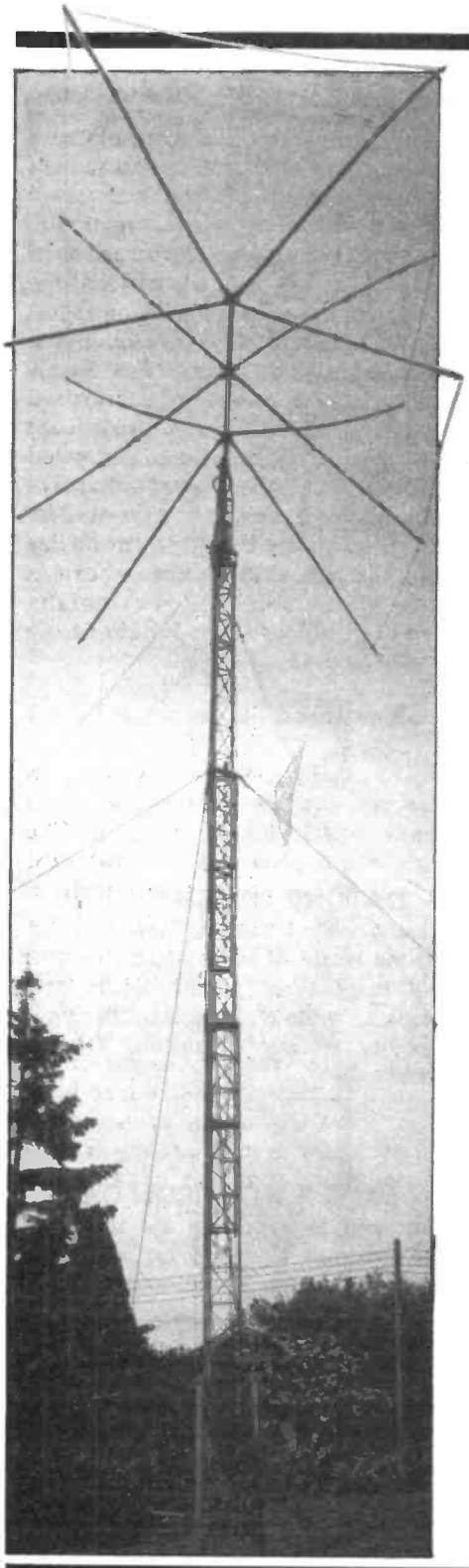
Aerials for DX working



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During the years of maximum sunspot activity, interest in working DX on the 7, 3.5 and 1.8MHz bands tends to wane because of the favourable propagation conditions on the higher bands. We are now approaching the trough of the 11-year cycle, so once again we are seeing an increase in activity on the lower bands.

The widespread availability of commercial transceivers and comparatively inexpensive 14/21MHz beam aerials has resulted in little skill being required to set up an amateur station which provides excellent DX communication from all but very poor locations. Obviously the fellow who is fortunate enough to have an unobstructed view of the horizon at all points of the compass, coupled with good electrical ground characteristics, is going to get better and more consistent DX results than someone surrounded by hills.

Nevertheless there has been a gradual erosion of signal strength differential between the best amateur stations and the 'average' over the past two decades as far as operation on the 14, 21 and 28MHz bands is concerned.

This degree of uniformity of DX results does not appear to exist so markedly on the 1.8, 3.5 and 7MHz bands because all but a small percentage of the amateur fraternity are compelled to use aerials, the performance of which falls far short of that which they can obtain on the 14/21/28MHz bands using one of the popular Yagi or Quad aerials.

Low angle radiation

It is well known that a low angle of radiation is needed for long range communication on the HF bands; also that aerials consisting of one or more half-wave elements should be elevated at least one half-wavelength above ground to avoid wasting power at high angles.

For this reason the popular 14/21/28MHz beams are frequently erected at a height of 10m or more. Indeed the availability of modestly priced masts and towers allowing a lightweight tri-bander to be elevated to a height of about 20m has resulted in a significant proportion of serious DXers having an aerial arrangement of no mean capability.

Table 1 shows the angle of elevation of the lowest lobe (where more than one exists) of a horizontal dipole for heights of 10m and 20m above reasonably flat and good conducting soil in a direction at right angles to the axis of the dipole.

Band	Angle of radiation	
(MHz)	Height=10m	Height=20m
28	14°	8°
21	20°	10°
14	30°	14°
7	90°	30°

Table 1

Clearly, given that the average amateur is severely limited with regard to height of the aerial above ground, the DX capabilities of a horizontal aerial deteriorate as the frequency is reduced.

The use of a multi-element