including xtal calibrator, Q-multiplier and speaker, £25. TCS-12 receiver, includes control box/speaker and AC/PSU, very good condition, £15. BC-348Q, with AC/PSU, £15. Ferrograph tape recorders with 3-motor Wearite decks, very good condition, £15. — Ring Allinson, Aspatria (Cumbria) 20243.

SALE: K.W. Victor AM/CW 120-watt transmitter, in excellent condition, fitted new 6146's, £28. Mint HW-7, checked by Daystrom, £32. Both items plus carriage.—Moon, G4ABE, QTHR, or ring Warrington (Cheshire) 64907, 6.0-7.0 p.m.

EXCHANGE: Pentax SP-500 with fitted 55mm. F2 Super Takumer, e/r case; 135mm. f3.5 S.M.C. Takumer, 35mm. f3.5 Super Takumer, both in cases; lens hoods, bellows attachment and extension tubes available, all in mint condition. Exchange for mint Yaesu, K.W., etc., HF transceiver or separates of equivalent value.—Goulding, GW3GWA, 10 Earle Street, Wrexham, Clwyd. (Tel: Ruabon 3891, extn. 309, office hours.)

SELLING: Trio 9R-59DS with fitted voltage stabiliser and SP-5D speaker, as new, £40. Buyer collects.—Court, 24 Micklam Close, Aldwick, Bognor Regis, Sussex.

P.M. FOR CRYSTALS

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4-0305 in HC6/U (145-100-R4)	£2-10	36-2500 in HC25/U (145-0)	£2-50
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SALE: HQ-1 2-element Minibeam, new condition, £40.—Mickleburgh, 85 Carey Park, Polperro (349), Looe, Cornwall.

WANTED: German military radio equipment of W.W.II vintage. Details and price please.—Box No. 5371, Short Wave Magazine Ltd., 55 Victoria Street, London SW1-0HF.

FOR SALE: AR88D with S-meter, product detector, EF183 front-end and manual, in pretty cabinet, £47 or near offer; matching speaker for same, £6. Collins TCS Rx, with built-in PSU and speaker, a good set for a junior operator, £17 or near offer. Stereo tuner Nikk FAM-300, very good condition, £35 or near offer. Ex-BBC frequency comparator RF/LF, makes a nice modulation monitor, £15. **WANTED:** Eddystone 680 or 750 receiver, (Buyers inspect and collect).—Ellis, Rose and Crown, Brailsford (242), Derbys.

FOR SALE: FT-101B, FV-101B, SP-101B, YD-846 microphone, and mobile mount, all brand new and boxed. Best offer secures.—Box No. 5372, Short Wave Magazine Ltd., 55 Victoria Street, London SW1-0HF.

SELLING: HRO-M receiver, with three coil packs, PSU and handbook, £25.—Buyer collects.—Glover, 8 Queensway, Kearsley, Bolton, Lancs. (Tel: Farnworth 75345.)

SALE: AR88D and speaker in absolutely superb condition, realigned and re-calibrated professionally, £65. BC-221 AC/PSU, £12. TE-149, £6. Creed 7E, £20. Creed 6S3, £10. Creed 7TR3, £15. lin. RTTY 'scope, £10. All carriage extra.—Wilks, Ty Celyn, Axton, Holywell, Clwyd. (Tel: Dyserth 570538.)

SALE: Codar AT-5 with home-built mains PSU, £15. CR-100, £12. Home-built CW Tx with Geloso VFO and most PSU components, £8. Also 650 radio magazines, 1947/74, mainly "Bulletin," "Radio Communications" and "Short Wave Magazine," 1p to 10p each or £12 the lot. Buyers collect.—Fowler, G3IQF, 85 Oxford Road, Marlow (6421), Bucks.

FOR SALE: Class-D wavemeter, Mk. II, mains, with tables and spares, £10 or near offer.—Talboys, G3ZMT, GTHR. (Tel: 021-327 0606, evenings.)

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SALE: AR88D with spares and handbook, £35. TCS Tx/Rx with ATU, PSU, cables, spares and handbook, £25. TW-2 converter, IF 24-26 MHz, with internal PSU and circuit, £7.50. FL-8A, £1.50. B.44, 4m. tunable Rx, 5-channel Tx, with xtals and circuits, £12. STR-9X (TR1936) with a/v mount, controller, cables and handbook, £3. BC-638A VHF frequency meter, £5. Tavasu whip with 15m., 20m. and 160m. coils, as new, £6. Buyers collect.—Knowles, G3UVA, QTHR. (Chester.)

SELLING: Sony CRF-5090 Earth Orbiter, latest battery/mains portable Rx, with 9 bands, SSB, including FM/LW/MW/Aviation and 1.8-30 MHz band (list price £145), accept £120. Full guarantee.—Ring Hutcliffe, Bradford 24144 daytime, or Bradford 676556 evenings.

FOR SALE: NCX-5 transceiver (mechanical digital read-out model) complete with home-built PSU and calibrator, matching speaker and Shure 222 microphone, £160 or near offer. Prefer buyer to collect. **WANTED:** Up to twelve W.W.II German valves, Type RV2.4P.700.—Bradford, G3LCK, QTHR.

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FOR SALE: Heath SW-717G Rx, built and aligned, 3 months old, plus stereo/mono headphones and manual, £40 or near offer. — Ring Juriciewicz, Brighton 732864 evenings only.

WANTED: Inexpensive receiver in good working order, coverage 10-160m. chiefly for CW. Would consider a home-built job. Details and price please. (Kent).—Box No. 5373, Short Wave Magazine Ltd., 55 Victoria Street, London, SW1H-0HF.

SALE: "G2DAF" Mk I Tx with PSU, working but fault on SSB, £20. Hudson AM-108 High-Band, £8.—Grisley, G4DNJ, 45 Ramsdell, Stevenage, Herts.

WANTED: Jackson Type C11 split-stator 100-plus-100 pF variable capacitor, suitable for use in 150w. Tx. State price please.—Boyle, G4AXQ, QTHR. (Tel: 01-679 2770).

SELLING: "Citizen" portable radio, mains/battery, squelch, with MW/SW/FM/VHF/Aviation, as new, £15.—Ring Dawbarn, 0202-74 3735.

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SALE: Codar CR-70A communications receiver with matching speaker, as-new condition, £25.— Pearson, West View, Upsall, Thirsk, Yorks.

SELLING: Collection of junk: Three A.R.E. 69 receivers two working. Two Eddystone 358X receivers, need attention. Various odds and ends. Call or write.—Monk, G3NAR, Flat 3. 35 Southwick Street, London W.2.

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