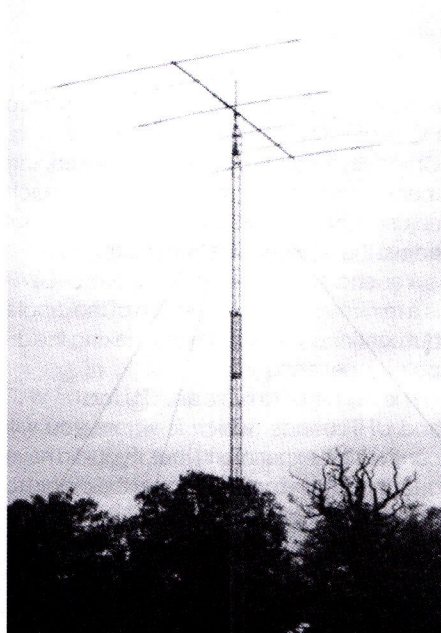




A large yagi antenna, mounted on a tower.

Gain (dB)	Gain (times)
3	2
6	4
9	8
10	10

Table 4: The gain of an antenna is usually expressed in decibels.

the product of the actual transmit power and the gain of the antenna.

$$\text{erp} = \text{antenna gain} \times \text{transmit power}$$

Unfortunately, most manufacturers quote antenna gain in a scientific way, using units called decibels (dB). This can be converted to actual gain by using Table 4.

The 5/8-wave ground plane

This is a development of the 1/4-wave ground plane. It is better at directing signals

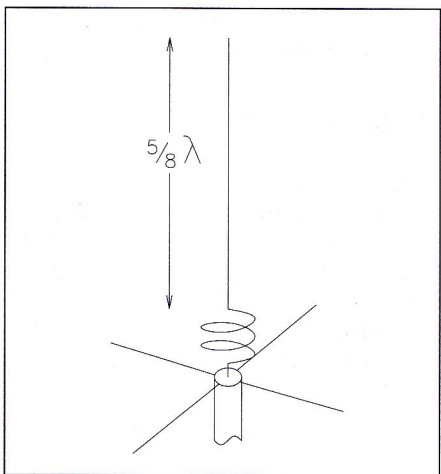


Fig 18: The 5/8 wave ground plane antenna.

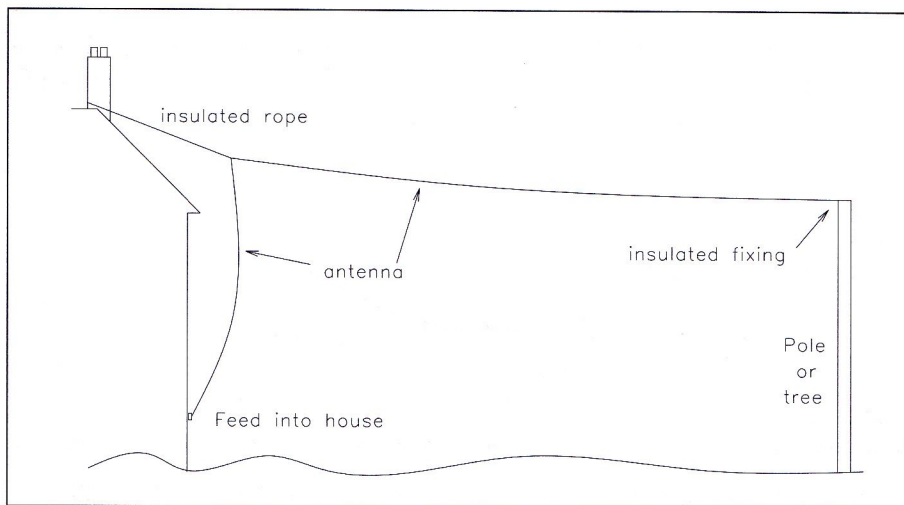


Fig 19: How a long wire antenna can be connected from the house to a tree or pole in the garden.

towards the horizon, rather than up in the air. It is always mounted with the active element vertical and is omni-directional.

As Fig 18 shows, the vertical active element is 5/8 of a wavelength long. Due to the size, this type of antenna is most often used on VHF and UHF frequencies, where wavelengths are shorter.

The coil at the base is part of the matching of the antenna to the coaxial cable. Matching is described later.

The end-fed

This antenna (shown in Fig 19) is easy to provide for HF use, where the wavelengths may well be longer than the garden. It is unlikely to be either 1/4 or 1/2 wavelength long and matching will be a problem. A device called an 'antenna tuning unit' (ATU) will allow for this and enable the antenna to accept power from the transmitter.

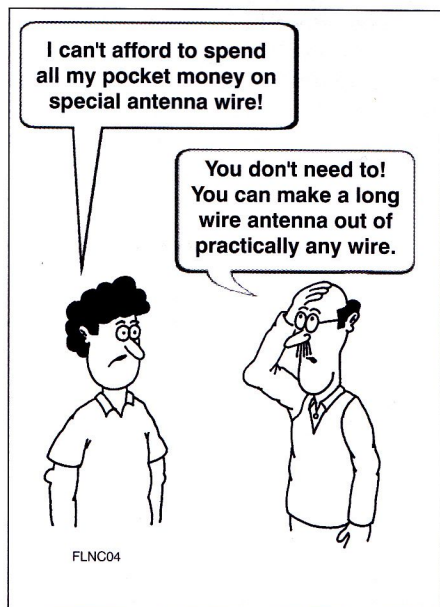
The antenna is often set up with the far end fixed to a pole or a tree and the end closest to the house secured by a short insulated rope to the chimney or suitable fixing, with the end dropping down the side of the house connecting to the transmitter. Unfortunately, this results in high voltages or high currents close to the house and the strong radiation is quite likely to upset the television or other electronic equipment, including neighbours' equipment. If such an antenna is unavoidable, it is better to feed it at the far end using a buried feeder. This is discussed later in 'EMC'.

Polarisation.

THE POLARISATION OF an antenna means which way up it is. The Yagi mentioned earlier could be mounted either horizontally or vertically. The polarisation of the antenna also determines the polarisation of the radio wave. For all the antennas we have seen here, the polarisation of the wave is the same as the 'live' element of the antenna. A vertical dipole or Yagi will radiate a vertical radio wave. It will also best receive vertical waves.

It does not matter much which polarisation is chosen as long as both antennas are the same. However, Ground Plane and 5/8 antennas are always vertical. Mobile antennas mounted on a vehicle are vertical for practical reasons.

There is an amateur convention at VHF and UHF that when using FM the antenna is vertical (most mobile operation uses FM) and SSB operation uses horizontal polarisation.



FLNC04