Manual", published by the RSGB, which is a goldmine of information. One of its many chapters contains a summary of the type of contacts likely to be made on each band at various stages of the sunspot cycle, at each season of the year. This should help the complete beginner decide which bands are likely to be of interest.

Initially, most people want to get going on all bands; but where space is at a premium, better results may be obtained by restricting operation to one or two bands to begin with. For those readers who cannot decide which bands will suit them, or for those who simply have to have a go at all of them, the words of the late Jim Fisk (W1HR) are good advice. "There is no doubt that the most efficient and simplest multiband aerial is a halfwave dipole cut for the lowest frequency of operation, and centre fed with open wire feeders via an ATU."

Dipoles

One of the simplest aerials to get started with is the half wave dipole, **Fig. 1**. The lengths for each band are given in the table beneath. Unless the aerial is totally in the clear, some adjustment will need to be made to the lengths to bring it to resonance. The proximity of buildings or the ground tend to lower the resonant frequency somewhat. The fact that the resonant frequency reduces is convenient since it is far easier to cut pieces off an aerial than to solder extra lengths on.

The table shows how much the resonant frequency shifts for a given adjustment, but note that the amounts indicated need to be removed from *each* end of the dipole. Generally, dipoles fed with coax or twinlead are essentially single band devices, with the exception of a 40m dipole which will also operate satisfactorily on 15m. Whilst the previous sentence can be found in any aerial textbook, the additional fact that I have only ever seen quoted in one of them is that on 15m a 40m dipole has a rather higher feed impedance, resulting in a minimum VSWR of around 1.7:1 on that band. This is low enough to be matched by rigs with valve PAs, but owners of modern solid state rigs may well find their output greatly reduced on 15m unless an ATU is used.

Fig. 1 The simple ½ wave dipole with a 'cutting' chart for each HF band.

FREQUENCY (MHz)	LENGTH "L" (M)	TRIM EACH END PER 100kHz (mm)
1.800	83.333	2193
3.500	42.857	595
7.000	21.428	150
10.100	14.851	72
14.000	10.714	37
18.068	8.302	22
21.000	7.143	17
24.890	6.027	12
28.000	5.357	9

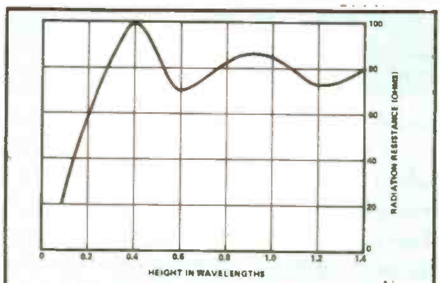

Fig. 2 Variation of feed impedance of a horizontal ½ wave dipole with height.

Many textbooks quote the feed impedance of a half wave dipole as 50 to 75 ohms and treat that as a constant. Unfortunately, life is not that simple, as **Fig.2** shows, the feedpoint impedance varies considerably with height. It is easy to see that particularly on the LF bands, a resonant dipole will have some residual VSWR, even though it is common to hear operators on the bands claiming "perfect" 1:1 VSWR. This is undoubtedly what their VSWR meter is telling them, but the situation is arrived at by the way the aerial has been adjusted.

The easy way to adjust an aerial — and hence the method most commonly used — is to snip gleefully away at the ends until the VSWR falls to an impressively low figure. Under these circumstances the aerial is not really resonant quite where you think it is, but the reactive components present with the resistive impedance "fool" the VSWR bridge. The correct way to adjust an aerial is with a GDO or noise bridge either at the feedpoint (hardly convenient), or at a multiple of electrical half wavelengths down the feeder being used. The mechanics of the latter method are fully explained in the various handbooks so I'll not regurgitate them here. If you want to get an aerial set up in a hurry, the first method actually works quite well *providing* that the aerial is a full sized one and not 'compressed' in any way by loading cells or whatever.

Whenever I've experimented with physically short aerials, it has always proved essential to get the aerial truly resonant and live with the resulting feed impedance, 'fudging' to get the VSWR looking good produces disappointing results. I think this is because the resonant frequency in such cases is considerably removed from that being used, whereas with a full sized aerial the shift is far less and the resulting losses are seldom noticed in practice.

Using Baluns

Obviously a dipole is a balanced aerial, but the output of all modern — and many not so modern — transceivers is unbalanced, as is coaxial cable. To be correct a balun (balance-to-unbalance) transformer should be used at the feedpoint. Otherwise, there could be radiation from the feedline which (when it is inside the house) can cause BCI/TVI by getting into the mains wiring. The fact that not using a balun will also distort the radiation pattern of the aerial, will not affect amateurs whose aerials are either very low or even indoors, as the proximity of the ground and buildings will distort the radiation pattern anyway.

Amateurs seem to be firmly divided into two camps on the subject of baluns with one side swearing by them and the other side at them. Whilst I number myself among the latter, it is a choice which readers must decide for themselves, based on their own experiences and QTH. Perhaps I have been unfortunate with the baluns I have either made or bought; but with a balun at the feedpoint I have always found it difficult to check the resonant frequency of an aerial with my GDO. This is because most baluns are wound on a ferrite core which always seem to give a number of spurious resonances on my GDO. Even when finally the balun is set up correctly, there are no noticeable benefits.

I hasten to add that my aerials have always been quite low and the results may well be different for aerials well in the clear. However, I have always felt that the currents