radiation efficiency. I found that about 30 feet was the minimum that worked in a worth-while manner. If you reduce the dimensions of either the horizontal top-loading section or the vertical section you will probably have to increase the number of turns on L2. As the inductance of L2 is increased, the losses of L2 unavoidably increase, so radiation efficiency drops.

Long Wires End Fed

At present I am using a long-wire, end fed on all bands 160-10 metres. The lay-out of the present QTH is such that the end of the long-wire is about 120 feet from the shack. This presented the problem of how to feed it. So, after a bit of thought and a few trials, I ended up with a 252-feet long inverted-L, with the horizontal portion at about 35 feet high. At the feed-point there is a step-up transformer with taps on the secondary. As the aerial presents a fairly high impedance at the feed point, a tolerable match can be achieved on all bands to the co-ax feeder. Also an ATU is used at the shack end of the co-ax to let the TX 'see' a good match on all bands (see **Fig.6**).

I was at first rather apprehensive that the losses in the transformer and co-ax might be rather high. I used some 69 ohm UR39 because I had a long enough piece (bought in a club junk-sale) and anyway it looked as though its losses and power handling would be good enough for the job. I compared results using an ATU at the feed point with those obtained using the step-up transformer and ATU and I could detect no noticeable difference between the two arrangements.

With this one doubt cleared up I was content; the present set-up gives good flexibility in band changing — without having to wander about the garden in the dark with a torch to re-set the ATU each time I wish to change bands! (The neighbours think I'm mad as it is, without giving them even more cause!)

I have used this set-up from November 1982 till now (April 1983). It seems to work reasonably well on all the bands except 18 and 24MHz, where I have not tried it (see licence Conditions HRT October). The arrangement has a number of advantages over end-feeding a multiple of half waves with the actual feed point in the shack, the most important of which was the reduction of RF level in the shack.

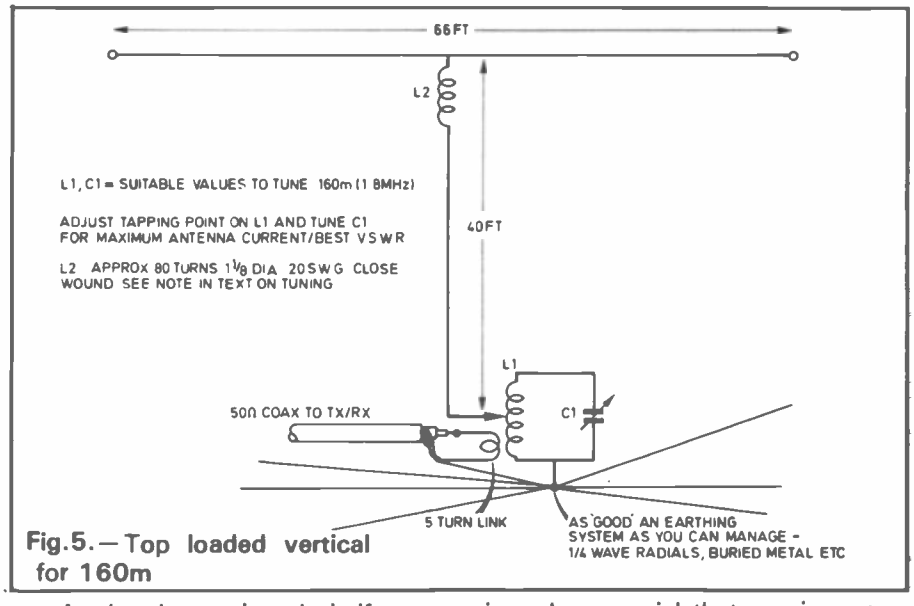

Fig.5.— Top loaded vertical for 160m

As already mentioned a half wave or a multiple of half waves has a rather high feed impedance. This varies from a few hundred to a thousand or so ohms, depending on the number of half waves. As a result the RF field, when running reasonably high power is quite high at the feed point. This high level RF field, unless you are very lucky, can get into the microphone stages of SSB transmitters, and in my case my home-brew CMOS keyer went absolutely barmy, sending dots and dashes at random all by itself. (I think it was trying to tell me something!) With the feed point remote from the shack, the feeder to the transformer is at low impedance and the effect of RF in the shack completely disappears.

Another advantage with a high impedance aerial that requires some sort of ground connection, is that the losses from having a less than perfect earth system are reduced considerably over an aerial of multiple odd quarter waves. If you can't manage a 252 foot top and still want to use 160, 132 feet works well 80-10 metres with the arrangement of **Fig.7**. However on 160, it is now approximately ¼ wave end-fed and requires a low impedance feed on 160 only. The 252 foot top that I use has worked a lot of DX on all bands, ZL, VK etc, except on 28MHz where it works well in other directions. I am sure this is due to the orientation of the aerial itself, and of course on 160 works pretty well considering its relatively low height (36 countries on 160 including SSB to W and VE plus Russians including UA9, UL7).

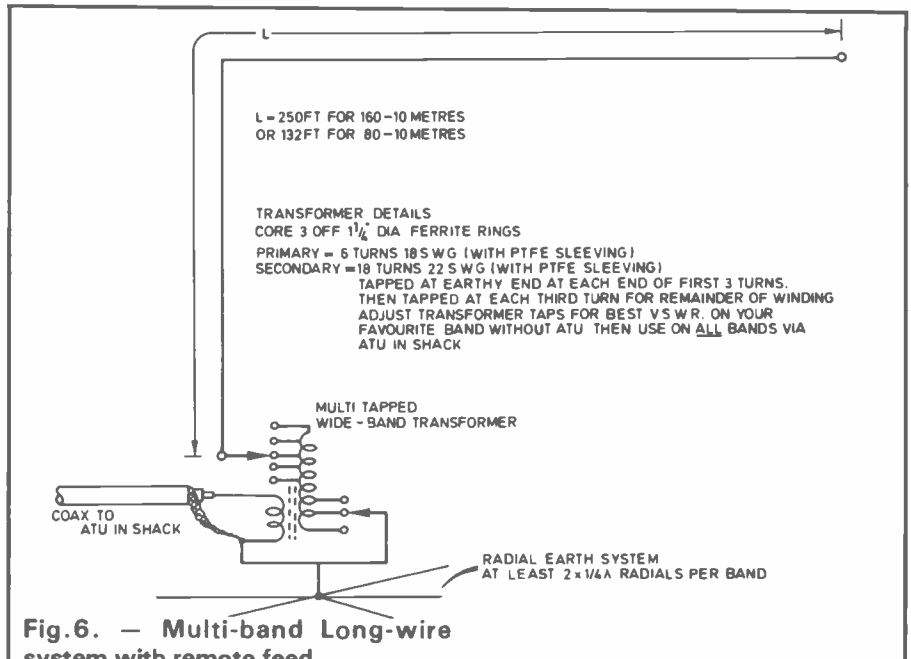

Fig.6. — Multi-band Long-wire system with remote feed