Easy to Build 10m Beam

The Sun-spots are coming. The Sun-spots are coming.

Adam J. Felde N6CJU
1627 E. Ave. Q-12
Palmdale CA 93550

This antenna uses four half-wave dipoles whose elements are all cut to the same length. The dipoles are mounted on the boom in piggyback fashion, one above the other. The four dipoles are numbered for identification:

Dipole #1 is at the front of the boom.

Dipole #2 is at the rear.

Dipole #3 is above dipole #1.

Dipole #4 is above dipole #2.

The dipole elements are in a horizontal plane with the earth. This element arrangement allows the use of a quarter-wavelength boom, and makes it possible to use a quarter-wavelength of air space time—the distance between the two sets of dipoles—on an alternate time share basis.

The design frequency is 28.700 MHz. Dipoles #1 and #2 are a set, and dipoles #3 and #4 are a set. Half-inch tubing is used for the dipole elements, which are insulated from each other and the boom. The two sets of dipoles are separated from each other (electrically) by a quarter-wavelength of RG-8U coax delay line. This causes the dipole sets to follow each other by a 90° delay. For example, dipoles #1 and #3 fire in sequence, and dipoles #2 and #4 immediately follow, also in sequence, making one complete cycle of all four dipoles. The close spacing between the elements has no ill effect on performance. Assuming the initiating signal from the transmitter to be a positive-going waveform, dipole #1 will be the first to radiate, followed by #3, whose signal phase has gone negative, along with #2, both of which are 180° for that instant. And, since dipole #3 is at the same place on the boom as dipole #1, dipole #2 will lag dipole #3 by 90° (the distance between dipoles #3 and #2). This will cause a cardioid (heart-shaped) waveform to be radiated from dipoles #1 and #2. In other words, dipoles #1 and #4 radiate a positive-going wave, and dipoles #3 and #2 radiate a negative-going wave. See Fig. 1.

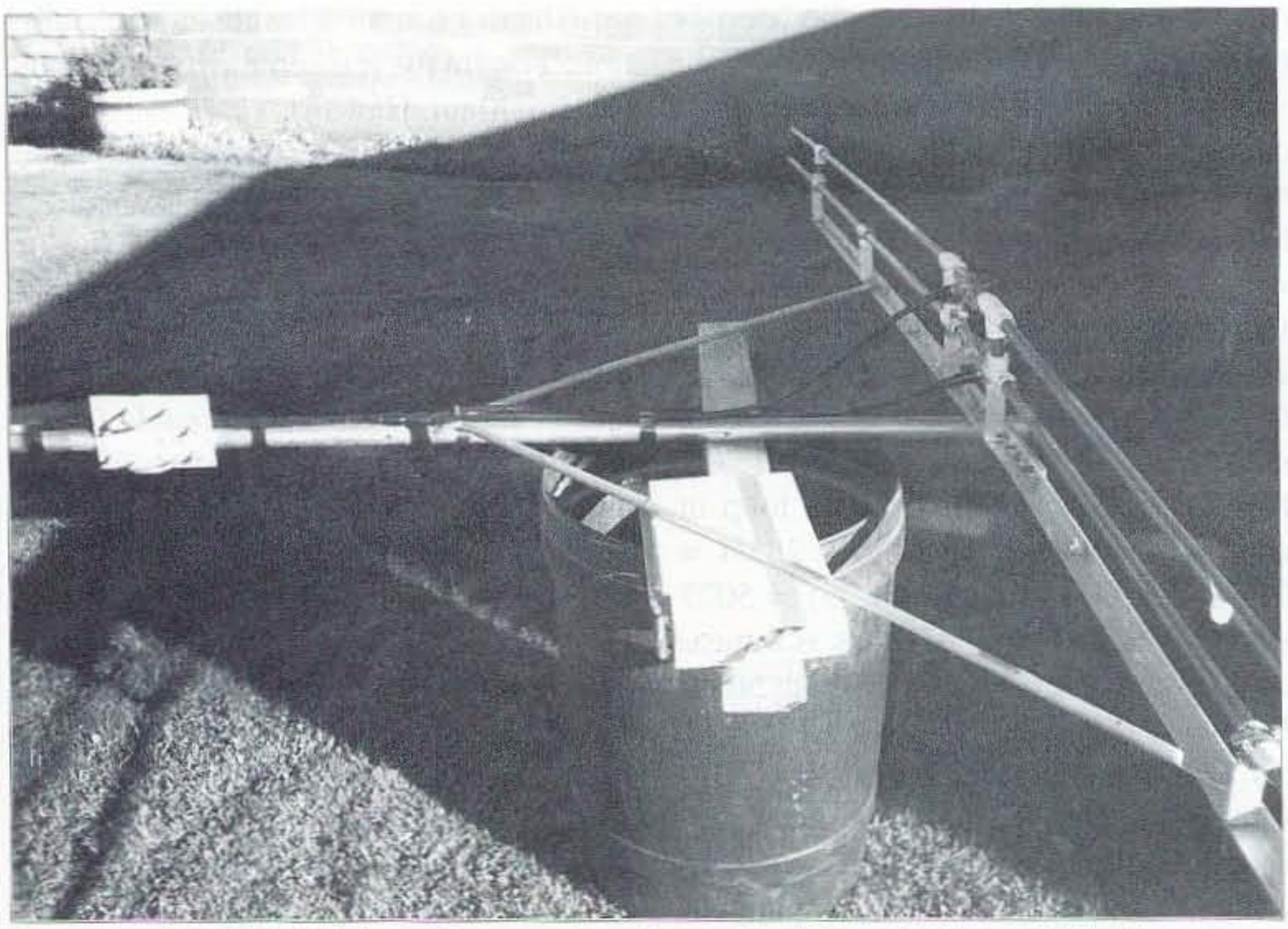

***Photo B.** To drill the bolt holes for mounting, flatten 1" of the ends of your 1/2" tubing, creating a support angle stabilizing wishbone.*

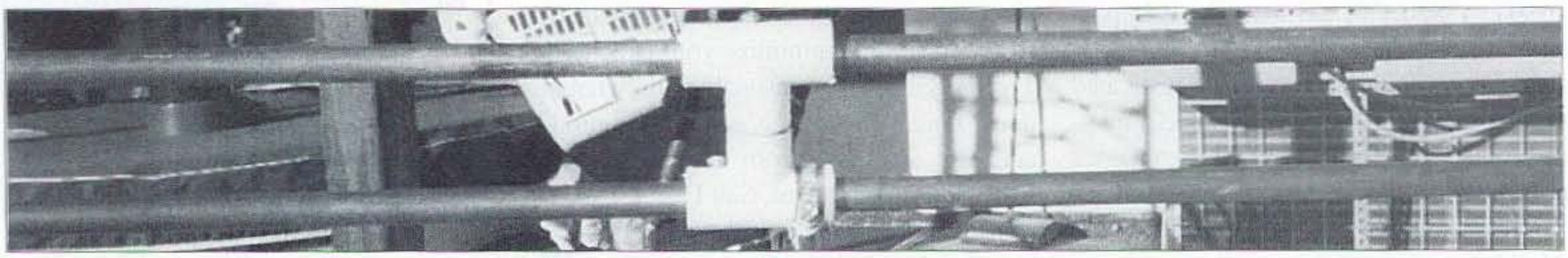

***Photo A.** The elements are supported by the PVC plastic three-way "T" of lawn sprinkler pipe to make an "H."*

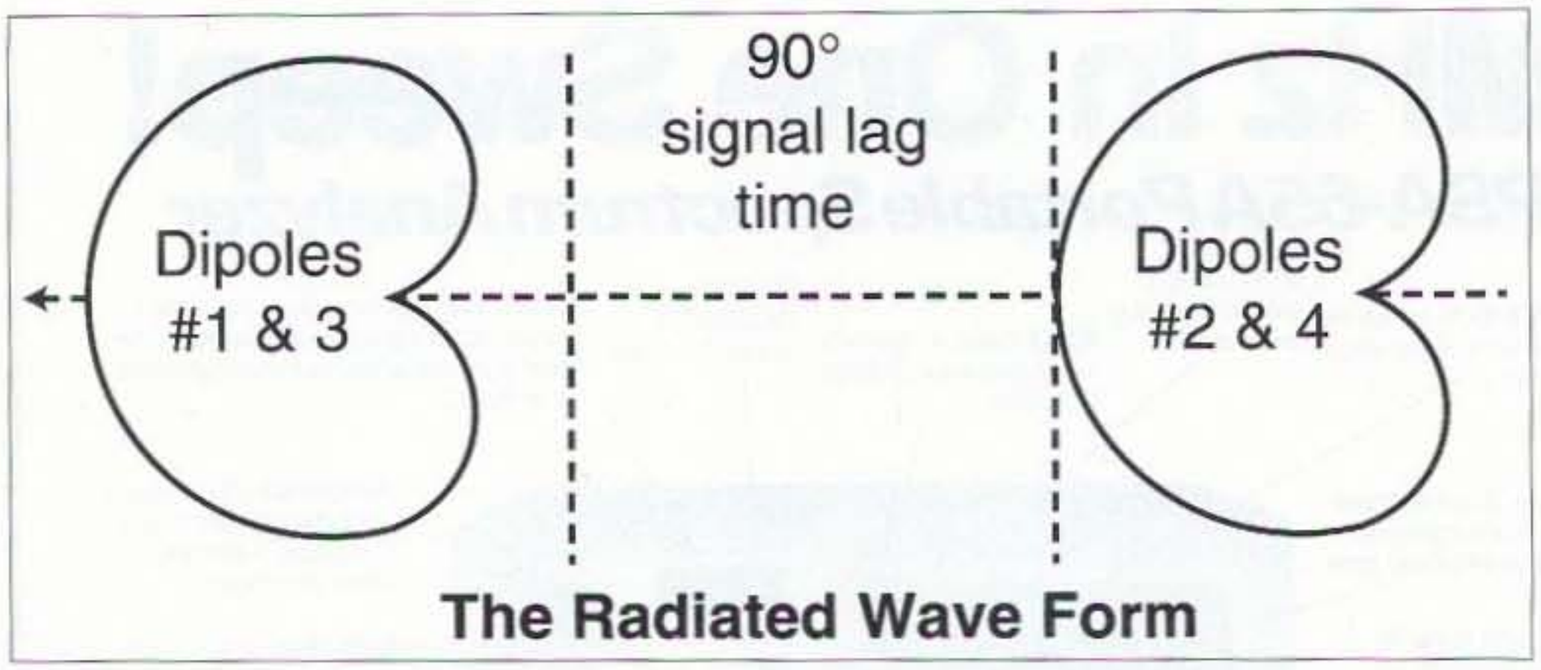

Fig. 1. The cardioid waveform.

The SO-239

Drill, in the exact center, a 5/8" hole in a 3/16" thick 3" x 2" piece of Plexiglas™. Drill another hole, capable of receiving a #6 bolt and nut, 1/2" from each end, in the center, to fasten the assembly to the dipole elements. Place an SO-239 chassis adapter/connector plate into the 5/8" hole, and drill four #6 screw holes through the existing holes in the connector body to bolt the SO-239 into the Plexiglas piece. Solder "pigtails" to the connector's center conductor, and to the conductor's outer body, for connection to the dipole elements. Make four of these assemblies, one for each of the dipoles.

Mounting the Dipoles

The dipole elements are mounted on 10-foot aluminum 2" x 2" x 3/16" angles (the elements are insulated from the angles). The boom will be nine feet long. The aluminum dipole support angles will have a "V" stabilizer, reaching from some point on the boom, with the open end of the "V" legs bolted to the aluminum angle spread open to reach at least a two-foot spread on each side of the boom, to make the antenna wiggle-proof (and bird-proof).

The Driven Element

Use a schedule 40 white plastic lawn sprinkler fitting, and a three-way "T" for 1/2" plastic schedule 125. You cut a 2" long piece of the schedule 125 pipe to cement into the leg of the "T," then take another "T" and cement the two units together, fashioning an "H." On the boom the "H" will lie sideways. See Fig. 2.

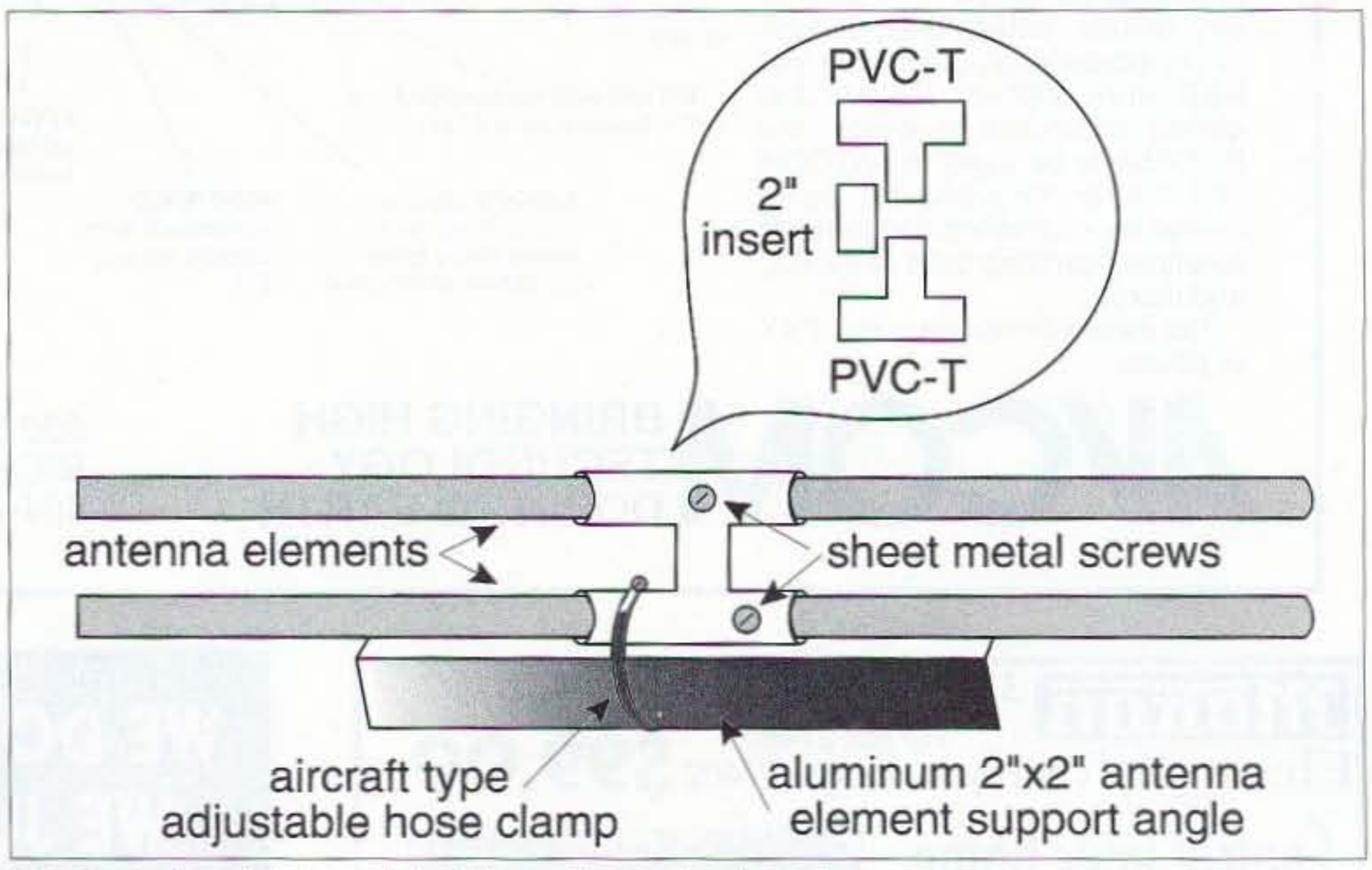

Fig. 2. A pictorial view of the driven element insulator/supports.

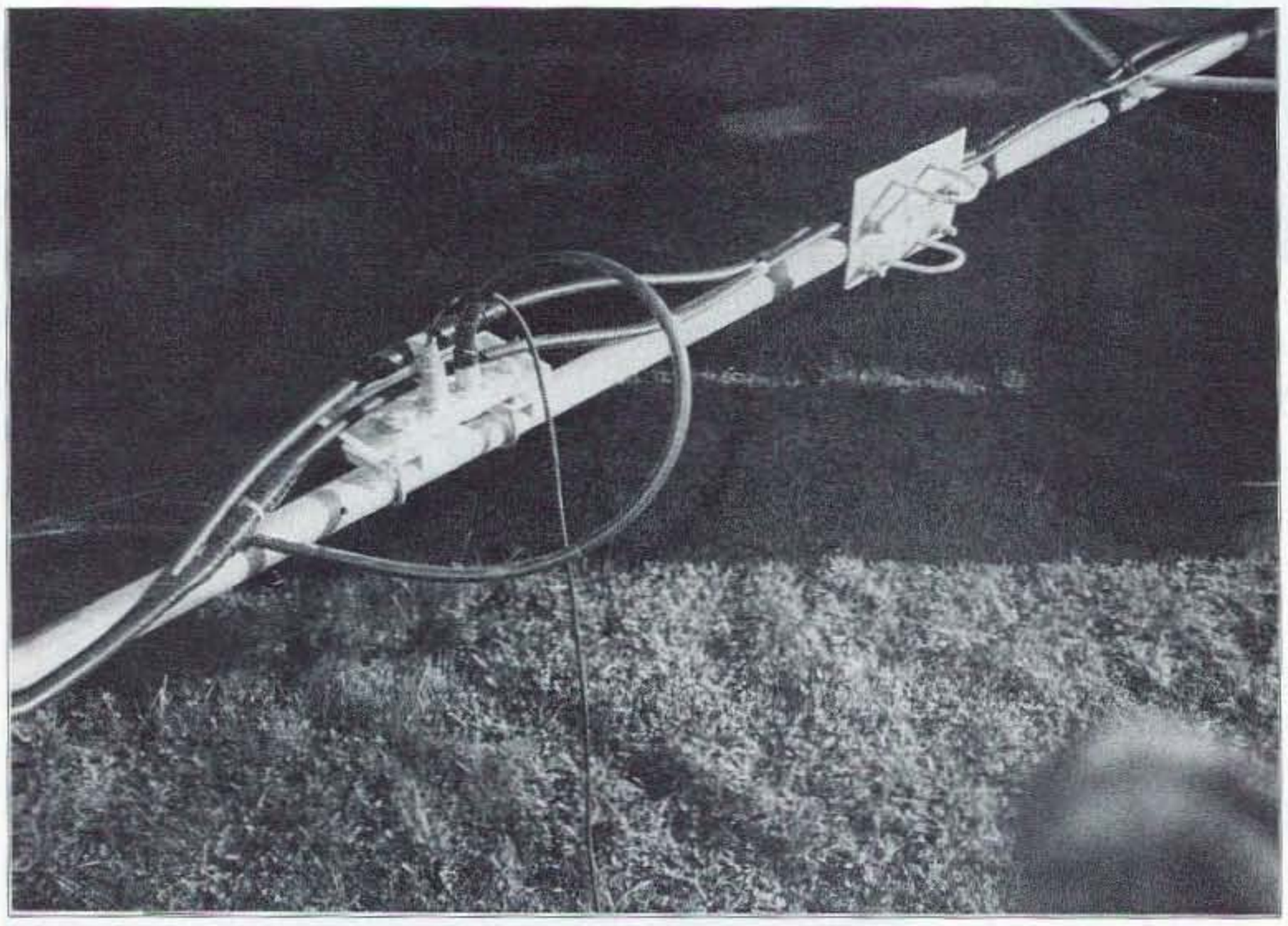

***Photo C.** Note the mounting for the delay line and feedline connectors; it's made of 3/16" Plexiglas™ wide enough to receive exhaust pipe-type "U" clamps bolting the unit to the boom.*

Use an aluminum 2" x 2" x 6' (10-foot is better if you can find it) angle. The insulator/supports you are going to make are clamped to the aluminum angle using #16 adjustable hose clamps. Position the element supports on the aluminum angle so the legs of the "H" are horizontal with the aluminum angle. Clamp them to the aluminum angles shown in Photo D. Slide the dipole elements into the supports and place them so the ends of both halves of the dipole are equidistant from the boom. Drive a sheet metal screw through the plastic support and into the dipole element, being careful not to come in contact with a clamp

and accidentally ground an element. Do this in two places on each dipole element.

The Coax Hookup Assembly

For dipoles #3 and #4, connect one end of a 10' 11" coax into the SO-239 chassis mount on dipole number 4, and connect the other end into the coax "T" (M-358). Connect a 5' 5-1/2" length of coax into the opposite end of the "T," and terminate the coax into the SO-239 chassis mount on dipole #3. Put a PL-258 coupler into the center terminal of the coax "T," and connect another 5' 5-1/2" length of coax to the end of the PL-258 connector. See Fig. 3.

For dipoles #1 and #2, connect one end of the last 10' 11" of coax into the SO-239 chassis mount on dipole #2, and connect the other end into the coax "T" (M-358). Then place a double PL-259 into the coax "T" and connect another coax "T" to it. Then, using a PL-258 connector, connect the center terminal of the second "T" with the

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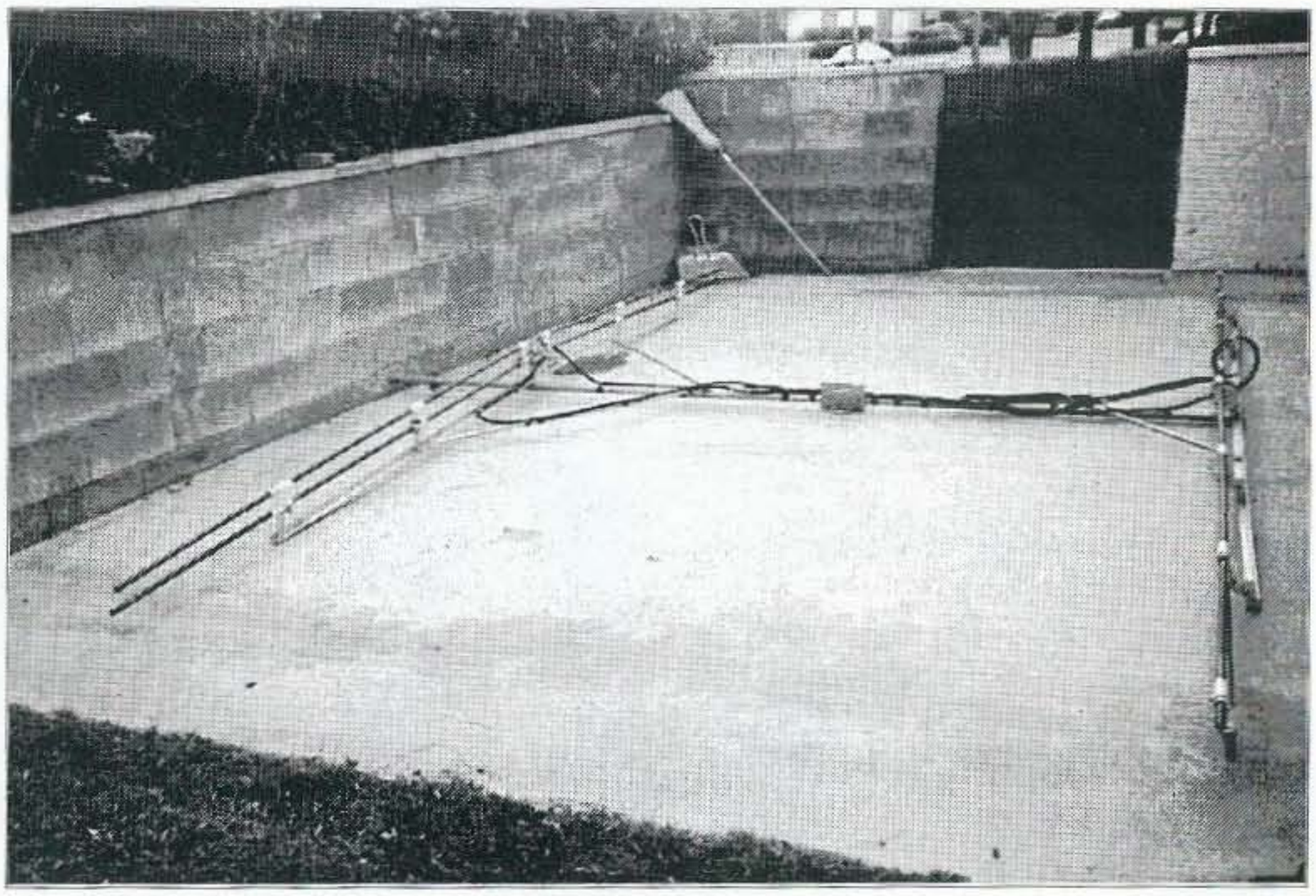

***Photo D.** The front of the beam is to the left.*

Easy to Build 10m

Continued from page 23

coax from dipole assemblies #3 and #4. Connect the last 5' 5-1/2" coax into the coax "T" and terminate the coax into the SO-239 chassis mount on dipole #1. Complete the assembly by connecting transmission feedline into the center terminal of the coax "T" using a PL-258 coupler. 73

Parts List

- 24 PVC Schedule 40 1/2" "T" plastic lawn sprinkler fittings
- 24 PVC Schedule 40 1/2" 1-inch long plastic pipe sections
- 12 3" adjustable stainless steel hose clamps
- 4 1 x 1 6' aluminum angle (for the element support)
- 4 1/2" x 10' aluminum tubing for the elements
- 4 3"X2" 3/16" thick Plexiglas™
- 2 "U" bolt type clamps
- 4 SO-239 chassis mounts for RG-8U coax
- 3 M-358 "T" coax adapters
- 1 M-359 right angle adapter
- 1 PL-258 coupler
- 16 Phillips 3/4 inch long sheet metal screws
- 1 Small can of PVC cement
- 3 Lengths of RG-8U, each 1/4 wave long, PL-259 connector at each end
- 2 Lengths of RG-8U, each 1/2 wave long, PL-259 connector at each end
- 1 Suitable 10-foot boom

Never Say Die

Continued from page 25

published in past issues of *73* just because you don't keep my thousand-plus old editorials on file and cross indexed. Most of the stuff in my booklets originally appeared in my editorials at one time or another.

Can I get you to think things over and decide to make some major changes in your life? A diet change for you and your family will eliminate the problem of degenerative illnesses. It means eating different food and water, and adding the vitamins and minerals that have long been gone from our soil. It means daily exercise. Maybe a job change to something more fun. Some ham radio challenges...like perhaps getting on the ham satellites. How about finding a better school for your kids? Most public schools suck.

Are there some skills you'd like to build? Books you'd like to read? TV you can do without? In the long run will you be better off for having watched a rented old movie or in reading a book? Or is what you're doing today so much more important to you than your quality of life ten, twenty or 50 years from now?

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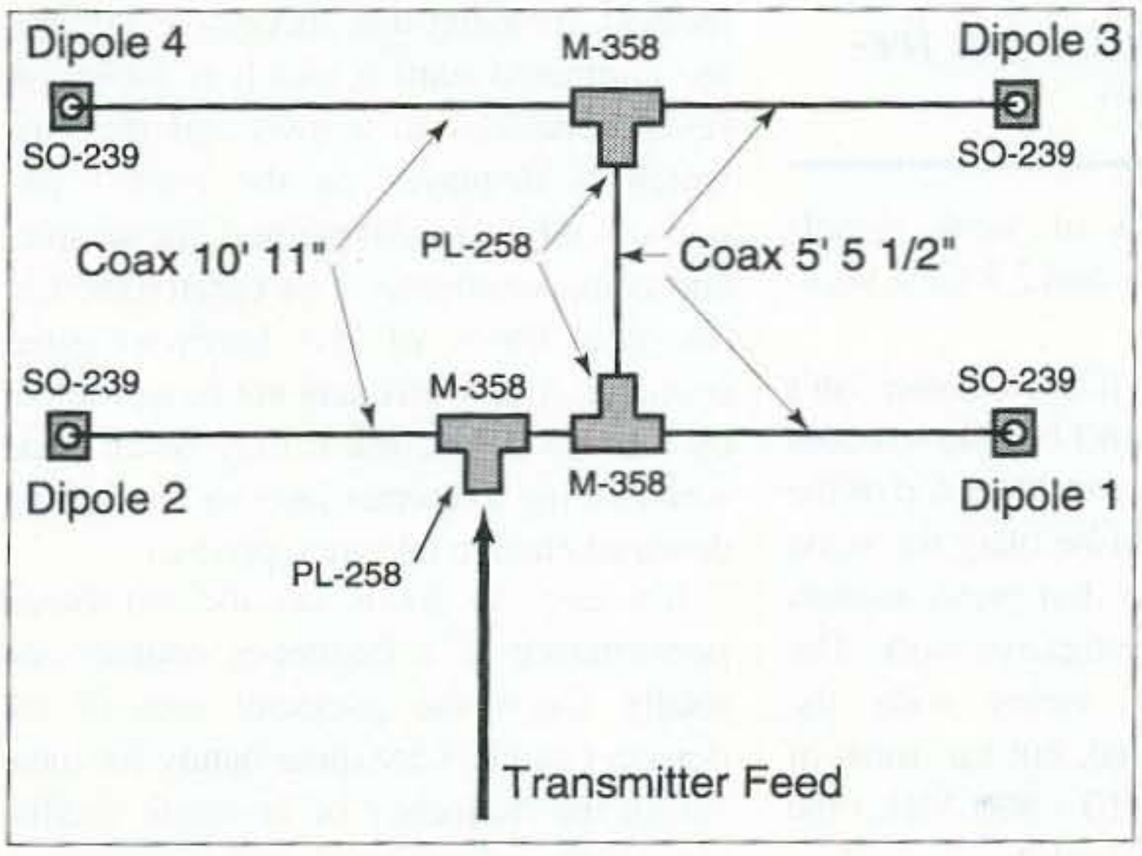

***Fig. 3.** The coax road map.*