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The SHORT WAVE Magazine

VOL. XXXVIII NOVEMBER 1980 NUMBER 9

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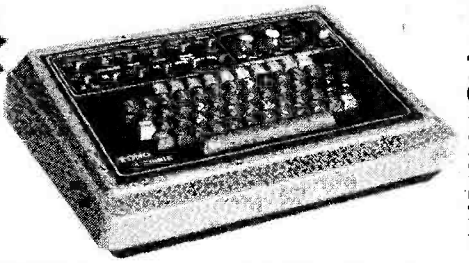

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CONTENTS

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Advertising: **Charles Forsyth**

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Articles submitted for Editorial consideration must be typed double-spaced with wide margins on one side only of quarto or foolscap sheets. Photographs should be lightly identified in pencil on the back with details on a separate sheet. All drawings and diagrams should also be shown separately, and tables of values prepared in accordance with our normal setting convention — see any issue. Payment is made for all material used, and it is a condition of acceptance that full copyright passes to the Short Wave Magazine, Ltd., on publication.

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COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

The Bands

PERHAPS very brief mention may be made here of your scribe's current efforts to get on the bands, homebrew-style. The QRP transmitter is now going like the proverbial dream, aerial/transmit/receive switching likewise; and the first converter design completed, tried, but found wanting — no lack of sensitivity but far too much response to unwanted big signals, so that it runs more or less all the time with 20 dB of attenuation connected! This was not entirely unexpected, in view of the quite simple arrangement used to bring the Top Band signals on to 7 MHz; but if it won't do, it won't do, and redesign is required in order to bring up the intercept point by at least 20 dB, and preferably more. Of course, having spent so much time on the transmitter it occurred to the writer that the Top Band signal could have been derived from the 3.5 MHz output by a simple divide-by-two circuit!

Next we turn to G3PKS (Wells) who reckons activity on the band is on the upswing, with some people at least finding DX. Jack confined himself to working sideband nets, and in particular the early-evening Somerset gathering on Mondays which seems to be quite a thriving affair.

Eighty

G3PKS found the evenings steadily getting better with good signals and less QRM than on Forty. On the two or three mornings when Jack had a sniff round before breakfast, little was heard in the way of DX, but plenty in the way of static; in fact it was a bit grim.

We had to go right to the last page of the G3CED/G3VFA log to find any QSOs on Eighty — George had clearly been too interested in real DX in the HF bands, but on two days he gave it a going-over, raking in DL0XX/DJ5PE, G4ITP, G4DPL, ON6FZ, G3IFB, YO4WJ/MM; and G4HQO/ex-G3REV who was running a Hallicrafters HT-40 transmitter and an HRO receiver, which brought memories flooding back to G3CED — he had one running continuously for seven days and nights during the Dunkirk evacuation in 1940. Here they are still doing their stuff forty years (or more, as they *first* appeared around 1936) further down the log. Indeed so, and your scribe wouldn't raise any objections to a good specimen in the shack right now!

G2NJ (Peterborough) mentions YO4AVR/MM, and G4FWC/P who said "we are members of Tamworth club here for the weekend" which made an odd coincidence as he worked G4HOM in Tamworth running one watt on the previous evening. Perhaps the best of the QRP bunch was PA0GG, at Heenstebe, with a half-watt putting in a very good signal (admittedly when conditions were good).

G3ZPF (Dudley) says he is "poised for the winter season" but so far the posture seems to have had unsatisfactory results — nothing of DX heard or worked save for one poor inoffensive UA9. As for SSB DX — "you must be kiddin' " (a phrase which defines David's age pretty accurately!).

Forty

For G3PKS the local and EU signals, at up to 20 over S9 during the day, created what he describes as bedlam; but on the other hand found a fair amount of DX on the band in the pre-breakfast period, with K4KP and K5MA worked just to keep the hand in, although EA and VE were all around.

Albert, G4CQK (Walton-on-Thames) has lashed out on a Ten-Tec Argonaut 515 which can put five watts p.e.p. input's worth of RF into his end-fed inverted-V, 120 feet long by 26 feet high, fed at the home end through an L-match ATU. The combination was used on 7-28 MHz as will be shown; on 7 MHz, a pleasant QSO was with EI0CF, a fellow G-QRP Club member, and QRP both ways.

G3CED/G3VFA's log shows various changes from 50 watts to 2 watts and back again; on 7 MHz YU3DEC, DJ3VK, G2IK, G3ORH, DL8LK, G3HHT, G3WSJ, PA0UB, G3IGU, all on 50 watts and the Joystick set-up, were mingled with the favourite two-watt level signals sent to GJ5DQE (QRQ log-filling contest in GJ5, says the log note!), G3BPX, LA0CX, OR5AG/QRP, F6ZSF, G4JFI, and GW5TW.

Nice to hear again from G3ZGC/MM on the *MV Sevonia;* the /MM permission this time took just five days, which is considerably better than the three weeks which is the time the Home Office people say the processing will take. Like almost everyone else, Richard took most of his operating on the HF bands, but on Forty there was an interesting one with ZL2BEM worked while G3ZGC/MM was in the Eastern Atlantic.

G4ITL (Harlow) came to the conclusion — we suspect he was "assisted" to it! — that his three dipoles with common feederline were a bit of an eyesore and possible wind-traps for the autumn gales. So — down it all came in favour of a half-sized G5RV, which gave an extra band to play wireless on. Forty was given a whirl, mainly at lunch time; so far it is difficult to come to any firm conclusions about it, but if a SSB contact can be found and worked on 7 MHz at lunchtime with about three minutes for the complete cycle, then it is quite clearly getting out OK!

Here and There

Turning now to the general goings-on, we were rather surprised to hear from G2LV up in Aberdeen instead of in Devon, and in Aberdeen Royal bandage-works at that. Hopes are high that Aberdeen will be able to solve a problem that Exeter and Guy's had both declined — so much for these Southrons! Anyway, Dick was quite happy about the chance encounter that took him away from salmon-fishing in just 24 hours flat! No doubt about it, these

fibre-optics are quite handy tools for seeing into odd corners — hope to hear you soon Dick, at first we guess on CW, but then hopefully back on Phone. Dick has a receiver with him, and he is quite surprised at the heavier traffic he is hearing as compared with home — commercial CW and duplex Phone, off-shore stuff and fishing, much of the noise Norwegian, and quite a dog's dinner at times.

G4BUE (Upper Beeding) writes with some details of DX worked, and adds some details nice and early of the G-QRP Club Winter Sports from December 26-31 inclusive, to promote QRP-to-QRP activity. On each day the times and frequencies are: 0900 on 14060 KHz, 1000-1100 on 21060 and/or 28060 KHz, 1100-1200 on 7030 KHz, 1200-1300 on 3560 KHz. 1300-1400 sees you back on Forty, 1400-1500 Eighty, 1500-1730 21/28 MHz, 1730-2000 on Twenty, 2000-2100 Forty, 2100-2200 Eighty; rounding off, between 2200 and chucking-out time, on Twenty. As for the weekly Sunday activity periods 1100-1230, and 1400-1530, on all the usual QRP frequencies as noted above, and with all times given in GMT. Next month we will give the 1981 Special Activity Week-Ends, due February 28-March 1, and September 12/13.

We must turn now to the CQ WW CW and Phone results, for '79. Looking first at the CW leg, and to the QRPp World Top Ten, where we see G4BUE's call right at the top — number 1 QRP score, no less. We need to remember it, because as we go through the all-band, and the multi-multi listings, and down the one-band lists we don't see another G until we get down to 7 MHz, where GW3NYY made fifth, and Top Band where G3SZA was top of the pack with all but double the score of the second placeman, K1PBW. We noted, too, W1BB/1 placed third in the W listing, where of course the lead score Stateside was K1PBW. To all these — our congratulations. On the Phone contest, we have G3FTQ placed seventh in the world QRPp listings, G3FXB second in the world single-op. all-band category. Among the single band wallahs, 28 MHz saw G3MXJ at fourth place in a *very* close top five — a couple more QSOs and a multiplier could have up-ended that list well and truly — with no other representation until we get to Top Band, where GM3ZSP was third and G3SZA placed fifth. Incidentally under the rules about holding trophies more than once in three years G3FXB takes the World-All Band Trophy.

Still with results, we have the 1979 TOPS CW contest results. Out of some 180 entries there were twelve G stations, of whom top of the bunch was GB2TAC at *HMS Belfast* in what would have been sixth place; however since he was scored but not entered, we must note GW3KOR 7th, and G3ABG at 16th. At the top was HA5NP, SM3VE came second, and DM2BTD third, G representation was completely absent in the multi-operator section.

For 1980, the TOPS CW contest weekend will be 1800z December 6 to 1800z on December 7. Call CQ QMF, and it all happens on 3.5-3.6 MHz, with the low end of the band the place to look for the DX. Contacts with own country one point each, other countries in same continent two points, contacts with other continents five points. A QSO with the HQ stations GW8WJ or GW6AQ rates 25 points, as does a QSO with GB3TAC if the latter can be on again this year. Total score is QSO points total times the sum of the prefixes worked, and logs to go to Peter Lumb, G3IRM, 14 Linton Gardens, Bury St. Edmunds, Suffolk IP33 2DZ not later than January 31, 1981. We assume that means to *arrive*. G3IRM is of course a QSL Bureau man, and we thank him for his kindness in popping a few QSLs in his letter.

On the contest front we have a couple of good ones on the weekend of November 15-16-17. MCC is of course the one we are most interested in — details were on p. 494 of the October issue — but we have an overlap of two hours with the OE Top Band CW contest, which is for a bit of extra flavour! For the record, the OE contest scoring is one point for each QSO, plus one point for each different country or numeral prefix (two for OE prefixes), with final score QSO points times multiplier. Note the OEs are authorised for 1823-1838, 1854-1873 and 1879-1900 KHz, and their contest runs from 1900z November 15, till 0600z the next morning.

ARRL's Sweepstakes CW is November 1-3, and Phone over MCC weekend. Remember this is an American contest, and that they have been recommended to stick to certain parts of the bands to leave room for the rest of us, and we can reciprocate by keeping as far as possible out of their hair!

Looking at W1WY's Calendar just to check we've forgotten nothing of importance, the eye lights immediately on November 29-30 for the CQ WW DX CW contest, and over the weekend December 6-8 the ARRL 160 CW contest. Fans of these two will know the game anyway, so we need say no more.

From contests we gravitate naturally to DX-peditions, since so many are set up to improve the chance of a winning contest score.

A DX-pedition with a difference it might be called; five amateurs were among the group invited to Peking between September 28 and October 8, including our old friend W6AM. The itinerary is Peking-Nanking-Shanghai. Sad to say W2IYX, who was one of the group invited, entered Huntingdon Hospital for heart surgery on September 6 — we can but wish him well and commiserate with him on missing what should be an interesting visit indeed.

Still with BY we hear that VK2NDK, who was operating /LH at the time of writing and hopes to be at T3A during December, has been enquiring about the possibilities of BY operation, and has received what he calls "encouraging" replies.

If you're looking for a QSO with the N. Cooks Is. it should be noted that by the time this comes to print a ZL station will be there; but he is a raw novice to our bands, and so he will be slow at first. Don't sweat too much though, as he is stated to be there for some 6-7 months. His actual spot will, it is understood, be Penrhyn Atoll.

During the period at which this issue reaches you, there is a possibility of Sable Island operation, albeit there will not be any special prefix — so keep ears flapping!

Finally, the matter of P29JS and Norfolk Island. It sounds as though things are falling into place, and P29JS has been doing his homework on the problems; the target is for a crew to be there in January 1981 and at this moment it all looks good.

Time and space run out apace on us, so we must return to the reports.

Twenty

Undoubtedly where most of the world's transcontinental amateur radio traffic takes place, regardless of the sunspot cycle; at the time of writing one could rise at almost any time and hear

life on the band (and noise, too!). G4BUE stuck to his QRP, where incidentally he is at 2O7C worked, and seven short of the 200 confirmed, those last seven QSLs don't seem to want to turn up! On Twenty he made just one QSO, a CW one with PY7PO/0.

G3PKS says he rarely visited the band, but found it in excellent shape for all that; he worked 4Z4TL, K4IXD and a brace of Europeans for aerial testing purposes.

At G3NOF (Yeovil) the West Coast Ws have been very strong at around 0600z; as they have faded down so the long-path VK/ZL have surfaced, and around 0700 the Pacific stations have shown. The good conditions on the higher bands have kept Don from the band, but he did work FK8DD, FR0FXP, FR0EUT/G, H44SH, HH2W, J3AH, HK0BKX, HK0FBF, IM0MIE, KL7Y, P29JS, P29PNG, T2XYL, T3AC, UA1PAL (Franz Josef Land), VK2AGT/LH, VK7KH/M, VK9NL, VK0KH, YJ8PD, ZK1AK, ZLs, 5W1AU, 8R1RBF and 9N1AG.

'CDXN' deadlines for the next three months—

December issue — November 6th
January issue — December 4th
February issue — January 8th

Please be sure to note these dates.

G4CQK and his Argonaut 515 worked Phone with CN8CK, IM0MIE, OZ7AMQ, with CW accounting for a two-way QRP Club QSO with SP5AGU.

Turning to the log of G3CED/G3VFA we see, at 50 watts into the development Joystick system, UB5MJL, DJ4LO/P who has a mobile aerial on the balcony driven by an FT-101, UA6PAP, a long ragchew with YU2REO, SM0LFK/0 (a YL); and on his favourite two watts George keyed to SM6HLN for a long ragchew after a CQ call, UA1CRD, YO2IR, OK2PGA, I4ZXH, OH5KP, HA7LM twice. Here is yet another log indicating how the DX is more to be found above 14 MHz these days.

Next we have G3FPK (Purley) who reckons that it has been a good month for VHF or HF addicts — doubtless all the VHF end is covered in his column elsewhere in this issue. Twenty with the FT-707 and half a TA33 driven-element plus some radials worked quite effectively. Even though Guinea-Bissau is one of the few DXCC countries Norman needs, he didn't need it badly enough to apply for entry to the list for J5KJ! Morukulien was worked using the SJ9WL call, CZ6ACB in VE6-land, PY7PO/0 from whom a QSL is hoped for (the previous Fernando do Noronha QSOs haven't resulted in a card), 4U1UN which Norman thinks is country number 305, FO8GM, and a band new one in VP2VGS; the XJ5YA heard on CW turned out to be a VE5.

G3ZGC/MM found conditions on Twenty a bit odd from the Med., with weak signals to UK unless there was some evening or night time around; however once out West, the skeds with G4GVF at 1715z seemed to pick up. Surprisingly a very weak signal from G3ZKL/M in Manchester was plenty good enough for a thirty minute natter with no QRM. An interesting one was with G3ZHI who has swallowed the anchor but was once /MM on the *Sevonia* team — the present indeed linking up with the past! All these were SSB, but CW yielded ZL2VS, ZL1BMH, ZL1AXM, ZL1BRB, ZL1OG, and VK3AVA.

Now 21 MHz

QRP on this band with SSB yielded G4BUE contacts with YJ8NPS, VS5DD, YC1GJ, KP4KK/DU2, YB2SV/9 and 9G1JX; CW accounted for 9M2KG, 4X6AG, FH0DX. Chris has 160 countries worked on QRP now on this band.

G3PKS remarks that generally speaking he *heard* DX a-plenty, with one twenty-minute session producing PY, Ws, VE, JAs, and VU, not to mention Europeans and a UL7. So — one day Jack called CQ on a dead band, to see if anything stirred, for nearly a quarter-hour. The result of his efforts was fine sharsh, plus a few weak signals which were believed to include JA; later on VE4SK was 599 both ways and W8NOT also was hooked.

G3NOF says in general conditions on 21 MHz were rather the same as 28, with the 0700 opening to VK/ZL/KL7 long path, turning to short path around 0900. JAs were about from 0700 till 1700, and around 1700 the short path has been good to HS, 9M, etc. Americans from 1000 right through till the early hours, QSOs on SSB were made with A4XGR, A4XHZ, DU1JB, FK8DD, FK8DH, FO8FO, FO8GX, FL0FLO/T, FR7BP/T, EW8SC, G4COA/W0 (N. Dakota), HS1AMI, HS1AMM, HS4AMI, J3AH, JAs, KC6IN, KH6CF, KL7D, KL7Y, KX6BU, OH0AM, P29NRL, S83T, TA1KD, UM8MAQ, VE7BRI, VK8DH, VK8NE, VK9NL, VK9NW, VK9ZG, VK0SJ, VP5KAQ, VP5TCI, VP8PP, VS5RP, VS6CT, W6LKT/7 (Nevada), W7AO (Arizona), W7RDO (Wyoming), WA4EHS/KH2, WA1Y1G/3B8, WL7ACN, XJ5AE/VE8, XP1AB, ZK2TW, ZLs, ZS3LK, 4S7EA, 6Y5DA, 9M2CR, 9M2GZ — a fair old collection!

G4CQK tangled with F0AHY/FC, HV1CN, VE1AJJ, 9G1JX, plus four W1s and three W2s; all SSB and all with his QRP.

G3CED mentions CW with OX3AX, UA3VAD, JR3RNI, WB9JBF, W9NFW, 12PYA, JA7HRF, UA4WPX, AF9X/MM1 who had a regular wolf-pack on him, K1HBX when that station was the only W audible on the band, JA0AXV, UA3WW, LA5XX, and YO2BON.

G2NJ reports on another of those /M expeditions with G5NX, where the latter operates 144 MHz Phone and Nick sits in the back with 21 MHz CW. This time the first three, HA6KVD, YU3CNO and YU1DGH all dished out 599 reports. Lunch was at Uppingham, with the G2NJ and G5NX QSLs left in the back window; when they got to the car after lunch they found a note under the wiper arm from G3UOF (ex-EL0N/MM) who had noticed the cards while happening to be passing.

At G3FPK not a lot of time was spent on 21 MHz, but he did find LZ13C, to celebrate 1300 years of the country's existence.

The most unusual QSO for G3ZGC/MM was with the one who turned out to be ground-wave at all of twelve miles away! VS5DD was worked with a crystal about six times too big for the holder, but it was good enough despite that, since the rig is pre-tuned and only about 5 watts of RF are available.

Ten

Space crowds in on us, and time is inexorably running out too, so we must make haste. G3PKS found this an enjoyable band save for his failure to raise KG6RT. However he did collect PY2GUL, W3GM, JI5TEQ, K4UWH, W4QLL, WB1HIH, K2QFL, WA9RDF, VE3BDO, (who gave Jack a RST599 report to his surprise), WB6GGL, W6THN, VE3KPH,

W5UW, KV4AD, WA3CAU, K3IWZ and W0IR; while, as he was writing at 0700, JAs filtering through.

G4HZW (Knutsford) sticks to his last, Ten with a FT-75 and a two-element Quad at 24 feet, a combination which seems to work very well; a pity Tony can't be on in the mornings which reduces the VK/ZL count, but from his list the underlined ones are noted here: JI1DLZ, C6ADV, FM7AV, LU9DGW, CX4BW, FP0FJW, 9J2FC, DF3NZ/ST2, W6EUF, CE9AF (King George Island), W7LR (Montana), WB7RFA (Oregon), JH7AQH, N6BBH, XE1LCM, TJ1CK, KH6IBA, KA0AKU/M in Minnesota with two watts, G4COA/P/W0 (N. Dakota); plus a few mornings yielding UI8AEE, RA0SFI, VS6CT, OX3AI, OX3CO, JH6WNO, JI1ILS, WA6PJJ and W9VJX who was running two watts to a three-element beam, not forgetting the small fry like "ordinary" Ws, VEs and so forth.

G3NOF likes his mornings best we suspect; he reports SSB contacts with FP0FJP, FP0FXP, FR0EUT/G, FR0FLO, FR0RX/J, K5LBU/ST0, K7ICN (Arizona), KL7JHD, KL7Y, JAs, H44PD, HL9TW, P29DP, P29GC, VKs, W7JVG, W7PEY, WOZV, YJ8NPS, ZL4BO, 3B0LH, 8Q7BB, 9G1JX, 9K2EW and 9M2GZ.

Now we turn to G4CQK and his Argonaut, which on 28 MHz connected with CT2CQ, EA8LS, FPOFXP, HM1QO, JA1JBY, JF1VUR, OX3CO, PS8SN, PT7WA, SV0AW, U6JOK, UK7PAL, UH8HAI, VE2FOU, WB4KQP, W4LVM, K0DOJ and WB0UXB.

The thought of Ten doesn't seem to have crossed the G3CED mind until the end of the period, when he put his two watts over to KA0BHK, W2AFM and UB5IMJ.

Ten, says G3FPK quite firmly, has been open daily to North America; and H44, VK and so forth, workable on the indoor satellite crossed dipoles. Norman fell over the SV0AW on Crete who was asking for 4 IRCs or a 'green stamp' for a direct QSL card — G3FPK is proposing to obtain a Green Shield Stamp for the purpose! 9V1UH was a scratchy affair, mixed SSB and CW; FH0DZ/MM on CW, FH0RX on SSB, 3Z50PZK was a Polish CW commemorative effort, DF3NZ/ST2 for a band new one on SSB, and another band new one on Ten was FRODZ/J.

An unusual QSO was the CW one with AI0M/M in Nebraska, driving a 65-foot forty-ton lorry and two trailers, the key strapped to his knee, and a TS12OS to a Hustler antenna on the Wing mirror. Finally just before posting, VU2AWL rounded the month out.

Finally we have G3ZGC/MM, who noted a slight opening to UK just as they entered the Med. and also as they came out again, Ws then until the Azores, when they became sporadic; CE5CFR, YB0ADT, OE8MI/M, 5N0ATW and 5N3ALE, VP8SB, and on September 3 JT1AN was 58 at 0622z, and a very startled VK2VUQ/M was a follow-up a moment later. From September 8 the band really opened up and every time Richard put out a call he raised a wolf-pack.

Finale

We must leave G3ZGC/MM at this point, as space closes in; the deadlines are in the 'box', and we hope to see you all at Leicester. Meantime, let's have all your news, addressed as usual to "CDXN", SHORT WAVE MAGAZINE, 34 HIGH STREET, WELWYN, HERTS. AL6 9EQ.

TESTING TRANSISTORS WITH A MULTIMETER

A SIMPLE METHOD FOR THE RADIO AMATEUR

P. C. COLE, G3JFS, ex-VK6AI, 5Z4PQ

TRANSISTORS operated within their published ratings are generally so reliable that the cost of a proper tester is not really justified for the average amateur workshop unless large numbers of surplus transistors are used for experimenting. However, failures do occur and where no tester is available reliance is usually placed on forward and reverse resistance measurements of the transistor junctions to identify a faulty device, as shown in Fig. 1. These tests are very useful but it is possible also to make a much more informative test of a transistor while still using only the resistance ranges of a simple multimeter.

The Multimeter

On the resistance ranges most multimeters use a circuit similar to that of Fig. 2, in which the internal battery causes the

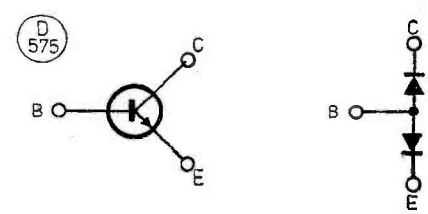

Fig. 1a NPN Transistor

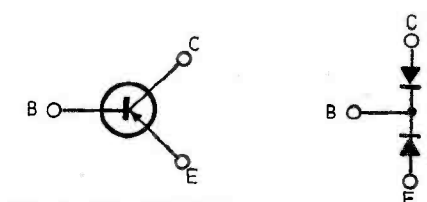

Fig. 1b PNP Transistor

For test purposes a transistor can be considered as two diodes or PN junctions placed back to back. As an aid to fault-finding a multimeter is often used to make forward and reverse resistance measurements of these junctions.

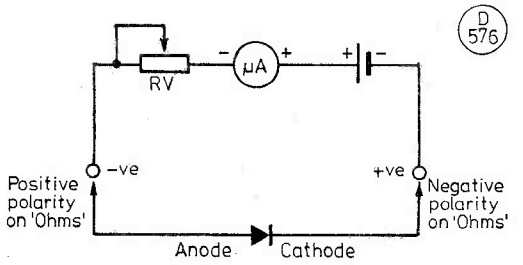

Fig. 2

The basic ohm-meter circuit as used in most multimeters. RV is used to set the meter pointer to full scale with the terminals shorted together; the mid-scale calibration point will then equal RV ohms. A diode connected as shown will be forward biased by the battery and will therefore indicate a low resistance.

polarity of the meter leads to be opposite to that of the terminal markings. There are very few exceptions to this "polarity reversal" on the resistance ranges of commonly used meters but as the lead polarity is important for the test to be described, this should be determined if it is not known. The simplest way is to connect the meter to a diode to read the forward resistance; then the lead going to the cathode of the diode will be the one having a negative potential.

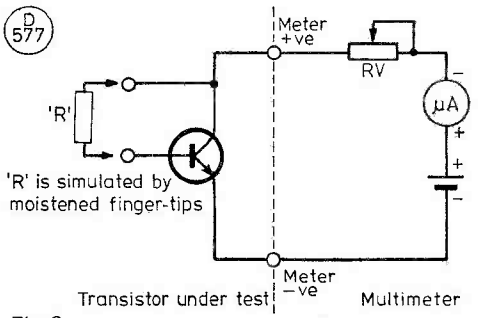

Fig. 3

The equivalent circuit of the test set-up for an NPN transistor. To test a PNP one the meter leads are reversed.

Test Procedure

The description below is for the testing of an NPN transistor as shown in Fig. 3. To test a PNP one follows the same procedure but with the meter leads reversed.

Consider then an NPN transistor. With the multimeter switched to a high (x100) ohms range connect the positive lead (this should be the one with negative polarity) to the emitter and the negative lead to the collector of the transistor, taking care that the base is open circuit. The meter reading is an indication of leakage current and will range from several megohms, *i.e.* very low leakage, for a silicon device down to tens of kilohms for some of the older germanium ones. A very low reading indicates a fault.

Now arrange the base and collector leads so that they are close together but not touching, and grip them firmly between a slightly moistened thumb and forefinger. The fingers act as a resistance allowing current flow from the collector supply into the base circuit. If the transistor is a good one the collector current will then increase and this will be registered as a large decrease in the resistance reading. Of course, the actual decrease will depend on finger-tip resistance and tightness of grip, as well as transistor gain, but for a simple "go/no-go" test this is relatively unimportant as, with practice, it will be found easy to test and evaluate a transistor in seconds.

Transistor Type	Leakage "Resistance"	Test "Resistance"
2SO18	>2M	50K
2N697	>2M	30K
2N706A	>2M	10K
2N3055	>2M	20K
2N4427	400K	20K
BC107	>2M	4K
OC70	50K	7K

Table 1. Leakage and test measurements for a variety of different transistors made with an Avo Multiminor on x100 ohms range. Although the actual resistance reading will vary for different types of multimeter, a good transistor will produce a "test" reading that is significantly lower than the leakage resistance.

	x1 ohms range.	x100 ohms range.
Leakage Resistance	20K	50K
Test Resistance	1K	7K

Table 2. Comparison of "resistance" readings for an OC70 transistor as measured on the x1 ohms and the x100 ohms ranges of an Avo Multiminor.

Test Results

The tables give "leakage" and "test" measurements for several transistors as made with an Avo Multiminor. The actual resistance reading is really quite meaningless as we are dealing with non-linear elements and the "ohms" reading for a given transistor will vary from meter to meter as well as for different settings of the range switch. In reality we are making a rather crude measurement of gain at a low operating current but in spite of the shortcomings the method works extremely well. There may sometimes be difficulty in assessing a transistor which has high leakage current but this can usually be overcome by switching to a lower resistance range on the meter.

In Conclusion

From a servicing viewpoint this method is as reliable as any tester and has been invaluable to the author whilst working as an engineer in remote parts of the world where even a battered Avo could be considered as a luxury. On the rare occasion that a proper tester has been used it has been to select or match a transistor rather than to test it.

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

THE discussions last time round about home-brew seem to have stirred up opinion in both directions. Perhaps we should clear up our meaning and design philosophy. First off, let it be quite clear that as far as a commercial receiver goes, one gets just what one pays for, bearing in mind that the design team wants lots of sales in their particular segment of the market; this means that the commercial receiver is almost always a compromise to please some people most of the time. On the other hand the home-brew merchant can sit down and write a specification for his "dream" receiver which may be unacceptable to every other receiver user in the world — what does he care if the receiver is for him alone? Also modern receivers tend to look complicated as compared with those of yesteryear, largely because today's transistor at 15p is compared with a valve which in 1939 cost, say fifteen shillings. Clearly then in those older days, elegant, simple design was all, whereas today the cost of the components is small enough for the designer to use more of them and still be able to produce a receiver within the price bracket. A third consideration is that in general one normally buys components of better standard than were available years ago, the old ones having disappeared from the market for just this reason. Finally, most ICs look awfully complex circuit-wise, but the cost of their mass-production is not so much different from that of a single transistor — the mask and the package are the meat of the cost.

Now, of course we have the other major factor to take into account, and that is the disappearance of AM from our bands. Back in 1927, G. G. Blake was commenting that the homodyne (= direct conversion) approach was not feasible (a) because the oscillator couldn't be made stable enough and (b) because it wouldn't cope with AM. Both objections are now gone. A single-band homodyne can be made quite effective, and converters will put it on other bands — converters like we always used at VHF until the advent of FM. These are simple items to make, and will compete well with a reasonably-priced receiver quite handsomely if properly built and driven. Indeed the dynamic range of the direct-conversion job may be better than the commercial superhet.

On the other hand, neither type of receiver can pick up signals below the inherent sensitivity level of around 0.1 microvolt, so one has to accept that a poor aerial or a poor site poses a major limitation. Equally, even with relatively poor aerials, one may find the dynamic range of the receiver is exceeded by a strong out of band or unwanted signal, in which case the only solution is to *attenuate* the aerial input until the noise-level drops suddenly and signals pop up out of the mush. Of course this solution implies that one has lost the weak ones anyway, but better half a loaf than none. The weakness of the cheaper superhet receiver, however, lies mainly in its lack of selectivity in the IF strip; the drift characteristic is annoying but no more. Thus, while there may be DX about as indicated by the stuff you can hear being worked, it is inaudible under the unwanted junk coming down an IF lacking a suitable filter. The answer is to build in a suitable filter, or extract the IF signal and feed it into an outboard selective arrangement, and then either give the outboard unit a detector and audio amp., or take the cleaned-up signal back into the receiver at the same level as it was taken out (to avoid instability) and let the rest of the receiver operate as normal. This last approach is tricky but can be done, and of course a valve receiver will permit the extraction and re-insertion to be done by the simple removal of a valve and its replacement with a plug fitting the valve base.

Anyone can build an ATU, and anyone can build a tolerable attenuator; getting these to work reasonably well gives heart to tackle something a bit more complex. Eventually one comes to be able to build anything one wishes — save for the cosmetics of case and finish, where the problem is not electronic but purely craftsmanship.

To change tack a little, we have a letter which says our HPX ladder is too hard for a newcomer; all we can say to that is that careful listening with a simple receiver and aerial, used intelligently, should see the 200 prefixes up within 48 hours total listening time — and over the years hundreds of SWLs have proved it for themselves!

The New Ones

A welcome to several this month. First *J. Inglis (Alloa)* who is hardly a newcomer insofar as we had some correspondence about 14 years ago, which lapsed for one reason or another. Jock is now retired and has an HA-350 receiver, which inhales the stuff by way of a 132-foot wire, dipoles on 14/21/28 MHz, and a VHF converter which can either be fed from a Slim Jim or a five-element array. As a long-time SWL, Jock has had a lot of fun and made many friends in 34 years at the game.

Two out three receivers are noisy on Top Band and Eighty, muses *W. R. Smith (Barnstaple)*, so what's wrong with design? He adds that the best he recalls was a marine-band Sailor 46TD and next to that his own home-brew receiver; aerial is a vertical with a loading coil — or rather was, until the upper bit broke when the remains were fashioned into an inverted-V. In essence, we reckon the problem is due to a *good* site (both the present Editor and his illustrious predecessor have/had very strong links with Barnstaple, Bideford and Appledore!) coupled with inadequate dymanic range in the receiver. The answer, as we have so often said, is to reduce the input by an attenuator. It could also be that "noise" means static or manmade electrical interference is high, although we doubt if that is the problem. The small coasters at Bideford Quay only use a short aerial usually, and load it as best they can, but of course sitting on seawater is "a good site" with a vengeance, so long as the site stays afloat!

A. Stevens (Crowthorne) just missed the bus last time, with a query which we in effect answered — albeit for R. Baker of North Walsham — last time. Odd that this question has never been raised before, and then turns up twice. That bit about AM Phone is to indicate that all Phone prefixes, whether they be AM, FM or SSB, are lumped together into a single list. If you don't find or claim any AM or FM prefixes, fine.

An initial list for the Annual comes from *J. A. Darby (London) SE16)* with no comments, so we don't know what gear or aerials are in use.

P. J. Boyce (Coventry) runs a Trio JR-310 to dipoles in the loft and has done much of his listening in the time between

HPX LADDER

(All-Time Post War)

SWL	PREFIXES
PHONE ONLY	
K. Kyezor (Brandon)	2430
B. Hughes (Worcester)	2229
S. Foster (Lincoln)	1977
E. W. Robinson (Bury St. Edmunds)	1762
M. C. P. Bennett (Datchet)	1571
M. J. Quintin (Wotton-u-Edge)	1517
H. A. Londesborough (Swanland)	1450
H. M. Graham (Moulton)	1285
M. Ribton (Oxted)	1091
M. Law (Chesterfield)	1197
M. Rodgers (Harwood)	1182
M. Shaw (Huddersfield)	1038
P. Ford (Longlevens)	1006
R. Middleton (Bury St. Edmunds)	924
Mrs. R. Smith (Nuneaton)	938
D. C. Casson (Reading)	851
J. F. Hobson (Ely)	842
J. Doughty (Bloxwich)	826
L. Stockwell (Grays)	821
A. Twelves (Rhos-on-Sea)	756
B. A. Payne (Leeds 18)	700
D. J. S. Williams (Wednesbury)	692
F. C. D. Barnes (Cardiff)	669
D. J. F. Gordon (Chepstow)	627
B. Shepherd (Staines)	571
T. Anderson (Stroud)	549
B. L. Henderson (Salisbury)	546
CW ONLY	
H. A. Londesborough (Swanland)	1247
D. W. Waddell (Herne Bay)	1062
T. Grimbleby (Hull)	722
J. Goodrick (Bognor Regis)	683
A. Rowland (Mansfield)	477

Minimum score for an entry: 200 for CW, 500 for Phone. Listings include only recent claims and are in accordance with HPX Rules (*see* p. 299, July issue). **A 'Nil' return is allowable in order to hold a place.**

O-level exams and the start of the A-level work.

G. Bentley (Sheen) questions whether many SWLs got into the Ladder with first-try home-brew receivers. That, of course, depends on what you call a receiver! We recall J. Fitzgerald from Great Missenden for many moons using a transistor portable as the main part of the receiver, with another one alongside so tuned that its local oscillator provided the carrier injection, the necessary amount required being adjusted by moving one receiver relative to the other! This set-up found him some 800 prefixes before he got around to a first communication receiver. Gordon has an SB-313 and says after ten years of SWL he still doesn't grasp the need for AF and RF gain controls. Let's try and explain. The AF gain is just a simple volume control. The RF gain, on the other hand adjusts the sensitivity of the receiver, gradually de-sensitising it as RF gain is reduced. For optimum reception of a given signal there will be a suitable combination of AF and RF gain settings. If the band is noisy, it will probably be found that winding up the AF gain to near maximum, and cutting the volume down with the RF gain will result in the noise dropping and signals appearing. Of course, this won't help directly with the bedsitter situation where much of the noise is local and man-made and the aerial is round the room; in such a case, it is quite surprising how much an ATU built for the special needs of this aerial will help by pulling the maximum energy into the receiver (of both signal and static of the aerial-borne type) which can then be dealt with at the receiver by correct operation. Gordon reckons his receiver is an old 'cheapie', but in fact it is as good as most and better than some currently on the market at quite a high price; we were sorry to see *ours* go!

W. Ashton (Bridgend) joins the pro-home-brew group; everything in his station is home constructed, down to winding his own coils. December sees him sitting down in front of an RAE paper, and when the pass slip is obtained he will brew up a transmitter with a couple of 807s, and get into the CW DX — sounds like a good idea!

the CW DX — sounds like a good idea!

"I've joined Margarets Millions" says *B. Shepherd (Staines)* wryly as a good reason for more SWL activity. It is hard that in 1980 Briant, like so many others, should be the unfortunates to pay the penalty for the greed of so many since the beginning of W.W.II; human nature was something Keynes and his theories didn't think of! But at least he gets time on the receiver at different hours.

Like most of us, *J. Doughty (Bloxwich)* didn't find much August time for listening, but a late session at the end of July netted a couple of new ones on 21 MHz, in 4S7 and 8Q7, while a few days before writing (i.e. early September) and early morning foray on Twenty laid low VR6, KH4, 9Y4, and VK9NL — but John doubts whether he'll be able to keep it up in the winter!

J. G. Worthing (Shrewsbury) suggests that we should give a certificate to everyone who achieves the All-Time Table, in view of the head start it gives them in their activity after the RAE pass has been obtained and a licensed station is being operated. It's a thought, for sure, but the problem is that we would then have to set up some onerous conditions to avoid the award being debased; frankly we'd rather see an operating (SWL) test made to be part of the licence requirements.

B. L. Henderson has been in his *Salisbury* place now for the thick end of the year and so the incidentals of moving are all but done away with, and a temporary wire is strung out and receiver attached. However, the new place is showing a shortage of new prefixes. Brian wonders whether this is the "500" barrier, or a bad location; we would add that most probably it's neither, but a matter of lack of practice! Usually a "poor" site, at least for HF, is more related to the nature of the underlying strata than to height; and the presence of trees and brick buildings may alter the polar diagram markedly but not soak up too much signal — but "metal framed, metal clad" so much in favour with the modern architect is definitely a barrier, albeit it does do some reflecting! Perhaps the most important factor is to try and get some idea of the polar diagram of the aerial, noting the big signals and plotting their bearings on a Great Circle map. This may show you that most of the second hop pick-up is non-existent because the major lobes of the aerial are aimed at blank areas of sea! The answer is a change of aerial type, and a bit of re-orienting to try and put the major lobes on to the DX.

B. Goodrick (Bognor Regis) has three or four oddities he wants to claim for HPX; LA9MI/P could have been on Jan Mayen temporarily, but one would have thought he would have been using the JX prefix; on balance we are inclined to say he's OK until someone proves us wrong! The Ws in VS9 and VO1 only count for these places, and so the two SMs signing /9Q5 are one prefix if you want to count 'em as 9Q5 (and if you look at the rules there's no other way!). The UPOL stations are Russians who are floating research stations on icebergs and things; they are officially given permission to work amateurs on safety and recreational grounds so for all practical purposes are amateur stations. For our purposes we will regard UPOL

ANNUAL HPX LADDER

Starting Date, January 1, 1980

SWL	PREFIXES		
R. Baker (North Walsham)	499	B. Musselwhite (Warminster)	335
J. Worthing (Shrewsbury)	499	P. J. Boyce (Coventry)	208
R. D. Newall (Bracknell)	493	J. A. Darby (London SE16)	207
J. Weston (Borehamwood)	470	M. Hill (Bedworth)	207

200 Prefixes must have been heard for an entry to be made, all since January 1, 1980, and in accordance with HPX Rules (July, p. 299). **At a score of 500, transfer to the All-Time list is automatic.**

as one single prefix, and the LA9 can only count as such, since he wasn't signing /JX.

R. Baker (North Walsham) has an SR9 FM receiver, and a Binatone "Worldstar" portable with coverage to 174 MHz. Using the latter as a BFO seems to have been the way to get the SR9 to resolve SSB signals.

That article on planning permission ("The DX-ers Guide to Planning Consent", *S.W.M.*, July 1980) has put off *P. Ford (Longleven)* from his proposed aerial farming. One feels the article in question did not sufficiently stress the variable nature of the situation in different places: Basildon is a "desert" while, for example, Harlow is very reasonable: but Chelmsford in the same county is another desert. It is certainly very well worthwhile finding out just what the attitude of your local council *is* before feeling that the battle will be too long and hard.

D. J. S. Williams (Wednesbury) has a couple of moans, as he calls them. Perhaps the most annoying is the case of the early rising and the station so heard, from the Central African Republic who was not identifying, so that although he was audible and his callsign known, he couldn't be logged. The other moan is more of a simple query, about the use of the numbers 1, 2, or 3 after a /MM. In essence Region 1 covers Europe and Africa, with the boundary around mid-Atlantic and curved to go between Iceland and Greenland, plus that part of the USSR outside Europe, territories to the North of Russia, the Peoples Republic of Mongolia, and Turkey lying outside the defined line, but minus Iran territory which may fall within the limits. Region 2 takes in Greenland, all America, both North and South, the Caribbean and some Pacific Islands. Region 3 covers the rest — that is most of Asia except that already covered, Oceania and the rest of the Pacific. In details the lines A, B and C define the limits. Line A takes in Europe: coming down from the North Pole along the longtitude 40°E to latitude 40°N, then by Great Circle path to the crossing of 60°E and the Tropic of Cancer, and down 60°E to the South Pole. Line B defines the other limit of Region 1: again starting from the North Pole, along longitude 10°W to 72°N latitude, thence by Great Circle to latitude 10°S longitude 20°W, and along longitude 20°W to the South Pole. Between A and B lie the main parts of Region 1, saving those already mentioned. Line C again starts from the North Pole by Great Circle to the Behring Strait international boundary at 65°30'N; by Great Circle thence to latitude 50°N longitude 165°E, by Great Circle to latitude 10°N longitude 170°W, along this latitude to longitude 120°w, thence along 120°W down to the South Pole. Region 3 is between lines B and C. Region 3 is between lines A and C except for those bits mentioned.

J. F. Hobson (Ely) seems to have obtained much of his entertainment on the bands from the Pacific Net. No doubt the change of listening hours occasionally does make for a welcome change in the signals heard!

E. W. Robinson (Bury St. Edmunds) seems to have had his fair share of fun on the bands, and noted the first autumnal opening on Ten on August 29.

S. Foster (Metheringham) offers a few new Prefixes, and notes his Country score is 320 heard, with 316 of them confirmed.

On we go now to *F. C. D. Barnes (Cardiff)* who notes K. Kyezor has built a peak-and-notch filter and says he'd like to see the circuit 'cos he reckons it is the accessory to complete his home-brew receiver. What about it, both of you? The Gaffer would appreciate an article, for sure.

One or two people wondered about the YO0OOO; *B. F. Hughes (Worcester)* found it to be the vehicle following the Olympic Torch, after some research.

Next *Mrs. R. Smith (Nuneaton)* seems to be headed directly for a 'grand' on the Table, despite her son David, who owns the AR88, being on leave and doubtless operating with his G call.

D. Casson (Reading) is sitting the RAE in December — to *all* candidates for this our wishes for luck — and says he will then be immediately after the morse, as he doesn't really see himself on the FM channels. We know the feeling!

H. M. Gordon (Moulton) says Ten is his favourite band and since August it has produced him quite a lot of DX to the Americas, and a VK4 at 1317z; however, he was on 21 MHz more, especially when Ten was sulking a bit, again to find plenty of DX. The remaining bands weren't ignored but certainly they only produced additions to the list 'in passing', at it were.

D. J. F. Gordon (Chepstow, Gwent) fills in the gaps in our knowledge of his rig: FRG-7000D is fed from a Daiwa CL22 ATU, and a recent addition has been one of the Datong FL1 filters in the audio. For VHF a Standard C8800 can be tacked either to a dipole or a five-element Yagi; five elements are also in use on 430 MHz, with a Discone, either of these aerials can be fed into the SX-200 down in the shack. Quite a lot of machinery! Incidentally, the HF aerial is an end-fed wire.

Others

Thanks for lists and notes from *A. Twelves (Rhos-on-Sea), K. Kyezor (Brandon), M. C. P. Bennett (Datchet), R. Middleton (Bury St. Edmunds), GM4ELV (Arrochar), M. Law (Wotton-u-Edge), H. A. Londesborough (Swanland), T. Davis (Bridgend), R. Pearce (Aylesbury) and J. Weston (Borehamwood).*

Deadline

The next two are November 20, and January 22, 1980. The address is "SWL", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. So — till we meet again, *au 'voir!*

"A Word in Edgeways", the new monthly feature of readers' letters, begins in the February issue: deadline for your letters to arrive is January 2nd. All letters for publication should be addressed to "A Word in Edgeways" (or A.W.E. for short), Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ.

AN INTRODUCTION TO QRP OPERATION

CHRISTOPHER PAGE, G4BUE

THE purpose of this article is to introduce QRP to those radio amateurs who never consider using less than the maximum power permitted by their licence, (150 watts DC input in the case of the United Kingdom), and to attempt to convince them that it is possible to maintain QSOs with considerably less power. To those radio amateurs already convinced of this, the article is an attempt to indicate some different approaches and aspects of using QRP.

If we examine the Q Code meaning of QRP we find that it states "Shall I decrease transmitter power? Decrease transmitter power". In practice present day radio amateurs use the expression QRP to indicate that they are a low power operator (hence the term QRP-er) or that they are using low power equipment; it is very rarely used as a question or a request as indicated in the Q Code.

For the purpose of this article, QRP is defined as DC input power not exceeding five watts. This is the definition most widely used by radio amateurs in Europe, whilst in the USA QRP is often referred to as any power up to 100 watts DC (!), and the expression QRPp being used to indicate power levels of five watts or less. Hence QRPp in the USA is the same as QRP in Europe. Occasionally radio amateurs use power as a standard of measurement, and there is some disagreement at present as to which it is better to use: some argue that it is easier to measure input power of a PA by simply using Ohms Law, whereas *output* power can be said to be the true amount of RF used to establish the QSO. It is hoped that in the near future all radio amateurs will adopt one or the other as a standard of measurement for QRP.

Let us examine the theoretical implications of using QRP. Imagine two radio amateurs in QSO on a quiet part of the 80 metre band, both using 150 watts DC input, and that signals are 599 both ways. If one of the stations reduces power to five watts DC input, that is a decrease in power by a factor of 30, or in other words 15dB, which is equal to two and a half 'S' points, assuming that 6dB are equal to one 'S' point. The signal strength of the station would then drop from 599 to 56/79, more than sufficient to maintain the QSO, assuming a clear frequency and no abnormal QRM. No doubt there are some critics who would say that what happens in theory does not always happen in practice! It is admitted of course that on occasions reducing power from 150 to five watts means losing the QSO altogether, but this is usually due to factors other than the drop in signal strength; for instance, there may be a certain amount of QRM or QSB which is not noticeable at 599, but would be at 56/79.

Five Watts Input

Having accepted that given the correct band conditions a reduction from 150 to five watts enables a QSO to continue, let us examine the different methods used by QRP-ers to obtain five watts input. Basically there are three methods, the building of a transmitter or outboard PA to be used with an existing transmitter, the purchase of a QRP transmitter, or the reduction of the drive control of an existing QRO rig.

Probably half of United Kingdom QRP operators are using equipment which is home-made, and varies from a completely home-made receiver and transmitter to an outboard PA which is driven from a commercial transmitter. (I do not intend setting out designs for QRP PA's or transmitters as reference to radio books or magazines will reveal many varying designs).

The majority of the remaining United Kingdom QRP operators use a commercial QRP rig. The *Heathkit* HW-8 (which superseded the HW-7) is a CW-only transceiver from 3.5 MHz to 21 MHz and varies from 2 to 3.5 watts input depending on which band is selected. The HW-8 is a large improvement over the HW-7 which only covered 21, 14 and 7 MHz. Probably the most popular QRP transceiver, apart from the *Heathkit* models, is the *Ten-Tec* 'Argonaut' from the USA, both the original Model 505 and the later 509. Both models cover all bands from 3.5 MHz to 28 MHz with five watts input on both CW and SSB; the transceiver has full break-in on CW and the receiver section is first class. *Trio* is represented by the Model 120V, which covers all bands from 3.5 MHz to 28 MHz with 20 watts input on both CW and SSB. *Yaesu* have the FT-7B which, although primarily intended for mobile use, makes an excellent QRP rig with 20 watts input on all bands 3.5 HMz to 28 MHz on both CW and SSB. Until recently *Yaesu* also produced the FT-301S, which was a base-station transceiver covering all bands from 1.8 MHz to 28 HMz, all modes, with 20 watts input. The most recent model is the *Atlas* 110-S which is basically a receiver (the *Atlas* RX-110-S unit) with the addition of the TX-110 QRP module delivering five watts output on 3.5 MHz to 28 MHz on both CW and SSB. In addition to commercial equipment there is a good selection of government surplus equipment available which can often be modified for QRP use on some to the amateur bands.

The photograph of the author's shack shows the *Ten-Tec* 509 'Argonaut' bottom left with its PSU above the rotator meter on the shelf above. Resting on top of the 'Argonaut' is a *Datong* model FL-1 audio filter, together with the 'Argonaut' CW filter — both of which greatly assist in copying weak QRP CW signals. On the shelf above the 'Argonaut' on the extreme left is located a *Datong* RFC speech clipper, with two cabinets above housing a voltmeter and three milliammeters which will be described later. To the right of the clipper is the SWR bridge and variable PSU which is used for the PA of the 'Argonaut' only, and will also be described later. The FR-101 next to the 'Argonaut' is part of the QRO line.

A small percentage of QRP operators use a QRO transmitter with the drive control reduced. The disadvantage of doing this is that by drastically reducing the current to the PA from that which it was originally intended to operate, inefficiency of the PA results; if one is using output power as a standard it does not really matter, but if input power is being used it is very important. It is often very surprising to discover the small amount of RF passing into the transmission line to the antenna when the output power is measured accurately. one method in which this inefficiency of the PA can be rectified is for the voltage to the PA to be altered in ratio to the current, thereby keeping the output impedance of the PA in the usual 50 to 75 ohms.

Getting Results

Assuming that one of the above methods has been adopted to obtain an input of five watts, what is the best way to use this power on the HF bands? One has to accept that you cannot expect to go onto 21 MHz, call "CQ DX" and have stations

from the other side of the world answer your call (although this does happen on occasions). A completely different approach to amateur radio has to be adopted. Unless one is attempting to QSO with other QRP stations, it is usually best to tune through the bands and find a station calling CQ: preferable the station should have at least a 599 signal, remembering that if you are 599 with him with 150 watts, you will still be 56/79 with five watts and he should hear you.

QRP stations are often heard signing with their call and then using QRP as a suffix, *i.e.* G4GUE/QRP. This is quite illegal under the conditions of our licence as QRP is not part of our officially issued call sign. On the other hand there is nothing wrong in signing "G4BUE QRP". The purpose of sending 'QRP' is an attempt to let the other station know that you are using low power, as the majority of amateurs will make an extra effort to hear you once they realise this; it also indicates to other QRP stations who may be listening on the frequency that you are using low power. I have often found when calling DX stations, even in pile ups, that a simple "W1ABC DE G4BUE G4BUE QRP" results in the DX station returning with "QRZ QRP", the 'QRP' being the only part of the call signs of the other stations calling him that he was able to copy. Tail-ending is another procedure that can be used to advantage by the QRP operator, again ensuring that 'QRP' is included with your call.

Generally if an amateur wants to work DX with QRP it is better to use the highest HF band which is open. This is especially true when 28 MHz is open, where all QRP operators agree that it is easier to work DX on this band with low power and simple antennas than on any of the others. Whatever band is used there are periods in the day when a particular path is at its optimum, and the QRP operator has to know and take advantage of this. For instance if there is a pile up on a DX station it is pointless the QRP operator joining in if the DX station is answering calls from East Europe with only the occasional G station being worked; on the other hand if the DX station is only working stations from the United Kingdom and the extreme West of Europe, that is the time for the QRP operator to join in. Monitoring the frequency for a while will determine which way the propagation is going by listening to the stations being worked by the DX station. You can then decide whether it is worth waiting on the frequency or if it is too late.

I have found that one of the best times to work DX, especially on 21 and 28 MHz, is to catch the band just as it is opening. As the MUF rises to, say, 21 MHz and causes the in the first hour, which I have not been able to repeat after that even with increased power, yet the USA station has been received at the same or even a stronger signal. Other QRP operators swear by using the reverse, *i.e.* catching the band just before it closes, when the MUF is on its way down. Whichever method one finds best, the point is that by knowing about propagation there are times during the day when it is much easier to work DX with low power.

In addition to selecting the correct band and optimum path opening, the QRP operator must send absolutely perfect CW, whether he be sending at eight or 30 words per minute: speed does not matter, but accuracy *does*. A study of the European stations regularly working DX on 1.8 MHz will reveal that CW is usually sent slower than normal, but very accurately, and the same tactics have to be employed by the QRP operator. With a weaker signal, the QRP operator cannot afford to make a mistake with his call sign or signal report; if he does it's certain that the only part of the transmission received by the DX station will be the part containing the mistake(s)!

When using SSB it is equally important that clear phonetics are used and all pronounciation is equally clear. Some QRP operators use speech processing to advantage, but the usual warning of having the output advanced too high is more important when using low power.

The many HF contests held throughout the year are an excellent method for the QRP operator to assess the capabilities of his low power transmitter and antennas. Many DX stations stay on one frequency for several hours working stations, and time can be spent calling them at different power levels, until a contact is established. One side-result from this is that it is interesting to compare the power levels required to work different stations from the same area which have the same signal strength, *i.e.* differentiating those stations which obtain their loud signal strength from good antennas and those which obtain it from high power. It is unusual for the large multi-multi operator contest stations not to hear other stations calling them, even weak QRP stations. They are after all the points they can get and will often make a special effort to pull a weak QRP signal through! This is especially true on the second day of the contest, when they are often running out of stations calling them.

The newcomer to QRP will quickly realise that a completely different approach in operating technique has to be made if successful DX QRP contacts are going to be made. One has to find new ammunition to take the place of power when competing with QRO stations in pile-ups, contests, etc. We have already mentioned that knowledge of propagation and accurate CW are two requirements, but in addition the QRP operator must have a great deal of patience, cunning and skill: when one is giving away at last 2½ 'S' points an attempt *has* to be made to make up for it. The successful QRP DX-er has a very ambitious approach and attitude to amateur radio. He considers that his extra cunning and skill more than make up for the deficiency of 2½ 'S' points compared to QRO colleagues, and as a result will often attempt to call stations in circumstances that other operators may describe as impossible. The last thing he considers is that he will not be successful because he is a QRP station! This ambitious attitude, combined with patience, is the main reason for QRP DX success.

Experience is a great thing and trial and error will quickly teach the newcomer to QRP: how and when to call DX stations successfully, and score over his QRO colleagues. The experience the QRP operator acquires, often without realising it, gradually results in him becoming a more skilful operator. After all anyone using kilowatts can obtain a reply from a DX station.

The vast majority of QRP contacts are made with CW and it is with this mode that almost all two-way QRP contacts are made: two-way QRP is the real test of an operators skill and patience as, in addition to ensuring that his signal is copied by the other station, he has to ensure that he is able to receive the other stations QRP signal. I believe the most important factor in successful two-way QRP is the ability to receive and copy weak CW signals. A good receiver is therefore desirable, but whatever receiver is used it is most important that it is aligned and adjusted for maximum performance. In addition, some form of filter should be regarded as a necessity as this will greatly improve the reception of CW signals on even the best receiver; preferably the filter should have a variable bandwidth. There are many designs available for simple audio filters which can be added after the audio amplifier state. As

The station at G4BUE: *see* **text for details.**

well as getting rid of unwanted QRM, they can be used to amplify the signal by incorporating an amplifier with the filter. A noise blanker is another desirable accessory to combat the many forms of QRM on the HF bands.

Whatever accessories are added to a receiver, they will all be wasted if the operator does not make the effort himself to copy weak CW signals. This requires a great deal of practice, initially in the reception of CW to ensure that a good standard is attained, and then on the bands amongst the QRM and other forms of interference. There is no doubt that practice helps make perfection, and it is frustrating to listen on the bands during QRP contests at the number QSO's being missed because other amateurs have not got the receiver or ability (or both) to hear stations calling them.

Antennas

The antennas used by QRP operators are as varied as those used by QRO operators. One thing they all have in common is that whatever antenna they use it has to be used in the most efficient manner possible. This means the antenna has to be perfectly tuned for that part of the band or bands where it is desired to operate, usually the QRP calling frequencies. In addition the transmission line has to be perfectly matched to the antenna and transmitter, and the SWR as near unity as it is possible to obtain. When one is only generating a few watts of RF it is essential that all of it reaches the antenna and is radiated, even a slight mis-match could cause a slight reduction in the amount of RF being radiated, and although this may not be noticeable when using 150 watts, it would be noticeable when using five watts. Ideally the feed point to the antenna should be located as close to the transmitter as possible thereby keeping the transmission line as short as possible.

After the antenna and transmission line have been finally adjusted it is a good idea to remove all unnecessary accessories between the transmitter and transmission line, *i.e.* SWR bridge, antenna switches, LP filter, etc. Anything placed in the transmission line is going to have an insertion loss to some degree. The low-pass filter should not be necessary at QRP levels, whereas the SWR bridge can be removed once the antenna has been adjusted. It would be better for the antennas to be designed in such a manner that they are changed physically by changing the coax to the transmitter rather than have some fancy switching system which by its insertion into the line causes some of the precious RF to be lost.

When 5 Watts is QRO

So far I have been referring to QRP as being in the region of five watts input, but it should be said that some amateurs would regard five watts as QRO. These amateurs are those who use input power levels usually measured in milliwatts or even microwatts. When using these very low power levels the attention to efficiency of the PA, transmission lines, and antenna adjustments become even more important.

If it is intended to operate a five watt QRP rig at milliwatt levels it is no good merely reducing the drive control. This was recently demonstrated to the author with his 'Argonaut' when he attempted to use an input of only 10mW. After reducing the voltage to the PA from 12 volts to one volt, the drive was adjusted for a current of 10mA: this resulted in only 576 microwatts output for an input of 10 milliwatts, an efficiency of only 4.6%. One has to experiment with different voltage and current combinations to find the most efficient method of running the PA; in the case of an input of 10mW this proved to be with 0.5 volt on the PA and a current of 20mA. A similiar example is reducing the input of the 'Argonaut' to one watt: initially I retained the 12 volts on the PA and just reduced the drive to approximately 83mA. As a result of experimenting, I found the most efficient method of running the PA at one watt input was with a voltage 4.25 volts and a current on 235mA — quite a difference!

The two cabinets referred to when describing the author's QRP equipment house a voltmeter, and milliammeters with 1 amp, 100mA and 25mA full scale deflection. These are inserted in the voltage line to the PA of the 'Argonaut' which is fed from the variable PSU on top of the SWR bridge. In this manner an accurate measurement of input power can be made when using the 'Argonaut' at different power levels, since in its standard form it has no means by which input power can be measured.

TVI

One of the advantages of using QRP is the virtual guarantee to the absence of any form of television or audio interference complaints. It is disturbing to hear of the number of radio amateurs who do not operate during television hours because of interference problems. If only those amateurs would consider the use of QRP, it would enable them to obtain so much more satisfaction from their hobby, whilst at the same time preserve the friendship of their neighbours. In my own case it is impossible for me to operate with 150 watts whilst my next door neighbour has his television switched on. Without going into all the details, both the Post Office and the television manufacturer agree that it is "an impossible case". Legally I am entitled to carry on and operate with my 150 watts despite the interference as my own station has been cleared of being the cause, but that is not in the best interest of

neighbour/amateur relations, and so I use QRP during television hours. It has been surprising how little this has restricted my operating. Given reasonable band conditions I am still able to enjoy QSO's with USA stations on 21 MHz CW, and a weekly sked with a W6 station on 28 MHz is usually made with QRP.

Recently G4FJF was in QSO with a West German station, when the German amateur told Mike that he had to go QRT as television was about to commence. Mike pursuaded the German amateur to stay on the air, but to reduce his power to five watts, which he did. The QSO was continued and there was no complaint of television interence. Yet another amateur shown the benefits of QRP operating! I therefore commend to anyone who has interference problems to consider reducing power and joining the ranks of QRP-ers.

Frequencies

To encourage two-way QRP contacts, international QRP calling frequencies have been adopted on a world wide basis. They are set out below and are used extensively by QRP operators, especially at week-ends: –

CW	*SSB*
3560	3690
7030	7090
14060	14285
21060	21285
28060	28885

These frequencies (kHz) have been very widely publicised during the last few years and it is hoped that in time they will become even more well known and QRO stations will avoid them.

QRP Activity Periods are held to enable QRP operators to meet on the air. The G-QRP Club hold weekly activity periods on Sundays, as follows: –

1100 – 1230 (GMT) on	7030kHz
1130 – 1230 (GMT) on	14060 kHz
1400 – 1500 (GMT) on	3560 kHz
1600 – 1700 (GMT) on	7090 kHz (SSB)

In addition the ARCI-QRP Club of the USA hold monthly activity periods on the first Sunday of each month between 1500 and 0300 GMT on all the above frequencies.

Contests and Clubs

During the year there are a number of contests which are held specifically for QRP operators. On the third week-end of January and the third week-end of July the AGCW-DL hold their Winter and Summer QRP Tests. There are four classes determined by different power levels, and the contests are very well supported. RSGB organise an annual Low Power Contest which is held in April on 7 and 3.5 MHz. The scoring is again determined by the power used.

Recently due to the increased interest and activity of QRP operators some of the major world wide contests have included QRP sections. The CQ WW Contests held over the last week-end of October (SSB) and the last week-end of November (CW), and also CQ WPX Contests held in March (SSB) and May (CW) all have QRP Sections defined as power not exceeding five watts output. Stations in these QRP Sections only compete against each other but a comparison with some of the scores of QRO stations, show they achieve some remarkable scores. In 1979 the RSGB included QRP section in their new 21 MHz CW Contest, which is now to be an annual event. The ARRL in completely altering the format of their CW and SSB DX Contests held in March, have now included a QRP Section.

In addition to the contests mentioned above for QRP operators, several week-ends throughout the year are set aside for QRP Activity Week-ends organised by the G-QRP Club and the AGCW-DL. All QRP operators are very welcome to join in all the QRP activity periods, whether or not they are members of the organising clubs.

There are several clubs which cater for the interests of the QRP operator, and these have been briefly mentioned already. By far the best of the QRP clubs is the G-QRP Club, which was formed in 1974. Despite its name, membership is open to all radio amateurs world-wide having an interest in QRP and at present the membership is around 900 from 30 different countries. The secretary of the club is Rev. George Dobbs, G3RJV, who was responsible for its incorporation, but I don't think he really envisaged just how quickly it would grow when he started it back in 1974. A very professional club magazine is produced four times annually containing everything of interest to QRP operators. In addition they promote a very extensive awards programme for QRP achievements, culminating in a QRP Masters Award which is a plaque retained by the recipient.

In the USA, the ARCI-QRP caters for the QRP operator, although they define QRP as not exceeding 100 watts! They promote certificates for Worked All States with Five Watts, and the famous Thousand Miles Per Watt award. This certificate is awarded to any amateur having achieved a QSO whereby the miles per watt distance between the two stations is in excess of one thousnd miles; the exact figure is quoted on the certificate and endorsements in excess of one million miles have been issued.

The Benelux QRP Group have just over one hundred members from the Benelux countries, and have weekly activity periods on the QRP frequencies. The majority of West German QRP operators are members of AGCW-DL, which although being primarily a CW club, promote the annual Winter and Summer QRP Tests.

Probably the most difficult awards open to the QRP operator, are those offered by Ade Weiss, K8EEG/O on behalf of *CQ* magazine. The QRPp DXCC Trophy is awarded for confirmation of QSO's with one hundred DXCC countries whilst using a power not exceeding five watts output, and the Milliwatt DXCC Trophy awarded for confirmation with one hundred DXCC countries whilst using a power not exceeding one watt output. Both trophies stand twenty-four inches high and are intended to illustrate the high degree of skill and dedication necessary to qualify for the awards. To date very few (less than ten) of both trophies have been awarded.

Conclusion

I hope this article will be read with interest by all radio amateurs. To those already using QRP, I look forward to having QSO's with you. To those amateurs using QRO, if you decide not to try QRP, please try and avoid the international QRP calling frequencies — thank you.

G4BUE is a regular contributor to "Communication and DX News."

EQUIPMENT REVIEW

THE YAESU-MUSEN FT-707 'WAYFARER' TRANSCEIVER

BACK in the 1950s, long before the U.K. authorities would have anything to do with reciprocal licensing, the reviewer operated from the Principality of Monaco. "Separates" were used on the HF bands with their bulky, external power supplies, interconnecting leads, relays and so on. A whole car bootful of spares, test gear and soldering irons, as well as hefty stepdown transformers was taken: all that for 50 watts of CW and AM. By contrast, today's DX-peditioner or holidaymaker can pack a complete high power, high performance, SSB/CW station into a suitcase. The Yaesu Musen FT-707 "Wayfarer" Transceiver is of this ilk.

Packaging and Accessories

The equipment for this review was supplied by *Messrs. S.M.C. Limited*, the well known distributors of Yaesu Musen products, and comprised the FT-707 transceiver, the FP-707 AC power supply, the FV-707DM digital VFO and the YM-35 scanning microphone. The first three items were separately double-boxed, the equipment nestling safely and securely in the usual bespoke expanded polystyrene supports. Included with the transceiver was the DC power lead for mobile use, with in-line, 20A, fuse, but there were no plugs for the microphone and aerial sockets. Delivery was by Securicor Ltd.

The Manuals

The FT-707 Instruction Manual runs to 48 pages. It includes a description, technical specification with semiconductor complement, illustrations and descriptions of all the controls and sockets, installation details and full operating instructions. The circuit description is very well presented and includes a complete block diagram, several separate circuit diagrams of the main sections of the transceiver, plus a loose leaf sheet showing how the many units are interconnected. The Maintenance and Alignment section comprises nine pages, amply illustrated by photographs, with all the necessary "tweakable" components identified. The final section is an eleven page parts list. This manual contains the circuit diagram of the power supply.

The Instruction Manual for the FV-707DM Digital VFO is a slimmer volume of twelve pages. It follows the same format as that for the FT-707 except that there are no maintenance and alignment sections. The circuit diagrams are on two, loose sheets.

Descriptions

The FT-707 must be one of the smallest, multiband transceivers available. The basic case measures 240mm. wide by 93mm. high by 235mm. deep. The high power version reviewed here has the 100 watts PA unit bolted on the rear and this is 60mm. deep. The main tuning knob projects 32mm. A retractable foot is provided so that the case can be tilted up at about 7° for table top use.

The front panel layout can be seen in Figures 1, 2 and 3. The dual concentric controls at the top left are for carrier level and microphone gain. The eight-pin microphone socket is at the bottom left with the eight ohms headphone, standard jack socket in between. The power on/off switch is next to the latter. From left to right, the seven push buttons are: manual changeover, slow/fast AGC, 25 kHz calibrator, ALC on/off, fixed channel selector, noise blanker on/off and clarifier. The four controls at the bottom, from left to right, are: mode switch, AF gain/RF gain, clarifier and variable bandwidth tuning, and band selector.

On the large VFO tuning knob there is a skirt marked in 100 one kilohertz divisions which can be adjusted to coincide with the digital frequency readout. The two tiny knobs below the VFO knob are VOX gain to the left, and VOX delay to the right. Signal strength, ALC voltage and relative power output are displayed by ten bar LEDs, five green, three yellow and two red ones. Receive and transmit frequencies are shown by six, 7.5mm. orange LEDs enabling the nearest 100 Hz to be read. Other LEDs above the VFO knob indicate when the calibrator is on, when the internal or external VFO is controlling the frequency and when the fixed channel is in use. To remind the operator when the clarifier is on, a small red LED lights up next to the "CLAR" legend.

There are ten sockets at the back for: 13.5 volts DC power, aerial, earth, morse key, external loudspeaker, low level RF output for a transverter, eight volts DC output for pilot lamps in the optional aerial coupler, accessories and external VFO. In the bottom panel of the case, a small loudspeaker is provided.

The FP-707 AC Power Supply is in the same basic size case as the transceiver and contains a four ohms impedance, elliptical loudspeaker. A 700mm. long trailing lead with four pin female plug is provided, together with a lead and miniature jack plug for power and loudspeaker connexions to the FT-707. On the rear, there are two posts to enable the FP-707 to be used to power other equipment requiring a regulated 13.5 volts DC at up to 20 Amps. on a 50% duty cycle, when not being used with the "Wayfarer". The mains transformer has two 117 volts primaries which are tapped, enabling AC inputs of 100 to 234 volts to be used. The correct tappings are very clearly indicated in both the FT-707 manual and the leaflet with the FP-707. They have to be selected and soldered on the actual transformer. There are two 16.5 volts secondaries connected in parallel to a full wave bridge rectifier, followed by 99,000 μF of reservoir capacity. Three hefty, parallel-connected pass transistors on generous heat sinks are used in the regulator circuit.

The FV-707DM Digital VFO is the same size as the transceiver but only 27mm. high. Two flying leads from the back are terminated in plugs to mate with the Accessory and Control sockets on the FT-707.

Band metres	μV for S9 + 30 dB.
10	725
12	410
15	540
17	410
20	380
30	380
40	410
80	410

Table 1. This shows the signal required in microvolts on each band to give an S9-plus-30 dB indication.

Circuit Descriptions

The FT-707 covers the present five HF amateur bands 80, 40, 20, 15 and 10 metres, the last in four 500 kHz sections, plus the three new bands, 12, 17 and 30m. which will become available later this decade. No 160m. coverage is provided.

The received signal is routed through a double, *m*-derived, *pi*-section high pass filter with a cut off frequency of 1.7 MHz, thence through a 9 MHz IF trap to the individual aerial coils for each band. The single RF stage uses a 3SK73CR, dual gate MOSFET which is bandpass coupled to the Schottky barrier diode ring mixer type ND487C2-3R. The VFO, which tunes 5.5-5.0 MHz, is a modified Colpitts circuit. The buffered output passes through a low pass filter to a pre-mixer, where it is mixed with a crystal controlled oscillator signal. The difference frequency is routed through bandpass filters, amplifiers and buffers to the ring mixer, the output frequency being the IF of 8.9875 MHz.

A 20 kHz crystal roofing filter is used ahead of the main SSB and/or CW filters to provide sufficient bandwidth and delay time for proper functioning of the noise blanker. The variable bandwidth is achieved by mixing the 8.9875 MHz IF signal with the output from a VXO operating around 19.7475 MHz, the resulting 10.76 MHz IF signal being fed through the 2.8 kHz crystal filter shown in Fig. 2. This signal is then fed back to another mixer where it is mixed with the same 19.7475 MHz VXO-ed frequency, thus reverting to the original IF. The SSB or CW signal is demodulated in a diode ring circuit by the carrier oscillator. An IC is used in a transformerless circuit providing three watts of audio for the loudspeaker. The audio circuit has an active low pass filter with a 2.7 kHz cut off and 12 dB/octave roll off.

The transmitter circuit is fairly conventional and makes common use of the carrier oscillator, SSB filter and VFO/premix circuits described in the receiver notes above. On CW, the ring modulator is unbalanced. Two low power RF stages are keyed by keying transistors and a sidetone oscillator is incorporated, the level of which in the loudspeaker can be adjusted by an internal preset control. AM is generated by modulation of one of the three carrier oscillator stages and is double sideband the SSB filter being bypassed.

Much thought has gone into the problem of protecting the 100 watts, broadband final stage against high SWRs. The line-up is a 2SC1589 driving a pair of 2SC2395s in push-pull, into a push-pull pair of 2SC2290s. A directional coupler senses any high SWR and generates a control voltage which reduces the gains of the AF, IF and RF stages. In the case of overdrive, the ALC controls these stages. Excessive PA transistor temperature is sensed by a *thermistor* and a control voltage is

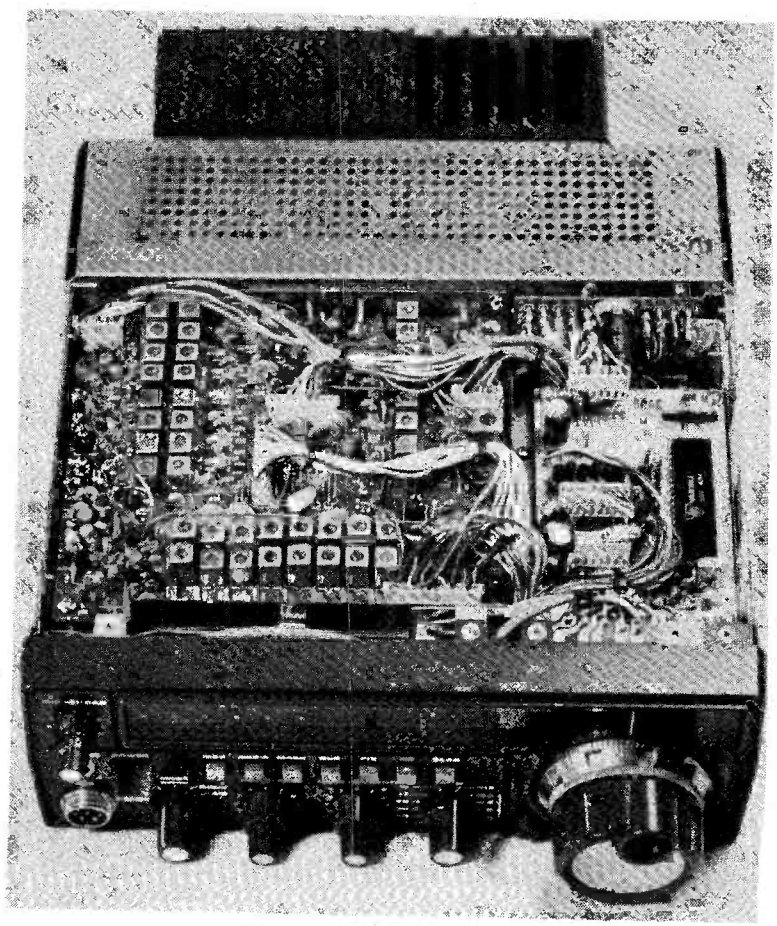

Fig. 1. Top view of the Yaesu FT-707 "Wayfarer" transceiver. The main board, occupying the left hand two-thirds, is the RF unit. The single line of eight cans at the rear are the coils ahead of the RF amplifier. The sixteen at the left form the eight pairs of coupling transformers to the ring mixer stage and the sixteen behind the front panel are the premix bandpass filters. The board at the right with the 40-pin IC is the LSI counter unit.

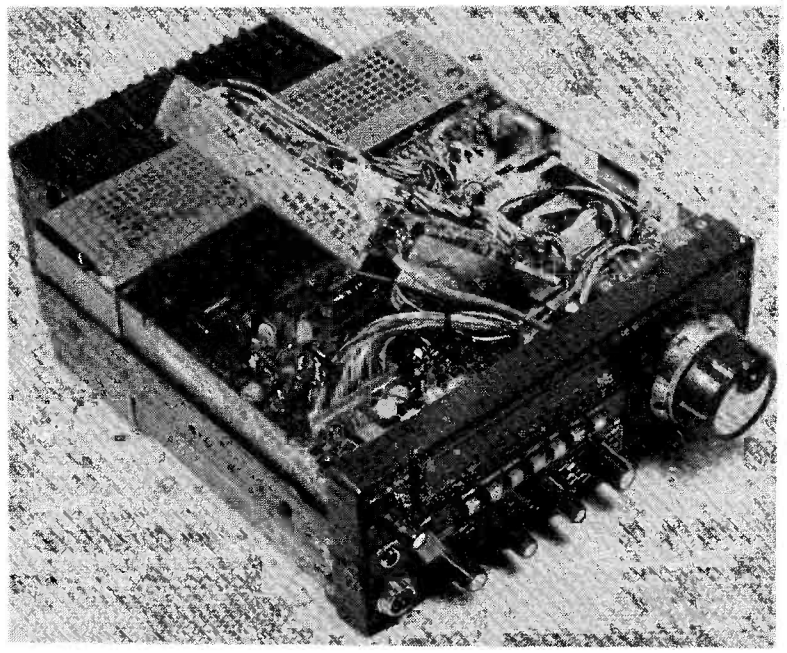

Fig. 2. Top view with the RF board partially lifted up to reveal the IF unit. The FT-707 is supplied with one 2.4 kHz (−6 dB.) crystal filter for SSB, partly visible under the corner of the RF board. The filter at the top left is a 2.8 kHz one operating at 10.76 MHz in the variable bandwidth circuit. The empty space adjacent to it is for the optional, narrow CW filter.

developed in a *comparator* which causes a cooling fan to be switched on and the ALC line to reduce the gains of earlier stages.

Between the broadband PA stage and the coupler, a low pass filter circuit is included. Five separate double *m*-derived *pi*-section filters are use, switched by five pairs of relays. They cover the 80, 40, 30/20, 17/15 and 12/10 metre bands.

The calibrator, or marker generator, uses a 3.2 MHz crystal oscillator and the signal is divided down in an F4024 binary counter to 25 kHz multiples.

The FV-707DM Digital VFO is a digitally synthesized oscillator employing a dual loop PLL system. Twelve frequencies may be stored in the memories in the basic VFO range and these can be recalled for receive or transmit or transceive operation. The memorized frequencies can be varied over the entire 500 kHz by pushing the "Clarifier" button on receive and the "Shift" button on transmit. This scanning can be controlled directly from the Up and Down buttons on the FV-707DM or from duplicate buttons on the YM-35 Scanning Microphone. The normal scan rate is 1 kHz/second but the Fast button enables this rate to be altered to 10 kHz/second.

Performance

Firstly the receiver function. The FT-707 was used almost exclusively as a base station with a tri-band ground plane aerial for 10/15/20 metres. In addition, crossed dipoles in the loft for satellite reception were available on 10m. It is likely that the majority of amateurs operating on the 10-80m. bands would use some kind of multiband aerial system, such as a trapped dipole and/or *Yagi* beam, so it was thought the system mentioned would provide a fair test. The maximum VSWR of these aerials was 2:1.

The "Wayfarer" proved to be very sensitive which is desirable when mobile operation with inefficient aerials is contemplated. It was difficult to make accurate sensitivity measurements in the absence of an analog signal strength meter. According to the figures above the bar LEDs, one lit up is S1; 3 is S5; 5 is S9; 7 is S9-plus-20 dB; 9 is S9-plus-40 dB. and all ten is S9-plus-60 dB. To compare the sensitivity band-by-band, the Heath IG-42 signal generator was used to supply a signal sufficient to light up 8 LEDs, presumably equivalent to S9-plus-30 dB. The microvolts necessary to achieve this are shown in Table 1. The centre of each band was used; *e.g.* 3.75, 10.25, 28.85 MHz. As far as could be deduced, S9 was achieved with a 4-10 μV signal.

The VFO tuning was beautifully smooth with complete absence of backlash. The analog dial was set at "200" exactly to coincide with 200 kHz on the digital readout. The maximum errors were +2.0 kHz at "350" and −1.0 kHz at "250" and "450", but this is of little consequence. It took about thirty revolutions of the knob to cover the full 500 kHz, averaging about 17 kHz per turn which made it quite easy to tune to the desired 100 Hz.

VFO stability was excellent apart from an odd, jumping effect which manifested itself occasionally whereby the frequency lurched about randomly by one or two kilohertz. Gently tapping the case could continue this phenomenon and it created a sound in the loudspeaker akin to that of a microphonic valve in an audio amplifier. Naturally it was impossible to read signals when this effect happened and it was probably a bit of suspect earthing internally.

The noise blanker was very effective on most noises of an impulsive type. The FT-707 was used briefly in the writer's Citroen car, one ignition lead of which is not of the proper, resistive type. The noise blanker coped very impressively with this situation. The next door neighbour, now in his eleventh year of *D-I-Y* drilling, hammering and general nuisance creation, has a daunting collection of fiendish electric tools, several poorly suppressed. Using the noise blanker, many signals which were otherwise wiped out by the racket were quite readable. It seemed to chop off some 30 dB of the

interference. As with most diode type noise blankers, when in circuit, strong adjacent signals did cause slight distortion of the wanted signal. Another effect noticed was that when it was switched in, other adjacent signals became audible as if the bandwidth had been widened.

The Clarifier control covered 6.4 kHz — actually 3.5 kHz up and 2.9 kHz down — and the variable bandwidh control was found to be especially useful on CW.

At first, it was thought that the Digital VFO was a bit of an expensive gimmick. However, it proved to be a useful accessory as will be covered later.

The most searching test for any receiver is how it performs on the 40 metre band where little amateur signals have to do battle with the megawatts of what G6FO used to call "The Voice of Saudi Banana!" The FT-707 came through this test with flying colours and it was possible to copy weak signals right alongside the most powerful stations, thanks to the sixteen poles of IF filtering. From the selectivity standpoint, this was one of the best receivers yet used.

Unfortunately the performance on 10m and 15m using the multiband ground plane left a lot to be desired. For example on 10m, when the band was devoid of amateur signals in the early hours of the morning, the band was, nevertheless, full of spurious signals. Some of these appeared to be coastal radio stations such as "FUF" which tuned in on 28.141 MHz; "UXN" on 28.120; "WCC" on 28.164; "IAR" on 28.336, and a U.S. station on 28.407 giving aircraft weather information on voice for the Bangor, Maine, and Pittsburgh areas, etc. These signals were not present when using the 10m dipoles.

Tuning across 15m, there seemed to be many heterodyne whistles. Again there were occasions when the band was all but closed yet there were dozens of pairs of stations tunable, evidence of intermodulation distortion. Also, around 2200 GMT, a standard frequency transmission was tunable on 21.061, 21.071, 21.086, 21.096 MHz., and so on. These shortcomings were taken up with *Messrs. S.M.C. Limited* who inferred that diode switching of the RF circuits was the cause of this problem. They suggested replacing ten resistors by ones of a different value in the RF unit and a couple of capacitors in the high pass filter unit. The calculated effect of this latter idea would be to alter the cut off frequency from 1.7 MHz to around 6 MHz and this would undoubtedly adversely affect the performance of the receiver on 80m. In any case, this reviewer does not expect to have to make these kinds of circuit alterations to improve the performance of equipment being tested.

During these tests on 10m and 15m, the aerials were switched frequently to the main station Hallicrafters SX-146 receiver. These spurious signals were just not there on the SX-146, the only non-amateur ones which were, were harmonics from lower frequency broadcast stations and their attendant jammers. It is worth mentioning that, despite its vintage, the SX-146 also uses a 5.5-5.0 MHz VFO, a premixer system and a 9 MHz IF.

Secondly, the transmitter function. The "Wayfarer" was connected to a large, 50 ohms dummy load incorporating a 2.5A. *f.s.d.* RF ammeter.The alignment instructions recommend setting the maximum power output to 110 watts, DC, at which level, seven LEDs should light up. The measured maximum power output on each band is shown in Table 2 along with the number of LEDs illuminated.

The power input on CW is claimed to be 240 watts DC which is well in excess of the 150 watts permitted by the Home Office for U.K. amateurs. However, there is no provision for measuring the input power as the bar LEDs indicate neither final collector voltage, nor current.

The keying waveform was examined on the station monitor scope and found to be excellent. Checks with other London stations were carried out and the keying confirmed as very clean, T9, and free of clicks. Semi-break-in operation is possible by using the sidetone oscillator to activate the VOX circuit and this was very convenient. The delay control is used to set the "hang" time to the desired length.

On SSB, some lengthy tests were undertaken to establish a firm conclusion about the speech quality using the Yaesu YM-35 microphone. The final conclusions was not too favourable in that the speech sounded lifeless, lacking the essential crispness for maximum intelligibility on today's crowded bands. As the received quality was quite satisfactory, it was assumed that the microphone was the weak link. Two were supplied and both were tried with identical results. These 600 ohms impedance microphones seemed to be rather insensitive, it being necessary to talk quite loudly and closely with the microphone gain fully up to achieve any worthwhile power output.

The microphone plug is a non-standard, eight pin type and, since no spare was supplied, it was impractical to try a better microphone with a rising response, such as the Shure 444, although that would have needed a matching transformer.

The ALC system worked very well and it was virtually impossible to generate a flat-topped signal. However, the 'scope pattern verified low average speech power when operated in accordance with the manual. VOX operation was very effective and easy to set up and it was not necessary to adjust the anti-trip control, which is inside the transceiver.

Reference was made earlier to the use of the Digital VFO. During the period of use, several DX-peditions were going the rounds, most working split frequency. The FV-707DM was invaluable here, allowing the transmit frequency to be generated by the external VFO while listening to the DX on the internal VFO. By putting the "five up" or whatever frequency in the memory and pushing the "TX Select" button, the transmitted signal was automatically shifted.

On certain bands — 10m. for example — the digitally displayed memorized frequency went mad as soon as the key was pressed or the microphone used, with numbers changing at random. It was impossible to know what frequency one was transmitting on. It was assumed that some unwanted RF was

Frequency MHz	DC output watts	No. of LEDs illuminated
3.65	92	8
7.05	88	8
10.125	90	8
14.175	92	8
18.118	98	8
21.225	108	7
24.940	200!	8
28.250	120	7
28.750	116	7
29.250	113	7
29.600	113	7

Table 2. This shows the measured DC output in the centre of each existing and proposed new band and the number of LEDs illuminated indicating relative power output.

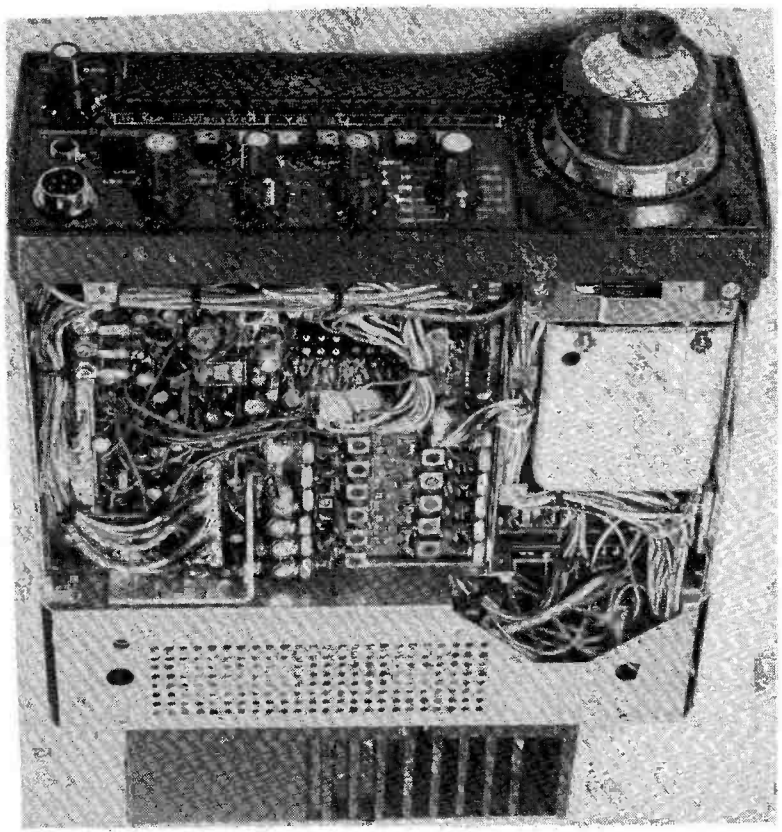

Fig. 3. Bottom view. The screened box at the right contains the VFO circuitry. The rest is the AF unit comprising the SSB generation, VOX, CW sidetone and AF circuits. The empty sockets in front of the eleven cans are for crystals for fixed frequency operation. The perforated, screened compartment at the rear houses the low and high-pass filters, with the 100 watt PA unit bringing up the rear.

upsetting the operation. This may have been due to the proximity of the aerial to the equipment or perhaps an inefficient earth. The manual recommends an earth lead less than 10 feet in length, though how this can be achieved from a first floor room is not explained.

Use with a VHF Transverter

As an enthusiastic VHF operator, the reviewer was very keen to try the FT-707 with the two metre transverter. However, this cannot be done without the use of an external relay connected to the transceiver's aerial socket wired to route the RF to a dummy load on transmit and to the transverter's 28-30 MHz output on receive. A low level RF output, phono-type socket is provided to drive a transverter. The output is 220 mV. across 50 ohms, equivalent to a paltry *milliwatt* of power. As the writer's transverter, in common with many others, needs 200 milliwatts of drive, it would have meant building a 23 dB. gain stage to enable the "Wayfarer" to be used with the "Europa" transverter.

The FT-707 was, however, used as a tunable IF and proved to be a virtually "bomb-proof" combination. With such a sensitive receiver, though, attention must be paid to the overall gain distribution and it is not necessary or desirable to employ much converter gain ahead of the FT-707.

Conclusions

The Yaesu Musen FT-707 and FV-707DM are unquestionably very advanced pieces of engineering and a far cry from the bulky and inefficient valve-type transceivers of the 1960s. The quality of the components and workmanship are high, all the components being clearly identified on the p.c.b's making servicing simple. On reflection, it is quite astonishing to realise that an eight band, CW/SSB/AM, 240 watts transceiver can be accommodated in such a small case. It is a pity that 160 metre coverage was not included in this ideal mobile transceiver, in view of the outcome of *WARC 1979*, but no doubt, it would be difficult to make a broadband PA covering four octaves.

For home station use, it would seem essential to use an aerial tuning unit, particularly on the higher frequency bands if a multiband aerial system is contemplated, in order to overcome the intermodulation problems referred to earlier. The FC-707 aerial coupler forms part of this "line" but was not tested.

There is little doubt that the Yaesu microphones are not worth buying as they do no justice to the rest of the equipment; spoiling the ship for the proverbial ha'porth of tar! In any case, the YM-35 scanning microphone is only necessary if one has the FV-707 DM VFO, since there is no scanning circuitry in the FT-707 on its own. The writer is convinced that a decent microphone with a rising response would transform the transmitted speech quality from mediocre to excellent.

Finally, a word of thanks to John Nelson, G4FRX, with whom lengthy tests were carried out on ten metres. As a professional broadcaster, his critical appraisal of the signal from the Yaesu station was invaluable.

N.A.S.F.

CLUBS ROUNDUP

By "Club Secretary"

ACTON, Brentford & Chiswick have their place in Chiswick Town Hall, High Road, Chiswick, on Tuesday, November 18, when G3IGM will be talking about Grid Dip Oscillators.

If you operate your rig in the /M style, and a lot of us do, then you should consider the idea of joining **A.R.M.S.** All the details can be obtained from the Hon. Sec. — *see* Panel.

The George Hotel in Axminister is, we understand, the new home of the **Axe Vale** gang, on the first Wednesday of each month. However, since their letter was written before the meetings there could commence, and we've heard no more, perhaps it would be a good thing to check with the Hon. Sec. at the address shown against the club in the Panel.

Every evening of the week there is something going on at the Hq of the **Barking** lot in Westbury School, Westbury Recreation Centre, Ripple Road, Barking. The "proper" club night is on Thursdays, and the Morse class takes the Tuesday evenings; the rest, it seems, are open dates.

B.A.T.C. caters for the interests of the amateur television fraternity, and we note also a developing interest in the application of home computers to ATV stations. Details from the Hon. Sec. *see* Panel, and note the new address.

At **Bishops Stortford** the group foregather in the British Legion Club, at the top of Wind Hill. Wind Hill runs out of the town to the west, heading for Much Hadham. It has always been a matter of the third Monday in the month, and there is usually something arranged to interest. Generally, arrival a few moments before 8 p.m. and straight into the bar will result in your hearing the familiar jargon of amateur radio over towards the window, until the Hon. Sec. begins to prise them out and upstairs to the Committee Room, where the meeting proper starts.

Bournemouth have their base at the Dolphin Hotel, Holdenhurst Road, Bournemouth, where they are set up for the first and third Fridays in each month, 7.30 for 8 p.m. Between the date of their newsletter and your reading this, they have an AGM, and thus the new committee will be getting busy on the new programme.

On we go now to **Bury** where the venue is the Mosses Community Centre, Cecil Street, on Tuesdays, with the main date on the second Tuesday each month. Thus we see November 11 down for a Surplus Equipment Sale. It is pleasing to note from their letter that they have been regaining old members and recruiting some new ones of late — someone is putting some effort in, which can't be bad!

At **Cornish,** the October date was at a different venue with seating for 170 — we wonder they don't try always for that as the usual SWEB Clubroom, Pool, Camborne is *always* bulging on meeting nights! November 6 is down for a Surplus Equipment Sale, just right for those who have brought goodies back from Leicester and have to get rid of something quick to placate the XYL!

Crawley's newsletter editors sound somewhat disillusioned about their efforts, largely due to the number of folk who ring them up to ask what's on at the next meeting; from which they deduce no one reads their effort. Not so, we think. Probably the painstaking ones "just checking" because they've misunderstood something on the local natter-net, or because they've forgotten where to look! Seriously it's a good one — we always read it from cover to cover. Now it tells us that at Trinity Church, Ifield, on November 26, they will have both the RSGB's RR, G3MDO, and the AR, G3JMB to explain all about RSGB.

Cray Valley's base is at Christ Church Centre, High Street, Eltham on the first Thursday in each month. This is November 4. We were saddened to see two obituaries on the back page of the current newsletter, and we offer sympathy to the relatives, and the club.

MCC! MCC! Get your gear together, gird your best operators, put up the best aerials ever, and prepare to do battle! Dates and Rules were given in full on p. 494 in last month's issue. All good clean fun, no butting or low blows. Roll up and beat the champs! If you can't beat the champs, at least you can beat that other mob down the road — so get them to make an entry as well to prove it!

Appeal

In the Cray Valley newsletter we have a transcript of letters passing between G2BVN and the club, with the trigger a letter from AMSAT-DL. In essence it says that the replacement of the lost *Oscar* is "on" given only the needful funds, for a 1982 launch. All the team's key people are staying on, money is the holding factor. One pound (two pints of beer or thirty fags!) from every amateur in the UK will virtually guarantee success in the appeal from the UK angle. Have a whip round at the next club meeting, or a raffle or something similar, and send the proceeds to AMSAT-UK, c/o 94 Herongate Road, Wanstead Park, London E12. Mark the outside of the envelope "AMSAT Project OSCAR" — and as for you chaps who don't belong to clubs, send *your* contributions direct.

Back to Work!

It's not very often we stop in the middle of "Clubs" for an appeal, but we couldn't let that one pass!

Crystal Palace now, and they have some more Silent Keys to report — G2VB, G2FOZ and G3ADL, all of whom had something to do with the build-up of club life in the area, and all will be missed. To turn to the November meeting, the group will be at Emmanuel Church Hall, Barry Road, London SE23, on November 15 (a Saturday evening) to hear a talk on Generating Electricity from G4AVV and G8GJO.

If you are interested in D/F, then **Dartford Heath D/F** are, so far as we know, the only club having this as a prime interest. On the other hand they do have a lot of other activities and a very good newsletter. They have just seen their tenth anniversary and it was good to hear that Maureen, G3XVC, who was one of the founding group was out hunting again. Details from the Hon. Sec. — *see* Panel; meetings generally are at the Scout House, Broomhill Road, Dartford, Kent.

At **Derby** the club have a place of their own at 119 Green Lane, on the top floor. Every Wednesday there is something set up: November 5, Bring and Buy Sale; on 12th a visit by *J. Birkett* of Lincoln; 19th a talk on Practical Computing, and 26th on Aircraft Safety. The one on 19th, by the way will be illustrated by several different varieties of home computer.

Name and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB.
A.R.M.S.: N. A. S. Fitch, G3FPK, 40 Eskdale Gardens, Purley, Surrey CR2 1EZ.
AXE VALE: Mr. & Mrs. Retter, G4JBG, 48 Fairway Rise, Chard, Somerset TA20 1NT. *(Chard 4163).*
BARKING: A. Sammons, G8IZN, 80 Lyndhurst Gardens, Barking, Essex IG11 5BZ. *(01-594 2471)*
B.A.T.C.: M. Cox, G8HUA, 2 Holmes Lane, Bottesford, Scunthorpe.
BISHOPS STORTFORD: T. E. White, G8LXB, 79 Elmbridge, Old Harlow, Essex.
BOURNEMOUTH: G. R. Freeth, G4HFQ, 9 South Avenue, New Milton, Hants. BH25 6EY. *(New Milton 618092)*
BURY: M. Bainbridge, G4GSY, 7 Rothbury Close, Bury, Lancs. BL8 2TT. *(061-761 5083)*
CORNISH: S. T. S. Evans, G3VGO, "Glengormley", Carnon Downs, Truro. Cornwall. *(Devoran 864255)*
CRAWLEY: D. L. Hill, G4IQM, 6 Reigate Close, Pound Hill, Crawley, West Sussex RH10 3TZ. *(Crawley 882641)*
CRAY VALLEY: P. J. Clark, G4FUG, 42 Shooters Hill Road, London SE3. *(01-858 3703)*
CRYSTAL PALACE: G. M. C. Stone, G3FZL, 11 Liphook Crescent, London SE23 3BN. *(01-699 6940)*
DARTFORD HEATH D/F: A. R. Burchmore, G4BWV, 49 School Lane, Horton Kirby, Dartford, Kent DA4 9DQ.
DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. *(0332 556875)*
DOUGLAS VALLEY: H. Hughes, G4HSC, Brockley House, Warrington Road, Goose Green, Wigan. *(Wigan 41670)*
DOVER: P. Chamberlain, G8EGT, 59 Capel Street, Capel-le-Ferne, Folkestone, Kent CT18 7LY. *(Folkestone 42387)*
DUMFRIES & GALLOWAY: C. Rodgers, GM8TKA, 5 Elder Avenue, Lincluden, Dumfries DG2 0NL.
EAST LONDON RSGB: R. Holmes, G3PKQ, 92 Dunedin Road, Leyton, London E10 5NJ. *(01-558 2928)*
EDGWARE: D. L. Lisney, G3MNO, 119 Draycott Avenue, Kenton, Harrow HA3 0DA. *(01-907 1237)*
EDINBURGH: A. Nadauld, GM3RFQ, 171 Causewayside (2F/1), Edinburgh EH9 1QF. *(031-668 1749)*
EXETER: G. Draper, 1 Carlyon Close, Heavitree, Exeter EX1 3AZ. *(Exeter 37170)*
EX-G Radio Club: F. W. Fletcher, G2FUX, 53 St. Ives Park, Ringwood, Hants. BH24 2JX. *(Ringwood 3561)*
G-QRP: G. C. Dobbs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham B37. *(021-770 5918)*
GUILDFORD: L. Bright, G4BHQ, 4 Dagley Farm, Shalford, Guildford, Surrey. *(Guildford 76375)*
HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford. *(Hereford 3237)*
IPSWICH: J. Tootill, G4IFF, 76 Fircroft Road, Ipswich. *(Ipswich 44047)*
I.R.T.S. (Region 1): G. Gervin, EI8CC, 185 Elton Court, Leixlip, Co. Kildare.
ISLE OF WIGHT: T. Fallick, G4FYI, "Harmony", Main Road, Chillerton, Newport I.o.W. *(Chillerton 328)*
JERSEY: S. Smith, GJ8EZA, 19 Parade Road, St. Helier, Jersey, C.I. *(Jersey 23249)*
KIDDERMINSTER: R. Manton, G4ILQ, 7 Osborne Close, Offmore Farm Estate, Kidderminster. *(Kidderminster 4930)*
MELTON MOWBRAY: R. Winters, G3NVK, 32 Redwood Avenue, Melton Mowbray LE13 1TZ. *(Melton Mowbray 3369)*
MEXBOROUGH: I. Abel, G3ZHI, 9 Grove Terrace, Maltby, Rotherham, Yorks. *(0709 814911)*
MILTON KEYNES: W. Backhouse, G4HZI, 46 Tattenhoe Lane, Bletchley, Bucks. *(Milton Keynes 77479)*
NORTHERN HEIGHTS: M. Topham, G8NUC, 1200 Gt. Horton Road, Bradford. *(Bradford 73271)*
NOTTINGHAM: M. C. Shaw, G4EKW, 50 White Road, Nottingham NG5 1JR.
R.A.I.B.C.: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.
REIGATE: Dr. J. S. Roberts, G8FDJ, 15 Bakehouse Road, off Horley Row, Horley, Surrey.
ROLLS-ROYCE (Barnoldswick): L. Metcalfe, G4IEX, 1 Park Avenue, Saltforth, by Colne, Lancs. *(Barnoldswick 813433)*
ROYAL NAVY: M. Puttick, G3LIK, 21 Sandyfield Crescent, Cowplain, Portsmouth PO8 8SQ. *(Waterlooville 55880)*
ST. NEOTS: P. Herod, G8TQI, 49 Luke Street, Eynesbury, St. Neots, Cambs. *(Huntingdon 74642)*
SOUTH DORSET: R. Cridland, G3ZGP, 13 Clarendon House, Redlands, Weymouth. *(Upwey 812893)*
SOUTHGATE: J. Fitch, G8EWG, 16 Kent Drive, Cockfosters EN4 0AP. *(01-440 7353)*
STEVENAGE: E. Godfrey, 94 Common View, Letchworth. *(Letchworth 72184)*
STOURBRIDGE: C. Williamson, G4IEB, 14 Lawn Street, Stourbridge. *(Stourbridge 2006)*
SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. *(01-642 9871)*
TYNESIDE: J. Dingwell, G4ILW, 10 Loweswater Road, Gateshead, Tyne & Wear NE9 6TN.
VERULAM: A. Clarke, G8MAE, 24 Kiln Ground, Hemel Hempstead HP3 8EZ. *(Hemel Hempstead 64751)*
WACRAL: L. Colley, G3AGX, Micasa, 13 Ferry Road, Wawne, Nr. Hull HU7 5XU.
WATERSIDE: C. Saunders, G4KCM, 35 Forest Edge Estate, Fawley, Southampton SO4 1FN. *(Fawley 893200)*
WEST KENT: B. P. Castle, G4DYF, 6 Pinewood Avenue, Sevenoaks, Kent TN14 5AF. *(0732 56708)*
WIRRAL: G. O'Keefe-Wilson, G8VPE, 20 South Drive, Upton, Wirral. *(051-677 1531)*
WORCESTER: M. Tittensor, G4EKG, 16 Dursett Road, Evesham, Worcs. WR11 6EQ. *(0386 41105)*
YEOVIL: D. L. McLean, G3NOF, 9 Cedar Grove, Yeovil.
YORK: K. R. Cass, G3WVO, 4 Heworth Village, York.
1ST RAINWORTH SCOUTS RADIO CLUB: J. M. Coates, G4GYU, 30 Abbott Road, Mansfield, Notts.

Douglas Valley newsletter has a map of the club location on its front cover. For details of the club programme either contact the Hon. Sec., *see* Panel, or toddle along to Shevington Conservative Club on Thursday evenings, *except* the second one in each month, and they are in the upstairs room.

At **Dover** we find ourselves in a bit of a quandary as to the clubs "proper" title. Anyway, they are at the YMCA, Godwyne Road, Dover. November 5 is a natter-nite, on 12th G8HNZ will talk about "Technical Aids for the Blind" (how about making a tape-and-slide one of this?). November 19 is down for a session on Project De-bugging, and on 26th Contest Preparation forms the subject. There is talk-in available from G3YMD on S20, or GB3KR, for any visitors.

Dumfries and Galloway are based on the Cargenholm Hotel, Newabbey Road, on the first and third Mondays of each month. November 3 is to be a social evening at Cargenholm Hotel and on 17th there will be a lecture-demonstration on "Satellite Picture Techniques" by GM8FRD.

At the time of writing **East London RSGB** will have begun activity after the summer lay-off. They are at Wanstead House, 21 The Green, Wanstead, E11. November 16 at 3 p.m. sees G8DPB giving a talk and demonstration on 10 GHz — away from all the squeakers and jammers!

It's nice to hear a club secretary saying his programme is firm until the end of the year — **Edgware** are in that happy state. November 13 is set aside for G3BNL to talk about Microwaves, and November 27 is the informal, both meetings being at Watling Community Centre, 145 Orange Hill Road, Burnt Oak, Edgware.

On we go to **Edinburgh** where we are told the group still have their place at Carlton Hill Observatory, each Tuesday saving for Christmas and the New Year. Details on the doings can be obtained from the Hon. Sec. — *see* Panel.

Exeter have had a shift-round in their November programme which now reads November 3 "Any Questions", in which a lecturer from the local college will attempt to answer the sort of questions which may crop up in RAE; and on November 10 there will be a Surplus Sale. Hq is at the Community Centre, St. Davids Hill in Exeter.

The **Ex-G Club** is for those who were born in UK or whose parents were born or naturalised in UK but who are domiciled abroad. Details from the UK Hon. Sec., at the address in the Panel.

Now we come to a club which is also very much international in membership, namely the **G-QRP Club**, which now has almost 900 members, an increasing proportion of whom come

from overseas. Every issue of the club magazine, *Sprat,* has lots of interesting stuff in the way of QRP gear articles, and talk of interest to the members.

At **Guildford** the venue is at the Hq of Guildford Model Engineers Society, in Stoke Park, on the second and fourth Fridays. November 14 is down for an Equipment Sale, and on 28th there is the Construction Contest.

It's the month for getting rid of the junk and getting silverware for the sideboard (if you do things right, that is!) at **Hereford.** November 7 is down for the Grand Junk and Equipment Sale, and on 21st comes the Construction Contest for which a big entry is hoped this year. The Hq address is County Control, Civil Defence Hq, Gaol Street, Hereford.

On to **Ipswich** where the long timetable they sent earlier in the year has now run out (*hint!*). So — we must refer you to their keen Hon. Sec. at the address in the Secretaries' Panel.

I.R.T.S. usually send over their newsletter, but it hasn't turned up at the time of writing, so for details on any of the activities in Eire we refer you to the Hon. Sec. — doubtless he will be able to point you in the right direction! His name and address appear in the Panel.

Isle of Wight have forgotten to tell us when they foregather, although they did quote the venue. Luckily we have a card-index for such eventualities and we can say look for them on Friday evenings at Unity Hall, Wootton Bridge, I.o.W.

In **Jersey** the venue is the Communicare Centre, Quennevais, St. Brelade, on the second Wednesday evening in each month. At the time of their newsletter writing the November 12 date was an Open evening.

At **Kidderminster** they have an excellent newsletter which tells us that on November 11 they have a film show, at Aggborough Centre, Hoo Road, Kidderminster.

One thing we can always guarantee and that is the notice of the AGM from **Melton Mowbray;** a pity it's dated for September 19 and we are writing the November piece! However, this doesn't alter the fact that the group are and have been steadily operating at St. John Ambulance Hall, Asfordby Hill, Melton Mowbray for more years than your conductor has been writing this piece. Details from the Hon. Sec. — *see* Panel for his address.

Every Friday evening is the time for the **Mexborough** lot, at Dolcliff Hall, Dolcliff Road, Mexborough, with the early starting time of 7 p.m.

November 10 at the Lovat Hall, Newport Pagnell is the date and venue for the **Milton Keynes** group who will be hearing about Rocket Propulsion.

Now we are off up North, to **Northern Heights** and their Hq at the Bradshaw Tavern; we don't have the latest gen, but a call to the Hon. Sec. will no doubt get it for you — or just turn up on a Wednesday evening. Halifax bus routes 3 and 26 pass the door.

Nottingham have their place at Sherwood Community Association, Woodthorpe House, Mansfield Road, Nottingham. November 6 is the monthly Forum, and on 13th there is a talk on **High** Definition Television. Activity Night is on 20th, and on 27th they have a demonstration by *Lowe Electronics.*

R.A.I.B.C. is the club with the interest in the blind and disabled in our hobby; the full member is helped to become an SWL by way of a receiver, and then encouraged to head after the RAE pass and Morse test for a full licence — all this of course being done by the help of a class of members known as 'supporters' and 'representatives'. Funds of course are always needed — how about your club doing something about it?

Pressing on to **Reigate** we see they have a meeting on November 18, but we have no details. They foregather in the Upstairs Meeting Room of the Constitutional and Conservative Centre, Warwick Road, Redhill.

Barnoldswick is near Colne, Lancs., and it is here the **Rolls-Royce** club have a place in the R-R Sports and Social Centre. There is a shack for their exclusive use and the use of a comfortable lounge seating up to 70 people for their main meetings on the first Wednesday in each month. Details from the Hon. Sec. — *see* Panel.

Deadlines for "Clubs" for the next three months —

(December issue — October 31st)
January issue — November 28th
February issue — January 2nd
March issue — January 30th

Please be sure to note these dates!

The **Royal Navy** newsletter is always looked forward to, being full of news and interesting articles. Any ex-RN types would find a subscription well worth while. Details from the Hon. Sec. — *see* Panel.

At **St. Neots** they have a place at Ernulf Community Association, where they are to be found on alternate Monday evenings. More details from the Hon. Sec. at the address in the Panel.

Back down south again, this time to **South Dorset;** they have a change of venue in the offing and so we feel it would be best to contact the Hon. Sec. for the details — his address is in the appropriate place in the Panel.

November in **Southgate** sees the G6QM Trophy being competed for, by all the best home-constructed equipment experts in the club. That is on November 13 — nearly 23 years ago your scribe had an entry in that same contest for the same trophy!

On the first and third Thursdays in each month, the **Stevenage** crowd foregather in the Senior Staff canteen at British Aerospace Dynamics group, Gunnels Wood Road. November 6 is down for a talk on the Royal Observer Corps, and on November 20 a talk by G8KMG on popular music

through the ages. A special-event station/stand will be operated at Davids Book Fair at Letchworth on Saturday 29th.

Our next is a camel-train visit to **Stourbridge** where Longlands School, Brook Street is the the venue. November 3 is down for Construction, and on November 17 comes the Annual Surplus Sale.

Surrey get together at *T.S. Terra Nova,* 34 The Waldrons, South Croydon. The routine is 'first and third Wednesdays', but we do not have the current details for November; doubtless the Hon. Sec. would be pleased to tell you — *see* Panel — or why not just pay them a visit.

Up to **Tyneside** now, and Vine Street Community Centre, Wallsend, on Monday evenings. It sounds as though they are really go-ahead and enthusiastic.

Verulam have, as we have indicated in recent pieces, moved out to the Charles Morris Memorial Hall, Tyttenhanger Green, Tyttenhanger, near St. Albans. The informals in the winter are at the RAFA Hq in St. Albans. For all the latest details contact the Hon. Sec. — *see* Panel. (We could add that it's a long time since we've *not* had a duplicate updating, and even longer since they had a meeting with nothing organised!).

WACRAL is a world-wide group of committed Christian radio amateurs regardless of denomination. Details can be obtained from the Hon. Sec. — *see* Panel.

Over now to **Waterside,** a name which hides a club covering the area of Hythe, Fawley and New Forest. The Hq is at Blackfield Community Centre, 1900 clock on the fourth Tuesday of each month, and the set-up is usually to start with a talk or similar, followed by an informal discussion. More details from the Hon. Sec. at the address in the Panel.

No doubt about it, the **West Kent** newsletter is eye-catching, and interesting. Having photography as a second hobby, the writer was more than a little interested in G4DYF's chemical balance, and there is now something rather similar in "Club Secretary's" shack. November 7 sees them getting on the new bands without a new rig, courtesy G3ROO, and on November 21st, some hints on good HF operating are dispensed by G6TQ, and on VHF by G8KPZ. The Adult Education Centre, Monson Road, Tunbridge Wells is the Hq.

Up to **Wirral** where they are based on the Sports Centre, Grange Road West, Birkenhead, on the first and third Wednesdays in each month. However the newsletter we have here indicates no meeting on November 5 — we bet there'll be fireworks among the members about that! Details on what goes on can be had from the Hon. Sec. — *see* Panel.

Worcester have November 3, the venue being the Old Pheasant in New Street; we understand there is to be a talk on radio control of models.

Every Thursday evening a 7.30 you will see people going into Building 101 at Houndstone Camp, **Yeovil;** the last meeting of each month is a natter session, but the earlier ones are all "organised" with a talk or films or whatever.

When one talks about encouraging visitors, **York** must be one of the best — recently they have had as many as seven at one meeting, including ON7TH and family. They enjoyed themselves, and so would you if you went to a York meeting at the United Services Club, 61 Micklegate, York, on every Friday save the *third* one in each month.

Our final letter comes from the **1st Rainworth Scouts Radio Club,** to say they would be on in J-O-T-A for the Mansfield Scout Council. However, there is still time for us to note they have GB4RHC as their call-sign and will be at Robin Hood Camp. Details from G4GYU — *see* Panel. We could comment that this is one of the few clubs which are part and parcel of a scout troop; and why not indeed? There should be more, but of course the ACF and ATC tend to be reaching out after all the technical talent around and so the scouts get left behind. A pity.

Deadline

Will be as given in the 'box' in the body of the piece — the bold one's the MCC reminder! See you at Leicester and on the air during MCC?

For your club details, please let us have 'em here on or before the due date; the address is "Club Secretary", SHORT WAVE MAGAZINE, 34 HIGH STREET, WELWYN, HERTS. AL6 9EQ.

We don't think Ferdinand Wolf, DF3PU, is *really* trying with this rather poorly equipped mobile station. After all, having fitted his Mercedes with an IC-701 with outboard VFO, and IC-211E (both rigs with computerised remote control), electronic keyer and RF processor, Trio 70cm. FM transceiver, HAL RTTY system with keyboard and video display which can also copy conventional Morse onto the screen, SSTV and ATV receivers (both kinds of TV could be transmitted if the authorities would give permission), an oscilloscope and SWR meters, Swan 5-band HF vertical, 5-element Yagi for two metres (vertical or horizontal polarization), an HB9CV for 70cm, and various whips for two metres, the very *least* he could do is fit an autopilot, head-up display and weather radar . . .

AN INEXPENSIVE, LIGHTWEIGHT MAST

D. J. WALTERS, G4DFV

WHEN the author moved QTH recently, the new location offered a more substantial area of land on which to begin the construction of the proverbial "Aerial Farm", albeit on a much smaller scale than that at some lucky amateur stations where the operator may have access to an acre or more of ground. The new QTH had a larger garden space than that of the previous location, where the only antenna was a vertical due to lack of garden. The new garden measured 20 yards long by 6 yards wide, and it was envisaged that a longwire type of antenna system would fit comfortably within the boundaries of this area, inclusive of the necessary support provided by a suitable mast.

It was decided that a height of 30 feet would be sufficient to afford a reasonable height for the mast, whilst the distance from the base of the mast to the guy anchoring points would still be within the width of the garden, thus providing the maximum stability.

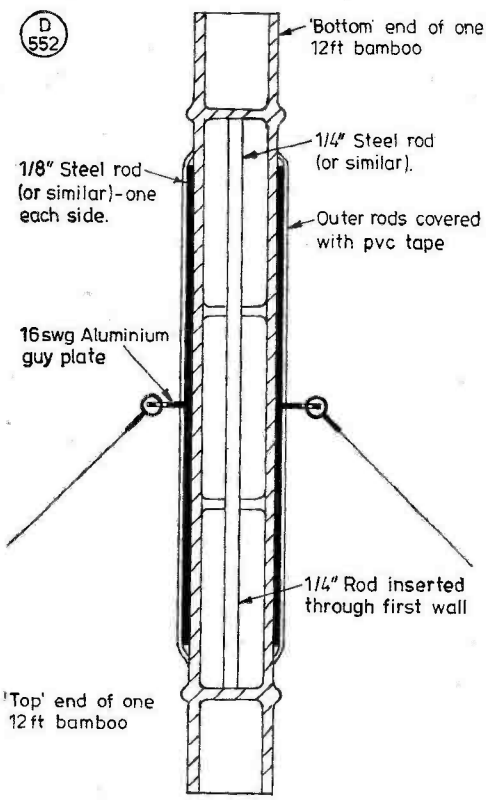

Fig. 1 SECTIONAL VIEW THROUGH JOINT IN MAST

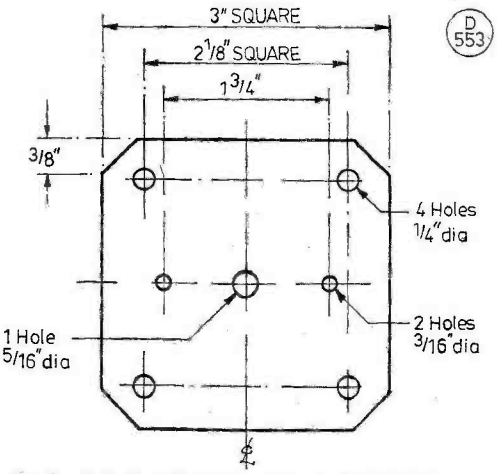

Fig. 2 GUY PLATE DETAIL (16swg Aluminium).

The choice of material for the mast was decided upon by the factors of weight, strength and durability, as well as the cost of materials. Bamboo was chosen as a suitable material, as the author already had a stock of 12 foot lengths which had been acquired from a local carpet warehouse. These cost 25 pence each, and were originally purchased with the idea of making a cubical quad antenna, but it was thought that they might make a simple yet sturdy mast which could be especially useful to the young SWL or newly-licensed teenaged amateur who might not be too well flushed financially to afford one of the more expensive commercial masts.

Construction

Constructing the mast was found to present little difficulty, and was basically straightforward, once the idea of jointing the bamboo was decided upon.

The initial consideration was the preparation of the three lengths of bamboo. Each was approximately 12 feet long, and about 1½ inches in diameter at the widest point, and tapering to about 1 inch at the other end. It was noticed that the tapering was only apparent within the last two feet of the length of the poles, so the lengths of the poles were shortened to 10 feet each.

The problem of joining them was solved by utilising lengths of ¼-inch mild steel rod, inserted through the inside 'walls' of the bamboo at the ends of the poles at the points of joining. Guy plates were then sandwiched between the joints, and lengths of ⅛-inch mild steel rod were also threaded through the guy plates and fastened to the poles at each side of the joint to prevent the guy plate from spinning round. The lengths of ¼-inch rod depended upon the distance between the walls

Table 1

Nylon Guys

Top Set = four 40-ft. lengths	Bottom Set = four 23-ft. lengths
Middle Set = four 35-ft. lengths	Lanyard = one 50-ft. lenth

Material required: 150-yds. nylon cord; three 12-ft. bamboo poles; two 2-ft. by ¼-in. mild steel rods; four 1-ft. by ⅛-in. mild steel rods (or piano wire); two 3-in. square 16 s.w.g. aluminium sheets; pulley unit; nylon aerial insulator; PVC insulating tape and aluminium paint.

inside the bamboo at the area of joining. It was decided that the rods could be knocked through the first wall nearest the end of the poles, but could rest on the second wall inside. This technique produced a fairly substantial joint, as is shown in Fig. 1. Both joints were accomplished in this manner; the guy plates were fashioned from 16 s.w.g. aluminium sheet, three inches square. The drilling details appear in Fig. 2.

The top set of guys were attached to the mast at a distance of one foot from the top, and was achieved by drilling four holes through the sides of the bamboo. After the guys had been secured, these holes were sealed with several layers of PVC adhesive tape.

At the top of the mast, a pulley unit was fixed by means of steel galvanised wire, which was wrapped around the top of the mast and through the pulley unit several times before tightening and trimming the loose ends off; several layers of tape were then applied. The open end of the top bamboo section was also sealed with tape to restrict the ingress of rainwater.

The whole length of mast was then fitted together and given two liberal coats of aluminium paint to stave off the effects of adverse weather. (One possibility here would have been to have wrapped the entire length of the mast with wide PVC tape). Whilst the paint was drying, the preparation of the guys was undertaken; these were made from strong nylon cord which was obtained for five pence per yard from a local supplier of camping material. The lengths for each set of guys is given in Table 1. A lanyard was also made from the same cord, and this passed through the pulley at the top of the mast; a nylon aerial insulator was then fastened to it, and the two ends of the lanyard were tied together to form an endless loop.

Erecting the Mast

The completed mast, with all guys fitted and suitably tied to the sides of the bamboo to prevent tangling, was then taken to the site where it was to be erected. A piece of scrap timber, about ten feet in length and some few inches square, was sunk into the ground at this point, to a depth of around four feet — this was to assist in holding the mast in the vertical position whilst the guys were tied off. Four pieces of wood about four feet long were hammered into the ground at distances of seven feet from the base of this post; these were the guy anchoring points and could have been made from metal, of course.

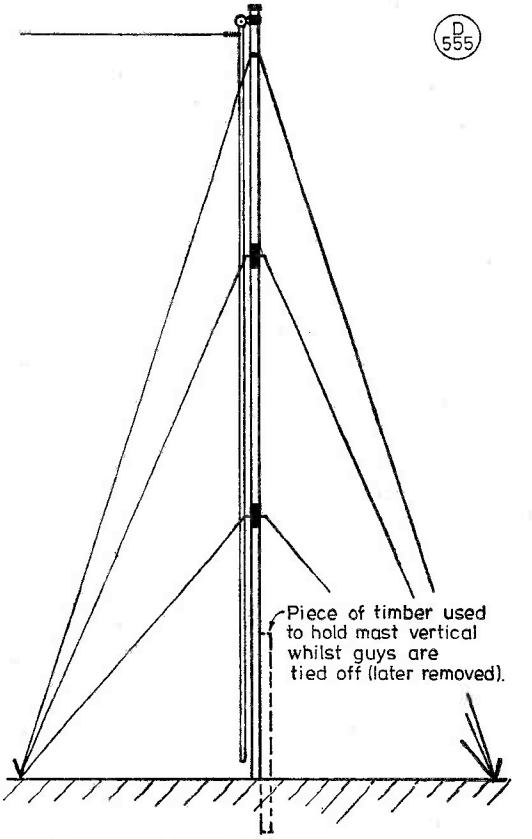

Fig. 4 GENERAL VIEW OF MAST

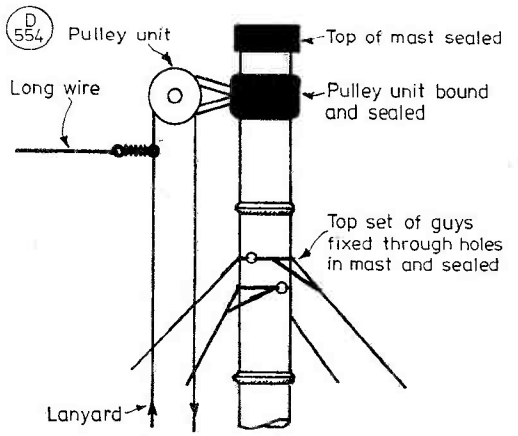

Fig. 3 TOP GUYS PULLEY UNIT & LANYARD DETAILS

The base of the aerial mast was placed against the bottom of the upright post, and starting at the pulley end of the mast, it was lifted and gradually "walked up", whilst ensuring that none of the guys got snagged on any objects. It was found to be quite easily raised into the vertical position, and whilst holding the mast to the post with one hand, two lengths of nylon cord were wrapped around the post and mast at top and bottom to hold the mast in position whilst the guys were secured. The top set of guys were temporarily tied off, then the middle set followed by the bottom set.

Lastly, the guys were tensioned up properly to keep the mast in a vertical position, the post supporting it was removed and the ends of the guys were wrapped up into neat bundles. The longwire was then passed through the nylon insulator attached to the lanyard, and hoisted into position.

December issue due to appear on Friday, November 28th.

VHF BANDS

NORMAN FITCH, G3FPK

Awards News

TWO more 2m. VHF Century Club certificates have been awarded this month. No. 326 goes to Ernie Phillipson, G3NVE from Goole, North Humberside. He was first licensed in 1959 starting off on 160m. CW working his way up to 70cm., although his interest in radio goes back to schooldays in 1934. Most of Ernie's 100 QSLs confirm AM contacts in the late sixties, early seventies, well before the FM and SSB era. His Tx then was a home made one using a QQV03-10 PA at 10 watts. To keep in touch now, a *Uniden* 2030 is used on FM mode, the aerial being an 8-ele. *Yagi* in the vertical plane. Ernie also operates on 70cm. using a home made *BAY 96 Varactor* Tripler from 2m. An 18-ele. *Parabeam* at 40ft. is the aerial while the Rx is a modified TV and VHF/UHF tuner, used mainly for receiving amateur TV signals.

Flemming Jul-Christensen, G8RMA, from Eastbourne, E. Sussex, receives certificate no. 327. He hails from Denmark where his call is OZ1EVA, but has lived over here for 15 years. His British call was issued in October 1978 since when he has been very active, sending out about 1,500 cards. In common with many others, he finds the QSL return rate appalling so has resorted to the expensive method of direct QSL-ing for new countries and squares. All G8RMA's cards were for non-U.K. contacts. The station comprises a *Trio* TS-700S with *Sentinel* PA giving 58 watts output, the aerial being a *Tonna* crossed 9-ele. *Yagi*. A transverter 144/432 MHz enables 70cm. to be used, the aerial being a crossed 19-ele. from *Tonna*. All the gear is powered from a 25 Amp. regulated P.S.U. Flemming is learning morse so that he can get on the HF bands to works some old friends.

On the QTH Squares Century Club scene, Mike Lee, G3VYF, holder of certificate no. 7, has got his sticker for 150 squares, his confirmed tally now standing at 154. His cards show a nice mixture of SSB and CW modes, and Tropo., MS and *E's* contacts.

Frequent requests are received for details of the Magazine's two VHF/UHF awards — the VHFCC and QTHCC. An *s.a.e.* will bring full details.

Oscar Topics

Following the loss of *A-O-9*, AMSAT is now constructing two more Phase 3 satellites, labelled "B" and "C". AMSAT-UK Secretary Ron Broadbent, G3AAJ, met Dr. Karl Meinzer, DJ4ZC, in London recently and learned that two transponders are planned, one operating in the 24cm. band. At the Geneva Conference last year, the band 1.24-1.26 GHz was agreed for amateur satellite services, but Ron was unaware of whether an uplink or downlink is planned for Phase 3B and 3C.

The next issue of *Oscar News* is at the printers as this is being written and should be in the mail to AMSAT members as you read this. In response to many requests, AMSAT-UK has published a booklet entitled, *The Best of Oscar News*, which is a self-explanatory description of its contents. The cost is £1.50 post included and it contains essential reading for all newcomers to satellite communication, as well as being a most useful reference book for the old hands. For full details of the activities, publications and supplies of AMSAT-UK, drop a line to G3AAJ at 94 Herongate Road, London, E12 5EQ enclosing an *s.a.e.*

Contest News

Brass pounders will be at it on 2m. on Nov. 2 for the six hour CW contest which starts at 1000GMT. This is a two section affair for either single or multi-operator stations with radial ring points scoring. The Cray Valley RS has the 2m. leg of its three activity contests on Nov. 16 from 1000 to 1300GMT. This event is open to all amateur and *s.w.l.'s* and is an all-mode contest. Usual RS(T) and serial number exchanges plus *administrative*, as distinct from postal, counties. Cray Valley members will identify by the letters "CV" and for working the club stations G3RCV and G8FCV you can claim 10 points. 3 pts. for working members and 2 pts. for members working each other; all other QSOs are worth one point. Final score to be points multiplied by total of counties plus countries. CVRS members' logs to G4DFI, 28 Garden Avenue, Bexleyheath, Kent, DA7 4LF. Non-members' entries to Bob Treacher, 79 Granby Road, London, SE9 1EH, by Dec. 14.

The 2m, Fixed contest is scheduled for Dec. 7 from 0900-1700GMT. This is another single or multi-operator one. There are four sessions in the 432 and 1,296 MHz *Cumulatives* in November on the 3rd, 11th, 19th and 27th. The 70cm. periods are 1900-2100 and the 23cm. ones, 2100-2300GMT. Scoring at one point per kilometre from the best three of the total of seven periods.

Repeater Notes

A new VHF relay has been commissioned, GB3WR on the Mendip Hills, near Wells in Somerset. It is on channel R0, which is 145.000MHz input and 145.600MHz output, for the uninitiated. Last month's comments on illegal operation brought a long letter from a reader giving details of the people using the three cells mentioned. One of them has now obtained an amateur licence. Hopefully other pirates will follow this lead.

VHF Convention

At long last, the RSGB has booked what promises to be an ideal venue for the popular, annual VHF Convention. The 1981 event will be held at the Sandown Park Racecourse, just north of the A3 in Esher in Surrey. This is now a fine, modern complex with some 10,000 square feet of exhibition area. Consequently, there will be no need to exclude the showing of VHF and UHF complete transceivers, etc. Naturally, being a racecourse, there is very ample parking space. The date is the later one of April 11, the weekend prior to Easter.

Gigahertz Bands

One of the best tropospheric lifts for years occurred on October 3 and it is certain that many "firsts" and new records will have been established when the final picture emerges. The ridge of high pressure responsible produced some excellent propagation from parts of the U.K. into central and eastern Europe. For example, the *GB2RS* News Bulletin on Oct. 12 mentioned a new record 13cm. band QSO between stations in YK and HK QTH squares.

Dave Sellars, G3PBV, (Devon) did not spend much time on 23cm. since it is difficult for him to change over at present. Consequently he missed out on

the Oct. 3 event but mentions that Bob Short, G3GNR, (XK20g) and G3AUS both worked into OK-land. On Sept. 26, Dave gave Jack Readings, GU3KFT, his first QSO on the band. Mike Hearsey, G8ATK, (Surrey) has a home brewed transverter on 23cm. being an amalgam of designs and ideas from several sources. It gives one watt output. Between 2307 and 2343 on Oct. 3 he was copying HB9AEN/P (DG13b); DK6AS (FM44d); DD3KF (DK21b) and DC51V (EI03j) but could not raise any of them. He mentions the appalling QSL return from 23cm. portable stations.

Ray Cox, G8FMK, (Oxen.) has a very respectable total of 25 counties and 3 countries on 23cm. and in his letter, mentions the UHF contest on Oct. 4/5. He found northern station workable only with difficulty on the 4th and inaudible on the 5th, but better, if unstable, conditions to the south to east. Best DX on 23cm. were G8SDS/P (Dorset) and G3XDY/P (AM67f) in Suffolk.

Tony Collett, G8GXE, (Bucks.) likes the idea of a four band annual table with 23cms. added; more on this later. In the Oct. 3 affair, he had only managed to hear PA0EZ for about 30 seconds until 0012, when Tony worked OK1KIR/P at S7 each way for the first QSO outside the country. During the contest, 23 contacts were made on the band, the best DX being G8SDS/P at 157 km. Only 8 portables were worked. Pete Connors, G8LEF, (Huddersfield) has finally abandoned his aerial tower planning appeal and has taken the other option — move! A new QTH still in ZN21d, has been bought, 1,150ft. *a.s.l.* with half-acre field attached. As the area already has a few 100-200ft. masts, he does not expect trouble this time.

Welcome to David Coupe, G8LZM, who writes from Co. Cleveland, pointing out that UHF activity is not quite lacking there. John Thompson, G3NWU, (Co. Durham) is QRV on 3cm. and 23cm. although work commitments curtail his activity. David's best DX on 23cm. so far is SM6HYG at 827 km. which resulted in *RSGB Microwave Distance Award* no. 20. His UHF set-up starts on 2m. with an *Icom* IC-211E, feeding a *SOTA* transverter giving 2 watts through lossy *UR67* coax, to a 15-over-15 *Yagi* at 30ft. He has a pre-amp. at the mast head. Another new correspondent is Pam Rose, G8VRJ, (Lincs.) who operates on 2m. and 70cm. and hopes to get onto 23cm. next year.

THREE BAND ANNUAL VHF TABLE

January to December 1980

Station	FOUR METRES		TWO METRES		70 CENTIMETRES		TOTAL
	Counties	Countries	Counties	Countries	Counties	Countries	Points
G4CMV	50	6	72	20	54	12	214
GD2HDZ	45	6	60	14	38	7	170
G4HNS	41	5	59	12	43	9	169
G8GXE	—	—	65	19	53	14	151
GJ4ICD	—	—	64	26	42	17	149
G3PBV	15	4	56	15	42	10	148
G8OPR	—	—	65	23	51	8	147
G3BW	—	—	72	25	37	7	141
G8TFI	—	—	59	20	42	11	132
G8VLQ	—	—	67	17	38	10	132
G8FMK	—	—	62	14	43	9	128
G4BYP	36	5	49	11	23	4	128
G8IFT	—	—	61	11	41	9	122
G8MFJ	—	—	64	17	30	8	119
G3FIJ	39	6	44	10	16	3	118
G8HHI	—	—	55	11	40	9	115
G4BWG	13	3	56	17	9	6	104
G4DEZ	—	—	69	29	—	—	98
G8KAX	—	—	43	11	31	8	93
G4IGO	—	—	65	28	—	—	93
G8VR	5	1	53	23	8	1	91
G4ARI	27	4	48	12	—	—	91
G3FPK	—	—	68	21	—	—	89
G3CO	22	3	36	11	9	4	85
G8KGF	—	—	48	14	17	6	85
G4ERX	15	2	30	10	18	8	83
G4FKI	36	5	20	6	9	7	83
GW3CBY	20	5	30	9	10	5	79
GM8TSI	—	—	53	13	5	2	73
G3KPU	—	—	33	5	28	6	72
G8RWG	—	—	58	14	—	—	72
G4HGT	—	—	63	9	—	—	72
G3EKP	22	5	18	6	8	5	64
G8TIN	—	—	51	13	—	—	64
G8VJJ	—	—	50	13	—	—	63
G8JJR	—	—	28	7	19	1	55
G8RZA	—	—	43	11	—	—	54
G8VFV	—	—	45	8	—	—	53
G8JGK	—	—	35	13	—	—	48
GM8MNG	—	—	39	6	1	1	47
GW3MHW	40	5	—	—	—	—	45

Hank Berg, SM6CEN, from Billdal, used to operate from the famous, UHF orientated, Chalmers Technical College club station, SK6AB, but now writes that he is only QRV from home. He says that UHF activity is good on the west coast with all squares, except GS, active. On 13cm. the most active stations are SM6FHZ (GQ); SM6ESG (GR) and SM6HYG (FS). Hank tells of a beacon, SK6UHG, on 1,296.925 MHz which was commissioned on Aug. 1. The output is 10 watts to a *Big Wheel* aerial. Initially, this beacon was to operate from the city of Gothenburg (FR30j) then, after any problems have been cured, it will be moved to a site in the Gothenburg Archipelago (FR28/29) affording the possibility of sea ducting to the U.K.

Claus Neie, DL7QY, who moved from Berlin to Rudolfsberg in Bavaria some while ago, is now up to 42 squares worked on 23cm. from FJ61e. During the tropo. opening of Sept. 2, when no beacons were audible, he worked G3PBV (YK32b); G4KBC (AL34a).

Seventy Centimeters

Brian Bower, G3COJ, (Bucks.) has now got his 70cm. aerial up again in time to work some new squares — BH, CH, DG and YH — in the Oct. 3 lift. G3PBV found an opening on Sept. 29 when some German, French and Dutch stations were raised, all at good strength. The next day, HB9F beacon, (DG40c) on 432.984 MHz., was pounding in. His contacts included F1FNY (DG) who was very strong, and HB9BPQ (G8BGQ) in Geneva. On Oct. 3, Dave's QSOs included OK1KIR/P at 1,171 km., DL7QY (FJ); DC3ID/A (EJ) and DF8FJ/P (FH). OK1AIY/P (HK) and OE2CAL (GH) were coming in well but he could not crack the pile-up. The contest weekend was a bit of an anit-climax, by contrast.

Mike Lee, G3VYF, (Essex) now leads the square table on 70cm. and this thanks to the Oct. 3 affair, his tally including; — OE2CAL; DF3RU (FJ); DK0NA (FK); DL7HR (FI); OK1KIR/P (GK) and G3GNR (XK). On Oct. 5, F9ZG/P (ZI) and F1AUB/P

(BD) were added. Clive Morton's, G4CMV, (W. Yorks.) letter covers his doings in September when, during the contest weekend of the 6th and 7th, he worked F1BYM (ZE). On the 26th., F1CPX (AH) and F6CFJ (ZH) were added. Ray Elliott, G4ERX, (Essex) has not had much time to operate recently but added DL7QY in FJ for square no. 45 on Oct. 3.

Dave Thorpe's, G4FKI, (Essex) 10 watts of SSB raised OK1KIR/P on Oct. 3 to boost his countries total on the band. From St. Austell, (XK56b) Martin Blythe, G4HFO, now has a *Microwave Modules* 50 watts PA unit which, together with its receive pre-amp, has greatly improved his capability on the band. On Sept. 2, he contacted LX1DB (DJ); HB9QQ (EH); HB9BPQ (DG) and DL7QY. A welcome QSO with GW8VHI (YL32f) gave Martin his 9th country.

G8ATK lists F, PA and DL QSOs on Sept. 2 between 1755 and 2152, the best being F1BUT (AD) and DK0NA (FK). The fine condition on Oct. 3 brought a further crop of DX including DF8FJ/P (FH); OE2CAL; DL7QY; DF3RU (FJ); LX1DB and OK1KIR/P. A surprise contact during the Sept. 6/7 contest was with EI2DJ/P (WN) for G8FMK, while the Oct. 3 affair saw QSOs with F1CYB (BH) and F1BCS (BJ). In the UHF contest on Oct. 4/5, Ray's best effort was DL9GS (DL).

G8GXE also worked EI2DJ/P in Dublin and later GM4BVE/P (Dumfries & Galloway) in the Region 1 event. Tony noticed the very selective ducting on Oct. 3. He spent most of the time on 70cm. working DLs in DK, DJ and FH squares, OE2CAL, OK1KIR/P, ON5FF and HB9AEN/P (DG) who was S9-plus-20 dB. at 2359. LX1DB was a gotaway, unfortunately. During the contest in the next couple of days, he made 80 QSOs with assorted DL, F, ON, PA and British stations.

John Hill, G8HUY, (Hayling Is.) netted 11 countries and 34 squares during 12 hours on Oct. 3. Best DX was OE2CAL at 1520 whom he called again later, at 1817, with GW8GKF in tow, for the latter to work the OE. John was running just 6 watts output to a home made 27-ele. *Q-L-Y* at 15m. He mentions that beacon HB9F was audible for *four days* before the lift but there was no activity in that direction. He reports that G8HND in Portsmouth worked a Polish station in JM square that evening.

Paul Broadhurst, G8LGL, (Avon)

QTH LOCATOR SQUARES TABLE

Station	23 cm.	70 cm.	2 m.	Total
G3POI	—	—	298	298
DK3UZ	—	—	252	252
I4EAT	—	25	238	263
G3IMV	—	—	230	230
G3CHN	—	—	196	196
G3VYF	—	82	186	268
EA3LL	—	15	185	200
G3SEK	—	—	182	182
GJ4ICD	—	80	180	260
9H1CD	—	13	178	191
G4ERG	—	16	174	190
G3FPK	—	—	167	167
9H1BT	—	11	163	174
G4IGO	—	—	160	160
G3KEQ	—	—	159	159
G4IJE	—	—	157	157
G4CMV	13	58	156	227
GM4COK	—	12	154	166
G3BW	3	26	140	169
GM4CXP	—	25	136	161
G8HVY	12	73	130	215
G4BWG	—	32	129	161
G4DEZ	—	—	128	128
G8GML	11	74	122	207
G8LGL	—	25	121	146
GJ8KNV	2	54	119	175
G3COJ	24	70	111	205
G8ATK	5	56	111	172
G8IXG	—	—	111	111
G4AWU	—	22	110	132
G3JXN	39	81	107	227
G8HHI	1	40	107	148
G8LFJ	—	—	106	106
G8MFJ	—	23	105	128
G3OHC	4	33	104	141
G3PBV	9	55	102	166
G8OPR	1	36	102	139
G8LEF	22	62	101	185
G4FBK	—	5	100	105
G8LHT	7	39	98	144
G8KGF	—	20	95	115
G2AXI	2	54	93	149
G8TFI	—	43	93	136
G4ERX	5	45	92	142
G3KPU	—	25	91	116
G6UW	—	1	89	90
G8KPL	—	7	87	94
G8VR	—	3	87	90
G8GXE	8	51	84	143
GM8NCM	—	12	84	96
GD2HDZ	12	41	83	136
G4HYD	—	40	83	123
G4JZF	—	—	82	82
G4GHA	—	7	79	86
G8JAG	—	7	79	86
G8JJR	—	9	78	87
G8KSP	—	2	76	78
G8TGM	—	—	76	76
G8KAX	2	40	74	116
GJ2RAX	1	27	74	102
G3SPJ	10	36	71	117
G4HFO	—	46	68	114
G8IFT	14	30	68	112
G3FIJ	—	27	68	95
GI8EWM	—	25	67	92
G8JGK	—	—	62	62
G4AEZ	5	29	61	95
G4GEE	—	28	60	88
G8RMA	—	7	60	67
G8VLQ	—	22	58	80
G4GNT	—	1	56	57
G8FMK	13	49	54	116
G4GSA	—	6	51	57
G8RWG	—	—	50	50
G8VFV	—	—	33	33

Starting Date January 1, 1975. No satellite or repeater QSOs. "Band of the Month" 2m.

caught F1DYD (XH) on Aug. 9 and on Sept. 2, F2TU (DI) and DL7QY. Oct. 1 saw another new square from F1FNY/P in DG. On the 3rd, the afternoon period produced F9NL (AD); F1CYB (BH) and DF1VW (DJ) but OE2CAL could not be raised. Some midnight oil burning netted DC5IV (EI); DL7QY; ON5FF and HB9AEN/P. G8LZM's 1980 tally is 41 counties, 11 countries and 30 squares. David now has a very sharp 88-ele. *Multibeam* at 33ft. and runs 50 watts to it from a *Microwave Modules* 144 to 432 MHz transverter.

G8TFI (Middx.) is another 70cm. operator using the 88-ele. aerial. Chris's station consists of an *Icom* IC-201, *MM* tranverter and home made, 200 watts amplifier. The period Sept. 30 to Oct. 4 produced some fine DX, the best on the 3rd including DF8FJ/P (FH); DL7QY; OE2CAL and HB9AEN/P. Bob Lane, G8VLQ, (S. Yorks.) is another reader who is now into double figures in countries worked this year. In the late evening of Sept. 26/27, he found a restricted opening to France when he worked F1CPX (AH43d). On the 29th, Bob at last worked fellow Yorkshireman GJ4ICD. The *RSGB* Region 1 contest weekend gave him 4 new squares and a couple of countries, plus two contacts in poor radio directions.

Ken Willis, G8VR, (Kent) has made a few contacts on the band using an *MM* transverter driven from a *Yaesu* FT-200, but at present there is no room on the mast for a decent antenna. Reg Woolley, GW8VHI, (W. Glam.) has a *Trio* TS-770E and *MM* 50 watts amplifier with a crossed 12-ele. *Yagi*. He is one of our younger contributors, aged 18, but has already worked some nice distances, *viz;* — F1BUU (ZE); F6ETI (YH) and EI9Q (WM).

From Jersey, Geoff Brown, GJ4ICD, says the GJ8KNV QSO with SM7 on Sept. 2, mentioned last month, was a *first*. He also claims other *firsts* from the Channel Islands, such as GU8FBO to OE2CAL; GJ4ICD to the same station and to OK1KIR/P; GJ4JWA to GI. Geoff has provided a copy of his complete entry for the UHF contest on Oct. 4/5 when he operated as a single-op. station on 70cm. only. It provided the 17th country on the band, a remarkable achievement. He completed 106 QSOs for a claimed score of 33,345 points, with EA3AIR/P (BC44c) the best DX at 836 km. Conditions were very poor to the north, but very good to the south through east which accounts for the average DX per QSO of 314 km. The output power was 390 watts PEP measured on a *Bird* Digital PEP Meter, the aerial being a single, 21-ele. *F9FT Yagi* at 35ft. An NEC 64535 masthead pre-amp. was used ahead of the *TS-770*.

In a letter to Geoff, PE1CIO tells that he hopes to be QRV from XH, XI, YG and YH squares on 70cm. in November, with PE0JOK. DL7QY now has one

kilowatt of RF into four, 21-ele. *Yagis* and, up to Sept. 11, had worked 89 squares from FJ Claus lists 16 U.K. and Channel Is. stations worked on Sept. 2.

SM6CEN writes that towards the end of the 1970s, some Scandinavian radio amateurs became very active on 70cm. during *Aurorae* with most activity around 432.050 MHz. Hank mentions that *Doppler* shift is greater than on 2m. so one should tune around for replies. He reckons a Tx output of 50 watts to a good, gainy aerial is necessary but adds that, from SK6AB, they have worked stations up to 650 km. distance with 10 watts. Although QRBs of 400 to 600 km. are common, those over 1,000 km. are rare. From his FR40b QTH, during the *Ar* of July 26/27, at around midnight GMT, Hank copied DF3XU (FN); SK6AB (FR); SM0DYE (JT), OH3TH (LV) and DF6NA/OH0 (JU). It would seem to your scribe, however, that one would need much more *e.r.p.* and a very sensitive, low noise Rx to achieve much success on 70cm. *Ar* from the more southerly latitudes in the U.K., although it has been done, of course.

Two Metres

In the space left, it is impossible to provide detailed, individual coverage of the tremendous amount of DX worked by so many readers. From Devon, Roger Thorn, G3CHN, did very well on Sept. 30, working 10 DLs, 15 Fs, 15 HB9s and 5 Italians — IW1AHH (DF); I2AV, I4BXN and I2DAT (all EF) and I2PAG (FF64d). In the Oct. 3 fun, 59 DLs, 5 Y2s, 9 Fs, 2 HBs, 7 OZs, 9 PAs, 7 OKs and I and OE were worked. Only G3COJ mentions the *Ar* on Oct. 4 from 1640, resulting in QSOs with SM4GGC (FT80c) QTF 340° and GM3ZXE (YQ) with several GMs heard at 0° QTF.

G3PBV did well in the Sept. 6/7 contest making 111 QSOs. Best DX were EA3JA/P (BC) and F0GBY/P (G8DDW) in BC. Dave worked 3 EAs and 50 Fs. Pick of the bunch from G3VYF on Oct. 3 were OK1QI/P (IK77h); OK2BFH/P (JJ33g); OK2UAS (II55e); OK2LE (II24b) and HG1KYY (IH53a). G4CHV made several long haul QSOs in the "Trophy" contest such as F6EVA/P (AC); EA2HO (ZD); F1BUT (AD) and DF8FA/P (FH). G4ERX has added 17 new squares from Sept. 6 with EA, F, OK and Y2 stations listed.

G4FKI reports an SM/Aeronautical Mobile en route from GJ to SM on FM channel S20, causing an enormous pile-up. G4HFO's best efforts on Oct. 3 were OE2CAL and OE5XPL. Ken Osborne, G4IGO, (Bristol) aptly sums up the period Sept. 2 to Oct. 4 in that over-worked adjective, "fantastic!" He reckons the Oct. 3 affair to have been the best lift ever heard in that 25 squares were worked. His long list includes, OE, OZ, OK, Y2/3 and many DLs.

Graham Taylor is now G4JZF and is doing well from his 650ft. *a.s.l.* Cannock (Staffs.) QTH. He runs an *Icom* IC-245E/*Mirage* amplifier/16-ele. *Tonna* at 36ft. set-up and is ex-G8SZF. He lists some fine DX worked on Sept. 2, 6/7 and Oct. 2 and 3. G8ATK is another well-sited station who did very well in the Sept. 2 event with 8 HB9s, a couple of Y2s and many DLs worked, plus HB0LL mentioned last time. Mike describes the Sept. 6/7 contest as, "... full of crud!" but he did work EA2EI/P and EA2HO, both in ZD, on the 7th. The tally on Oct. 3 includes 6 OEs, 4 HB9s and more DLs.

G8FMK finally worked HB9QQ (EH) when Peter sensibly decided to operate split frequency. This idea is worthy of serious consideration when a DX station is being called by perhaps hundreds of anxious operators. The Sept. contests gave Ray his first EA QSO with EA2EI/P and that station was worked, too, by G8GXE, along with assorted, distant HB9s, Fs and DLs. On Oct. 3, little time was spent on the band, with just OE and OK added.

Chris Baker, G8JGK, (Essex) found it difficult to work any real DX on Sept. 2 as the ducting was over his head apparently. He had 74 QSOs in the Sept. 6/7 contest including 2 HB9s. On Oct. 3, Y24TN (GK); OK1MBS (HK); OK1KIR/P and DD1SA (EI). DD3PF (EJ) was another new square. Jon Stow, G8LFJ, is another Essex chap who lists many DX stations worked on Sept. 2, 6/7 and Oct. 3 including SM7, HB9, EA, OE and OZ, plus the usual DLs and Fs.

The following stations also participated in some or all of the previously mentioned openings and are thanked for their reports:— John Cleaton, G4GHA, (Dorset); John Wilkinson, G4HGT, (Leeds); Paul Broadhurst, G8LGL, (Avon); George Gullis, G8MFJ (Wilts.); Andy Markham, G8RZA, (Essex); Chris, G8TFI, (Middx.); Roger Gregory, G8TIN, (Oxon.); Neil Clarke, G8VFV, (W. Yorks.); Bob Lane, G8VLQ, (S. Yorks.); Ken Willis, G8VR, (Kent); Arthur Breese, GD2HDZ, and Richard Pope, GW8TVX, (W. Glam.).

Geoff Brown, GJ4ICD, participated in the RSGB "Trophy" contest on Sept. 6/7 and made 648 QSOs which he thinks might be a record for a single-op. station. His final points-per-km. total was 242,022, or 9600-plus on the radial ring system. A notable catch in the Oct. 3 affair was Y22SA in the rare GN square.

Mick Allmark, (Leeds) has continued his *s.w.l.* activities and heard some interesting DX on Sept. 2. He was out with G3XNO/P for the Sept. 6/7 event and on Oct. 3, G8MJD and G4HGT operated -/A from his QTH, working a lot of the DX.

Four Metres

G8VR is erecting a new 4m. aerial to replace the temporary indoor dipole. His gear comprises a "Nostalgia Four" home brewed Tx, using three 6AJ5 valves in a local oscillator chain, an 832A mixer, driving a 6146 PA. A 3-ele. aerial at 25ft. is contemplated but, if he gets really hooked, Ken may launch a 4-over-4 by next spring.

John Baker, GW3MHW, (Dyfed) has mentioned a callsign error in the September piece; the Austrian station's call should have been OE8NTK. On the 80m. net — 3,718 kHz — GM3WOJ says he has donated his SSB transverter and PSU to ZB2BL. It is in the custody of the RSGB awaiting a suitable opportunity for it to be taken to Gibraltar. John wonders if anyone would be prepared to donate a QQV06-40A valve as a spare for the PA? There is talk of a 4m. beacon for Scotland. It seems the Tx is available but some decent feeder, an aerial and site are now sought. The latter at GB3ANG? John advises that G3LZN (Warwick) is back on 4m. after 20 years and, *via* G8VN, that G3NRW is testing on the band.

Deadlines

Another most rewarding period. Your reports are all read with keen interest, particularly those that are thoughtfully broken down into bands rather than a chronological account jumping from band-to-band. Your ideas about a four band annual table for 1981, including 23cm., would be appreciated. e.g. participants to choose any three enabling the G8s to avoid the present handicap. All your news for the December issue by Nov. 5, and for the January one by Dec. 3rd. Everything to: "VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts., AL6 9EQ. *73 de G3FPK.*

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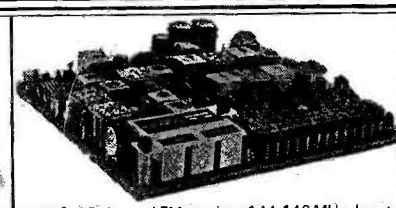

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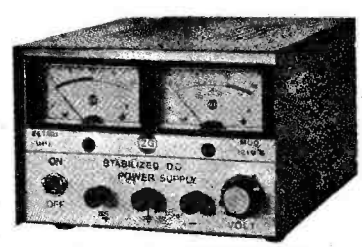

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