A Simple HF Aerial

A loft mounted HF DX system

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Having just removed QTH to a house with a small garden, I was stuck with the problem of finding an aerial to use for the HF bands.

A number of aerials were tried including a 132 foot inverted Vee, which was tuned against a number of radials, and dipoles of various types including trapped dipoles and a G5RV. They all were poor for DX working.

After a chat with G3ASG, an old aerial design by W8JK was looked at. It seemed to be ideal in that, the aerial was broad-band with no critical tuning and also had a low angle of radiation.

The W8JK consists of two dipoles side by side, and spaced ⅛ wavelength apart on the lowest band to be used with the two dipoles fed out of phase. The basic W8JK is shown in **Fig 1.** The aerial is fed in the centre using a 300 ohm ribbon or open wire feeder with the feed line to one dipole transposed. The whole array is fed with 300 ohm ribbon or open wire feeder from the shack.

DIMENSIONS FOR 28, 24, 21, 18 and 14MHz USE.

S = 8 feet

L = 33 feet

The dimensions can be scaled up for use on other bands. I have in fact used this aerial on 10 MHz without any changes of dimensions. But for 7MHz use

S = 16 feet

L = 66 feet

Consider the polar diagram of a free space half wave dipole veiwed end on as in **Fig 2**.

It shows that the RF field is circular about the dipole and that the aerial will radiate at all angles, ie both high and low angles equally well.

However, few if any, amateurs

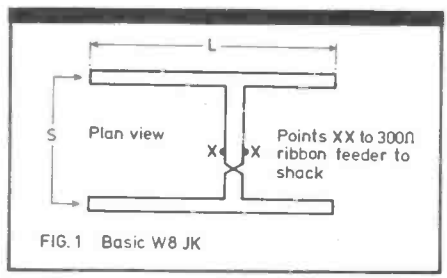

FIG. 1 Basic W8 JK

can erect an aerial at a height great enough to be considered 'free space', and in most installations, the polar diagram is likely to look more like **Fig 3.** This is due to the effect of the earth's surface, beneath the aerial reflecting signals upward, causing the angle of radiation for

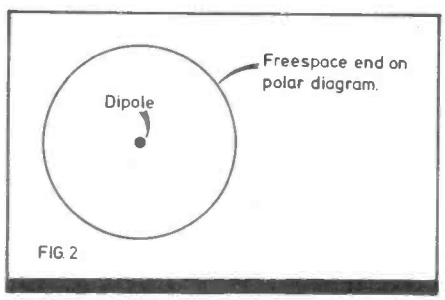

FIG. 2

the majority of power to be raised to far higher values than the optimum for DX working.

The half wave dipole either in a free-space or at most resonable heights always exhibits the expected figure of eight polar diagram at right angles to the direction of the wire, **(Fig 4).**

High angle radiation (as in **Fig 3**)is undesirable because, if the signal hits the reflecting layers of the ionosphere at high angles, the signal will in the main be reflected at equally high angles or not be reflected at all **(Fig 5)**.

In **Fig 6** a signal is shown leav-

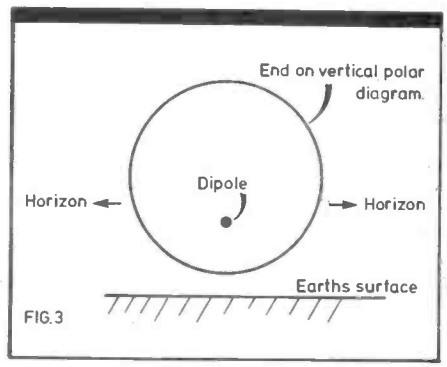

FIG.3

ing the aerial at very low angles and returning to earth also at a low angle many thousands of miles away.

The W8JK dipoles are fed in opposite phase. The effect of this is to cancel the radiation above and

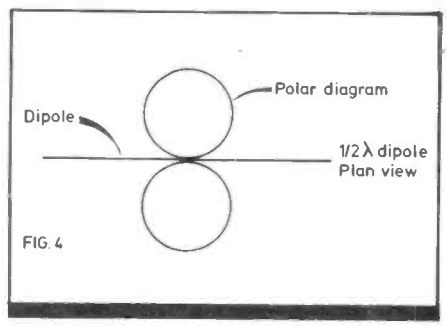

FIG. 4

below the aerial almost completely, due to the fact that the fields from the two dipoles are in the opposite phase to each other. In the horizontal direction this phase cancelling does not occur. This is due to the time the signal takes to travel from