Packaging the W4KFC 15/10 Meter Array

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Improved U-Bolt Mounting Techniques For The Beam

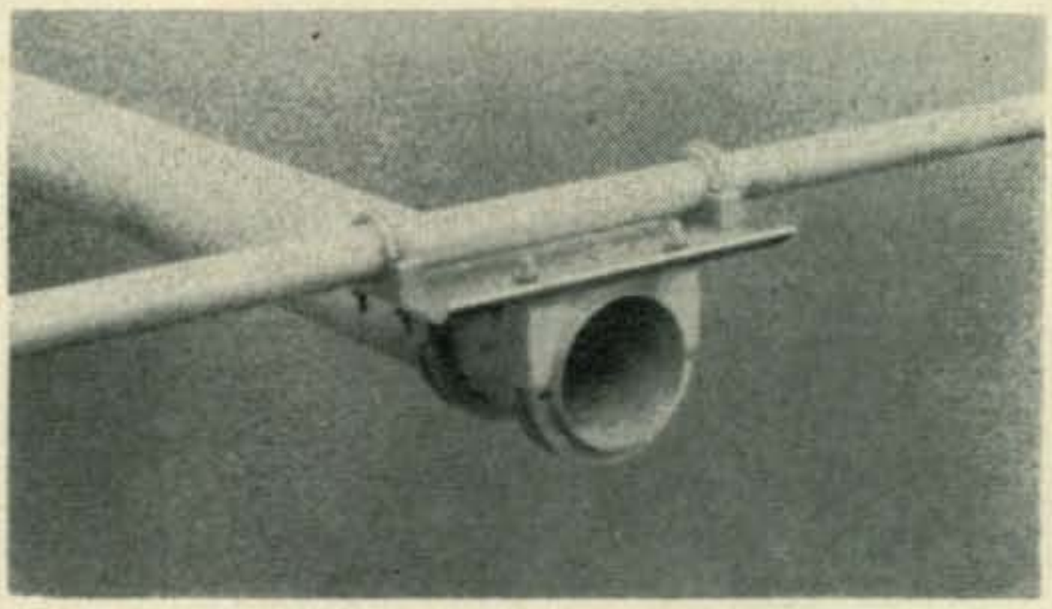
CQ for July 1958 carried a description of a superior two-band beam by Vic Clark, W4KFC.[1] The five-element array had two elements on each band in-line, with a shared parasite between them. His DX-test proof-of-the-pudding scores made the beam more than a little attractive. Additionally, others —notably W3GRF—have similarly employed the in-line arrangement with outstanding results. Apparently, the 'floating' elements for the band not in use complement the driven portion to give over-all performance exceeding that of 3 elements per band.

Three summers ago I had the privilege of viewing the antenna firsthand. In a word, it was impressive. The Vesto tower and fabricated 20-foot boom evinced a feeling of heft and permanence. Duplication seemed out of question, for a similar supporting structure was not possible on our city lot.

Casting about for a physically smaller design left us with the feeling that a 20-foot boom might still be possible if the problems of weight and wind area could be reduced. This quest led to Bill Orr's *Beam Antenna Handbook*. Subsequent sessions with several serious DXer's brought to light the fact that the recommended cast-aluminum irrigation-pipe fittings often failed after some months of use. (It appears W6SAI recognizes this defect, as they are not mentioned in later articles by him.)

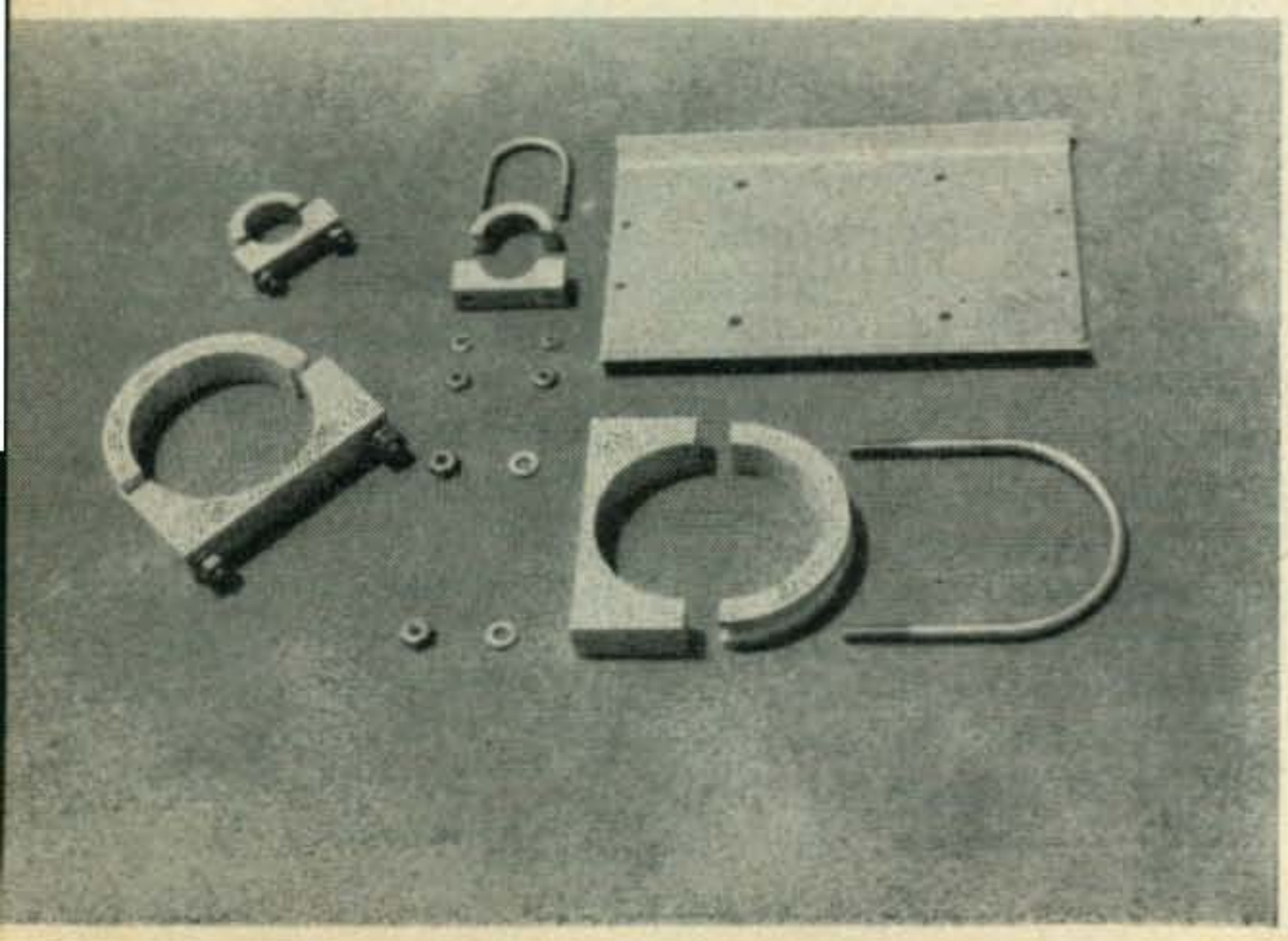
Over the years the skewing of elements on booms and booms twisting in yokes has been a problem. TV fittings with their line contact and vulnerability to corrosion have proved utterly useless. Living on the coast is great propagation-wise, but the hydrochloric atmosphere is death on all but the best of materials.

It did seem though that if the alternate combination of muffler clamps and mounting plates could be improved, we might have the solution. Patterns were made; aluminum was cast, precision bored, grooved, and split; stainless rod was

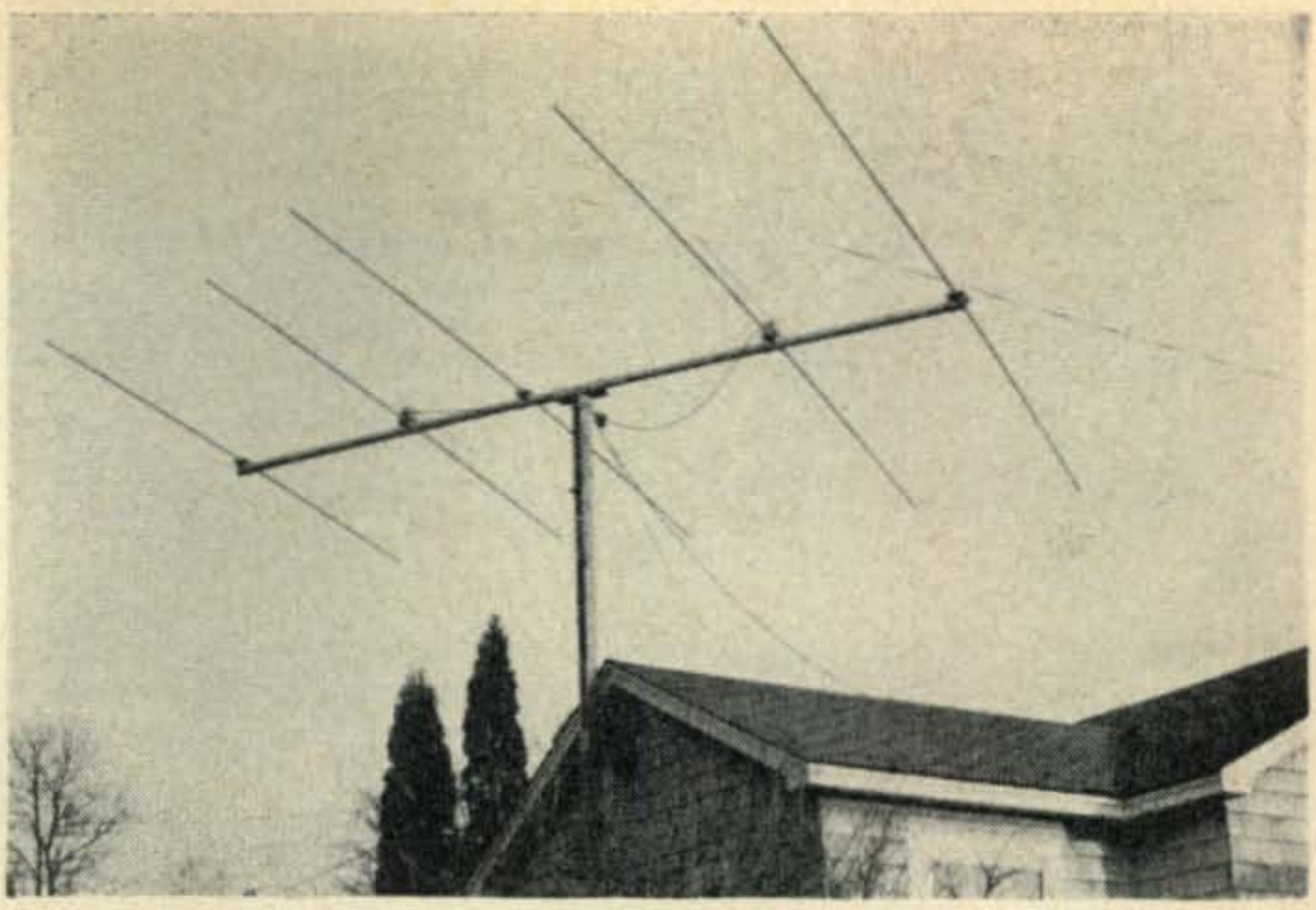


Mounting plate and U-bolts demonstrate the neat appearace of the boom-to-element connection. No holes are made in either the boom or the element and beam dimensions are easily changed.

[1]Clark, V. C., "One Boom Two Band Beam at W4KFC", *CQ*, July 1958, p. 32.



Materials used by the author to mechanically secure the elements to the boom. The large clamps are 3 inches in diameter and the small clamps have a diameter of one inch. The threaded rods are stainless steel. Materials are available from the Precision Tool Company of New London, Inc. Box 617, New London, Connecticut.



Overall view of the 5 element 2 band array. Both 10 and 15 meter gamma matches are visible in this view.

threaded and formed into U-bolts.

The 9½ square inches of surface-to-surface contact afforded by the castings, when backed up by the superior strength of stainless steel, gave a grip that won't quit. The first sample assembled on a 3-inch irrigation pipe easily withstood 500 pound-feet of torque. (Know of any commercial fittings you'd care to try that on?)

Perhaps the biggest bonus in this method is the total absence of holes in either tubing or boom. This means a beam can be put together with just two nutdrivers. The elements are not weakened in any way and are totally reuseable. Spacings are very easily changed, and even conversion to another band is a "snap."

In order to reduce sail area the element diameters were reduced to one inch. This brings down the bandwidth a little and requires slightly longer elements. Total weight above rotator is 32 pounds.

An afternoon spent 20 feet above ground with a half wave of coax between feedpoint and s.w.r. bridge produced ratios unreadable on the meter, i.e., apparently better than 1.05 to 1.00 at the resonant points, 21.1 and 28.2 mc.

The over-all results of this project have proven one thing. The expense in beam construction should go into the mechanics of holding the array together. There are plenty of good electrical designs in amateur literature "fer free." If big league performance is your aim, this would seem the sanest approach. ■

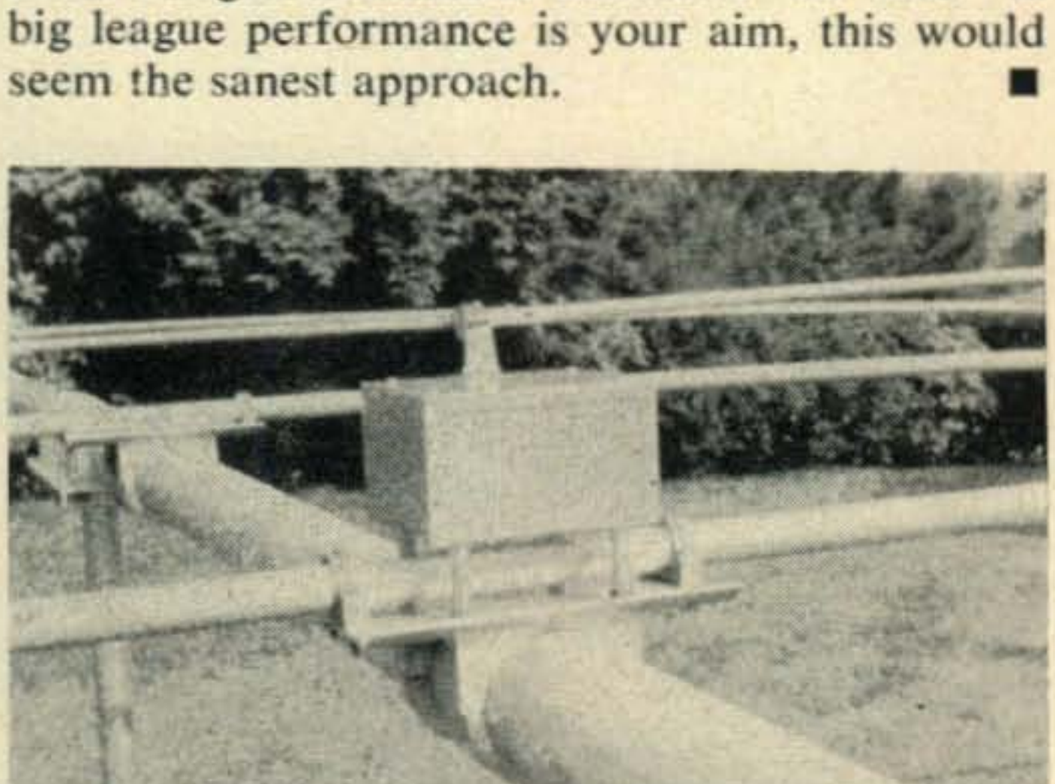
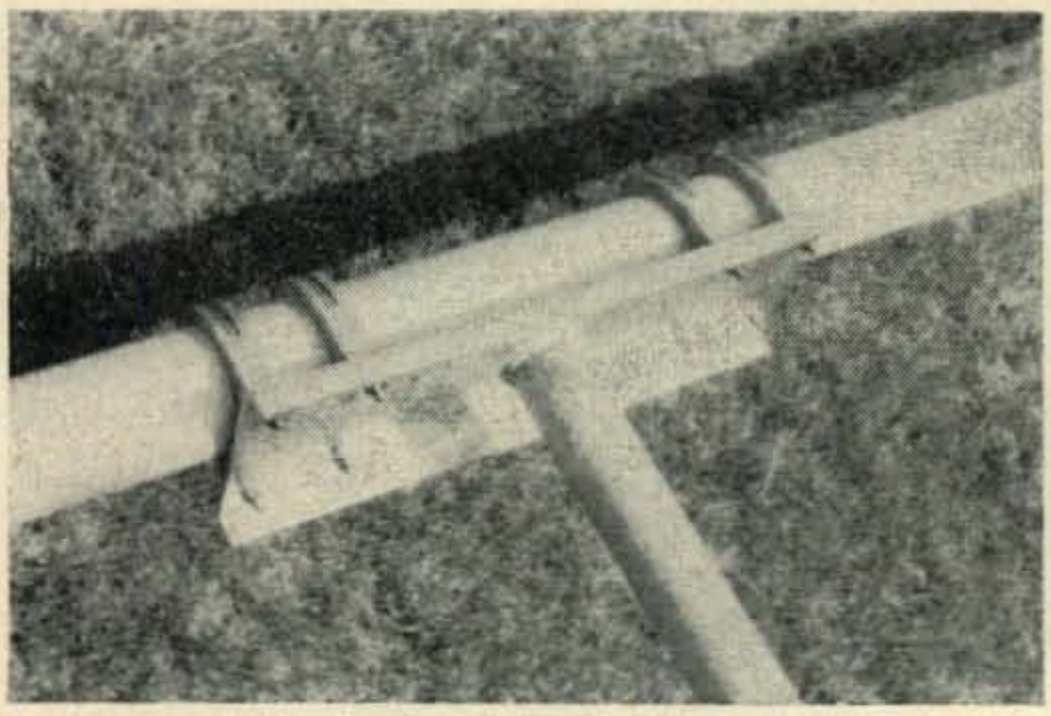


Fig. 1—Diagram illustrating the most efficient way to cut the aluminum tubing for the correct element length. Aluminum used for W1RAN installation was 6061-T6 alloy (aircraft grade), center sections: 1" O.D., 0.049" wall thickness; end sections: ⅞" O.D., 0.035" wall thickness. Note the combinations which total one standard 12-foot length of tubing: 7+5; 6+6; 3¼+3¼+2¾+2¾.



Four clamps provide sufficient support for the yoke section.

The gamma match housing mounts on the four studs available from the U-bolt clamps, via short spacers.