A Discone Antenna for 10 Meters

It looks like a bird cage, but works like a yagi.

by O.B. Boddie W1ZB/6

A truncated cone antenna is a superior radiator, equaled by none. The cone antenna is used extensively on VHF and UHF, and the Skelton cone is a version of it for HF.

The discone antenna described in this article resembles the old cage antenna of the spark days. My XYL says it looks like a bird cage. But, looks can be deceiving. This small antenna was tested extensively, with a 6-dB gain three-element yagi as a standard. It proved equal to the yagi in every way.

This discone antenna has a gain of 6 dB across the entire 10 meter band. How does it do this? It has an infinite number of half waves in parallel for a radiation pattern. It always has the right angle of radiation because of the rotating field pattern.

"This is fine for apartment dwellers and works well from the inside of the apartment because of the multi-angle radiation pattern."

You can build it as a single cone 5 feet high to sit on the roof, giving you a 3-dB gain in all directions at a low angle. This is fine for apartment dwellers and works well from the inside of the apartment because of the multi-angle radiation pattern. It is easy to construct and the cost is so low that anyone can afford to build it. Or, you can construct two cones separately and hang them both from the ceiling or under the eaves on a house or garage. Mine are hung in the shape of an inverted "V" and favor signals broadside. Mounted vertically, it radiates in all directions with a 3-dB gain when using only a 5-foot antenna.

The low angle of radiation makes this cone an excellent DX antenna. It even picked up a few new countries I could not raise on the yagi! For 20 meters, double all measurements and you can have a 6-dB gain antenna on 14 MHz.

If you are using a single cone antenna, no tuner is necessary. On the discone antenna, however, an antenna tuner may be necessary for a perfect match.

Construction Details

These details are for a single cone. Make two of them for a discone.

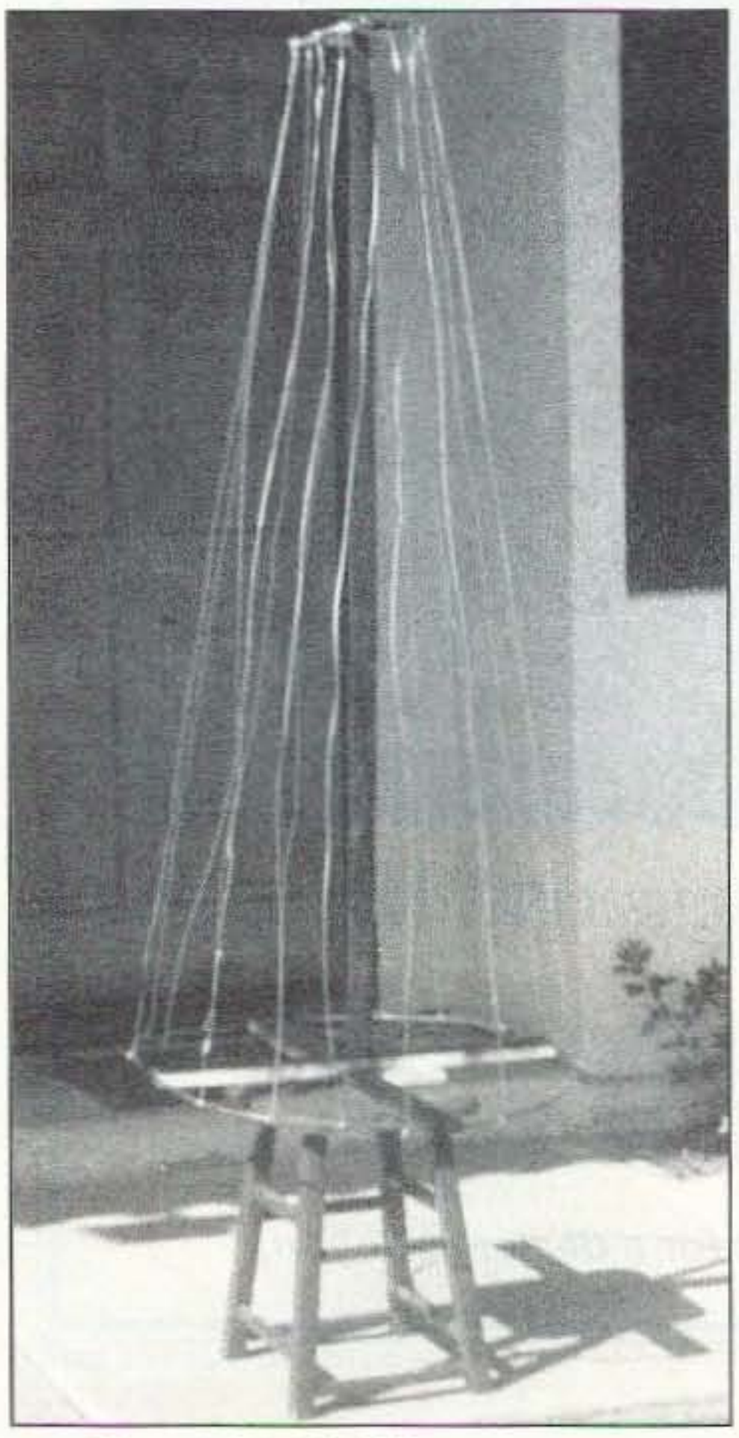

Photo A. Finished discone antenna.

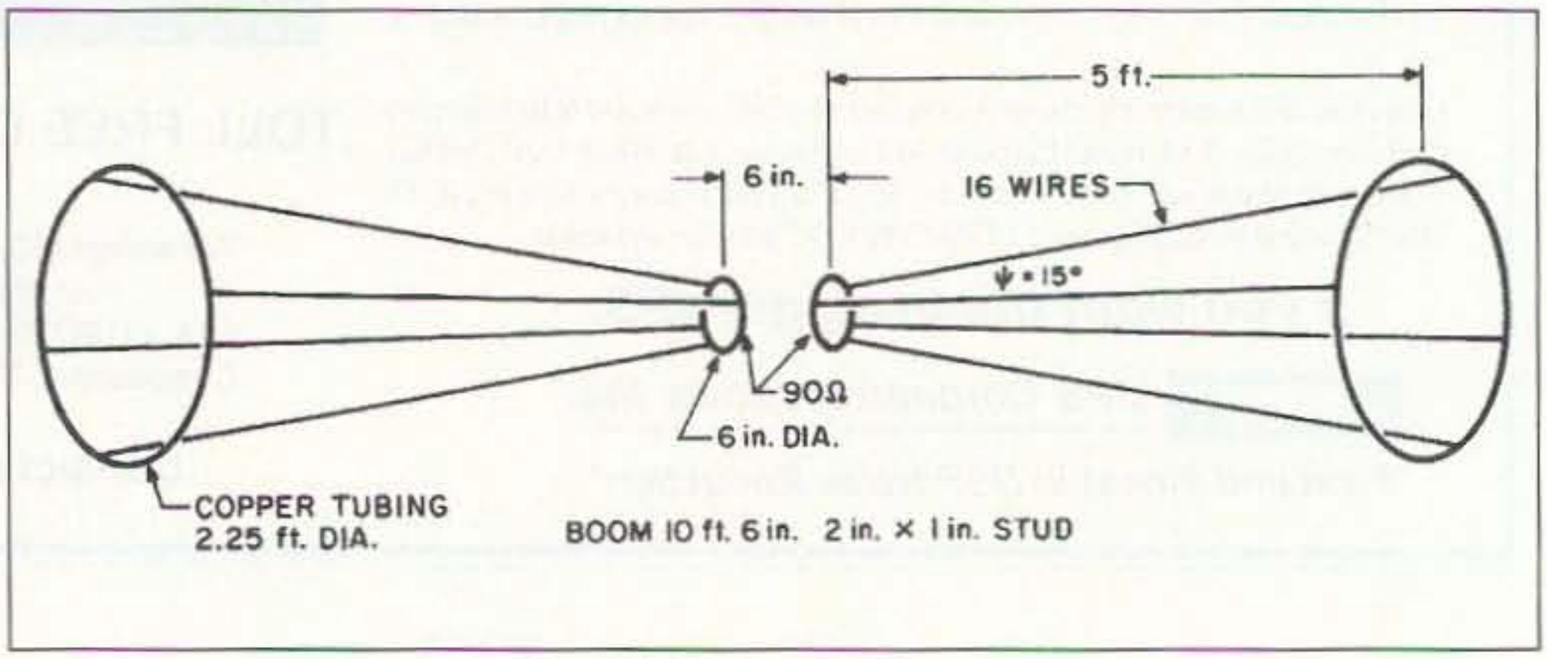

Figure 1. Discone for 10 meters.

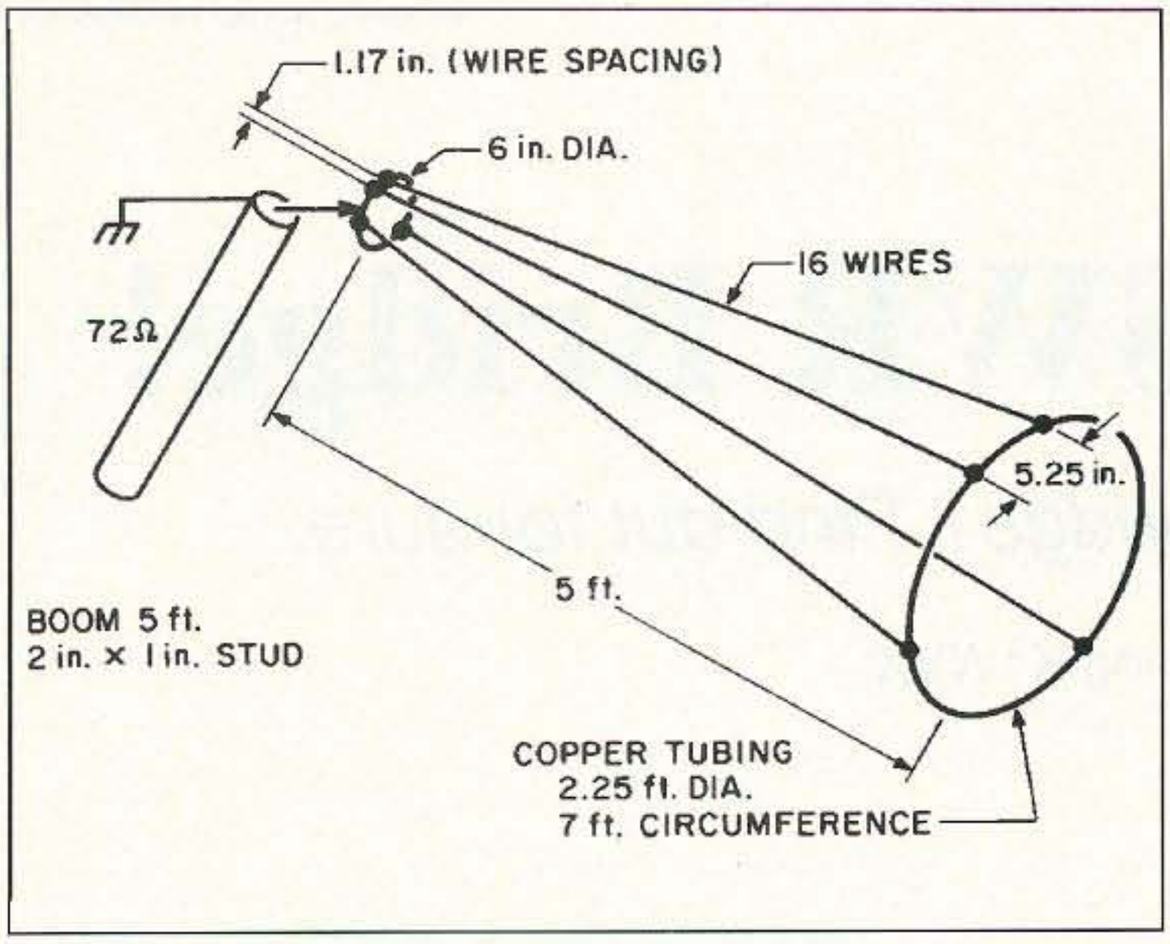

Figure 2. A 10 meter conical.

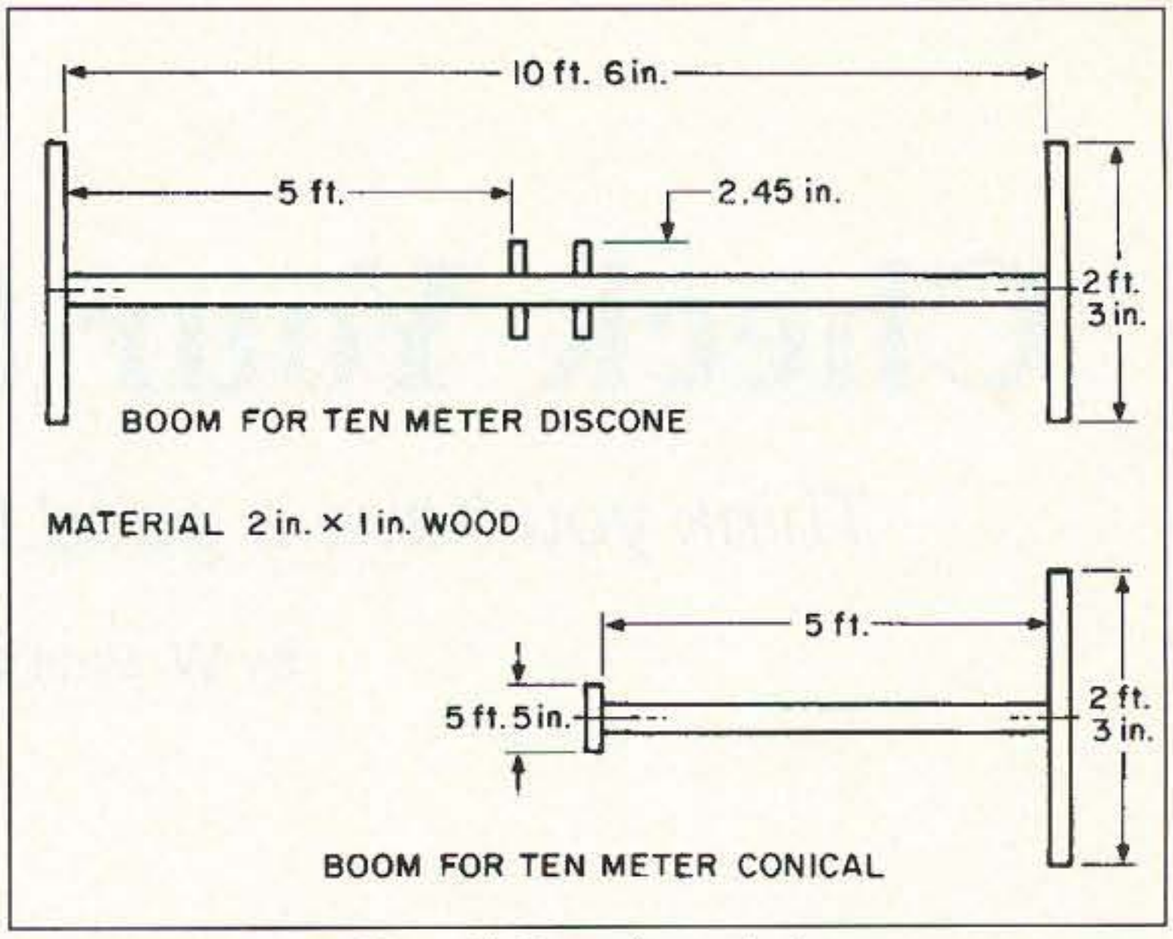

Figure 3. Boom for conicals.

First, make the booms, following the details in Figure 1. Next, cut a 7.20-foot piece of copper tubing. Flatten one inch on the ends with a hammer. Bend it in a circle. Drill through the flattened ends with a #18 drill clearance for an 8-32 machine screw.

Cut off a 20-inch piece of copper tubing. Flatten 1 inch on the ends with a hammer. Bend this piece of tubing in a 6-inch circle. Drill through the flattened ends with a #18 drill clearance for an 8-32 machine screw.

Bolt together the two copper tubing circles with 8-32 machine screws.

It is easy to construct and the cost is so low that anyone can afford to build it.

Insert the tubing circles onto the boom for fit. Shave down the wood for fit. Flatten the copper tubing where it goes over the 2-inch by 1-inch ends of wood.

On both the large and small loops, drill two holes through the copper at the flat portion to clear 5/8-inch by 8-inch wood screws. Remove the copper tubing loops and drill 1/16-inch holes, evenly spaced, in 16 places on each copper tubing loop.

Assemble boom and copper tubing loops together. Tighten the wood screws to hold the assembly together. String 16 wires as per Figure 4 after scraping enamel off the ends of wire for good contact. 73

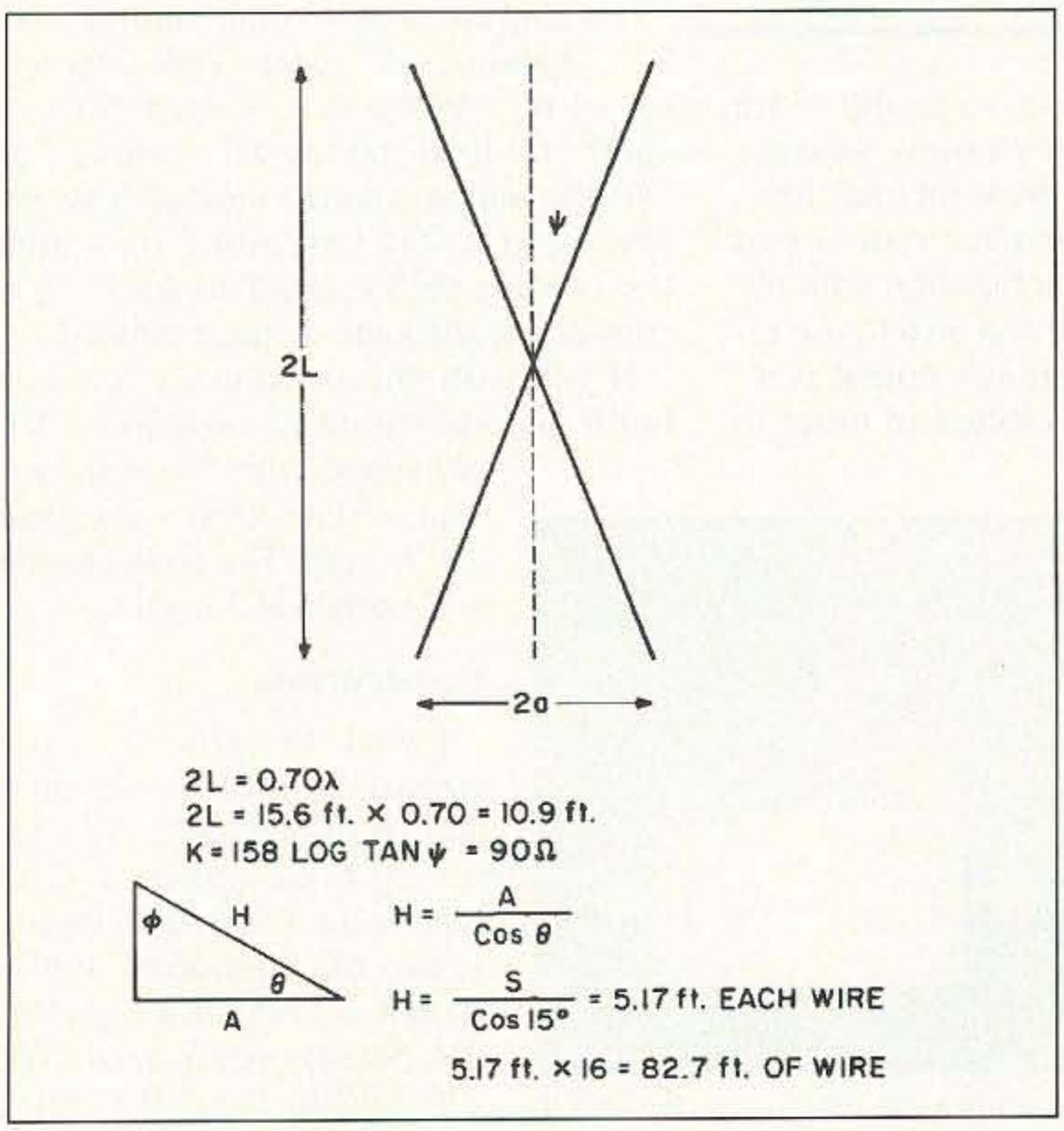

Figure 4. Conical math.

Parts List (for one cone; double for discone)

10 feet of 1/4 inch copper tubing
100 feet of #18 copper wire enamel covered
32 each 3/8 inch #6 pan head sheet metal screws
2 each 1 1/2 inch #8 flat head Phillips brass wood screws
2 each 8-32 1/4 inch-long machine screws and nuts
1 five-foot 2 inch x 1 inch wood stud for boom
1 two-foot-3-inch 2 inch x 1 inch wood for end piece
1 six-inch 2 inch x 1 inch wood for end piece
Note. For the discone, two cones make the boom 10 ft. 6 inches long.

Construction

1. Make booms as per drawing.
2. Cut off a 7-foot 3-inch piece of copper tubing. Flatten 1 inch on ends with hammer. Bend it in a circle.
3. Drill through flattened ends with a #18 drill clearance for an 8-32 machine screw.
4. Cut off a 20-inch piece of copper tubing. Flatten 1 inch on ends with hammer. Bend it in a 6-inch circle.
5. Drill through flattened ends with a #18 drill clearance for an 8-32 machine screw.
6. Bolt together copper tubing circles with 8-32 machine screws.
7. Insert copper tubing circles on to the boom for fit. Shave down wood for fit. flatten copper tubing where it goes over 2 inch x 1 inch ends of wood.
8. Drill two holes through copper at flat portion to clear 1 1/2 inch x 8 wood screws.
9. Do this for large and small loops of copper tubing.
10. Remove copper tubing loops and drill 1/16 inch holes in 16 places on each copper tubing boom evenly spaced.
11. Assemble boom and copper tubing loops together. Screw down wood screws to hold assembly together.
12. String 16 wires as per drawing after scraping enamel off the ends of wires for good contact.