

25p

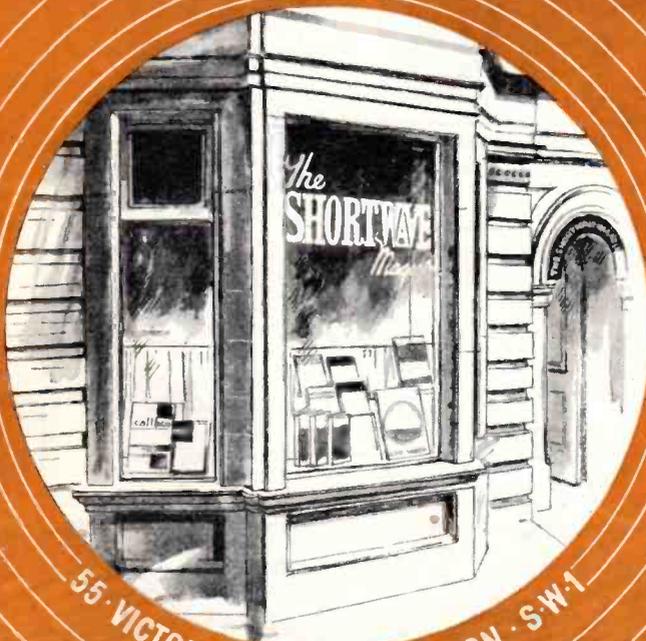
# *The* SHORT WAVE *Magazine*

VOL. XXX

APRIL, 1972

NUMBER 2

for  
the  
radio  
amateur  
and  
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radio



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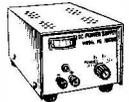


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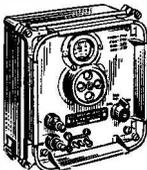


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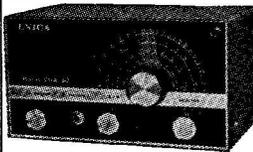


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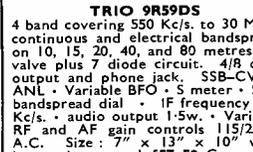


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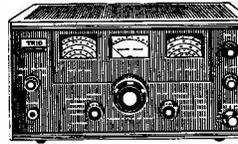
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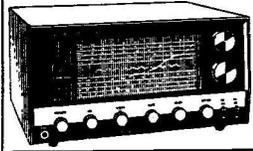


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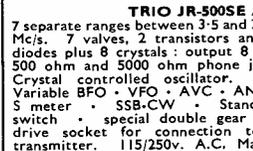
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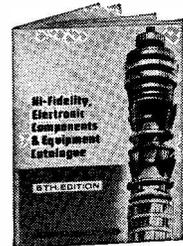
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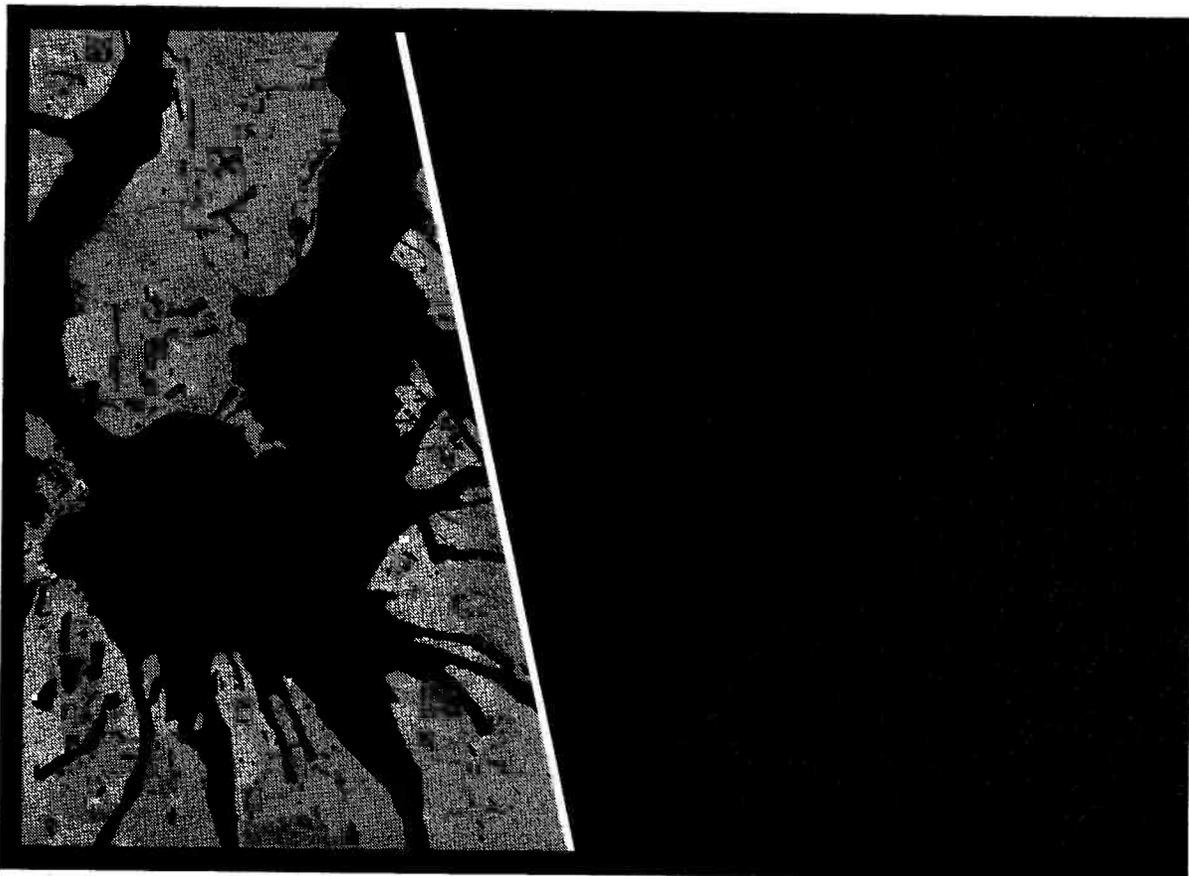


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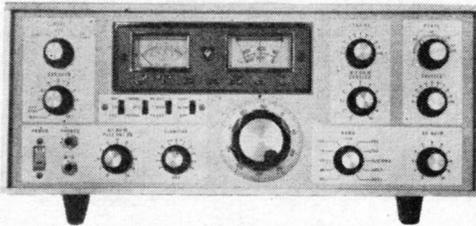
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**Sensitivity :** 0.5 Microvolt for 20 dB S/N (SSB 14 MC)  
**Selectivity :** 2.3 kHz (6 dB down) 3.7 kHz (60 dB down) six pole crystal filter nominal shape factor 1:6 : 1. Optional 600 Hz CW filter is available.  
**Frequency Range :** 3.5 to 4, 7 to 7.5, 10 to 10.5 WWV, 14 to 14.5, 21 to 21.5, 28 to 30 (Megahertz).  
**Unwanted Side Band Suppression :** 55 dB down (at 1000 Hz).  
**Carrier Suppression :** 50 dB down from full output.  
**Distortion Products :** More than 25 dB down.  
**I.F. and Image Ratio :** More than 50 dB down.  
**Frequency Stability :** Less than 100 Hz drift in any 30 minute period after warm-up.  
**Antenna Impedance :** 50 to 120 Ohm-SWR 2 : 1 or less.  
**Audio Output :** 1.5 watts, 350-2200 Hz, 8/600 Ohm impedance.  
**Power Source :** 117 or 220 volts A.C. 50/60 Hz.  
**Dimensions :** 15½" wide, 6¼" high, 13¾" deep.  
**Weight :** 45 pounds.

★ Built-in A.C. power supply.

★ Built-in VOX.

★ Built-in 25/100 kHz calibrator.

★ Built-in WWV band (to check calibration).

★ 1 kHz read-out.

★ Receiver incremental tuning.

Considered the best buy in amateur equipment available today, the FTdx560 features highpower, super sensitivity, and sharp selectivity, in one complete station package. Except for the addition of a microphone and speaker no other accessories are dual to be "On the air."

De luxe equipment built-in to the FTdx560 at no extra cost includes, A.C. power supply, dual calibrators (100 kHz and 25 kHz), VOX, Break-in CW with sidetone, clarifier, phone patch terminal, and WWV 10 MHz band. Full transceive capability 80 through the complete 10 metre band plus two optional auxiliary bands between 3.5-30 MHz.

The FTdx560 features velvet smooth tuning with zero backlash planetary gear system. Readout to within 300 Hz is easily obtainable when calibrated to the nearest 25 kHz marker. WWV frequency check to crystal calibrator assures "on frequency" operation on all bands.

DUAL TOROID first I.F. stage provides high gain/bandwidth product for double conversion tunable I.F. circuit used in the FTdx560. This system guarantees linear tuning rate plus high image rejection.

Twenty tubes plus forty-two silicon semi-conductors make up the active devices used in the transceiver. The passive crystal filter is of the six pole type designed for optimum SSB audio quality.

The FTdx560 was planned and designed specifically for the World Amateur utilizing standard electronic parts readily available from local sources. Yaesu warrants the FTdx560 for a period of one year following sale. Continuing service is available for your complete satisfaction.

Check the specifications and compare your cost. We believe that the FTdx560 is truly the best buy in the amateur field today.

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FL2100 Linear Amplifier ...	£135-00	SP400 speaker ...	£10-00	FT401 Transceiver ...	£215-00	FP2AC/B AC supply with batteries ...	£34-00
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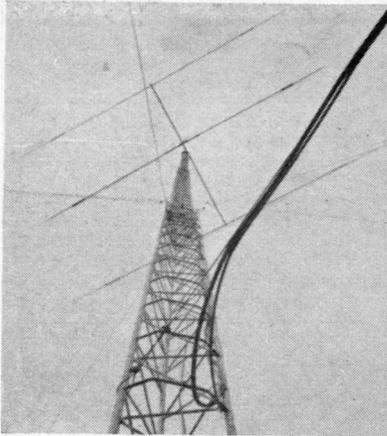
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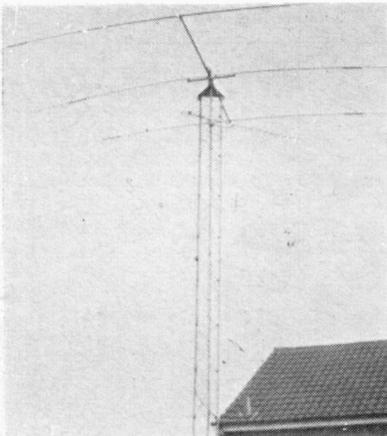


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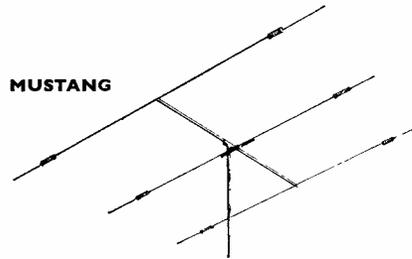
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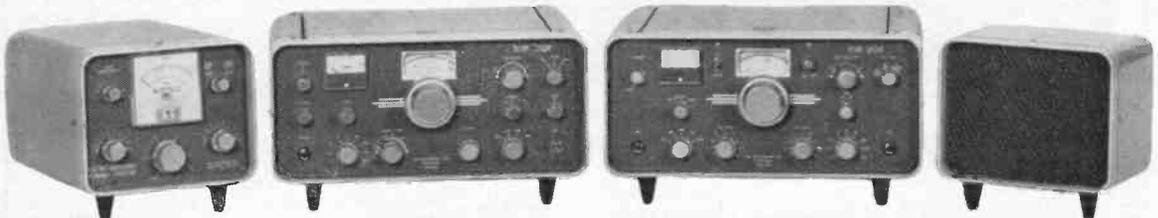
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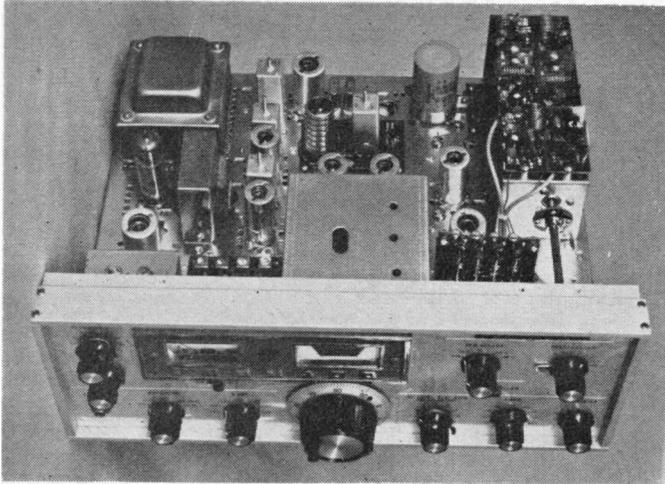
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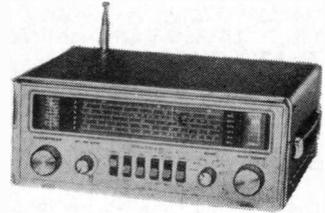


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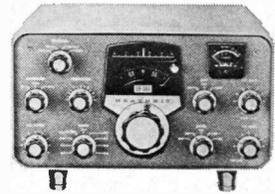


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# SHORT WAVE MAGAZINE

(GB3SWM)

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APRIL, 1972

No. 342

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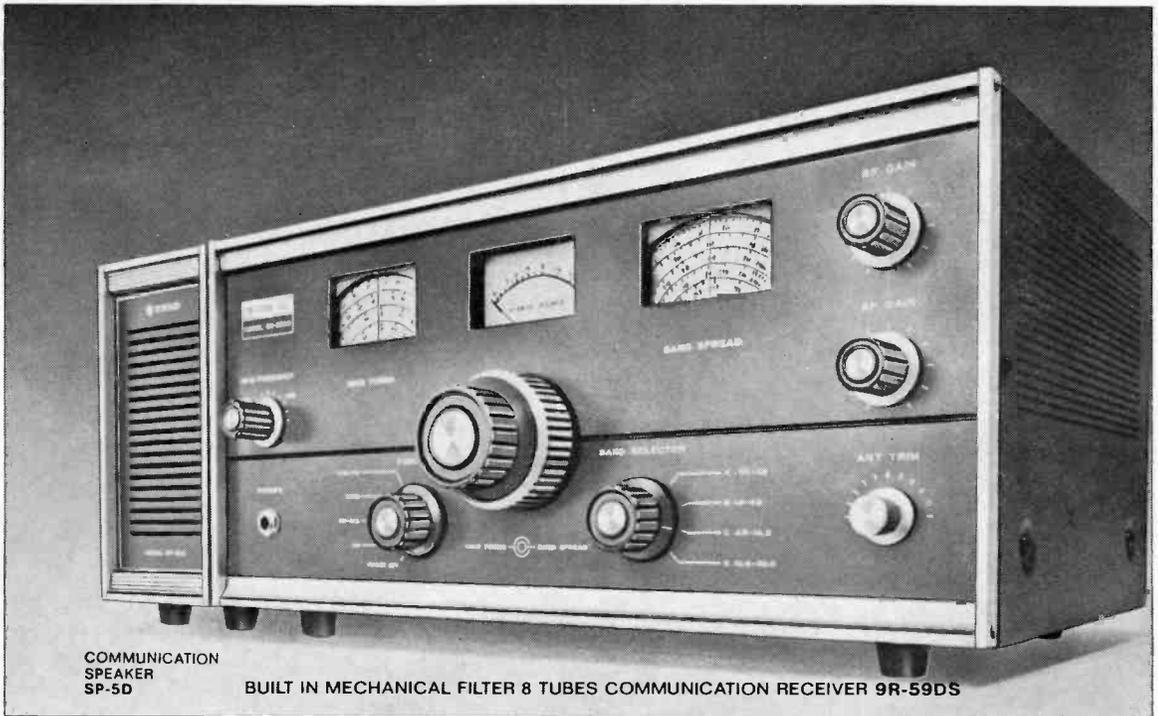
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*The*  
**SHORT-WAVE**  
*Magazine*

E D I T O R I A L

***Frustrating***

Last month in this space, we had to explain production difficulties associated with the electricity supply failures.

Since then, we have become involved in another sort of hang-up on the mechanical side—the printing unions are working out a dispute with their managements, which directly or indirectly affects all print production outside the London area. It is neither our purpose nor our function to attempt to inform readers on the issues involved—it is enough to say that any such dispute must lead to what (for us, as for many other periodicals) are considerable difficulties, quite beyond our control, in getting an issue out and also in giving full coverage of all the news reaching us.

The issue now in your hands has been produced in just this situation. To enable us to continue to meet our commitment to get *SHORT WAVE MAGAZINE* out and on time, readers can do a great deal to help.

In the first place, let all your contacts know (over the air and otherwise) that, for the time being, we are in same position as most periodicals dependent on the normal processes of print.

Secondly, let us have whatever you want to get into the May issue—Activity Feature reports, Club news items, Small Advertisements, and so forth—just as soon as you can. Though in this issue we do give normal deadline dates for the next, in fact they should be regarded as somewhat unrealistic. At the moment of writing, it is not possible to say what, in reality, they ought to be. For instance, for this issue we had to anticipate the production of Editorial material (which means all that goes in the body of the *Magazine*) by a full week, meaning that much in the way of news came in too late, and is now dead for May.

Thirdly, accept our assurance that all concerned with the preparation of *SHORT WAVE MAGAZINE* for press are doing their utmost to overcome what we all hope will only be a temporary difficulty.

*Austin Forth,  
G6FO.*

# COMMUNICATION and DX NEWS

*E. P. Essery, G3KFE*

**T**HIS month, we are starting to write the piece much earlier than usual, because of possible "delays in the system" while a printing dispute is being worked out, which means some regular correspondents may be missing, the piece having left these hands before their letters could be taken in. To such, and to any readers who find the offering somewhat lacking in meat as a result, our apologies—we promise to try and do better next time!

## The Bands

Not bad at all, by and large. The falling of the sunspot number has made quite a difference, of course, as it has gone from the eighties down to the low fifties a year later, which will make a noticeable difference. Nonetheless, harder going or not, this time of year invariably sees much of the high activity and the DX QSO's.

Naturally, Ten has fallen away, and Fifteen to a lesser degree, while Twenty is not staying open so late as of yore in the evenings—but the counterbalance is in the improvement in DX conditions on 1·8, 3·5, and 7 MHz caused by the reduction in absorption effects. Indeed, Forty should be yielding something of interest almost round the clock, given a decent aerial system (and appropriate QRM suppressants!) So . . . let's look at it all, as seen through the eyes of the beholders.

## Ten Metres

Naturally, a shortage of reports—half the trouble at least with Ten is lack of activity, as most of the big contests seem to demonstrate.

First we hear from W6AM (Long Beach), who mentions QSO's on SSB with CR6IY, HC1RF, ZP5AQ and CP1EU, all around 1800z and all on approximately the same frequency, 28·5 MHz.

Also "over there" is W4WFL/1, although by the time this is being read, Morgan will be operating in Europe under some quite interesting calls, using his modified SBE-33 transceiver for all this; the modifications comprise fitting of a CW

facility and, in addition, coverage of all of the bands 80 to 15 metres. This is not to say W4WFL/1 does not show up on Ten, at least from home—he does, and recently booked in TG9YN and VP2LAT just to prove it.

A new correspondent, and very welcome, too, is G3JFF (Cowplain, Hants.), who runs 150 watts of SSB or CW to a "5RV". Results have been quite good of late, thanks to conditions. Ten CW yielded contacts with EA8BK, ZS3AW, OD5LX, VU2AAA, CR6AI and ZS6OS, with VP2AAA as the prize gotaway.

An HW-101 and a bit of wet string serve as his weapons, but G4AMJ seems to have deployed them well enough, SSB having produced VU2JM and ZE1DI, and CW CT3AS and a string of W1-4 types.

Low sunspot count or no, G2DC reckons there have been several days on which WAC could be made, with an opening as early as 0700z to UL7 and that part of the world, gradually spreading Eastwards, and to Africa, then about noon the first W's coming in and coverage Westwards later to bring in all districts by about 1700. As for conditions to VK, they have been somewhat erratic, but this may have been to some extent the old bogey of activity, since it is nearly always the same VK chaps one runs across. All his 10m. contacts were CW, with such as C8CQ (a new one for the band) FG7TG, EP2PR, JA1NW, JA6JML, JA7AT, JH1TGO, KZ5MS, LU8EQI, PY2AME, OX3AB, RA0LAY, TY7ABM, UA9SA, UA9MC, UA9NAD, UA9UAR, UD6AS, UL7GAU, UL7GAN, UL7SAC, UL7PAO, U8AFI, UH8HAF, VP2AAA, VK5GM, VK6SA, VU2AAA, ZE3JJ, ZS1A, ZS3AW, ZS5NQ, ZS5KI, ZS6KT, ZL1ADD, all W call areas, and VE1-7.

## Fifteen

Here pride of place must go to the return of old-stager G8DI

(Liverpool) who seems to have stuck to CW with his TR4 by Drake. One notes JY6FC, KR8BY, KH6HGP, 5T5CJ, EP2PR, 6W8AL, EA9OG, VP2LY and HI3JEI all taking the G8DI bait; the escapers numbered among them KR6KC, ZE1JL, XE2BG, KG6ALV, 8P6BU, 3B8RS, and TG9NJ.

Quite a lad is G4AMT (Penzance), one way and another. That Quad of his blew down, but was eventually re-erected with enough guys, Terry says, to keep the Post Office Tower upright. Rather than leave Fifteen alone while the Quad was down, Terry loaded up the 7 MHz dipole and promptly worked VK6PM and VK6CF, over the top of hills of 200 feet coming within fifty yards of the station, which must act as pretty effective screens. Once the Quad was back in the air, Terry made his first three QSO's by way of FL8MM, JY8JK, and VU2JM! For the rest, there were such as MP4MBC, VU2HLU, JY6FC, W1-5, W8-0 and VE1-3, 9K2BQ, OD5ET, EQ2KH, EQ2SW, EQ2TB, ET3DS, 9M2MN, 5Z4MO, FC9VN, ZC4LC and CT2BG.

For W6AM, the only contact considered worth a mention in his letter was KS6DH, hooked on Fifteen right at the LF end of the Phone area, for an SSB exchange of RS59.

G3JFF found the band quite lively but not as full of interest as Twenty, but his CW tickled the palate of EA9EO, 5T5CJ, EQ2BQ, ZS6OS, ZS6AL and OD5LX.

As for your poor old scribe, his view of the band is simply that every time he goes on it the lesson is rubbed home that he badly needs both a beam and a hefty linear; to which his ambitions have got no further than a cabinet for the linear and a rotator for a beam!

An interesting situation arose for G2HKU (Sheppey) who was working a string of W's on Fifteen, when quite suddenly the band folded up and there was—silence! Just like Ten, even to the 599 signal reports just before the calamity.

Since his operating time has been a bit limited by the slow departure of the screws, G2DC (Ringwood) has not given much attention to the band, saving one spell during the Phone leg of the ARRL shindig, when ninety minutes of SSB operating resulted in 143 W QSO's, just to prove Jack could still show some DX operators a trick or two!

G4AMJ only managed a look at 15m. while he was /A from G4AMT's shack, but in that period he did raise on SSB FL8MM, JY8JK and VU2HLU, which must have encouraged him a bit, since he then went home and worked KP4BCL, also UI8BL, WB4QVG, UK9HAA and a string of Europeans on CW.

### Twenty Metres

Sad to say, complains G2HKU, he has not yet found a way of going without sleep—unlike the contest experts!—and the rest of his time is taken with such sordid things as working and other unmentionable necessities. As if that were not bad enough Ted has a very justifiable gripe about some of the II stations; one well-known "Eye Wan" was on at the time Ted wrote and he was spreading a measured 18 kHz across the band! It is true most of us go "over the top" at times, but a normal rig will not produce splatter of that magnitude unless it is being overdriven to a point which is painfully evident by a glance at the PA current meter on the linear. G3KFE recalls his operation with the Hallicrafters SR-400: One could literally put volts on the mike socket, but it would not allow itself to be goaded into producing any significantly powered splatter, no matter what. That II station was going the right way to wreck his output bottles! On a happier note, Ted managed to find time for a CW QSO with UK9WAA, and SSB chats with JD1ACF (Bonin), UW0IF, ZL1HR, ZL1VN, ZL1WE, ZL2AUX, ZL3FO, ZL3SE and EQ2SW.

Ed at G3XTJ (Palmer's Green) has been bashing at the DX again, when he could spare the time from bashing the QRM on Forty, and on Twenty he came up with A2CAE, 5R8AP, DU1DBT, XE2ID, MP4M, 9M2, HS, VK, ZL, VS9, 4S7, 5X5 and 9V1. And he says that anything



G3JPN operating GB3BBS, Bingley Hall, Birmingham, on the occasion of the Boat Show there during February 12-26. The gear shown here is a KW-2000A with a KW linear, which worked into a KW trap dipole on the roof of the Hall. Contacts world-wide were made during the period of the Exhibition, this being the annual M.A.R.S. contribution to the Show.

done away from Forty is a mere sideline!

Still soldiering on, G8DI seems to have had rather mixed luck of late; he notes QSO's with TY1ABE, HK1QQ, FG7TG, 9V1QK, UH8CS, EA9EO, W7OHR, YV5DRN, VP2GLE, UH8CW and FM7AI, but the gotaway list includes 5R8AB, PZ1AP, LX1SN, TU2CV, OY1R, JW6FP, VP2AAA, CN8CF, FG7AA, HK2DP, ZD8JT, OX3AY and KL7CYL.

As has been often said, G4AMT does not like Twenty, but this month Terry admits this is mainly a function of his receiver, which we gather is not so hot; however, he did try the band, to work an assortment of Europeans and HV3SJ.

W4WFL/1 has been having sessions on Twenty, thanks to its later activity with the changing season, his new ones on SSB including CR7GJ, VP2SG, 6W8AL and 9G1WW, while CW also added to the score by way of KS6DY, OD5EJ, 3D6AF, 7Q7AA and 9H3C.

Strange to relate W6AM, who usually seems to devote most time to 20m. only mentions a couple of contacts, with KC4USA, on Sideband, and KC4USP, CW. Incidentally, the latter was the first time your conductor recalls W6AM getting a report worse than 59 on

Twenty—this time he was down to 569. There's hope for the rest of us yet!

Both modes are shown in G3JFF's report. To look at the CW list first, we see VE6VK, VE7EG, VK2EO, VK2BQQ, ZL2AI, ZL2ASM, ZL2AFZ, UH8CS, UA50A, ZD9GA, JA3XKJ, TY1ABE, UA0IT, VP8LK, XE1FFY, OX3ZO, ZS6S, ZS6AL, CR6AI, ZL3IS, PY2SO and W7RHO, while SSB accounted for 5Z4NM, 5Z4DW, VQ9DM and 5Z6XF. As for the gotaways, there are TI2MV, TG9NJ, 7Q7BC, VP2GSY and 9Y4MM on *this* list.

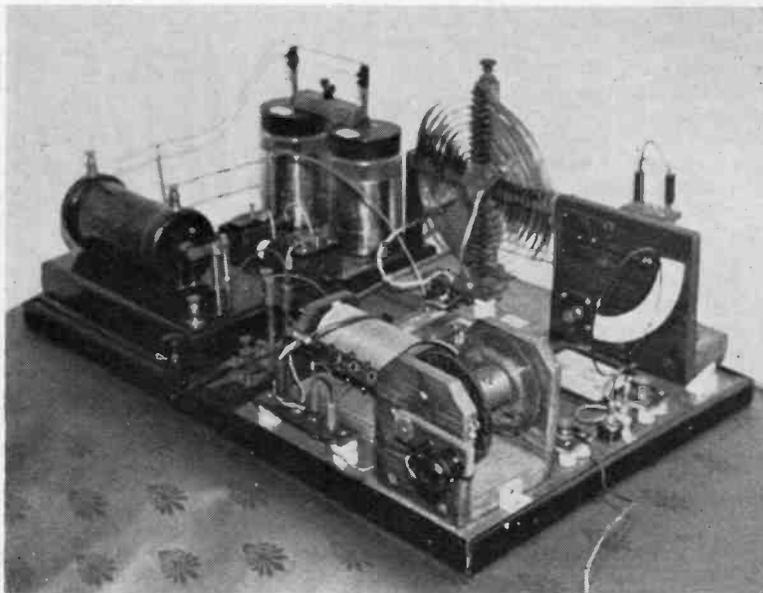
From SWL Ellis of Guildford, we hear that VK4SU, who has been on six metres exclusively, and has not used Twenty since his spells from October '68 to April '69 and (portable) in late 1969, has been receiving cards which indicate the presence of a pirate on the band—which, rightly, annoys him.

An amusing letter from G5CS (Esher) decries the use of the term "old-timer" in the Amateur Radio sense—after all, Gerry may be 65, but he still likes looking at miniskirts, and driving a Lotus Elan. Anyway, he says, the old-timers generally know a lot less than today's youngsters! Be that as it may, Gerry was on Twenty one day

with a net of eight "doddering old greybeards" which included G6DW, GM5NW, G5CS himself, VK3AD (who is ex-G6TM), VK3OG (ex-G6OH), and a distinguished visitor in the VK3AD shack in the shape of W8GZ of Windom aerial fame. Of this group the "youngest licence" was first issued in 1928, the oldest in 1914; and G2DX was around on channel but did not quite make a QSO, for he would have been able to go back almost to coherer days!

### BRIEF DX DATA

Call	Details
XU1AA	Operator VO2AH is from Cardiff; QSL's from VE7IR/XU are quite OK for DXCC credit.
WS3VOA	Special prefix to commemorate 30 years of VOA broadcasting!
XT2AF	SSB signal at S9, 1700 to 2000, 14100-14200 kHz usually; Nil is ex-TJ1AU. QSL to N. Belanger, Box 127, Bobo Dioulasso, Volta Republic.
VR1AA	Looks for Europeans, 14027, 0615-0730z, 3504, 3528, 7002 kHz, 0645-0700z.
C2...	C21AA, 14 MHz SSB, 1135z; C21DC worked 181PB at 0640z; C21TL, 14312 SSB, 1500z.
ASITY	New call for Yonten, was AC5TY; 14195 kHz, around 1700-1800z with 4S7AB as m.c.
W9IGW /CEØX	San Felix. About April 7, for four days. CW/SSB operation, all bands including 160m. QSL's via K3RLY.
UA50..	Special prefix from U.S.S.R.; five stations will visit each Republic in turn, using calls of this form, as, e.g. UF5Ø.. between March 1 and June 7 in all. Each stop for a week. Award, USSR-50 for 15 QSO's with the special stations, + 35 other U.S.S.R. stations, and there will also be trophies to be won. Mail by June 22, to USSR-50, Box N-88, Moscow, also the address for QSL's.
VR6TC	14228 kHz, 0630z, S9 SSB signal, QSL to W5OLG, or direct to Box 1, Adamsville, Pitcairn Island.



Over in the Black Forest, a group of amateurs including DL1CU (of "QRV Amateur Radio", the new German magazine) have a hobby-interest the rebuilding of antique amateur equipment. Here is a model of a very early transmitter, still capable of giving (we are told) a sweet MCW note on the LF bands. The picture opposite is of an early amateur-band station of years later!

As for G2DC, Jack's main pleasure this month lies in his gradual return to the CW ends of the bands. Although various VK's have mentioned that C21TL is active on both CW and SSB, G2DC has not as yet tripped over him—but he did make CW contact with VK2-7, ZL1-4, UAØFD, VK9LV (G5RV, who will soon be returning to the U.K., by way of various odd places) and JD1ACF, while on sideband there were accountings with MP4MBC, MP4MBB, MP4MBA, JY8JK, VK4VX, VK4VC, VK6LK, VK6MO, VK6VC, VQ9R, VE8BR (Baffin Is.), 5H3LV, 5X5NA, 9M2DQ, YBØCJ, all W call areas and VE1-8.

G4AMJ (St. Ives) seems to have been hammering Twenty for new countries, and to show G4AMT "the way home!" said countries on SSB included ZF1GC, 8P6CC, HR1RF, FG7XL, VQ9R, ZS1TS, MP4MBM, 8R1U, VP8MM, CN8CG, VK9JV, ZB2BL, 9K2AN, LA8YB/4W, HPØLL, EL2T, VP2MY, VP2GAE, DU1MAT, OD5FU, VP2KF, HZ1SH, and OH1JW/OHØ. Other contacts of interest were VP9GE, PZ1AP, various PY/YV, VP9K, VP9AF, HK3LT, JAØBBB, ZP5KA,

HV3SJ, KP4ZC, PJ2CL, LU3AHR/P, LU2FAO, 9K2CI, PZ1DR, ZB2RE, VP2VAM, VP2LY, 8P6EK, PZ1AN, HK1CEY, 4X4HT, VP2LI, LX1RF, DU1ZAC, ZB2CK, OD5GT, OD5GU and CT3AT. As if that were not enough, the man goes on to his CW new countries, with TY1ABE, ZP5KA, LU6FA, T12WX and CX4CO, also other CW DX such as PY's, OY4M, HK3AVK, 8P6AE, HK7UL, KV4AA, W5OJZ and W5RM. We wait with bated breath to find what will happen when G4AMT hears about all this, he being busily engaged on building a Quad for G4AMJ!

### Points of View

Your conductor recently received a stack of back-numbers of American magazines which had been held up in the dock strike over there. He was brought up sharp by the November 1971 issue of *CQ Magazine*, and its Editorial. This quotes W4BW as being more interested in the present age of the newcomers to Amateur Radio rather than the fall in numbers over there—after all, as he says, 500,000 W's on the air would make the QRM pretty grim, even with 200-cycle filters! However, he goes on to offer the suggestion

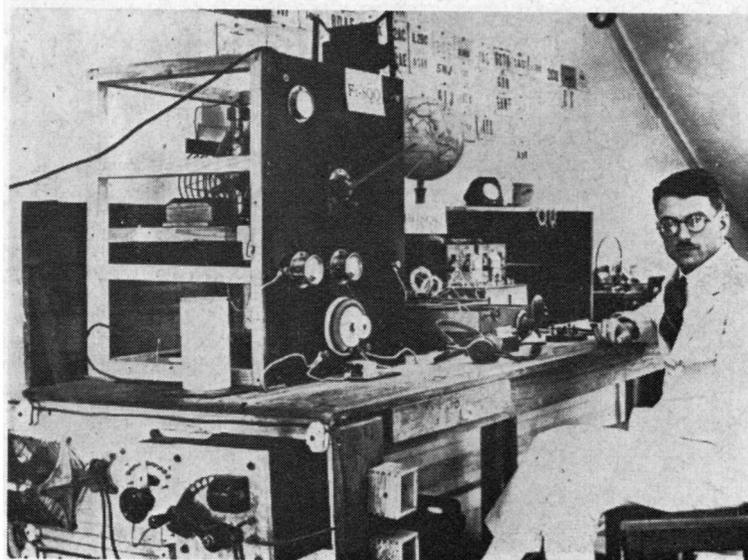
that the international Frequency Conference in 1977 is the time for the amateurs of the world to press hard for more bands—as he says, a look at the frequency allocation charts will show how the growth of international cable and satellite communication is significantly easing the pressure in the HF bands, as indeed we have all hoped it would. He therefore goes on to say that proposals should be offered which could lead to more space for amateurs, a suggested range being bands at 10 MHz, 18 MHz and 24 MHz.

Now, just who is this chap? W4BW is the Chief of the Amateur and Citizens Division of the Federal Communications Commission, the U.S. licensing authority.

So much for those who spend their time at Conferences just hoping we will not *lose* too much spectrum-space! All your conductor would add by way of comment is that the easiest way to lose a battle is to *think* you have lost it, to which the corollary is that attack is far the best form of defence.

### QSL Matters

Quite a crop of QSL addresses again. G2HKU mentions JD1ACF, whose cards go to JA1OAF. W4WFL next: Morgan's forthcoming trip to Europe will involve the calls F0AEE/FC and PA9RA, not to mention others not yet to hand, and they all go to him at BM/W4WFL, London WC1V-6XX. Oh, and we forgot, he also has C31EF lined up, as the QSL card (blank, sadly!) on the writer's desk shows. In addition, W4WFL offers 9H3C, to W2FXA; VP2LAT, to WA9UCE; IB0CRW, IL7CRW and IM0CRW, all to DK5KA; 5T5CJ to Box 202, Naukchott, Mauritania; JT0AE to OK1AQW; JT1AW to K4MPE; HB9XJG, HB0XJG and 3A0FN all to either DL4VA via DARC, or to WA4WME. The next lot, from G4AMT, has VP2VAM, to VE3GMT; LU7TD, to Box 1981, Jujuy, Argentine; CT2BG to WB8ENY, FC0VQ to DJ8UT; FL8MM to Box 574, Djibouti, T.F.A.I.; VU2HLU to W0PAH; HK3LT to Box 584, Bogota, Colombia; 9K2BQ to JA1ZZ; OD5ET to Box 4848, Beirut, Lebanon; JY6FC to Box 11020, Amman, Jordan; 4Z4G to



In the last few years, we have been hearing a lot of unhappy Saigon. When this picture was taken, in 1926, Saigon was one of the peaceful, elegant and gracious cities of French Indo-China, and F8QQ was among the locally active amateurs. We have only the picture to go by but we would say that at the time F8QQ was working CW/DX on 45 metres, running about 50 watts into an L-aerial of 66ft. or so, tapped directly on to the tank coil, and his Rx would probably have been a 1-V-1. Happily, M. Richard Jamas is still with us, and now signs F8QQ from Nice, on the DX bands.

W2KF; ET3DS to VE2DCY, and 9H3B to VE3MR.

### Bits and Pieces

Various items to be mentioned. First, by way of the RAFARS Newsletter, a note about the Cyprus QSL Bureau. This is *incoming* only, to Box 216, Famagusta. Anyone who has left Cyprus but may have a few cards coming in, should send a supply of s.a.e.'s for the QSL's to be forwarded.

Now the question of 5B4 stations: 5B4ES is quite valid, we understand, and is held by the English School in Nicosia. This is the only station properly licensed to use the 5B4 prefix; however, there are some UN licensed stations, who *should* sign 5B4UN + call letters, but generally omit the letters UN.

By now, we shall be past the deadline for the CQ WW WPX Contest over the March 25/26 weekend, but it is not too late to say that logs should be timed in GMT, with a separate log for each band, prefixes indicated the first time they are worked, and the logs checked for duplicate QSO's; then add the summary sheet, the category you are entering, which may be single-op,

all band; or one-band, multi-operator; all-band, single transmitter; or multi-op. multi-transmitter. All entries, postmarked not later than May 1 to CQ WW WPX Contest Committee, 14 Vandeventer Avenue, Port Washington, L.I., N.Y. 11050, U.S.A.

April 22/23 sees the Bermuda Phone Contest, which has been mentioned before, and May 6/7 is the CW leg, when you can brush up your CW, ready for the U.S.S.R. CW Contest the following weekend.

Among the lesser ones, we have some detail on the contest which is being run in conjunction with the 7th World Orchid Conference, which is the world working the HK4 stations, with 5J4LR and 5K4LR also available. It is five points for each HK4, or ten points for 5J4 and 5K4, giving RS plus the usual three-digit number starting at 001. The HK4's pass RS plus a number indicating the power. Same station may be worked on different bands, final score to be QSO points times multiplier for the number of bands worked. Mail to LCRA, Seccional Medellin, Apartado Aereo 51900, Medellin, Colombia, South America.

On a more domestic level, the

Chiltern Club found their own shindig on Top Band quite popular, and to judge by the logs sent in, at least twenty counties were available to be worked during the morning, although DHJ was by no means strong, which would suggest that conditions were not too good.

By way of *QRV Magazine*, we have some interesting details on the HV2 operation last year from Castelgandofa, which with the help of HV3SJ, was mounted by a group of DL amateurs, led by DL1CU, which gave CW contacts to about 3000 lucky souls: Brother Ed., HV3SJ is normally a phone-only operator himself, although certainly active enough to please the most hardened DX'er. Enclosed with the data was a picture of the rig, with DL9PF at the operating position—a nice business-like station set-up. It is understood that ARRL have been approached regarding the status of an HV2 operation as a separate country for DXCC, but at this time we have no further information as to the outcome.

From BFPO 33 comes an incensed missive—G3YEU has been out of the country for 2½ years now, but is receiving QSL cards from late 1970 onwards, covering all bands on SSB, and, on the face of things, a resident of Nottinghamshire. Barry appeals to anyone who worked this character *please* to stop sending QSL cards, as they hooked a phoney.

### Top Band

Rather a thin clip this month. G3VLX (Chislehurst) sends in his entry for the Table with a cryptic comment to the effect we'll be tired

#### COUNTIES TABLE

##### TOP BAND

Callsign	Counties CW	Counties Phone	Total Score
GM3YOR	56	23	57
G3YPT	44	8	52
G3VLX	18	21	39
GW3WSU	—	32	32
G4ALG	19	6	25
G3DCS	14	—	14

This table will run until December 31 1972. Starting date, January 1, 1972. Any mode goes.

## Reporting the HF Bands

of seeing his short notes—never, it's all grist to the mill!

From WIBB's latest *Newsflash*, we have various bits of news, perhaps the most important of which is that K1PBW has lost his house and shack, with the 133-foot vertical and eighty radials, all burned to the ground as a result of an overheated stove pipe. Ernie was able to dash in and save the receiver and transmitter. Let us hope he will be able to get everything sorted out and up again in time for next autumn—this was a real disaster, on which we all sympathise.

Also from WIBB, we hear that DL9KR, who used to be DL9KRA, has already managed a WAC from his new apartment-block home. He has put up a 30-foot vertical with an "umbrella" of six wires giving top-loading, plus some two thousand feet of wire on the roof in the form of radials up to seventy feet long. Once this was tuned-up "on the nose" a listen round yielded a first QSO with K2ANR, after which he was called by ZD9BM, for a "First." As if that were not enough, Jan was able to go on in the *CQ WW 160 Test*, raising 21 countries and making 269 QSO's, including 20 States and Provinces, also such as VP2AAA, 8P6DR, HZ1KE, W4BRB/VP7 (all "Firsts" for DL). Within three days, DL9KR had made a WAC, with EQ2BQ, VK5KO, W5RTQ, K4CIA, KV4FZ and PY1DVG. This should interest the chaps who say DX can't be worked from a small plot.

G2HKU (Sheppey) continues his serene way with the EU/DX, and this month offers PAØPN and PAØINA on SSB, plus CW with EI9J, OL1AOH, GD5DZ and GW3UPK.

JH1LKH, Minekazu Sugiyama, has been active on Top Band since 1968, his first DX QSO being with W7DL/T, when JH1LKH had only ten watts of transmitter; this spurred him on, to use higher power, with Drake and, to judge from the photograph WIBB sent over, Yaesu, gear, which has netted him contacts with VK, VS6, and a "First" to VK9, not

to mention CR6, KH6, and regular W6 and W7 working—all of which have generated ambition for European and East Coast W contacts.

G4AYZ (Northampton) is now on 160 and 80 metres, with a Codar A.T.5. as a starter. It is interesting to notice that it is a year to the day between his first picking up a copy of *SHORT WAVE MAGAZINE* to the date when he received the ticket, although it has to be admitted he was a pre-war SWL. He hopes to get on SSB later, but meanwhile he would appreciate reports, SWL and otherwise and promises to QSL any which are of any help at all.

GW3WSU (Llancarfan) comes into the Table, having picked up 32 counties all on Phone; it is interesting to see he is operating from the Decca site, so doubtless he is pretty well clued-up on the ways and means of making RF go off in the desired directions.

GM3YOR (Kirkcaldy) is also in the Table, and at the same time is looking for *CW* QSO's, to make his 98, with the Scillies, Alderney, Guernsey, Armagh, Tyrone, Caithness, Brecon and Montgomery—any offers? On a different tack, Drew has received the QSL for his MP4BJI contact, and John claims this is the first GM/MP4B on Top Band.

G3YPT (Swanage) reports a quiet spell, apart from a session in a recent Top Band contest, when conditions seemed quite fair and GD5DZ, GI3OLJ, GI3SSR, GM3NCS/A and GM3UKG (Banff) were worked, not to mention OK1IDK/P. Paul hopes to be somewhat more active in the counties context during the coming weeks.

And that, it might be added, goes for your conductor, too. There is wire coiled up ready-measured for at least a temporary end-fed aerial to get going again on the band, but . . .

### The LF Bands

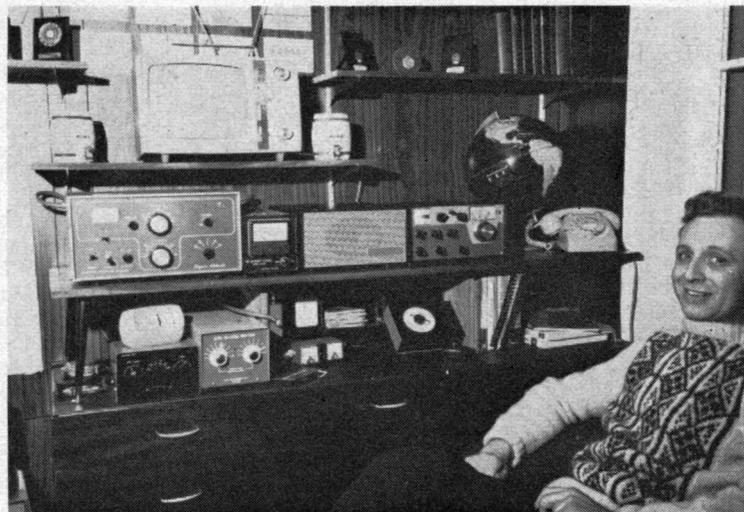
First G2DC, who confined himself to being on and active at times, between 0300z and 0630, on *Eighty*,

when the band has been good to the West, which meant he was able to work all the W call areas except W6, plus VE1, VE2, VE3 and VE7. As for *Forty*, it has been quite fair during 2200 and 0330z and again between 0530 and 0730. One morning HKØBKX was there with a nice signal, but after a couple of contacts was mobbed by the EU's to such a degree that the HK just gave up and sent in conclusion that he would be better off in bed! CW accounted for PY2AME, PY7OS, VK3MR, ZL4IE, all W call areas, VE1-5, VE7 and lots of UA9's.

Although G4AMJ, as related elsewhere, spent a lot of his time working over Twenty, he did find enough energy to tackle *Eighty* SSB, which resulted in contacts with CO2FA, VP9AT, VE3PT, UA2UN and WBØFFG/TF.

Using a sloping-Vee dipole, with the apex at sixty feet, G4AMT spent quite a lot of effort working *Eighty* between 0600 and 1000. All this list is 80m. Sideband: VE1FO, VE1IE, VE3FKU, VE3NE, VE3PT, VE3GGS, VE1AVN, VO1JK, W1FVD, W2ZPO, WB2OEU/2, W4JT, WB4JYB, VA2UN, ZL3GQ, ZL3GS, ZL4AV, HR1KAS, HR2GK, CT2AK, XE1KB, PY1HA, CO2FA, VP9AT, 6W8DY and VP2LY. The CW on *Forty*, in a half-hour stint before going to church one Sunday morning, accounted for all W call areas (apart from W7), 3A2AB, 5Z4JD and FCØVQ.

For G2HKU there was interest in *Eighty* by working CW to YK1OK, W1, W2, W4 and other routine stuff; *Forty* produced 6Y5SR, and a comment about the way Radio Peking spreads of late, as though the transmitter were out of kilter—a point mentioned, too, by others. In an aside, Ted talks about his "5RV" and 14AVQ aeriels; the ground-mounted 14AVQ is well up on the 5RV to U.S.A. on 7 MHz, but not so good to ZL—on the other hand, surprisingly enough, it produces less TVI on any band—



G3UCV, Ron Cartwright, 5 Manston Gardens, Crossgates, Leeds, 15, passed the R.A.E. in 1952 but did not take out his ticket till 13 years later! Since 1965, wide varieties of gear and antennae have been tried and he is now happily settled with a Drake TR-4 transceiver, a linear to go with it, and the necessary ancillaries. His aeriels are a trapped mini-Quad for the DX and an inverted dipole for 80m. The shack is an annex off the living room.

being fed through individual ATU's switched at the transmitter-output.

For W6AM, there have been a few interesting QSO's, on CW, including TG9HP, DL3ZM/YV5 and 8R1G, all worked just HF of the U.K. upper frequency limit of 3.8 MHz.

Another "5RV" aerial addict is G3JFF, who used it on *Eighty* to key his 150 watts with CT2AK, HV3SJ, GB2MT and East Coast W's; *Forty* produced only Europeans and W3/W4, but created a comment that these transceivers just *hate* the amount of signal that pounds their front-ends from the BC stations. Very true, and a good argument for an aerial attenuator!

To round off, a letter from G3XTJ (Palmer's Green) who has clearly been inspired by all the talk of DX on *Forty*. He set off to work it, with a Drake R4-A, and registered with FG7TG, JA5FHQ, KP4BNH,

PY4BUN/2, PZ1AP, SV1CH, TG9CD, UK8JAD, VP1AV, VP9BK, VP9BO, YV5DRN and 4S7DA—the SV was raised while writing his letter, and takes Ed. up to Country No. 99 on *Forty*, assuming the JT1AA he worked was OK; and a sked with ZC4KJ could put the "ton" up by the time this reaches the bookstalls.

### Conclusion

And there, good people, you have it; as this is going down before time—see Editorial—there may well be more news in the pipeline but it will, sad to say, have to wait till our next. But we *haven't* forgotten or lost the letters! All being well, the nominal deadline for next month will be April 11, addressed, as always, to CDXN, SHORT WAVE MAGAZINE, BUCKINGHAM. Till then, good luck and good DX. Write in again as soon as you can.

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

Independent, Unsubsidised and now in its 30th volume.

### ANOTHER MARCONI ANNIVERSARY

In connection with a range of activities—both on the air and off it—arranged for May 13-21 by the Barry College Radio Society in commemoration of the Marconi-Kemp first 'cross-water tests in 1897, from Flatholm in the Bristol Channel, we have received a large amount of detailed information from GW3VBP, the hon. secretary. There is neither time nor space to deal with it all here now, except to mention that the local stations to be on are GB3MKT (Lavernock Pt.), GB3BCT (Flatholm Is.) and G2WS/P (old "Two Walking Suitcases" who started out /P many years ago), on Brean Down, Somerset. We hope we may be able to cover this more fully in the May issue, due out on April 28.

### USEFUL NEW PRODUCTS

The first is a neat little instrument box, 4 x 6 x 4 in., finished grey, with mounting feet, a chrome handle and detachable aluminium panel. Costing but £1.50 post free, a container of this sort has many obvious applications in the construction of small pieces of apparatus.

Another item is a QSL mounting sleeve in a clear plastic material, designed to take a dozen cards for display, of course with the minimum of marking of the wall on which they are mounted. Ten such strips cost 25p (post 6p), accommodating 120 QSL cards.

Both these items can be obtained from: Derwent Radio, 28 Hillcrest Avenue, Scarborough, Yorkshire.

### CORRECTION NOTE—R.A.E. PASSES

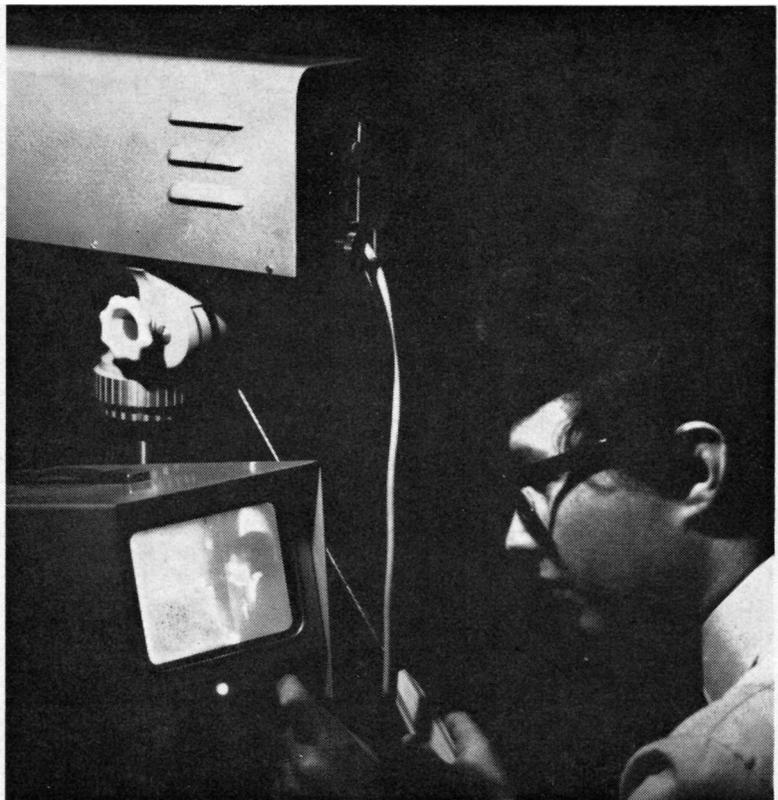
As several readers have rightly pointed out, an error was made in that item on the R.A.E. on p.43 March. A pass must be secured in *both* Parts I and II, to the extent of 50% of the marks for each section, in order to obtain the R.A.E. Certificate. While we much regret having perpetrated such an error, in fact it does not in any way affect the tenor of the argument, which is that the pass-rate overall ought to be higher.

### NOVICE LICENSING IN AUSTRALIA

The problems of Novice Licensing and the definition, control and examination standards for such a system have become the hot topic for the Wireless Institute of Australia (the VK amateur representative body) and their *Amateur Radio*. Pages are devoted to correspondence—unedited and *in extenso*—on the subject and from here the arguments look to be about as broad as they are long (though that may be somewhat over-simplifying the situation). One point emerging that came as news to us is that in Australia their equivalent to our R.A.E. demands 70% of the marks for a pass; in New Zealand it is 50%, as in the U.K.

The present position is that in the light of the discussions since the first Novice Report was published for general consideration, a Supplementary Report on Novice Licensing is to be prepared for submission to the authorities concerned.

Interesting picture showing the effect of a Mullard image intensifier, demonstrated at their Research Laboratories, Redhill, Surrey. The TV camera, fitted with the intensifier, is at one end of a long, dark room, with a lamp directed on to the camera and operator. The picture on the monitor is illuminated only by the stray light reflected from the camera equipment, yet the monitor shows clearly such details as the operator's glasses and his watch.



## THE MOBILE SCENE

The Rally Calendar has been filling up well during the last two months. All dates notified at the time of writing are given below, with details (where we have them) for the events shortly to take place.

Latest figures show that there are now more than 3,200 U.K. amateurs licensed for mobile operation, of whom about 16% are /M on the VHF bands. These numbers should ensure a large turn-out for the more popular of the Season's Rallies.

With the formation of the Amateur Radio Retailers' Association (*see* elsewhere this issue) trade participation in Mobile Rallies by A.R.R.A. members is now being handled by H. James, G3MCN (Stephen-James Ltd.), 70 Priory Road, Liverpool L4 2RZ. (Tel: 051-263 7829.) Rally organisers are asked to note this and contact G3MCN direct if they wish for retail trade support at their event.

Incidentally, we understand that A.R.R.A. members are much concerned about the increasing pilferage round the trade stands at Rallies. Measures are being taken to counter this—it is a manifestation of the times of which nobody can be proud. It is the intention of the Association to take the severest action against anyone caught shop-lifting.

Now for the Calendar of Events:

- April 2:** White Rose Mobile Rally at Lawnswood High School, Leeds, 6, at junction of the A.660 Leeds-Otley and A.6120 Leeds ring road. Ample car parking, trade representation, bring-and-buy sale, raffle and talk-in on 2m./160m. Contacts are: R. Short, G3YEE (Tel: Bradford 664220), or E. Lawley, G8EHV, *QTHR*.
- April 16:** Annual North Midlands event at Drayton Manor Park, near Tamworth, Staffs., opening at 12 noon. There will be trade stands, a grand raffle, judging of mobile installations and talk-in on Top Band and Two metres. And if it is a fine day, the Park has many attractions for the family. Details from C. H. Lloyd, G3ZPQ, *QTHR* (Tel: Colehill 63092).
- May 7:** Spalding Tulip-Time Rally at Surfleet, Lincs., 4 miles north of Spalding on the A.16 Spalding to Boston. The tulip fields should be in full bloom and are a magnificent sight. Pleasant riverside venue, offering overnight camping and caravan facilities, attractions to include trade stands, raffle and bring-and-buy stall. Free admission, and refreshments available on site. Talk-in by G3VPR/P on 1980 kHz, G3MMS/P on 70.26 MHz and G3XBS/P on 145.80 MHz. Maps of the Tulip Fields and further information from: R. Harrison, G3VPR, *QTHR*.
- May 21:** Annual Northern Mobile Rally, at Moor Grange School, Parkstone Avenue, off Ring Road, West Park, Leeds, with all the usual attractions, including trade stands, sale of surplus equipment (bring yours for the stall) and prize draw. Refreshments will be available. Contact for details: D. Binns, G3MGI, *QTHR*.
- May 28:** Chiltern Amateur Radio Club Rally at West Wycombe, Bucks., at the Dashwood home near High Wycombe, on the Oxford road just outside the town. This Rally will coincide with the Steam Rally and the Model World shows. Details from: P. Perkins, G3OUV, Loakes House, Loakes Park, High Wycombe, Bucks.
- May 28:** Hull & District Amateur Radio Society first Mobile Rally, in grounds of the East Riding College of Education, Bishops Burton, on the A.1079 York to Beverley. Contact man: L. D. Colley, G3AGX, *QTHR*. (Further details later.)
- June 18:** Anglian Mobile Rally, at the Suffolk Show Ground, Ipswich. Contact: D. W. Thomas, G3ZLN, *QTHR*. (Further details later.)
- June 25:** West of England Mobile Rally, at Longleat, near Warminster, as in previous years. Information from D. Iles, G3COP, *QTHR*. (Further details later.)
- July 16:** Upton-on-Severn Mobile Rally organised by the Worcester & District Amateur Radio Club. Information: B. Jones, G8ASO, *QTHR*.
- August 13:** Torbay Amateur Radio Society Mobile Rally at Newton Abbot Rugby Ground.
- August 13:** Annual Derby Mobile Rally at Rykneld Schools, as in previous years. Details from T. Darn, G3FGY, *QTHR*.
- August 20:** Saltash & District Amateur Radio Club Rally at Saltash Grammar School, with all the usual side-shows and activities, most of which can be under cover. Ample free parking on site. Details from: I. Aldridge, G4AJU, 302 St. Peter's Road, Manadon, Plymouth, Devon PL5 3DU.
- August 26-27:** Stratford-on-Avon Radio Club Mobile Rally at the National Agricultural Centre, Kenilworth, Warwickshire, Hq. of the Royal Agricultural Society of England. Contact: M. J. W. Webb, G3OOQ, *QTHR*, or ring Stratford-on-Avon 5973. (Further details later.)
- September 24:** Harlow & District Amateur Radio Society annual Rally at Magdalen Laver Village Hall, as in previous years. For details: V. Heard, 106 Vicarage Wood, Harlow, Essex.

Any further information for publication relevant to "The Mobile Scene" should be sent in to SHORT WAVE MAGAZINE, BUCKINGHAM as soon as possible—and on a separate piece of paper, please, not mixed in with other correspondence, nor addressed to our London office!

We are always glad to see good photographs of current Mobile Rally interest. Those we can use are paid for on publication.

### THEFT OF GEAR

Over the week ending March 4/5, G3YJE lost, from the boot of his car, a Heathkit HW-30 (known also as the "Two'er"). This must have happened somewhere between Chester and Newby Bridge. The HW-30 itself is somewhat modified, has two scrapes on the front panel, no screws at the back of the cabinet and no control cabling or other ancillaries. Information would be appreciated by P. R. Merriman, G3YJE, *QTHR*, (or ring 01-953 8088).

## THE HW-17A MODIFIED FOR IMPROVED PERFORMANCE ON TWO METRES

DISCUSSING THE PRACTICAL DETAILS

C. P. HOWARD (G8ANU)

THE *Heathkit* HW-17A two-metre transceiver kit is no longer listed, having been withdrawn from the U.K. market in January 1971. However, during the time that it was available in its original HW-17 and later HW-17A form a large number of units were sold and are still in use, for both fixed station and also for mobile and portable operation with the accessory HW-17-1 DC inverter power supply from a 12-volt battery.

The transceiver unit is compact (14½ in. wide, 8½ in. deep and 6½ in. high) and weighs 13 pounds. It has a built in 240v. AC/PSU. The receiver section is completely transistorised and the Tx side had three valves and a transistor modulator. Four internal switched crystal sockets are provided and also connectors for the *Heathkit* HG-10 VFO.

### Shortcomings of the Original Design

The transmitter circuitry of the HW-17A in general performs tolerably well in the standard form (the original severe lack of PA drive of the HW-17 having been largely eliminated by component changes in the later model) the only remaining transmitter fault being lack of modulation. The receiver is generally considered to be short on sensitivity and to have a tendency to frequency drift due to temperature variations affecting the first oscillator, which is a single tuned transistor arrangement.

The suggested modifications are divided into three sections: (1) Transmitter, (2) Receiver, and (3) Minor general modifications.

### The Transmitter

A useful improvement in modulation can be achieved by replacing the ceramic microphone insert in the p-t-t microphone by an *Acos* Mic. 40 crystal insert and dispensing with the paxolin disc and all but the decorative metallic fabric in front of the insert when fitted in the case.

A more substantial increase in depth of modulation was obtained by increasing the value of the PA screen resistor (R115 in the original circuit) from 12K ohms to 22K ohms, a 2-watt resistor being required. This has the effect of reducing the DC input to the PA from 30 watts to about 25 watts and while the reduction in carrier strength is not detectable the available audio produces more modulation.

A final increase in depth of modulation was obtained by replacing the rectifiers supplying the 15-volt DC line (D307, D308, D309, D311 in the handbook circuit) by rather more adequate plastic encapsulated 1N4002 types and by adding a further 2000 µF capacitor in parallel with the smoothing/reservoir capacity for the

15-volt supply (C325). The effect of these changes was that the 15v. line fell from a no-load of 15 volts to a value of 13.5v. with a sustained loud whistle into the microphone, whereas with the original components the voltage fell to 8.0 volts under the same conditions.

It has been suggested to the writer that substitution of AD149 transistors for the standard audio output transistors (Tr14 and Tr15) could be of benefit but no improvement in modulation could be obtained in this way.

### Receiver Modifications

Various attempts were made initially to obtain adequate sensitivity from the receiver section by careful adjustment of the existing circuitry without the addition of pre-amps. or other devices. Reasonable performance was obtained by very carefully following the handbook on "Receiver Alignment" for the IF stages, and carrying out a modified version of the "Tuner Alignment" procedure—this was to align at 144 and 146 MHz instead of as recommended (who needs a flat response from 143.2 to 148.2 MHz?) and by increasing the 2nd oscillator injection by reducing the value of the emitter resistor (R207). The original 680-ohm resistor can be reduced to less than 100 ohms to produce noticeably more gain—but a compromise is needed as too much injection can greatly increase noise; a value of 270 ohms appears to be suitable.

With these preliminary modifications carried out the receiver seemed much more lively, the AVC began to work and hence the squelch, and tuning meter circuits also started to function. But even at that more sensitivity is obviously needed for other than cross-town type contacts.

To obtain further sensitivity more amplification is required. This may take the form of either an additional RF stage or more IF gain. Both alternatives will be described.

### RF Pre-Amplifier

Attempts to add a pre-amplifier within the case of the transceiver were unsuccessful due to the limited space available and the most promising solution was an external unit mounted on the right-hand side of the cabinet, the input and output coax and power leads being

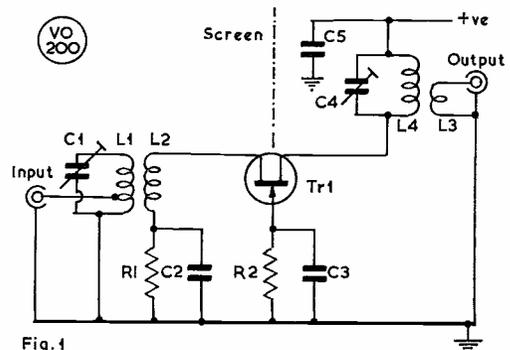


Fig. 1

Fig. 1. Pre-amplifier for the HW-17A Rx section. Values can be: C1, C4, 2-8 pF trimmers; C2, C3, C5, .001 µF feed through; R1, 330 ohms; R2, 100K; L1, L4, 6 turns, ½ in. diameter; L2, L3, single-turn coupling to L1, L4; Tr1, TIS88.

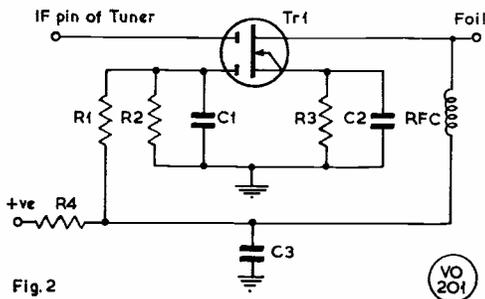


Fig. 2

Fig. 2. Circuit of the IF amplifier discussed in the text. C1, C2, C3, .002  $\mu$ F; R1, 100K; R2, 33K; R3, 120 ohms; R4, 560 ohms; RFC, 19 inches of 30g. enam. wound on 1-megohm resistor as former; transistor Tr1, 40673.

taken through holes in the side of the lower half of the case. A circuit such as that shown in Fig. 1 can be used or a ready-made unit (which must be negative earth!) such as the *Solid State Modules Sentinel* pre-amplifier would be suitable. The DC supplies may be taken from any suitable earth point (-ve) and from the positive end of C325 on the underside of the receiver partition. The 100 pF disc capacitor should be unsoldered from lug 2 of terminal strip AP (the other end being left connected to the Ant. pin on the underside of the receiver printed circuit board) and the inner of the coax input lead to the pre-amplifier connected to lug 2 of strip AP instead. The inner of the coax output lead from the pre-amplifier should then be taken to the free end of the 100 pF disc capacitor. The two coax braids should be earthed to lug 3 of terminal strip AP. If connections to the pre-amplifier are made with coax plugs and sockets re-assembly of the unit is made easier and it is possible to use an external converter and tunable IF strip with the transmitter and aerial switching of the HW-17A if this should ever be required.

The result of this modification is a really worth-while increase in receiver gain up to the level to be expected from a conventional FET converter and tunable IF arrangement, the tuning meter deflecting to full scale on strong signals, with the AVC and squelch circuits working in a most satisfactory manner. In the "spot" mode the transmitter oscillator produces a half-scale meter reading for netting purposes instead of the previous slight deflection only.

#### Additional IF Amplifier—Alternative Arrangement

This modification was originally described by WASPWX as an alternative to the use of a pre-amplifier and its attraction is the small number of components required. The circuit is shown as Fig. 2, above.

The IF pin underneath the tuner section of the receiver printed circuit board is unsoldered from the "island of foil" and insulated from it. Gate 1 of the 40673 is soldered directly to the pin and the drain lead goes to the island of foil originally connected to the pin and the other components are hung on the remaining transistor leads and the adjacent large area of earthy foil below the tuner. (Voltage supplies can be obtained as previously described for the pre-amplifier.) After fitting the amplifier T1 (in the tuner) and L6 require re-alignment as described

in the HW-17A handbook.

#### Receiver Drift

It was observed that the frequency drift of the receiver, previously mentioned, occurred only when the transmitter was in use and appeared to be due to heating of the tuner unit by radiation from the Tx valves. The rate of drift was greatly reduced by lagging the sides and top of the tuner unit box with the thickest polystyrene foam sheeting which could be accommodated. The foam was cut from ceiling tiles and taped into position.

#### Minor General Modifications

Other modifications are mainly minor points of detail and are listed briefly:

- (1) A standard *Belling-Lee* coaxial aerial socket can be mounted directly using the original holes provided for the "phono" socket,
- (2) For safety a three-core mains lead should be used with "live" connected to pin 3 of the 11-pin power socket, neutral to pin 10 and earth to pin 8 and a fused plug fitted to the other end of the lead,
- (3) The VFO position of the crystal switch can be used to connect a further crystal socket mounted on the back wall of the case to provide one crystal which can be changed without removing the top of the case. If one side of the crystal socket is connected to the inner of the VFO input "phono" socket and the other side to the common point for the internal crystal sockets it is possible to use either an external crystal or a VFO as required,
- (4) The arrangement by which the dial light is switched off in the "Batt. Saver" position of the function switch as well as the valve heaters seems to be carrying economy *too* far. By joining together lugs 1 and 2 of the function switch the dial light will remain lit as long as the transceiver is switched on—a great convenience when operating mobile or portable at night,
- (5) If it is desired to add a coaxial aerial change-over relay to replace the diode switching system originally used it will be found that one of the relays available from surplus commercial R/T equipment with a 12-volt, comparatively high-current, operating coil can be wired in series with the HT supply to the anode and screen of the PA stage and will provide superior aerial switching performance,
- (6) A final point, though not a modification, is the fact that 12 MHz crystals can be used in place of the usual 8 MHz ones without any circuit modifications at all (and with no re-tuning required). Slightly more drive to the PA should be obtained.

#### Conclusion

If the principal receiver and transmitter modifications described in this article are carried out the result should be a transceiver of greatly improved performance, which should provide many more contacts than could be expected in the unmodified condition.

## THE EDDYSTONE 888A

### NOTES ON AN INTERESTING AMATEUR-BAND RECEIVER

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

**T**HOUGH not apparently available second-hand in great number, the 888A is quite often seen for sale, and these notes should be of interest to anyone thinking of obtaining this equipment. The *Eddystone* S.640 was discussed in the January 1966 and April 1968 issues of *SHORT WAVE MAGAZINE* and the 740 and 750 receivers in the May '69 issue. Notes on the 840A and 840C appeared in the *Magazine* for December '69. These are all general-coverage types—whereas the 888A is for amateur bands only.

#### Coverage

Six directly calibrated bands are provided—1.8-2.0, 3.5-4.0, 7.7-3, 14-14.35, 21-21.5 and 28-38 MHz. All these are available on the large and familiar styled *Eddystone* dial which has scales about 12in. long, and is shown in the illustration. The drive ratio is 40 : 1. The vernier scale in the central window is read in conjunction with the bottom 0-1000 scale, dividing the ranges into 1000 divisions, for logging or re-set purposes.

It is worth noting that the 28-30 MHz range is excellent for two-metre work in conjunction with a converter for this band.

#### Scale Accuracy

This can be high through all ranges. An internal 100 kHz crystal marker is brought into action by pressing the "Cal. Press" button on the panel, and the central

small "Osc." knob can be rotated (actually a 2.5-4.0 pF air trimmer) to bring the dial pointer into agreement with the nearest 100 kHz scale marking.

#### Circuit Layout

This is a double-conversion superhet, shown in Fig. 1. The RF stage is a 6BA6, followed by an ECH81 mixer with separate 6C4 oscillator. This converts to the 1st IF of 1620 kHz, resulting in excellent suppression of second-channel interference. A second ECH81 converts to the 2nd IF of 85 kHz, and is followed by a 6BA6 IF amplifier.

The low IF of 85 kHz gives high selectivity, and a variable selectivity panel control is also fitted. This adjusts, mechanically, coupling between windings in the two 85 kHz transformers.

A 6AT5 follows, for AM detection, AVC, and first AF amplifier purposes. Audio signals pass to a 6AQ5 output stage.

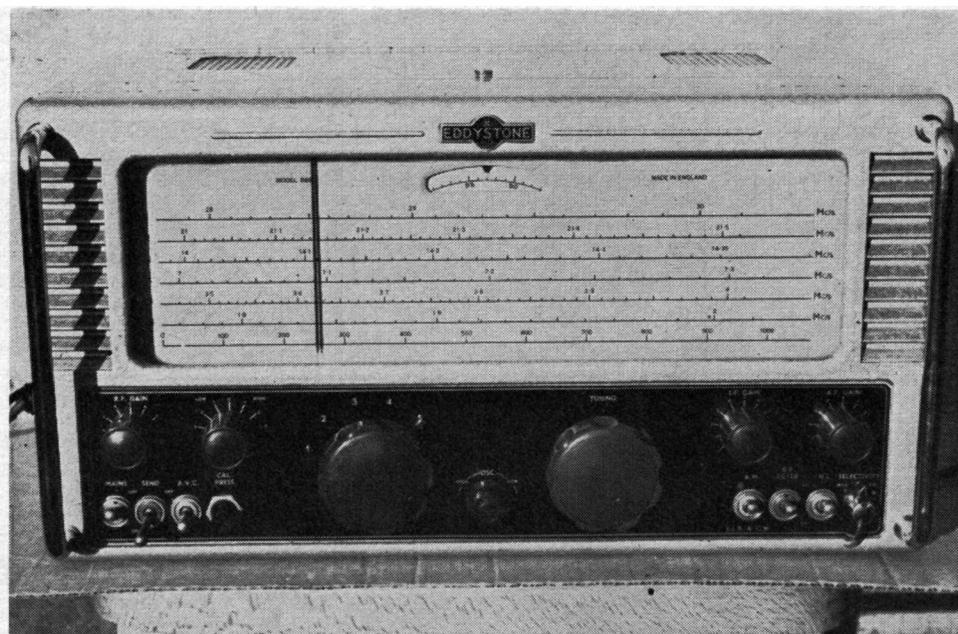
An optional audio filter can be switched in between AF and output stages. Its quoted insertion loss is only 1 dB, with a band width of 100 cycles at 6 dB points. If a CW signal is tuned into the filter pass-band, this gives a very noticeable selection of the wanted signal over surrounding mush. (It is used for CW only.)

For SSB and CW reception a 6BE6 operates as BFO or carrier oscillator, with the final IFT supplying grid 3 for mixing. The BFO setting is adjustable by a panel control in the usual way.

A 6AL5 is used as an optional noise limiter, with panel switch, and the 100 kHz marker oscillator is a 6AU6. A 5Z4G rectifier provides HT, and a VR-150 voltage regulator supplies 6C4 first oscillator and mixer screen grid, and second oscillator HT.

#### Aerial Connection

The input impedance is 75 ohms, but any aerial can



be used. There are two aerial terminals for a balanced feeder, or for use in conjunction with an earth socket for co-axial feeder or end-connected single wire aerials, the "A2" terminal then being joined to the earth terminal with a short lead.

The control knob of an aerial trimmer can be reached by opening the cabinet lid, and is rotated for best results with the aerial in use.

### Output End

Back terminals take connections for an external 2/3 ohm speaker. Phones may be plugged into a jack socket at the left of the case. This mutes the speaker. The phones are fed from the 6AQ6 anode via a 0.01  $\mu$ F isolating capacitor and should be of high or medium impedance.

### External Accessories

The receiver "standby" panel switch also closes the circuit to the back terminals, which can be used to operate a relay controlling the station transmitter.

Two octal sockets are also fitted at the back. These can be used to operate the receiver from an external power supply other than 110v. or 200/240v. AC mains, for which the internal power pack is intended, and for an S-meter.

### S-Meter Arrangement

Fig. 2 shows the S-meter circuit, with connections viewed from the pin end of an octal plug. This plug is put in the socket nearer to the receiver centre. (A correctly wired plug is present in the outer socket, to complete power circuits.)

It will be found that satisfactory results are obtained by using a 330-ohm resistor and 500-ohm potentiometer. The meter can be the easily available 0.1 mA type.

A reverse-current diode is present in the receiver. With the meter disconnected, set the meter zero to bring the pointer a little below zero. Then with the meter plugged in and the receiver working, and with the RF and IF gains at maximum, but *no* signal tuned in, set the 600-ohm (or 500-ohm) potentiometer for zero on the meter.

### Panel Controls

From left to right these are RF Gain, BFO pitch, Bandswitch, Osc. trimmer, Main Tuning, IF Gain and RF Gain. Switches are Mains On/Off, "Send" (Standby), AVC On/Off, "Cal. Press," AM/SSB-CW, AF Filter and Noise Limiter, with the variable selectivity control at the extreme right.

Receiver dimensions are near enough 42.5 cm. (16 $\frac{1}{2}$ in.) wide, 25.4 cm. (10in.) deep and 22.2 cm. (8 $\frac{3}{4}$ in.) high. Weight is about 44 lbs., or 97 kg.

### Valves Used

If a second-hand receiver is purchased in an untested condition, and results are not satisfactory, it is usually worth checking that the valves are not suffering from lost emission. The quickest method is to use a valve tester or put in new valves, replacing the original valves where no improvement results.

Failing this, meter tests of anode current, cathode current, and SG current can be made without discon-

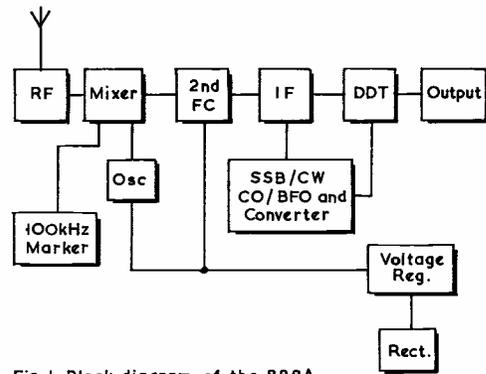


Fig. 1 Block diagram of the 888A

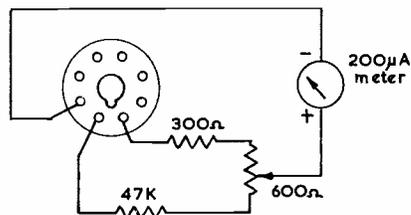


Fig. 2 Circuit for plug in 'S' Meter

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necting any circuits by taking voltage readings across the anode, cathode and SG resistors in the usual way. The HT line is about 250v. If this is not obtained, the rectifier may need replacing. None of the valves required are difficult to obtain.

### IF Alignment

The "beginner" is probably best advised to leave all alignment untouched. But the more experienced user can normally deal with this, provided care and patience are exercised, and the correct tools are used (*not* a collection of old screwdrivers and spanners).

The receiver should warm up for twenty minutes or so, and be switched to the 10m. band, with RF gain at minimum, but IF gain, AF gain and selectivity controls at maximum positions. Select AM reception, with filter and limiter off. A 85 kHz signal can be injected at the grid of the 2nd mixer, and the four cores of the variable IFT's are adjusted for best output.

A 1,620 kHz signal can now be injected at the first mixer, and the first IFT (near the panel) adjusted. Behind this is a can with the 2nd mixer on top, and this oscillator is also adjusted for best results. The signal is then applied to the fixed plates of the middle section of the tuning capacitor, with the bandswitch at 1.8-2.0 MHz. The second oscillator and all cores in the IFT's should then be carefully touched up if needed. An input of 15 mV at 1,620 kHz should give an output of about 50 mW.

Failing a generator, use a stable signal such as from a crystal marker or transmitter VFO, coupled to the receiver aerial terminal, and accurately tuned in. Then *carefully* adjust all IFT cores and the 2nd osc. core for

the best S-meter reading (assuming the signal is unmodulated). *Very slight* adjustments one way or the other may be expected after changing valves, or ageing.

### First Oscillator

Cores and trimmers can be reached from below the chassis. If dial readings are correct, the oscillator cores and trimmers should *be left as they are*. But should there be significant errors in one or more ranges, these can be dealt with by adjusting the core and trimmer of the range affected.

Adjustment of cores or trimmers is made at the following frequencies:

Core	Trimmer
1.8	2.0 MHz
3.5	4.0 "
7.0	7.3 "
14.0	14.3 "
21.0	21.5 "
28.0	30.0 "

The internal 100 kHz marker can be used for these adjustments. Note that it is easily possible to shift tuning 100 kHz out, and thus adopt wrong marker points, especially in the 28-30 MHz range. If there is any doubt about calibration for this reason, check with an external source, such as a one-megacycle crystal, or a Tx VFO.

Adjustments are repeated as often as required, at one end of the band, then the other, to secure best agreement with the dial calibration, and with the "Osc." panel control in its central position.

### Aerial and Mixer

Cores and trimmers can be dealt with at or near the frequencies already given, using an external stable signal, such as from a generator or VFO. Adjustments are repeated until no further improvement can be obtained.

A 1,620 kHz rejector coil stands by itself near the back of the coil box, and is adjusted for *minimum* output with a 1,620 kHz signal put in at the aerial terminal.

### BFO Stage

The BFO core is found below chassis, quite near the "Cal." switch. If adjustment of this is necessary, set the BFO variable capacitor half open, tune in an AM signal correctly, and then switch to CW/SSB. Rotate the core for zero beat.

### Calibrator Unit

This is mounted in a can on top of the ganged capacitor and has a trimming adjustment to shift the crystal into agreement with some standard reference.

One method is to tune in the BBC on 200 kHz with a portable or other receiver, and adjust the calibrator, if necessary, for zero beat. Or the calibrator can be adjusted to zero beat with the standard frequency transmissions on 2.5 MHz or 5.0 MHz.

*Editorial Note:* An Eddystone 888A, properly serviced and correctly aligned, is a very good amateur-band receiver, particularly for CW working. Though "obsolete" in the sense that it is all-valve rather than transistorised, this in fact gives the 888A the great advantage of being capable of withstanding much abuse in terms of RF pick-up from a near-by trans-

mitter—the condition that often applies in an amateur station, and which can soon lead to deterioration in a transistorised Rx.

### POINTS OF INTEREST

The brothers Old, of 7 Trelawney Road, Camborne, Cornwall, have recently been licensed with the consecutive call signs G8FSW, G8FSX—so they should between them be stirring up the two-metre ether in those parts.

From their Jan./Feb. *Newsletter* we get it that the Royal Naval Amateur Radio Society now has 349 members, of whom 280 hold call signs. The hon. secretary is CRS A. G. Walker, R.N.A.R.S., H.M.S. *Mercury*, Leydene, Petersfield, Hants.

The fee for the official Morse Test (to qualify for a full licence) is now £2. Application to take the Test should be made to: The Inspectorate of Wireless Telegraphy, Union House, St. Martin's-le-Grand, London, EC1A 1AR.

The Radio Amateur Invalid and Bedfast Club, with a membership of 400 blind or otherwise incapacitated Amateur Radio enthusiasts, shows an operating surplus for the year to Dec. 31 '72 of £418. That this association is heavily dependent on outside financial help is shown by the fact that donations for the year totalled the goodly sum of £558—without which, of course, no "operating surplus" could have been possible.

We gather that there are pressures developing to get the Hq. of Region I of the IARU moved from London to the new DARC headquarters at Baunatal, near Munich. The RSGB is a large—if not the largest—contributor to the funds of Region I IARU, of which the secretary is Roy Stevens, G2BVN. We would support him in whatever action he thought fit to take to resist such a move. (There is no reason why the U.K. should be pressured into acquiescing unless there are clear advantages in making the move.)

Those who use spiral-bound log books, or made up in any form involving tear-out sheets, are reminded that the Ministry require the pages to be numbered in sequence before use—in other words, the inspector must be able to check that pages have not been abstracted from the running log record. And while on the subject of the regulations, Class-B licensees should remember that they are *not* permitted to work across to any frequency-band below those for which they are licensed—that is to say, G8/3's must not indulge in cross-band operating with stations transmitting on 10-160m. (Please don't challenge us about this—write to the Ministry. It is they who make the rules!)

Anent the note regarding the *CHARN Fund*, on p.37 of the March issue, we are now informed (by G3GDW, of the Torbay Club) that the amount handed over was £100, and not as stated. The beneficiary is to be the Brixham Cheshire Home.

## TRANSISTOR TRANSMITTER FOR TOP BAND

VFO CONTROLLED — RUNNING  
FULL INPUT — /P, /M OR BENCH  
OPERATION — DESIGN  
AND CONSTRUCTION

R. GOULDSTONE (G3TAG)

THE transmitter described here was the fourth in line of a series of units to be constructed over a period of some three years. A large number of circuits and layouts were tried under actual operating conditions during this time, and this the final design embodies the most reliable parts of these.

It was found at the outset that the usual complaints about transistor transmitters were as follows: (1) Poor AM characteristics; (2) Severe FM content, (3) Poor note on CW, (4) High harmonic content, (5) Catastrophic PA transistor failure.

Condition (1) was found to be almost always due to the use of an inadequate PA transistor. A large number of medium power HF transistors will handle the 800 mA at 12 volts required under CW conditions, and give good results. Trouble crops up, however, when collector modulation is applied. The fault is due to the fact that a transistor's gain has a tendency to fall as the collector current is increased, particularly if the transistor is being pushed to its limits. This non-linearity causes flat-topping of upward modulation peaks. Some improvement can be obtained by upward modulating the driver stage; but this cure can only be carried so far.

Conditions (2) and (3) are both caused by oscillator troubles and can be due to poor VFO design, stray coupling or poor layout.

Over driving the PA transistor in order to obtain adequate modulation depth was found to be one of the

main causes of (4), resulting in delightful TVI, BCI and front-door knocking! Some PA circuits published in the past have also been found to give a first-class sawtooth waveform output. These can be removed by using a good ATU but there seems to be no point in using the Tx to warm up the ATU when we want the power into the aerial. One well-known design was found to have a PA efficiency of only 30% when all the "bent bits" were filtered out.

Failure of the PA (5) is one of the worst problems to overcome. This seems to be due to two things: First, overdriving and exceeding the base emitter reverse voltage limits of the PA transistor. Secondly, self-oscillation caused by instability in the PA circuit. These can, however, be prevented by careful choice of components and layout.

By taking all these points into consideration the transmitter described here has first-class AM characteristics, a T9 note on CW and its PA efficiency is around 70%.

### (1) The VFO

In order to keep the number of tuned stages to a minimum and therefore eliminate one of the main causes of instability it was decided at the outset to use an aperiodic-transformer coupled driver stage. From this it will be realised that the signal source (VFO) must be as clean and free from harmonics as possible. The

### Table of Values

Fig. 1. VFO and Buffer circuitry

C1 = 47 $\mu$ F, s/m	R3 = 350 ohms
C2 = 220 $\mu$ F, s/m	R4, R8 = 22,000 ohms
C3 = 0.1 $\mu$ F, disc	R7 = 270 ohms
C4 = .001 $\mu$ F, s/m	R9 = 820 ohms
C5 = .01 $\mu$ F, disc	D1 = 7.5v. zener
C6, C7,	Tr1 = 2N3819
C8 = 0.1 $\mu$ F, disc	Tr2,
Ca = 100 $\mu$ F, s/m	Tr3 = BC108
VC1 = 50 $\mu$ F, var.	L1 = 65 turns 34g. on
R1 = 47,000 ohms	‡in. former, iron-
R2, R6 = 1,000 ohms	dust core

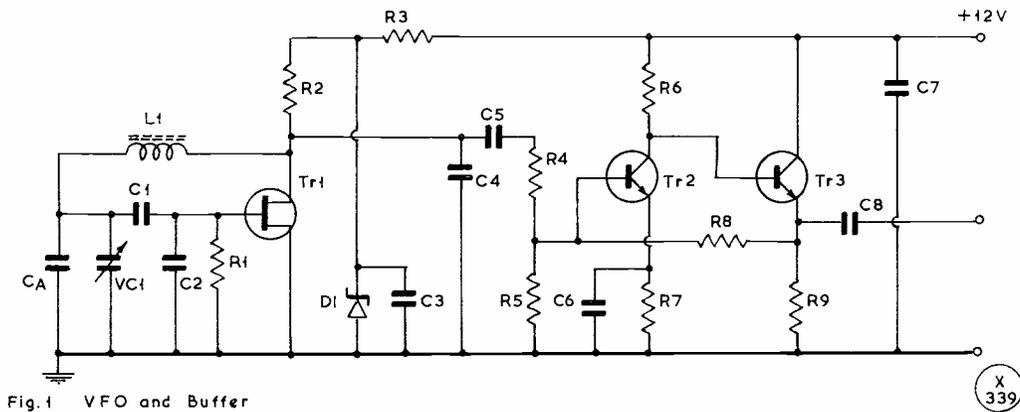


Fig. 1. The VFO and Buffer stages.

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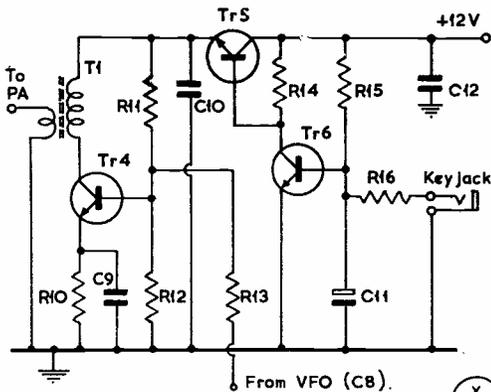


Fig. 2 Driver and Keying

Fig. 2. Driver and Keying stages.

**Table of Values**

Fig. 2. Driver and Keying stages

C9, C10,	R16 = 470 ohms
C12 = 0.1 $\mu$ F, disc	Tr4,
C11 = 10 $\mu$ F elect., 15v. wking.	Tr5 = BFY50, or BFY51
R10 = 33 ohms	Tr6 = BC108
R11, R14 = 1,000 ohms	T1 = Ferrite ring* core, with pri. 21t. 26g., sec. 6t. 26g.
R12 = 220 ohms*	
R13 = 150 ohms*	
R15 = 22,000 ohms	

Notes: See text reference R12, R13. T1 can be Type CRO-71-12/AC, 12 mm. o.d., 6 mm. i.d. by 3 mm. height.

oscillator must also run at the radiated frequency.

Several well known VFO circuits were tried with both FET and dipolar devices but all suffered from both FM and a high harmonic content. Finally the FET layout shown in Fig. 1 was tried and found to be ideal on all counts. Drift is about 100 Hz per hour and the output waveform is a clean *sine* wave in the region of 3 volts p-p. With the components shown in Fig. 1 the tuning scale will be almost linear over the range 1.8-2 MHz. Transistors Tr2 and Tr3 form the buffer stage, giving good isolation and a low impedance output.

It is recommended that this unit be constructed on a small P.C. board about 2½ x 1¼ inches to ensure rigidity, particularly if mobile use is anticipated. After construction and testing the capacitors Ca, C1, C2 and C4 should be prevented from vibrating by the application of a little *Araldite* adhesive.

**(2) Driver and Keying Stage**

As mentioned previously this is an untuned amplifier using a ferrite ring core as the output transformer in the collector of Tr4 *see* above.

The keying stage, consisting of Tr5 and Tr6, works as follows: Under key-up conditions Tr6 will be turned hard "on" and Tr5 "off". Therefore, the amplifier Tr4 will be inoperative. When the key is closed C11 discharges *via* R16, Tr6 turns "off" and Tr5 comes "on."

The capacitor C11 together with R15 and R16 gives the correct time-constant for envelope shaping.

If the CW facility is not required the keying circuit may be omitted, but R12 should then be changed to 150 ohms.

Resistor R13 can be varied to adjust the drive to the PA stage and will usually be between 100 and 200 ohms.

**(3) The PA Stage**

The RF power amplifier shown in Fig. 3 is a simple Class-C grounded emitter amplifier with an L-network to provide tuning and matching.

Diodes D2 and D3 protect the transistor from excessive base-emitter reverse voltage; although they are not essential they do give a greater degree of safety should the stage be overdriven.

Resistor R17 and capacitor C13 are essential to obtain Class-C operation. Some circuits have been seen in various publications in which this network has been omitted and the base of the transistor is connected directly to the driver transformer. Such an arrangement will usually cause the stage to run near to the Class-B region and efficiency will be rather poor. R17 may be adjusted to give optimum efficiency and can lie between 100-200 ohms but the value given will usually be quite satisfactory.

It should be noted that C13 and C14 must be of very low inductance. If inferior capacitors are used (in particular the tubular paper types) instability could

**Table of Values**

Fig. 3. PA stage for the TTx

Cx = 470 $\mu$ F, s/m	D2, D3 = 1N914 diodes
C13, C14 = .022 $\mu$ F met. poly.	Tr7 = BD123*
VC2,	L2 = 37t. 22g. close-wound on 1½ in. o.d. former, tap at 27/32 turns.
VC3 = 500 $\mu$ F, var.	
Rx = 10 ohms	
R17 = 150 ohms*	
RFC1 = 38t. 22g. close-wound on 2in. length ¼ in. ferrite rod	

Notes: Reference R17, see text. BD123\* can be mounted on chassis in normal way using mica washers and insulating bushes.

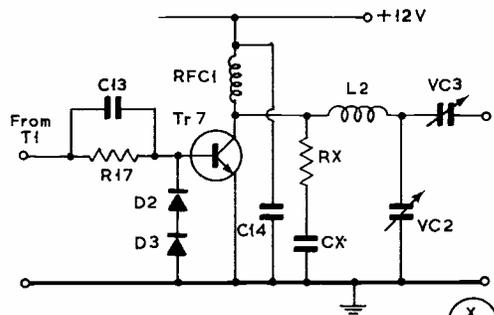


Fig.3 PA Stage

Fig. 3. PA stage for the G3TAG TTx.

**Table of Values**

Fig. 4. The audio-preamp. stages

C15, C17 = 200 $\mu$ F, s/m	R21 = 2,200 ohms
C16 = 2 $\mu$ F, elect.	R23 = 470 ohms
C18, C19 = 50 $\mu$ F, elect.	VR1 = 10K pre-set
C20 = 100 $\mu$ F, elect.	Tr8 = 2N3819
R18, R19,	Tr9,
R22 = 470,000 ohms	Tr10 = BC108
R20 = 10,000 ohms	

result. No other special precautions need be taken in the construction of this stage. The transistor is simply mounted on the chassis in the usual way with insulating bushes and a mica washer. The input components are mounted below chassis and the output components above.

**(4) Audio Pre-Amplifier**

The circuit shown in Fig. 4 uses an FET in the input stage followed by a DC-coupled transistor pair. It will be noticed that in the table of values the gain control is given as pre-set. If, however, the user requires an extra knob to twiddle there is no reason why it should not be mounted on the front panel.

A crystal microphone giving an output of around 50 mV will be more than adequate, using this stage, fully to drive the modulator. If a dynamic microphone is used the gain may not be quite sufficient. In which case Fig. 4 can be replaced by any pre-amp of higher gain capable of giving an output of about 1v. r.m.s. from a low-impedance source.

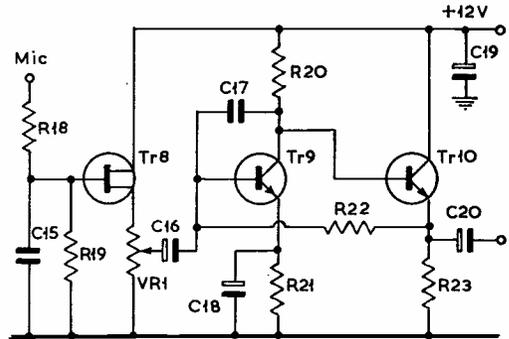


Fig. 4 Audio Pre-amplifier

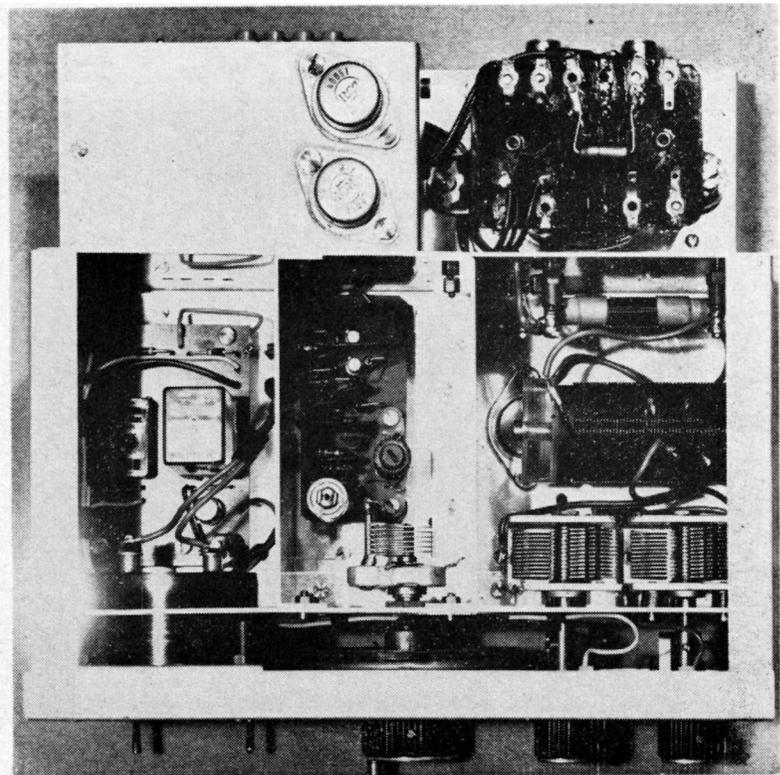
X  
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Fig. 4. Audio-preamplifier section, TTx.

**(5) The Modulator**

This is a normal transformer-coupled amplifier using Tr11 as a Class-A driver into Tr12 and Tr13 Class-B output stage. Negative feedback is applied to the emitter of Tr11 from the output stage via R28 and C21 to reduce distortion. The actual end of T3 primary to which this feedback loop is connected will have to be determined by trail and error. If it is on the wrong end the circuit will simply go into oscillation.

Construction of the transformers is quite simple if



General layout above chassis, showing each sub-unit in a separate compartment. The VFO is at lower centre, PA stage and associated tuning capacitors at right, and amplifier-modulator along the top. At lower left is the control unit described in Fig. 6.

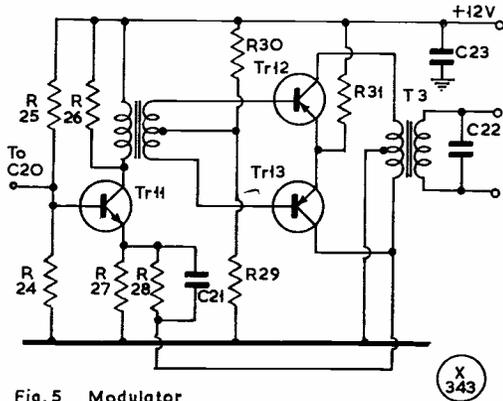


Fig. 5 Modulator

**Fig. 5. The Modulator Stage.**

Note: Transformer for Tr11 is T2.

you are prepared to do some surgery on an old mains or output transformer from the junk box. First find one which has a 1in. stack of lamination not less than  $2\frac{3}{4}$  x  $2\frac{1}{4}$ in. with a centre limb of about  $\frac{7}{8}$ in. and side arms of around half-inch. Strip off all the old wire, retaining the bobbin if possible. Next wind on, trifilar, 100 or so turns of 22g. enamelled wire and secure with p.v.c. tape. Locate the start and finish of each of the three windings and label them A, B and C. Use the start and finish of winding A as the secondary. Connect the start of B to the finish C and use this as the centre-tap of the primary. The start of C and the finish of B then go to the collectors of Tr12 and Tr13.

**Table of Values**

Fig. 5. The Modulator section

C21 = .022 $\mu$ F	R30 = 20 ohms
C22 = 0.1 $\mu$ F	R31 = One ohm, wire-wound
C23 = 500 $\mu$ F, 15v. elect	T2, T3 = See text
R24 = 150 ohms	Tr11 = BFY50, or BFY51
R25, R26 = 1,000 ohms	Tr12, Tr13 = OC35, or similar
R27 = 47 ohms	
R28 = 3,300 ohms	
R29 = 1,800 ohms	

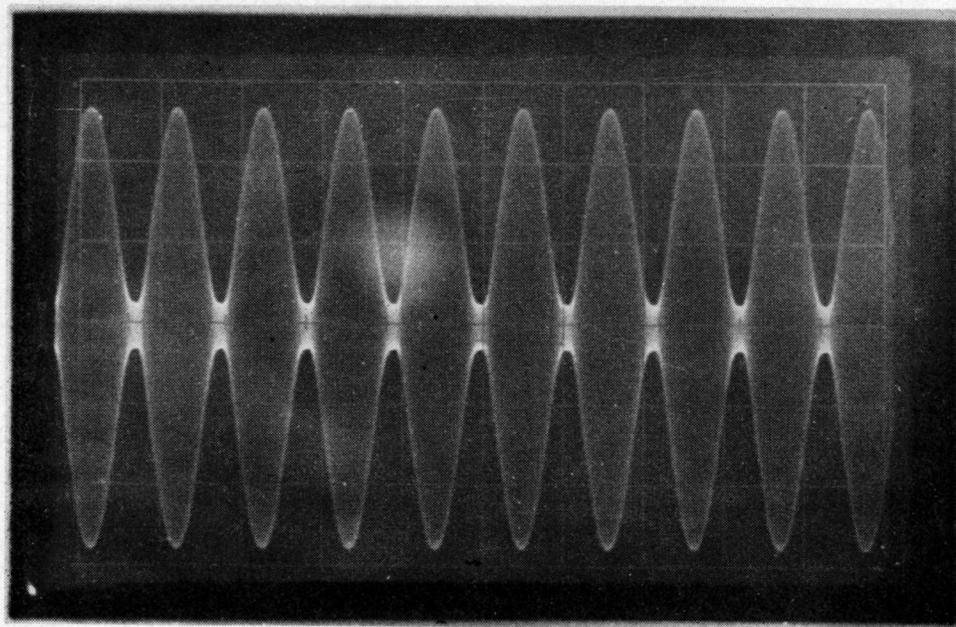
When re-assembling the laminations it is advisable not to interleave them. For best results and a tidy finish, the I's should be butted on to the ends of the E's with a piece of card between them.

T2 can be made from an old transistor radio output transformer. A quarter-inch stack of laminations about  $1 \times 1\frac{1}{4}$ in. is all that is required. Mount the bobbin in a hand drill in some way and scramble on 1000 turns of 40g. for the primary. After covering with p.v.c. tape put on the secondary winding of 200—CT-200 turns of 34g.

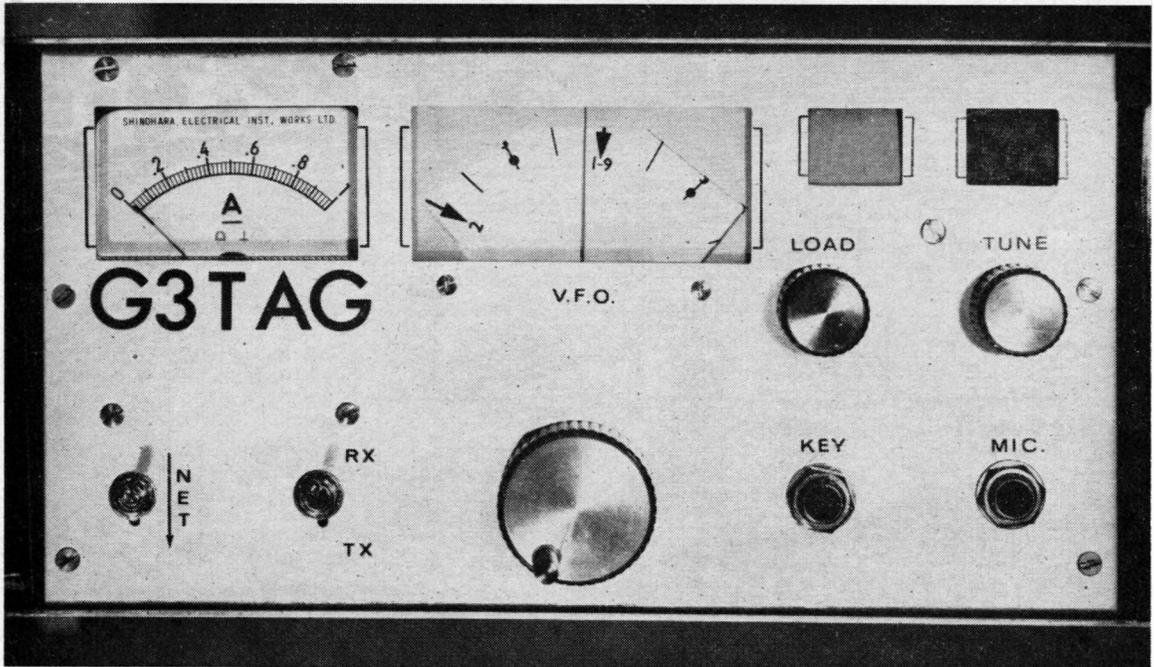
**(6) The Control Stage**

This circuit is included mainly as a matter of interest and it is not expected that the constructor will want to copy it in every detail—see Fig. 6 opposite.

The unit works as follows: Under receive conditions as shown in the diagram, signals from the aerial flow via C26, RL1 and C27 to the receiver. LP2 is the only part of the circuit taking power. RFC2 prevents the signal path being shorted to the HT line. When S1 is placed in the "net" position HT is applied to the VFO via D4 but prevented from entering the rest of the



This trace shows the output waveform with 1000-cycle tone modulation on the carrier.



Front-panel layout of the G3TAG Transistor Transmitter.

circuit by D5.

After netting S1 is returned to the stand-by position and S2 thrown to Tx. Current flows to the VFO via D5 and to the coil of RL1 through D6. LP2 goes out and LP1 is illuminated.

It follows, then, that RL1 contacts will change over, connecting the PA output to the antenna via C28 and C26. Also it will be seen that DC can now flow through R32, RFC2, RL1, RFC3 and R33 to the base of Tr14. This transistor will now turn on, energising RL2 coil, thus causing the relay contacts to close and route power to the modulator, driver and PA stages.

On returning to the Rx position RL2 will drop out, immediately turning off the PA, driver and modulator. RL1 will remain at "Tx" for a few milliseconds before changing back to the Rx contact. This is due to the energy stored in C24.

All this may seem a little complex for a change-over system but it does prevent the receiver from being damaged by RF from the PA. Also it makes it impossible for the PA to be energised before the change over to transmission is complete, thus preventing the transmitter from being run unloaded.

(7) Construction and Layout

No detailed constructional notes are given because it is felt that this will depend on personal requirements. In any case it is usually found that one has to make use of the materials to hand rather than try to make a Chinese copy. The block diagram given in Fig. 7 shows how the six units are interconnected in the

writer's transmitter. Note the diodes D8 and D9 which are used to provide some extra drive on upward modulation peaks. These can be omitted if desired with very little degradation in performance.

Switch S3 is used to remove the modulation transformer from circuit during CW operation—this should not be omitted if any CW work is done. (over)

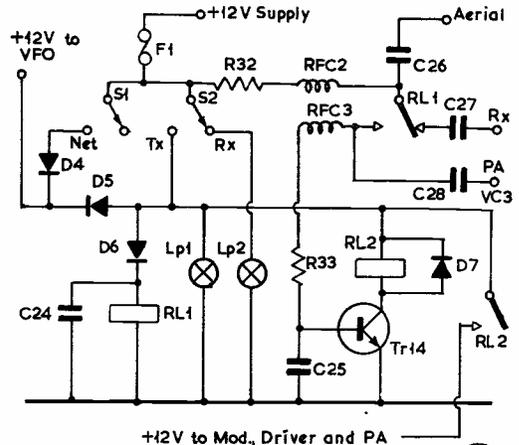


Fig. 6 Control Stage

Fig. 6. Control stage as used by the author.

Note: Values on p.98.

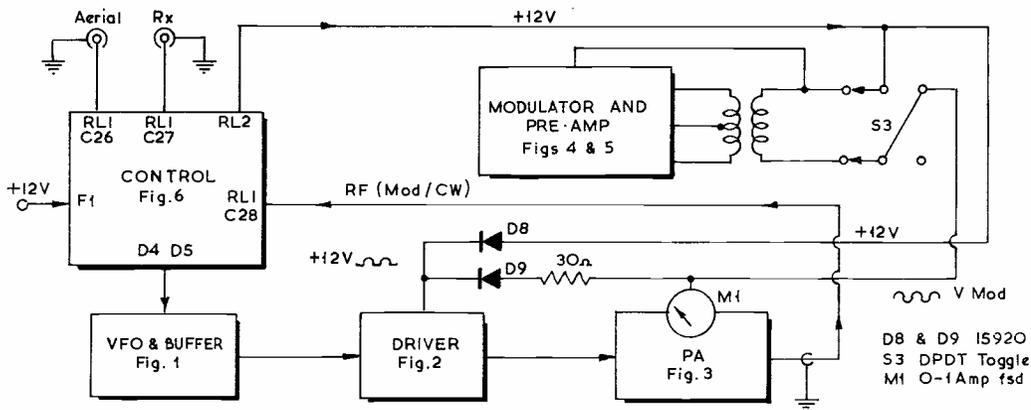


Fig. 7 Block Schematic Diagram

X  
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Fig. 7. Block diagram showing layout complete.

Providing care is taken to screen the VFO, driver and PA from each other and wiring is kept reasonably neat and short no trouble should be experienced.

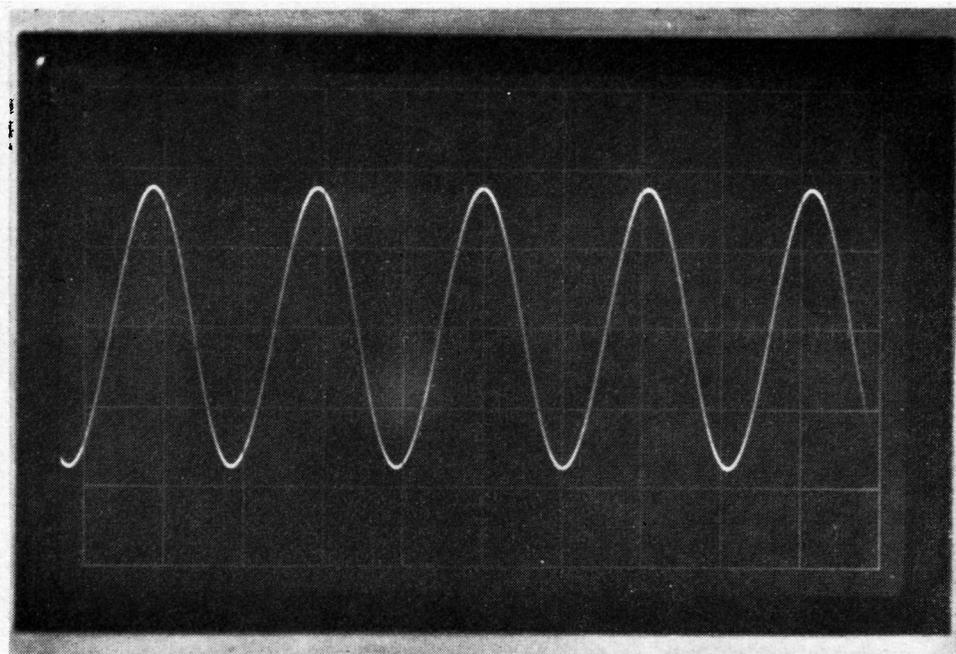
**Table of Values**

Fig. 6. Suggested control stage, p.97

**(8) Operation**

When running a TTx for the first time proceed as follows: Connect the transmitter to a power supply capable of providing 12 volts at 2 amps. During these tests put a 1 amp fuse in series with the 12 volt + lead, just in case.

C24 = 100 $\mu$ F, 15v. elect.	RL1 = Reed relay, c/o
C25 = 0.1 $\mu$ F, disc	RL2 = Min. relay, 700-ohm coil,
C26, C27, C28 = 0.1 $\mu$ F, disc	(Omron MH-2P)
R22, R23 = 18,000 ohms	S1, S2 = SPDT toggle
D4, D5, D6, D7 = IS920, or similar	F1 = 1.5A, anti-surge
RFC2 = 2.5 mH chokes	Lp1, Lp2 = 12v. low-wattage
	Tr14 = BFY50, or BFY51



Trace of the TTx RF output waveform into a 75-ohm resistive load.

Under chassis view of the Top Band transistor Tx, capable of running the full 10 watts—fixed, mobile or portable—from a 12v. 2 amp. supply line. Lower compartment, left to right: PA input and output harmonic filter; driver and keying stage; AF pre-amplifier. Upper right: AM/CW switch and PSU input compartments, with relays and Ae./Rx sockets at left.

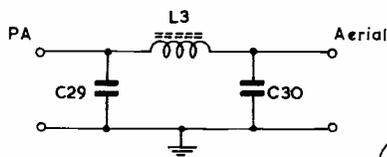
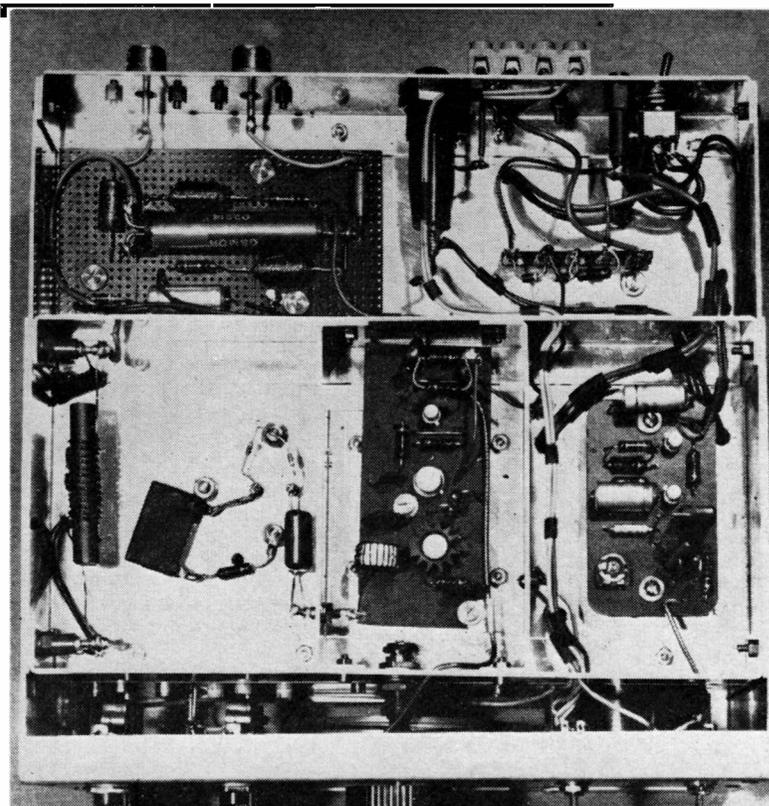


Fig. 8 Harmonic Filter

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Fig. 8. In areas where TVI is a factor, the inclusion of the simple pi-network filter shown here may be helpful. It is designed to cut off at 3 MHz when used with a 75-ohm load. C29, C30 are 120 pF silver-mica, and L3 is 13 turns of 22g. on a quarter-inch dia. ferrite rod  $2\frac{1}{2}$  inches long.

Plug in a dummy load of 75 ohms with some form of output indicator, *e.g.*, RF voltmeter or thermocouple ammeter. Switch on the station receiver and tune to 1.9 MHz. Next, put the "net" switch on and set the VFO to the same frequency. Set VC3 to maximum and VC2 to about half-mesh, cross your fingers and switch to "transmit." If all is well the PA collector current should be about 500 mA under these conditions. Now reduce VC3 slightly until this current increases to about 700 mA. Check the output meter and obtain a peak by rocking VC2. If the PA input power is still below ten watts decrease VC3 again and readjust VC2 for maximum output. Repeat these adjustments until

maximum efficiency is obtained with ten watts input.

The transmitter should be checked in this way over the entire band, each time tuning the receiver (muted) to the frequency. If at any time the PA goes into oscillation it will be heard on the receiver as "sharsh"—the Tx should be switched off at once and an effort made to cure the fault.

If it is not possible to cover the entire band with PA tuning, a different tap on the tank coil should be tried. The PA tank circuit shown here is fairly tolerant of the sort of load it is presented with providing it is not too reactive. However, here are a few simple tips that will help to give your lump of silicon a trouble free life:

- (1) Do use an ATU and if possible an SWR meter,
- (2) Do tune for maximum RF power output and *not* for collector current dip,
- (3) *Don't* fiddle with the aerial while the transmitter is switched on. An open circuit will not do much harm but a dead short will put a nasty dent in your PA transistor,
- (4) *Do not* under any circumstances or excuse use unbranded, unmarked or "maker's seconds" transistors or you will be doomed to total failure from the outset.

# MINIATURE MONITOR/OSCILLATOR

RF-ACTUATED DEVICE FOR  
MORSE SIDE-TONE

A. S. CARPENTER (G3TYJ)

**S**IMPLE audio frequency oscillators are not infrequently required in amateur operation and various designs appear in print from time to time. The need for such devices is well known to the CW transmitting fraternity whilst those striving for true amateur status usually rely on such a unit as an aid to learning Morse. Without monitoring it is difficult to send clean, easy-to-copy code and this is obviously appreciated by most makers of commercially-produced apparatus, particularly in the transceiver category, where "side-tone" is usually made available. Such monitoring signals are often generated in the 1000 Hz frequency region and may be derived from a phase-shift type oscillator to produce a sine-wave output.

Where no inbuilt audio monitor is included in the apparatus it is an easy matter to construct one as an outboard item using readily available components.

There are two ways in which such a device can be activated in sympathy with the keying function and these are (1) By directly keying the outboard oscillator using spare contacts on the key—in which case a DC power supply for the unit must be provided, or (2) By energising the monitor *via* a portion of the radiated RF from the transmitter, whereupon no powering battery is required. If the oscillator is to be used solely for Morse practice method (1) is obviously the only one possible.

It may also be convenient to utilize the same AF generator in other connections from time to time, *e.g.*, to energise a CR bridge, or for AF tracing tests in faulty electronic apparatus.

The circuit of an easily made audio oscillator/monitor is shown in the diagram, where transistor Tr1 functions in positive feedback mode due to the transformer T1. (The transformer specified is supplied complete with a fixing clamp and it will stand easily on a ½p piece!) By making the emitter resistor of Tr1 partially variable the note—the waveform generated—can be controlled within limits. Amplitude is also affected, therefore it is convenient if VR1 is made panel-controlled; output tone in the region 600-1000 cycles results, depending on the voltage applied. Transistor Tr2 is but a simple amplifier and the output can be fed either to Lx—a medium-impedance insert—or to socket SK1 where external items or phones may be connected as required. The waveform generated is sine wave in form and although this could be obtained from a transformerless phase-shift oscillator the available output would tend to be low; a higher DC powering potential would also become necessary. A two-transistor multivibrator circuit could also be employed but since this generates a square waveform it is less popular here.

To energise the oscillator a small 3v. dry battery may be used or, as was mentioned earlier, the monitor can

### Table of Values

Fig. 1. Circuit of the Monitor/Oscillator

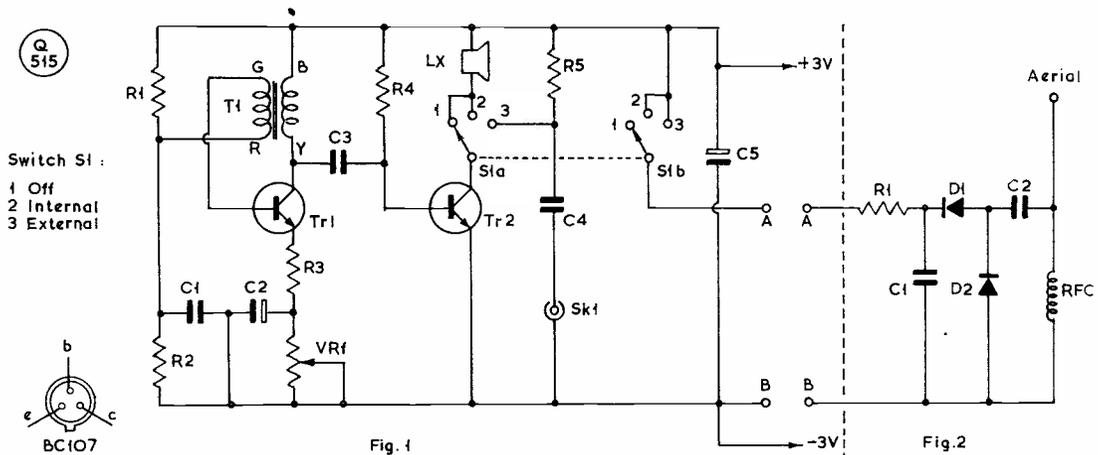
C1, C4 = .01 $\mu$ F	T1 = Interstage transformer type
C2 = 50 $\mu$ F 6v.	D1001 (T1079)
C3 = .005 $\mu$ F	with clamp
C5 = 100 $\mu$ F 10v.	(Ardente)*
Tr1,	R1 = 18,000 ohms
Tr2 = BC107	R2 = 4,700 ohms
Lx = See text	R3 = 100 ohms
S1 = Miniature 2-pole,	R4 = 270,000 ohms
3-way rotary	R5 = 5,600 ohms
switch	VR1 = 10,000 ohms
	miniature pot.

\* (Obtainable from Home Radio Ltd.)

### Table of Values

Fig. 2. Rectifier Circuit

C1 = 1 $\mu$ F	R1 = 390 ohms
C2 = .1 $\mu$ F	RFC = Miniature 2.5mH
D1, D2 = OA81	RF choke



Switch S1:  
1 Off  
2 Internal  
3 External

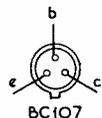


Fig. 1

Fig. 2

be driven by the transmitter itself merely by adding the six items depicted in Fig. 2. The aerial pick-up may be some 12in. or so of stiff copper wire and this is placed reasonably close to the transmitter output, aerial lead, or ATU, whereupon a sample of the RF generated when the key is pressed is developed across the choke and fed to the rectifying diodes D1 and D2, to produce sufficient DC to actuate the oscillator. The oscillator/monitor will also function if phone (A3 or A3J) is used, therefore it is essential to incorporate On/Off switching in any case. By using a third switch position "external" output to SK1 results.

Construction on an oddment of *Veroboard* or a small tag board is very simple if it is remembered that

even when sub-miniature items are used for VR1 and S1 they will still be the largest components. Even so the finalised unit can be made physically very small indeed.

Some minor changes to suit individual needs are envisaged and if, for example, the device is to be used solely for Morse practice Fig. 2 can be disregarded, in which case the key can be arranged to make-and-break either the battery feed or the emitter-ground lead of Tr2. If the note sounds chirpy it may be possible to clean it up by experimenting with a smaller value for C5, assuming that the chirp is not in fact due to the transmitter! In the unlikely event of the oscillator not starting, reverse the leads to either the secondary winding of T1 or the primary—but not both.

### THE PHYSICS EXHIBITION - 1972

**T**HIS, the 56th Physics Exhibition, was held at Alexandra Palace, London, during March 13—16, and will probably be the last to be mounted at "Ally Pally," as plans have now been finalised to use Earls Court as the venue for the 1973 show.

A special feature of this year's Exhibition was the *montage* arranged by the Electronics, Optical and Spectroscopy Groups of the Institute of Physics to mark the award of the 1971 Nobel Prizes, for both physics and chemistry, to members of the Institute—namely, Professor Gabor and Dr. Harzberg, the former for his original work in the field of holography, and the latter for his outstanding contribution to the development of molecular spectroscopy.

As in previous years, the accent was on fundamental research, particularly that in Universities, and the application of that research to commercial hardware.

Some twenty Universities or Technical Colleges had stands at the Exhibition, of which three seemed to be attracting the attention of the younger generation—the combination of Oxford and Heriot-Watt, who had co-operated to produce an infra-red radiometer to be launched later this year as a development of the successful *Nimbus-4* instrument; University of Swansea with a solid-state, white-noise generator providing a flicker-free spectrum up to 100 MHz; and the University of Warwick, who had a working model showing magnetic levitation and its application to the train of the future, where it might well replace the current "wheel-on-track" system, and even the air suspension method at present undergoing trials in this country.

Among manufacturers' exhibits, the emphasis was on measurement almost exclusively, and pretty sophisticated some of it was, although the *mystique* was somewhat alleviated at the Mullard Educational Service stand where an electronic "fruit machine"—strictly on a non-profit making basis—had been installed as an example of their projects for student construction.

Westminster School were showing their weather satellite receiving and recording gear, as described in *SHORT WAVE MAGAZINE* for July 1971 and, subject to local QRM, were to attempt to receive pictures direct from *Nimbus-4* and *ESSA-8* during appropriate passes or, if this were not possible, had tapes available to demon-

strate the working of the apparatus.

For the less than highly technically trained visitor, these Exhibitions may seem tough going, but the advanced techniques of today become the standard practice tomorrow and keeping up, or even attempting to keep up, with modern developments, is unlikely to be a waste of time.

A.H.D.

### NOTE FOR AUTHORS

When being offered articles for possible paid publication in *SHORT WAVE MAGAZINE*, we are often asked the sort of questions already answered under the heading "Authors' Mss.", to be found on the Contents page of any issue of the *Magazine*, where it has been appearing literally for years. If material is prepared strictly along the lines laid down there—which, in the case of technical articles, involves a study in detail of how such articles are presented in the *Magazine*—you will not go far wrong. Yet we are still offered contributions demanding extensive Editorial marking and adjustment simply because they do not conform to our setting convention (which means how you see them in print). And this as well as the work that may be required on the purely technical side.

While no article can be expected to go through exactly as the author composed it, those that require minimum Editorial attention always command the highest fee. Authors should also note that we expect their material to be "right the first time"—this means not only careful drafting in the first place but also checking and re-checking before sending it in. A full copy should be kept of the article complete, in case the Editorial Dept. have any queries.

In the Amateur Radio field, we pay the highest rates and are always only too glad to see, for early appearance, material that merits generous payment.

*For this month's Readers' Small Advertisements see pp.122 to 127.*

# LOW POWER NBFM FOR SEVENTYCEMS

## CIRCUITRY, NOTES AND RESULTS

A. JUNGBLUTH (F6APU)

("Radio REF")

Translated from the original by

A. H. Dormer, G3DAH

IN view of the increasing amount of activity on 432 MHz, it is often useful to be able to QSY from 144 MHz to 70 cm without having to couple up a tripler, tune it and connect it to an aerial. The solution is to have a compact transmitter ready to go on the band immediately. It was for this reason that a low-power Tx (200 mW output) has been designed to facilitate not only cross-band duplex 144-432 MHz, but also short range duplex contacts on 70 cm, the latter providing always that two antennas are available.

### Description

The transmitter is built on single-sided copper clad board measuring 10 x 6 cm, and consists of five stages as follows:

(1) *The oscillator* is designed round a 72 MHz xtal, the transistor being a 2N2369, but a 2N706 would serve

equally well.

(2) *The tripler* uses a 2N2369, which must be contact-cooled, to give 216 MHz. The output is connected through a bandpass filter to the 216 MHz amplifier.

(3) *The 216 MHz amplifier* has a BSX61 in common emitter mode, but may be substituted by a 2N2219, BSX60 or BSX59, with a reduction in the output power. The transistors were chosen having regard to their low price.

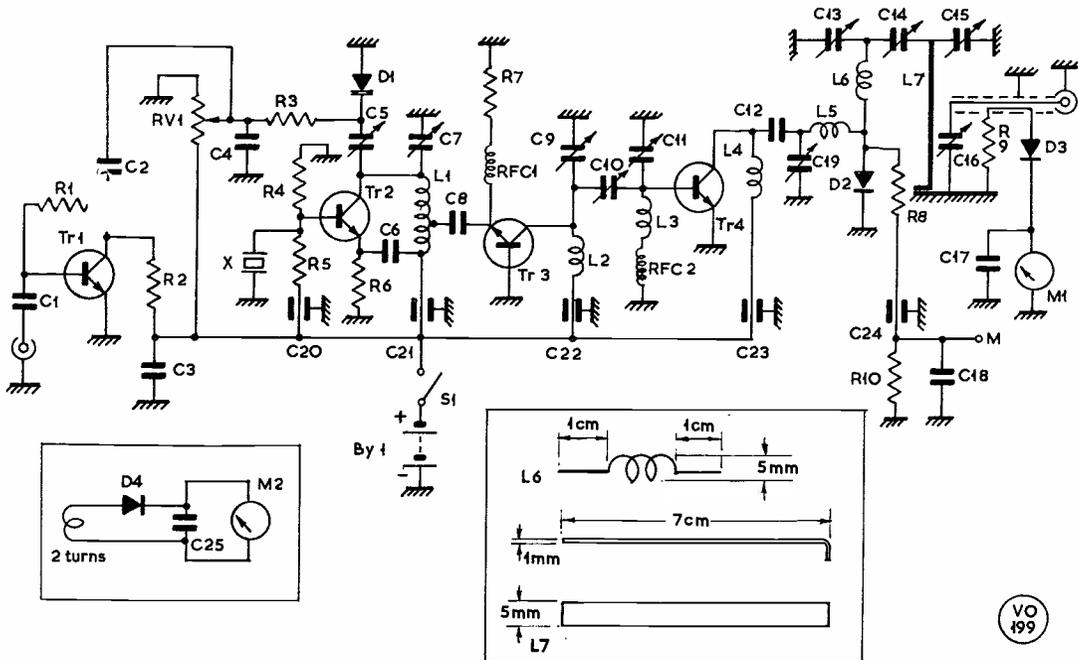
(4) *The doubler* consists of the base/collector junction of the BSX61 (or 2N2219) or any other epitaxial planar device of equivalent rating, with the collector connected to the case. Alternatively, a silicon diode of the 1N914 variety would serve.

(5) *The microphone pre-amplifier* is designed for a xtal microphone, so the input impedance is relatively high. The varicap diode is connected between the amplifier and the input to the oscillator, and is biased at about +3 volts to give symmetrical NBFM.

The RF indicator which is incorporated in the Tx indicates that the equipment is functioning correctly and also shows the state of the batteries. It is constructed by inserting a short length of insulated wire under the braid of a piece of coaxial cable 5-10 cm long, and connecting one end of it to an OA47 diode and the other to a 150-ohm resistor. The meter should have an f.s.d. of less than 500  $\mu$ A.

### Setting-Up

Once the wiring has been completed, disconnect temporarily the supply to Tr1, Tr3 and Tr4, set C5 at minimum capacity and adjust C7 for oscillation, as



Circuit of the F6APU 70-Centimetre Tx.

(Note: R1 joins to C2)



## Table of Values

Circuit of the 70 Cm Tx by F6APU

C1 = 1 $\mu$ F	M1, M2 = 0-100 $\mu$ A f.s.d.
C2, C3 = 0.1 $\mu$ F	D1, D2 = BA102
C4, C18,	D3, D4 = OA47
C25 = .01 $\mu$ F	BY1 = 12-18v. batt.
C5, C7	RFC1,
C19 = 3-30 $\mu$ F	RFC2 = 10 turns 22g.,
C6 = 22 $\mu$ F	5 mm. dia.
C8 = 25 $\mu$ F	Tr1 = BC107, BC108,
C9, C10,	BC109
C11, C12,	Tr2 = 2N2369, 2N706
C15, C16 = 0.6-6 $\mu$ F	Tr3 = 2N2369
C13, C14 = 0.3-3 $\mu$ F	Tr4 = BSX61, 2N2219
C20, C21,	Tr5 = BSX61, 2N2219,
C22, C23,	1N914
C24 = .0022 $\mu$ F, feed	L1 = 6 turns, 8 mm. dia.
thru	L3 = 2 turns, 6 mm. dia.
R1 = 1 megohm	L2 = One turn, 8 mm.
R2 = 12,000 ohms	dia.
R3	L5 = 3 turns, 8 mm. dia.
R4, R5 = 10,000 ohms	L6 = 2 turns, 5 mm.
R6, R7 = 100 ohms	dia., one cm.
R8 = 100,000 ohms	leads
R9 = 150 ohms	L7 = see diagram inset,
R10 = 10,000 ohms	with 1 cm. wire
RV1 = 10K potentiometer	(L8) coupled to
	L7.

Note: All coils L1-L6 self supporting, in 20g. enam.

shown by the RF probe in Fig. 1. Adjust the tap on L1 for clean oscillation—it should be at two to three turns from the supply end of the coil, then check the frequency with a GDO. Set C10 at minimum capacity before connecting the supply voltage to Tr3, couple the RF probe to L2 and tune L3 to resonate at 216 MHz with C9. Re-adjust C7 for maximum current through Tr3. Adjust the tapping point of the 25 pF capacitor on L1 again for maximum current through Tr3. Connect the +15 volt supply to Tr4 and adjust C10 and C11 for maximum current through Tr4, then adjust C12 and C19 for maximum indication on the meter. Retouch capacitors again for maximum. C13, C14 and C15 should then be adjusted to give maximum RF current in L8. Ensure that the RF is at 432 MHz by absorption wavemeter or Lecher line, remembering that when the lines are resonant at 432 MHz, a lamp load connected at the output socket will go out.

Now it only remains to look at the audio side. Connect the +15v. supply to Tr1 and adjust R1 so that the collector of Tr1 is at a potential of half the supply voltage. Connect the microphone and screw in C5, at the same time unscrewing C7 by the same amount to maintain oscillation. (The greater the capacity at C5, the greater the deviation.) A check with another station is most valuable at this point. The final adjustment, once the aerial is connected, is to touch up C16 for maximum output. The current drain at 15 volts should be about 70 mA.

## Results

Several versions of this Tx have been constructed and have given good results for local contacts, but QSO's have also been made at distances up to 100 km. using a 19-ele. beam.

Further information may be obtained from F6APU, A. Jungbluth, 3 rue des Tulipes, (67) Lingolsheim, (TPR), France. Please do *not* contact G3DAH, who has merely done the translation!

TONE MODULATED  
OSCILLATORFOR MORSE PRACTICE AND  
GENERAL TEST PURPOSES

J. MORRIS (G4ANB)

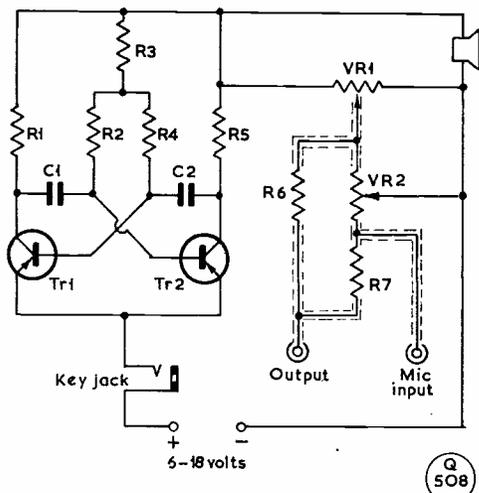
THIS circuit was devised when a local G8/3 asked for some slow Morse to be sent over two metres for practice purposes. As the receiver in use had no BFO, MCW had to be used. The oscillator gives a tone which is fed firstly to a speaker, for monitoring, and secondly, *via* an audio mixer circuit, to an output socket.

This output can be used to feed either the transmitter modulator or a tape recorder. By using the mixer, the station microphone can be left connected and a quick and easy change over from MCW to AM can be made. For face-to-face practice, of course, this output can be left unconnected and the speaker only used.

## Circuit

Transistors Tr1 and Tr2 form a multivibrator circuit, the frequency of which is determined by capacitors C1 and C2 and the base bias resistors. The values given were found to give a suitable note, but the note can be lowered in pitch by increasing the value of R3 (and *vice-versa*) if so desired. If a continuously variable note is required, then R3 should be replaced with a 10K potentiometer.

It will be noticed that the speaker coil passes the whole of the oscillator current. This is the basis of operation of the circuit. Tr1 and Tr2 have different collector loads, so that when the circuit flips from one state to the



Circuit of the tone-modulated oscillator, as described in the text. Values are: C1, C2, .05  $\mu$ F; R1, 220 ohms; R2, R4, 10K; R3, 5.6K; R5, 1K; R6, R7, 220K; VR1, VR2, 250K potentiometer; Tr1, Tr2, OC71, NKT214 or similar.

other, there is a change in the current flowing through the speaker coil and so an output is generated. This arrangement allows the use of a low-impedance speaker without a transformer. VR1 taps off an appropriate voltage from across the speaker and feeds it to one end of the mixer potentiometer, VR2, the other end of which goes to the microphone input. As the earthed slider moves from one end of its travel to the other, it bleeds to deck more and more of the unwanted signal. Thus, by turning this control across its track, either the keyed tone or the microphone signal is passed on, *via* resistors R6 and R7, to the output.

#### Construction and Use

Any convenient form of construction may be used, but care should be taken over the screening of the audio leads. The speaker can be of any impedance from 3 to

80 ohms, the low-impedance types probably being cheapest to obtain. (One from an old TV set is ideal.) Almost any surplus transistors will do, but of course the supply polarity must be reversed if n-p-n types are used.

After checking that the oscillator is working through the loudspeaker, the output may be taken to the transmitter. The gain of the Tx should first be adjusted using the microphone, and then VR1 set to give a suitable strength of oscillator signal. By adjusting VR2 it should be possible to pass only the tone or the mic. signal to the Tx. If the oscillator is not to be used over the air, then VR2, R6 and R7 can be omitted and a tape output taken from the slider of VR1.

An oscillator of this sort also has obvious applications as a tone modulator for the transmitter and for general checking and calibration purposes.

# VHF BANDS

A. H. DORMER, G3DAH

ONCE again, there seems little that can be said about DX propagation on any of the VHF bands during the last few weeks—unless it be that there wasn't any! Or at least, that very little was observed in the South. The non-operation of the U.K. two-metre beacons during the power cuts made it difficult to assess exactly what was happening on that band, and the general observance, by the majority of amateurs, of official requests to "economise in the use of power" meant that activity also was at a low level. However, some idea of propagation could be obtained by beaming towards Europe, and this exercise confirmed the doleful picture. An unusual occurrence was

the appearance of Sporadic-E on 4m. during the early evening of March 6, when G3OHH reports listening to a complete symphony from Poland on 70.6 MHz.

A check back on conditions during February and early March, 1970, shows that much the same situation prevailed then, but the corresponding period in 1971 did exhibit the odd lift, particularly on 2m., and to a lesser degree on 70 cm.

However, there are some grounds for optimism. For one, it can't go on like this for much longer, and secondly, we are approaching the season for Auroral displays. In the past, March and April have been more productive of DX contacts by this mode than the summer months, and there seems no reason to doubt that they will again be forthcoming—so G3DAH, for one, will be polishing up the key.

For those newcomers who have not yet had experience of making *Ar* contacts, the usual procedure is to point the beam slightly East of North and tune the CW sections of the bands (2m. or 4m., that is) since no auroral reception has ever been reported on 70 cm. Due to Doppler shift effects in the reflecting curtain, notes which are normally T9 deteriorate to T5 or worse and the reports passed indicate this by the addition of the suffix "A." For example, where the usual RST report might be 579, the *Ar* report would be 57A. It is a feature of these conditions that auroral propagation may exist at the same time as extended tropo., so the "buzz-saw" note may alternate between T5

and T9. Although phone contacts *have* been made *via* Aurora, the Doppler shift makes copy extremely difficult, if not impossible, on AM or NBFM though very slow and distinct phrasing will get through on SSB. Whilst there is no infallible method of predicting an Aurora (and, be it noted, not all visual displays are accompanied by anomalous radio propagation) some indication of the imminence of auroral effects can be forecast by listening to GB3VHF on 144.50 MHz with the beam headed North. If the note sounds rough, or if there is a "burble" on it, it is worth having a look on the CW ends of the bands. So, let us hope that both newcomers and the old hands will be notching up that UQ2 this next time!

#### Contests

The last of the 70 cm. Cumulatives has come and gone, and, by and large, it's a pretty sorry story. On no occasion has propagation been up to a really good standard, and at times has been diabolically poor. Take this fact, and the power cuts, into consideration and one reaches the ineluctable conclusion that scores are going to be low, both in the number of contacts made and in distances covered, all of which is doubly unfortunate, since newcomers may get a completely false impression of the potential of the band. All participants, old and new alike, must surely enjoy a contest more when there is plenty of DX to be worked. Of course, these were *Winter* Cumulatives, and one can but hope

that the Autumn ones will be more productive.

The 144/432 MHz Open over the weekend of March 4/5 also failed to come up to the expectations of many, although propagation was better on the Sunday than the Saturday. Two metres was certainly livelier than 70 cm., in spite of the multiplier on the higher frequency band, but few 200+ mile contacts seem to have been made, and many complaints were heard about the low activity levels. Under these conditions, SSB certainly showed its merits—the contacts between G8CIW in London and G3BW in Cumberland and GD2HDZ in I.o.M. were good examples. In view of the conditions, it was surprising that more use was not made of CW on both bands. Scores logged towards the end of the contest were generally lower than those in the corresponding event last year, a notable exception being G8BHH/P, 24km. West of Hereford, who was heard on 2m. passing 207 just before closing time. Agreed, he was operating from a much sought-after county, but that figure cannot have included many local contacts at one point each, and his final total, with the distance multiplier taken into account, must be fabulous. G3OXD/A was around 170, and G8DQX about 180 at the close. A couple of high spots were the G8CHW/A (Oldham) contact with G3MOT (Oxford), and the GD2HDZ / G8BCG (Manchester) QSO on 70 cm. Incidentally, G3MOT said that he had just come off the HF bands where he had made 300+ QSO's during another sort of contest, and he certainly sounded a bit hoarse!

Better to assess the situation, your scribe did some homework on his own results, and the following figures are quoted in the belief that they are probably fairly representative: Contacts per hour of operation this year were 7.1 compared with 7.7 last year, and on a 24-hour basis that represents 25 fewer contacts *vis-à-vis* 1971. The crunch comes, though, when the points per contact are computed—5.83 last year but only 3.1 this year, and this is indicative of the lower ranges which were achievable under the prevailing conditions. Best DX this year was under 200 miles against

just over 300 miles last year.

Forthcoming events are the 70 MHz contest on April 8, the 432 MHz event over May 6/7 and the 144 MHz contest on May 21.

### Activity

There have been many attempts over the last few years to increase the level of activity on the VHF /UHF bands—some have met with greater response than others, some died after a very brief life, and others never really did get off the ground—and the need to encourage more operating, particularly on the 4m. and 70 cm. bands, remains as important as ever.

It was good news, therefore, to learn that the old firm of G8APZ /G8AZU, who did so much to encourage 70 cm. traffic with their own contest last year, are still at it. They have now enlisted the help of two other devotees of the band, G8CIT and G8DKK, and go out

portable every Sunday morning from a good location, usually in the Home Counties, but occasionally as far afield as GW, in fair weather and in foul. In order not to commit themselves too deeply, they do not announce beforehand just where they will be, but one can always reckon that, with the experience that they have now gained, it will be a site which will offer some reasonable DX when conditions are right; the choice of Sunday mornings may be of assistance to those who suffer from the dreaded TVI on weekday evenings. Good hunting to them—and thanks.

G4ALN (Romford, Essex) is also prepared to do his bit. Every Tuesday and Thursday evening during April he will be on 432.10 MHz CW with the beam N-W from 2100-2130z, and S-W during 2130 to 2200z. Skeds can be arranged and he is *QTHR* under callign G8DLJ.

(over)

## THREE BAND ANNUAL VHF TABLE

January to December, 1972

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL pts.
	Counties	Countries	Counties	Countries	Counties	Countries	
G5DF	17	2	30	4	17	1	71
G8BXX	—	—	28	2	17	1	48
G3NHE	—	—	38	2	4	1	45
G3DAH	3	1	22	2	10	1	39
GD2HDZ	—	—	23	3	8	2	36
G8CIW	—	—	30	4	—	—	34
G8EMS	—	—	26	2	—	—	28
G3OHH	5	1	11	1	7	2	27
G8AGL	—	—	25	1	—	—	26
G4ALN	—	—	12	1	9	1	23
G4AJE	—	—	21	1	—	—	22
GM8BDX	—	—	14	3	2	2	21
G8BKR	—	—	6	2	5	2	15
G4ALN	—	—	8	1	1	1	11
F6BQH	—	—	7	3	—	—	10
G3EKP	1	1	4	2	1	1	10
G8DBX	—	—	6	2	—	—	8
G4AVX	—	—	5	1	—	—	6

Just a reminder that the Tables go through to December 31, 1972. The Three-Band Annual Tables show claims to date for the year commencing January 1, 1972. Claims should be sent to: "VHF Bands," SHORT WAVE MAGAZINE, BUCKINGHAM, as they accrue.

With the rate at which new licences are being issued, and the consequent increase in the amateur population on the two-metre band, it may be thought that any attempt to increase activity there was unnecessary. So it probably is, as far as AM and NBFM phone is concerned, but there is still room for encouragement for the CW and SSB men, and to this end, G3BA and some colleagues are trying to revive the idea of calling every hour on the hour between 7 p.m. and 11 p.m. each evening. We must all have heard CQ calls going out on both modes at odd times with no response, and this in spite of the fact that one does not expect to have to cover the whole band for a reply, but if it were known that there would be a greater likelihood of a contact at set times, then this would be advantageous for all. Such a scheme has worked very well in contests where one has often heard an SSB operator come up on the hour, scoop up all the available contacts, and then revert to AM. The same is true of CW. There seems little reason, therefore, why such a scheme should not be equally successful under normal conditions. It seems well worth a try to get both SSB and CW out of the rut of indiscriminate calling and a low return rate, and may well prove to be a better scheme than the idea of "Activity Nights", which seem to change with bewildering rapidity depending upon the part of the country in which one lives. So, how about giving it a whirl?

### And on Seventycems

Ingenious, and numerous, as the attempts have been to raise the tempo on 70 cm., none has succeeded completely and permanently, and one cannot help wondering whether—not only in view of the current claims by commercial interests on part of our UHF allotment, but for the good of VHF radio as a whole—Class-B licensees, after a certain date, should be confined, as originally, to 70 cm. and above, if not for all time, at least for a probationary period, during which they could get the "feel" of the bands and absorb the construction and operating techniques and characteristics peculiar to them. It would not be the first time that such a scheme had been operated successfully.

### VHFCC Awards

Certificate No. 137 goes to G8DVZ (Northampton) for 2m. operations. He first came on the air in January 1971 with a series-gate modulated QQV06-40A, a *Micro-wave Modules* Mosfet converter and an AR88, but this gear has now been replaced by a Pye Cambridge running 16 watts to a four-ele. beam, all of which, from a 400ft. a.s.l. site, is getting him some nice DX—for example, he got in on the Italian opening last year. It has still taken more than 12 months to get all the QSL cards in, though!

Robert Lee, G8CQR (Hemel Hempstead) gains Award No. 138 for his 2m. work. Initially, in May 1969, he ran 40 watts to a QQV03-20A with a pair of 6BW6 modulators, but this has now been replaced with a QQV03-10 job using EL84's in the modulator. The FET converter and the Sommerkamp FR-DX500 receiver, together with the 8-ele. beam at 27ft., are still in use from the 420ft. a.s.l. site. An unusual feature of his claim is that the QSL return rate is about 60% from British stations, and 100%(!) from Continentals. There must be a lesson to be learned here!

G8DQN, Norman Hunter (Hornchurch, Essex) is now the holder of two-metre Award No. 139. He runs 35 watts to a QQV03-20A with TT12 modulators, a G3HBW converter and EC-10 Rx. The 6/6 antenna is at 20ft. with a good take-off in most directions, although three tower blocks some 500ft. away do not help matters in the easterly direction. Nevertheless, he is making Continental contacts under the right conditions.

In the notes about applying for VHFCC, on p.45 March, we might have mentioned that good black-and-white photographs of VHFCC stations are always welcome, with appropriate notes. This is not, of course, a condition for obtaining the Award but, like the station details, always of interest—and those that we can use are paid for on publication.

### Beacon News

GB3ANG, the Angus two-metre beacon, is now back in full operation on 145.950 MHz, a fact which will please many users of this valuable aid to the assessment of propagation

conditions. Our thanks to GM4HR, the beacon keeper responsible for this installation.

A new 2m. beacon is now in operation in Switzerland at Chasseral in QRA Locator DH66f. The frequency is 145.985 MHz, and the callign HB9HB, output 10 watts. Reception should be possible under good extended-tropo. conditions.

Another new one that is going to be a bit difficult under normal conditions, but which may be possible during a strong Aurora, is UK3A located near Moscow. Frequency is 145.4 MHz and power output 50 watts. Best times to look for it are between 2015z and 2030z and 0230z and 0245z, when it is beaming West, provided always of course, that the aurora is obliging enough to manifest itself at those times!

The Dutch 70 cm. beacon is now off the air while PAØVD completes the "transistorisation" of the Tx. When it does reappear, it will be operating on the new frequency of 433.00 MHz.

In addition to the German FM repeaters, of which details were given in this Column in the December 1971 issue of SHORT WAVE MAGAZINE, information has now been received of new installations in Scandinavia. SKØDZ is undergoing trials in Stockholm. The calling frequency will be 144.900 MHz and the reply on 145.800 MHz. Output power is 10 watts, and access to the repeater is by 2172 Hz tone. Time-limiting circuits are incorporated in the installation giving continuous use for ten minutes before resetting becomes necessary. An interesting feature is that the problem of interaction between receiving and transmitting antennae has been solved by siting them remotely from one another and connecting them by a 70 cm. link.

The second Swedish repeater is located at Rommeleasen, South Sweden. The technical data are similar to those for SKØDZ, but the output power has been raised to 20 watts and the connection between Tx and Rx is by landline. It is still on test and not in continuous operation. It is reported that there is also an FM repeater on trial in Copenhagen but no details are available other than that the operating frequencies are 145.350 MHz and 145.850 MHz, testing is being

done by OZ8JS, and access will be by double-tone 1400 Hz + 2200 Hz. It seems a pity, in the interest of standardisation, that the Tx/Rx channel spacing selected for the Scandinavian repeaters is not identical with the German, and proposed British, systems.

### AMSAT Satellites

If all goes according to plan, the AMSAT satellite *Oscar-B* should be launched in June of this year. The exact date is subject to meteorological requirements, but appears firm from all other considerations. If the launch is successful, and the satellite is put into the correct orbit, it will become known as *Oscar 6*, and so follow its illustrious predecessor *Oscar 5*.

The orbit parameters are determined by the launch vehicle, again a *TIROS* weather satellite, so that we may look for a path some 1,000 Km. above the earth, probably sun-synchronised, and closely following that of *Oscar 5*. A life of one year is

planned as, unlike previous projects of this nature, the nickel-cadmium batteries can be recharged by energy from solar cells.

Three translators will be carried:

(1) A linear translator from 70 cm. to 2m. up—frequency 432.15 MHz  $\pm$  25 kHz, and down on 145.95 MHz  $\pm$  25 kHz. The 10 watt p.e.p. Tx can be operated on 2.5 watts to conserve power. A beacon Tx on 145.98 MHz is also incorporated in the design.

(2) A linear translator from 2m. to 10m., up on 145.95 MHz  $\pm$  50 kHz and down on 29.50 MHz  $\pm$  50 kHz, output power 2 watts. This installation is also equipped with a beacon on 29.45 MHz.

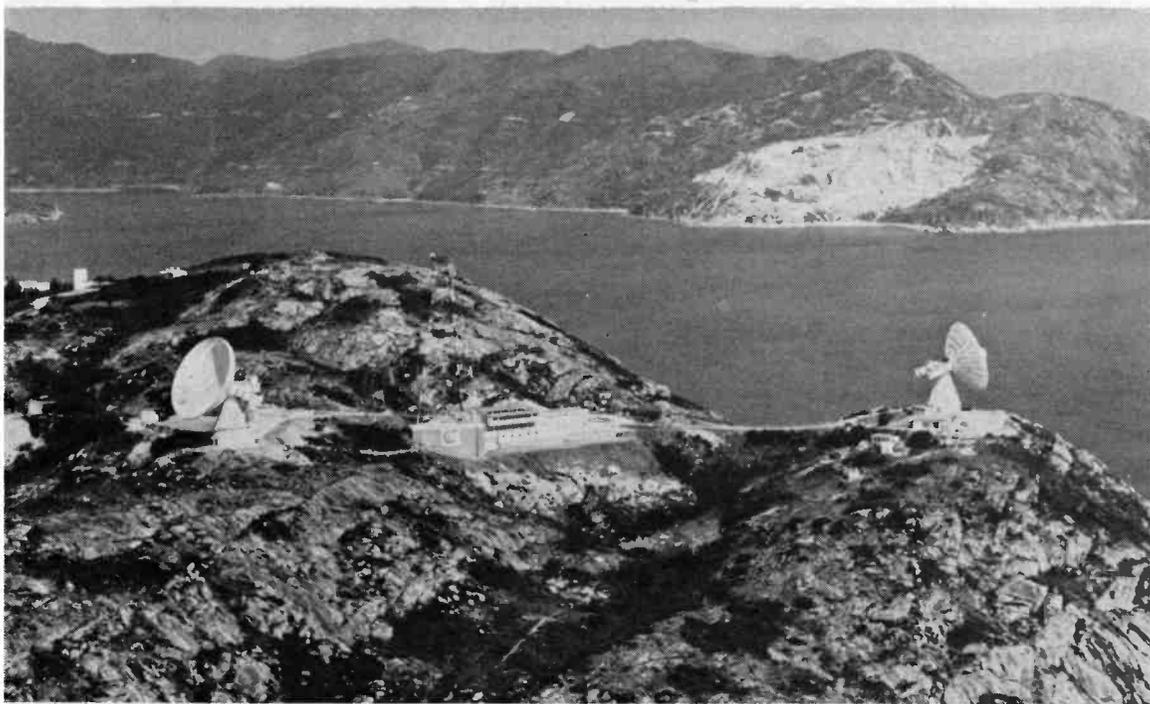
(3) An NBFM translator, 2m. to 70 cm., with up-frequencies 145.80 MHz, 145.85 MHz, 145.90 MHz and 145.95 MHz, and corresponding down frequencies of 435.10, 435.15, 435.20 and 435.25 MHz, unfortunately well outside the U.K. communications segment of 70 cm.

It was planned originally that the four channels in (3) should be transmitted simultaneously, but it seems that the available power supply capacity would be exceeded if this were done, and so it is likely that only the 145.80 MHz/435.10 MHz pair will be used. With a bit of fiddling

with the converter it might be possible to get it up to 435.10 MHz provided that the IF strip will tune up there. No beacon is provided in this translator as it serves *per se* as a beacon.

In the event of interference with other services, or if the power loading becomes too great, only one transponder will operate at a time. Similarly, if the battery voltage drops below the design operating level (or the ambient temperature rises beyond prescribed limits) the output power will be reduced automatically to 2.5 watts, at which level the solar cells will cut in to recharge the batteries. Should this safety measure fail, then all transponders will be switched off, and only an emergency beacon on 10m. will remain active.

*Oscar 6* will be spin-stabilised with respect to the earth's magnetic field, and this has meant that because of the field reversal at the poles the satellite antennae must be circularly polarised to minimise fading at the



As well as being strategically placed for the China trade, Hong Kong has become an important link in the realm of international communication by satellite. The site we see here—on Stanley Peninsula, southernmost point of Hong Kong Island—in effect scans the world on a 24-hour basis. These two earth stations, the newest of which is on the left, have been established by Cable & Wireless, Ltd. and complete the East-West coverage. The new dish is 97ft. in diameter and embodies the latest techniques.

linearly polarised aerials common at ground stations. They consist, in fact, of crossed dipoles in a "Turnstile" configuration, and are arranged so that in the Northern hemisphere the 70 cm./2m. translator gives right-hand polarisation and the NBFM translator left-hand.

As far as equipment at the ground stations is concerned, almost any good converter, with an antenna gain of 12-14 dB or better, should serve. Tx powers will need to high, full legal limit for both the 70 cm./2m. and 2m./70 cm. translators, and best results are likely to be achieved with SSB or CW when working through the linear translators. The NBFM limits are  $\pm 7.5$  kHz, but that doesn't mean that you *have* to exceed the IARU standard!

Information on the launch date will be given when it becomes known, as will details of the exact orbital parameters when they have been established.

#### Club and Group Activities

The mid-Severn Valley Teleprinter Group are organising a two-metre contest on Sunday, May 14 next between 1000z and 1600z. Further information may be obtained from G3PWJ (to whom logs should be sent) or from G3NUE, both *QTHR*. The Group normally operates on the Group channel of 144-986 MHz, AFSK 850 Hz shift, at 50 bauds.

In January this year, a Group known as the "U.K. FM Group (London)" was formed with the object of seeking a common NBFM frequency and transmission standards in all zones throughout the Band Plan. They hope that other Regional Groups may be formed who will co-operate with them in this endeavour, and those interested are invited to contact G5AGX, *QTHR*. This seems a laudable idea, but as with other schemes which require the allocation of a specified frequency for operations of a particular nature, a certain amount of self-discipline will be needed. One has only to look at the abuse of 145-00 MHz, the mobile calling channel, by fixed station operators to appreciate this. The play must be—*call* on the calling channel and then vacate it when the initial contact has been made to make way for others.

The R.A.F. Amateur Radio Society will be holding their AGM at the Society Headquarters at R.A.F. Locking, Weston-super-Mare, Somerset, on October 21 this year, and the occasion will coincide with the 50th Anniversary celebrations of the establishment of No. 1 Radio School. It is hoped that many members of the Society, far-flung though they may be, will attend, as well as many of the "Old Boys" of the School. Further details may be obtained from G3GNS, *QTHR*, who for many years has been active in the Society's interests.

The annual London VHF Convention takes place this year at the usual venue—The Winning Post Hotel at Whitton, near Twickenham, on Saturday, April 22. Tickets, at £1-80 for the whole event (£1-50 for the dinner only, or 40p for the afternoon) are available from A. Wheeler, c/o RSGB, at 35 Doughty Street, London, WC1N 2AE. Envelopes should be marked "VHF Convention."

#### Scottish News

It appears that conditions for the 144/432 MHz contest in March were as bad in Scotland as they were down South. The best signals were, fairly obviously, those coming from the well-sited portables such as GM3ZVB/P (Lammerlaw), GM3YLD/P (Kilsyth Hills), and GM3OXX/P (Lomond Hills, Fife). Conditions on the ground seem to have been equally poor for these intrepid operators. 'OXX was snowed up in his tent for much of the time.

GM4AVH is the callsign of the newly formed "Pioneer Club" in Edinburgh, active on 2m. with a Pye Base station from the Club premises in Gilmerton, some 450ft. a.s.l., so they should be able to put out a fairly potent signal in most directions. GM8DOX is another station well received to the South from his QTH in Denny, Stirlingshire. He also does quite a bit of mobile operating.

GM8BDX, *QTHR*, is a call which is well known to many DX operators in the South. Alex operates from Duns in Berwickshire with 55 watts to a QQV06-40A and a 10-ele. at 38ft. For 70 cm., this Tx feeds a BAY96 varactor for which the antenna is an 18-ele. Parabeam at

30ft.; he would welcome skeds in the South and West, particularly GD and GC, during the summer months. Operating frequencies are 145-92 MHz and 145-52 MHz on 2m. and 432-90 MHz on 70 cm. He reports yet more 2m. activity from the Border counties—GM3FSD, GM3WIG, GM8CVN and GM8ETJ, all in the Hawick area, GM8EUG in Duns and G3KML in Berwick-on-Tweed, Northumberland.

Mobile operation appears to be on the increase in GM, and this has led in turn to Mobile/Static working from suitable high spots, so giving more opportunity for GM/G contacts. If only someone could move the Pentland Hills!

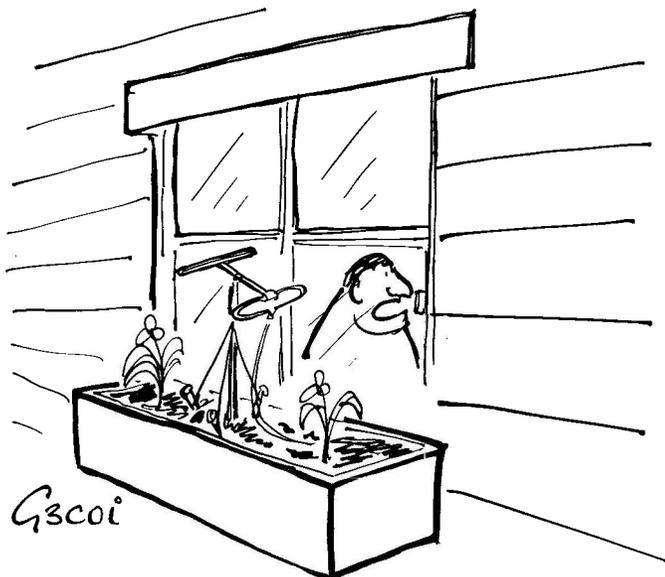
#### News Items

Another "hail and farewell" piece this month. Welcome back to G8AGL who is again on the air from East Yorkshire after an absence of some two years in South Africa. He is active on both two metres and 70 cm., and would welcome DX contacts, particularly from the far South-West and North-East, on Monday or Friday evenings. Welcome, too, to G8EDJ (Ashford, Kent) who is now G4AYT—to G4AZR, ex-G8FVQ who, only three weeks after getting his Class-B licence, took the Morse test and passed for his full call—and to G4AZK, who was G8FBD.

Farewell, perhaps a little precipitously, to G3FRV of Crawley who shortly becomes VK6RV. The Crawley Club are going to miss one of their most active supporters here, and RTTY operators on 2m. will certainly miss Ron's potent signal on 144-6 MHz.

On April 9, GM3XWJ/M will be on four metres whilst *en route* between Liverpool and Newcastle, and at some time during the afternoon from a fixed location on Hadrians Wall, Northumberland. The Tx runs 25 watts, and frequencies will be 70-26 MHz and 70-375 MHz—xtal controlled transmit/receive. All contacts will be QSL'd, *QTHR*.

Two newcomers to 70 cm. who are looking for contacts on that band are G3BHW (Margate) who runs 5 watts to a 14-ele. beam, and G3VJF of Whitstable with the same order of output power and a similar beam. Both are in danger of enter-



“ . . . Using rather an unusual Seventycem antenna here . . . ”

ing a state of severe depression caused by lack of QSO's, since both started up on the band when the present dismal set of conditions beset us.

G13SUM and DL3YBA have a sked arranged for every Friday evening on 144.063 MHz, 2200z—2359z, with the object of finding out whether it is possible for them to make regular contact *via* sporadic meteors. Anyone copying the DL at these times might care to let G13SUM, *QTHR*, know.

Readers who have heard GB2MT on the 2m. band may like to know that it is a special station set up in Chelmsford to commemorate the 50th anniversary of the establish-

ment of the first regular broadcasting service in this country from the Writtle, Essex, station of the Marconi Company. “Two Emma Toc,” as it was known in those days, will be remembered with affection by many amateurs for whom it provided not only entertainment but also a Rx calibration service to boot.

G8EMS comes up with some more news of the EA phone station which was mentioned last month. He was apparently working a French station at 2250z on December 12 on 144.32 MHz, so again, any further identification would be useful.

In spite of the poor conditions during the March 144/432 MHz

contest, and an interruption due to necessity of replacing the coax feeder which had “become water-spaced rather than air spaced,” GD2HDZ still managed to pull off some decent DX, his best effort on 2m. being with G8CIW (London) and G8BBB (Ely, Cambs.) and on 70 cm. a solid QSO with G3NEO (Sheffield). He also reports working old-timer G3BW in Whitehaven on 2m. SSB, so those wanting a Cumberland contact will know where to look! (And we are very interested to hear of G3BW again after many years.)

### Three-Band Annual Tables

A spirited start has been made with the Three-Band Annual in spite of the generally poor conditions prevailing since the beginning of the year. G5DF in Reading holds his lead and has obviously been wasting no time. It is good to see a GM and an F making an appearance. F6BQH is F1AOY (a holder of the VHFCC Award) and as such pretty well known in this country, at least in the South, while GM8BDX is usually one of the first stations to be heard in the South when there is a bit of a tropo. lift on.

### Deadline

April 8 remains the deadline for the next issue as it is hoped that the planned publication date for May will be met in spite of current production difficulties on the printing side—at any rate, we shall do our best. The address for news, views, claims and comment is: “VHF Bands,” SHORT WAVE MAGAZINE, BUCKINGHAM. Cheers for now and *vy 73 de G3DAH*.

### “TVI AND STUBS”—CORRECTION

G2HR points out that in his article (p.49, March), the “75 ohms” at 5th line down, right-hand column, should read 750 ohms. This brings the mathematics right!

### AMATEUR RADIO RETAILERS' ASSOCIATION

At a well-attended Trade meeting in the Midlands on Sunday, March 5, a proposal to form an Amateur Radio Retailers' Association (A.R.R.A.) was discussed and agreed, with a founding-membership list of 14 firms in the radio-amateur retail trade. The secretary of the Association is L. J. Hellier, G3TED (Taurus Electrical Services), 26-28 Nottingham Road, Lough-

borough, Leics. (Tel: 05093 5131) to whom Trade enquiries respecting the Association should be addressed. One of the objectives of the new Association is to organise, during this coming October, a two-day Exhibition in the Midlands.

### WHITHER ELECTRONICS—THE LIMITS?

Though the application of electronic techniques in many fields is well appreciated, is there a limit to what can be expected? This is a subject to be discussed by a panel of specialists, at a meeting on April 17, 6.0 p.m., at the Institution of Electrical Engineers, Savoy Place, London, W.C.2 (down on the Embankment), under the auspices of the I.E.E.T.E. Admission is free and tickets are not required.

# THE MONTH WITH THE CLUBS

By "Club Secretary"

(Deadline for May issue: April 7)

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

IN the last few months, it seems that seldom a deadline comes round but what *something* has to happen to make life a little harder—after the power cuts, this time we have to produce copy earlier to beat a period of disruption on the printing side. Because of this, your scribe is taking the reports as they fall, and cutting the normal rigorous selection procedure for the Short Notices. This may mean that some Clubs have been shortened beyond their fair share. If so, this will be put right later on.

First we must mention that the Swindon Club has been writing to various groups regarding their Two-Metre Project. It seems they have been very successful with this, and are now in a position to offer a "book of words" and kits of parts to build either a two-metre converter, a Tx, a modulator, or a complete transceiver, not to mention ready-folded metalwork for the latter, minus only cutouts for the boards and things. Details are available from G8AVG, 29 Okus Grove, Swindon, Wilts, SN2-6QA. It is understood the Swindon lads are even prepared to come and give a talk on this project, which is really going out of the way to help others. Include a large s.a.e. with Project enquiries.

## Round The Country

The **Midland Newsletter** tells us of their meetings—these are at the Midland Institute, Margaret Street, Birmingham. However, we do not have a date for April, although it is believed that if you look out for them, some at least of the members will be at Drayton Manor Rally on April 16; or of course you can contact G8BHE, as Panel, p.112.

A most interesting newsletter from **Wolverhampton** this time, with, briefly, a note of their titles since 'way back in 1913, not to mention a very amusing piece on the old R.C.A. ET-4332 transmitter. As to meetings (Neachells Cottage, Stockwell Road, Tettenhall), April 3 is passed, due to the Bank Holiday, but on the 10th they have the Wolverhampton Astronomical Society coming along to talk about home-built telescopes, and their control—sounds an interesting evening. April 17 is a discussion session.

Every Wednesday at Newton House Community Centre, 203 Droylsden Road, Newton Heath, sees the **Manchester** lads getting together; once each month there is a lecture, April 12 being "Aerials" by G2ALN, and May 17 "Computers" by G3JIB.

Down West now, to **Plymouth**, at Virginia House, Bretonside, for the local meeting on the first and third

Tuesday in each month, with a programme of talks and film shows, not to mention the essential AGM, which takes up May 2.

Doing things the right way is the principle adopted at **Otley**, where a new item of entertainment is a "Let's Talk About It" item where a member describes a bit of gear, and the design and constructional snags in building and getting it going. Any Tuesday you will find them in the Hq. at 14, Back of Court House Street, Otley.

First stop in Wales is at **Port Talbot**, to mention their Annual Social on April 11—somewhat of a house-warming of their new Hq., as all future dates are at this venue, namely the Rail and Transport Club, 39 Station Road, Port Talbot. All welcome and details from the hon. sec., as in the Panel.

**South Birmingham** have their home in Hampstead House, Fairfax Road, West Heath, on the first Wednesday of the month, which makes it April 6, for a talk on Stereo Sound by Mr. R. Savin.

\* \* \*

Grand news for the **Nigerian** crowd. It seems that their president, Adebayo Browne, 5N2AAJ, can attend the Region I IARU Conference at Scheveringen, Holland, over May 15-19, which means the Nigerian chaps will be able to compile a really effective dossier on international Amateur Radio to present to the 5N2 authorities, asking for a statement of the position regarding licensing. Let us hope with them that they are at last able to persuade the Govt. out there to grant some new 5N2 tickets.

Now **Purley**, who are beginning to feel that their sudden departure from the old Hq. was a blessing in disguise! The general opinion seems to be that the new place is nicer, brighter and warmer than the old, and even the Hon. Treasurer is pleased—the rent is less! As the nights are now the second and fourth Tuesdays, they Natter on the 11th, and have a Junk Sale on April 25. The venue? Landsdowne Hall, Landsdowne Road.

It is not very often we hear from the **G.C.H.Q. Club**, Cheltenham—but once a year they have an open evening to show some of the wonders of the future to the rest of us. This year the event is on Friday, April 28, at 8.0 p.m., with the usual display, not to mention the bumper raffle. Well worth the time, is this, the more so for those interested in advanced professional techniques. Further information from G3PEO, as Panel, p.112.

Second and fourth Tuesdays is popular at the **Wolverton** and **New Bradwell Youth club**, because this is the evening the **North Bucks.** group hold their meetings.

Details of the programme are not available, precedence having been given to information about their two enterprising DX-peditions, to France and Scotland.

At **Newark**, the compiler of their *Newsletter* is quite a comic, in his way, but the details of the club Hq. and meeting-dates has again had to be passed over in favour of other things, so we must refer you to G3YCT direct (see Panel).

**Acton, Brentford and Chiswick** are to be found at Chiswick Trades and Social Club, 66 High Road, Chiswick, on April 18, starting at 1930, and we understand G3VUQ will be talking about Varicaps.

Alternate Mondays at **Brighton Technical College** means, for April, the 10th and 24th. The programme, we understand, will be announced. You can find them at the College, which is in Richmond Terrace.

Advance warning is given of the **Southdown Annual General Meeting** on June 5. However, before this, we note a Junk Sale on April 10, and a demonstration of Amateur TV on May 1.

A late change in the arrangements for **Dunstable Downs**, where the talk will be given by G3ZVI, who is filling a gap caused by the non-availability on the due date of G3RPE with his Microwave talk. This is for April 21, but you can find the meeting on a Friday evening by going to Chews House, 77 High Street South, Dunstable. April 7 features G3BPT, while the 14th and 28th are what they call "between weeks," for ragchewing, Morse, and R.A.E.

On to **Bury and Rossendale** and the first issue of their *Newsletter*, which we rather liked; the accompanying report mentions April 11, at the George Hotel, Market Street, Bury, when the technical director of the Nombrex concern will be demonstrating and discussing the range

of test equipment this firm manufactures.

At **Echelford**, the lads are booked in at the Hall, St. Martins Court, Kingston Crescent, Ashford, Middx. Here, it is the last Thursday, with March 30 down for the Annual General Meeting.

Now to **Verulam**, and their Hq. at the Town Hall; they have the Council Chamber laid on for April 19, for a demonstration of the latest from K.W. Electronics, a talk which was of necessity postponed last November.

\* \* \*

**Harlow** have their own place at Mark Hall Barn, First Avenue, which lies between Kenning's and the All-Harlow Bypass. Details of meeting dates, the programme, and whatever, may be obtained by dropping a line to the hon. sec., or better, by looking in at the Club meetings on Tuesdays or Thursdays.

Near neighbours **Bishops Stortford** have a different approach to meetings altogether; they have a single date each month, in a rented room, and almost always a formal lecture. Thus, between the two Clubs, the tastes of most of the amateurs in the area are catered for. April in Stortford sees members eagerly waiting the 17th, to hear the rest of the talk by G3VVS on Oscilloscopes (which came to a sad end in the February power-cuts!) As for the place, try the British Legion Club at the top of Windhill; the meeting starts at 8.0 p.m. but a listen in the bar a few moments before will usually disclose some radioese being talked.

On April 15, at Emmanuel Church Hall, Barry Road, East Dulwich, the **Crystal Palace** crowd will be hearing a talk about Test Gear, including among others, the Grid Dip Oscillator, the Valve Voltmeter, and the Oscilloscope; the lecturer is not named, but this group



Part of the Midland Amateur Radio Society set-up for the Birmingham Boat Show over the second fortnight in February, for which they signed GB3BBS, with G8EXW/A on two metres. The HF-band station ran a KW-2000A-and-KW Linear with a trap dipole on the roof of Bingley Hall, where the Exhibition was held. Excellent coverage was achieved, world-wide, on CW and SSB. The exhibition itself covered, as well as boats, all outdoor activities associated with camping, underwater sports and caravanning and is an annual event, regularly supported by M.A.R.S. On the left, we see an equipment display, with G8ADV, president of the Society, and on the right G3JPN is operating GB3BBS, with G8FTU at the two-metre rig.

has an array of talent to call on and it could be any one of about six members!

Now **Southgate**, who have their place in the Civil Defence Hut, Bowes Road, right opposite the Arnos Grove Tube station. From where we sit, the date to book looks rather like April 13, but we suggest a check with G3XMV first—see Panel below.

One of the rather few Clubs in Scotland is away up in **Inverness**, where they have a new Hq. address at the Cameron Youth Club, Planefield Road, Inverness. The A.G.M. falls on April 6, and from then on, the meetings will be fortnightly on Friday evenings.

From North to South, to **Horsham** in particular, and April 4 at the Guide Hq., Denne Road. Here the Horsham crowd will be putting on one of their famous

Junk Sales.

Quite some time since last we heard from **Fareham**, who used to be “regular customers.” No worry, though, the boys are still in business on Sunday evenings. We notice they miss Easter Sunday, but on April 9 an informal is taken, and a visiting lecturer is due to be heard on the 16th; a film show and raffle is down for the 23rd and the month ends with David James giving a talk on Colour Television. The place to find them is Portchester Community Centre, and it used to be said that you could locate them by following the feeders to the source!

**Radial** of the R.A.I.B.C. is one of the monthly treats for your old scribe, and this month is no exception. In particular, the group are particularly pleased over the

### *Names and Addresses of Club Secretaries Reporting in this issue :*

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NORTH DEVON: H. G. Hughes, G4CG, Crinnis, High Wall, Sticklepath, Barnstaple, North Devon.

NORTHERN HEIGHTS: A. Robinson, G3MDW, Candy Cabin, Ogden, Halifax (44329), Yorkshire.

NORTH KENT: M. Lee, G8EJH, 46 Harman Drive, Sidcup, Kent.

OTLEY: H. S. Johnstone, 12 Rurple Croft, Newall Carr, Otley, LS21-2RE, Yorkshire.

PLYMOUTH: S. E. Martin, 32 East Park Avenue, Mutley, Plymouth, PL4-6PF, South Devon.

PORT TALBOT: A. C. Williams, GW5VX, 14 Holland Street, Port Talbot, Glam., South Wales.

PURLEY: A. Frost, G3FTQ, 62 Gonville Road, Thornton Heath, Surrey, CR4-6DB.

R.A.I.B.C.: Mrs. F. Woolley, G3LWY, Woodclose, Pensefwood, Wincanton, Somerset.

REIGATE: D. Thom, G3NKS, La Collinette, 6 Bracken Close, Copthorne (2165), Crawley, Sussex.

SALTASH: I. C. Aldridge, G4AJU, 302 St. Peters Road, Manadon, Plymouth, PL5-3DU.

SHEFFORD: A. Sullivan, G2DGF, 12 Glebe Road, Letchworth, Herts.

SLADE: J. E. Drakeley, 186 Conway Road, Chelmsley Wood, Birmingham, 37.

SOLIHULL: A. W. Bagley, G3XPY, 266 Warwick Road, Olton, Solihull, Warwickshire.

SOUTH BIRMINGHAM: R. J. Thompson, 23 Fox Hill, Selly Oak, Birmingham 29.

SOUTHDOWN: A. Seabrook, G3ZQB, 6 Harebeating Gardens, Hailsham, Sussex.

SOUTHGATE: J. Batchelor, G3XMV, 22 Faversham Avenue, Bush Hill Park, Enfield, Middx.

SOUTH MANCHESTER: D. Holland, G3WFT, 7 Alcester Road, Sale, Cheshire, M33-3GW.

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SURREY: S. A. Morley, G3FWR, 22 Old Farleigh Road, Selsdon, Surrey. (657 3258.)

THORNTON CLEVELEYS: R. Bellerby, G3ZYE, 4 The Cop, Rossall School, Fleetwood, Lancs.

TORBAY: Mrs. G. L. Western, G3NQD, 10 Truro Avenue, Torquay, South Devon.

VERULAM: H. Young, G3YHY, 93 Leaford Crescent, Watford, WD2-5JQ.

WEST OF SCOTLAND: V. T. Budas, GM3VTB, 28 Kelvinside Gardens, Glasgow, G20-6BB.

WIRRAL: A. Fisher, G3WSD, 34 Glenmore Road, Oxton, Birkenhead, Cheshire. (051-652 5078.)

WOLVERHAMPTON: J. P. H. Burden, G3UBX, 28 Coalway Road, Wolverhampton, WV3-7LX.

WORCESTER: B. A. Jones, G8ASO, 12 Woodside Road, Larkhill, Worcester (29208), WR2-4NU.

YEOVIL: D. McLean, G3NOF, 9 Cedar Grove, Yeovil.

YORK: J. Rainbow, G8BOK, 14 Temple Road, Bishopthorpe, York, YO2-1QN.

achievement of member Esther Thomas who, totally reliant on the Possum self-help equipment, has managed to pass R.A.E.; Esther will shortly be appearing on Two with a G8/3 call, but the target is a G4. When you hear of such an achievement, it makes you wonder how much the people who moan about it being too hard to get a ticket really want to get on the air. Our congratulations must be added to those of the R.A.I.B.C. members who helped her on the way.

Over at **Edgware** they have meetings on the second and fourth Mondays of every month, at St. Georges Hall, 51 Flower Lane, Mill Hill. April 10 is the Constructor's Contest, and the 24th an Informal Evening.

One of the more comprehensively-equipped groups is **Mid-Warwickshire**, with meeting-room, library, workshop, and Club station, all at 28 Hamilton Terrace, Leamington Spa. They normally congregate every Monday, but April 3, being Easter Monday, is scrubbed, leaving April 10 for a demonstration of Amateur TV, the 17th for an "open" and 24th for a Film Show.

**Spalding** seem, to judge by the potted history in the current *Newsletter*, to have had a pretty chequered history in the last seven years or so; but also one gets the impression that now the group is on a far sounder footing than its members would believe! If you are within striking distance, you should get in touch with G3VPR (as in Secretaries Panel) who will advise you where the meeting is—they rotate around members' houses each month. However, the next date is April 21.

Doubtless many people at **Crawley** are looking forward as far as May 5, the annual dinner date; but the main meeting is on April 26, when K.W. Electronics will be discussing Receiver design. As usual, the venue is Trinity Congregational Church Hall, Ifield, Crawley.

At **Harrow** the gang are taking a chance for April—weather permitting, they are going to run "a mobile ramble to a venue to be announced," to quote the programme. Thus, your immediate point of contact is the hon. secretary, G3JVM—see Panel. Incidentally, the date for the ramble is April 7.

The Hq. of the **North Kent** group is the Congregational Church Hall, Chapel Road, Bexleyheath. April 13 is a Junk Sale and on April 27, they will welcome Geoff. Stone, G3FZL, to talk about "Developments at VHF/UHF."

Up North again now, to **Doncaster College of Technology**, where they get together in the Refectory, between 1900 and 2100 every Monday evening. Any one interested in either becoming a member or just dropping by for a visit, will be very welcome indeed, says the hon. secretary, G4AWU.

The A.G.M. for **Reigate** comes up on April 5; this will be held at the Nutley Hall, Nutley Lane in Reigate. As for the informal, well now, you have first to find the "Marquis of Granby" in Redhill, and then pay a visit on April 19.

This old scribe is reaching for his gun! The Secretary of **Thornton Cleveleys**, G3ZYE, says the venue for his Club meetings on April 5 and 19, is "the same as before." A scratch back through the March issue shows this to be the St. John Ambulance Brigade Hq., Fleetwood Road North, Thornton Cleveleys. Oh, and he omitted to give his address, too—lucky we have a file for reference! Will all hon. secs. please take note: It is most important



The Club Station of Mosley Electronics, Ltd., Norwich, signs G4ANT, which is also the call sign of the East Anglian Contest Group, operated from the Mosley works premises at Rackheath Airfield. In this picture are, from left to right, G3JOC of Mosley Electronics, G3IOR (seated) and G3MPN, operating. The gear consists of SB-102 into SB-220 and FL-200 driving a 2/813 linear, or SB-301/SB-401 into SB-200. The antennae are, of course, a variety of Mosley types, on a good site for take-off, at heights up to 100ft.

that all the data are *in your letter*, as otherwise it would take three times longer to put the piece together, to say nothing of the possibility of error.

At **Bedford**, the "Dolphin," in the Broadway, is Hq. Here, on April 6, G3RFG will be reminiscing under the title "From Arc to Spark to SSB." Digital Frequency metering is the subject chosen by G3UQR for April 13, while on the 20th G4AAA is in charge of "Vic's Van of Goodies." That leaves April 27, and on this date they are going to have a discussion on their experiences with TVI.

**Cheltenham** RSGB group is one of four Clubs in the town. They have their Spring junk sale in April—the date is the 6th but the place is not stated, so it will be necessary to contact G2FWA for details. See Panel opposite.

A late change is notified from **Chiltern**, reversing the dates of the formal lecture and the informal; this means that on April 5 they have the natter-session, so that April 26 is the date for G6CJ and his famous Aerial lecture—this is one not to be missed, the more so as Dud does it so rarely since he moved down to Dorset. This being the case, the meeting is being thrown open to visitors for the night, and any parties from other Clubs who might care to attend—but one would think it would be a courtesy to advise them in advance by way of a line to the Secretary, G3OUV, as Panel.

\* \* \*

Usually A.R.M.S. report in by sending us a copy of their *Mobile News* but this time (due to production difficulties) G3FPK decided to write himself and tot up the various advantages for a mobile-minded amateur

## SHORT CLUB NOTICES

CLUB NAME	HEADQUARTERS LOCATION	MEETING DAY MONTHLY
Cornish	SWEB Clubroom, Pool, Camborne	April 6 (AGM)
Coventry	Scout Hq., St. Nicholas Street, Radford Road	Fridays
Cray Valley	Congregational Church Hall, Eltham, London, S.E.9	April 6 (AGM), 20
Glenrothes	Old Nursery Bldgs., Leslie, Fife	1st Sunday
Guildford	Model Engineering Hq., Stoke Park	April 14 (AGM), 28
Harrogate	Scriven Women's Institute	April 17, 24 (AGM)
Hull	592 Hessle Road, Hull	Fridays
Mid-Cheshire	Winsford Verdin School, Grange Lane, Winsford	Wednesdays
Northern Heights	The Peat Pitts Inn, Ogden, Halifax	April 12 (AGM), 19, 26
Shefford	Church Hall, Ampthill Road	Thursdays (not 6th)
Slade	Church House, High Street, Erdington, Birmingham 23	April 7, 21
Solihull	Manor House, High Street Malt Shovel, High Street	April 18 April 4
South Manchester	Sale Moor Community Centre, Norris Road, Sale	Fridays
Surrey R.C.	Swan & Sugarloaf, South Croydon	April 18 (AGM)
Torbay	Bath Lane, Torquay	April 29 (AGM)
Yeovil	Youth Centre, 31 Park Lodge	Thursdays
York	British Legion, 61 Micklegate	Thursdays

N.B.—In each case, Secretary's name and address appears in Panel, p.112.

or SWL of joining the Amateur Radio Mobile Society. For example, there is a Club station, call G4AMS; there is the monthly *Mobile News*; and the information service, which exists to help members deal, for instance, with the suppression of their cars and other special problems that can confront the mobileer, including getting /M permits overseas. This mentions only a few—for the rest, why not talk to the hon. secretary—see Panel—about joining?

\* \* \*

A very sad thing has happened to the Wirral group. Their store at the C.D. Hq. was burgled, and they have lost their petrol generator and mains distribution apparatus, among other things—but worse still is the fact that the signs are the thief *could have been a member*. To mention their dates, there is a change of arrangements, to make the meetings fall on April 12 and 26, so there will not be anything doing on the 5th or 19th. This is to avoid missing a session at Easter.

Saltash next, where they welcome visitors, and anyone within travelling distance, on the first and third Fridays in every month, at Burraton Toc H. We do not have any

details on the current programme; try G4AJU, as Panel.

At Mid-Sussex they have a film of *Apollo 11* on April 6, which should draw in the crowds; and on April 20, stimulated by all the techniques shown on the film, they will take, and judge, the entries for the Construction Contest. Both these are at Marle Place, Leylands Road, Burgess Hill.

At Worcester an experiment is going on with the idea of running Monday-evening sessions, in addition to the Saturday ones, and first indications are, as one would expect, that Monday is more popular. For April the Monday meeting on the 10th is a visit to the local telephone exchange and therefore limited in numbers. For the Saturday meeting, April 15, there is a constructional contest. All the "home" dates are taken at the Crown Hotel in Broad Street, where the Commercial Room is separated from the bars and is available from 1930 so speakers can get cracking sharp at 8.0 p.m.

Nice to hear again from North Devon—they are still getting together at the QTH of G4CG, so it would be advisable to contact him first, both as a courtesy. and also to find out how to get there—it would be quite hard to find did you not have the directions.

Hereford have recently held their A.G.M. which probably means the secretary is chasing round quite frantically for lectures and such. But by the time this is coming to be read, he will be "all sewn up" on programme matters. More details, and the venue, can be obtained by reference to the address in the Panel, p.112.

For West of Scotland the Wednesday evening sessions are aimed at R.A.E. and constructional work, but on Fridays there is usually a talk or film show or whatever laid on for the attendance of, on average, 45 members. However, we can't tell you what is on in April, as the Secretary has not mentioned it that far ahead. So either you must go to a meeting if you already have a note of the venue, or get in touch with GM3VTB, as Panel.

It must be a tough job, being hon. sec. of British Rail club—the second in succession has had to give up his commitment on account of ill-health! Quite seriously, though, it *is* demanding, and we are sorry to hear it has happened again. G3ILC has now taken on the job.

Loughborough is a sizeable town and it supports a goodly crop of amateurs and SWL's, in the form of the local club. The Hq. is at Bleach Yard, Wards End, in Loughborough, where they assemble every Friday evening at 8.0 p.m. As for the programme, April 7 is a film or slide night; the 14th an SWL's Question and Answer Forum; the 21st sees them putting the Club 144 MHz gear on the air; and the 28th is the AGM.

## Conclusion

Our production schedule has been totally disrupted due to the working-out of a printers' dispute and this situation may last some time. Though we give normal forward closing dates, in fact we ask for reports as early as possible so as to help us get the *Magazine* out somewhere near on time.

As for next month, your letters should carry the story for *May* meetings, and arrive by first post April 7, addressed to "Club Secretary," SHORT WAVE MAGAZINE, BUCKINGHAM, and *not*, please not, to 55 Victoria Street just on the deadline! Till then, 73.

# NEW QTH's

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

- DA2XF**, F. J. Hayward (*G4ABA*), 20 Armd. Bde., HQ & Sig. Sqdn., B.F.P.O.41.
- DA2XG**, J. McGuire (*G3LNW*), c/o Sgts' Mess, R.A.F. Gutersloh, B.F.P.O.47.
- G3DYB**, T. L. Davies, Forge Lane, Norton-in-Hales, Market Drayton, Salop. (Tel. *Norton-in-Hales 266.*) (*re-issue.*)
- G3IGC**, A. Garford (*ex-D2GC*), 110 Foxdenton Lane, Chadderton, Lancs. (Tel. *061-652 5576.*) (*re-issue.*)
- G3WKC/A**, J. W. Birkbeck, 96 Newhaven Road, Warrington, Lancs.
- G3ZQL**, S. Murray (*GW3ZQL*), 7 Osborne Road, New Brighton, Wallasey, Cheshire.
- G4ACJ**, H. J. R. Reeve, 53 Kenwood Drive, Beckenham, Kent.
- G4AIV**, D. Scotney (*ex-G8BKD*), 9 Spencer Street, Rothwell, Kettering, Northants. (Tel. *0536 710519.*)
- G4AUQ**, F. W. Barker, 13 Marsdale, Sutton Park, Kingston-upon-Hull, Yorkshire, HU7 4AJ.
- G4AUT**, J. Wynn, 18 Moorfield Crescent, Lowton, Warrington, Lancs.
- G4AVF**, A. Fletcher (*ex-G8BWL*), 221 Coalshaw Green Road, Chadderton, Oldham, Lancs.
- G4AWM**, D. W. E. Norfolk, 190 Whitton Avenue, Greenford, Middlesex.
- G4AWS**, A. J. Foster, 16 Parkside Drive, Watford, Herts.
- G4AWU**, R. Lane, Post Office, Scrooby Road, Bircotes, Doncaster, Yorkshire.
- GM4AXE**, J. R. Trowsdale, 6 Abbotsford Place, Ferryhill, Aberdeen, AB1 2SG.
- G4AXP**, G. K. Clode, 25 Penfold Drive, Countesthorpe, Leics.
- G4AXQ**, E. J. Boyle, 48 Biggin Hill, Norwood, London, SE19, 3HY.
- G4AXS**, P. Wilberforce, L.D.S., R.C.S.(Eng.), F.L.S., L.I.Biol., Little Yaffles, Womenswold, Canterbury, Kent. (Tel. *Barham 362.*)
- G4AXX**, M. Marsden, 343 Wanstead Park Road, Ilford, Essex. (Tel. *01-554 9457.*)
- G4AYH**, G. Monks (*ex-G8ENL*), 83 Scotland Way, Horsforth, Leeds, Yorkshire.
- G4AYU**, N. Kenyon (*ex-G8EEH*) 39 Mayfield Avenue, Clitheroe, Lancs.
- G8FQB**, Amateur Radio Club (G1LLQ), The Queen's University of Belfast, 37 Fitzwilliam Street, Belfast, BT9 6AW.
- G8FQM**, J. Groom, 2 Oakwood Crescent, Winchmore Hill, London, N.21. (Tel. *01-360 1760.*)
- G8FQP**, B. P. Keeble, 6 Heathway, Woodford Green, Essex.
- G8FRM**, E. A. Johnson, 34 Morthen Road, Wickersley, Rotherham, Yorkshire. (Tel. *Wickersley 2624.*)
- G8FSL**, A. D. S. Benham, 15 South Lodge Drive, Southgate, London, N14 4XD. (Tel. *01-360 5221.*)
- G8FSO**, D. J. Lockwood, 7 Northfield Road, Charlston Common, Wakefield, Yorkshire, WF4 1AG. (Tel. *Crofton 862458.*)
- G8FSO/A**, D. J. Lockwood, Amateur Radio Society, Normanton Grammar School, Church Lane, Normanton, Yorkshire. (Tel. *Normanton 2322.*)
- G8FVI**, C. C. Reeves, 7 Baronsmede Court, Baronsmede, Ealing, London, W5 4LN.
- G8FVU**, G. E. J. Bloomfield, 11 Boyden Close, Wickhambrook, Bury St. Edmunds, Suffolk. (Tel. *Wickhambrook 557.*)
- G8FVZ**, J. Haig, 30 Bedford Street, Hitchin, Herts. (Tel. *Hitchin 53097.*)
- G8FWU**, T. R. Yates, 26 Birchill Avenue, Wombourne, Staffs., WV5 0DR.
- GM8FWY**, P. Russell, 69 Silverbank Gardens, Banchory, Kincardineshire.

## CHANGE OF ADDRESS

- G3ASJ**, T. G. Kelsey, The Chalet, 33 Chandos Road, Newbury, Berks. (Tel. *Newbury 4886.*)
- G3AVN**, P. Parker, 27 Colbourne Road, Hove, Sussex, BN3 1TA.
- G3FIU**, W. B. Gray (*ex-G13FIU*), 20 Vesey Road, Sutton Coldfield, Warks.

**GM3FZG**, A. Treanor (*ex-G3FZG*), 19 Meadows Avenue, Campbeltown, Argyll.

**G3JBA**, G. H. Maddox, 13 Cecil Aldin Drive, Tilehurst, Reading, Berks., RG3 6YP.

**G3LNW**, J. McGuire (*DA2XG*), c/o Sgts' Mess, R.A.F. Gutersloh, B.F.P.O.47.

**GW3MSY**, A. C. Davies, 10 Camden Crescent, Brecon. (Tel. *Brecon 3798.*)

**G3NUG**, E. N. Cheadle, Black Warren, 27 Shenley Hill, Radlett, Herts. (Tel. *Radlett 4435.*)

**G3OQC**, J. W. Woods (*ex-VS1MA/V56FA/9M4MA/DL5ZH*), c/o Officers' Mess, R.A.F. Benson, Oxfordshire.

**G3SDW**, K. J. Underwood, 29 Hare Street Springs, Harlow, Essex.

**G3TNY**, K. J. Spooner, Wilrose, Main Road, Hevingham, Norwich, Norfolk, NOR.04-Y.

**G3UKV**, M. I. Vincent, 10 Woodhouse Road, Broseley, Salop.

**G3UQX**, P. D. Johnson, 42 Nicholas Drive, Ratby, Leicester.

**G3VMB**, A. W. Cooper, 409 London Road, Appleton, Warrington, Lancs.

**G3VOY**, A. R. Fortnum, Decca Transmitting Station, 5531 Stadtkyll, West Germany.

**G3XDD**, S. C. Crampton (*ex-G13XDD*), 1 Church Road, Roffey, Horsham, Sussex, RH12 1RF.

**G3XLS**, T. J. Williams, 3 Idenwood Close, Rainham, Kent.

**G3ZOJ**, B. D. Corper, 60 John Wilson Street, Woolwich, London, S.E.18.

**G4ABA**, F. J. Hayward (*DA2XF*), 20 Armd. Bde., HQ and Sig. Sqdn., B.F.P.O.41.

**G4AJM**, B. Smith, 20 MunHaven Close, Mundesley, Norwich, Norfolk, NOR.33-Y.

**G6JK**, H. J. Sherry, 72 D'Urville Drive, Swanage, Dorset.

**G8EVU**, K. D. Howe, 64 Barnstaple Road, Thorpe Bay, Essex.

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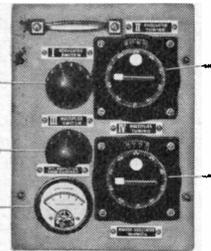
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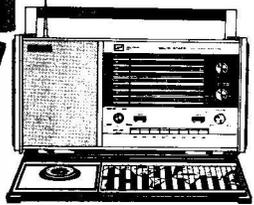
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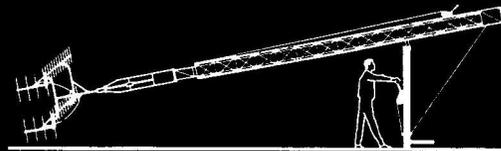
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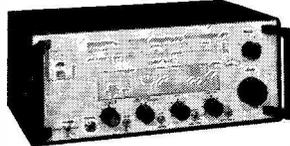
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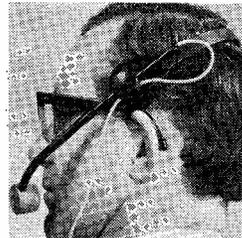
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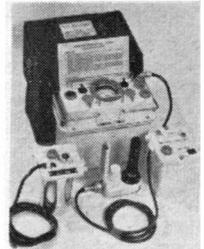
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**GIEGER COUNTERS** (For mains or portable battery use). Latest Home Office release and probably the last, of this well known Contamination Meter No. 1, this very useful Instrument is used for the measurement of Radio-Activity. Indicated on an Internal Meter scaled 0.1 to 10 milli Rontgens/Hour, a socket is also provided for additional sound Monitoring on Headphones. This instrument is housed in a strong, light alloy case, placed in a carrying haversack with shoulder strap. Containing cable and hand held probe, Instruction card, plus the latest plug-in Vibrator Power Unit. Which uses current small transistor radio batteries (4 Mallory long life RM12 or 4 Ever Ready H.P.7 or equivalent makes). For Mobile use anywhere. (Cost Govt. approx. £70 each). Supplied brand new in carton only **£5.50**, carriage 50p. An additional plug-in Power Unit for Laboratory use, operating from 100-120 volts or 200-250 volts A.V. mains is available. Supplied brand new in carton at only **£2.50**, post 50p. Headphones (not necessary) if required **£1.50**. A few Gieger Counters as above new but not boxed in cardboard carton available at only **£4.50** Carr. 50p.

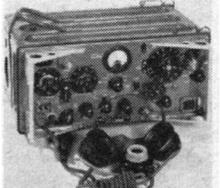


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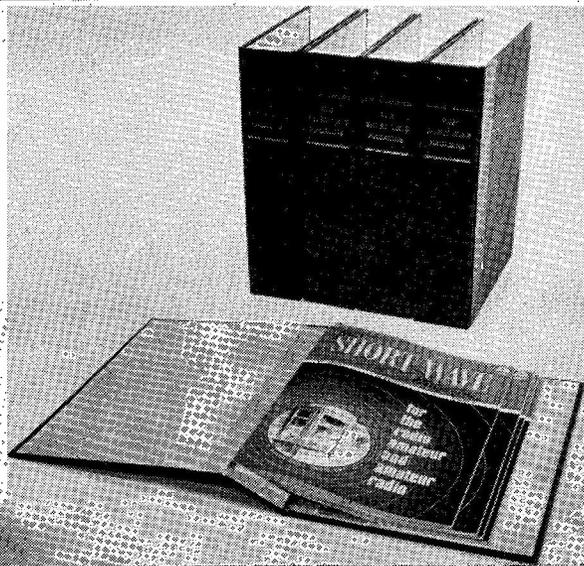
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