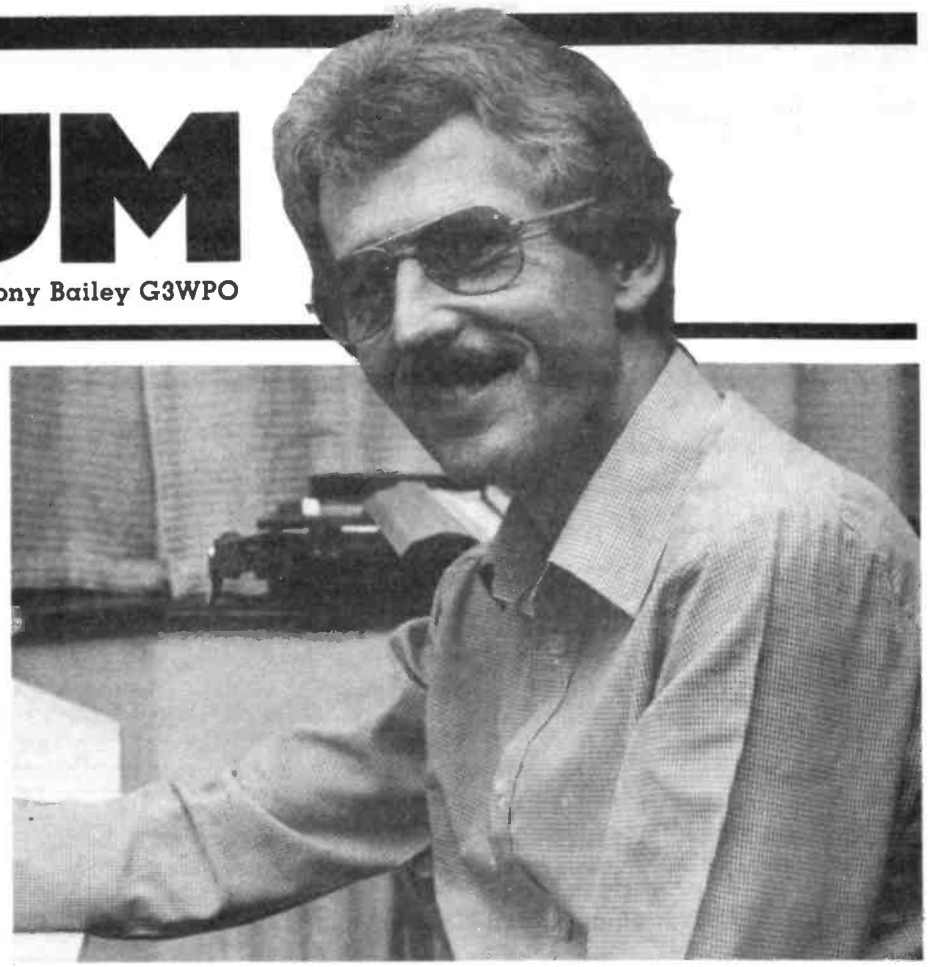
FORUM

By Tony Bailey G3WPO



isation depending on the nature of the object. As this change occurs at every reflection, by the time the signal reaches you it will be anything but how it started off.

Long distance repeaters

If you do have the means of switching between vertical and horizontal polarisation, try listening to a distant Repeater, and see which polarisation modes gives the best received signal. You may be surprised that sometimes you will achieve a higher signal strength on horizontal polarisation, as all repeaters use vertically polarised antennas. The London repeaters (if you really want to listen to them) are all audible at the writer's QTH, and frequently equally as strong on horizontal polarisation, due to the changes in polarisation of the signal on route to the antenna.

The effect on your S-meter

What sort of effects on received (and transmitted) signal strengths due to these polarisation changes can one expect? Well, a vertically polarised signal that has had its polarisation shifted by 45 degrees, can be expected to produce a loss of 3dB (or half an 'S'-point) when received on a similarly vertically polarised aerial. In theory, shifting through to 90 degrees (the signal would now be horizontally polarised) will produce infinite loss, but in practice the signal is never exactly 90 degrees out, and losses of 15-25dB would be normal, or 2-4 'S'-points. This is in fact the sort of difference you will notice at fairly short ranges when you are using the opposite polarisation to the transmitting station, and where little opportunity has occurred for reflections.

For some reason, horizontally polarised signals are less likely to change their mode than vertical, a factor which may have influenced the choice of horizontal for SSB communications on VHF/UHF. The choice of vertical for FM use was of course intended for compatability with mobiles, but with so many fixed stations using FM, why not go circular and enjoy the best of both worlds, plus some advantages?

With mobile stations, the same situation holds, in that the polarisation will be changing continually, especially when travelling through built up areas. One recent QSO with G4GPW/M about eight miles distant, stopped in a notorious radio 'hole' amongst the South Downs, produced no copy at all on vertical, but S7 on horizontal!

Circular waves

When using a circularly polarised signal, usually derived from a crossed-yagi, or a helix on the higher frequency bands, the electrical field rotates around the axis of the direction of propogation, such that it rotates through 360 degrees in one wavelength.

The consequence of this is that when such an antenna receives a linearly polarised signal, it doesn't matter what the instantaneous polarisation is, the loss will be 3dB. Compare this with the situation when both aerials are linear, and instead of possible losses of up to 20-25dB when the signal is cross polarised, there will be a constant loss of 3dB. This does of course assume that the antenna used for receiving is perfectly circularly polarised and that there are no other effects producing fading.

If both stations are using circular polarisation, then the signals between them can be expected to suffer very little polarisation induced losses. There is one other point though — there are of course two types of circular polarisation! It is probably simpler to use the helix antenna as an example, as it is easier to visualise, and the 'thread' of the antenna, when viewed from the rear, and in the direction of propogation, will give the sense, which will be clockwise (right-hand) or anti-clockwise (left-hand). If the two stations are using opposite sense antennas, or the sense has become reversed during propagation of the signal (more likely with satellites than terrestrially) then there will be