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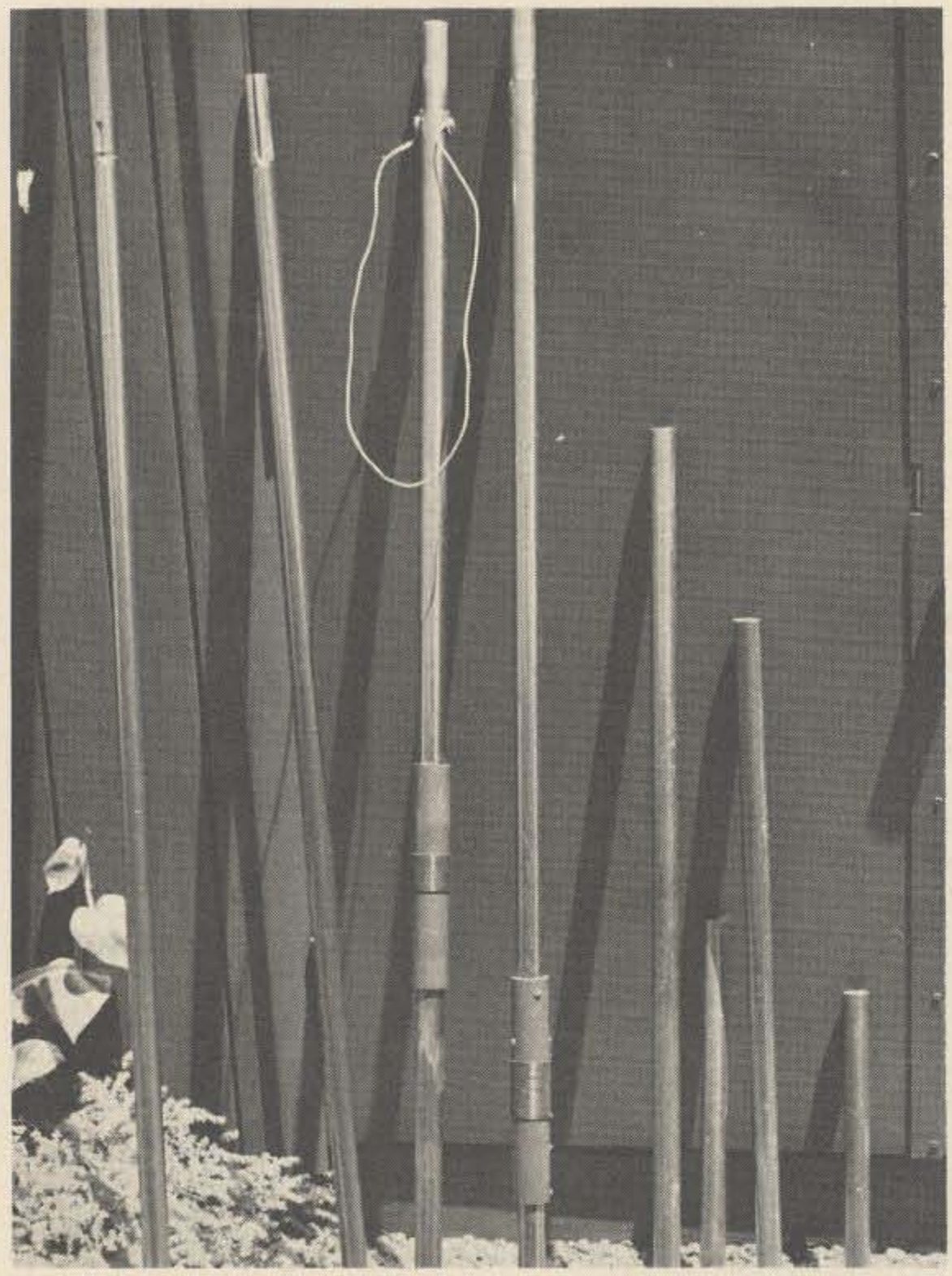
The Invisible Allband Antenna

—works DX, too

The townhouse is fast becoming a new style of housing in south Florida and in California. The young ham living with his family or just out on his own may think twice about living in a townhouse because of the antenna problem, wondering how he can fit a decent system into a backyard that may only be 18' x 35', like mine. Worse yet, what can you do when the townhouse association says no to any type of outdoor antennas? In my case, the restriction included TV antennas, which have to be installed in the attic. TVI, anyone?



Antenna in its disassembled form showing resonating sections for the different bands. The two sections with the traps fit together for operation on 80, 40, and 15 without changing sections.

When I lived in a house, I used dipoles strung about 10 feet off the roof, about 30 feet above the ground. I found two characteristics of the dipole to be true: 1) I could work only half the stations I heard, and 2) I couldn't hear much of anything, especially DX. This held true for my 15 meter inverted vee as well as the 20 meter dipole. After four years with dipoles, I was ready to try something new.

The Antenna

I found the answer in a catalog from Antenna Supermarket (PO Box 1682, Largo FL). After looking through their catalog, I decided on the Model ABC-1 allband vertical. Here was an antenna with no traps being used on 10, 15, or 20 that would stand no higher than 5 feet unassembled. The backyard fence is 6 feet high, so in unassembled form, it can't be seen!

What good is an unassembled antenna? Well, the beauty of this vertical is its construction. It is made simply of pull-apart TV mast. After the first 5-foot section is mounted on the base plate, the sections are slipped on the mounted mast. For 10, 15, and 20 meters, no traps are used; the sections form a full-size vertical on each band. The disadvantage is the need to go outside to the antenna and switch sections when changing bands. This is only a two-minute job, with the result that the antenna can easily be taken down when not in use.

The antenna's maximum height is 20 feet. This means that on 80 and 40 meters, traps are used to resonate the antenna. There is a resonating coil that can be adjusted by hand — straight out for 40 CW or down for 40 SSB. On 80 meters, short sections of mast are slipped on the top for any chosen segment of the band. Antenna Supermarket includes enough mast to cut two sections for any two segments of 80 meters between 3.5 MHz and 4.0 MHz. You can, of course, buy extra sections of mast and cut them so that you can cover the entire 80 meter band. The bandwidth on 80 is around 100 kHz and, on 40, 125 kHz for 2:1 swr points. Swr on 20, 15, and 10 meters never rises above 1.4:1. The rather noticeable sections that make the antenna resonate on 40 and 80 meters aren't seen because I only operate those bands at night. When the antenna is set for operation on 40 and 80 meters, it will also operate 15 meters without any section switching.

The Ground

The ground for a vertical is very important. In an

article in the December, 1976, *QST*, author Stanley describes the amount of loss of radiation versus the number of radials.[1] The important point of the article is that a ground-mounted vertical doesn't require resonant radials. In fact, it would be better to put down 50 feet of wire in the form of five 10-foot radials rather than two 25-foot radials. The idea is to make the ground underneath the vertical as conductive as possible. The radiation efficiency for the number of radials versus the length of radials is given in the article.

Here's the shocker: I don't use radials at all. In my backyard, planting radials would be difficult at best — the ground becomes solid coral rock only 6 inches down. Since the idea is to make the ground as conductive as possible below the antenna, I decided to lay a piece of metal below the antenna. I went to the local hardware store and bought 3 square feet of plasterer's metal lath — a tightly-woven sheet of metal. It isn't a solid sheet, but it isn't as open as chicken wire. Placed directly below the antenna, it makes a dandy ground. Since we were ripping up the grass in the backyard and replacing it with stone, it was easy to dig down a few inches and lay the sheet down and cover it up.

If ripping up a 3-foot square piece of your backyard doesn't appeal to you, you can use radials. Just try to get a good density of wire below the antenna. Don't lay them all in one direction, either, unless you aren't interested in omnidirectional coverage.

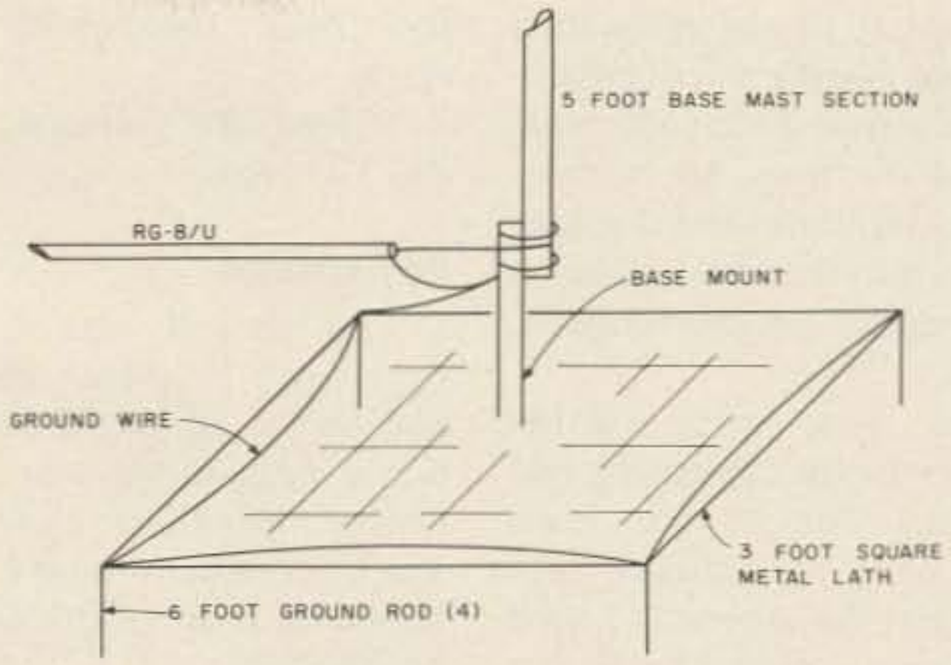


Fig. 1.

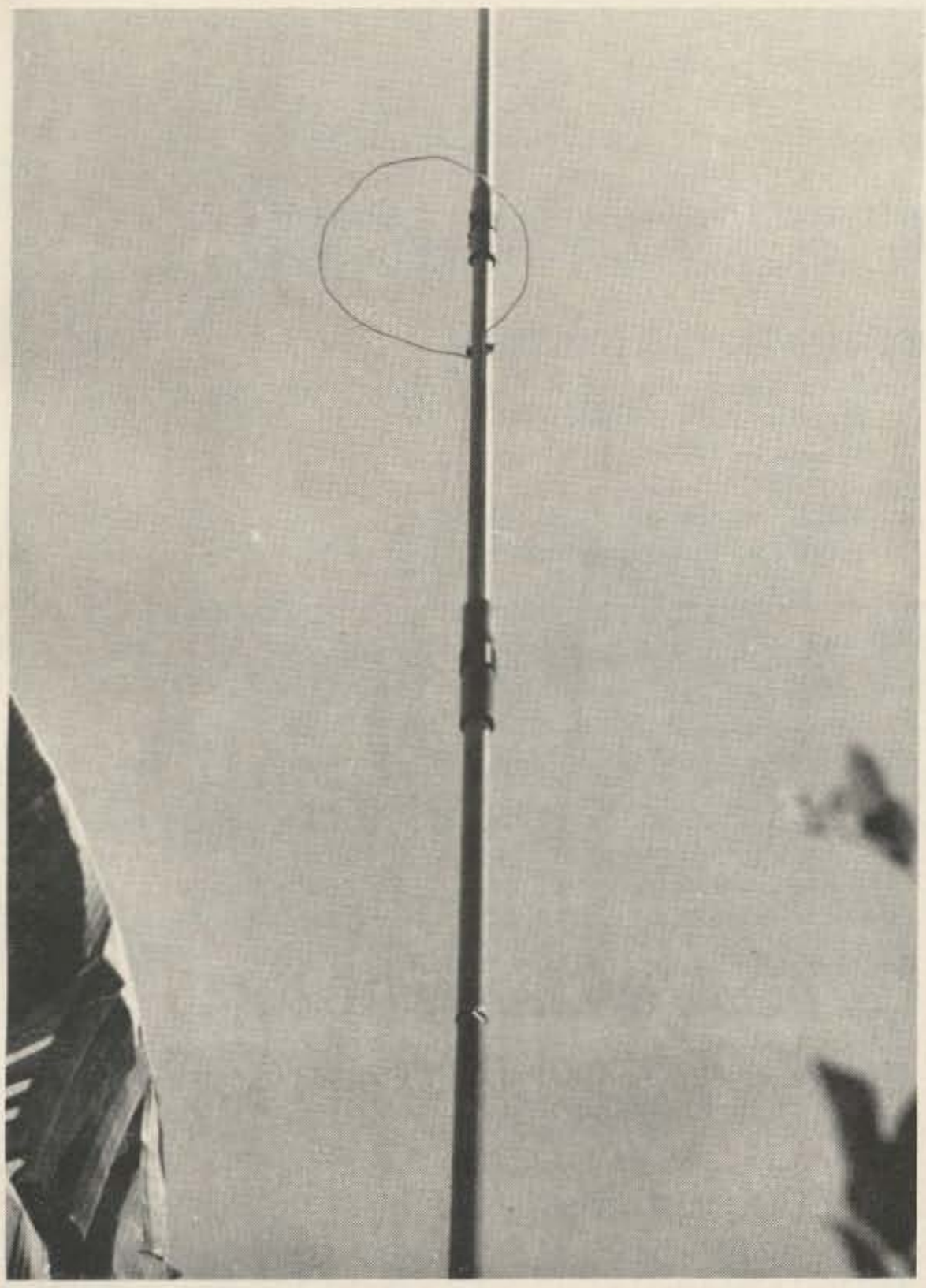
Fig. 1 shows the rest of the installation. The mount for the antenna is centered over the buried metal and hammered down into the ground and the metal lath. Four 6-foot ground rods surround the base and are hammered inside the corners of the lath. They are connected to the base with aluminum ground wire to the point where the braid of the coax is connected.

Some Tips and Construction Notes

Before you try slipping the sections together, sand them down so that they will slip together easily. You will be happy in the middle of some contest that you did.

Decide on what segments of 80 meters you want to operate. Cut the mast to the lengths required, as noted in the instructions that come with the antenna. Sand these sections where they join, too.

I would recommend



Vertical assembled for use on 20 meters. Operation before and after growth of the plants showed no noticeable difference in swr or effective radiation. Note that no traps are used on this band.

Top of vertical set for operation on 40 and 80 CW.

etching all of the resonating sections with a diamond-tipped pencil or an ice pick. You don't want to be measuring sections and looking them up in the instructions in the middle of the contest, either.

The base mast section mounts to the base using two U-bolts. This is nice when you want to totally disassemble the antenna. I used this vertical at field day last June, and it took just 5 minutes to loosen the U-bolts and pack them with the masts.

I feed the vertical with RG-8/U coax.

Performance

The general idea is that verticals "radiate equally poorly in all directions." I don't find this to be true. Unlike my dipoles, I can now work almost anything I hear, including most of the pileups on 20 SSB.

Another result of using a vertical is the lack of QRM from the local boys on 10 meters due to cross-polarization. This amounts to a difference of 7 or 8 S-units as measured at K4HYE, some 10 miles east of me. Believe me, after living in front of some of the guys running a kilowatt and a beam pointed at me, it's nice to be able to hear something else on the band!

Operating 80 meters can be tricky at times. Unless you used a lot of radials or a bigger lath, don't expect to compete with those with full-size antennas.

Plenty of DX is worked here. Europe, Africa, and South America are very strong on this antenna. Unlike my dipoles, DX stations are usually as strong or stronger than stateside stations.

The combination of easy breakdown and efficiency has made this system work for me. The system might just work out for you. Try it, and let me know the results.■

LETTERS

from page 90

INT (A*RND(1)) must be changed to 210 LET Y = INT(A*RND(0)). The same change must also be applied to lines 220 and 230. If the program is run on a TRS-80 without these changes, the Klingon base will be located at the coordinates of your search area. This is not a criticism of Mark's program, since he addresses this potential problem in this article.

In regard to playing games on computers, I look people right in the eye when they ask why I bought one, and admit that game playing was a major consideration! Keep up the good work, and keep *73* the best ham magazine on the market!

Larry Russo K3TFU
Columbia MD

CHIME POWER

I wish to add a small comment to your article on page 11 of the April issue of *73 Magazine*, concerning the Chroma-Chime.

I have had one of these "Chimes" for several months and like it very much. As you say, it is out of the ordinary. There is only one thing that you did not know and that takes time to find out: The batteries used to power the unit only hold up for a couple of weeks—not months, as stated in the literature.

The operating instructions say not to operate from a power supply. After using up several sets of batteries, I replaced them with a power pack, after putting a regulator on the output of the power supply.

Edward C. Carnes
Deming NM