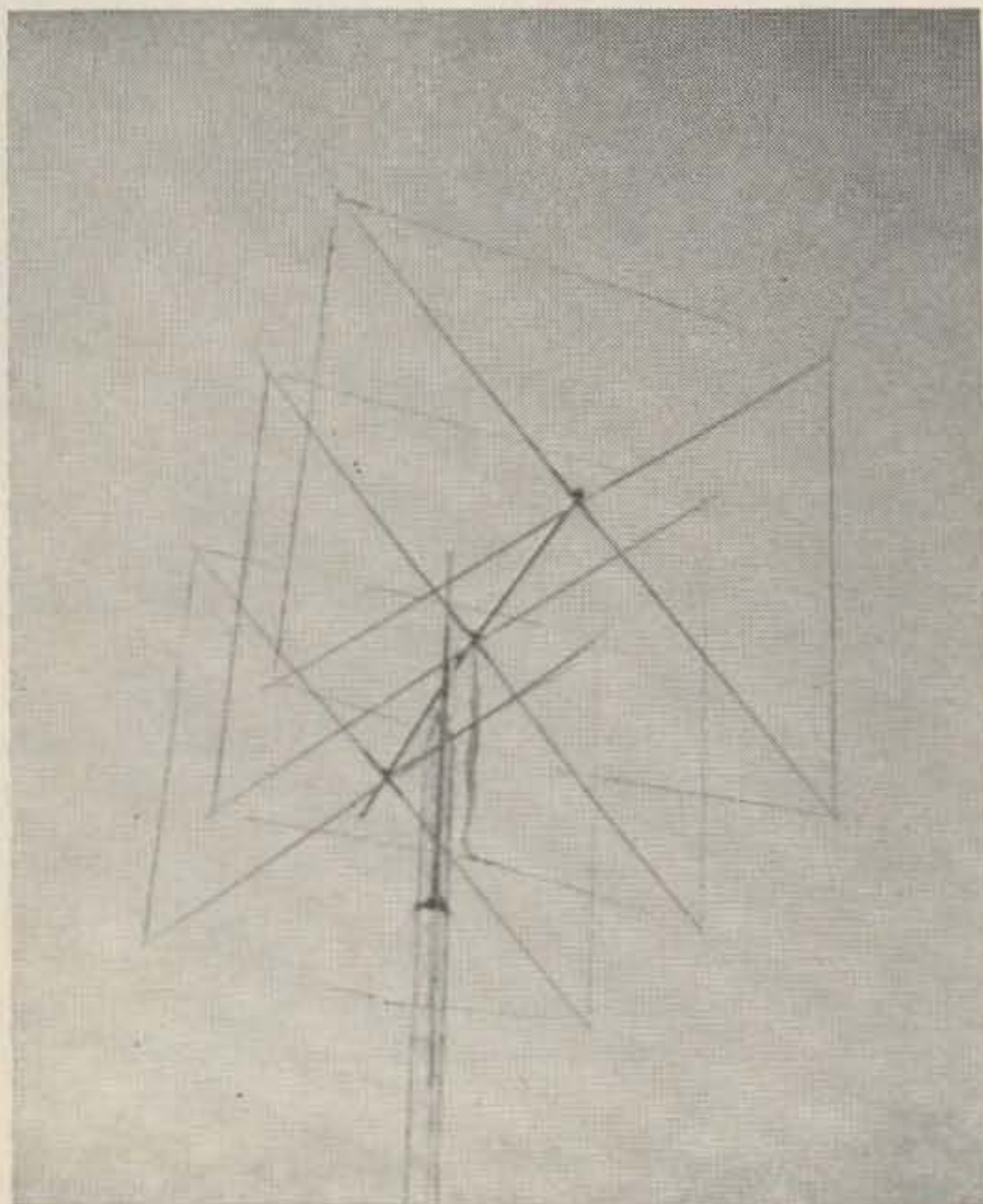


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The Three Element Quad

It is certainly not an "old wive's tale" when someone speaks about the performance results of the two element cubical quad. The gain is comparable to that of a three element yagi. From personal experience, the front-to-back ratio ranges from 25 to 30 dB, with the front-to-side ratio reaching as much as 40 dB. For the size of the antenna it packs a mighty punch in the roughest of pile-ups, and amateurs around the world will attest to its performance. Another favorable aspect of the quad is the relatively low construction cost.



The three element quad as seen from K8YIB's house shows the director, the driven element, and the reflector. The boom consists of three inch irrigation tubing and the spreaders are bamboo.

As we all know, most amateurs are never satisfied with their antenna, so we decided to go one better, and try a three element quad. There was very little information available on this type of antenna, nevertheless the problem of design and construction was undertaken.

Design

The dimensions for the three element quad were taken from WØAIW's dimensions for his four element quad. It was thought that we had to start somewhere, and Lee's figures looked good. Originally the boom length was twenty-five feet, but after running some tests on the air with local and out-of-state stations, it was decided that the front-to-back ratio was suffering badly. Thanks go to WAØIOR, Hal, whose suggestion to shorten the boom length was a great help in the final success of the antenna.

Construction

Spreaders: Fiberglass poles make excellent, durable spreaders, but are quite expensive. Bamboo poles also suffice, but do not weather well unless they are protected. A few coats of Spar varnish will last several years, but if the poles are fiberglassed, they will last indefinitely. Fiberglass resin and fiberglass cloth are available at most boat centers and sport shops. The bamboo poles were cut to a length of thirteen feet, and wrapped from the small end to the butt with three inch wide fiberglass cloth. About half a quart of resin was mixed at a time, and applied with a paint brush. About two days are required for the poles to dry.

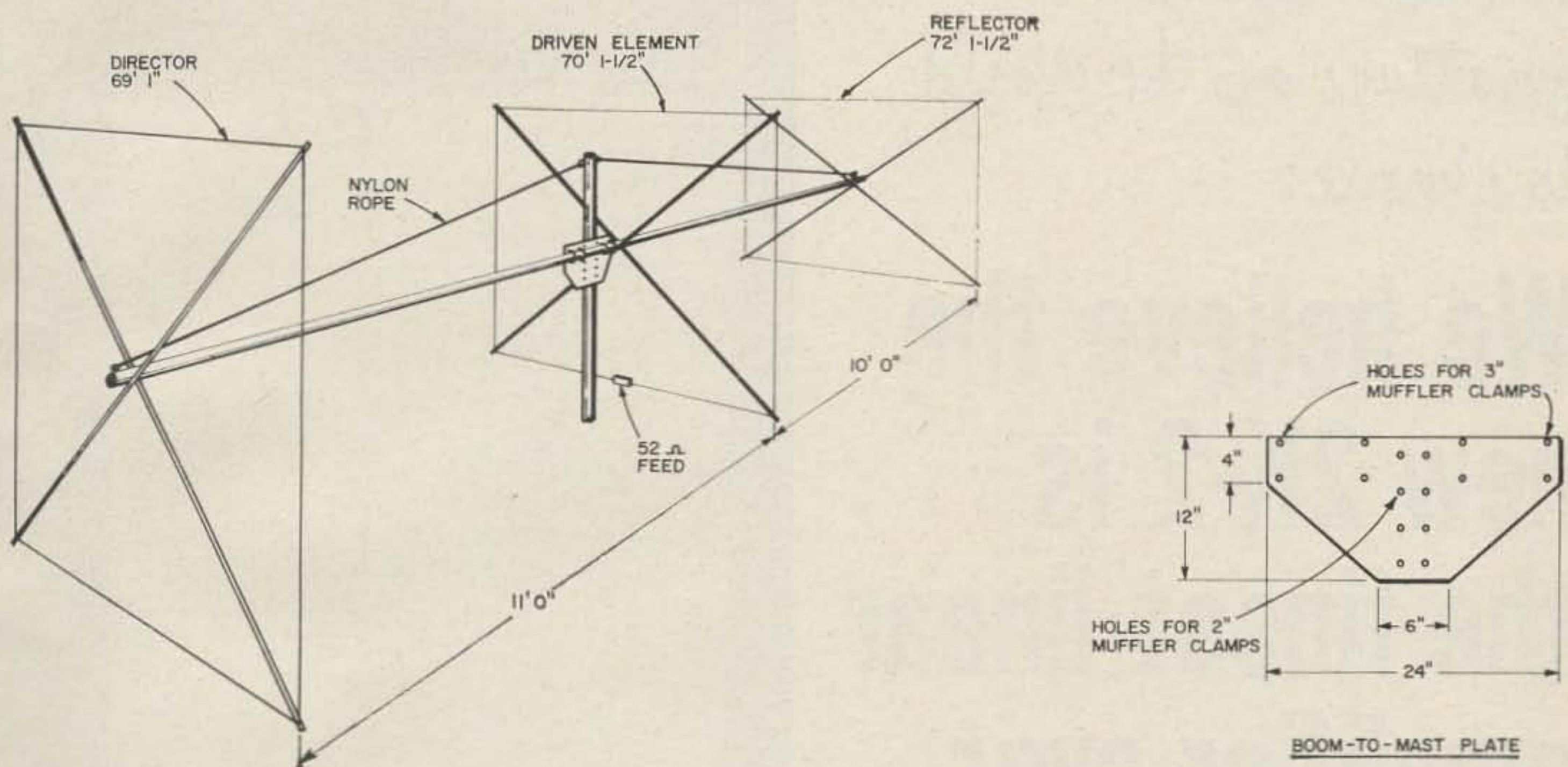
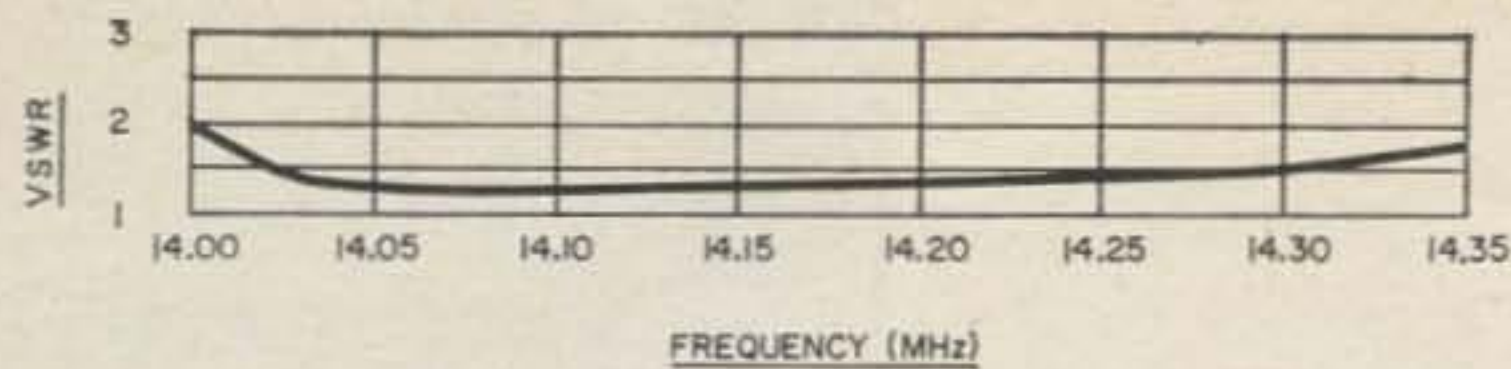


Fig. 1. This three element quad for twenty meters provides extremely wide bandwidth as indicated by the low SWR throughout the band. The construction of this quad is straight-forward and only requires a boom length of 21 feet.

Supporting crossarms: Three foot sections of one inch angle aluminum were used to hold the poles to the boom. The muffler clamps used between the angle stock and the boom are three inch. The bamboo poles are held to the angle aluminum by one and a half inch hose clamps.

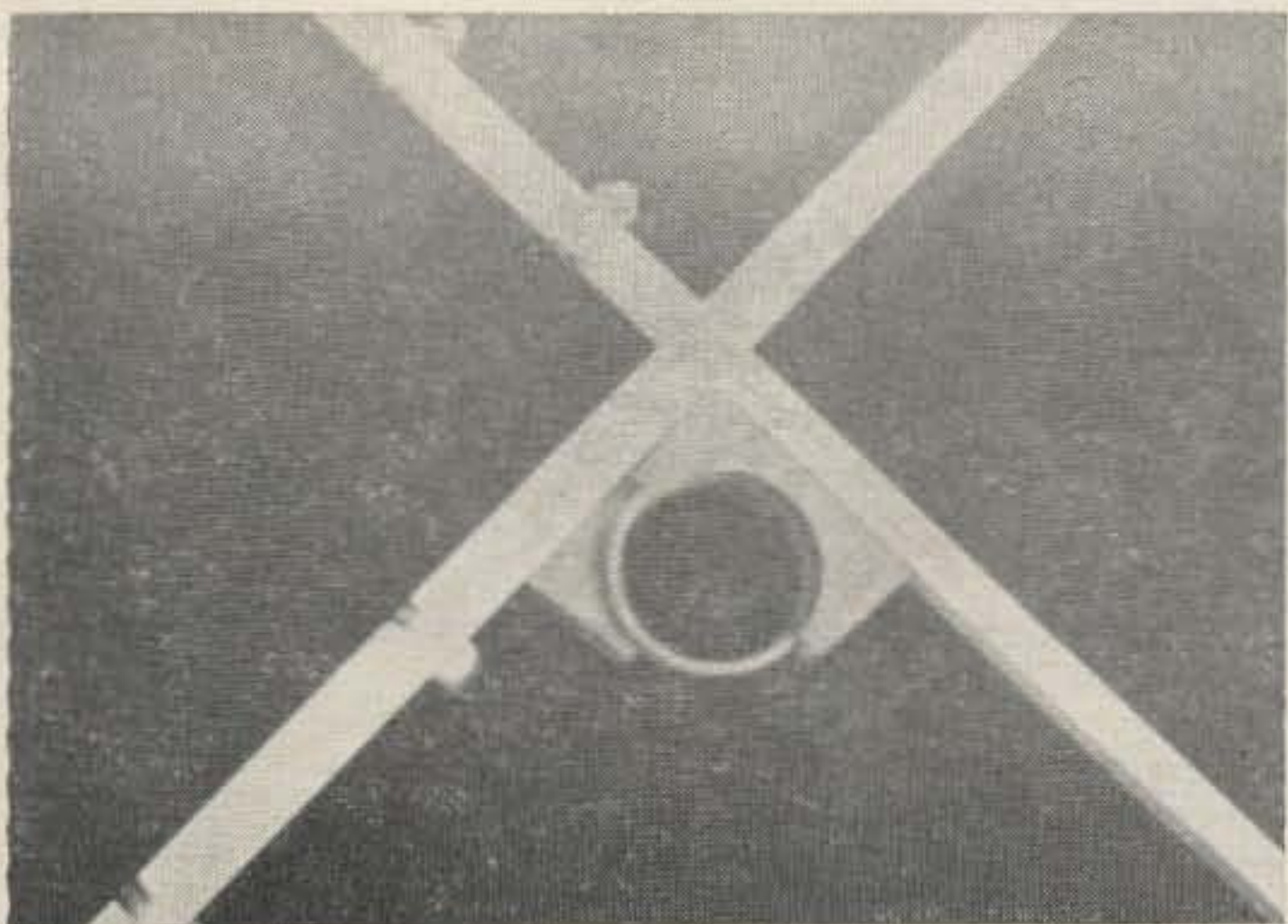
Boom: The boom consists of twenty-one feet of three inch irrigation tubing. The spacing from the reflector to the driven element is ten feet, and the distance from the driven element to the director is eleven feet.

Stringing the elements: Number fourteen wire was stretched out and marked at 69' 1" for the director, 70' 1½" for the driven element, and 72' 1½" for the reflector. After the crossarms had been assembled, the spreaders were staked out perpendicular to each other, and each element was strung.

Assembly and tuning: Each element was fastened to its respective position on the boom, and 52 ohm cable was attached directly to the driven element. Tuning stubs were fashioned out of #12 wire and fastened to the director and reflector. The antenna was raised to approximately twenty feet, and the stubs were adjusted to give maximum s-meter readings on a receiver beneath the antenna.

Repeated comparisons with a nearby station, on the long and short haul DX, seem to indicate that the three element quad is comparable to his four element yagi. The front-to-back and front-to-side ratios are as good if not better than the two element quad.

Over 200 countries have been worked in the last six months, and good success has been experienced in the pile-ups.



The supporting crossarms.

... K8YIB