Making the most of the Solar Minima

AERIALS

All HF operators are aware of the effect of the solar cycle on the HF bands. As we approach the trough of the current cycle, DX contacts on 15 & 10m will be few and far between. 20m will be well below par, but the LF bands are coming into their own for long haul DX.

Unfortunately, many amateurs have aerial supports of only 30ft or so. The chances of any real success on the LF bands may therefore seem pretty remote. A brief listen to the madness at the top end of 80m is certainly enough to discourage the faint hearted, but LF DXing with low aerials from small gardens *is* possible. I hope what follows may be enough to cause one or two of you to reconsider your own 'hopeless' situation.

Although it took me a few years I eventually managed to work over 100 countries on each of the 80, 40, 20, 15, and 10 metre bands, although getting QSL cards proved to be almost as tricky as working the stations in the first place.

I can't be the only person to have looked through various aerial books and come to the conclusion that none of them would fit into my garden. Magazines often refer to a QTH with a 'modest' garden, but this invariably turns out to mean around 100ft in length. I daresay that may be true in certain areas of the country, but here in the midlands you would be fortunate to have one in excess of 40ft long. It seems to me that the one failing of most publications is that they give the impression that unless the aerial is constructed exactly as described then it will not function *at all*. Fortunately this turns out to be far from the truth. I managed to take great liberties with the construction and layout of aerials and still get worthwhile results.

In restricted sites, the inverted vee has much to recommend it for use on the 80 and 40m. The overall length of the aerial is reduced; only one high support is needed; and the ends are easily accessible for adjustment.

FIG1 shows the layout of a W3DZZ type aerial I used at my previous QTH. Hardly inspires confidence, does it, but I managed to work ZL on 80m with it on more than one occasion, and with only 100w from the TS520 I had at the time.

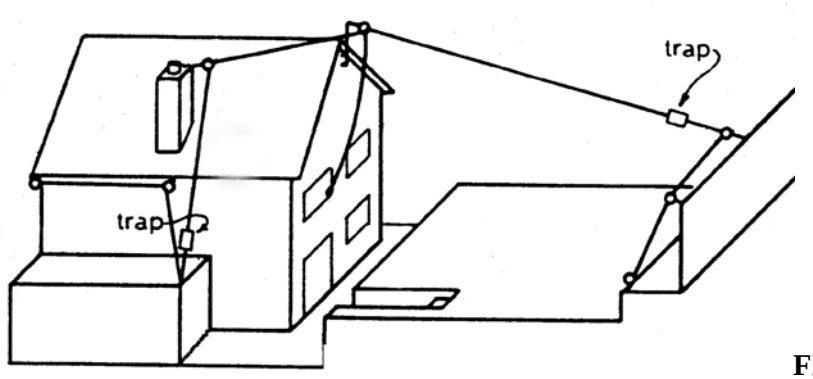

FIG 1

For those of you wondering why I didn't use a 20ft scaffold pole off the back gable of the house and get the feed point up to a respectable height, lets just say the local Council Planning Officer lived two doors away. ☹

The traps of that aerial are slightly unusual. Instead of the normal coil+capacitor construction they were each made from a coil of coax. They are larger than conventional traps, but much lighter. This

means they don't bob around in the wind so much and, given a couple of short lengths of coax, didn't cost anything. An obvious attraction.

Although the W3DZZ is often referred to as a 5-band aerial it is basically an 80/40m trap dipole with the L/C ratio of the traps chosen to give a reasonable match on 20, 15, and 10m. Unless erected at a decent height, in the clear, and using traps of a specific L/C ratio it is highly unlikely that you will get all band coverage without an ATU.

I did try a balun at the feed point but found it caused me more problems than it solved. Eventually I decided to cure the problem of RF on the braid by using a choke balun (TVI filter style) just outside the shack window, and this seemed to work much better in my situation.

With low aerials, the feed-point impedance is not going to be anything like 50 ohms, so anything that looks like a decent match without an ATU can only be arranged by trimming the wire ends until the rig thinks it is looking at a half decent VSWR. Further up the coax, things will be less rosy though. For low dipoles it seems to me that tuned feeders are the way to go.

Where a balanced ATU is available, and open wire feeders are used, all adjustments are carried out from the comfort of the shack. Given the rapid changes of weather in this country, anything that reduces the amount of time you spend outside making adjustments has to be a good idea. Once the ATU settings for each band have been recorded, band changing becomes pretty simple.

Having replaced the aerial in FIG 1 with a doublet of similar length and layout I began to realise that performance on 15 and 10m was very poor. I eventually came to the conclusion that unless the top of the doublet was horizontal, a long top was actually counter-productive on the higher bands. After some experimentation an 84ft top seemed to be about optimal. Any shorter and 80m performance suffered badly. Any longer and 15/10m performance was non-existent. It is important to note that every QTH is different & the same 'rule' may not apply elsewhere.

The resulting doublet was dubbed the "Winfield Wonder Wire", for no other reason than the prototype was made from Woolworth's finest bell wire. The development of this aerial was more fully described in Short Wave Magazine of July 1982. The layout is shown in FIG 2.

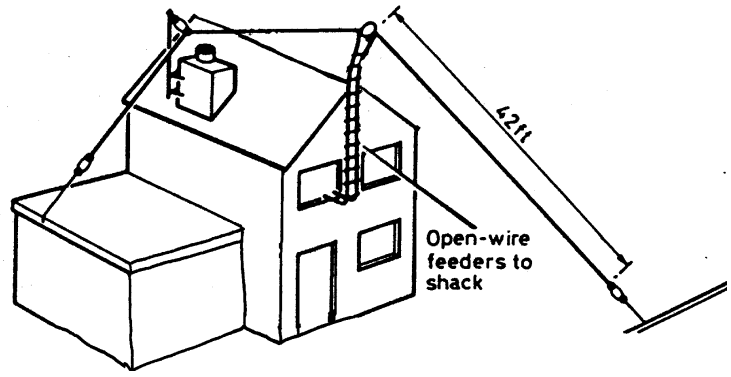

FIG 2

At the time I made these aerials, 450 ohm ladder feeder had yet to become commonly available, but the 300 ohm twin feeder that was available had two unfortunate features. It changed its impedance when it got wet, and it wasn't very strong. The later 'ladder' version was rather better in both regards. The patent plastic clips now available for making open wire feeder were not available either, so yours truly decided to make his own.

I settled on 4" spacing purely because it "looked about right". Goodness knows what the impedance was, but with tuned lines it doesn't matter. First attempts at ladder lines looked a real mess, but I

quickly made two advances that made life much easier. It didn't take me long to realise that drilling short lengths of varnished dowel was tricky at best, but a kitchen refit directed my attention in the direction of plastic sliding door track. You could cut it with a kitchen knife, it didn't roll around when you drilled the holes, it didn't need waterproofing, and it was cheap.

That still left the feeder runs looking untidy. Eventually I found a way to make more professional looking feeder runs. FIG 3 shows how I did it. The key is to keep the feeder wires taut while the spacers are fitted. A low wall, a house brick, and a dustbin handle were all the tools that I needed. To start with, shuffle all the spacers at the one end, then slide them down to where you want them, one at a time, using a ruler to get the spacings exactly the same. I fixed them in position with a short length of tying wire around the ends of the spacers.

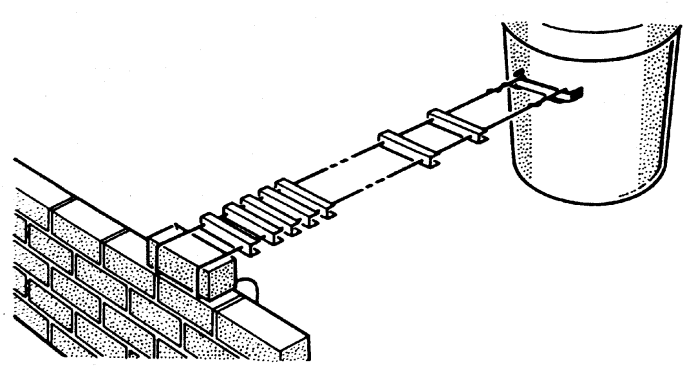

FIG 3

The method of getting the tuned feeders through the window frame may be of interest, and FIG 4 shows how I did it at the time. Nowadays UPVC double glazing frames have replaced timber in many houses so you'll probably need to improvise. If you're about to have UPVC glazing fitted, you could get them to lay a pair of small diameter tubes running from the outside to the inside underneath the new window sill before they fix & seal it. How I wish I'd thought of that before I had the windows at this QTH replaced a couple of years back ☹

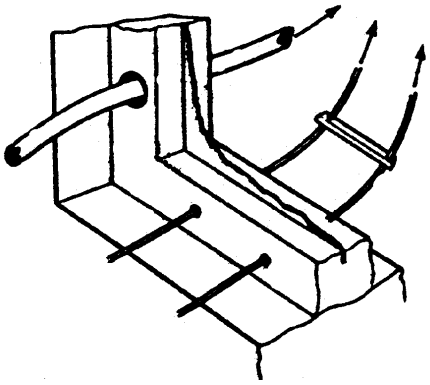

FIG 4

An alternative is to bring the open wire feeders through an air-brick into the gable wall above 1st floor ceiling height. Once routed through the roof space to a position over the shack, two small

holes in the plasterboard ceiling near a wall is all that is required to bring them down neatly into the shack.

The next thing I needed was a balanced ATU. Somewhat foolishly I had previously sold my KW Z-match so all I had left was a tuner that had originally been supplied with a Joystick and which I'd picked up in a junk sale. It isn't a balanced ATU, but I did have an Amidon T200 core from a DIY balun kit. Like many MFJ tuners today, my single-ended ATU was soon sporting a toroid balun on its output, as shown in FIG 5.

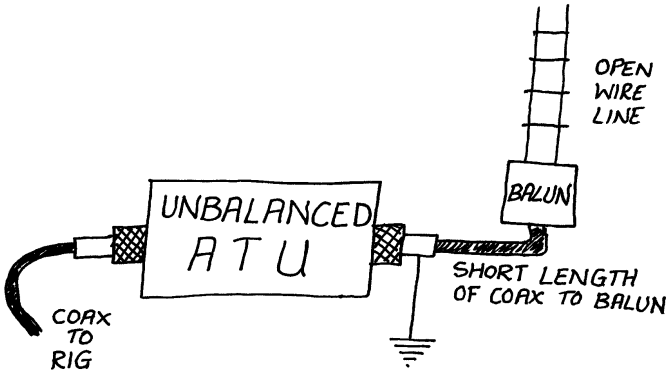

FIG 5

I'll gloss over what happened next. Suffice to say, my belief that ferrite cores do not perform well when reactance is present were emphatically confirmed. The arrangement was quickly revised to have a choke balun on the TX side of the ATU, as shown in FIG 6. This worked really well, and it is somewhat gratifying to see this arrangement being touted as the preferred arrangement in recent years. When the aerial system is matched by the ATU, the ferrite balun sees a purely resistive transformation and is far less likely to saturate. It is important to realise that the ATU must be 'floating' from earth to use it in this fashion.

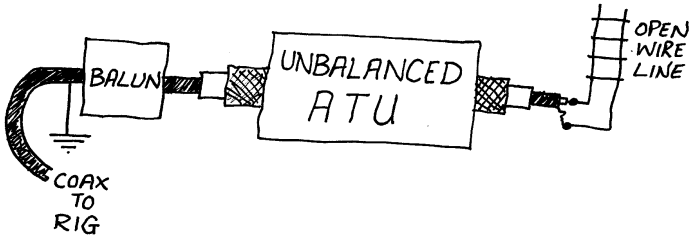

FIG 6

Hopefully some of you are now looking at your own circumstances with a little more hope, but if not there is something you might like to try for yourselves if you have a great circle map available.

Mark a circle with a radius from the UK to the mid-west of the USA. If you count them up you will find that there are well over 100 countries inside that circle. DXCC is easily possible. Even if you are not chasing an award, it is encouraging to have such a variety of countries available. The opposite is true of a station located in the mid-west USA. I still have a QSL from an American Novice who was ecstatic at having worked outside his own country on 15m for the first time. When you look at a great circle map centred on his QTH you can see what a hill they'd have to climb to make DXCC compared to us.

OPERATING TACTICS

With modest power to a low dipole or doublet, technique plays a great part in making yourself heard. The DX is unlikely to hear you *above* everyone else so it comes down to making yourself heard *amongst* everyone else. Even so, there comes a time when a pileup gets so chaotic that you have to accept the fact that there is no chance of getting through. But don't forget that the guys with the big aerials will be chasing the real exotica. The presence of a super-rare DXpedition may result in the more mundane DX (to them) scratching around for contacts elsewhere in the band, resulting in some choice contacts for you.

Nowadays the DX cluster network means pileups tend to form in just a few minutes, so the chances of dropping on something rare before anyone else is less likely than it was 20 years ago. So use the DX cluster against itself. If it shows the band is open, and a couple of really rare ones 'spotted', then everyone else will have seen it too. Leave the hordes to get on with it & scout around elsewhere on the band.

Operating times can play a part in successful DXing. There is a well-known peak in propagation around sunrise and sunset, often referred to as "greyline propagation". The benefit to signals is further enhanced if both ends of the QSO are in twilight simultaneously. But there is one big snag with Greyline propagation. Everyone knows about it. You crawl out of your pit early one morning to find the whole of Europe has done the same thing.

But time is on your side. The UK will lose propagation later than EU, so all you have to do is wait. For a short period of time you'll only have other UK stations to compete with. There is an added bonus when sunrise time approaches the hour that most people have to go to work. Anyone old enough, or fortunate enough, to be 'excused' that tedium can use it to their advantage.

In September, if you can get to the rig for about 0500z you will find plenty of DX with relatively few takers. The ageing process often produces insomnia, or the need to take a nocturnal trip 'across the landing', so you don't have to make a special effort to rise early, and only need to take a short detour into the shack to see what is about. Even if the band turns out to be dead then you didn't get up for nothing ☺

As winter approaches, sunrise gets later and the competition increases as more folks manage to wake up. If early mornings are out of the question then 0000 to 0100 is a good time on lower frequencies. Most of the broadcast QRM on 40m goes away so your receiver front-end has an easier time. By midnight UK it will be dark in the states during winter months and a CQ call will invariably bring back a W station if the band is anything like. The Caribbean area will be strong enough to be easily workable too.

40 metres

The 7MHz band used to be thought of as pure noise, although modern rigs fare rather better. If you are still using a rig over 20 years old, the judicious use of a 20dB attenuator in front of your RX really can work wonders. I found that I operated exclusively CW on 40m, and most DX activity seemed to do the same, but the recent extension to the 40m allocation may well change the dynamics of this.

It is pretty much essential to have a CW filter. 20 years ago they were an extra, and an expensive one at that, but most current rigs seem to come with all the filtering they need. It isn't necessary to be a 40wpm man when chasing DX on CW. 15wpm will do fine, and is often an advantage in a pileup as it stands out from the tinkling noise of high speed stations.

Many DX stations operate split frequency, but unlike SSB they only need an offset of a few kHz so if you have an old rig without a second VFO then judicious use of the IRT control is all you'll need. If the rig has ITT, then so much the better. You won't have to tune off the DX to set your TX freq and then find him again with the IRT. An indication that a DX station is operating split freq is finding a horde of stations just sending "DE <callsign>" spread over a few kHz. Most DX stations tend to listen above their TX frequency so tuning around the lower edge of the activity should reveal him. Along with the usual few who insist on calling co-channel.

Listen when the DX signs, usually including something like "DE <his callsign> U3" indicating he is listening from 3kHz above his freq and beyond. Sometimes it is possible to hear the station being worked and set your TX frequency on him. That way when the DX signs with him, he'll be listening where you are transmitting. If only lots of others didn't try that too. Still, it cuts down the odds and is well worth trying.

80 metres

The top end of the 80m band has always been a madhouse if conditions are good. When I was really active most of the DX seemed to be on SSB and after about 85 countries worked on CW I had to grit my teeth and try SSB. Although the DX portion is intended to be the top 25kHz of 80m for some reason most EU gather in the top 2.5kHz, or even the top 250Hz on occasions. With EU signals very strong, even the big players sometimes have difficulty hearing the DX come back to them. The downside to having a monster aerial is that the demands on your RX front-end become almost impossible to cope with. Co-channel working spawned the 'list' method of operation, which is regularly abused to make 'contacts' of dubious worth. I still much prefer CW operating on this band, but you need to check the freq allocations for CW on 80m as some countries don't have the same as us.

Finally

After seeing the aerials I actually used, maybe you'll consider your own in a more favourable light and give the LF bands some serious attention while the sunspots are low. You may surprise yourself at what you can achieve.

There used to be a 'slide-rule' type device called the "DX Edge", made by Xantek in the USA, which showed Greyline curves for each month of the year. Unfortunately it is no longer available.

If you have a relatively modern PC there are some really nice programs that allow you to plot Greyline maps. My personal favourite is DX Atlas (www.dxatlas.com).

If you don't have a PC then it is possible to use the output from a friend's computer to plot Greyline curves to fit over whatever maps you have to hand. Even with nothing, it is easy to know when it is twilight in the UK (look out of the window) and you can take pot luck at whatever happens to be at the other end on that day.

There is no mention of 160m here, because like many other mature amateurs I got my feet wet on 'Top Band' in the days of AM. For some reason I cannot summon up the interest in using 160m for anything other than AM. I left the band once the mode ceased to be fashionable, and have never returned, despite the fact that my TS930 can actually transmit 'proper' AM (full carrier plus both sidebands). Most SSB transceivers only use one sideband plus full carrier.