that the other way is preferable so that vertical and horizontal polarisations are still available. You can in fact still have these polarisations when in the X-configuration by suitable switching but it is a bit more complicated, and needs a lot of adjustment for optimum results so we will stick with the H/V method.

If at all possible, use a fibreglass pole to mount the antenna, as a normal aluminium one will upset the radiation patterns of the vertical elements to a large extent, with the result that the final polarisation will not be exactly circular (and your linear vertical polarisation will also suffer, with a non-theoretical radiation pattern and impedence). In fact, it is very unlikely that it will be entirely circular anyway due to the constructional methods normally used, but more elliptical. We will have to accept this, but the results are still very worthwhile.

Feeders

You will no doubt already have two feeders coming down from the two dipoles. The first point is that it is important that both feeders are the same physical length. By length, we mean from the point at which each connects with the driven element, to the termination in the shack. They should also be of the same type of coax (as well as the same impedance of course), if this is possible, so that you can be sure the velocity factors are the same, although most cables do vary slightly along their length. The actual length doesn't matter. If your antenna is already up, you have a problem if you didn't measure this in the first place!

Going circular...

Having established that, the next part is how to get the radiated signal circularly polarised. This is usually achieved by lengthening one of the feeders by an electrical quarter-wave of cable and this will have the effects of giving a 90 degree phase shift to the dipole which has the extra 1/4 wave in its feeder, and producing the circular polarisation required when the radiated signal gets into space.

However, its not quite that easy! The next part depends on whether you aerial feed impedance is 75 or 50 ohms nominal. As the majority of

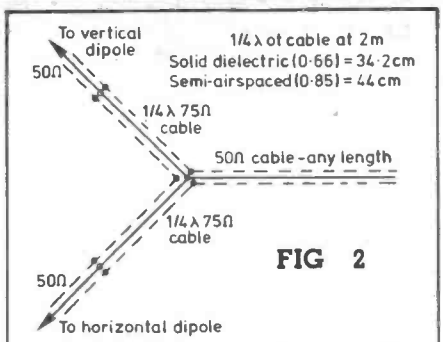

FIG 2

Phasing harness. Adding a ¼ wave of 50ohm cable in either dipole feeder will produce circular polarisation.

people will be using 50 ohm systems. There are now two lengths of feeder which have to be paralleled, to get the single feeder needed for the transmitter end. Connecting them together will of course result in an impedance half that of the feeder, or around 25 ohms — cable of this impedance is a little difficult to come by.

This is easily overcome by using two 1/4 wave transformer lines of 75 ohm coaxial cable in each feeder to transform each feeder impedance up to 100 ohms, then connecting the two free ends together so that we are back at 50 ohms again.

If we now make up a fixed set of cables as per the above, we will have a circularly polarised signal, or as near as we can get to circular without recourse to a lot more adjustments, bearing in mind the points made earlier. Which sense polarisation is it? Well, if you put the 1/4 wave delay line in the feeder to the horizontal dipole, the radiation will be clockwise circular. Putting it in the other feeder will change this to anti-clockwise.

The best way to make this change is to leave the 1/4 wave delay line in place and introduce an additional shortable 1/2 wave of delay line into the other feeder, which will have the same effect as shifting the 1/4 wave delay line between the two feeders. Bear in mind that all these various 1/2 and 1/4 waves have to be electrical lengths and not physical, taking into account the velocity factor of the cables used. These would normally be 0.66 for solid dielectric, and 0.85 for semi-air spaced, if you lack the actual figures for your cable.

All that remains is to fabricate a switching unit to move between the various polarisations. A suitable method is shown, and you can omit some of the switching if you only want the two circular modes. The actual switch unit should of course be coaxial for the optimum results. However, most people will not be able to afford a number of these switches, and like myself, would prefer something cheaper! Whenever using such systems, I have always used a normal Yaxley wafer switch (3 pole 4 way) with satisfactory practical results at powers up to 100W output, since we are working at low impedance, avoiding switching while actually transmitting.

If possible, use a ceramic type with the rallies being good hunting grounds for such items. Some inaccuracies will be generated using this type of switch, due to the varying distances between the contacts, and the lengths of the contacts themselves, but again, you will have to put up with these.

When making up the switches and cables, try to keep the screening as intact as possible at the joins, with around 1/2 inch of pigtail only, and make the various lengths of coax into gentle loops where necessary. Make sure that you preserve the correct lengths when making up the cables and any connectors etc.

Let us know

There is just one further point. All the above assumes that your aerial is of the type where the two dipoles are mounted next to each other on the boom. If they are spaced by 1/4 wavelength already, then the above still holds, but omit the 1/4 wave delay line — it is already present in the antenna physical construction. There is also the point that the small physical separation between the actual dipoles on the boom will introduce a phase discontinuity, although this could be allowed for in the length of the feeder.

So armed with the above, go off and try the world of circular polarisation. If you care to let us know the results, with specific examples of any notable results, with specific examples of any notable results, these will be published to spur others onto trying the same. If there is enough interest, we will also show how to optimise the system for best results by a little pruning.

Next month I hope to answer some of your letters, providing I receive them of course!