Dick Van Wickle W6TKA/Ø
17 El Rey Hts.
Route 6
Columbia MO 65201

The Procrastinator's Special:

A Simple Six-Band Antenna

—this 10-160 endfed vee goes up in a jiffy

There is really nothing new about this type of antenna, but I'm *using* it as an inverted vee. Many years ago it was called a Fuchs antenna (pronounced "Fooks"), but it's easy to see why that name didn't stick. Later on, it was (and is) variously called an endfed Hertz, a directly-fed, self-fed, voltage-fed, straight-wire, or random-length antenna. That last name is applicable only when you really don't know or care what length it is.

Pre-TV, some of the more daring hams would simply clip one end of the antenna to the hot end of the final amplifier tank coil at a point where the final loaded up reasonably well, and they were on the air—never mind the harmonics and parasitics. Using a capacitor at the tank circuit, in series with the aerial, kept anyone who might touch the wire from getting fatally zapped with dc, so the more prudent operators opted for that approach.

Later on, things became more sophisticated and, in the late 1930s, something known as the Universal Antenna Coupler was developed. This enabled link-coupling of an antenna to the amplifier, thus eliminating the dc shock hazard and minimizing spurious radiations.

The ARRL *Antenna Manual*, in its 1949 Fifth Edition, called antennas without feedlines "... the simplest and probably least effective multiband antenna." Untrue. Simple, yes. Ineffective, no.

Those graybeards among you who can remember back to over 20 years ago may recall an article written by me and published in the February, 1956, issue of *CQ* under the title, "The Drooping Doublet." To the best of my knowledge and research, that was the first article to appear in an amateur publication pertaining to what we call today the inverted vee. That antenna, as was the one I am about to describe, evolved out of necessity.

After many years of using the inverted vee—usually fed, in my operations, with open-wire feeders (or tuned, as many call them)—I found myself in a situation where it just was not too convenient to bring the feedline from a centerfed antenna into the radio room. Having moved from California to Missouri, I now had more land but the shape of my God's Little Half Acre meant that the optimum means of feeding the inverted vee was at one end. What to do? No problem. The ham shack was now in the basement, so I planted my 40-foot telescoping TV pole out in the middle of the backyard, attached an insulator to the top, ran approximately 130 feet of wire through the insulator, hoisted up the mast, and guyed it.

I then extended half of the wire out to a 10-foot pole (which I no longer needed for not-touching-things-with) which was located at the rear fence and attached it with a large insulator. The other end of the wire drooped nicely down to the eaves of the house, where I anchored it with another insulator and then brought it in through an access hole in the wood just above the concrete basement wall. Inside it was attached to a transmatch with, of course, coaxial cable running from there to my transceiver or amplifier.

Having gotten you thoroughly enthused about this miracle of modern science, I must inject a note of caution: A good ground system is most helpful when using

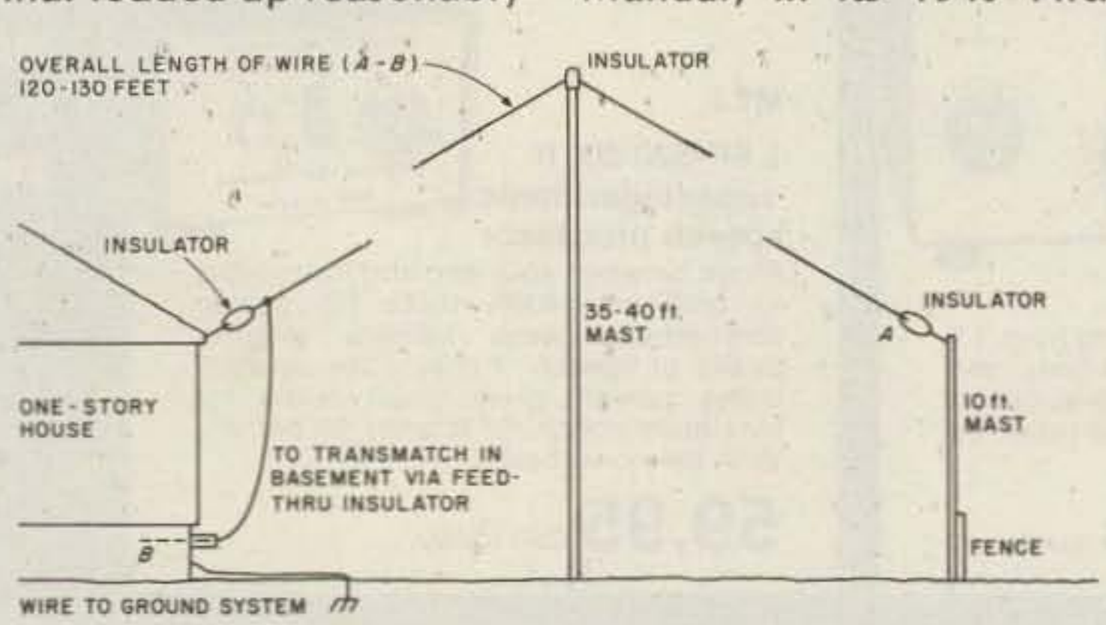

Fig. 1. Directly-fed inverted vee antenna, as installed at W6TKA/Ø. Layout and dimensions can be varied somewhat to suit individual installation requirements.

this antenna. Even if you have only a small backyard, the antenna and ground system are still feasible. Among other things, I used a large quantity of #18 copper wire (copperclad steel or aluminum electric-fence wire is cheap and comes in rolls ranging from small to huge) and simply sliced the lawn with—now, don't laugh—a pizza-cutting wheel, poked the wire about an inch into the soil with a large screwdriver, then stomped the grass back in place. No one could tell where I had buried wires.

Somewhat like a ground-plane antenna, the ground system forms a reflecting, conductive plane—the other half of the antenna system, as it were. This is especially important on 160 meters, where the directly-fed inverted vee functions as a quarter-wave or slightly longer radiator.

A good ground helps on all bands to prevent "rf from floating around the shack," as the old expression goes. And it makes quite a difference in the kind of signal others, at distant places, hear from your station. Here in this part of Missouri, soil conductivity is pretty good, according to a soil conductivity map issued by the FCC for use by broadcast stations. To make sure I had the best possible ground, I got a half dozen five-foot ground rods (they really should have been eight feet long), spotted them at various places around the 100- x 100-foot backyard, and wired them together with #12 copper wire. Tied to all of this is the #18 wire I mentioned earlier and the radial system employed for my all-band vertical (that antenna is yet another story). From this conglomeration, a couple of stout copper wires run to a chain-link fence which borders the back of my lot (plus several other lots) and is about 600 feet in total length. All ground rod and wire connections were carefully spliced and soldered. (See Fig. 2.)

This antenna was put up in something of a hurry in the fall of 1977, just before the weather turned nasty. My main concern was to have an allband radiator up for the winter; a classy, super-efficient installation was secondary to me at that time. But, to my surprise, the thing seems to radiate as well as any inverted vee I have ever used and is still in use with only minor modifications.

I have three home-built transmatches, so I use one on 160 meters, another on 80/75, and the third on 40 through 10. (See Fig. 3.) One transmatch might work as well if you don't mind retuning it each time you change bands. The transmatches are separated from the radio room by a wall and are located in the unfinished furnace area of the basement. A remote meter on the swr meter and a remote transmitter keying circuit enable me to adjust the transmatches from the furnace room without having to be in two places at once.

Just in case you happen to be curious about the resonant frequency of your directly-fed inverted vee, here's a hint that may help you. Just on a hunch, I connected the center conductor of the RG-8/A coax running from my Kenwood TS-820S to the end of the vee and the shield to the ground system. Switching the transceiver to 160 meters and placing it in the "tune" mode (about 10 Watts of output), I carefully tuned the band for a dip in reflected power. Minimum swr occurred at 1.810 MHz. The swr was about 2.0:1, but it was a pronounced dip, so I knew the antenna was quarter-wave resonant at that frequency. Some simple calculations (234/f) told me

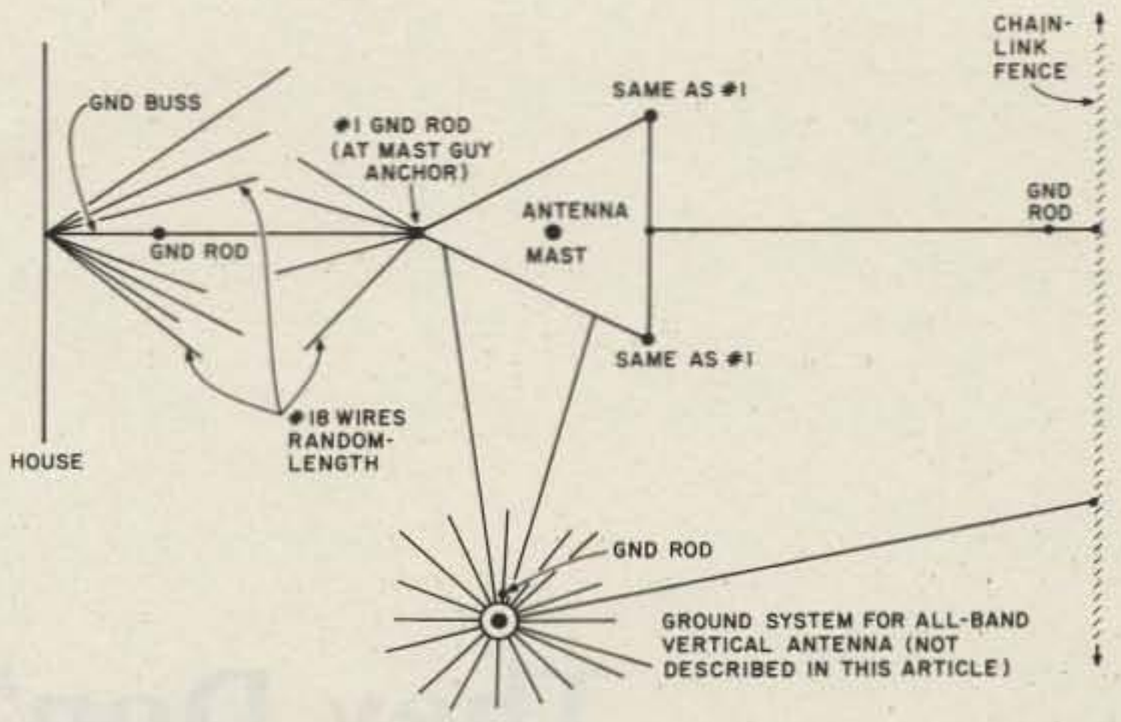

Fig. 2. Ground system in use with directly-fed inverted vee at W6TKA/Ø, shown only as an example of how an efficient ground system can be installed. Many variations are possible and acceptable. (The vertical antenna shown is not described in the article—it is included only to illustrate the total ground system being used.) Both hot and cold water pipes in the basement also are included in the ground system.

that the antenna was—electrically, anyway—just over 129 feet long—a quarter wavelength at 1.810 MHz. It is a bit long for 75 meters, representing a half wavelength at 3.610 MHz. It is a full wavelength at 7.220 MHz, two wavelengths at 14.440, three wavelengths at 21.660, and four wavelengths at 28.880 MHz. It provides some gain in those bands over the basic half-wave antenna. Obviously, the antenna presents a variety of input impedances, and hence the need for an antenna tuner (or transmatch) to match the transmitter to the antenna.

I've been very pleased with the results this antenna has provided on all bands, especially 160, 75, and 40 meters. I feel that it is a much more versatile system than a conventional single band, coaxial-fed inverted vee. Advantages include the convenience of allband operation, no cost for feedline, and no worry about where to run the feedline to keep it from getting too close to the antenna or other structures. It seems to work as well as any inverted vee I have used in the past twenty-five years. It is inexpensive, and you can put it up in a few hours.■

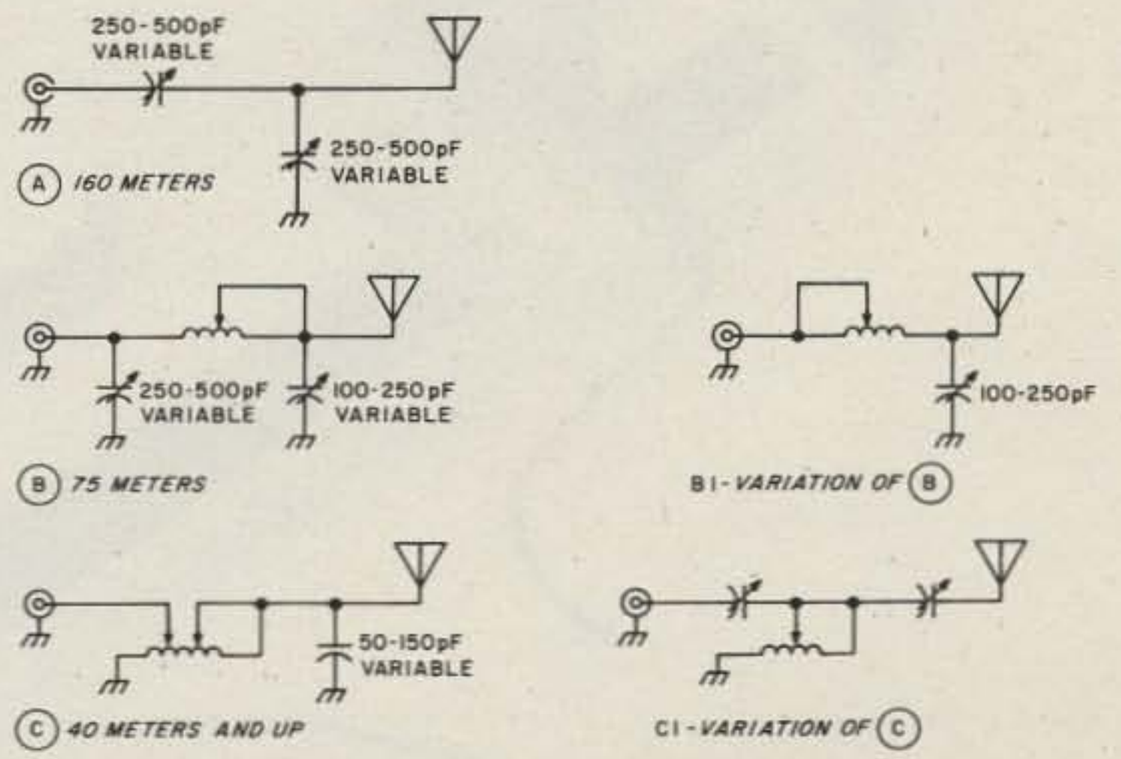

Fig. 3. These transmatch circuits, or other variations of pi, pi L, L, T, et cetera, can be used with the directly-fed inverted vee antenna.