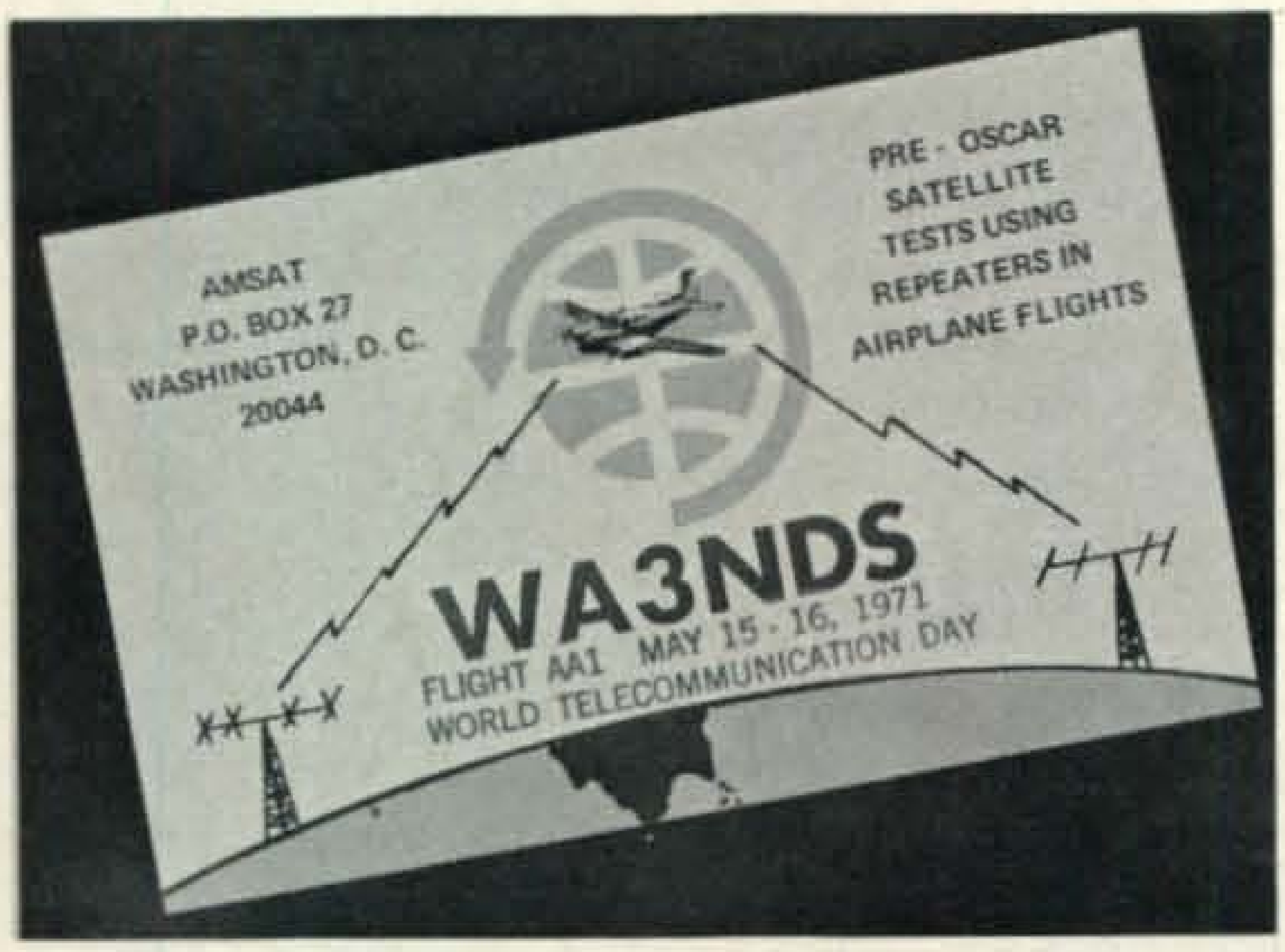

Commemorative QSL card send to each station participating in the AMSAT flyover.

over short distances, the majority of participants reported disappointing results with attempts to use a.m. or f.m.

Among the more active stations participating in the tests were K1HTV who worked 10 stations and heard 2 others, including his own signals through the repeater; WB8ELK who heard 18 stations; WA1IOX on Talcott Mountain who worked 7 stations and heard 5 others; and WA9UHV who worked 8 and heard 7 other stations through the repeater.

A very interesting report was turned in by WA8LOW of Cincinnati, Ohio. He reported hearing the 29.45 mc beacon during the leg of the trip from Baltimore to Boston and when the plane was over New York State heading west. He heard 12 stations including K2SS (Long Island, N. Y.), W3 ZPO (Md.), K1HTV (Conn.), and his best DX, W1QXX in eastern Massachusetts. This last path was approximately 725 miles and took place while the aircraft was over New England. It probably resulted from sporadic-E propagation on 10 meters, and no doubt, the 24 element 10-meter array (4 stacked 6-element beams) installed at WA8LOW especially for the flyover helped also.

Air-to-ground liaison for the AMSAT flyover was provided by a special net operating on 7225 kc with WA1IOX at the Talcott Mountain Science Center, Avon, Conn., as net control. W8FSO was in contact with the plane during a good portion of its trip west across Ontario, as well as its flight east across Ohio and West Virginia. Check-ins to the AMSAT net totalled well over 100, and simulated the type of report-in operation that will be required when the next amateur satellite is launched.

[*Continued on page 100*]

A Rotatable Dipole for 20, 40 and 80 Meters

BY RONALD LUMACHI,* WB2CQM

I'D bet a dollar to a doughnut that a great many hams operating on the lower frequencies (40-80m.) would never attempt to rotate their half-wave dipoles. I wouldn't either if my antenna were 60-120′ long. It seems a shame it isn't done since a dipole antenna does have a great deal of directivity. It could be used to great advantage by hams especially when pulling in those weak stations. Cheer up fellows—it can be done—cheaply and inexpensively. By electrically lengthening a shortened dipole with a coil, the radio amateur can pick and choose those areas he wishes to radiate his strongest signal. Incidentally, this feature works equally well when receiving. Sound good? Why not build a similar system and pack away that long hunk of wire for a more compact design.

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Antenna Theory

The antenna is made from two lengths of aluminum tubing in series with a length of Air Dux 2010 coil. By shortening an 80 meter antenna, for example, to 32′ it can then be easily rotated. All that remains is to re-stretch the antenna electrically by installing a suitable coil. An antenna of this design unfortunately exhibits a very high center impedance. This can be overcome easily by inductively coupling the antenna to the transmitter via a length of 50 ohm co-axial transmission line. The antenna also exhibits very high Q and consequently, narrow bandwidth.

Construction

Cut a length of 1¾" wooden pole (actually measures 1⅝") to 13". In each end, drill a 7/8" hole 3" deep. Use a brace and bit. One caution—have someone guide your boring so that the holes are parallel. Cut two lengths of 3/4" thick wood to 2¾ × 5". In each piece, drill a hole 1⅝" for the wooden pole to pass through snugly. Use a saber saw if an adjustable auger bit is not available. Cut the circle coil supports. Use the actual size template in fig. 2. Notch out the four detents using the rounded end of a file. When fitting the units to the coils, do not allow the wood to touch the coil windings. The wood should touch the coil only at its plastic supports. This is only a precaution since damp wood in contact with the coil may effect the frequency during rainy weather. Attach the two notched circles to their supports. Use a single wood screw at each end. Count off 45 turns and cut the coil at this point. Temporarily mount in position. Drill two 1/4" holes for the mast clamp.

It may be difficult to locate a "U" clamp sufficiently long to mount this unit to the mast. In that case, cut a length of 1/4-20 threaded rod 10" long. Bend it around the pole and install with nuts and lockwashers. The yoke clamp shown in the photo was salvaged from the scrap heap of the local muffler repair shop.

Cut lengths of 7/8" tubing to 16'3½". Shorter lengths of tubing may be butted to dimension by using hose clamps and two half shells. The shells are made from a 6" length of tubing slit lengthwise.

Drill a small hole 3½" from the end of the

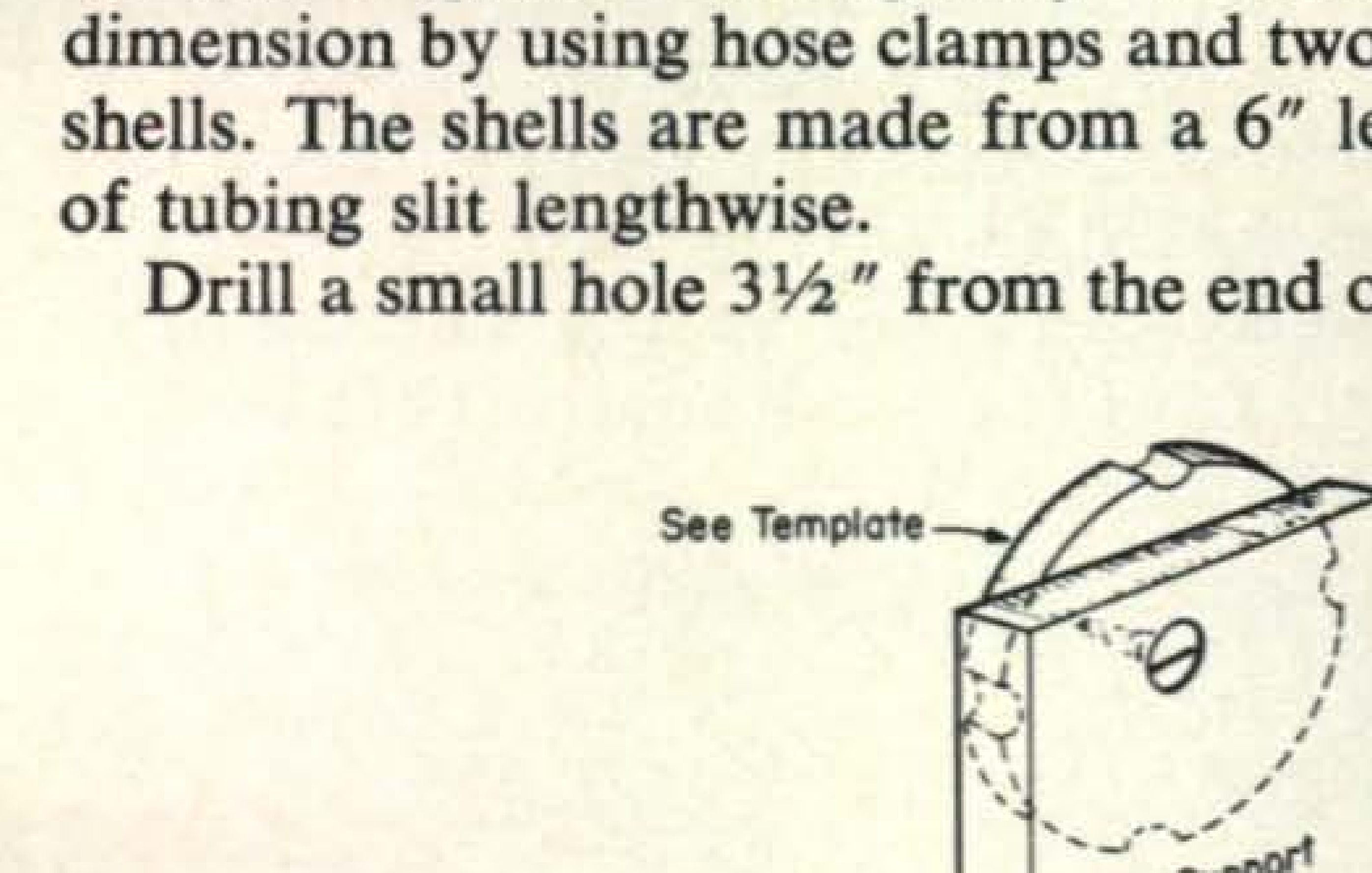
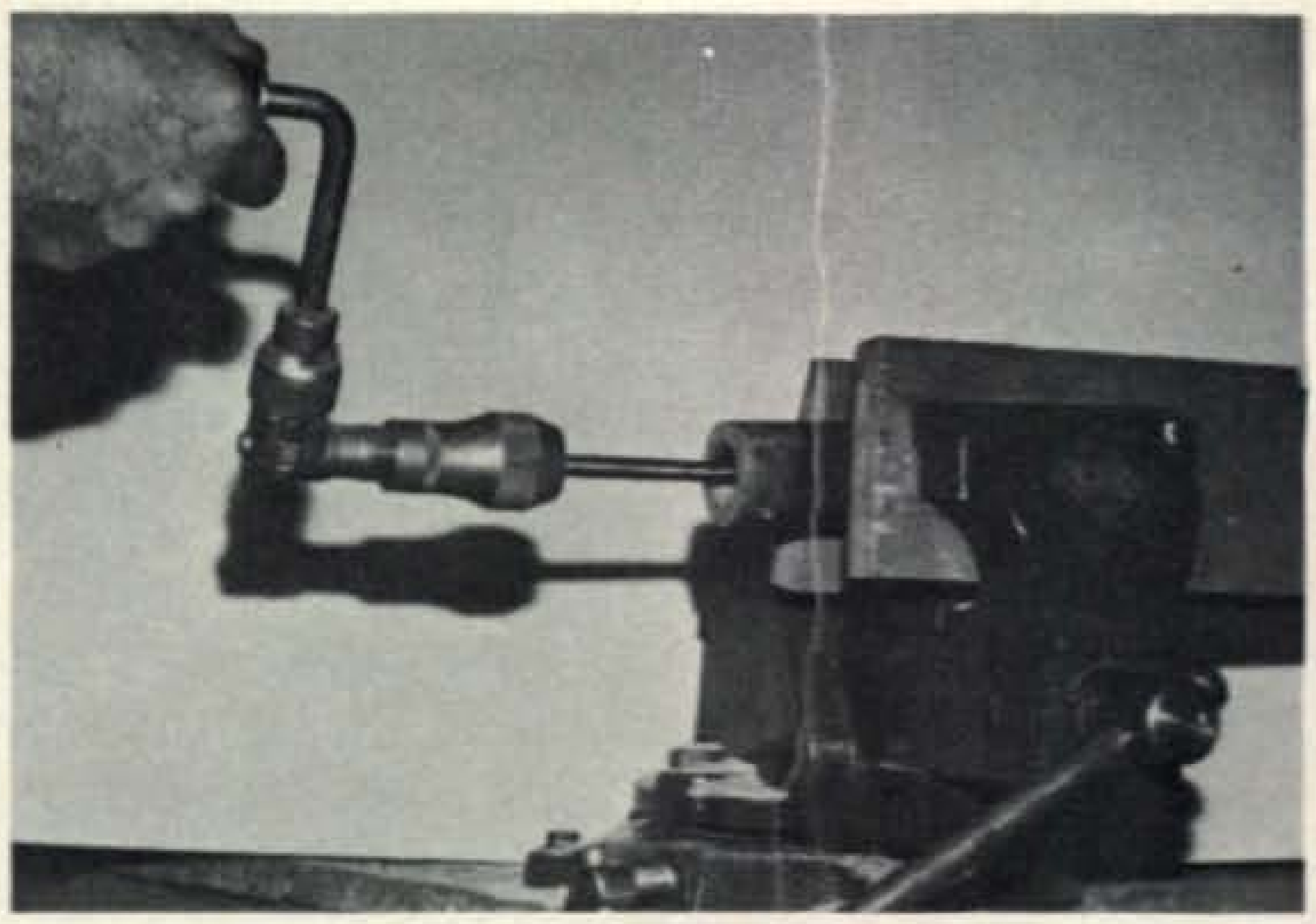
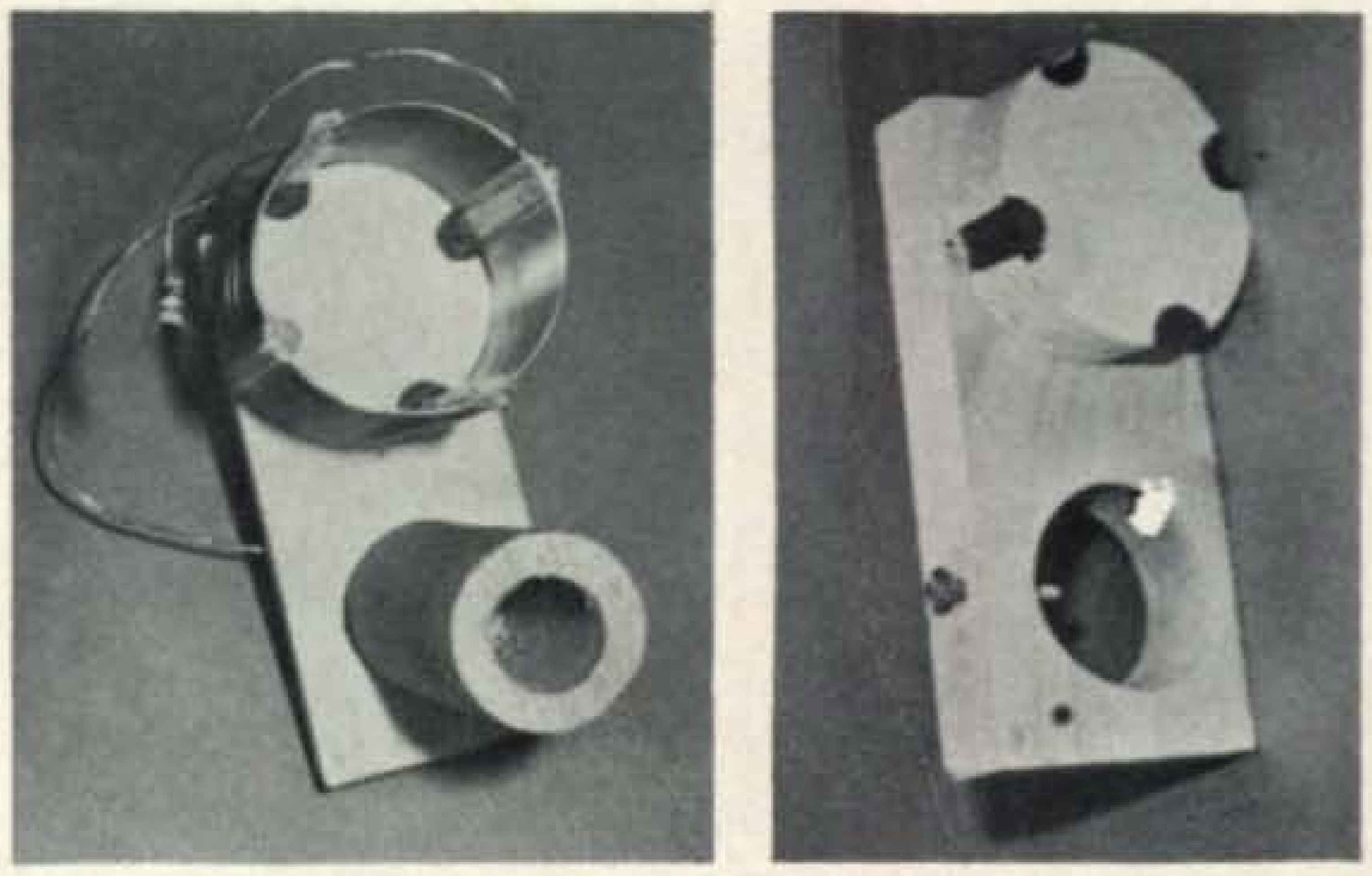


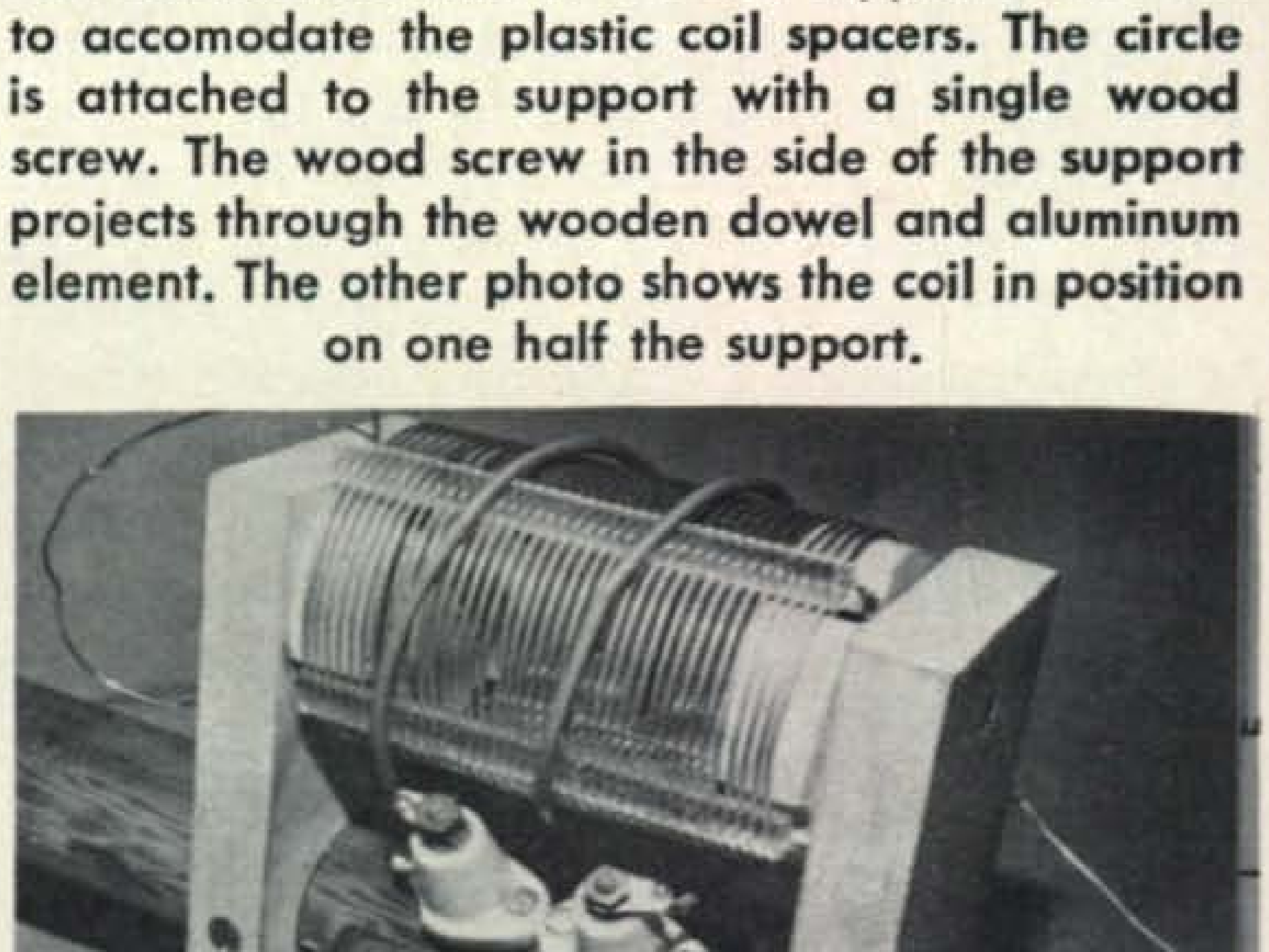
Fig. 1—Construction details of the loading coil support/center insulator for the rotatable dipole.



Brace and bit cuts opening for 7/8" o.d. tubing elements. Bore 3" deep parallel to the length of the wood so that the elements will be straight when installed.



The notched sections in the coil support circle are to accomodate the plastic coil spacers. The circle is attached to the support with a single wood screw. The wood screw in the side of the support projects through the wooden dowel and aluminum element. The other photo shows the coil in position on one half the support.



The completed coil assembly ready for the coax feedline to be attached. The coil end is connected to the self tapping screw out of view at the end of the dowel Coupling to the coax feedline is via a 2-turn link secured to porcelain insulators. The yoke on the mast clamp was salvaged from an old muffler clamp.

tubing. Start a self-tapping screw here. The ends of the coil will be attached at these points. The lengths of tubing should measure 16′ from this point. Drill two holes through each vertical support, dowel, and into the tubing. Use a self-tapping screw to keep the units in place. Install two porcelain stand-off insulators above the "U" clamp. Cut a length of #14 plastic insulated wire to length and wrap it 2 times around the coil. Connect the ends to the insulator's tie points. It is convenient to use solder lugs. Connect the center conductor and shield of RG-58/U cable (8/U for higher power) at these two tie points. Mount the mast. TV tubing is suitable. Use any light duty rotator for movement.

Final Assembly and Tuning

Several turns of coil have been deliberately left on the form. Since each antenna is different because of height above ground, final tuning must be made in the operating position. On 80 meters, height above ground is particularly critical. Begin tuning by connecting the ends of the coil to the element tie points. Short out turns of coil and strive for a low s.w.r. Once the resonant point on 80 meters has been found, the excess coil may be removed. Solder lugs to the coil ends and permanently attach to the tie points. Count off approximately 18 turns from one end and tune the 40m. band. A grid dip meter may be useful here. Otherwise, use the s.w.r. bridge. The inductive winding may be off center for the 40 meter operation, however, it does not seem to have any adverse effect. For 20 meter operation, remove the coil ends from the elements. Run a length of wire from the two transmission line termination points

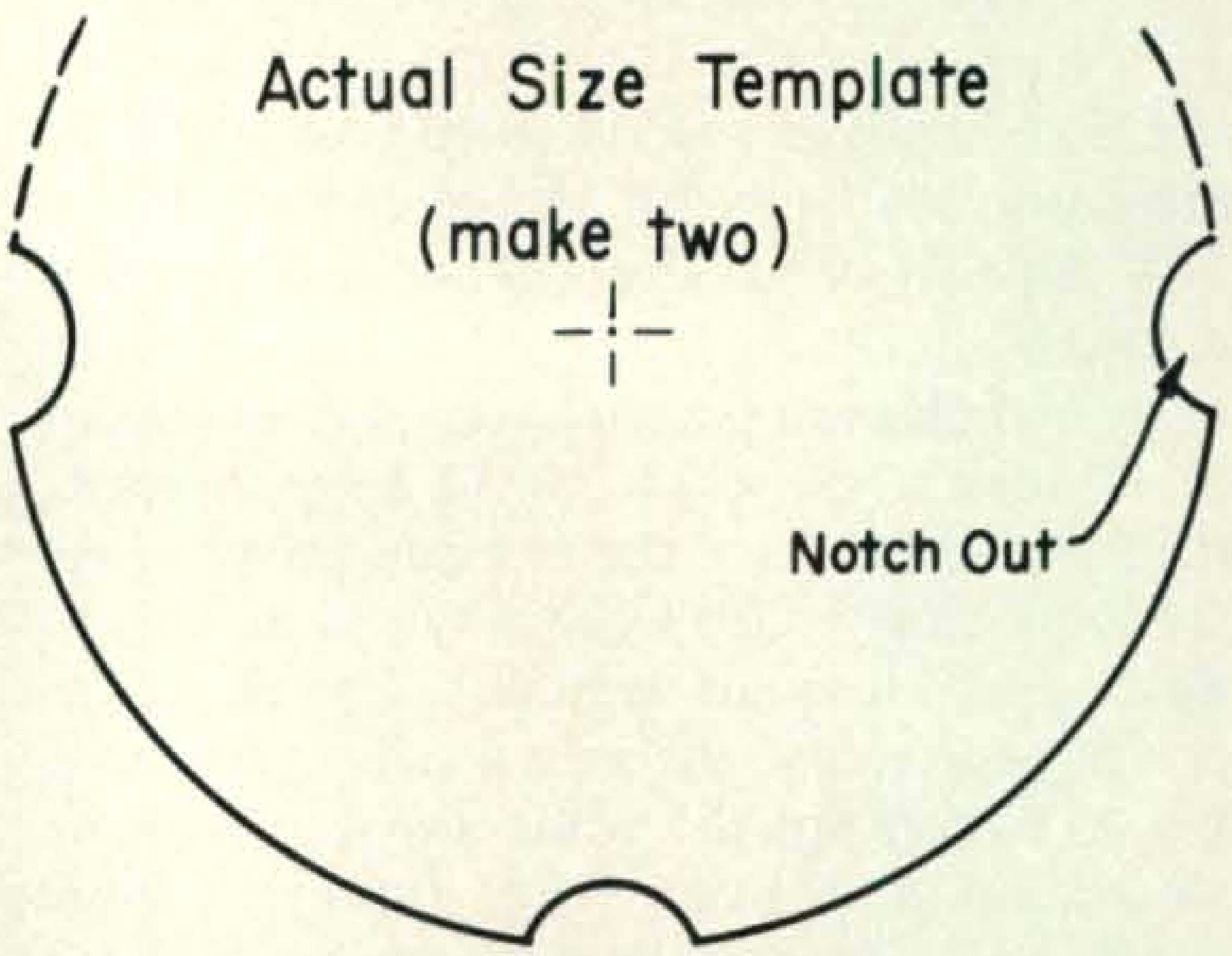


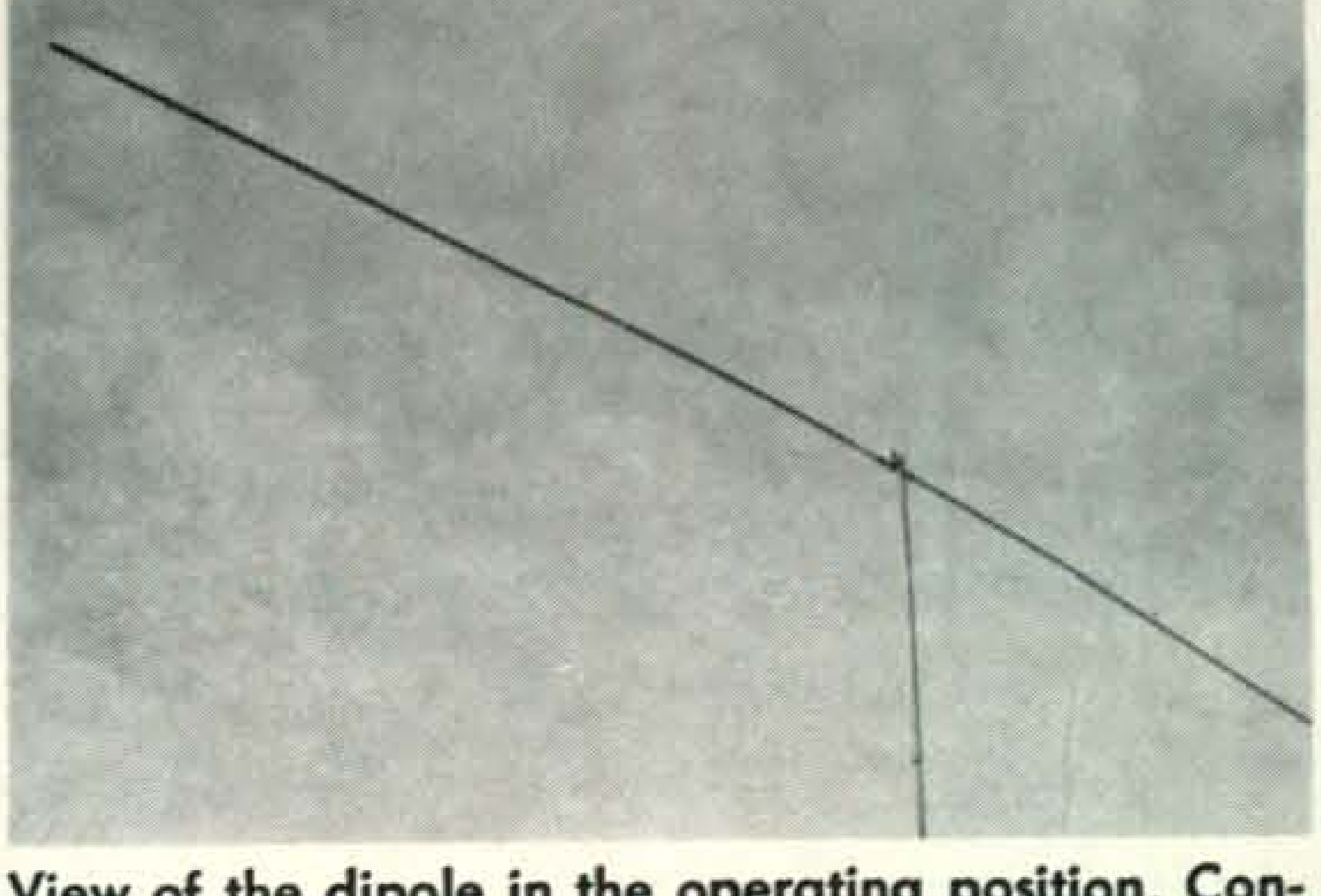
Fig. 2—Actual-size template for the coil supports. Two are needed. Material is 1/2" to 3/4" wood.

to the tie points on the elements previously occupied by the coil ends. When changing to any of the three bands· it becomes a simple matter to simply shift more or less coil into the circuit.

Although only one band can be operated at one time, the bandwidth, or that point of either side of the resonant frequency of the antenna, is reasonable. For any major change in 40-80 meter operating frequency beyond about 10 kc, readjust the coil taps at the antenna. For drastic changes on 20 meters either shorten or lengthen the tubing elements for minimum s.w.r.

The greatest signal will radiate from the dipole in a plane perpendicular to the broadside of the antenna. By rotating the array so that its full length faces the receiving or transmitting station, the greatest signal will be sampled. Signals to the rear of the antenna will be equally strong and directional; however, there will be a null area off both ends of the antenna. ■

Use 6" half shells with two hose clamps to join lengths of tubing to achieve the needed 16′ dimension.



View of the dipole in the operating position. Construction is very light; consequently it can be rotated even with light TV rotators. For 20 meter operation the coil is removed. The 32′ elements will then resonate on 14.350 mc.