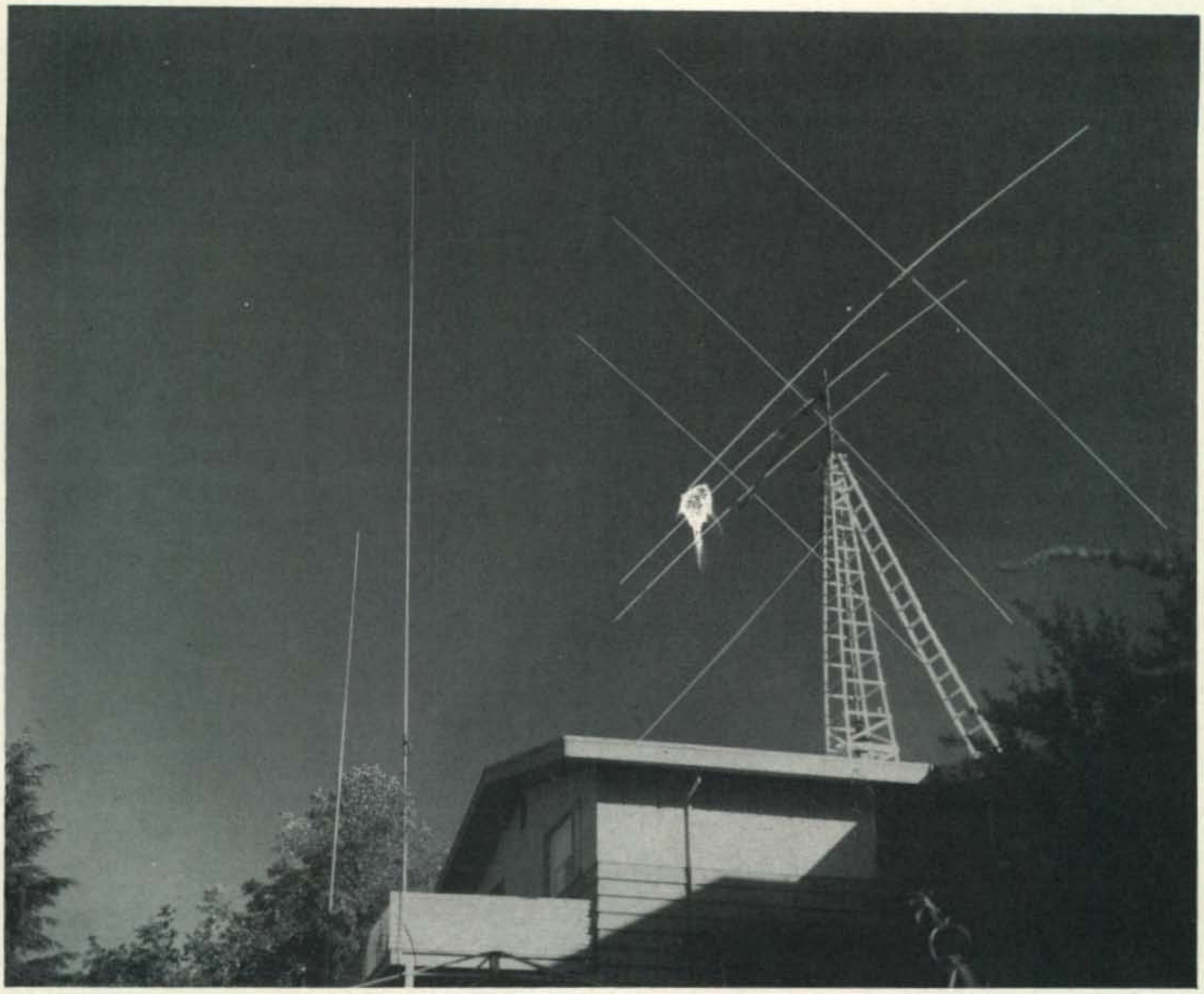

Half-wave antennas for 15 and 20 meters are mounted at opposite ends of a sun deck with minimum interference to each other or to the beam.

The K7GCO DXer 20 Meter Vertical

BY KEN "JUDGE" GLANZER,* K7GCO

Using simple construction techniques the author erects a high-performance 1/2 wavelength vertical antenna for 20 meters. Radials are not required for its operation, although they may be used in lieu of the decoupling stub described. The strong, lightweight design is suited for home station or portable applications.

THE antenna described here is one of the most practical and effective single band verticals that can be built for the h.f. bands. It is a half wavelength long, voltage fed with an L network and uses a couple of radials or a decoupling stub (or both) to "cool" the coax. The design requires no guy wires although a guyed configuration can be used. It gives the lowest possible angle of radiation without an extensive radial system and compares to a 5/8 wave vertical for gain. Mount it on a sun deck post, drop it in vent pipe on the roof, mount it on a chimney or stick it in the

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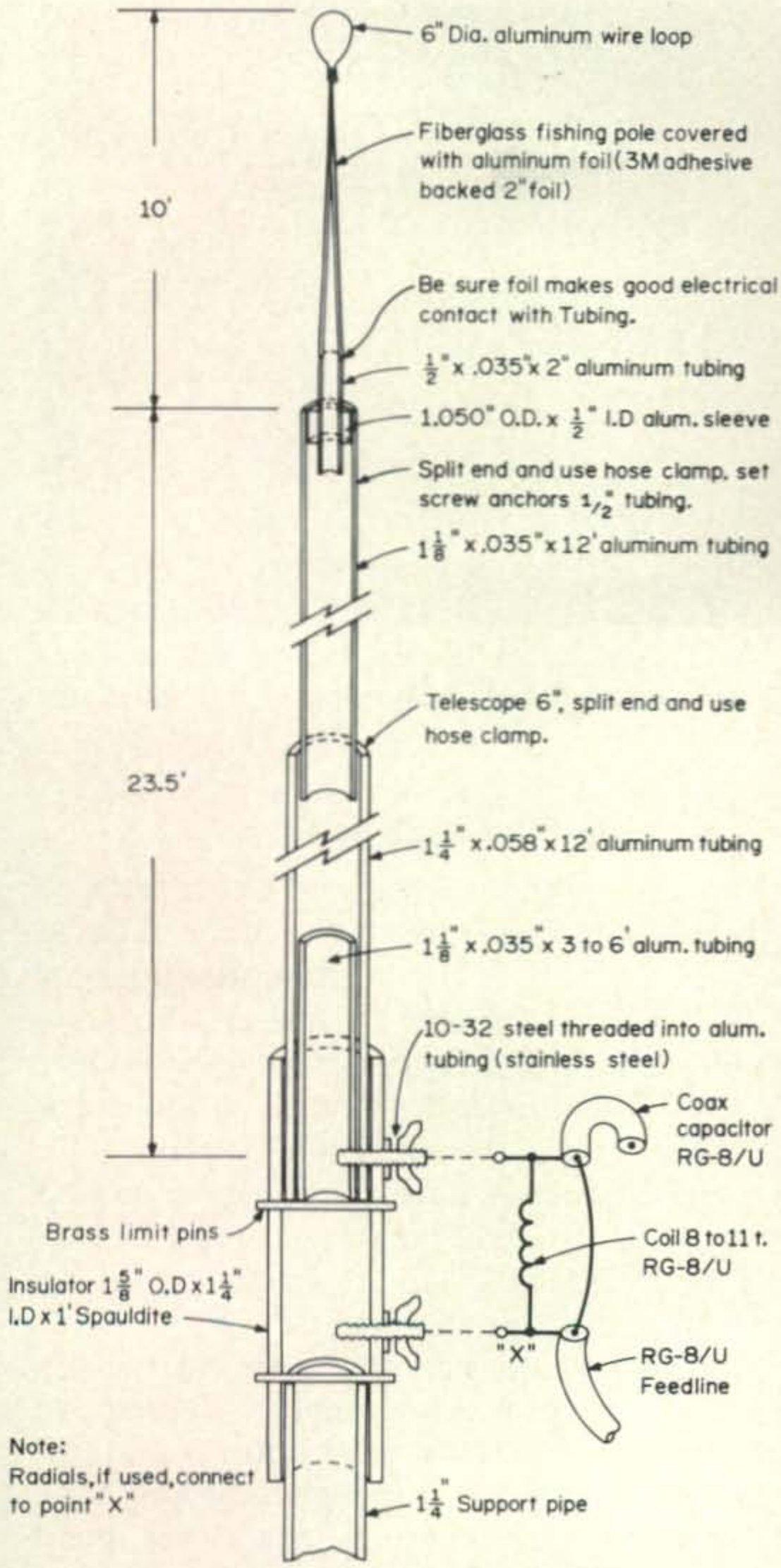
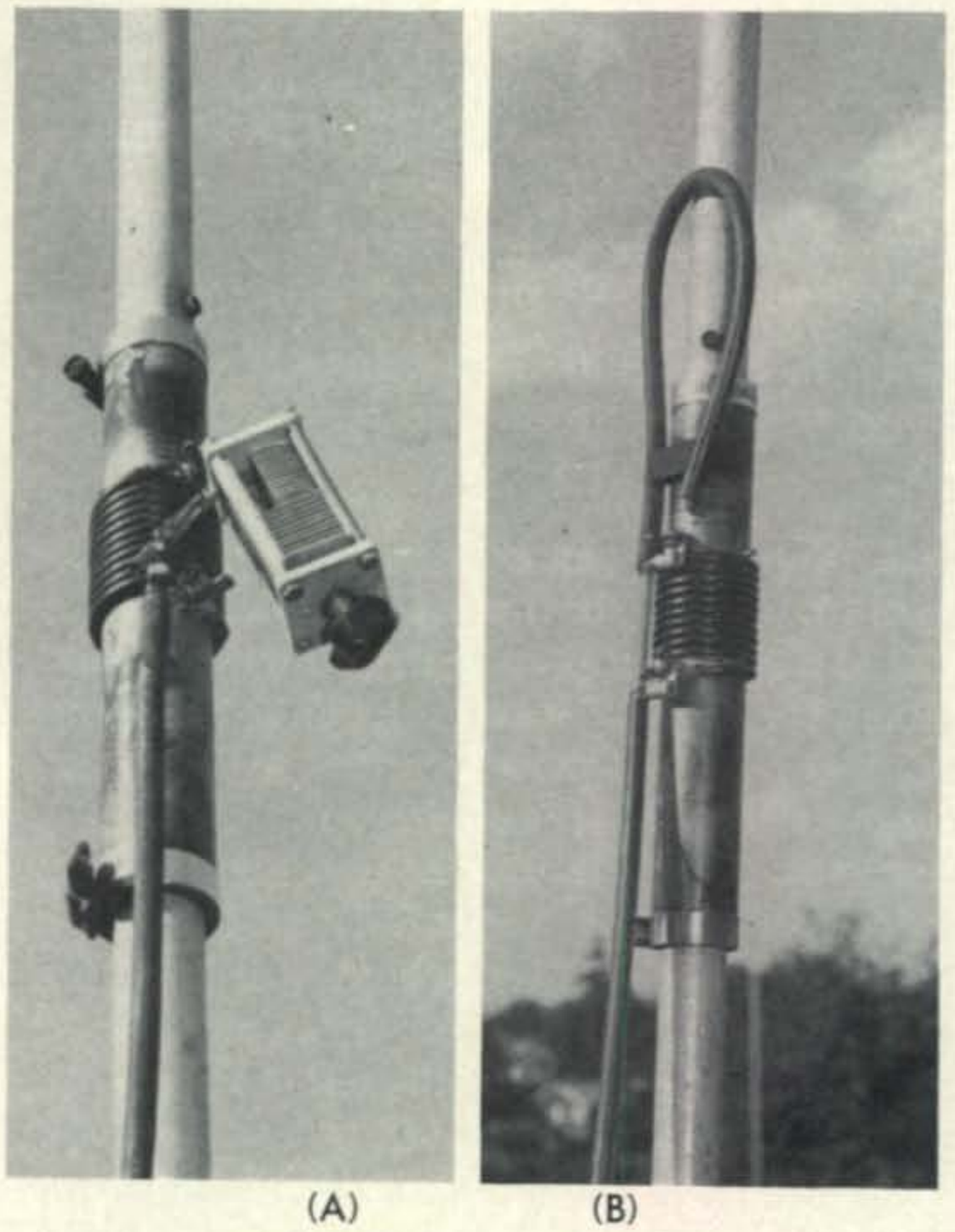
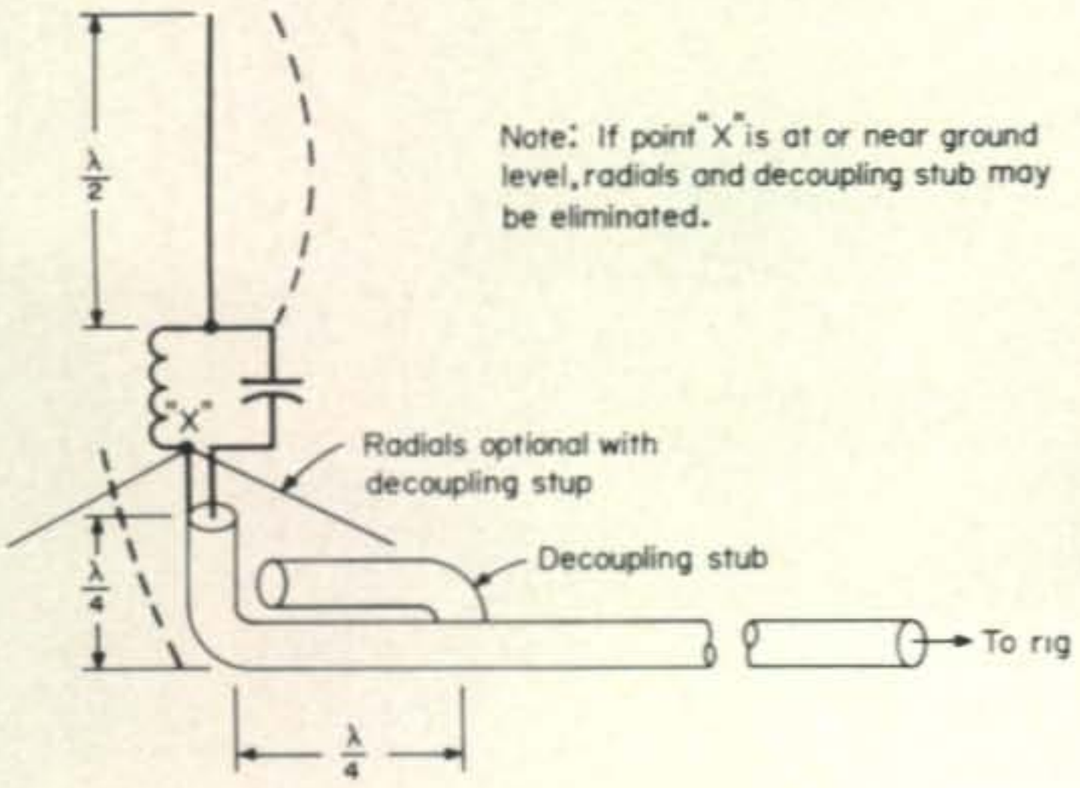


Fig. 1—Construction details of the self-supporting 1/2 wave 20 meter vertical antenna.



(A) (B)

Fig. 3—(A) Initial tuneup of the L network is made with a 50 mmf variable capacitor while adjusting the inductance of the coil. (B) Once a 1:1 s.w.r. is achieved, replace the variable capacitor with a length of coaxial cable having the same capacity. Start with a length longer than needed and trim 1/2" at a time. As the s.w.r. starts to dip, take 1/4" cuts, and finally 1/8" cuts until the 1:1 s.w.r. is again achieved. After the correct length has been determined, the coax capacitor may be fabricated again from a continuous length of feedline. Spray the open coax and seal with RTV silicone rubber and tape. By using lugs and wing nuts, feedline can be quickly removed when necessary.



Note: If point "X" is at or near ground level, radials and decoupling stub may be eliminated.

Fig. 2—Schematic of 1/2 wave vertical antenna. Be sure to make feedline some half-wave multiple.

ground. One man can handle it easily and it is ideal for field day, camping or cabin. This basic design is usable on 15, 11 or 10 meters or on 40 meters as a quarter wave with radials. Also the vertical can be mounted close to horizontal beams with minimum pattern interference.

Construction

Figure 1 illustrates the basic construction which is light, simple and self-supporting. Two of these elements back to back make excellent 40 meter beam elements.

The special insulator I used in the base is called Micarta (Westinghouse Trade name) or Spauldite (Spaulding trade name) Grade C. Do not get the paper base type which is

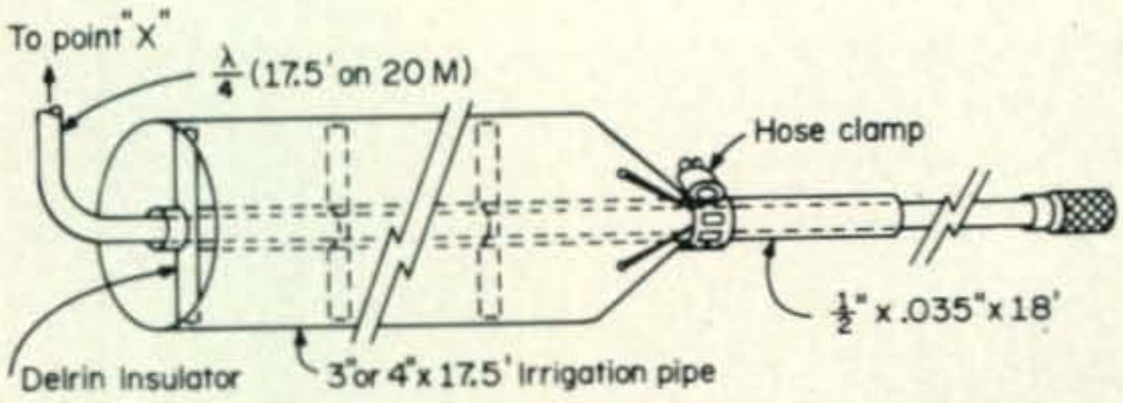


Fig. 4—The ultimate decoupling stub for "cooling" coax shield. The sleeve slips over the coax feedline.

black. Supplyers can be found in the yellow pages under industrial plastics.

The L network matches the high end impedance of the half wave antenna to 50 ohms and also forms a phase inverter for the bottom quarter wave (producing a half wave and quarter wave in-phase). See figure 2. Radials can be used but if they are, it is suggested that a 45° slope be used where possible. The exact length of the radiator is not critical as the L network will match the antenna regardless. Bandwidth is excellent.

The L network inductor is made from either RG-58 or RG-8 coax using the shield and outside insulation. Other insulated wire may be used, however. The capacitor is also made from coax. Tune up is accomplished by using a 50 mmf variable capacitor temporarily installed as illustrated in fig. 3(A). Tapping down the coil in 1/2 turn steps, rotate the variable capacitor through its range while watching the s.w.r. meter. At the correct tap point the s.w.r. will dip to 1 to 1, or zero reflected power, at a certain setting of capacitor. At this point finalize this value of inductor and substitute an RG-8 coax capacitor for the variable. Remove and estimate or measure the capacity of the variable and substitute a coax length longer than the equivalent capacity. Install the coax capacitor, apply power to the antenna and check the s.w.r. Start trimming the coax end 1/2" at a time until the reflected power starts to dip. Then cut 1/4", then 1/8" snips until zero reflected power is obtained. If you pass the 1:1 s.w.r. point, start over with another length of coax. Finally, peel the shield back 1/8" to prevent arc-over from center conductor to shield. Now that the exact length of coax capacitor is known, you can substitute a continuous length of coax from the feedpoint and use solder lugs, etc., as illustrated in fig. 3(B). Spray the open coax heavily, and seal with RTV silicone rubber and tape. Make it a couple of inches longer than needed and repeat the tuning process.

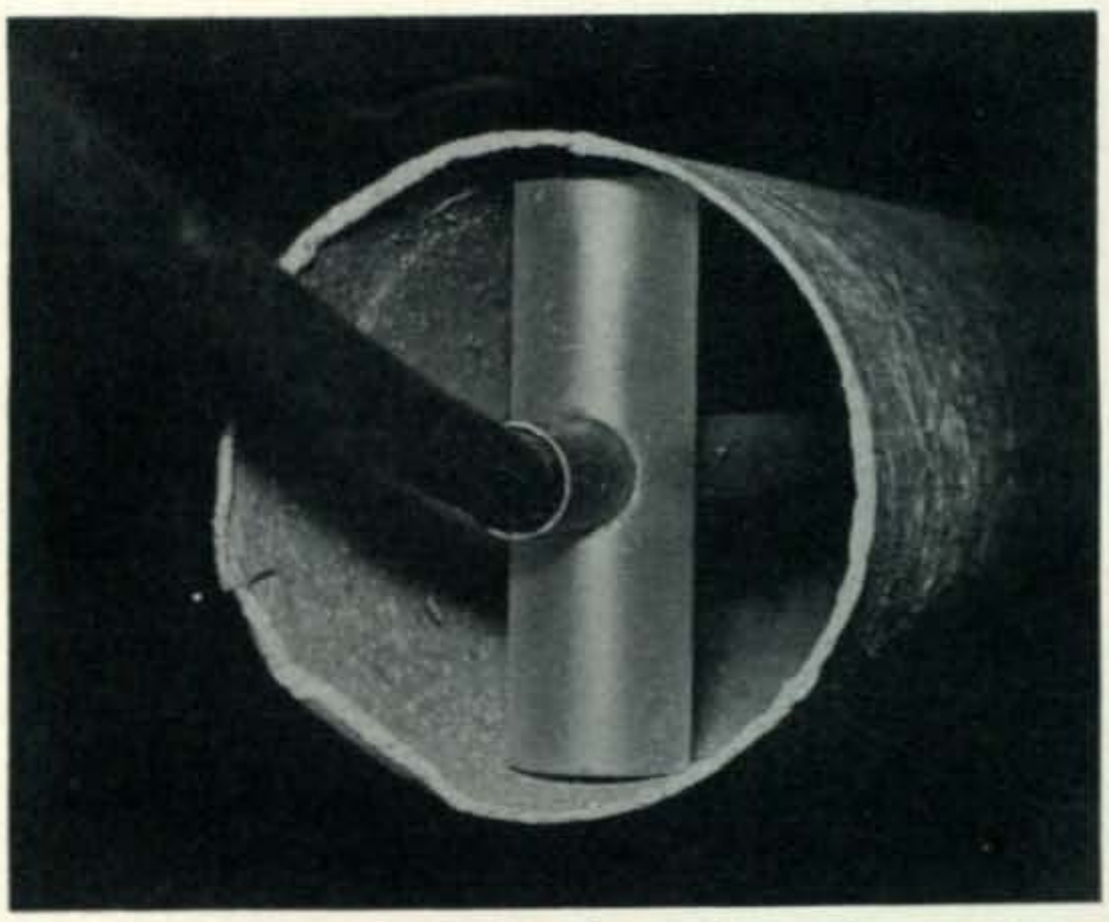


Fig. 5—Open end of the decoupling sleeve showing Delrin insulator supporting 1/2" diameter tubing.

The Decoupling Stub

The decoupling stub is used either with or without the radials. One or the other must be used. Its purpose is to end the radiating part of the antenna on the outside of the coax shield at the high impedance or open end of the stub. This prevents stray r.f. in the shack and helps retain the radiation pattern.

A most effective decoupling sleeve can be made which is ideal for this purpose from a 16.5 ft. length of 3" or 4" irrigation tubing as illustrated in figs. 4, 5 and 6.

A similar design antenna made out of wire and coax, hung in a tree, makes an effective antenna also. This half wave DXer is an ideal secondary antenna or supplementary antenna for a horizontal beam to check for band openings or by itself, as at times it will outperform a beam and any of the multiband quarter wave verticals. ■

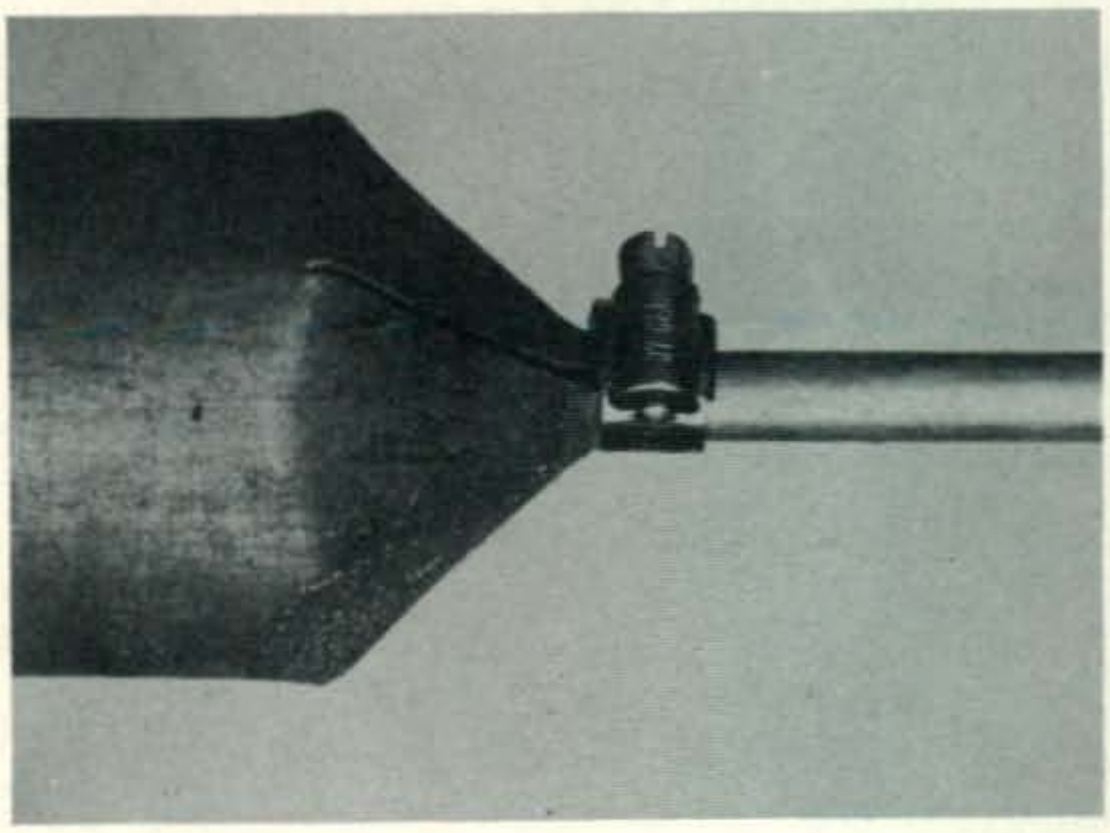


Fig. 6—Closed end of the decoupling sleeve. 60° segments are cut from the end of the irrigation tubing and bent in. Hose clamp grounds tips to center tubing.