The Vertical J

a simple, inexpensive six meter antenna

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Having trouble working 6-meter mobiles who're using whips, with your home-station beam?

Or maybe you're interested in an omnidirectional antenna for CD net use which you can put up or take down in a heck of a hurry?

Or maybe you just want a simple and inexpensive skywire for Six, which you can put together in a very few minutes and which will perform excellently (although admittedly, it's *not* in the same league with a 4-element or bigger beam).

If any of these situations fit you, you might consider using a vertical J. That's what we call it in the Midwest, although the fellows out in 6-land know the same antenna as "the grounded J." This is a simple, fast-to-build antenna which meets all the needs outlined above.

This is *not* a radical new antenna. Its basic principle has been included in the VHF antenna portion of every ARRL handbook I have ever seen, all the way back to the 1943 edition. But this is a case of something being so old it's new again!

Around Oklahoma City, the first vertical J went up something like four years ago (naturally, I mean the "first" of the new generation). It took quite a while to catch on—but today more stations are equipped with Js than are not.

Which isn't saying that Okla. City is a vertical area, for it's not. Many if not most of the J-equipped stations are also equipped with beams. The J is used for local net work and ragchewing with mobiles; the beams come into play when DX is available or when extended groundwave is the object.

So what is this device? Fig. 1 shows what it looks like; the long element is ¾ wave long while the shorter one is ¼ wave. In essence, this is an end-fed half-wave, using a shorted quarter-wave section of parallel transmission line (the lower sections) as an impedance transformer. While it's possible to feed it directly with 50 ohm coax by connecting the shield to the grounded strap across the bottom and tapping the inner conductor several inches up either element, the preferred feed method is shown in Fig. 2—a half-wave "trombone" balun to provide 208 ohm balanced feed, which is then tapped up both elements at the proper point.

Where is this "proper point?" It will depend to a large degree on just how you put the antenna together; best practice is to determine it with the aid of an SWR bridge as will be explained later, but it's usually within 6 inches of the bottom.

Before we look at some more-or-less detailed construction data, let's examine the advantages and disadvantages of this antenna. On the advantage side you have omnidirectional pattern resulting from the vertical polarization; lack of cross-polarization loss when working to whip-equipped mobiles; ease of construction; and positive grounding if recommended construction practice is followed. On the disadvantage part of the ledger you find the introduction of cross-polarization when working horizontal stations, and lack of any antenna gain (although this antenna is usually credited with 3 db gain over a ground plane, for no tenable theoretical reason that I have been able to locate).

If you want one of these, at this writing, you'll *have* to build it yourself since no one I know of makes a commercial model. This, however, is not hard to do. Start out with a long

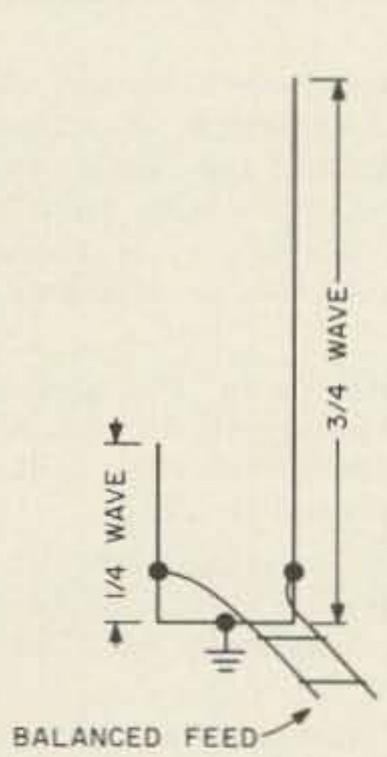

FIGURE 1

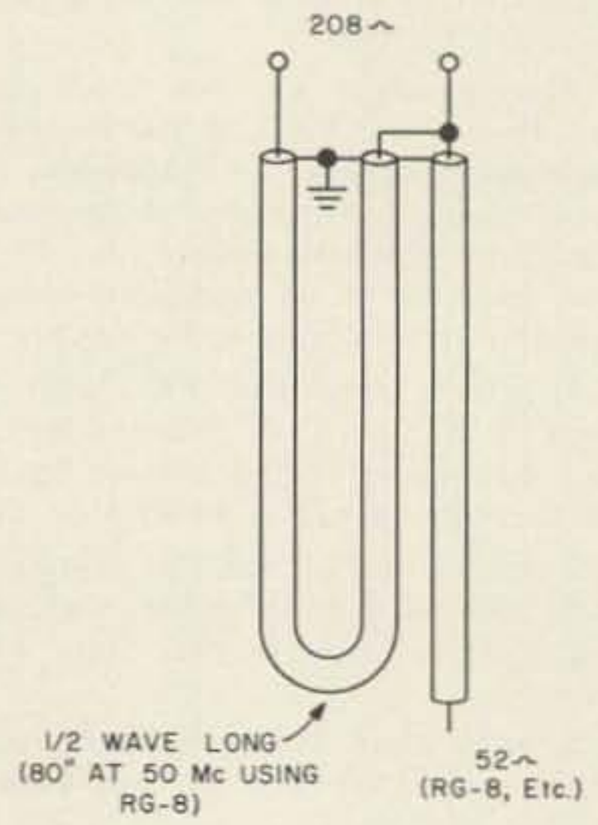

FIGURE 2

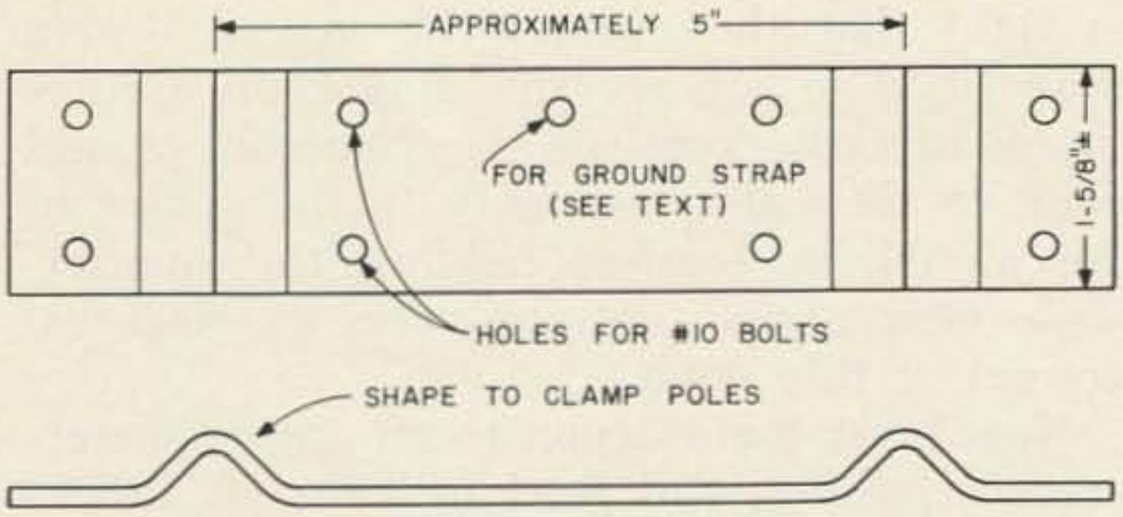

FIGURE 3

supporting mast. Telescoping TV poles will do. Extend the top end of the mast the required ¾ wave distance above the upper guying point. This will be approximately 15 feet, requiring a 5-foot extension if you use a telescoping stick.

Shape two straps similar to Fig. 3 from ⅛ inch aluminum (a 1⅝ inch relay rack panel comes in handy as a source of raw material at this stage) and bracket the quarter-wave element to the pole just above the guy point as shown in Fig. 4. Scrape all metal surfaces clean and tighten screws fully, since this is a high-current point and any resistance will cause power loss.

Form a similar set of straps from ⅛ inch Plexiglass or Lucite. Most cities of any size at all now have plastic-sign shops which provide a source of this material from their scrap piles. To bend the plastic, soak it in boiling water until it softens and then bend rapidly, holding in place until cool. Attach this insulating bracket near the top of the quarter-

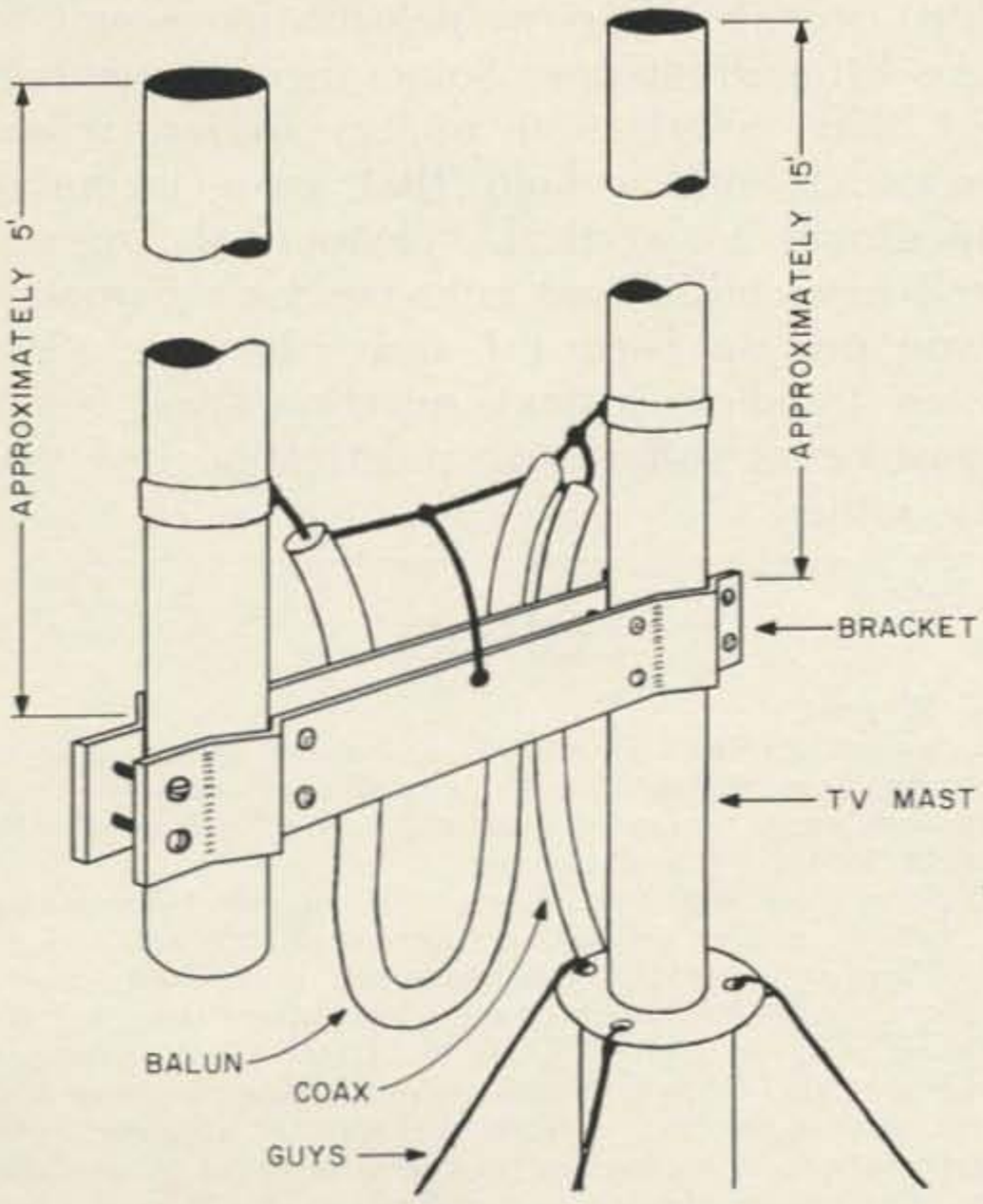

FIGURE 4

wave element to maintain spacing and to support the element.

Now prepare your balun as shown in Fig. 2, and solder each center conductor (the 208 ohm connection points) to a radiator-hose clamp of proper size to slip over the antenna elements. Slip the clamps over the elements (this may require partial disassembly of the antenna or may not, depending on your clamps. If you use the "universal" variety, no disassembly should be necessary) and tighten them just enough to hold in position but not so tight that they cannot be moved. Using strap braid or salvage shielding from a short chunk of coax, connect the common ground point of the balun assembly to the center of the aluminum bracket holding the quarter-wave element on. This provides an electrical ground at this point.

Now hoist the antenna to an approximately vertical position and feed in some rf. If you have a source of about 5 watts or less you can make adjustments with power in the line; If you use higher power it's best to turn the rig off unless you have a special fondness for rf burns. With an SWR bridge in the coax, preferably as closely as possible to the balun, slide the clamps up and down on the antenna until you get a reading of 1.0 (or as close to this as you can) at your favorite operating frequency.

The only remaining step is to tighten the clamps down firmly so they won't slide, and waterproof all connections by spraying with Krylon or similar plastic. Tape the coax to the side of the mast as you raise the antenna into position, and prepare to work the world!

If you have never experimented with cross-polarization, be prepared for a surprise. Losses due to this factor alone *can* be as great as 20 db. This means that you may find 20 db improvement on whip-equipped mobiles compared to your past results with a beam—but it also means you may find 20 db loss on halo-equipped mobiles or beam-equipped fixed stations. Strangely enough, on Sporadic-E (skip) signals the cross polarization seems to make little difference. Some theories tend to hold that polarization rotates during reflection, while others hold that most incoming skip signals are vertical. Whatever the reason, you'll have additional enjoyment on 6 meters if you put up *both* a J and a beam, with a switch to allow instant selection. And you'll almost never suffer cross-polarization loss that way, either!

Letters

Dear Wayne:

Lying on my back in a hospital bed for pretty close to a month gave me a chance to really go over the still rather numerous pieces of mail which the XYL graciously brought to me each afternoon.

With a break like this, I was able to sort from among the various pieces (including the usual "riff-raff' which we all get and resent) the items which really had "meat" in them. I kept coming back time after time to the INSTITUTE of AMATEUR RADIO which you initiated in 1962. Weighing this against what we have had in the past some 50 years in the way of amateur radio representation, it became increasingly apparent to me that very definitely a change was indicated. As I read more and more, through your editorials in "73" and the occasional IoAR bulletins, the more thoroughly I became convinced that you had a new and fresh grasp on the re-