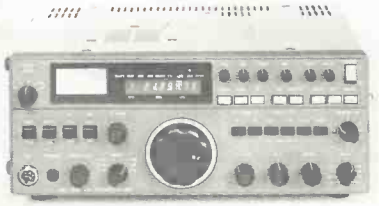
The SHORT WAVE Magazine

60p

VOL. XLI JULY 1983 NUMBER 5

an amateur band transceiver for the discerning, the JST100



The Japan Radio Company has, in the manufacture of the JST100, produced an amateur band transceiver, the quality of which most amateurs have only been able to dream about. Whilst other manufacturers have concentrated on producing transceivers which, along with the amateur bands include a general coverage receiver, JRC has devoted time and effort to produce the finest performance possible on purely the amateur bands. Their considerable efforts have been justified, the JST100 is the finest amateur band transceiver that we have seen for many years. To produce perfection is not easy, neither is it cheap, there are amateur band transceivers which cost less than the JST100, but and it is as large but, we are certain that none of them in any way approaches the quality found in the JST100. However there is one thing that is certain. As with other rigs in the Japan Radio Company's range, and I am referring to the NRD505 and the NRD515 general coverage receivers, they become the property of the discerning few. Indeed it is true that one can savour the enjoyment of owning a JST100 transceiver without ever switching it on.

Taking a trip across the front panel one finds a comprehensive display of operating information; a digital frequency readout down to 10 Hz which in shift mode indicates the frequency difference between VFO's F1 and F2. Above the readout are a string of LED's showing that the transceiver is reading the frequency shift, transmitting, that the mike gain is set high (at the optimum setting the LED "twinkles"), that the attenuator is on, a memory channel is either in use or has been accessed and which of the four modes is being used. A fully backlit meter enables Vc, Ic, transmitter output power, compression level and reflected power to be closely and accurately monitored, whilst on receive it functions as an S meter. Front panel controls adjust the intensity of the readout, set the mike gain and compression levels, adjust the threshold level of the noise blanker and provide VOX control. Transmitted power is adjustable, a front panel knob reducing output from 100 watts PEP to approximately 10 watts. All the usual modes of communication are available on the transceiver, USB, LSB, RTTY and CW wide, narrow (600Hz) and narrower (300Hz). The transceiver has 11 memory channels, each channel holding not only the frequency and band but also the operating mode. Two digital VFO's are incorporated in the transceiver, each tuning across the band in 10Hz steps. Use of the two VFO's together permits split frequency or cross-mode operation.

Taking into account the high levels of activity to be found on the HF bands today, JRC have included a notch filter as well as pass band tuning so that the desired signal may be "lifted" from the QRM. It is in the reception of extremely weak signals that the Japan Radio Company's careful attention to circuit design, components and construction can really be noticed. This, however, is the most difficult aspect of the transceiver to describe.

One way to experience the quality of the JST100 transceiver is to visit a Lowe Electronics shop, either here in Matlock, London, Glasgow or Darlington. Ask to see the amateur band rig for the discerning, a JST100.

JST100 AMATEUR BAND TRANSCEIVER	£998.00
ND8500Σ POWER SUPPLY	£148.50
NFG97 ANTENNA TUNING UNIT	£150.00
NVA1BE SPEAKER	£37.00
CFL280 600 Hz CW FILTER	£39.10
CFL230 300 Hz CW FILTER	£66.00
CHG14HAND MICROPHONE	£14.26
CHG43 DESK MICROPHONE	£47.81

TW4000A dual band mobile

The TW4000A covers in one compact transceiver both the 2 metre band (144.000 to 146.000 MHz) and also the full 10 MHz of the 70 centimetre band (430.000 to 440.000 MHz). Measuring 60mm high, 161mm wide, 217mm deep and weighing only slightly more than 2.0 kg, the TW4000A is smaller than most current 2 metre transceivers.

Added to the exceptional receive performance, now a Trio standard by which others are judged, is the TW4000A's 25 watt capability on both 2 metres and 70 centimetres. Using the TW4000A not only can you hear weak signals on either band but they can hear you too. A HI/LO switch reduces the output power to 5 watts when required.

A green backlit liquid crystal display gives frequency, memory channel, repeater offset, VFO A or B, scan function, channel occupied and "ON AIR" information. Brightly illuminated, the display can easily be read under unfavourable conditions. All important controls are illuminated for easy operation during darkness.

Ten memory channels are provided with store frequency, band and repeater offset (on 2 metres minus 600 kHz shift, or 70 centimetres plus 1.6 MHz shift). Memory 1 is used for priority watch, memories 8 and 9 for instant recall and memory 0 for split channel use (cross band operation). An internally fitted lithium battery gives memory backup.

Frequency scan is extremely versatile in that the rig can be programmed to scan either all memory channels or those holding either 2 metre or 70 centimetre frequencies. The rig can also be programmed to skip those channels which the operator does not wish to monitor. The scan direction can also be changed by using the UP/DOWN switch on the microphone. In order that an important contact is not missed, when in priority watch mode, the rig switches back from the frequency in use to memory channel 1 for one second out of ten. The two most used frequencies can be placed in memories 8 and 9 respectively, common channel scan checking each alternatively for approximately 5 seconds.

The use of GaAs FET's in the RF amplifiers on both 2 metres and 70 centimetres, as well as the use of high performance MCF's in the 1st IF section, provides a high receive sensitivity and an excellent dynamic range.

Two VFO's are provided tuning in either 5 or 25 kHz steps, the UP/DOWN shift switch on the microphone providing control.

Full repeater facilities are included giving the correct frequency shift, 1750 Hz access tone, and of course the essential repeater shift.

The use of advanced diecasting techniques in the fabrication of the combined chassis/heat sink, as well as in the RF shielding results in greatly improved mechanical strength, plus a higher immunity RF interference.

OPTIONAL ACCESSORIES

DATONG

New

AUTOMATIC WOODPECKER BLANKER MODEL SRB2

All too often in the past the appearance of the Woodpecker has wiped out that elusive DX, just when it was within your grasp. Now for the first time there is a really effective antidote, and at a highly competitive price.

With Model SRB2 fitted in series with the antenna and loudspeaker of your receiver or transceiver everything is the same until the Woodpecker appears. Then after a few seconds a magical difference becomes apparent; the receiver comes back to life again and you can copy the original signal. What happens is that the receivers antenna and loudspeaker are momentarily disconnected during each Woodpecker pulse.

No synchronisation, pulse width, or 'in/out' adjustments are required. Instead the blanker's exclusive circuitry (patent applied for) analyses the Woodpeckers signals, and produces blanking signals to suit. It can even remove multiple Woodpeckers at the same time (a situation which occurs fairly often.)

Because blanking occurs at both RF and AF, serious receiver desensitisation is avoided and yet the unit is also effective on AM broadcast signals as well as SSB and CW (of course, if the Woodpecker pulses are very wide then fast CW may become uncopiable).

A built in r.f. activated transmit relay will handle the output for normal HF transceivers and three push button switches are fitted for: power on/off, selectable 10 or 16 Hz pulse rate, and before-and-after comparison. The unit uses the same case design as Model ANF (see this ad.), and a panel LED tells you when the unit is actually blanking. Price: £75 00 plus VAT (£86.25 total). Expected availability early July.

AUTOMATIC NOTCH FILTER MODEL ANF

Model ANF is a unique dual-mode audio filter designed to connect in series with a receivers loud speaker.

As an automatic notch filter it will make a continuous tone disappear within about half a second. You just leave it permanently in circuit and forget about problems from 'tuner-uppers'.

As a CW filter its 4 pole tunable filter dramatically pulls out weak signals from noise.

At all times the 10 LED bargraph-type display shows the filter's centre frequency. In auto-notch mode for example, you can see the notch filter sweeping over the full tuning range every second, until it finds a tone to notch out.

Performance is independent of receiver volume setting thanks to a built-in compander chip, and the notch depth is typically well over 40 dBs.

Price £59.00 plus VAT (£67.85 total). Available now. Free data sheet on request.

AUDIO FILTERS
MODELS FL2, FL3, FL2/A

Model FL3 represents the ultimate in audio filters for SSB and CW. Connected in series with the loudspeaker, it gives variable extra selectivity better than a whole bank of expensive crystal filters. In addition it contains an automatic notch filter which can remove a "tuner-upper" all by itself.

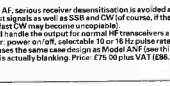
Model FL2 is exactly the same but without the auto notch.

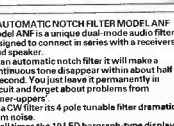
Any existing or new FL2 can be up-graded to an FL3 by adding Model FL2/A conversion kit, which is a fully tested auto-notch module in P.C.B. form.

Datong filters frequently allow continued copy when otherwise a QSO would have to be abandoned.

Prices: FL2 £78.00 with VAT £89.70, FL3 £112.50 with VAT £129.37.

FL2/A £34.00 with VAT £39.67





COMPACT RECEIVING ANTENNAS
MODELS AD270/370

Datong Active Antennas solve the age-old problem of finding space for a "good" receiving aerial.

Model AD370 mounted on a roof top or Model AD270 in a loft will give similar sensitivity to much larger conventional aerials yet are only 2 ft and 3 metres long respectively.

Moreover they do not suffer from interference picked up by the feeder cable, such pick-up can be a problem with conventional dipoles because it is hard to maintain good balance over a band of frequencies.

Although active antennas were introduced to the amateur market by Datong only a few years ago they have long been used by military and commercial receiving stations. The performance specifications achieved by the Datong AD270/370 are very close to those of "professional" active antennas selling for ten times the price – a point which is not lost on our many professional customers.

The advanced design ensures two things: that you don't miss signals through inadequate sensitivity and that the antenna does not invent signals which are not there.

Datong Active Antennas represent an advanced solution to a common problem and so far as we know have no serious competition in terms of performance at the price. (Reviewed in Rad Com., June 1982).

MODEL AD370 HEAD UNIT

AD270 £41.00 with VAT £47.15 AD370 £56.00 with VAT £64.40

GENERAL COVERAGE RECEIVER CONVERTER MODEL PC1

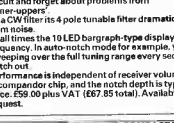
Once upon a time it was the norm to use a ten metre receiver to receive the two metre band. Now, large numbers of special purpose two metre SSB rigs are in use and conversion the other way becomes a very attractive possibility.

With the addition of Model PC1 each of these two metre SSB rigs becomes a really good general coverage receiver (from 50 kHz to 30MHz!)

Two metre SSB rigs are not cheap and it makes good sense to get the most out of them. They also tend to have very good performance in terms of sensitivity, selectivity, and big signal handling. Each of these features is just as vital for short wave reception and Model PC1 is designed not to degrade them at all. The result, your two metre SSB rig receives below 30 MHz as well as it receives on two metres. And contrary to many medium cost general coverage sets, that is saying a lot!

Try this test. Listen in twenty metres after the band goes dead in the evening. With many general coverage receivers the band never dies. It remains populated with phantoms generated by the receiver from the many very strong signals on forty metres. This is the kind of effect that the higher quality receivers minimise, and that goes for PC1 plus a good two metre rig. Reviewer: Rad Com., April 1982.

PC-1 £119.50 with VAT £137.42



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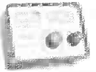

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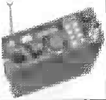

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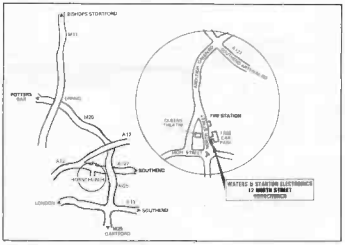

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ACCESS

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CONTENTS

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Editorial Address: **Short Wave Magazine, 34 High Street, Welwyn, Herts. AL6 9EQ, England.**

AUTHOR'S MSS

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FOR THE RADIO AMATEUR AND AMATEUR RADIO

The SHORT-WAVE Magazine

EDITORIAL

Licence Fees

The Home Office recently announced that fees for the different types of radio licence available are to be varied. Among other changes this means that our licence will now cost £12 per year, while some PMR and ship licences will cost less. The H.O. has told the RSGB that it "hopes the increased revenue will enable an improved service to be provided". Quite rightly, the RSGB has questioned this stinging rise, and asked for a more detailed explanation of what is intended.

CB

Still with the Home Office, a new frequency allocation for the CB 934 MHz band has been announced. The change, in accordance with the Conference of European Posts and Telegraphs Administrations (CEPT) will have the effect of moving the UK channels down in frequency by 12.5 kHz. There has been consultation with the two manufacturers involved: *Reftec*, who are in production, will shortly announce arrangements for the modification of their sets, while *Grandstand*, who are about to enter production, have indicated that they will change almost immediately. There is a date, yet to be fixed, by which all sets produced must be to the new specification, and also a date by which all sets in use must be modified or withdrawn from service. Performance specification MPT1321 is being amended as appropriate.

Does this mean more out-of-band operation?

G3KFE.

WORLD-WIDE COMMUNICATION

COMMUNICATION and DX NEWS

E. P. Essery, G3KFE

WE seem to have swung into more summery conditions on the bands, even if the weather hasn't played along as well! The low bands have been plagued by static and rain noise, and conditions generally have been very much like the curate's egg. However, there have been some small bright patches: the evening before we started this piece the 28 MHz band was open around 2200 to the U.S.A., and a couple of evenings earlier your scribe's doubts about his twenty-metre aerial were somewhat shaken by finding the Phone end of the band — a spot he rarely looks at these days — bubbling mildly with DX. So — while there's life, there's hope!

Top Band

Our first item has to be a letter we have received from Stew Perry, W1BB, the doyen of Top Band activity for so many years. Stew writes to say he has a health problem which for the moment, and for some time past, has restricted his Top Band activity to the odd early-evening opening when circumstances has allowed him to be at the rig. This is indeed sad, and we feel sure all the Top Band types who have had the pleasure of working W1BB, or of receiving his *Bulletin*, over the years, will join with us in offering our best wishes for a speedy recovery; and we would also ask readers to pass the word around known Top Band addicts, who may care in addition to drop Stew a line themselves. The band doesn't seem the same somehow without the W1BB signal to show us how it ought to be done!

Another letter from the States is that invaluable effort by W1WY; in it he includes some provisional high scores for the 1983 CQ WW 160m. Contest, and an interesting breakdown it all makes. In the SSB contest, none of the single-op stations were outside the Americas, but in the multi-op category OK3KFO won handsomely, and at eleventh was OK1KSO; congratulations to both. As for the CW section, the highest of the U.K. multi-op stations was GW3YDX, plus quite a decent sprinkling of Europeans scattered throughout the list in both multi-op and single-op categories; but at the time the list was printed it was by no means definitive, as some of the entries were still to arrive.

A turn now to G3ZGC, who wrote from home about his last trip to the Caribbean where he signed at one time or another G3ZGC/J7, G3ZGC/J8, G3ZGC/J6L, G3ZGC/8P6, and of course G3ZGC/MM. As far as Top Band was concerned nothing at all was heard on either the March or the April/May trips; but we believe Richard did put out a call or two as your scribe heard a signal in the noise at his QTH which copied as G3ZGC suffix something-or-other — but no more.

G3HKU (Sheppey) says both conditions and his own activity were poor; so he records QSOs on SSB with PA0PN and, on CW, UK9FER.

Apart from work commitments, holidays and other such interruptions, not to mention ear-battering static, G4AKY (Harlow) did at least look at the band for a short period at regular intervals, and came up with CW contacts to: GM3MXN, GM3BQA, UA6WU, EZ1AAE, EZ1WSN, UA9WHL, UB5PBA, UA6EAZ, UK1NAO (Karelia), UK2PCR, DL6OH, SP3GVX, SP1DPA, SP1ADM, OK1AEH, OK2BAS, OL8CNT, OK1KFQ, OK2BQU, OE1NDW, OE5JDL, OE8LKK, EA9KQ (Melilla), UL7IBQ, UL7NCH (Kazakh), EZ9CBH, UK9FER, UA9FKW, LZ2KVK, LZ2BE, LZ1KSN, LZ2RF, LZ2CJ, LA2GV, LA4O, GW8WJ, HB9EX, 4N9OLY (QSL *via* YU4EXA), YZ1EXY, YU3APR, YU3EF, YT4I, DA1WA/HB0, OH3TQ, PA3ABB/A, YP3A in Romania, and OY7ML. As for SSB contacts, there was just the one with LX1TW. We have printed Dave's list in full, by countries, because we feel it just shows how the summer static can, allied with poorish conditions, reduce the potential of even one of the top-dog DXers on the band. That YP3A was doubted at first, but there seems more than enough proof to demonstrate his validity — he's the 'real McCoy' all right!

Odds

Back in the May column, G2NJ reported the signals from ON4ABT, and now we have a nice long letter from the man himself, Paul, in the Belgian city of Lier. Paul used a crystal-controlled TS-120V into around 40 metres of wire fed through an ATU; but the authorities stepped in and stopped the activity of the 'beacon' after receiving reports from Sweden, Spain and Greece. On a different tack, ON4ABT says that commercial equipment is about 30% cheaper in the UK than in Belgium, so that it is economic to travel here to buy a rig. Now why can't *we* find something for which we can justify a trip to the continent? Somehow, a day trip to the Dunkerque hypermarket doesn't have the same zest!

At noon on July 2, that historic broadcast callsign 2MT will be reactivated as G2MT by members of the Marconi companies based around Stanmore. Frequencies to be used will depend on propagation conditions; we hope as many amateurs as possible will be listening for them.

Eighty

G4LDS (Chelmsford) is in the process of creating an HF Linear, having found the raw materials at bargain price and rebuildable form; the basis will be a 4CX1500B with some 3kV on the anode, so the rebuild goes *carefully*. Chris also reports getting country number 220 by working GW4RIB/A.

In March G3ZGC found conditions in the Caribbean to Europe very good, but the second trip around April-end was a complete dead loss. For the first trip as G3ZGC/J6L, on March 27, SSB worked VP2EC, CN8CX, EA9IB, NP4CC, and VE3KZ; while on March 31, HZ1AB seemed rather keen to work Richard for a QSL card. From G3ZGC/8P6 on March 29, YU3TV1, GW4OFQ, G3XTJ, and CT3BV were worked. March 29/30 saw a change of call to G3ZGC/J8, which resulted in contacts with DF3KV, G3ALI, GW3XHG, G3FPQ, GW4OFQ, ON6OX, 15YBZ, OE3OOG, VP2MIX, and 4Z4DX.

From Peterborough, G2NJ found the month rather trying thanks to high rain-static and atmospheric noises of other varieties. Nick reports the PA0GG 'beacon' signals as having been heard on ten successive days (May 5-14) before the watch came to a sticky end due to the static conditions. Nick also worked QRP stations, G3OUC/P camping in the grounds of Longleat had an aerial slung over a tree; GI5DX was an excellent signal, worked at 1345z and using a No. 19 set. TV6ICE was very rapidly knocking them off with his 599 signals, but merely said "QSL *via* F2YT" and was not communicative in the matter of where he was. Another one of interest was signing PB0ABP/M, and was heard by Nick telling an F station what he was "on a ship on the river Maas Lamense" — maybe he *was* mobile rather than MM.

G3OUC (Newbury) has been amusing himself of late with a new SSB transceiver for Top Band and Eighty, and he wryly remarks that this seems to have caused an upsurge of AM activity, particularly on Top Band. Pat has an advantage in that his

the **TR3500** handheld for those seventy centimetre contacts

Without a doubt one of life's great mysteries to me is why, when the two metre band is at times so busy, few people are to be found communicating on the wide open spaces of the seventy centimetre band.

I have come to the conclusion that misapprehensions exist about the band. The first being the lack of activity. From my first comments you will have gleaned the fact that seventy centimetres is not a busy band, however there are stations on, myself GBGIY, my colleagues David G4KFN and Roy GBROR form the nucleus of a UHF group here in Matlock, there are many others like us up and down the country. Seventy centimetre repeaters abound and are a perfect means of communication, their somewhat shorter range serving well their immediate area and, please remember, in the words of that doyen of seventy centimetres Jack GBUM, "Activity breeds activity", simple but true. The second misapprehension is that the equipment is expensive. Not so, the Trio TR3500 costs only slightly more than its matching stable mate, the TR2500, and here again, with the same sensible approach which we have all come to expect from Trio, the accessories which you bought for your TR2500 are compatible with the new TR3500. The appearance, size and weight are similar to the TR2500, output power is 1.5 watts high and 300 milliwatts low, repeater shift is programmable, ten memory channels are provided and frequency scan between operator-defined limits is included. The conventional memory scan and reverse repeater facilities help to make operating a pleasure no matter how difficult the conditions. With the Trio TR3500 handheld as part of your station, you are equipped to expand your operating and begin communicating on the wide open spaces of the seventy centimetre band.

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and the **TR7930** for the two metre mobile operator.

Any amateur who has used or owns a Trio TR7800 has had the finest piece of 2 metre mobile technology at his fingertips. The TR7800 had simply everything that the keen mobile operator could ever want. Of course, there were a few points which customers said could be improved on and, I must admit, we, in the majority of cases, agreed. Trio, with the introduction of the new TR7930, have taken note of this feedback of information and the result, I am sure you will agree, is as close to perfection as you will find in a rig.

The improvements are, a green floodlit LCD readout which does not disappear in strong sunlight, additional memory channels, both timed and carrier scan hold on occupied channels, selectable memory channel for the priority frequency and automatically corrected mode selection (simplex or repeater) without having to instruct the rig. The most significant change is the liquid crystal frequency readout on a green illuminated background, but closely following this must be the ability to omit specific memory channels when scanning, and the programmable scan between user designated frequencies. This gives the rig the ability to scan simplex channels only, without holding on repeaters.

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next-door neighbour is G4MLG, who is amenable to giving help in the matter of loaded whips for the band; the latest effort, it seems, can be tuned by means of a motorised slug in the loading coil, while the VSWR of the line from aerial to rig can be adjusted from the cab of G4MLG's Land-Rover.

Forty

Only two reports; G3ZGC says he worked nothing of interest from the Caribbean on the band under any of his callsigns; while G4LDS mentions HZ1AB with G8ECI at the controls, GU4NYT, for a new one, and GD4MNS.

Which is quite odd, as there is DX about on the band, and it is being worked by the savvy types without too much bother or anything very exotic in the aerial-system line. So — why don't we get reports?

The New Bands

If we don't use them more, we're going to be on the way to *losing* them. And, after all, the power and aerial requirements are such as to demonstrate that if all is level-pegging, than there is a lot less QRM. . . .

GM4BYF (Edinburgh) says he is more of a VHF buff, but he tries the new bands regularly just to ensure someone can be said to have used them! Pete uses an IC-730, and his scoring so far is rather like this: 10 MHz, using frequencies in the area 10.1-10.110 MHz, G3KLP raised but lost in deep QSB, EA3ALV, K8MP, and ZP5XGG. On 18 MHz, a couple of bites gave F5ZN for Pete's first and third contact on the band; and GM3PPE, who is all of 800 yards distant. Pete notes that after much listening these are the *very first amateur signals he has heard on the band.* As for 24 MHz, the situation is the same again — not an amateur signal heard on the band yet. Pete (and your conductor) feel this is somewhat sad, and GM4BYF says he is only too pleased to offer skeds with GM if anyone wants. Contact him at 18 Riselaw Terrace, Edinburgh EH10 6HW.

Our other reporter is G3ZGC, who writes about 10 MHz only; March 29 was useful and saw G4PTP and VP2MIX booked in, while April 27 turned up such as G2FHV, G3DRQ, G3ITP, and G6LD.

Twenty

Is, and one supposes always will be, where most of the world's DX business is transacted, when one considers the entire sunspot cycle. Let's see what our reporters have to excite our interest.

On Twenty, says Richard, it came about that he actually did manage to sign G3ZGC/MM, and in that guise, on May 1, ZB2HO was worked.

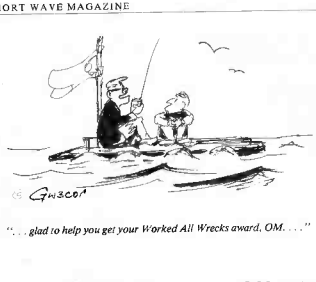
G3NOF (Yeovil) doesn't seem to operate a lot on Twenty these days, but he does listen; he finds VK peaking around 0730 and staying about until 0900; a few W6 and W7 were heard, while in the evenings around 2100 the East Coast Ws were workable along with South America. Don made SSB contacts with PG1ITU and W7ISX.

Turning to G2BON (Aldridge), Tom seems to have cut his activity back a little, but he still finds them — on 14 MHz he offers CP6EL, JY9TS, KH6LG, KA9IBG/PJ4 (Bonaire), VK2APT, A4XJQ, KP4EBQ, and VK3NQ, all worked in the early session before breakfast.

G6QQ (Hoveton) missed the bus last time, so we are lucky enough to have two reports; and he enclosed a QSL which is exactly the same as the one he used back in the 1932 period, before the long QRT. The April period seems to have been productive, with such as VK2APK, KL7H, VK3MR, HK3DD, some Ws, and M1KY; the second letter, containing the May gleanings, showed with Ws, VKs, OA4LS, OY2H, 4U1VIC, T77V, KH6IJ, PP2AAM. There is now a list of 92 countries entered in the log, post-war — created with the help of his FT-102, not FT-101 as mentioned in the May column.

If we now turn to the letter from G4LDS, Chris seems to have been practising his CW a little of late; but the contacts of interest here were SSB, with JA7IL, assorted Ws, HL1MV, VK2XG, JY9CL, W2FJ, VK5AWC and VP8ANT.

G2HKU has found himself a new hazard in the garden, thanks to the awful Spring weather; the garden pond has a gaggle of *large* frogs washed into it, and Ted has 'received his orders' from the boss about these. Added to this of course is the inevitable colony of ants in the greenhouse, and the inspection parties of wasps prospecting the roof defences prior to open warfare. Turning from the frogs to the DX, we find Ted's SSB made it over to ZL3FV, ZL3RS, and 9H1GY, while CW accounted for ZL4CO, VP2MM, VK3RJ, HH2VP, OH1VY/W5, YV1AD, and VK3MJ. That left the QRP CW box, which was used for a two-way QRP-QRP contact with OK2BMA.



". . . glad to help you get your Worked All Wrecks award, OM. . . ."

Oddments

By the time this is written, HC1JB will have come and gone (*see* p. 203 in last month's issue). HC1JB was the personal call of Clarence Moore, who was HCJB's chief engineer during the 1950s, and who invented the Quad aerial as a solution to the problems of corona with the high powered beam aerials of HCJB.

If you lack Zone 23, then you probably missed out on U0Y back in 1979. We hear that UW0MF is getting things all sorted out for another longish bash, from October 1 to November 30, using the same call, all bands and modes, and with an entry in the CQ WW Phone Contest very likely.

Z22A heard on Twenty, bears the stamp of phoniness, we are told; and we wonder a little about S2BTF who is giving LA5NM as his QSL manager, and says he will be in Bangladesh till mid-July.

The 1S1CK operation from Spratly by DU1CK resulted in some 2000 QSOs using dipoles and list operation. The group were landed in Pantana Cay, which we understand is Philippine-occupied, by way of a Lockheed C-130 transport plane, and we understand that they prefer to receive dollar bills rather than IRCs for QSLs, as "IRCs cannot be exchanged in the Philippines" — likewise, *don't put callsigns on envelopes.* The latter seems a sensible precaution in any correspondence in this lawless age, but the one about IRCs not being exchangeable in the Philippines is news to the writer and probably the Philippine Government too; we suspect the difficulty is probably spelt g-r-e-e-d. Or are we being cynical?

The recent SMOM operation didn't come off, for some good reasons, and so 10MGM is reported as having said he will try to get something organised during June; if that falls through there'll be nowt till the late autumn from 1A0KM.

If you worked TT0KP on the LF bands, there seems a strong feeling that he was a phoney; and if you want XT2AW on the LF bands you're too late — we understand

the operator has sold his linear and taken down the LF aerials, ready for a return to DL-land before this piece lands on your doorstep.

4S7PVR runs a guest house in Sri Lanka if you are thinking of a holiday there, and makes a thing of welcoming radio amateurs. P. M. A. Perera, 'Spangles', 84 Templars Road, Mount Laviniya, Sri Lanka, should reach him.

"CDXN" deadlines for the next three months:

August issue — July 7th
September issue — August 4th
October issue — September 1st

Please be sure to note these dates

Fifteen Metres

G3ZGC simply comments that for him the band had nothing of interest.

On the other hand, **G3NOF** seems to have been luckier; Don found the band patchy, with fade-outs, and the North American stations scarce, although on good days they have been around from 1300z to as late as 2200z. The JA short path has been open between around 1000 and 1600z, and this same path also opened to the Pacific on occasion, noting particularly DU, YB and VS5; and of course there were Africans to be found anywhere from 1100 through to 2000z. Don made his SSB penetrate to: **A81LC, AP2P, C21RK, CP6IM, CR9AN, DU7RLC, EA6DE, EA8ANZ, FY0ESE, G4JFM/JA, HH2JD, IS0USU,** JAs assorted, **JA1LW/5N0, JT1AN, NN6R, TR8CR, TR8MYA, TU2JD, TU2JL, UK8BAA, UK0AMM, UL7TAY, UM8MKF,** V3TV, **VK4MB, VP2MDG, VP8ANT, VP9GQ, VS6DK, VS5GA, VU2IOC, W6RTN, W6BSY, W7LXR, XE1KB, XT2AW, YB6MF, YC4FNO, YI1BGD, JY8TT, ZB2CR, ZB2CN, ZB2HP, ZD9BX, ZD7CW, ZK2JS, 4U1VIC (UN,** Vienna), **5B4BS, 5H3DM, 5N8HEM, 5T5AP, 5T5RY, 6W8DS, 6W8EX** and **9V1VP**, hooked as late as 2000z.

G4PTY (Bracknell) wrote some while back after working **LU3ZI**, asking about the QSL address, **GACW**; the answer we gave him was the right one, as he is now proudly displaying his QSL card for the **LU3ZI** contact — **LU3ZI** in South Shetlands group.

We have quite a long list of stations worked by G2BON; Tom stuck to SSB for his contacts with **TR8JD, TR8IG, EC9GS, UK0AMM, UA0SDB, HL0CBA,** 4X4HQ, **VP8ANT, VE7CZH/4U** on the Golan Heights, YK, **CY1YX, 7P8BX,** JW0A, **EA9OI, TU2KC, ZS5RSA, FY0ESE,** and **ZD7BW**. Tom adds a note about the stations **EK1A, EK1B, EK1C,** etc., which are to do with a special Russian Arctic expedition travelling from the Barents Sea; the party includes some 16 men and fifty dogs, according to the information received from **UK9CAE**.

G6QQ next; David's first letter indicates some concentration on 21 MHz, with lots of JAs, South Americans and Ws placed in the CW bag. Perhaps the best single day was April 21, which accounted for VU2LV, HC2HM, KP4ER, 3B8CF, Ws, ZS2GH, PY, and JA stations. In the second letter there is a dauntingly long list of DX, all of the calibre which objects to being thinned out. For instance, CW with **Z23JO,** JAs, **K2AOE, W2ZJI, W3TGM, PY7AJB, 4X6DF, KA8QVH, 4X4MH, UK6GAH; PJ8UQ, ZS4CV,** and **YV7PF** on SSB; **PT7VJD, ZS6ABZ, K6CXB, W8IXG, W2GP, NP4O, N4FGG;** VP2MDG and **PY2PWH** on SSB; W4VBB, 9V1VP, 7X2CK, KB0MK, KC7UU/5N6, W3GM, K2VV, PY2AHF, HH2VP, PT9EJ, N4EA, CX7BY, LU5BB, 4Z4NUT, VE2GFE, CY3NE!, and XT2AW.

G4LDS was able to spend most of the Bank Holiday on the air, while the XYL was away, and he found the JAs crashing through, C21, ZK2 both heard under a pile-up; Chris has been practising his CW on novices and Russians, while he gets used to a straight key. The list of real DX includes CX4CC, CP6IM, JAs W1HH, WB2EZM, 9V1VP, ZL7WCY, CY1YX who was a special for World Communication Year, WA4JZZ on CW, **CO7AM,** CE6DFY, JY9CL, CW with a couple of SMs and KA2QOF, **9V1LP** again, **AP2AC,** a pile-up of JAs to a CQ call, a thirty-minute ragchew with **C21BD, EL2BA, VS6DK, K6YRA, KH7HLE** in Washington, K2OZ, **ZD7BW, 9V1VM,** KB7CQ (Idaho), **K6UD** and **W6KPC**.

Fifteen for G2ADZ was a matter of coming down from a dead ten-metre band to work 9M2SG, 9N1MM (QSL to N7EB), 9N1MM again (QSL to YU2DX), and FK8CE (QSL to K2ROR).

28 MHz

Our first reporter is **G3ZGC/J7**, who found just one G contact, with G4LAN, on what appeared to be a dead band towards U.K., on April 29.

G3NOF says he often found the band dead, but notes openings in the mornings to USSR, and in the afternoons to South America and Africa, plus other openings at odd times; for example, **FG0HUL/FS** was the only signal audible on the band on May 29, at 2206z, working North Americans who were definitely inaudible in this country; be that as it may, Don managed to raise the FS station for himself. SSB contacts were booked in with **CE3DPD, FG0HUL/FS, JAs, PY2AC, VS5RB, XT2AT,** and **ZP5JCY**.

G6QQ in his first letter mentions just **CX2CT** and **ZD7WT**, while in the second letter, covering the May period, David noted and raised **ZC4RH, UY5XU, SP2ZFJ, UP2BKX, 4X6FF, SP9PDJ, CX7BY** and **ZS1KO**, which filled in a few gaps in the countries-worked listing for him.

For G4LDS, there was the pleasure of CW QSOs at the bottom of the band, despite the CB-ers, plus **VP8ANT** for a new one, **A82LC, EL2AK, CE3DNP,** and **ZD7BW**.

G3URA (Cheshunt) writes to say that he has noted a new beacon which has appeared on **28.2275 MHz** with somewhat intermittent operation. It signs **EA6AU** and says it is 'Nr Palma'. Thanks for the accurate frequency — another one for the records!

G4HZW (Knutsford) found that in order to maintain his all-28 MHz record, he had to resort to the key, as many QSOs were just not possible on Phone. The list includes **5Z4CQ, C53DF, CE3DNF, CX8AC,** DL, **F, I, JF6DHE, JH7DNO, JR1CFG, JY9CL, JY5AZ, LU4FEL, LU1BR, LU9DCF, LU2DPW, OE, OH,** SM, **SP3HLM, S83H, PY1ZEY/MM2, TF3YH, TU2IJ, UK2PCR, UI8ADF, RI8LBU, UI8BI, UK7PAI, UL7AAS, UL7ABA, UL7TAG, UL7ECU, UA6,** UA9s, **UK0AMM, DF2NZ/S12, VS5RB** (this at 1700z!), **VU2BX,** W1, **W8, YC2DNT, ZJ1DF, ZD7HW** who came back to a CQ on a dead band, **ZP5CF, ZS1WQ,** and **ZS4KHY**. It is of interest to note the number of Europeans worked, presumably by scatter propagation modes, at such low strength.

Our final offering on this band is from **G2ADZ (Chessington)** who agrees with us about the dearth of activity on the band being half the trouble. Bill worked one station whose Morse was so quick he couldn't copy the call but whose QSL manager's call he *did* get. So, out of curiosity off went a QSL card, and it has just come back to reveal that the QRQ merchant was **FB8ZQ**. May 5 was a good day, with beacons **VS6IW, VK2WI, ZD9GI, ZS6PW, ZJ1ANB;** a **VP8**, other ZSs and PY2AMI were pounding in, while the JAs were two-a-penny, as it were. Bill settled for a long natter with **VK6CI!** Other QSOs of interest during the period included **5Z4DR,** CX7BY, **TR8JD, KJ8I/3B9, VK6OH,** and **YB5AES**.

Finale

Various kind souls have sent in lists of QSL addresses, but we will have to hold over a list till next time; and the deadline for next month is in the 'box' as usual. Address your letters to your conductor, "CDXN", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ. Meantime don't forget to ground the aerials when the weather is thundery!

"KITCHEN-TABLE TECHNOLOGY"

A SERIES OF OCCASIONAL ARTICLES TO PUT THE 'AMATEUR' BACK INTO AMATEUR RADIO

REV. G. C. DOBBS, G3RJV

No. 1: Checking Junk Crystals

OVER the last several years, in my own meagre, haphazard way I have tried to show readers of *Short Wave Magazine* that amateur radio is about fun, not money. One reader was bold enough to write to me about my 'Theology of Radio Meanness' and invest me with the honorary callsign M1SER. But if your are short of money, or fed up with exchanging one grey box for the next, have limited technical expertise, have little or no test equipment, and work in your garage or the edge of the kitchen table, stick around, these little articles may be for you.

There was a time when amateurs could get hold of a whole range of surplus crystals cheaply but those days have long since gone. I sometimes get new constructors writing to me asking where to obtain amateur band crystals and as I tell them, "you're on your own, son!" However from time to time useful frequencies pop up at junk sales and rallies, often very ancient and dirty in "sort them out for yourself" boxes. I used to think 'Rock of Ages' was a hymn until I began to look for crystals at rallies. Such crystals are usually cheap although of late dealers seem to have tumbled the idea that for some people they can be precious items. Naturally the would-be constructor does not want to part with good money for non-working crystals, so a simple means of checking their activity is very useful.

Some years ago I built a Crystal Checker for taking with me on crystal hunting expeditions. It is nothing fancy; just a small plastic box with a push button, and LED and a couple of crocodile clip leads — but what a useful little item it has become. The leads can be clipped onto any type of crystal, the button pressed and if it is active, the LED lights. "Handy, but limited in its uses", I thought when I first made it, but it has become a very commonly used item in the shack. I have used it as a calibration oscillator to find spot frequencies on the bands; I have a crystal on each of the International QRP Calling Frequencies and it has often been used to check my receiver calibration at these frequencies. I added an output to drive a frequency counter so it can be used to check the frequency of an unknown crystal or one of those marked with a frequency other than the fundamental. It has become one of those little items I wonder how I did without before I built it.

The circuit diagram is shown in Fig. 1. All very simple stuff. TR1 is a Colpitts oscillator circuit with short leads terminated with miliiature crocodile clips to take the crystal to be tested. The output is coupled *via* C3 to a pair of diodes, D1 and D2, which rectify the RF output from TR1. TR2 acts as a simple DC amplifier feeding a light emitting diode (LED) in series with the limiting resistor, R3. If the crystal is active, TR1 will oscillate and drive TR2 to light the LED. The circuitry around TR1 seems to give a wide range of frequencies over which results can be had from an active crystal. I have no problems with crystals from 100 kHz upwards — if they are active the LED glows. Some of the larger, older crystals do struggle a little if they are low in frequency but this is a good indication of how well, or not, such crystals might function in solid state circuitry.

Fig. 2. shows the layout of the circuit board. I used an offcut of *Veroboard*. Never throw away odd pieces of *Veroboard*, they often find a later use! The size of board required in 0.1" matrix is 12 holes by 7 holes. The layout is very compact to get the whole unit into a small case with a battery; this small layout depends on getting small physical size capacitors. I had some small polystyrene types for C1 and C2 and some miniature disc types for C3 and C4, which nearly gives me enough room to keep my rally sandwiches in the box as well. The resistors are ¼-watt types, but ½-watt would be better. The two diodes, D1 and D2, are just junk box germanium diodes of any type. The *Veroboard* layout is very simple and the only tracks to be removed are the lines between the two stages, that come between the two leads of C3, except for the 9 volt and ground tracks.

The layout is compact so remember all the *Veroboard* 'rules'. Clean all the tracks before building the board: I think *Veroboard* is bad enough to solder without having to contend with mucky tracks. The holes are usually too large for most component leads so jam the tip of the soldering iron between the lead and the track and use the opposite end of the lead-track junction to melt the solder. We all know the iron tip will melt the solder, but the joint is only ready for soldering if the heat of the track and lead will melt it. Use the minimum of solder needed to make a good joint as the majority of problems on *Veroboard* come from shorts between adjacent tracks made by surplus solder. I use a small sharp twist drill to make the breaks in the tracks in the hole positions shown in Fig. 2. Do clean the board after making the breaks to ensure that no whiskers of copper track connect to an adjacent track.

Fig. 3. shows how I housed my Crystal Checker. It is mounted in a small plastic box complete with a PP3 battery. My box is one of the commonly available types measuring 100mm x 50mm x 25mm deep, or so they tell me; in English that is about 4" x 2" x 1"

Table of Values
Fig. 1

R1 = 39K	C3, C4 = 1000 pF
R2 = 1K	D1, D2 = general purpose, germanium
R3 = 100R	TR1, TR2 = BC109
C1 = 680 pF	LED = general purpose LED
C2 = 150 pF	PB = push-on switch

Also miniature croc. clips and 0.1" pitch Veroboard.

Fig. 5

R1 = 100K	VC1 = 3-60 pF trimmer
R2 = 1K	RFC = 1.5mH choke
C1 = 0.01μF	TR1 = 2N2819
C2 = 50 pF	

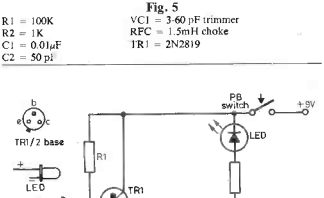


Fig. 1 CRYSTAL CHECKER CIRCUIT DIAGRAM

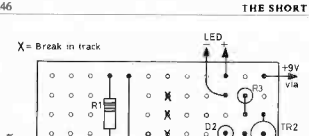


Fig. 2 CRYSTAL CHECKER VEROBOARD LAYOUT

deep. The LED is mounted through two small holes and secured with a spot of glue. A miniature push button switch is required for this size of box; mine came off an old item of surplus equipment, but they can be bought . . . if you insist. *RS Components* do a very nice one which would add a touch of class — but so it ought to at the sort of price it is! The circuit board is 'Blutacked' to the inside of the case with two short leads to the miniture croc clips. A PP3 battery will just fit inside the case and although the battery lasts for years, a snap on connector is useful. Don't *buy* snap on battery connectors! Pull the tops off dud batteries, solder leads on what used to be the inside, and use them as connectors.

The Crystal Checker may be used to drive a frequency counter. This simply involves taking some of the RF output from TR1 *via* a capacitor to a socket. My capacitor was soldered onto the TR2 end of C3, but that was only because I could get at it easily; the TR1 side is probably better. The value of capacitor depends upon how much drive the counter needs. I used a 50pF capacitor, but mine is an 'el-cheapo' type which needs a small neutron bomb to get it ticking. Try it and see, a lower value might be more suitable for many counters. I took my output to a phono socket mounted between the two leads; any type of socket will serve but I use phono for everything. They might be cheap and nasty but I concentrate on their cheap qualities and have never had any problems with them up to 5 watts, up to 30 MHz. . . my part of the ship.

One minor problem is that the reading on the frequency counter may not be the exact nominal frequency of the crystal, since the crystal is loaded in the circuit by C1 and C2. In practice I have found that it can be up to 3 kHz low at 20 MHz and almost 1 kHz low at 7 MHz. The lower the frequency the less the effect. Placing a capacitor in series with the top of C1 and the crystal would probably reduce this effect but makes the frequency range of the checker somewhat more limited. I find this no real problem as usually I only want to know the approximate frequency of the crystal as it will be loaded by the circuit in which it is finally used, and my final check is to try it in that circuit and listen for it on a receiver.

Surplus crystals come in a whole variety of types and housings, some are the modern sealed HC25U or HC6U types and others have the older FT243 or 10X and 10XJ mountings. These latter

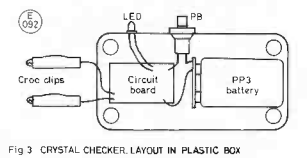


Fig. 3 CRYSTAL CHECKER LAYOUT IN PLASTIC BOX

types sometimes cause problems in modern solid-state circuits as they were usually designed to be 'kicked into action' by valve circuitry. The chances are that if they will light the Crystal Checker they are a viable bet for many solid-state applications. Naturally armed with the Crystal Checker, the junk hunter can sort out the active ones at point of sale . . . as they say these days. Often the older type of crystal represents a good buy, sometimes in a "stick your hand in anywhere for 10p" type of sale. Although they are large and prone to sluggishness at least they can be opened and fiddled with, unlike the modern sealed housings. Open heart surgery on old crystals can sometimes be very fruitful. Whereas small modern crystals usually have contacts welded onto the quartz plate, the openable type have pressure mounted thin slabs of quartz.

Pepping up a sluggish crystal can sometimes be worthwhile. Doubtless you may have heard the stories of the wild and woolly 1920's when amateurs kept a toffee hammer by their crystal oscillators to bang the crystal into oscillation. Perhaps not appropriate in today's genteel technology, but sluggish crystals might just be lazy through old age and capable of revival. I thank Gordon, G3DNF, [1] for reminding me of an old dodge which I thought to be just part of amateur radio mythology until I tried it with some success. That is cleaning a sluggish crystal using *toothpaste!* Toothpaste, the white type is required, is a useful mild abrasive and can help crystals . . . it's not bad on teeth either.

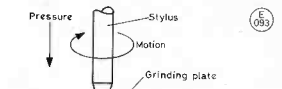


Fig. 4 GRINDING ASSEMBLY (Side view)

An essential item for crystal surgery is a supply of clean paper tissues used for cleaning and keeping the bits together. Unscrew the housing, of whatever type, over an outspread tissue to gather the pieces as the crystal comes apart; all types of mounting hold the quartz plates under pressure so take care that the precious little piece of rock does not shoot out and break, or injure the cat. It's not a bad idea to try breaking-in slowly to ensure that the method of mounting is understood for the replacement stage. Gently place the contents onto the tissue. It will usually be a quartz sandwich of a thin quartz plate between two milled metal surfaces held under tension. The cleaning process is very easy, just rub the quartz plate between the finger and thumb which have both been dipped in toothpaste and water. The plate can then be cleaned in warm water, blotted on tissues and dried in the air. Grease from the fingers can have an adverse effect on crystal activity so a pair of plastic, normally closed, tweezers of the sort sometimes used in photographic work are useful. Use these to gently hold the edges of the crystal for rinsing and drying. Put it all back together again and with any luck it might be better.

As all the old hands will tell you it is possible to grind crystals to move their frequency. This is moving the frequency higher . . . think about it, we grind it smaller so the resonant frequency rises. Some old timers swear that a crystal can be lowered in frequency by rubbing one side with a soft pencil. It never seemed to work for me but it might for you! There are many bold tales in the saga of crystal grinding about how far various people have shifted a crystal but my previous experience is that crystals below 4 MHz easily move up 100 or 200 kHz and above 7 MHz they can be moved up as much as 500 kHz. It's all a question of technique and

care, the chief enemy being uneven grinding. Some amateurs etch crystals in deadly chemicals, but I find that stocking ferric-chloride is enough to contend with in a home where two boys seem to constitute a major unlawful gathering.

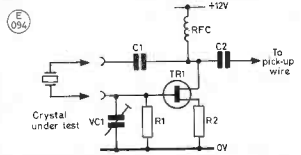


Fig. 5 CRYSTAL TEST CIRCUIT (For 2–20MHz fundamental pressure mounted crystals – recommended by "JAN Crystals")

A few words of advice might be useful and I owe these to some bitter experience, a fine article by G3DNF in the G-QRP Club "Circuit Handbook", and W9PBI in *QST* for September, 1969. The technique is simple and just involves grinding the quartz plate with grinding paste on a plate-glass bed. There are all manner of tips for the practice. The grinding paste can be graded aluminium oxide (about 145 grit) or the carborundum paste used for polishing gems; hobby shops sell the rock polishing grit and only the fine and medium grit are required. Whatever the grinding agent, it must be kept wet throughout the whole process of grinding so water must be at hand. The grinding is best done with overlapping circular strokes or in a figure-of-eight pattern. Only one side of the quartz plate should be ground and frequent turning is important to help maintain a plane surface. Some people grind both surfaces but this increases the risk of having non-parallel plates.

A very useful tip comes from W9PBI.[2] A common method of holding a quartz plate for grinding is to place the first two fingers onto the plate and press evenly on the grinding glass; this can lead to an uneven grinding even with frequent changes in direction and holding. W9PBI suggests making up a grinding plate to press the quartz plate to the glass; he uses a small brass plate cut just larger than the crystal plate. I have found a better method based upon this idea is to use a plate from rejected crystal. Begin by taking a reject crystal of the large 10X or 10XJ type and pulling it apart. Even if a such a crystal has to be bought it will only cost a few pence at a junk stall. The crystal is sandwiched between two milled plates and one of these is used to make the grinding plate. Select a low frequency crystal to obtain a plate that will be larger than most of the crystals that are to be ground; these plates have a milled surface for making contact with the quartz. As the plates are rounded at the edges it should be somewhat larger than the quartz plate to be ground.

The milled plate (or piece of brass plate, if this is used) should be punched very lightly with a centre punch to make a mark in the centre of the outside edge. This outer edge will probably also be milled and the circular marks from milling will give an accurate centre point. This punch mark can be enlarged slightly with the tip of a small twist drill. One corner of the plate is marked with a small dot of paint later used as a reference point when turning the crystal during grinding. A piece of PVC tape is then stretched over the milled flat of the plate and stuck down as evenly as possible. Excess tape can be cut away. The grinding place is now complete and is used as shown in Fig. 4. A pointed stylus or scriber, or even a centre punch, is placed into the indentation to provide the pressure and movement. The quartz plate goes between the PVC surface and the grinding glass.

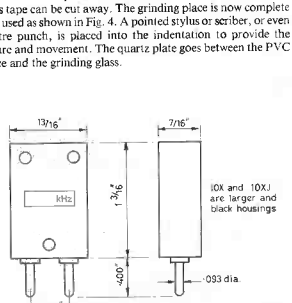


Fig. 6 FT 243 PRESSURE MOUNTING

The procedure goes something like this. . . . Before grinding mark one edge of one side of the quartz plate with a pencil dot; since only one surface is to be ground this marks the non-grinding surface. Moisten the quartz plate and PVC tape with saliva and the crystal should hold against the tape. So don't eat cream crackers when grinding! Use a small amount of grit, about a level teaspoon, and wet until a creamy sludge. Place the grinding assembly, crystal down, into the sludge, insert the pointed stylus and grinding can begin. The sludge should remain wet enough for easy movement of the crystal. Try between 10 and 15 circular movements before testing the crystal. Remove the grinding assembly, hold it carefully by the edges, using tweezers if possible, rinse it in warm clean water, dab it with clean tissue and air-dry it. The XYL's hairdrier can be useful here. The reassembled crystal can be tested on the crystal checker against a receiver or counter. If a simpler circuit is required, Fig. 5 shows the circuit I used before I built the Crystal Checker. An even better idea is to try it in the actual oscillator circuit for which it is intended.

As the grinding procedure continues the crystal should be rotated in the grinding assembly: try 90 degrees, then 180 degrees, then 90 degrees, and so on. When the crystal approaches the required frequency the grinding should become less each time. After the grinding is completed it is a good idea to give a final careful wash in distilled water before mounting back into the holder. The whole secret is to take care, do not try to rush the job and keep the quartz plate as clean and grease free as possible. HF crystals can be ground a long way with care, some people claim 2 to 3 MHz which is a little ambitious but 500 kHz on crystals above 7 MHz should present no problems. A good and useful way to take crystals into another amateur band. Grinding for filters can be another issue as sometimes ground crystals shift a little in frequency after they have been in use for some time.

So perhaps crystals need not be the problem some think. Certainly suitable frequencies in the amateur bands are difficult to get but look around the junk stalls at rallies, use the Crystal Checker, and perhaps grind a few to get onto a band. Try practising with some cheap old ones at first; some of my crystals are older than me.

References

[1]Dr. G. Bennett, G3DNF, G-QRP Club "Circuit Handbook".
[2]J. B. Rosenbery, W9PB, "Grinding Techniques for Surplus Crystals", *QST*, September 1969.

SIMPLE REGULATED POWER SUPPLY UNITS

N. G. HYDE, C.Eng, MRAeS, MIERE, G2AIH

BOTH the two power supply units described are based on the use of three-terminal integrated circuit voltage regulators. The first delivers a current of up to one amp, at a voltage variable between approximately 9 and 14, and is suitable for use as a base station power supply for most of the VHF and UHF handportable transceivers that are very popular at the present time. The second unit has a current capability of up to 5A at a fixed output voltage of 13.6, and is thus capable of powering many types of 2-metre FM and multi-mode transceivers.

Low-Current Regulator

Fig. 1 shows the circuit of the 1A version. A variable output voltage from the 7808 8V regulator, IC1, is obtained by the *pnp* transistor, TR1, in the common ground lead of the regulator. VR1 determines the base voltage of TR1 which has the effect of increasing the IC potential from 0.6V to approximately 6V above earth; this is added to the normal output voltage of the IC, giving a voltage variable between 8.6 and 14.4 at the output of the regulator. The type of *pnp* transistor used for TR1 is not critical.

Input and output circuit decoupling is provided by C2, C3 and C4 respectively. D3, connected across the input and output terminals, prevents any damage should a short-circuit occur on the input side of the regulator. Overvoltage protection is provided by a 1A fuse F2 and zener diode D4.

All major components, with the exception of the mains transformer, are mounted on one printed circuit board measuring 3½in. x 3in. Figs. 2 and 3 show the PCB track layout and location of components on the topside of the board. It should be noted that the cathode of the stud-mounted diode D4 is connected to the PCB track *via* a short wire link.

When supplying currents in the order of 1A and in the short-circuited condition (450mA), IC1 runs very hot and in accordance with the manufacturer's recommendations adequate heat sinking must be provided. This is achieved by mounting the IC *via* a mica insulating washer and bush on a heat sink consisting of a 3½in. length of ¾in. aluminium angle fixed to the board. The aluminium angle is in turn bolted to a larger external heat sink, which could conveniently consist of the backplate of any case into which the complete unit is fitted. Heat transfer between the IC and the heat sink is assisted by the application of *Thermaflow* or similar type of silicone grease.

The 5A Regulator

The circuit diagram of this power unit is shown in Fig. 4. Increased current capability is obtained by a *pnp* wrap-around pass transistor, TR1. When the voltage drop across R1 reaches a value of 0.6V, corresponding to a current of approximately 250mA through the regulator IC, TR1 switches on and passes all current in excess of this; in practice, the current through IC1 increases to some 350 to 450mA when the power unit is delivering its full load current of 5A.

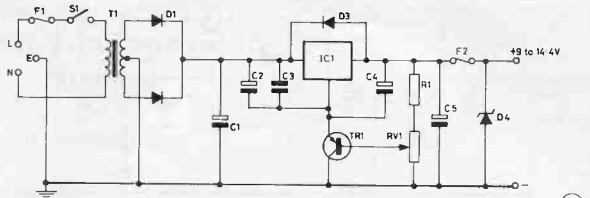


Fig. 1 LOW CURRENT POWER SUPPLY CIRCUIT DIAGRAM

Should the current through TR1 emitter resistor R2 rise to such a value as to give a voltage drop of 0.6V across this resistor, TR2 switches on; TR2 then puts a short-circuit across R1 with the result that the base of TR1 becomes positive with respect to the emitter, thus switching off the pass transistor. In this condition excessive current cannot be drawn through IC1 as the regulator overload circuit comes into operation, limiting the current to approximately 350mA in the short-circuit condition.

The output voltage of the regulator is increased from 12V to 13.6V by D1 and D2 in series in the common ground lead. If desired an LED may be substituted for the two diodes; this also has the effect of raising the IC approximately 1.5V above earth, and at the same time can function as a front-panel indicator that the unit is switched on. Input and output decoupling and short-circuit protection of the IC is similar to that employed in the 1A circuit.

The PCB measures 3¼in. x 2¼in., and Figs. 5 and 6 show the track layout and component location respectively. TR1 is mounted externally on a large finned heat sink with emitter, base and collector connections made through three studs fitted to the PCB. IC1 and TR2 are mounted on the PCB, being fitted to two small heat sinks made from ⅜in. aluminium channel section, 1¼in. long, painted matt black. The connection to TR2 emitter is made by a wire link, designated "X" on Fig. 6, on the topside of the board.

The configuration as described will not withstand sustained short-circuits on the output, and if these are anticipated it is

Table of Values
Fig. 1

R1 = 15K, ½W	D3 = 1N4002
RV1 = 10K, 100mW horizontal preset	D4 = 15V 25W zener diode
C1 = 2K2 μF, 40V	TR1 = BCY72
C2 = 0.47 μF, 35V tant bead	IC1 = 7808
C3 = 100nF ceramic disc	T1 = 15-0-15V, 1A
C4 = 6.8 μF, 25V tant bead	F1 = 250mA
C5 = 100 μF, 40V	F2 = 1A, 20mm., with PCB clips
D1, D2 = 1N5404	S1 = SPST switch

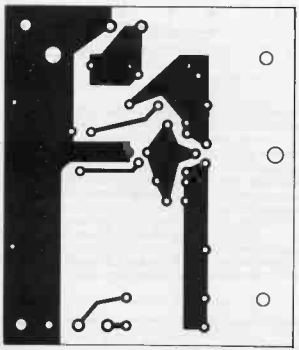


Fig. 2 PCB TRACK LAYOUT (Full size). E 057

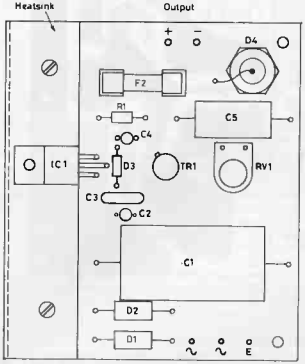


Fig. 3 PCB LOCATION OF COMPONENTS (Full size). E 058

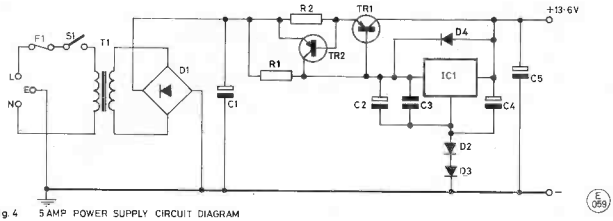


Fig. 4 5 AMP POWER SUPPLY CIRCUIT DIAGRAM

Table of Values
Fig. 4

R1 = 3R3 wirewound	TR2 = TIP32A
R2 = 0.15R approx. (*see* text)	IC1 = 7812
C1 = 8K μF, 35V	D1 = 100V, 20A bridge
C2 = 0.33 μF tant bead	D2, D3 — 1N4148
C3 = 100nF, 30V cer. disc	D4 = 1N4002
C4 = 6.8 μF, 25V tant bead	T1 = 15-0-15V, 5A
C5 = 100 μF, 50V	F1 = 1A
TR1 = MJ2955	S1 = SPST switch

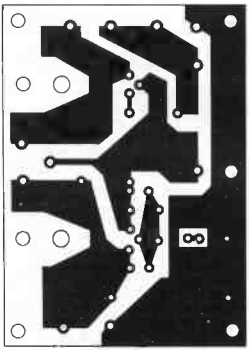


Fig. 5 PCB TRACK LAYOUT (Full size) E 060

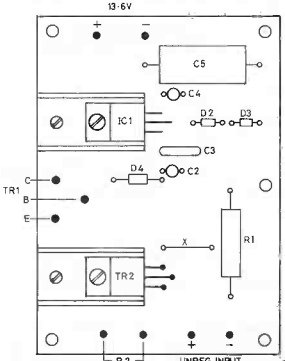


Fig. 6 PCB LOCATION OF COMPONENTS (Full size)

recommended that IC1 is detached from the board and located on a larger external heat sink. This may be the same as that carrying the pass transistor, provided that both devices are fitted with mica washers and insulating bushes.

The value of the current limit resistor R2, which is mounted external to the PCB, is approximately equal to 0.6/I. Thus for a limiting current of 5A through the pass transistor, R2 should have a value of 0.12 ohms. Resistors of such a low value may be made up by connecting a number of low-value high-wattage wirewound resistors in parallel. In the particular application for which this power supply was designed a current limit of 4A was adequate and the required resistance of 0.15 ohms was obtained by connecting three 0.47-ohm high-wattage resistors in parallel.

August issue due to appear on Friday, July 29th

CROWBAR CIRCUIT FOR THE FT-707 POWER SUPPLY

IAN KEYSER, G3ROO

WHEN working on the power supply for the Yaesu-Musen FT-707 (*Short Wave Magazine*, January 1983) a simple crowbar protection circuit was tried but with little success. The problem was that although a rapid voltage rise would trip the SCR, a slow rise could cause an overdrive situation in the gate circuit of the SCR, thereby destroying it. By increasing the gate current limiting resistor to try and overcome this problem it was found that the voltage level for tripping was not consistent, and so it was decided to omit the crowbar until more time could be spent in designing a suitable circuit. At this point I removed the crowbar from the circuit but, to my later embarrassment, failed to remove reference to it from the final text. . . .

What is really required is a comparator circuit whose output goes high as the input exceeds the reference circuit. When this was being investigated it was noticed that in the *Radiospares* catalogue there is a device designed specifically for this purpose, the RS3423; with a couple of external resistors to set the trigger voltage, and an SCR to do the dirty work, the problem is solved.

As the PSU could supply a peak output current in excess of 40 amps. it was decided to use the largest possible SCR that could be found on the open market. This turned out to be the THY 500-40, which is also available from *Radiospares* (part no. 261-889) — and although rather expensive it is a cheap price to pay when one considers the value of the equipment that is likely to be hung on the power supply.

The circuit, Fig. 1, does not need much explaining as there is little to explain. R1 and R2 are the resistors that set the trip voltage, and these are calculated using the simple equation:

$$V_{trip} = 2.6(1 + \frac{R1}{R2})$$

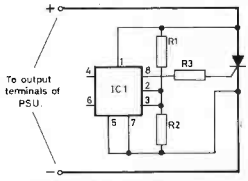
The only stipulation is that R2 must not be greater than 10K ohms for minimim drift; R3 is to limit the gate current to protect the output of the 3423.

Someone is bound to say, "Ah, when the SCR fires the supply will drop to zero volts and therefore no supply to the IC!" Well, the answer to that one is that when the SCR has fired the 3423 has done its job, and the SCR will continue to conduct until the current through it has reduced to zero, *i.e.* when the fuse blows on the unit is switched off.

". . . the antenna here is rather novel. . . ."

Table of Values
Fig. 1

R1 = 22K, ¼W
R2 = 4K7, ¼W
R3 = 52R, ¼W
IC1 = RS3423 (*RS* 307-890)
SCR = THY 500-40 (*RS* 261-889)



Note: Heavy wires to SCR should be at least 2·5mm² and be as short as possible.

Fig. 1 SCR CROWBAR CIRCUIT.

With the values shown on the circuit diagram the trip voltage is 14.77 volts. To test this, wire the crowbar circuit across the output terminals of the PSU and wire a 12v. light bulb across the output along with a voltmeter. Now increase the output voltage using the preset on the regulator PCB while observing the output voltage. As the voltage passes the 14.7v. mark the circuit will fire and the bulb will light up. Reduce the preset to its original position, unplug the supply, and wait until the capacitors have fully discharged. Turn on the supply again and reset the output voltage to the required level (13.6v.) and replace the bulb with fusewire of the correct rating.

For final mounting, the SCR should be mounted on the PSU chassis using suitable mica insulating washers and thermal grease. This is not strictly necessary as the device should blow the fuse within a second, and so the heating should be minimal; however, there is the possibility that the fuse will not blow (having forgotten to replace that bit of 16 s.w.g. wire you used when the fuse blew last year), and but for this simple precaution it might be necessary to spend out on a new SCR, new pass transistors — and a new FT-707!

EQUIPMENT REVIEW

DATONG AUTOMATIC AUDIO NOTCH FILTER, MODEL ANF

IN 1976, **Datong Electronics Limited** introduced their unique Frequency Agile Filter, type *FL-2*, which was reviewed in the July 1976 issue of the *Short Wave Magazine*. The Automatic Audio Notch Filter plus CW Filter, **Model ANF**, reviewed here, is the logical development of the *FL-1* idea, though in size more in keeping with the diminishing masurements of 1980s communications equipment.

Specification

The **ANF** is an audio frequency device consisting of:—

(i) A tunable, two-pole notch filter with a notch depth better than 40dB at 3.5 kHz.

(ii) Two cascaded two-pole tunable bandpass filters for peaking the chosen audio frequency for CW reception with a bandwidth of 60 Hz at the −3dB points, at 800 Hz.

(iii) A continuous scanning circuit covering the range 270 to 3,500 Hz for use in "AUTO" mode.

(iv) Input and output automatic gain control circuitry forming a *compandor* to achieve an overall gain of unity.

(v) A bar LED display to indicate the frequency of the peak or notch.

(vi) An audio output stage providing two watts into eight ohms with a 15 volts supply.

The input threshold for correct operation is one millivolt RMS and the lock threshold is 6dB below the noise level. The input impedance is 100 k-ohms and the output impedance is suitable for loads of three ohms or more.

Description

The filter is housed in a small, robust extruded aluminium case 90mm. wide, 42mm. deep and 150mm. from front to back. It is painted black and the general appearance can be seen from the photograph. Fig. 1 shows the two glass fibre PCBs which are actually one single board during manufacture, but split into two prior to assembly. Flow soldering is used and the construction and components are of the professional standards expected from **Datong Electronics Ltd.** The front and rear panels are 2mm. thick aluminium, silver anodized finish with black lettering, and the two PCBs are attached to brass pillars at each corner, resulting in an extremely robust construction. The unit weighs 450 grammes. The rear panel contains input and output phono sockets, a 3.5mm. jack socket for headphones and a 2.1mm. coaxial DC power socket.

Installation

Two screened jumper leads, about one metre long and fitted with a phono plug at one end, are supplied. The "INPUT" of the filter is connected to the loudspeaker socket on the receiver or transceiver, while its "OUTPUT"is connected to a loudspeaker. An unstabilised DC supply of 11 to 18 volts at a maximum current of 400 milliamps is required and **Datong's** own "MPU AC Adaptor" was used for this purpose. The station transceiver has a 13.8v. stabilised DC outlet which could have been used instead.

Results

Particularly on the HF bands, one often suffers from anonymous carriers which appear within the passband during a QSO. To deal with this interference, the **ANF** can be used in "AUTO NOTCH" mode by depressing the two buttons so identified, The unit will then scan the AF range from 270 to 3,500 Hz about 45 times a minute. As soon as any steady heterodyne is detected, the scanning circuit latches onto it and attenuates it by some 40dB. If the heterodyne is of the "happy wanderer" variety, its frequency will be tracked, rather like a ferret after a rabbit; there is no escape!

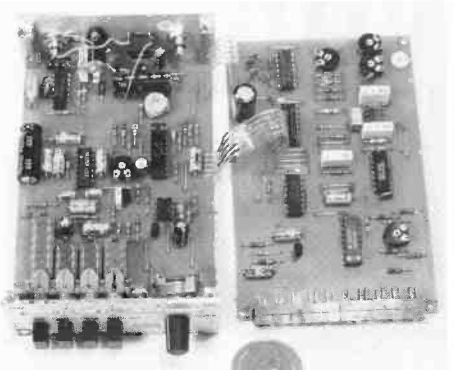


Fig. 1. Opened out view of the Datong Auto Notch Filter showing the neat layout of the two, single-sided, glass fibre PCBs. The "pot" in the middle of the left hand, bottom, board controls the notch depth. The "pot" at the top right of the right-hand, top, board sets the threshold to control the sensitivity of the locking process. The one below it sets the LF limit of the scan, the third control in this group setting the upper scan limit. All these controls can be user-adjusted from "below," without dismantling the boards. The coin is a 10p piece.

While silently scanning for a carrier, the row of ten LEDs are illuminated one after the other, from left-to-right, then right-to-left, and so on. Once a whistle has been detected, this furious scanning stops and one of nine LEDs will stay on, and the extreme right hand one, marked "LOCK," will also light to confirm the quarry has been caught. Figures "**1, 2 and 3**" above the row of LEDs indicate the frequency in kilohertz of the interfering signal. In "AUTO" mode, the filter will stay latched onto a fast CW signal but, if dealing with a slow one, it will likely resume scanning during a space. Therefore the "MANUAL" mode should be used by tuning out the unwanted signal with the knob on the right. As mentioned in the caption to Fig. 1, the upper and lower scanning limits and the depth of the notch can be adjusted *via* preset pots by the user.

If only the "NOTCH" button is pressed, the filter must be tuned manually to the unwanted heterodyne, one of the LEDs indicating the approximate frequency. Sometimes two adjacent LEDs will light up alternately in rapid succession, however. The tuning is quite sharp but there is a limited AFC action with a pull-in range of about 100 Hz.

For CW reception, the **ANF** is used in "PEAK" mode, the manual tuning knob being used to select the preferred beat note. In the reviewer's case, the transceiver side-tone oscillator frequency is 800 Hz and netting onto a signal is by matching this to the incoming beat note, so the peak frequency was set to 800 Hz.

The very narrow 60 Hz bandwidth at 800 Hz transforms what seems to be a crowded band into one where the wanted signal is usually QRM-free. However, your receiver and the other person's transmitter must be very stable in order to be able to take advantage of such a narrow bandwidth. The earlier *FL-1* model featured variable bandwidth so you could increase it to cope with less stable signals. You also need a very good, back-lash-free slow motion tuning drive. The receiver used in these tests was part of the Icom IC-730 transceiver which has a synthesised VFO with tuning steps of 10, 100 and 1,000 Hz and only the 10 Hz rate was really satisfactory. Those readers using VFOs of this type with a lowest step rate of 100 Hz could miss signals completely unless an RIT facility is provided.

In "PEAK" mode, the review model generated some noise of its own, the pitch of which varied with filter tuning. Since no block or circuit diagrams were supplied, no suggestions can be offered as to the cause of this noise.

A demonstration of the effectiveness of the **ANF** in either mode can be made by depressing both the "NOTCH" and "PEAK" buttons, when the filters are bypassed. The result is usually quite dramatic. When the "OFF" button is pushed in, the unit is switched off and the output from the receiver goes straight to the loudspeaker.

Conclusions

The **Datong Auto Notch Filter** proved to be a very useful accessory which did all that is claimed for it. The reviewer's IC-730 has the narrow CW filter and passband tuning filter installed. Nevertheless, the CW performance was notably superior with the **ANF** in use and only the wide, SSB filter, than with the basic transceiver "with all the stops pulled out." However, a 60 Hz bandwidth is narrow enough to cause a little "ringing" on fast CW signals and some users may find this a slight disadvantage of a single, fixed bandwidth.

In common with many other transceivers in its class, the IC-730 lacks a tunable notch filter and the few that do, as far as can be recalled, do not offer automatic tuning. Consequently, the **ANF** increased the overall receiver efficiency in this area, too. The product comes with four pages of typed operating instructions and can be highly recommended to anyone whose receiver or transceiver lacks the facilities it provides. The **price** is currently **£59** plus VAT — a total of **£67.85** in the U.K. — and is available either directly from **Datong Electronics Limited**, Spence Mills, Mill Lane, Bramley, Leeds, LS13 3HE, or from various dealers.

N.A.S.F.

VHF BANDS

NORMAN FITCH, G3FPK

IN last July's issue, much space was devoted to the first, extensive Sporadic E opening on June 5, 1982. Unfortunately, nothing similar has occurred this year, so far, for British Isles readers. Such *E's* openings as there have been have been confined to Band I TV with fairly frequent reception of Soviet bloc stations and some from Spain, Portugal and Italy. While *E's* propagation has occasionally reached to the 70 MHz FM broadcast band, it does not seem to have affected Band 2 FM.

Awards News

All this month's news concerns the QTH Squares Century Club which has two new members, while two others have been awarded stickers, all for the 2m. band. Congratulations to Doug Mellor, G8WPD, from Fairfield in Derbyshire, who is member no. 25. His station comprises a *Trio* TS770E transceiver, a *NAG* amplifier and two 9-ele. *Tonna Yagis* at 40ft., the site being about 1,150ft. *a.s.l.* Future plans are to build a better PA using a pair of the popular 4CX250B valves, and to double up on the antennas. Currently, Doug is de-bugging a 200 *w.p.m.* send and receive morse program for a *Sinclair* ZX-81, with EPROMS, with a view to going for his Class "A" licence. However, with current squares worked at 139, he wants to work 200 before turning to CW. His confirmed total for his certificate, issued on May 19, is 100 and consisted of 56 tropo, 6 *via E's*, 2 on MS and 36 *via Auroral* mode. Best DX was ROSOAA (OH) via *E's* on June 7, 1981, a distance of 2,270 kms.

Certificate No. 26 went to John Neal, G4NQC, from Catford in southeast London, and is dated May 26. His confirmed total is 103 from 21 countries made up of 93 tropo contacts, 9 *via Ar* and just one *via E's*. First licensed in Sept. 1981 as G6EIT, he passed the morse test in December but had to wait till April 1982 for the "A" call. His first 2m. station comprised a *Yaesu* FT-902DM plus transverter and a pair of 14-ele. *Cushcraft Yagis* and most of the squares were worked with that combination. The present set-up is a *Yaesu* FT-225RD with *muTek* board and a *Dressler* D-200S amplifier. The antennas are now a box of four 17-ele. *Tonna Yagis* with 3SK97 *Gasfet* masthead preamplifier, on a 60ft. *Westower* at the bottom of the garden, necessitating 100 feet of UR67 feeder cable. The QTH is 36m. *a.s.l.*, best take-off being to the north. John also operates on 70cm. and 23cm. using four 21-ele. *Yagis* with elevation control on 70cm. and four 23-ele. *Yagis* on 23cm.

John King, G6ADH, now has 125 QTH squares confirmed and his sticker was issued on May 26. His list included several cards from OK. OE and Y stations and all but two were tropo contacts. Erik Cechota, OE3CEW (1152f) was sent his "125" sticker on May 31. Among his QSOs were G4ANT (AM), G3UVR (YN) and G8UHU/P (ZN) on tropo; GJ4ICD *via Ar*, and GW3NYY (XL), GM4CXM (XP), G4ASR (YM), GM3ZXE (YQ) and G3IMV (ZL) on MS mode. Erik's station consists of a *Trio* TS-770E and MGF1400 preamp., a 4CX250B amplifier and four 16-ele. *Yagis*.

Satellite Notes

As this is being compiled, the news from *AMSAT* is that the *Phase 3B* satellite is due for launch around midday on June 16. The launch vehicle is the *ARIANE* L-06 which will be blasted off from the *European Space Agency's* site at Kourou in French Guiana. Two hours before "lift off" the "ALINs" launch information net was scheduled to relay the proceedings. If all goes well this time, *A-O-10* should be in orbit and the transponders working seven days after launch, just about publication date for this issue.

Two transponders are incorporated in *A-O-10*. The "U" one is a linear converter with a 150 kHz bandwidth. The uplink band is 435.025 to 435.175 MHz and an EIRP — effective isotropic radiated power — of 21.5 dBW is required for a 20 dB signal-to-noise ratio on the downlink. This equates to about 10 watts at the antenna, whose gain should be at least 10 dBd. The downlink band is nominally 145.975 to 145.825 MHz and, assuming a 2m. Rx with a 5 dB noise figure and a 2.4 kHz bandwidth, an 8 dBd or more gain antenna is suggested. There is an engineering beacon on 145.987 MHz to transmit by phase-shift keying, data about the satellite's internal system at 400 bits/second. A general beacon on 145.810 MHz is for general information to users.

The "L" transponder has a bandwidth of 800 kHz, the uplink being from 1,269.05 to 1,269.85 MHz. 28.8 dBW is the suggested EIRP, *e.g.* 3 watts to a 22 dBd gain antenna, or 50 watts to a 10 dBd gain antenna. The downlink is from 436.95 to 436.15 MHz nominally and, assuming an Rx noise figure of 3 dB and a 2.4 kHz bandwidth, the antenna gain required is 12 dBd or better. Engineering and general beacons are on 436.02 and 436.05 MHz respectively. All antennas should have *right-hand circular polarisation* to counteract the effects of spin modulation.

If the launch has been a success, information will be discussed on the 80m. net around 3,780 kHz from about 1800 GMT, no doubt daily. It is likely that the 2m. nets on 144.280 MHz will be operating from about 1830 GMT, in various parts of the country. Hopefully, some first impressions can be printed in the August feature.

Your scribe telephoned the *University of Surrey's UOSAT* answering service, the latest information being recorded on June 1. The only item of news was that the 2.4 GHz beacon had been switched on and had been received in the U.K. and Belgium. The period at orbit no. 9141 on June 1 was given as 94.668148 mins. with a drag factor of 5.19467×10^{-2} x (Orbit no. −9141) to be subtracted. The track separation was 23.666156° with a drag factor of 1.307028×10^{-3} x (N−9141) to be subtracted. A reference orbit for June 8 was no. 9247, equator crossing at 14h.18m.14s. at 345.4°W. No news about possible un-snagging of the fouled magnetometer cables along the gravity gradient boom.

The June issue of *AMSAT-UK's* excellent journal *Oscar News* has been published along with the latest orbital calendars. Members were also sent a reprint of a May 1983 *Wireless World* article by J. R. Miller, G3RUH, describing a Data Decoder for *UOSAT*. For full details of *AMSAT-UK* membership and services, send an *s.a.e.* to:— AMSAT-UK, London E12 5EQ.

On the operational side, Russell Coward, G6HRI, (Blackpool) has been active on *O-8* and on several of the Soviet satellites, mainly working U.S.A. stations. He uses a *Commodore* VIC-20, expanded to 32k, for orbit predictions and tracking, and has written his own program that takes about two seconds to produce the day's predictions for each satellite. He will send this program to any reader who supplies a blank tape and return postage. It will run on a basic, unexpanded *VIC-20*, by the way, and he also has an option, expanded, for tracking the RS satellites. He is *QTHR*.

Tim Kirby, G6TTU, (Cheltenham) is now using the satellites and mentions the advice and encouragement given by John Hawes, G8CQX. So far, Tim has worked a few German stations plus N0AN (Iowa) and TU2IT in the Ivory Coast, but complains of bursts of QRM marring reception at times, possibly from a central heating system.

Contest News

Michael Toms, RS31976, has sent the results of the Barking Radio and Electronics Society's 2m. contest held on March 27. In spite of terrible conditions, it attracted the largest entry yet. The high power section was won by G4PSX (Hants.) with 11,715 points, with G4RZO (Kent) runner-up with 10,660 pts. G6SRY

(Oxon.) came third with 8,016 pts. In the low power section, the winner was **G8WBO/P** (Wilts.) with 10,094 pts., with G6ECM (Kent) next with 6,191 pts. and G4HRO/P (Staffs.) in third spot with 4,512 pts. Only two *s.w.l.'s* took part. Nearly half the contestants had to have their scores adjusted due to various logging and scoring errors. Mick remarked upon the number of people who cannot seem to add up or multiply in this age of pocket calculators.

The *AGCW-DL* 2m. CW contest is on June 25 from 1900 to 2300 GMT; full details on page 186 in the June issue. June 26, from 1400 to 2100 GMT is when the 2m. and 70cm. *WAB* phone event takes place, as detailed also last month. VHF NFD takes place the weekend of July 2/3 and on July 31, 0900-1700 GMT, there is the 70cm. low power event limited to 15 watts output, which is a Fixed station, and All-other station affair.

On the *Cumulatives* scene, further legs of the 10 GHz contest are on June 26 and July 24, 0900-2000 GMT. June 26, same hours, for the 3.4 GHz section of the *Microwave* contest, with a 24 GHz session on July 24.

DX Notes

Roger Thorn, G3CHN, passes along details of operation from YX square in southern Spain from June 30 through July 6. The call will be ED7YDG from YX74f, 3,400m. *a.s.l.* in the Sierra Nevada mountains, 25 kms. southeast of Granada. The gear sounds formidable: on 144.333 MHz, 1kW with two 17-ele. *Yagis*; on 432.333 MHz, 1kW with four 21-ele. *Yagis* and on 1,296.333 MHz, 100w with four 23-ele. *Yagis*. Tropo and MS skeds can be made over the 20m. VHF net, around 14.345 MHz. Operation from the same location by F1ADT was also mentioned on July 9, 10, 15 and 17.

Rainer Bertelsmeier, DJ9BV, has sent full details of the *Hamburg VHF/UHF/SHF Group's* trip to Heligoland (DO70j) mentioned in a *Stop Press* item last month. The dates are July 2 to 8, the call DK0IK/P. On 70cm. they will operate on 432.225 MHz CW/SSB with 700w to four 23-ele. *Yagis* and MGF1400 preamp. On 23cm, 1,296.190 MHz CW/SSB with 130w to four 29-ele. *Yagis* and MGF1402 preamp. On 13cm. 10w to a 1.3m. dish with MGF1402 preamp. on 2,320.200 MHz. Tropo skeds can be made by telephoning the shack, direct, on 010 49 472 5310 from the U.K.

As stated in the May *VHF Bands*, the *HADRABS* group will be operating from Andorra from July 16 to 24. The call C31XV/P will be used on all bands above 30 MHz, and for the 3.5 to 28 MHz operation, they will use C31YR/P. 6m. operation will be on 50.433 MHz, SSB/CW using 28.885 MHz for daytime talk-back. *E-M-E* skeds and random working will be on 144.033 MHz, 144.133 MHz being proposed for CW MS skeds. 144.233 MHz will be used for CW/SSB tropo and random MS QSOs on SSB. The 70cm. working QRG will be 432.233 MHz CW/SSB.

They will be QRV on the 20m. VHF net daily most of the time, with U.K. skeds at 0900 GMT.

From July 17-24 inclusive, they will be on 2m. between 0400 and 1100 GMT for tropo and random MS and from the 18th to 23rd on 2m. from 1800-2300 for tropo. Due to the frequent occurrence of lightning storms, they may have to close down for safety reasons so prefer not to make advanced skeds but rather making them over the VHF net just 24 hours in advance, maximum. All *E-M-E* skeds to be made *via* the 20m net or VE7BQH and all CW MS skeds over the VHF net. *Sporadic E* openings will take priority over all 2m. skeds and good 70cm. tropo conditions will take priority over 2m. tropo.

Listener reports and cassette recordings in particular, are sought and will all be QSL-ed and cassettes returned. It is hoped to take video recording equipment too with a view to editing lecture material for later on. Thanks to Robin Lucas, G8APZ, for all this detailed information. He is *QTHR* for direct QSLs, if desired.

Another British team, the *Falcon Contest Group*, G4SGK, plan operation from Luxembourg from July 26 to Aug. 14 with the call G4SGK/LX on 2m. SSB. 100w to two 17-ele. *Yagis* is hoped for, with MS skeds the priority in the *Perseids* shower. Operation from CJ, CK, DJ and DK squares is possible and skeds can be arranged either by writing to P.O. Box 30, Shepsted, Loughborough, Leics., LE12 9SQ, or *via* the 20m. VHF net during the expedition. An *s.a.e.* should be sent if a reply is needed. Thanks to Matthew Reed, G4NPX, for the foregoing information.

Six and Four Metres

Geoff Brown, GJ4ICD, has opted out of the 6m. tests and the *Home Office* has replaced his call by GU2HML, the first Guernsey licensee and a new country to work. A number of the other 39 6m. operators have reported working him.

Denis Jones, G3UVR, (Merseyside) reports an *E's* opening to Gibraltar on May 25 on both 6m. and 4m. which resulted in a QSO on 4m. CW with Jim Bruzon, ZB2BL, for country no. 7 this year. The *Auroras* on May 11 and 24 brought CW QSOs with G3YRH (Tyne & Wear), GW4HBK (Gwent) and G3VIP (Humberside). GW4IIL/A (Dyfed) was a good tropo QSO on the 29th on SSB.

Paul Turner, G4IJE, (Essex) made a successful 6m./2m. crossband CW MS test with YO2IS (KF) on May 22, Szigy getting 12 bursts and many pings from Paul using an 2-el. *Quad* antenna in his loft. Paul got 12b, 8p. from the YO over the 1,675 km. path. His tests with GM3s WCS and WOJ continue.

ANNUAL VHF/UHF TABLE

January to December 1983

Station	FOUR METRES Counties	FOUR METRES Countries	TWO METRES Counties	TWO METRES Countries	70 CENTIMETRES Counties	70 CENTIMETRES Countries	23 CENTIMETRES Counties	23 CENTIMETRES Countries	TOTAL Points
G3UVR	38	7	74	23	51	15	—	—	204
G8TFI	—	—	52	13	47	14	8	1	135
G2AXI	24	3	51	14	33	8	6	2	133
G8PMK	—	—	43	8	36	8	29	4	128
G4ROA	—	—	42	6	33	7	12	4	104
G3BW	15	5	43	10	24	5	—	—	102
G8PNN	—	—	35	10	34	9	6	5	99
G8ULU	—	—	41	12	30	9	5	2	99
G4MUT	14	2	40	11	25	6	—	—	98
G4ARI	15	2	64	14	1	1	—	—	97
G6HRI	—	—	57	9	23	6	—	—	95
G4NBS	12	1	28	8	33	11	—	—	93
G4FRF	27	4	6	2	39	11	3	2	89
G6DER	—	—	48	8	24	5	—	—	85
G6BCM	—	—	65	19	—	—	—	—	84
G8KAX	—	—	31	9	35	8	—	—	83
G3FIK	—	—	65	15	—	—	—	—	80
G3FIJ	17	1	38	10	10	2	—	—	78
GW6JDK	—	—	58	15	1	1	—	—	75
GD2HDZ	21	3	19	8	17	6	—	—	74
G3FBV	2	1	20	3	19	9	5	3	69
G4FRX	—	—	40	7	20	2	—	—	69
G4DEZ	—	—	39	22	—	—	—	—	61
G6TIU	—	—	51	9	—	—	—	—	60
G8VFV	—	—	40	12	—	—	—	—	52
G8RWG	—	—	42	8	—	—	—	—	50
G6HDD	—	—	37	10	—	—	—	—	47
G8XTJ	—	—	39	7	—	—	—	—	46
G4NRG	4	1	16	7	3	1	—	—	32
G4FKI	7	1	20	2	1	1	—	—	32
GM4CXP	—	—	18	12	—	—	—	—	30
GW4HBK	24	5	—	—	—	—	—	—	29
GU4HUY	—	—	17	5	—	—	—	—	22
G2DHV	4	1	2	1	3	1	—	—	12

Three bands only count for points. Non-scoring figures in italics.

Dave Lewis, GW4HBK, found May a quiet month till the 24th, when he was on during the *Ar*. The first station worked was GM4DLJ at 1720, the last G3UVR at 1840, with G4IDE and GU2HML in between. EI4RF was the first *Ar* signal heard in Blackwood. The following day, Dave worked ZB2BL at 2052 on 4m. and also crossband 4m./6m. The beacon ZB2VHF was audible on the 25th, 26th till 2240, and 27th. During a QSO with G4ANT on the 26th, the latter said he had heard the Russian "Woodpecker," the scourge of the HF bands, on 4m. for about 7 mins!

Two Metres

Although in the opening remarks it was stated that no major *Es* openings had occurred, nevertheless there have been a few, very brief, manifestations. John Hunter, G3IMV, (Bucks.) heard HG7KSV calling "CQ" on CW for about a minute at 1346 on May 31. On June 2, OH5AD (NU) worked LZ2FA (ND) and LZ2QA (OD) and half made it with YO4YT (OE) between 1655 and 1701. There was also *E's* propagation between Y and UB5 the same day. On June 6, around 1340 GMT, I8TUS (IZ5Af) popped up briefly on the SSB calling frequency and was worked by John Neal, G4NQC, (London) at S9 both ways, and some others. The odd thing was that there was no sign of *E's* on any lower VHF bands.

While some contributors have concluded that May was a rather poor month, G3UVR found it rewarding for the annual table score, adding another seven counties. These included Co. Louth, EI3VLT, on tropo on the 23rd, and GW6RAW in Mid Glam. on the 28th, both SSB. In the *Ar* on the 17th, Dennis worked GM3WML (Highlands) and LA9BM (EU), and in another event on the 22nd, SM5BEI (JU).

G4IJE reports the following MS contacts in May:— 11th, YU7NTU (KF), who got a one minute burst from Paul for an R38 report; 17th, OE6WIG (HG); 19th, EA6FB (AY) on SSB for a new square, SM3AZV (IX) another new one, and F9HS (BD). On the 22nd, Paul worked OY5NS (WW) for a new square and country no. 51. G3IMV also worked SM3AZV on MS, on June 3 in 45 mins. from 0400. Then from 0600, he had a sked with HG8KWG (KG) receiving a 14s. burst in the second period, not nothing thereafter.

Tony Collett, G4NBS, (Berks.) was pleased to actually catch the *Ar* on May 11, but not till 1711. It faded out at 1850 and he could not understand any of the SSB signals and also the CW ones were extremely rough and wide. QTFs were from 0° to 25° and he worked GM4ILS (YR24), GM4IAO (YR), GM3JIJ (WS69) and G4OMK (XO31) between 1725 and 1820. G4TAP was the last signal heard, still calling for DX. Rod Burman, G4RSN, has been out of the country quite a bit lately but did catch the tail end of the May 24 *Ar*. He heard, but did not contact, G4TAP.

Congratulations to Julian Blythe, ex-G8ORP, from St. Austell in Cornwall, who is now G4TJX. His father is G4HFO, and both are looking forward to the *E's* season. They listen and call to the east most evenings. Up to May 14, John King, G6ADH, (Surrey) had only operated a total of 14 hours this year due to frequent business trips overseas. However, he has now retired so is eagerly looking forward to some good summer DX.

Mick Cuckoo, G6ECM, (Kent) found May conditions generally very poor with just a few brighter spots like the 8th, which yielded tropo QSOs with GI4OPH and GI4TAP, both in XO, and with GM4CXM (XP) on the 19th. The 22nd saw contacts with DC1ZN (EK) and DF1IK and DL0WN, both in EJ, G16VPT (XO) and GM8YJU (YO). In the May 11 *Ar*, Mick worked GI6ATZ (XO) and GM8VBX (YP), and the one on the 24th provided GI6ATZ again, GM4PWR (XQ) and GM5FM (WR47j) for a new square.

Phil Ingham, G6HDD, (Bolton) mentions the "... QSB playing havoc ..." with reception and this has been noticed at G3FPK during much of May, with many stations sounding as if they were mobile. G6HR1 worked a couple of French portables at 1600 on May 7 in AK square and heard F1DPU/P (ZI). On the 8th, Russell worked G4RLP/P (Devon) and on the 15th, GI4SXV (Co. Tyrone). EI9EH and EI2EZ were contacted at S9-plus on the 24th.

G6TTU missed last month's deadline so listed some of his April successes. During May, the 1st saw a QSO with GI4OPH (XO) and the 4th brought one with TO2YT (BK). (The French amateurs are using TO instead of F as their prefix, if they wish). Tim reckons that the 7/8 contest weekend was splendid as it brought stations in F, ON and PA in AK, AI, BL, CL, ZJ and ZJ. On the 24th he contacted GM6WIX/P (YP) and on the 29th, GD3YDB who was running 10w to an indoor antenna. GM4LG/P (YO) was also very loud on 10w and he ended this session working EI4AEB (WN). Tim is looking for stations in Norfolk and Suffolk and wonders where all the Jersey stations have gone?

During HF NFD on June 4/5, there was a VHF contest on the continent as well and this generated a fair amount of activity. Jim Rabbitts, G8LFB, (London) had 55 QSOs, with a station in DH the best DX heard. Nothing further south than the "H" line was heard at G3FPK. John Fitzgerald, G8XTJ, (Bucks.) just sent a postcard to update his scores and to report being off the air for three weeks, ". . . with a blown front end!"

Kelvin Weaver, GW6JDK, (Gwent) also found things rather dead in May and so took to the hills for the QRP contest on the 8th with GW6GW/P in YL15e, 1,800ft. *a.s.l.* Very strong winds during erection of the tent almost turned it into a

QTH LOCATOR SQUARES TABLE

Station	23cm.	70cm.	2m.	Total
G3VYF	—	117	307	424
OZ1EKL	—	101	314	415
G3POI	—	—	393	393
G3MJV	—	63	325	388
G4HCO	1	102	225	329
G3JXN	58	99	155	312
DK6JZ	—	—	311	311
G4IJE	—	—	297	297
EA3LL	—	30	261	291
LA9AA	25	62	200	287
SP2DX	—	—	280	280
G8BXN	12	76	191	279
G3COJ	36	87	150	273
G3PFV	18	86	163	267
G6KBQ	4	91	172	267
G4GO	—	19	246	265
G4ERG	—	16	243	259
G3XDY	30	86	131	247
G3BW	6	36	204	246
G4DEZ	—	—	236	236
G8VR	2	3	228	233
GW3NYY	—	48	185	233
G3UVR	—	46	184	230
G8ATK	15	81	129	225
G3CVN	—	—	225	225
G4RZP	—	76	147	223
G8RZO	—	75	148	223
9H1BT	—	11	210	221
GM4COK	—	26	194	220
G8HH	12	70	133	215
G4MCU	—	50	163	213
G8CNQ	—	63	146	209
G3PNN	30	70	108	208
G4JZF	—	68	140	208
G2AN	9	76	121	206
G4AWQ	—	50	150	200
G4PCI	—	28	167	195
GI3EQ	—	—	194	194
G4OAE	—	28	165	193
G3PEK	—	—	193	193
G4ERX	7	53	131	191
GM4CKC	—	26	163	189
GW4EAI	—	—	187	187
G3NAQ	—	58	128	186
G4NQC	11	33	138	182
G4IMF	2	35	144	181
G4NBS	13	75	92	180
G8TET	—	95	82	177
G4NPD	—	36	138	174
GI4UQO	3	86	80	169
G8UUG	5	66	98	169
GI4POO	—	60	106	166
G8BBT	3	—	161	164
G4WPD	—	24	139	163
G4NQX	—	47	113	160
G4ADH	—	29	131	160
G8KAX	17	57	82	156
G8VRT	16	38	101	155
G8PMK	21	59	74	154
GD2HDZ	13	46	91	150
G8LFB	—	—	150	150
G6HKT	—	60	89	149
G6DDK	2	13	127	142
G8ECM	—	—	142	142
G3MUT	—	57	84	141
GM4IPK	—	—	139	139
G4KUA	—	30	105	135
G3ADE	—	64	70	134
GI7GCM	—	—	133	133
G3FIJ	—	29	92	121
G4TJX	—	39	82	121
G4MJC	—	12	108	120
GM8OEG	—	—	115	115
G8XJR	—	—	115	115
G4MEJ	—	—	114	114
G4ROA	9	45	58	112
G8WFL	—	30	79	109
GI8SKL	—	21	83	104
G4OHA	—	—	104	104
G6DER	—	27	76	103
GW3CBY	5	16	79	100
G8WUL	—	27	72	99
G4WWD	—	—	95	95
G8VJV	—	—	94	94
G4RSN	2	39	52	93
GM8RDX	—	33	53	86
G8RWG	—	—	84	84
GI6HTJ	—	17	66	83
G4IVY	—	9	72	81
GW4JDK	—	2	79	81
G8NQS	—	2	76	80
G6ABB	—	—	80	80
G4NRG	—	11	61	72
G4ELQ	—	—	69	69
G4PBN	—	—	63	63
G6CNX	—	—	63	63
GI5MP	—	—	62	62
G6DTT	—	—	60	60
G8ZYL	—	—	54	54
G4FRX	—	10	40	50
G8XTJ	—	—	48	48
G4HRI	—	13	34	47

Starting date January 1, 1975. No satellite or repeater QSOs.

hang glider. He has passed the morse test in mid-May so awaits the GW4 call. He mentions very strong Spanish TV on Band 1 on the 28th for over an hour and a slight opening on FM Band 2. By the way, Kelvin, there is no minimum report for QSOs counting for scores in the tables. If both parties are genuinely satisfied that reports have been exchanged, that is suffieient. After all, one hears "five and zero" reports given, just because the listener's S-meter is a bit mean!

A 144 MHz contest over the weekend May 21/22 was in the *RSGB's Contest Calendar*, but later dropped. However, an unofficial event was organised by John Ridd, G8BQX, at the eleventh hour. By June 6, your scribe heard John telling someone that about a dozen logs had been received. A few stations were taking it seriously but most operators were making a few contacts to give them point in rather flat conditions. With seven minutes to go, G4DEZ/A was on their 717th QSO and G6HH/P ended up with 690. With ten minutes left, G6CHL/P was up to 521.

Seventy Centimetres

May brought another five counties for G3UVR: on the 3rd, GI4GVS (Antrim) and GI4SAM (Down), GI being country no. 11 for 1983; GW8TFI/P (Gwent) on the 7th; GI4SXV (Tyrone) on the 25th, with WO another square, and G3BPM in Surrey on the 29th. G4NBS was on for the contest on May 7/8 and made 82 QSOs, mostly "locals," but the following representing better DX: — GW4SSO/P (VM44), GW8TFI/P (YL25), G4THB/P (ZO48), G4CKT (ZN05), G4HGT/P (ZO55), DF7KB/P (DK), DL0LC (DL), PA3AOH (DL), PA0FRE (CL), PA0EZ (CM) and ON7WR/A (CK). All this effort for just 325 pts. in generally poor conditions and lowish activity. Tony spends a lot of time monitoring the band but activity seems very low outside of contests.

G6HRI lists a couple of new, 1983 counties and worked G3UHF/P (ZN) on May 7. Ray Cox, G8FMK, confirms that contest conditions were very poor with no enhancement detected at any time, so he concentrated on 23cm. Gordon Emmerson, G8PNN, (Northumberland) managed G4DDC/P (Beds.) and GW4SSO/P (Powys) for a couple of new, 1983 counties on May 7, the latter an all-time new one for Pete Godfrey, G8ULU, (Kent). May 14 brought a QSO with G3OBD (Dorset) and on the 24th, G4KUX in Durham. GW6JDK's antenna was down in the contest, so he had to be content with a dummy load one on which he worked GW8TFI/P!

Twenty-three Centimetres

Martin Blythe, G4HFO, (Cornwall) writes that when he and G4TJX work into the continent, they are always being asked for 23cm. QSOs, so they are contemplating getting active. G4NBS stayed home for the May 7 contest and put up a single 23-ele. *Yagi* at 26ft. on the side of the mast with the transverter immediately below it. This resulted in 25 complete QSOs worth about 1,400 pts. Tony's "prize contact" was GW4BVY/P at 177 km. on CW operating from the hill he had occupied in the April 2 contest. Other noteworthy QSOs were:— G4ODA/A (Lincs.) on CW, G4LOH/P (Leics.), G3XDY/P (AM67) on CW and G4KDH (AL34) on SSB. This activity brought 14 counties for the table but once again, G3WFM (Herts.) heard in every contest, was missed. G8TFI went out -/P on the 9th to give Tony another new county, but he forgot to state which.

Adrian Chamberlain was active in the contest, too, but wishes stations would give their QTH when calling. As most are portable, the *Call Book* is no use. He lists G3XDY/P (Suffolk), GW4BVY/P (Gwent) on the 7th, and G6FSN/P (Glos.) on the 22nd. G8FMK stuck to 23cm. in the contest and made 23 QSOs, best DX being G3XDY/P. GW4BVY/P in Gwent was all-time county no. 37 for Ray.

G8PNN worked G8PPR (N. Yorks.) and G3NWU (Cleveland) for all-time new ones on May 24, plus G4BYV in Norfolk for this year's total. G8ULU is glad to hear so many stations on 2m. and 70cm. say they intend to get going on 23cm., too. Pete regularly hears the PA0QHN beacon in CM53j, mostly just above the noise. His best DX was on Apr. 15 and 16 when three PAs in CL and CM were worked. However, with only one watt available, he has to rely on conditions being favourable.

Odd Interference

Last month, mention was made of two-way computer interference between the 2m. G3FPK station and a *BBC Micro* on the other side of the party wall. Another complaint has been received from next door, this time that the RF from one or more bands in use is rendering their *telephones* unusable, according to a couple of *British Telecom* engineers with the hapless task of dealing with the problem. Now the older style telephones, like the wall and *Trimphone* types in your scribe's abode, are low impedance devices which work quite happily next to lots of RF. It seems that the neighbour has some new style marvels which are high impedance instruments, designed so that umpteen sets can be paralleled up. The *BT* chaps said that a whiff of RF is sufficient to ruin all the dialling tones and they complained that these devices were designed and installed with no inquiries of them as to possible drawbacks of high impedance instruments. It seems it will be a very difficult problem to cure but one thing is quite certain; your scribe will absolutely refuse any request, if it should be made, to curtail operations on any band.

For about a year, some weak carriers around 144.443 MHz have been noticed. They beam up to the north, are about S5 and there all the time. It was thought they were "birdies" in the receiver but now transpires that many other 2m. operators have the same problem. Accordingly, with the help of Ken Miles, G8GGK, in Selsdon, some very accurate bearings were taken which suggested the signals originated in the business centre of Croydon, about three miles away. Subsequently, other London stations took bearing but with very ambiguous results and it seems that we are not all listening to the same signals.

Some descreet inquiries seem to indicate that the interference originates in offices with a particular type of digital telephone exchange. But again there is, as yet, no conclusive proof and it would be irresponsible to name names at present. Meantime, perhaps readers would like to search around 144.443 MHz in their area for these odd carriers.

Yet another source of VHF QRM has been reported, affecting the 4m. and 6m. bands and which manifests itself as carriers every 38 kHz. In one case in Shropshire, the QRM was coming from a house with a burglar alarm system, so have any readers been suffering from this kind of QRM?

Late News

As this was being compiled in the afternoon of June 7, from about 1400 GMT, there were fleeting *E's* openings to the Mediterranean. Many London stations worked some 9Hls in the *9H Falcon Contest* and some 10s were on, too. The 2m. band was in an odd state with a mixture of good tropo and *E's* for several hours.

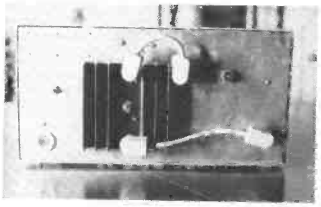
Deadlines

Not quite such an early deadline for the August issue. It is July 6 and for the following month, it will be August 3. As usual the address is:—"VHF Bands," SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts., AL6 9EQ. *73 de G3FPK.*

THE "WHITFIELD" SSB/CW/QSK TRANSCEIVER, PART V

AN EASY-TO-BUILD, 5 WATTS OUTPUT, MODERN DESIGN COVERING 160 METRES, 80 METRES, AND 3—3.5 MHz

IAN KEYSER, G3ROO



Rear view of the "Whitfield".

THIS month the set should begin to look like a set! But before we start on the metalwork it is necessary to complete the low pass filtering on the output of the transmitter and the aerial switching.

At first this was to be included on a PCB, but on further investigation it was decided that the work involved in building on tagstrip was far less than the work in making the PCB! The reason for this is that the switch wafer is in the middle of the box and there is plenty of room either side of the wafer to take the filters, and plenty of room below it for the aerial relay. The layout of this box is therefore left to the individual constructor and only the circuit is given. There is one point that is worth mentioning, though, and this concerns the input and output sockets which have to protrude through the back panel: to overcome this problem I mounted the sockets on long pillars so that the flanges of the sockets were flush with the edge of the LPF box.

The LPF Circuit

The reason why we require a low pass filter after the transmitter PA is that inevitably there are harmonics generated of the required signal. These have to be removed as they are potential sources of interference to others even though they may be many dB's below the required signal. What we mean by a low pass filter is that all signals below the cut-off frequency of the filter are allowed to pass unattenuated, but all frequencies above the cut-of frequencies are attenuated by about 30dB. There are several designs available to the constructor but here we are using the simplest, which is a double *pi*-network. *See* Fig. 20.

For the 1.8 MHz band we use a cut-off at about 2.2 MHz and this circuit is C6001 C6002 and C6003 in conjunction with L6001 and L6002. For the 3.0 and 3.5 MHz bands we use the same filter with a cut off at about 4.3 MHz, as the second harmonic of the 3.0 MHz signal will be on 6 MHz and so outside the filter; this filter is made up of C6004, C6005 and C6006 with L6003 and L6004. The required filter is selected by the switch wafer S3001*d*, which is the rear wafer of the bandswitch. Relay 6001 is used to switch the filter from the receiver input and transmitter output, and switch the +12 volt supply for the PA bias and muting, etc. RL6001 is not energised directly from the Tx/Rx control PCB but by a transistor Q6001. This reduced the output currrent requirements of the control PCB and so simplifying this circuit.

Tables of Values
Fig. 20

C6001, C6003 = 1800 pF poly.
C6002 = 3600 pF poly.
C6004, C6006 = 750 pF poly.
C6005 = 1500 pF poly.
R6001 = 10K, ¼-watt
Q6001 = BC107 or similar
RL6001 = 12v. relay, 2-pole, 2-way
L6001, L6002 = 31 turns, 26 swg, T50-2 cores.
L6003, L6004 = 21 turns, 26 swg, T50-2 cores
S3001*d* = *see* Part III, May, p. 140

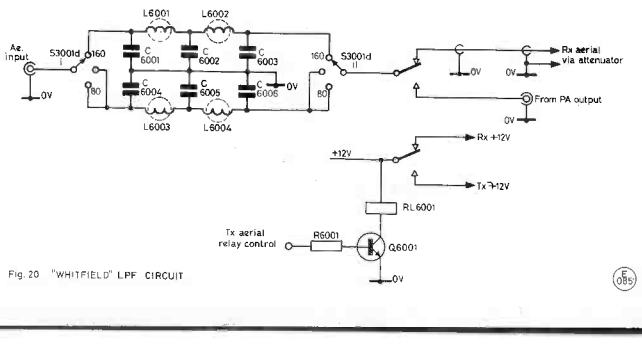
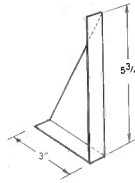
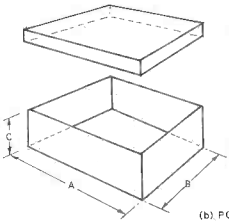


Fig. 20 "WHITFIELD" LPF CIRCUIT



(a) Dial supports (both same hand)



BOX	A	B	C	SWG
PA	4"	2 3/4"	1 1/2"	18
Tx Driver	6 3/4"	4"	1 3/4"	16
LPF	4"	3 1/2"	1 1/2"	16

(b) PCB Boxes

Fig. 21 "WHITFIELD" SUPPORTS & BOXES

Metal Bashing

In fact this is the worst part of the construction, in my view, as I always manage to drill holes in the wrong position and have to file them out, but with a little care these mistakes can be covered up and all looks well in the end!

The case is fairly complex, the reason for this is to be able to gain access to the circuitry without having to dismantle the whole set. The principle behind this construction is that the receiver section is mounted on the front panel, the transmitter on the rear panel, and the base holds the two together. The top cover then slips over the assembly and is fixed to the baseplate with either self-tapping screws or adhesive tape! *Sellotape* is my favourite as there is then no problem with gaining access rapidly and there are no unsightly screws showing.

The front and back panels are fixed with 6BA screws through the baseplate into little brass strips 'Araldited' to the flanges and then drilled and tapped 6BA. This means that there is no problem in the future when the time comes to remove these panels. Of course, self-tapping screws can be used, but with repeated use these soon open up the holes in the aluminium thereby creating problems.

The first fixing are these brass strips. For this I use one-inch lengths of 1/4 x 1/16-inch strip obtainable from model shops. To ensure good adhesion to the aluminium it is necesary to clean both surfaces thoroughly and roughen the surface of the aluminium with a screwdriver. Fix one strip to each side flange and at least two, if not three or four, along the long flange, *see* Fig. 23. To drill the holes in the correct position is difficult, but I found that the most accurate way was to drill and tap the holes first and then, holding the panel in the correct position on the base plate, mark through the holes with a scribe.

The next problem is drilling the holes for the controls and the dial cut-out. There is only one way to do this, and that is by 'dead reckoning': the method I used was to place the receiver module on the edge of a table (ensuring that the VFO box lid is on) and measuring the positions of the existing controls relative to the table surface and marking them on the front panel, then the other holes that will be filled with panel mounted controls can be located by measurement from the centre line. Having got the existing controls poking through the front panel it is a fairly simple job to locate the position of the dial cut-out. Fig. 24 shows my dimensions but these are only for reference to check your figures by, and not as a drilling guide.

Having fitted the front to the base the next move is to fix in position the dial supports. These frames not only act as dial supports but also as supports for some of the other controls, and they will have to be cut to serve this dual function. It is impossible for any guidance to be given on this matter as there are too many variables involved, but with a little thought it is surprising what can be accomplished with very little work. Examples of what I have done can be seen in the photographs.

Fitting the driver box is the next problem, as this sets the exact

The "Whitfield"

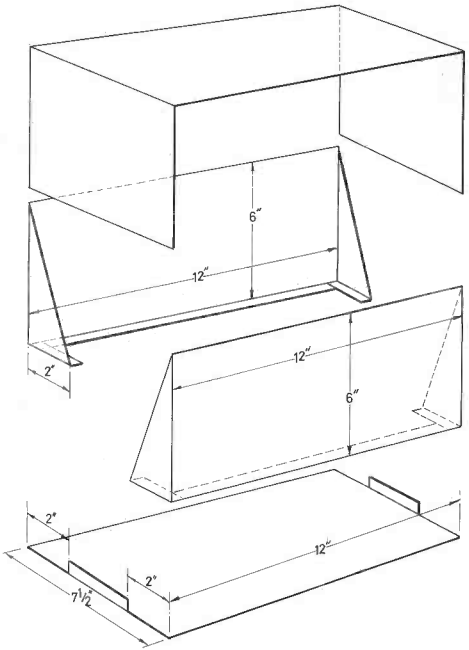
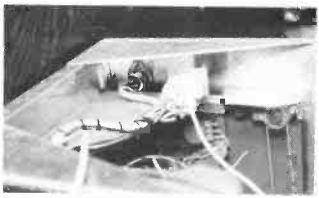


Fig. 22 WHITFIELD CASE DETAILS (16 swg Aluminium)

E 087



Showing the method of cutting the dial support to hold the mode switch; the mic. socket is to its left.

E 088

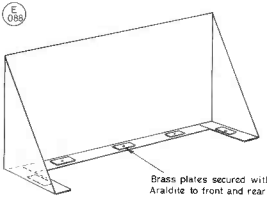


Fig. 23 "WHITFIELD" BRASS PLATE POSITIONING

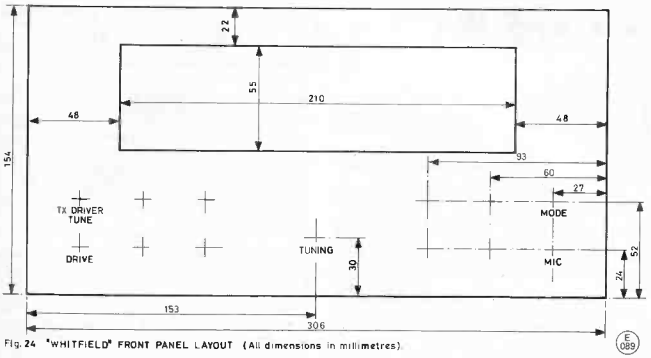
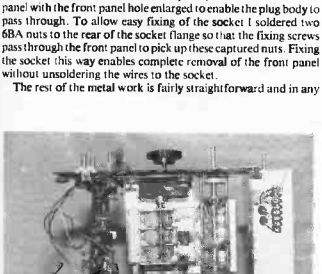


Fig. 24 "WHITFIELD" FRONT PANEL LAYOUT (All dimensions in millimetres).

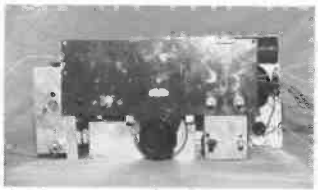
spacing between the front and back panels. This box is supported on the left-hand dial support (looking from the front) about half-an-inch above the baseplate. The exact position is set by the position of VC4001 (Tx driver tuning) and this has to align with the hole in the front panel. Having decided on all these variables (and these depend on the physical size of the components used), the driver box is fitted to the dial support with a nut and bolt in a suitable position that is accessible. Having done that, it is now possible to place the back panel in position and fix the driver box to it, using the mounted bolts for the driver output socket (the driver output is available on the backdrop for use with transverters and is routed *via* a coax cable to the input of the PA).

The microphone socket, a five pin DIN, is not mounted in the normal fashion on the front of the panel, but on the rear of the panel with the front panel hole enlarged to enable the plug body to pass through. To allow easy fixing of the socket I soldered two 6BA nuts to the rear of the socket flange so that the fixing screws pass through the front panel to pick up these captured nuts. Fixing the socket this way enables complete removal of the front panel without unsoldering the wires to the socket.

The rest of the metal work is fairly straightforward and in any case there will be differences due to different components and ideas. There is plenty of room in the base and boxes to accept these variations as well as any additional circuitry required by the individual.



Receiver module 'married' to transmitter module.



Front view of the receiver module, showing positions, with the Tx mixer box in place.

Having completed the case it is now necessary to make up two coax leads, one to couple the driver output to the PA input and the other to connect the PA output signal to the LPF box. (I have available a few right-angled sockets which make these connections neatly and these are available for an *s.a.e.* until the source is exhausted).

The Front Panel

Finishing off the front panel can be a problem. Over the years I have come to favour perspex as the finishing touch, using *Lettraset* on the face and spraying the back with paint; this gives a high gloss finish with a "relief" effect on the letters — but the problem is that the lettering easily rubs off. Having recently seen G3RJV's finish of using coloured paper and careful lettering, and *then* perspex, this is the system that I would now recommend; though of course the whole effect depends on the quality of workmanship.

In the next, and final, part we will cover the Tx control PCB and the optional RF amplifier.

• • • SWL • • •

SHORT WAVE LISTENER FEATURE

By Justin Cooper

PERHAPS it would be interesting this time to talk about the shack and the layout of its contents, and what is to be preferred — we know that none of us have a perfect shack, but it is nice to know how far from perfection ours really is!

Let's look at the things we would like first: privacy, warmth, access to aerials and earth by the shortest routes possible, and no sharing with other hobbies or activities.

Immediately we come to the basic question of a quickly heatable outside shack or a place indoors. Most would go for the latter, but there are good arguments in favour of a shack at the far end of the garden, especially in terms of the local man-made noise, of access to aerials and earth, and privacy. Getting the place warm quickly is then merely a matter of a beefy enough mains lead out to the shed, plus enough kilowatts to get the temperature up quickly.

Inside the house, there are various places which can be considered: a separate room is an ideal, but the coal-cellar or the corner of a less-used room are easily made snug and cosy for the expenditure of a few hours effort. Up in the loft is superficially attractive, but needs very careful thought before committing oneself — for example can you get the gear up there; can you get the operating desk up there; is the access easy for you and any visitors?

Now, having chosen the place (or been pushed into one corner of the sideboard!) you have to consider the details. The height of the operating surface is *critical* to less than an inch for best comfort and is related, of course, to the height of the chair you are using. Most people are right-handed and therefore need to tune the receiver with the left, leaving the right hand free for logging, reaching for books or pencils and so on. Thus the receiver tends to sit on the left of centre, the speaker maybe at the centre, leaving room to the right for a small filing-box for records, an RTTY or SS/TV set-up, or even a home-computer. When one turns to VHF, of course there are some more questions to be answered: as far as your scribe is concerned, he uses an FM rig occasionally but by far the majority of his listening on VHF/UHF/SHF is done by way of converters.

On the other side of the room, ideally one wants a workbench with room for test equipment — shelves overhead can be a nuisance as they tend to cause the head to be wagging continuously from whatever is under test to the display on the test gear. Also, a rack on the wall to hold a few small tools, and the soldering-iron and stand should have a convenient site so that the iron needs no more than switching-on.

We have talked a little about ideals — and one writer's ideals at that. Obviously, no one has the same approach to the hobby as someone else, or the same degree of commitment, or the same financial constraints, or even the same degree of tolerance (or lack of it) from the family and near neighbours. All we can do is look to the ideal, and then aim as near as we can.

Home Brew

Most operators have something home-brew around the place, and most of them are items which either can't be bought commercially or which replace things that the owner couldn't afford to buy. So — we are going to have us a little **competition!**

If you've built something, then we want a description, a photograph (b/w or colour), and the story of exactly what it does in your own scheme of things. If you would like to see your pride and joy in these pages, then the picture should be a good sharp black-and-white print. We will award marks for the idea, the design, the construction, etc. In other words, we would like to see everything, from a tyro's first try at a published circuit right through to the beautiful work of someone who constructs electronic equipment for a living; not forgetting the 'lash-up' job of someone who just wants to prove a design point.

There will be some marks spare for us to award for the effort put into photographing and describing the masterpiece — but not for the typing! And, if there are enough entries, we may well dig deep into our pockets for a little prize of some kind, one for the OMs and another for the YLs. The deadline will be as for the batch of letters for next January's piece, which a glance at the calendar says is **November 17th**. So . . . get you cracking, folks!

The Letters

B. Patchett (Sheffield) was a bit upset by an RAE question last time about propagation over 4000 miles at night in midwinter — he says that while he answered the question as best he could, it was plumb daft because whoever heard of propagation at night in midwinter on 21 MHz? Most of us who have lived through a sunspot peak would be a pretty fair answer! In fact, one can often hear a signal with a pronounced 'echo' on it, due to having gone right round the globe, which implies it has gone right through the night! (Think about it — it takes about 1/7 second to girdle the globe, passing on the way the night zone and the day zone). This is a manifestation of night-time propagation which Brian implicitly denies exists! But, seriously, at a sunspot peak one will often find late-evening openings on any of the HF bands; and if there is *activity* at each end of the path, you are made aware of the path's presence. See how much more lively any band becomes during, say, the ARRL, the CQ WW, or the Russian world-wide contests, and be aware that it's *not* due so must to 'lift' conditions as to activity in the right places. One's normal reaction to a 'flat' band it to crank the bandswitch — and so is everyone else's! This is very definitely the time for a speculative 'CQ' call or two. On a different tack, Brian hopes to have the G4 callsign in the bag by the next letter, so we must abide in hope — and hope he reports to *CDXN* as well as continuing SWL activity!

D. P. Shapiro (Prestwich) ruefully remarks that he has projected himself into the All-Time Table — over-enthusiasm, doubtless! On a different tack, he has been somewhat diverted by his studies for another 'O' level pass (in Computing) and the 'A' levels which are almost upon him. A little puzzle is the use of the term 'G4 + 3' to refer to post-war callsigns. It all goes back quite a long way to when all the three-letter suffixed calls were of post-war origin, except for the few who had G2+ three letters, who in the pre-war years had held them, without the G, as the so-called AA licences, who could tune up but not transmit; these chaps were all given full permits with just the G added when the 'tickets' reappeared after the war. Thus, since there were as many pre-war calls as post-war ones about, the late G6FO referred to the post-war chaps as G3 + 3s to distinguish them from the pre-war G3 + 2 callsigns; the term, like so many of his, stuck, and in 1983 can be said to include all the post-war issues.

Aero-Mobiles

C. H. Kirk (Leeds 15) noticed an /AM call and wonders about its legality, Aeronautical Mobile is permissible in some countries, one of which is U.S.A. — and Charles's chap was KA9BRO/AM, oddly enough working an Italian station who was an off-duty air traffic controller. Now his second letter, from which we gather he has two sets of aerial wire: the first one is a set of three dipoles on common feeder up in the loft, while the other one is a sixty-odd foot wire fed through an ATU, with counterpoise earths of quarter-wave for each band all connected to the ATU earth terminal and 'lost' under the shack carpet. The dipoles, with their 'inverted-V' shape, seem to perform better for Europe, but the

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first assessment of the end-fed wire is that on DX it outperforms the dipoles. In a post-script comes a question about what are known as 'active aerials'. These are in essence small aerials with a fitted amplifier in the base and an output feeder at some specified impedance which is taken away to the shack and receiver. It must be remembered firstly that no active device, valve, transistor, FET or whatever, is free from *noise*, and secondly that by far the most important parameter in the receiver system is the 'dynamic range' between the minimum detectable signal and the maximum before blocking or other effects occur (that's a bit of a simplification but it'll do for now!) Now, on the face of it, that means the active aerial isn't a lot of use — but we must take into account that, certainly at HF, most of the noise at the aerial terminal is manmade, and probably generated in our house or the one next door. *Ergo* if we take an active aerial to the bottom of the garden, where it is farthest away from houses and hence noises, we might find that we have made a vast improvement. The answer has to be the old one — suck it and see!

A second letter from B. Patchett comes to the top now, and contains something of interest for those who like to get in a bit of Morse practice: Brian notes ONY52 which he finds sitting around 7.0 MHz between 0900 and 1530, Mondays to Fridays. It starts about 5 w.p.m. and gradually works its way up to 16 w.p.m. as the day progresses, always in five-letter groups, and is presumably of Belgian origin.

D. Woods (Swindon) set up shop with an HF5V and an R-600 receiver fed from it, back in March, and is now ready for a first entry of 453 in the 1983 Table, which looks OK. One minor point that arises is that Douglas, after listing all the prefixes in terms of complete callsigns, broken down to band and time — beautiful — then added a complete list of the prefixes themselves, which he added up and totalled. This (and Doug's not the only one who does it!) is a duplication of effort; and it's easier to check the main list anyway and count 'em at the same time. We don't much mind how you present the required facts, but that having been said, it seems worth while to avoid duplication of work around deadline time! On a different tack, we notice Douglas is another RAE candidate, so we hope to hear before long that of another pass slip.

R. Hurst (London SE23) started again in 1982, after a break of fifteen years, while he got married and had a family. The receiver is an Eddystone S740, bought second-hand twenty years ago, and stored in the garden shed for most of that time. A little 'rejuvenation' on it and it was a matter of back to business.

Turning to *P. Oliver (Paisley)* we find Pete has been a BC band SWL for four years, but in January he bought a Realistic DX-200 and found the amateur bands, to which he has remained glued ever since!

Barking

Thanks to an ex-regular of this piece, M. Toms, we have the results of the Barking club contest, which had sections for licensed operators and SWLs. There were lots of licensees, but only two SWLs — Mrs. J. Charles of Colchester with 1848 points, and N. Henbry of Northiam who for many years also adorned this piece. Congratulations to both — and from Barking an appeal for more SWL support next time round, lest they withdraw the SWL section!

Our next letter comes from the Sage of Nottingham, *B. Ward*. It is nice to see that he is once again able to use a pen rather than the typewriter — as he says, there isn't the same sense of involvement. For the moment, Barry's XYL still has him in the throes of decorating and D-I-Y activities. However, the books are still being worked at, and some progress is being made, to judge by the additional understanding of the articles he reads in the magazines. The 'shack' corner of the room has been completed, and looks good, while the rest of the room has also been decorated — albeit Barry reckons the rest of the family don't have enough respect for his kindness in letting them dine in his shack! Barry has tried to explain that this is a shrine to radio, and not just a place in which Dad does his thing with dits and dahs, and they don't listen when he explains about those two saints Henry and Farad, let alone the idea that they will each have a cloud of their own with 360 degree take-off to DX! Sad.

On a different tack, Barry wonders about the great strength of signal the West Coast Africans can dump on to his aerial. Well they are, after all, about 3000 miles away which would make them mostly somewhere near first-hop signals if they have good aerials. Changing subject again, Barry has discovered that the spacing between his house and the one next door is greater than he had thought, and so the next project is a set of dipoles for 7-30 MHz using common feeder, plus the making of a balun, and a compatible ATU. Barry goes on to wonder about dipoles of different lengths on a common feeder, and how about that the unused ones don't upset the one in use. We suspect that they *do* interact, but that the reactance of the shorter ones is such that no power is fed into them, while the longer ones are either high impedance anyway or have opposite-sign reactances. Anyway, the scheme works well enough.

R. Wooden (Staines) and others mention the odd SP station again operational on the bands; he also noted VK7PPW/MM aboard the *Sea Shepherd* on March 26, one of the protesters at the seal cull, being monitored closely by the Coast Guard — until his batteries went flat. An April 1 callsign heard on Twenty was signing TV6ICE — a comment on the weather?

The Ladies

The pile this time includes the current letter from *Mrs. R. Smith (Nuneaton)* plus her letter postmarked 28 September 1981 — good going for the postal service! In Ruth's latest one she gently chides us for the slip in the Ladder which put her lower down than she should have been — Sorry!

Apart from her first place in the Barking contest, which we have already mentioned, *Mrs. J. Charles (Colchester)* has continued to wend her way toward the magic 1000 mark. On the way, June found OA2I on Twenty and wonders about his worth; suffice it to say that if the last digit was 1 and not 1, then he is all present-and-correct in the current world Call Book.

HPX LADDER (All Time Post War)

SWL *PREFIXES*

PHONE ONLY		J. Heath (St. Ives)	672
		R. Wooden (Staines)	609
		A. J. Hall (Alvaston)	595
B. Hughes (Worcester)	2685	B. Patchett (Sheffield)	587
Mrs. R. Smith (Nuneaton)	2340	D. B. Shapiro (Manchester)	587
S. Foster (Lincoln)	2304	A. Pilkington (Chesterfield)	518
E. W. Robinson (Bury St. Edmunds)	2181		
H. M. Graham (Chesham)	1578	CW ONLY	
G. W. Raven (London SE13)	1474	E. B. Ward (Ruddington)	1577
M. Toms (Barkingside)	1400	J. Goodrick (I.o.W.)	1400
Mrs. T. Parry (Blackpool)	1394	A. F. Roberts (Kidderminster)	1139
M. Rodgers (Harwood)	1392	J. M. Dunnett (Prestatyn)	1127
N. Askew (Coventry)	1282	H. Scott (Wetherby)	1105
J. Doughty (Bloxwich)	1190	R. Fox (Northampton)	380
N. E. Jennings (Rye)	1150	D. J. S. Williams (Romsey)	273
H. Bale (Cardiff)	1130		
R. Fox (Northampton)	1123		
D. J. S. Williams (Wednesbury)	1051	RTTY ONLY	
A. Pyne (Bradford)	1004	N. E. Jennings (Rye)	410
Mrs. J. Charles (Colchester)	921	P. Lincoln (Aldershot)	378
R. Everitt (Blunisham)	872	J. M. Dunnett (Prestatyn)	287
P. Lincoln (Aldershot)	798		

Minimum score for an entry: 200 for CW and RTTY, 500 for Phone. Listings to include only recent claims and to be in accordance with HPX Rules, *see* p. 26, March issue.

Mrs. T. Parry (Blackpool) seems to have settled down nicely to the new place and the aura of domesticity, but still with a steady influx of new prefixes noted in the Ladder. Tina seems to have picked up another April 1 joker in IF1F, heard on both 14 and 21 MHz on the magic day — but that still won't make him into a Good 'Un!

Next we come to *W. G. Skipton (Rye)* who remarks that his typewriter is, like himself, a learner — we know the feeling! George started back in 1937 with a home-brew two-valver, with which he heard various stations including Moscow; and the resulting QSL card plus parcel of propaganda made him very unpopular with a Conservative parent! The outbreak of War saw the end of George's interest in the hobby until 1982; now in Rye, he is able to get together with N. Jennings each week for a ragchew. The station comprises a DX-302 plus an AD370 active aerial from *Datong*.

Turning next to *N. Jennings (Rye)* we see the results of his efforts largely on George Skipton's list(!) and in his letter Norman reckons that many more SWLs, whether to the broadcast or amateur bands, would find it worth their while to become members of ISWL — a sentiment with which we agree. On a different tack, Norman wonders just how long it will be before someone else joins the RTTY section of the HPX Ladder.

J. Goodrick (Newport, I.o.W.) is all nostalgic, recalling the good old days back in the early sixties, when his SX28 never heard VK or ZL despite a good location near Huddersfield, 200 feet of wire out and an ATU on Twenty. This was probably because the long wire — and it was a true longwire at that length on Twenty — was probably too directive and sat the VK/ZLs in the minor lobes or nulls of the aerial. And, of course, there was the far greater Top Band activity — mostly AM and CW of course, and some of the AM was of real BBC quality.

Our congratulations are due to *R. Fox (Northampton)* who has gained an RAE pass and obtained G6UTI; but this is just the prelude to some effort being applied to passing the Morse test. In readiness for the upgrade he has changed the FRG-7700 in favour of an Icom 740 and its matching automatic ATU, with a transverter to produce the needful on two metres. On the aerial front, a trap dipole arrangement has been put up for the HF bands, plus an eight-element Quad for 144 MHz and twin Parabeams for 432 MHz. As for the Apple II, that is being pressed into service for *Oscar* predictions and, in the near future, RTTY if all goes to plan. An interesting point is that the RFI problem from the Apple has disappeared now that the motherboard has been changed and updated following a problem with software and interfacing.

Disaster

That's what struck *A. P. Lincoln (Aldershot)* recently, when he went into the shack for the first time for a period and found that the roof had been leaking for some time and — of course — all over the gear. It was all dried out with the aid of a hair-dryer, although the R70 receiver was a mite slow to respond to the treatment; but it all sorted itself out in the end. In such a case as this, probably the best thing to do is what Peter did, unless one happens to live near a big city. Often the rain in such an area can be quite corrosive, in which case the best bet is probably to give the gear a full-blown bath in clean water, followed by a good dry out and some attention to the points which may need lubrication. Turning to SS/TV, Peter reckons that the bands having been open later due to the longer days has resulted in some more countries having been seen.

T. Morris (Headingley) braved wifely wrath enough to put in three sessions on each day of the CQ WW WPX contest, to a total of around 13½ hours. As predicted, she was Not Amused! Nevertheless the trade-off was in the form of some 93 new prefixes to make it worthwhile. On the matter of portables, in the U.S.A. when a station goes out portable, as for a Field Day or such, the station signs with its own call suffixed by an oblique stroke and the call area in which the operation occurs. This is the same as our 'alternative address' and 'alternative location' /A and /P. However, to distinguish between them, the Stateside station will sign, if out portable, for instance W6/ZZ/P6 which says he is out portable in the sixth call area (California). Should he decide to go portable in the seventh call area, he would sign W6/ZZ/P7, and so on. The picture is a little complicated of recent years because while an American station who has a permanent address in each of two call areas would have a basic callsign in each area, it seems that nowadays they only have the one call, and if operating in another call area, whether temporary or on a semi-permanent basis, sign the original call stroke number of the call area from which he is operating.

A return to the fold sums it up for *J. Doughty (Cheslyn Hay)* who re-enters the table after an absence due to the pressures of a hectic life. However, he admits that part of the trouble is that he goes into the shack to make up the list and then, having switched on the rig, "gets interested" and the paper work just doesn't get finished!

H. M. Graham (Chesham) hasn't been this low in the pile for years — but we picked it up and inverted it for a change! Among Maurice's list, we wondered about his TA8MSC — we understand that TA1 and TA2 are the only prefixes being used, but since all the TAs are 'undercover' (amateur radio is only just beginning to be legalised after many years), it is just possible that some variations may occur.

Breakfast TV has got up the nose of *D. A. Whitaker (Harrogate)* — as he says, we have the blasted time-base QRM for 18 hours daily now! And, of course, the morning period is by far the best time for DX operating, with most of the EU QRM still abed or getting off to work. All of which is a side-issue, because David actually wrote on behalf of White Rose club, with results of their annual SWL Contest for 1983. Looking at these results, we note Bob Treacher — who writes the *RadCom* SWL column — at eighth, while David Whitaker himself is at sixth place. Another old-time reader of this column is N. Henbrey at tenth. Sadly, there were only seven entries in the CW section and none from UK, despite the White Rose picking the weekend of the CQ WW 160 contest *and* the French DX contest! Top Band was buzzing, while some 92 DXCC countries were noted in the 3.5 MHz European logs, with 69 DXCC countries reported on Forty. Again, the pity of it is that more CW entries were not made, as the I.F bands are very definitely the place where it all happens on CW.

ANNUAL HPX LADDER
Starting date, January 1, 1983

SWL	PREFIXES		
D. Woods (Swindon)	453	C. H. Kirk (Leeds)	308
G. Skipton (Rye)	435	S. J. Bedford (Wakefield)	244
R. G. Hurst (London) SE23)	426	T. Kirby (Cheltenham)	221
T. Morris (Wakefield)	341	P. Oliver (Paisley)	211
G. A. Carmichael (Lincoln)	331		

200 prefixes to have been heard since January 1, 1983 for an entry to be made, in accordance with HPX Rules, see p. 26, March issue. At score of 500, transfer to the All-Time listings is automatic.

Others

We acknowledge, and thank, the following for their entries — why not add a letter with some news to your next list? *B. F. Hughes (Harvington); D. J. S. Williams (Wednesbury); G. A. Carmichael (Lincoln); G. W. Raven (London SE13); A. Pyne (Bradford 6); J. Heath, (St. Ives); A. Pilkington (Chesterfield); N. Askew (Coventry); A. F. Roberts (Kidderminster)*; and *H. Bale (Cardiff)*. To you all, many thanks — and keep 'em rolling!

Wind-up

Which it where we give you the deadline for next time out as Thursday, **July 21**, to arrive first post, the address as always being to your J.C., "SWL", SHORT WAVE MAGAZINE, 34 High Street, WELWYN, Herts. AL6 9EQ. Till then, Good Hunting!

BASICS FOR THE S.W.L AND R.A.E. CANDIDATE PART XI

SUGAR-COATED THEORY

LAST time we finished by saying that this instalment would cover directional aerials. That was a mildly premature statement, insofar as we must pay a little more attention to the matter of half-wave and quarter-wave aerials and their relationships with earth in the real world.

In general, aerials are erected either such that they radiate horizontally or vertically, in terms of the electric field; conveniently this coincides with the radiator being either horizontal or vertical respectively. So — when the chap at the club talks about a horizontal aerial, he's also talking about a horizontally polarised aerial. Let's consider a half-wave dipole in free space and imagine we can energise it at the centre with some suitable source of RF; a wander round the thing with a field-strength meter and plotting the results would give us a 'polar diagram' of the radiation in '3-D', which would look for all the world like a doughnut with our half-wave dipole poking through the hole in the middle. This is not a shape that we can plot on a single piece of paper, even though we could represent it in 3-D with the help of plasticine or putty. However, if we assume for a minute that the dipole is horizontal, the doughnut will be standing up, and if we took a section horizontally through the doughnut, then we could plot this on a piece of paper — it would look like a figure-of-eight lying on its side, and the dipole, which is in the same plane, would lie across the neck of the 'eight'. This tells us that the aerial will radiate horizontally with the maximum strength at right angles to the wire, the strength tailing off as we look round towards the end of the wire. This is a 'horizontal polar diagram' of the dipole in free space.

Using the same argument, a section at right angles to the first one, cutting through the centre of the dipole would show a 'vertical polar diagram' and this one would draw out on the paper as a circle round the point representing the aerial. One usually sees these sorts of diagrams drawn on 'polar' graph paper, where the lines of the paper radiate from the centre like the spoke of a wheel; this is handy as we can use the length along a line to describe the field strength, and the angle for the other argument. Sometimes — not usually in amateur publications — one may see the polar diagram plotted on 'ordinary' graph paper, using field-strength on the 'Y' axis and the angle along the 'X' axis. This is confusing except for special purposes.

Of course, we can draw sections at all sorts of angles in between vertical and horizontal, but when we talk in normal terms about a polar diagram we are referring to a section parallel with the earth under the aerial — so let's go right back there and shed the free-space suits.

In our free-space aerial, it didn't take a lot to see that we couldn't expect much radiation off the end of the dipole, since we couldn't see any of the wire. Now our horizontal dipole is sitting above its own little bit of earth, and we agreed last time that the earth will contain a mirror image of the aerial. Now walk out to the ends of the dipole; if you can't see the dipole, you can see some of the reflection. Try it with a horizontal pin over a bowl of water — try as you might, you won't get shot of both the end of the dipole and of its image at the same time. *Ergo*, deduction suggests that the horizontal dipole hung up over an earth plane will in fact show signs of radiation off the ends. An interesting point is that a vertical aerial will see this bit of radiation off the ends better than a horizontal, as you will see if you continue the experiment with the pin and mirror.

Now, when we energise our half-wave dipole above ground some of the RF will be aimed down towards the ground, some horizontal and some upwards. Over a 'perfect' ground all the RF that hits the ground will be reflected upwards again, and so we would expect the resulting polar diagram to depend on the height of the dipole above ground. For radiation hitting the ground at a very shallow angle a particular effect occurs and the wave reflected off the ground is phase-reversed, which modifies the picture slightly, but essentially the argument holds good. Practically, we may say that at a quarter-wave above earth our half-wave dipole (horizontal, or course) will radiate a large proportion of its RF at very high angles — most of it, in fact. Taking the aerial up to a half-wave above ground, this large component at near vertical disappears and most of the RF goes out at more sensible angles. Go up higher again, to ¾-wavelength high, and the vertical lobe reappears, though not so strongly, and the lower angle lobe comes nearer the horizontal. At one wavelength above ground the vertical lobe disappears again, and the lower-angle radiation peaks at yet again a bit nearer the horizontal. Thus, we may say that our half-wave dipole wants to be, preferably, at a height of a half-wave or multiples thereof, and that in any case the higher the better.

Turning to the vertical quarter-wave aerial, here we have a complication. This is that our quarter-wave aerial needs the image in the earth in order to even accept power, regardless of the effect of the image on the radiation pattern. Hence the old saying that verticals radiate equally inefficiently in all directions! We must first do as much work as possible on improving the ground. One way is to lay in lots of radials just below the surface to 'silver the mirror' — and we find in practice that lots of shorter radials use a given length of wire better than a few long ones. Another way of attacking the problem is to use an artificial ground by way of a 'counterpoise' — a quarter-wave long running just above ground (which usually means around seven feet high to avoid garrotting the OM or the XYL while gardening or hanging out the washing!)

A third way is to elevate the whole works and use a *ground-plane* of two or four quarter-wave radials disposed equally round the compass. If we consider the quarter-wave above an earth well dosed with buried radials, application of our pin-and-mirror experiment shows no radiation directly upwards and maximum radiation horizontally outwards from the aerial; if we look at the ground-plane or the counter-poise scheme we would instinctively expect some vertical radiation off the lower half, and in practice that seems to be the case. Practically, too, our earth will always be less than perfect, even over sea-water, and so the achieved result will be a peak of radiation at a low angle above the horizontal, just how much depending on how much the ground departs from the ideal.

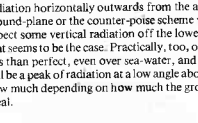

Fig 1(a) "3D" Polar diagram of horizontal dipole in free space. The actual 'doughnut' pattern is cut in half to show how the line from the centre to the surface of the pattern varies.

Fig. 1(b) Horizontal polar diagram of a horizontal dipole in free space

Fig. 1(c) Vertical polar diagram of horizontal dipole in free space.

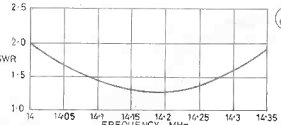

Fig. 2

Fig. 2. A hypothetical graph of SWR against frequency for a 14 MHz dipole dimensioned for the middle of the band, *i.e.* 14.175 MHz. *See* text for discussion.

An interesting follow-up to this argument concerns the case of a low horizontal erected over ground sloping downwards (and upwards in the opposite direction) parallel to the direction of maximum radiation. Applying the pin and mirror to this situation reveals that if we look at this situation from the direction in which we can see the image in the glass, we would expect much more radiation near the horizontal looking downhill away from the aerial, and indeed G6XN has reported results on the path to VK/ZL which confirm this argument with some force; it also tends to confirm the essential validity of the pin and mirror demonstration. We have obtained directivity by simply using the shape of the terrain.

Now, we can start to consider ways of augmenting the radiation in one or more directions at the expense of others. To do this we use more than one half-wave element; we may drive all the elements with chosen phase relationships (all driven arrays) or we may use parasitic excitation, in which the parasitic element is excited by its proximity to the drive element (parasitic, or in particular, Yagi arrays such as the three-element beam beloved by the DX-er) or combination of the two methods (which used to be a favourite with VHF DX-ers, and is much used commercially). To make the main beam point in the desired direction we may adjust the phase relationships of an all-driven array, or rotate the whole works as is done with Yagis and VHF phased arrays, thus avoiding fiddling with the phasing.

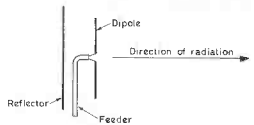

Fig. 3(a) DIPOLE PLUS REFLECTOR

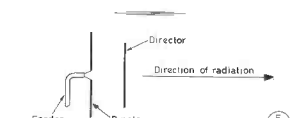

Fig. 3(b) DIPOLE PLUS DIRECTOR

Fig. *3(a)*. A dipole plus reflector showing the direction in which the radiation is greatest; note that the reflector is longer than the dipole. Fig. *3(b)*. A dipole plus director; note that the director is shorter than the dipole.

The operating frequency has a lot to do with the choice of steered arrays by phasing or rotation of the whole aerial; a Top Band or eighty-metre rotary beam would be a jumbo-sized engineering problem indeed (although at least one American amateur did at one time have a two-element rotatable Delta-Loop beam!). With verticals, phased arrays seem to be preferred, although there is *intrinsically* nothing against vertically-polarised Yagis at frequencies in the VHF region and above. A practical problem arises here, in that, at VHF, one would want the antenna to be polarised in the same way as the station one is going to communicate with, ideally; hence the FM mobiles and repeater users favour vertical as it is better for the mobile, while the CW/SSB buffs tend to prefer horizontal aerials. This problem does not arise at HF due to the effect of the ionosphere, save that it may matter to some slight degree locally, where one is communicating by virtue of the ground-wave rather than using ionispheric reflection.

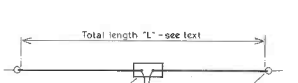

Fig. 4 PRACTICAL HALF WAVE DIPOLE CONSTRUCTION

Design

As we have already said, one can make any old bit of metal into an aerial if one is prepared to accept that its efficiency and polar diagram are in the lap of the gods as far as rational prediction goes. We have also said that the amateur is confined very largely to simple test-equipment in the aerial department, which at best can only give indications that a chosen theoretical design might have been put up and be near enough for the last little tweek to bring it on the nose. Furthermore, most amateurs don't know enough about aerials to be able to do more than copy a design or, at best, scale an aerial from one band to another; thus they either hang up an end-fed wire, use an ATU and live with the results, or start into cutting dipoles (or chicken out and go buy a commercial job!).

Thus, we need some formulae and relationships. Let us start with the basic half-wave dipole; this is in fact a wee bit less than a half-wave long physically, thanks to what are termed 'end effects'. The normal formula is length in feet, L, = 468/F, where F is in MHz. Let us take a practical example of the use of this formula. Imagine we want to make a dipole to cover all the 14 MHz band, we would take F as being the centre of the band, namely 14.175 MHz; whence L, = 468/14.175 feet, or 33.01 feet. Most of us would take a 33' piece of wire, cut it exactly at centre (16' 6"), connect it to a length of coaxial feeder of 50 or 75 ohms at a centre insulator, use an insulator at the ends, and hang it all up, as in Fig. 4. What more can we do? Practically, most people solder the thing together, and if the ends are taken in a loop round an insulator and soldered back to themselves (Fig. 4), then the correct length is to the end of the loop; the argument is that the wire splits into two parallel parts of the same length between the soldered joint and the end of the loop, and therefore the overall length of each leg is from centre to the furthest point of the end loop.

Secondly, lots of people ask about the gap in the middle; just take each side as being of length half that of the wire cutting formula (L = 468/F), and arrange to keep the centre gap as small as conveniently possible. Third, we come to the making of the centre bit. Your scribe prefers solderless construction and a bit of 'chocolate-block' connector, but *above all* the construction method must be such that once it is erected there is *no way that water can seep into the coaxial cable*. (Apart from ruining the coaxial cable the water may appear in the bottom of the ATU or the PA compartment!). The coaxial will become lossy, and so the mismatch will *improve* with some cases and get worse with others, depending on the cable length and type.

Assume for the moment you have made your dipole and put it up, what comes next? If you don't just mean to 'live with it' you should now do a test. Tune up at 20 kHz steps from the bottom to the top of the band, and note the SWR at each stop. Plot the result and you should see a curve something after the style of Fig. 2. You have aimed to get the lowest SWR to occur at 14.175 MHz in the design; you would hope that the best SWR *does* occur at 14.175 MHz, and that the SWR remains within 'acceptable' limits over the whole band. What is acceptable? If the rig is commercial and you don't have an ATU, take the handbook requirements. If your rig specifies a range of impedances it will cope with, then turn these into SWR: say, a normal 50-ohm rig needs 25 to 100 ohms, then commonsense and a simple bit of mental arithmetic says it wants better than 2:1. No information, assume 2.5:1, or on an older rig 3:1. If you have a solid-state PA, you want unity SWR because the PA hasn't got a tuning control. No tuning control in the PA means you *must* tune the aerial with an ATU — a contrick, not a 'simplification'!

If your plot shows best SWR at, say, 14.1 MHz, but still acceptable across the band, live with it. If it is too high at the HF end and best at 14.1 or so, drop the aerial, hack an inch off each end, and put it back up for another run of measurements; repeat until you have an acceptable SWR across the band, with the best point at around mid-band.

Bandwidth

Bandwidth is usually defined as the range of frequencies between which the SWR is at a specified maximum or better. If nothing is said, one can assume an SWR of 2:1 or better. By that criterion, there is no way you are going to make a dipole cover all of Top Band, or all of Eighty, or all of Ten. So — what to do? One possibility is to cut the dipole for a chosen part of the band and restrict one's operating to that section of the band. Another way is to cut for mid-band and use an ATU to achieve the desired low SWR between the ATU and the rig while letting the SWR on the aerial-feeder system go where it will. The choice is your own.

Feeder

We haven't made any distinction yet with regard to the feeder impedance to be used with our dipole. The centre impedance of a dipole in free space is about 74 ohms, but the practical dipole may vary widely from this. G6XN's book *HF Antennas for All Locations* gives figures between about 50 and 90 ohms, even when the dipole is very low, so on the face of it 75-ohm feeder looks a best bet. However, the Americans standardised on 50 ohms and most transmitters are 50 ohm output nominally, so you pays your money and takes your choice! However, whatever impedance coaxial cable you use, get the best you can afford, and if it is at all possible have it all in one length — every joint is a weak spot for ingress of moisture, and moisture is *death* to the insides of a bit of coax!

To keep a check on the state of your coax, it's best to start with new cable. Put on the connector (and it is important to do it *properly* with a soldering iron and in accord with the instructions) and the aerial centre-insulator connection, but not the aerial wires. Lay it out in a straight line as far as possible, connect the 'home' end to a SWR meter, and the SWR meter to the rig, or to a GDO as may be required by your station set-up. Measure and record the SWR. It should be approaching infinity for a normal run of coax and a measurement at 28 MHz. If you are talking about VHF, then you should expect greater than about 10:1, but in any case it depends on the length of run. Now you can put up the aerial after proper weatherproofing, but if you have any doubts, or each time the aerial is down for maintenance, then you can repeat the measurement. And remember, any sign of an 'improvement' in SWR tells of deterioration of the cable.

The new fully auto-ranging DM2350 multimeter costs £55 plus VAT, and is available from *Semiconductor Supplies International Ltd.*, Dawson House, 128/130 Carshalton Road, Sutton, Surrey SM1 4RS. (Tel: 01-643 1126).

Back to our Beams!

Just a little time left to look at parasitic beams, of the Yagi type. If we take a dipole, and nearby we put another dipole, minus centre connection (*i.e.* a single length) but a bit longer, we will find that we will tend to radiate more in the direction away from the parasite — Fig. 3(a). Make the parasite a bit shorter than the dipole, and again we will find a change in the radiation pattern — this time, the array will radiate in the direction of the parasite, as in Fig. 3(b). The first case parasite is called a 'reflector' because that is what it seems to be doing, and in the second case the parasite is called a 'director'. We have just created two versions of the two-element Yagi beam!

Having nicely whetted your appetite, we'll leave it there till next time!

to be continued

CLUBS ROUNDUP

By "Club Secretary"

ONE of the problems in setting out this column lies, oddly enough, in the Address Panel, and that is in the manner of giving telephone numbers. Now that the trend is to amalgamate telephone exchanges into groups, one really needs to have the following information, namely: exchange name, STD code, and the number. If we get less than the full information, then we can have problems. After all, if we can't figure out what the full code is, we just sit back and cuss the Hon. Sec. — but if it's a potential new chum who is looking for the details and hates writing letters, your club has almost certainly lost a recruit. Enough said?

The Clubs

Chiswick town hall is home for the **Acton, Brentford & Chiswick** group, and their next get-together is on July 19, when they have set up a demonstration of amateur test gear.

A place which your scribe used to go through regularly but never ever stopped at is **Bishop Auckland.** A local group of enthusiasts has now formed a club, which is based on the "Travellers Rest," Evenwood, Bishop Auckland, where they are to be found each Monday evening. We understand that there is activity going on through a separate entrance to the clubroom to allow access outside licensing hours, and so increase the range of their doings.

Bishops Stortford have always had their base at the British Legion Club in Windhill on the third Monday, but of late they have added to that an informal session on the first Thursday of the month, so that those who can't get to the main meetings can still keep in touch personally; and of course there is a lot of local activity on the air on two-metres and the local UHF repeater.

On to **Brighton** now, where we note meetings on July 13 and 27 at the YMCA in Marmion Road, Hove; July 13 was 'open' at the time they last wrote, while on 27th there is a talk on fox-hunting by G3WMU. For the latest details we suggest a contact with the Hon. Sec. — *see* Panel.

At **Bristol** the publicity lad has a computer to write the programme out for him — but we guess it didn't do the telephoning! They assemble at the YMCA, Park Road, Kingswood, every Tuesday and, reading the programme through, one sees something is organised for every meeting, with due allowance being made for the time of year.

British Rail get in touch once in a while to let us know they are still around, but this time they wrote to tell us that they were at the ceremonial opening of the new rail link between the Conwy Valley and the Cambrian Coast, which is operated by the Ffestiniog Railway. They had GB2FFL from the new station at Blaenau Ffestiniog over the weekend around April 30 and had many visitors. Details of the club from the Hon. Sec. — *see* Panel.

Bury have a rather interesting and amusing newsletter; the current issue is quite superb on the subject of G4FOT's ZX81 computer. Every Tuesday evening you can find the gang at Mosses Community Centre, Cecil Street, Bury, but one of these — July 19 — is a formal, in this case a surplus equipment sale. We are also reminded in a later letter that the Hq is closed on July 5 and 12, so there will be *no meetings* on those dates.

Cambridge have their place at Coleridge Community Centre, Radegund Road on Fridays in term-time. The general form is to alternate between informals, at which the club station is operated, and lectures, films, etc. Details from the Hon. Sec. — *see* Panel.

The **Chesham** Hq is at the Stable Loft, Bury Farm, Pednor Road, Chesham, where they are to be found every Wednesday evening. More details, if wanted, from the Hon. Sec. — *see* Panel for his details.

The **Chichester** people have a visitor from RSGB on July 5, and there is another meeting on July 21, not to mention the Sussex Mobile Rally on July 17 at which they will be running the bring-and-buy stall. The Hq is at the Green Room, Fernleigh Centre, 40 North Street, Chichester.

The old **Civil Service** group died many years ago, but a new generation of radio enthusiasts seems to have grown up and the club is reformed. They now foregather in the lunch hours of the first and third Mondays of the month, at the Civil Service Recreational Centre in Monck Street, just off Horseferry Road, London SW1. The group is being run as a national affair — details from the Hon. Sec.

Down west now, to **Cornish**, which has a temporary move for July to St. Stephen's Church Hall, Treleigh, Redruth, which is close to Treleigh Junior School. On July 7 G3VWK will talk under the heading "You and Interference". We suggest you get there early — there is usually a full house, as the writer knows only too well!

Turning to **Crawley**, we find them at Trinity Church Hall, Ifield, Crawley, on the fourth Wednesday of each month; the programme details are not given this month as there has been much other material to fill the pages of the newsletter, so for the latest details we must refer you to the Hon. Sec. — *see* Panel.

The **Cray Valley** gang have just had their AGM, but the latest newsletter doesn't give details of the July dates at Christ Church Centre, High Street, Eltham, for which we must refer you to the Hon. Sec. — *see* Panel for his details.

A familiar handwriting comes next; the Hon. Sec. of the **Crystal Palace** group tells us that they are booked in on July 16 for a talk and demonstration on UHF operating, with a home-brew 432 MHz transverter, and equipment for 23cm and 13cm. This will be followed by a discussion. The venue is easy to find — All-Saints Parish Church Rooms, Upper Norwood, are opposite the base of the IBA TV transmitting mast, at the junction of Beulah Hill and Church Road.

If you are into direction-finding, the **Dartford Heath D/F club** is worth looking at. As they have recently had their AGM, we must refer you to the Hon. Sec. for the details of their hunts and social gatherings — the latter are usually at the "Malt Shovel" at Eynsford, Kent.

The visit by G5RV must be the highlight of the month for **Denby Dale** on July 13; and on July 27, the **RSGB's** RR, G4DAX, comes along to make his number with them. Both are at Pie Hall, Denby Dale.

At **Derby**, the Hq is at 119 Green Lane, every Wednesday evening from 7.30; on July 6 they have a junk sale, and on 13th a talk by local magistrate Bob Eccles. July 20 is set aside for a session on radio control, and on 27th they have a practice at two-metre D/F.

Although they have now worked many countries, the **Derwentside** club hasn't yet had any offers of skeds with the club station, G4PFQ; club evenings are every Monday, at the R.A.F. Association Hq, Sherburn, Consett, and usually they have something of interest in the way of a talk, films, or activities. Details from the Hon. Sec. at the address in the Panel.

Now we turn to **East London RSGB;** the group have a place at Wanstead House, Wanstead, London E11, which is 100 yards behind Wanstead underground station. The new committee is busy putting together a programme for the meetings on the third Sunday in each month. Again, more details from the Hon. Sec. at the address in the Panel.

The **Echelford** crowd seem coy about their meetings, but we have it that they are held at The Hall, St. Martin's Court, Kingston Crescent, Ashford, Middx., on the second Monday and the last Thursday of each month.

The same comment could be applied to **Farnborough,** but we know they are to be found at the Railway Enthusiasts Club, Access Road, Hawley Lane (near the M3 Bridge), Farnborough, on the second and fourth Wednesday of the month.

Edgware offer a demonstration of RTTY, in particular the all-electronic variety, on July 14, thanks to G3SHY and G4HMD; while on July 28 they have an informal with the club station on the air. Both are at 145 Orange Hill Road, Burnt Oak, Edgware.

Over in El-land, the Fingal radio club have every Monday evening at the Scout Hall, Ballygall Road, East, Dublin 11; they run classes for the Radio Experimenter's Licence exam, which is their equivalent to the RAE, and have regular lectures and film shows; twice yearly they have junk sales which they reckon are the largest and best in all EI. At the time of writing they were planning a construction project in the form of a QRP rig. Details, of course, from the Hon. Sec. — *see* Panel; or go and meet them, as they like meeting visitors from outside EI.

Fylde have their base at the Kite Club, at Blackpool Airport, on the first and third Tuesdays; July 5 is an introduction to computers by G6HEA, and on 19th they have the informal.

For the Gloucester gang the venue is St. Barnabas Hall, Stroud Road, on most Wednesdays. More details from the Hon. Sec. at the address in the Panel.

We mustn't forget the G-QRP Club; this has now over 2000 members, with many from overseas; the common interests are low-power operating and also the home-brewing of equipment for the purpose. Details from the Hon. Sec.

The date of the Greater Peterborough meeting is the fourth Thursday of the month at Southfields Junior School, Stanground. More details from the Hon. Sec.

Deadlines for "Clubs" for the next three months —

August issue — June 24th

September issue — July 29th
October issue — August 26th
November issue — September 30th

Please be sure to note these dates!

Fridays at Harrow are taken at the Harrow Arts Centre, High Road, Harrow Weald. July 8 is a talk on vertical aerials at HF, and on 17th they are out with D/F gear and a barbecue. The July 22 talk was still 'open' when they wrote, but on 29th they have an equipment-testing evening. Looking forward to August, all the Friday evening sessions will be informal and practical.

The main meeting of the Hastings group is on the third Wednesday of each month, July 20 being down to crime prevention/police communications. Other Wednesdays there are also meetings at Ashdown Farm Community Centre, and this venue is also used for the RAE and Morse classes on Tuesdays and the Friday evening 'Chat Night'. In mid-month of course they will be 'on show' at the Sussex Mobile Rally.

July for Havering is still a matter of Wednesdays at Fairkytes Arts Centre, Billet Lane, Hornchurch. July 6 is the quarterly business meeting, while G3AAJ is down for July 13 to talk on Amsat; should the satellite launch interfere with Ron's talk, it will be put back to 20th. On 27th, G8IXC will give his postponed talk.

In view of the problems surrounding the Hereford Hq we feel that if would be best for you to contact the Hon. Sec. The formats are, at the time of writing, being held in the Lord Scudamore School, Friar Street, and the informals at the "Antelope Inn." As for subjects, July 1 is the G4HHJ "New Approach to D/F", while the informal is on July 15 — but do check the venues.

We now head for Ipswich, where they gather at the "Rose and Crown" at the junction of Norwich Road and Bramford Road, on the second and last Wednesday in each month; July 13 is a D/F Hunt on VHF, entrants returning to the clubroom to finish the meeting off, and on 27th they have a talk on the Microdot computer, by *Polemark Ltd.*

Retiring secretary Don McLean, G3NOF, left, receiving a shield and cheque from the Yeovil A.R.C., presented by 'Nobby' Clark, G3BEC, the club president. Don, who has been secretary for the past 37 years, was also made a life member of the club in appreciation of his long and faithful service. The new Hon. Sec. is Adrian Dening, G4JBH. As many readers will know, G3NOF is a regular reporter to "Communication and DX News", and has been for many years. Enjoy your retirement, Don!

photo by G4PDG

Back to El-land again, to IRTS, where the main item of news is that they now have the new bands opened to them. This is the group to contact if you want to know what's what on a licence in EI, or anything about the amateur radio scene in that country, in particular local club meetings. Details from the Hon. Sec. — *see* Panel.

The Itchen Valley group meets every other Thursday evening at the St. John Ambulance Hq at the corner of Blenheim Road and Desborough Road, Eastleigh; and looking forward to August 20, they are putting on a demonstration station of amateur radio at the *Debenhams* department store in Southampton, which sounds like a good idea.

Kidderminster have July 5 for an HF night-on-the-air, and July 19 for a VHF operating evening at Aggborough Community Centre, Hoo Road, Kidderminster, and visitors are always welcome.

Up at Lincoln the Hq is at the City Engineer's Club, Central Depot, Waterside South, Lincoln; on July 7 they have a visit to the *Lincolnshire Standard* Group printing works, and on July 13 at Hq there is a talk on electricity distribution by the local Electricity Board people. G6AJL takes the stand on July 27 to give a talk on video. Looking at the programme it seems the alternate Wednesdays are taken up with RAE and CW classes.

Next we turn to Maltby; this young club already has an average attendance of forty members every Friday evening at the Methodist Church Hall, Blyth Road, Maltby. More details of what goes on from the Hon. Sec. — *see* Panel for his details.

On Fridays, the Number One Hall, St. Luke's Church, King William Road, Gillingham, is occupied by the Medway chaps; the July dates are: July 8 for a social evening, with talk-in available on VHF, and July 29 is down for a film evening. Again, more details can be had from the Hon. Sec. — *see* Panel for his details.

Turning to Midland, we see they have the main meeting on the third Tuesday, the computer section have the second Tuesday, and the committee meeting is on the first one. Wednesday evening is Morse class, general natter, and amateur TV activity; Monday evening is the Working Party night for work on the completion of the HQ and its upkeep, Thursdays are HF nights-on-the-air, Fridays the RAE class, and weekends are used by the Working Party. All this at the club Hq, which is at 294A Broad Street, opposite Birmingham Repertory Theatre.

Names and Addresses of Club Secretaries reporting in this issue:

ACTON, BRENTFORD & CHISWICK: W. G. Dyer, G3GEH, 188 Gunnersbury Avenue, Acton, London W3 8LB. *(01-992 1778)*

BISHOP AUCKLAND: J. A. Wake, G6VPV, 1 Killerby Hall Cottages, Killerby, Darlington, DL2 3UQ.

BISHOP'S STORTFORD: B. J. Salt, G4TTL, 135 Kingsland, Harlow, Essex. *(0279 20478)*

BRIGHTON: W. Firmager, 26 Browsleaf Road, Brighton.

BRITISH RAIL: G. Sims, G4GNQ, 85 Surrey Street, Glossop, Derbyshire.

BRISTOL: M. Goodfellow, G4KUQ, 99 Somerset Road, Knowle, Bristol BS4 2HX. *(0272 716093)*

BURY: B. Tolmsley, G6OKE, 4 Colne Road, Burnley, Lanes. *(Burnley 24254)*

CAMBRIDGE: D. Wilcock, G2FKS, 6 Lyles Road, Cottenham, Cambridge CB4 4QR. *(Cottingham (0954) 50591?).*

CHESHAM: J. Aldridge, G6LKS, 15 Wicheote Gardens, Chesham, Bucks. *(Chesham 786935)*

CHICHESTER: T. M. Allen, G4ETU, 2 Hillside, West Stoke, Chichester, Sussex PO18 9BL. *(West Ashling 463)*

CIVIL SERVICE: G. H. Costin, G4GFU, MOD(PE), SIP13, Room 328 Fleetbank House, 2-6 Salisbury Square, London.

CORNISH: J. J. Vinton, G6CIKZ, Cheriton, Alexandria Road, St. Ives, Cornwall. *(Penzance 795860)*

CRAWLEY: D. L. Hill, G4IQM, 14 The Garrones, Worth, Crawley, W. Sussex, RH10 4YT. *(Crawley 882641)*

CRAY VALLEY: P. J. Clarke, 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, Kirby, Dartford, Kent DA4 9DQ.

DENBY DALE: J. Clegg, G3FQH, 8 Hillside, Leak Hall Lane, Denby Dale, Huddersfield HD8 8QZ. *(Huddersfield 862390)*

DERBY: Mrs. J. Shardlow, G4EYM, 19 Portreath Drive, Darley Abbey, Derby DE3 2BJ. *(0332 556875)*

DERWENTSIDE: P. Howes, G8WEJ, 26 Hadrians Way, Ebchester, Co. Durham, DH8 0PE.

EAST LONDON RSGB: C. A. Ramsey, G8VZD, 45 Bulwer Court, Bulwer Court Road, Leytonstone, London E11 1DB.

ECHELFORD: A. H. Otten, G8TSZ, 5 Millan Close, New Haw, Weybridge, Surrey KT15 3NP.

EDGWARE: H. Drury, G4HMD, 11 Batchworth Lane, Northwood, Middx. *(Northwood 22776)*

FARNBOROUGH: I. Ireland, G4BJQ, 118 Mychett Road, Mychett, Camberley, Surrey. *(Farnborough 543036)*

FINGAL: G. Birkhead, EI9DZ, 103 Roselawn Road, Castleknock, Co. Dublin, Eire.

FYLDE: H. Fenton, G8GG, 5 Cromer Road, St. Annes, Lytham, St. Annes, Lancs. FY8 3HD.

GLOUCESTER: A. J. Martin, 12 Redwood Close, Podsmead, Gloucester GL1 5TZ.

G-QRP: Rev. G. Dobbs, G3RJV, 17 Aspen Drive, Chelmsley Wood, Birmingham B37 7QX. *(021-770 5918)*

GREATER PETERBOROUGH: F. Brisley, G4NRJ, 27 Lady Lodge Drive, Orton Longueville, Peterborough, Cambs.

HARROW: C. D. Friel, G8AUF, 17 Chilterne Avenue, Harrow, Middx. HA2 9UU. *(01-868 5002)*

HASTINGS: G. North, G2LL, 7 Fontwell Avenue, Little Common, Bexhill-on-Sea. *(Cooden 4645)*

HAVERING: A. Negus, G8DQJ, 17 Courtenay Gardens, Upminster, Essex RM14 1DH. *(Upminster 24059)*

HEREFORD: S. Jesson, G4CNY, 181 Kings Acre Road, Hereford.

IPSWICH: J. Tootill, G4IFF, 76 Fircroft Road, Ipswich, Suffolk IP1 6PX *Ipswich 44047)*

I.R.T.S.: S. Nolan, EI7CD, 68 Ratoath Estate, Ratoath Road, Dublin 7.

ITCHEN VALLEY: S. W. Bone, G4PPJ, 19 Tickner Close, Botley, Hants. SO3 2SW *(Botley (04892) 3312)*

KIDDERMINSTER: A. F. Hartland, G8WOX, 22 Granville Crescent, Offmore Farm, Kidderminster. *(Kidderminster 61584)*

LINCOLN: Mrs. P. G. Rose, G8VRJ, Pinchbeck Farmhouse, Mill Lane, Sturton-by-Stow LN1 2AS.

MALTBY: I. Abel, G3ZHI, 52 Hollytree Avenue, Maltby, Rotherham, Yorks.

MEDWAY: P. J. Poole, G4EVY, 5 River Drive, Strood, Rochester, Kent ME2 3JW.

MIDLAND: N. Gutteridge, G8BHE, 68 Max Road, Quinton, Birmingham B32 1LB *(021-422 9787)*

NORTH WAKEFIELD: S. Thompson, G4RCH, 3 Harlington Court, Morley, LS27 0RT. *(0532 536603)*

PERTH: R. H. Barnes, GM6ESY, Pittendynie Cottage, Moneydie, Nr. Luncarty, Perth *(Stanley (073882) 375).*

RAIBC: Mrs. F. Woolley, G3LWY, 9 Rannoch Court, Adelaide Road, Surbiton KT6 4TE.

REIGATE: C. S. Barnes, G8FEE, 25 Hartswood Avenue, Woodhatch, Reigate, Surrey RH2 8ET.

ROYAL NAVY: M. Puttick, G3LIK, 21 Sandyfield Crescent, Cowplain, Portsmouth, Hants. PO8 8SQ.

ST. NEOTS: S. Foote, G4POM, Whitchlights, 10 Old Farm Close, Needingworth, Huntingdon, Cambs. PE17 3SG.

SHEFFORD: A. Little, G4PSO, 41 St. Michaels Road, Hitchin, Herts. SG4 0QA *(Hitchin 57946).*

SOUTHDOWN: T. Rawlance, G4MVN, 18 Royal Sussex Crescent, Eastbourne.

S.E. KENT YMCA (DOVER): A. Moore, G3VSU, 168 Lewisham Road, River, Dover *(Kearsney (03047) 2738).*

SOUTH ESSEX: D. V. Pritchard, 55 Walker Drive, Leigh-on-Sea, Essex.

SPALDING: I. Buffham, G3TMA, 45 Grange Drive, Spalding, Lincs. *(Spalding 3845)*

STC (Bishop): P. J. Poole, G4EVY, 5 River Drive, Strood, Rochester, Kent ME2 3JW.

STEVENAGE: C. Barber, G4BGP, 13 The Sycamores, Baldock, Herts. *(0462 893766)*

STOURBRIDGE: M. Davies, G8JTL, 25 Walker Avenue, Quarry Bank, Brierley Hill. *(Lye 4019)*

SURREY: R. Howells, G4FFY, 7 Betchworth Close, Sutton, Surrey SM1 4NR. *(01-642 9871)*

SURREY POLICE: R. J. Hook, G8LVB, Surrey Police Radio Society, Operations Room, Surrey Police Hq., Mount Browne, Sandy Lane, Guildford, Surrey GU3 1HG.

THAMES VALLEY: J. Axe, G4EHN, 65 Ridgway Place, Wimbledon, London SW19 4SP. *(01-946 9569)*

THANET: I. B. Gane, G4NEF, 17 Penshurst Road, Ramsgate, Kent. *(Thanet 54154).*

TORBAY: Mrs. M. Rider, 7 Kingston Close, Kingskerswell TQ12 5EW. *(08047 5130)*

UK FM GROUP (SOUTHERN): T. Emery, G3KWU, Wilverley, Old Lyndhurst Road, Cadnam, Southampton SO4 2NL.

UK FM GROUP (WESTERN): G. L. Adams, G3LEQ, 2 Ash Grove, Knutsford, Cheshire WA16 8BB.

VERULAM: E. Bailey, G4KLQ, 30 Bettespon Meadows, Redbourn, St. Albans, Herts. AL3 7EW.

WACRAL: L. Colley, G3AGX, Micasa, 13 Ferry Road, Wawne, Nr. Hull, Yorks. HU7 5XU.

WAKEFIELD: W. Parkin, G8PBE, 14 Cleveland Grove, Lupset Park, Wakefield WF2 8LD *(Wakefield 378727).*

WEST KENT: P. Reeve, G4GTN, 2 Court Road, Tunbridge Wells, Kent. *(Tunbridge Wells 24689)*

WESTMORLAND: N. Martin, G6OPO, Flat 8, Broom Close, Sedbergh Road, Kendal, Westmorland LA9 6BG.

WORCESTER: A. G. Lindsay, G4NRD, 11 Durcott Road, Evesham, Worcs. WR11 6EQ *(Evesham 41508)*

YEOVIL: A. Denning, G4BJH, 19 The Park, Yeovil *(0935 23873).*

A rather nice idea appears from **North Wakefield** this time, by way of a pre-printed postcard which gives the main details but leaves space for the current programme details. They are to be found at Carr Gate Working Men's Club every Thursday evening, and on July 7 have a talk on "Radio and Air Navigation" by G3WGW, plus, on August 4, a demonstration by the local rep. for *Farnell Components*.

The **Perth** group have their own club room at Perth City Sports and Social Club, Leonards Street, Perth, where they are to be found every Tuesday evening, starting later than most at 8.30 p.m. Wednesday evening are down for Morse tuition. More details from the Hon. Sec. — *see* Panel.

One of the nice things about looking through the current issue of **R.A.I.B.C.**'s *Radial* is the report of a large number of new members. We hear of lots of clubs making donations to repeater groups — how about a few donations to R.A.I.B.C. (a far more worthy cause in our humble opinion) and, equally important, some practical support? Details from the Hon. Sec.

Next we have a note from **St. Neots**, who foregather on alternate Mondays at the "Horseshoe Inn", Offord Darcy, near Huntingdon; more details from the Hon. Sec. — *see* Panel for his vital statistics.

For **Shefford**, the dates are: July 7, VHF NFD Post-Mortem, plus a slide show; July 14 a junk sale, and July 20 a natter-nite. On July 28 they will be planning their attack on SSB NFD. As for August the club will be closed down for the month. The Hq is at the Church Hall, Ampthill Road, Shefford.

The **Southdown** club have their Hq at Chaseley Home for Disabled Ex-Servicemen, Southcliff, Eastbourne, on the first Monday in the month; for programme data we must refer you to the Hon. Sec. — *see* Panel.

S.E. Kent YMCA is another name for the Dover group, due to their Hq in Godwynehurst, Leyburne Road, Dover, where they are to be found every Wednesday evening, the programme alternating informals with the talks. Thus July 6 is down for G3ROO to talk about QRP operating, and on July 13 they have a film of events in Dover in 1982, by Ray Warner. For the rest of July and August they have a range of outdoor activities planned

After many years serving the Chesham & District A.R.S. on the committee, 'Steve' Stephenson, G3CLJ, left, has had to step down through pressure of work. Club chairman Peter Cabbon, G4OST, presents G3CLJ with a pack of his favourite brew.

photo by G6LKS

— details from the Hon. Sec.

On now to **South Essex**, where the 100-plus members are to be found on any Wednesday evening at the Paddocks Community Centre on Canvey Island starting at 1900. July 6 is an informal, and on July 8 they go to visit the Medway club. July 13 is a Top Band D/F Hunt, and on 20th G3VUE will demonstrate, weather permitting, how to build a Top Band vertical. That leaves a barbecue on July 23, and the Late Summer Junk Sale on July 27.

Over to **Spalding**, where they leave the "White Hart", Market Place, Spalding, on July 8 for a two-metre D/F Hunt.

Next we must mention that the **STC Sports & Social Club** at Footscray now holds G4STC, and they propose to activate it as much as may be in this 100th year of the company's existence. Details from the Hon. Sec. — *see* Panel.

Nowadays the **Stevenage** crowd meet on first and third Tuesdays in each month at *TS Andromeda,* Fairlands Valley Park, Shephall View, Stevenage. There is a meeting on July 5, details not finalised at the time they wrote, and on 17th we gather they are off to the Sussex Mobile Rally at Brighton.

At **Stourbridge** the calendar seems rather full, but if we extract the club meetings as such, we get July 4 for the informal, and July 18 for the main meeting, both at "The Garibaldi", Cross Street, Stourbridge.

Looking through the **Surrey club** newsletter, there seems to be no reference to meetings in July — June and August, yes, but nowt for July. This being so, we can only suggest you contact the Hon. Sec. for details.

At **Thames Valley** they have a place in Thames Ditton Library Meeting Room, Watts Road, Giggshill, Thames Ditton, where they get together on July 5 for a talk on HF aerials and equipment, by Louis Varney, G5RV.

July 3 at **Thanet** is down for a Fox Hunt, and on 12th they have a Business meeting followed by a natter. July 26 is down for a talk, the details of which were not finalised when they wrote.

Turning to **Torbay**, we find they have a talk by G8XNE on his Stateside visit, at Bath Lane, rear of 94 Belgrave Road, Torquay; the date of this is July 30, but they also have a weekly informal at the same QTH every Friday evening.

The **UK FM Group (Southern)** have their monthly meetings on the first Wednesday of the month, at Chineham House, Shakespeare Road, Popley Way, Basingstoke; we are awaiting details on their programme for future meetings.

UK FM Group (Western) spent some £800 on the ten repeaters they control, and another £400 on the newsletter, which is an awful warning to any small club thinking of an ambitious club publication! The Group has a booking at Grappenhall Community Centre, Bellhouse Lane, Grappenhall, Warrington, on the first Thursday of each month.

We come now to **Verulam**, and here for the first time in many moons we don't have the current data, so we must refer to the Hon. Sec. — *see* Panel for the details.

WACRAL is the group of radio amateurs and SWLs who are committed Christians, with a membership list that is world-wide. Details from the Hon. Sec. — *see* Panel.

We have a note from the new Hon. Sec. at **Wakefield** giving his details, and we must in turn refer you to him for details of the club and its meetings — *see* Panel.

Yet another group who seem to have overlooked the need for an up-date is **West Kent**; they are based on the Adult Education Centre, Monson Road, Tunbridge Wells, but for the rest we refer you to the Hon. Sec. — *see* Panel.

Revival

This refers to the **Westmorland** club, based in the "Strickland Arms", just south of Kendal on the A6, where they are to be found on the second Tuesday of each month, with visitors and new members, licensed or SWL, all welcome. We hope that this time the group will go from strength to strength.

July 4 is 'Oddfellows' night for **Worcester**, the Oddfellows Club being in New Street, Worcester. In the same street is the "Old Pheasant Inn", where they gather on July 18 at 8 p.m. for an informal evening session.

Finally, **Yeovil**, where the meetings are every Thursday at Milford Recreation Centre, Milford Park, Yeovil.

QRT

That's it for another month; deadlines for the next few times are shown in the 'box', and are the dates for the words of wisdom to arrive, addressed to your "Club Secretary", SHORT WAVE MAGAZINE, 34 High Street, Welwyn, Herts. AL6 9EQ.

Special Event Stations

The **Southampton A.R.C.** will be operating two special event stations in July. GB2SOU and GB8SOU at the Annual Southampton Show, **July 8-10**; and GB2CAV and GB8CAV from *H.M.S. Cavalier*, which is a City of Southampton museum, **July 1st to 28th**. Special QSL cards will be issued. More details from R. Stanley, G6LOB, on Southampton 771251.

Mobile Rally

July 24, McMichael A.R.S., Burnham Beeches A.R.S., Home Counties ATV Group and Maidenhead & District A.R.C. are holding a combined Mobile Rally at the McMichael Sports and Social Club, Bells Hill, Stoke Poges, Bucks. Doors open at 11 a.m., and there will be trade stands, a fleamarket, and many other attractions.

Money!

The stand operated jointly by R.A.I.B.C. and the Molly Wisdom Hospice at the recent Maidstone Rally raised a total of £223.30 for the two charities. Peter Poole, G4EVY, who is Rochester R.A.I.B.C. representative and who helped run the stand, would like to thank all those who gave so generously to the scheme and the visitors who then parted so readily with their hard-earned cash.

Pictured left with its companion ATCS 144s controller is the GFBA 144e high performance 'masthead' preamplifier for the 144-148 MHz amateur band. It is unique in using a 'noiseless' negative feedback circuit (the result of several months research at muTek) around a MGF 1202 gasfet — resulting in a combination of very low noise figure (typically <0.9dB) with quite outstanding large signal performance (the input third order intercept point is typically around + 14dBm!). Through power handling in the transmit mode is 1kW pep (500W carrier) for vswr's of <1.1:1 and 500W pep (300W carrier) for vswr = 2.0:1. The companion ATCS 144s controller allows preamplifier control with proper power amplifier sequencing and will interface with all transceivers (that we're aware of!) currently in use.
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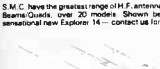

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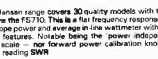

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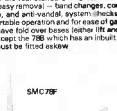

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