"STREB" VHF Compact Beam

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For many years I have had the feeling that somewhere, somehow, a much smaller and more compact beam was possible for use on VHF, without loss of efficiency. Of course I was labelled *crazy* and the project *impossible*—a pure waste of time.

I tried many ideas such as loaded dipoles with wrap-around reflectors, zig-zag dipoles, etc. Smaller in size but also smaller in gain. In 1987, I started experimenting with continuous shaped dipoles, and then progress was made. Circles and squares showed promise, but were not exactly what I was seeking.

It was when I decided to bend the two ¼ wave elements of a dipole into uneven sections that a real breakthrough was made. By bending each ¼ wave section at an angle of 90° at a point 45 per cent from one end and placing them in such a position that the verticals were longer than the horizontals (see Figure 1), I found that I had created an RF cage. Experimentation was carried out on 146.000 MHz and the spacing used between the two sections of the dipole was 30 mm. Aluminium tubing of 6.4 mm diameter was used and was found to be much easier to work than larger diameter tubing.

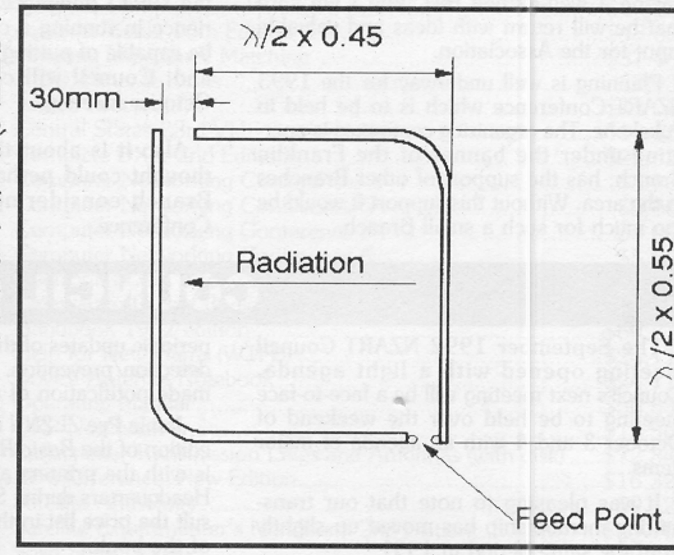
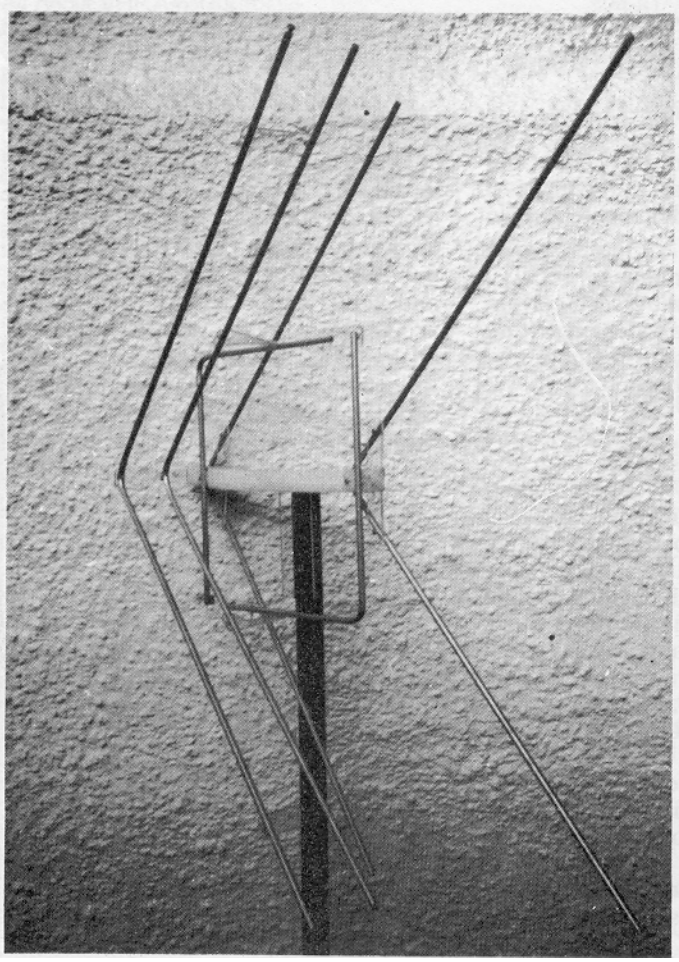


Figure 1. RF Cage.

Upon energising the cage, the RF **oscillates around the cage and is trapped.** Placing a field strength meter close to the cage showed that there was a definite direction to the left, as in Figure 1, or to the voltage vertical as opposed to the current vertical to the right. The directional properties of the Cage were most intriguing and the next move was to find a way of releasing the RF and directing the signal in the desired direction.



Fitting an ordinary reflector element to the right of the Cage proved useless, but when the same element was moved behind the Cage, the RF meter acted strongly. By bending that same element to a Vee shape and placing it 50 mm behind the Cage at point X, so that at points Z the spacing was 60 mm, the RF was drawn out of the rear section of the Cage and fired in the desired direction, that is, to the left as in Figure 2. This rear Vee element could **not** be described as a reflector, but rather as a rear **output** element. The length of this rear output element is a halfwave plus 2 per cent with adjusting screws added as in Figure 3. The gain was considerable, about equal to that of a three-element Yagi.

Now, attention was given to the front portion of the Cage. A similar Vee element was tried but was found to be too long. When shortened to less than a halfwave and placed near to the front vertical portion of the Cage further gain was registered. The most suitable length for this element was found to be one per cent less than a halfwave, and situated