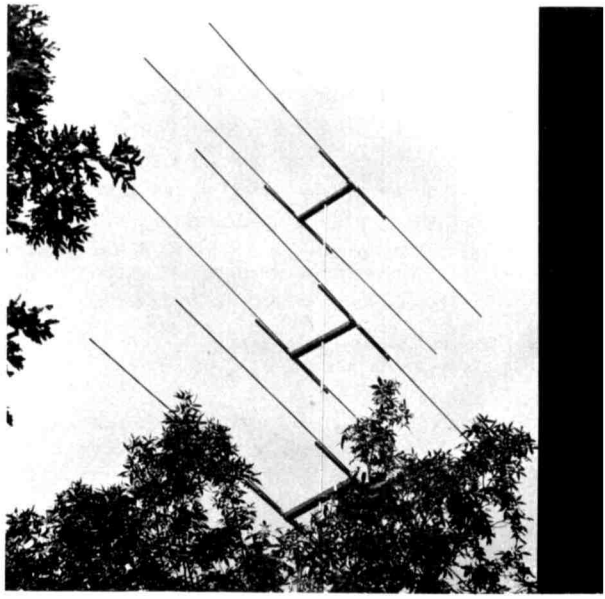


big beam for six meters

Practical construction details of a 12-element collinear array for high performance on 50 MHz

John Stanley, K4ERO, 1501 Robin Road, Maryville, Tennessee

With more and more people getting on vhf in a serious way, vhf antennas have become a lively topic of conversation. One antenna that has always been popular with the 2-meter-and-up enthusiasts is the collinear; this is not without reason.

The collinear doesn't have quite as much gain, element for element, as a Yagi but it has two important advantages: low-Q operation and broad radiation pattern. The low-Q feature means that you can move over large parts of a band without fear of high swr. The broad radiation pattern means that aiming is not as critical; with high gain arrays this is a real advantage.

Although collinears are very popular on 144, 220 and 432 MHz, very few seem to be used on six meters. This is unfortunate because a rotatable eight-, twelve- or sixteen-element collinear for six meters offers one more advantage; it's easy to assemble up on

top of the tower. Since no part of the antenna has to be more than an arm's length from the tower itself, you don't have to balance a 20-foot boom or try to wrestle 50 pounds of aluminum tubing up through a maze of guy wires.

six-meter collinear

I hit upon the idea of a collinear for six when I was contemplating what kind of antenna I could put on my own 50-foot tower —a handy hickory tree. Obviously a long Yagi was out of the question. If I built it on the ground, I would never get it up through the branches, and I wasn't about to climb hand-over-hand out on the boom to fasten on the elements while floating between heaven and earth.

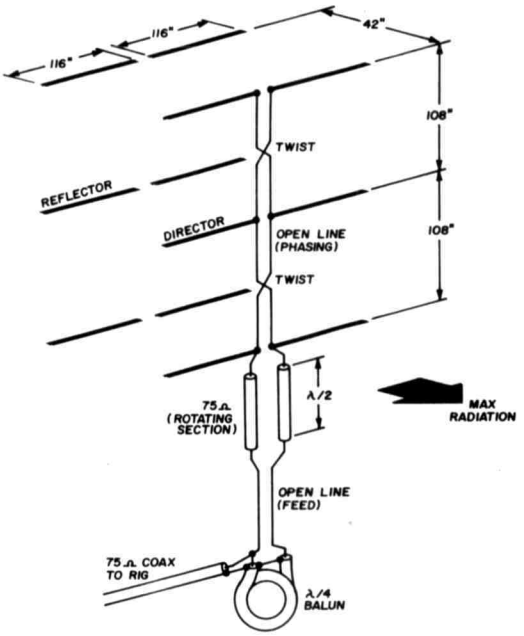
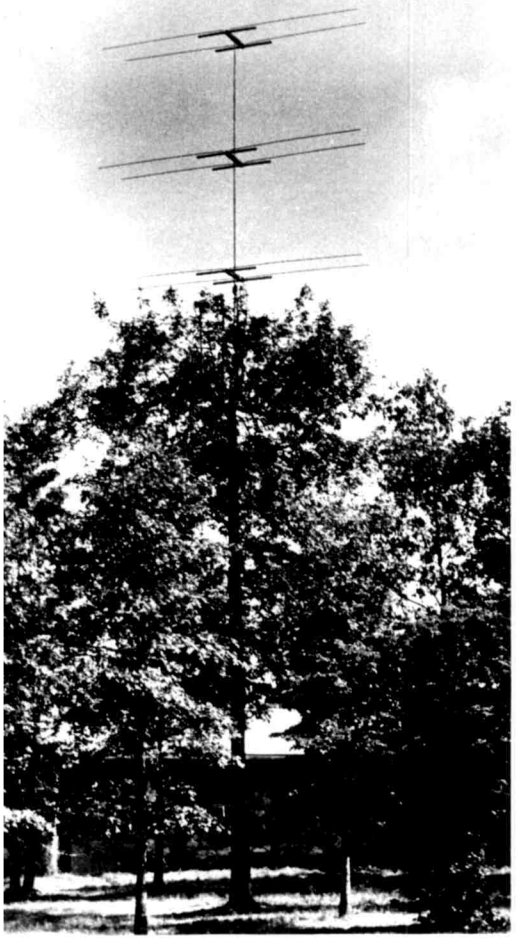


fig. 1. Electrical construction of the 12-element collinear for 6 meters.



The 12-element collinear beam uses a handy hickory tree for support.

With a collinear I could build each bay at tree top level without leaving the security of the hickory trunk, then raise each bay in turn by running the pipe mast up nine feet, and build the next bay. It was a snap. With a minimum of danger, work and investment, I had the most exciting six-meter beam I have ever used.

I am not going to give you all the mechanical details because the average ham should be able to equal my design or improve upon it.

construction

The booms are made of redwood, the elements are electrical conduit, and the insulators are ceramic rods and standoffs I picked up locally. Plexiglass is an excellent substitute for the insulators, aluminum would result in much lighter (and more expensive) elements, and oak might make more rigid

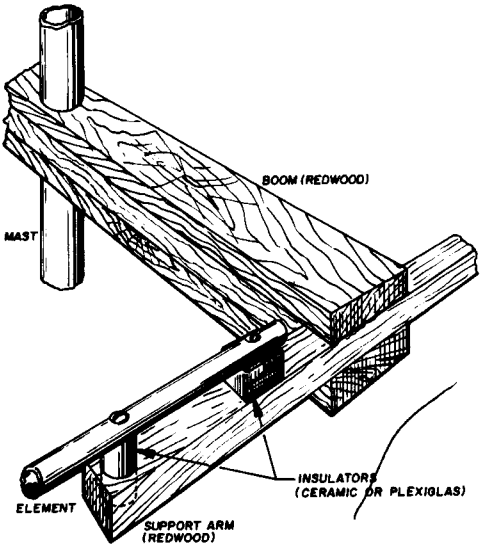


fig. 2. Mechanical construction used by K4ERO uses electrical-conduit elements, surplus insulators and redwood booms and support arms.

booms. I built my beam for under twenty dollars, and it has been up for more than a year.

Each driven element is 110 inches long and each reflector, 116 inches. The booms are 3½ feet long and stacked 9 feet apart (see **fig. 1**). The balanced phasing sections and balanced feedline are transformed to 75 ohms unbalanced through a balun. The rotating section consists of two half-wave sections of coax spliced into the open-wire line in the vicinity of the rotator.

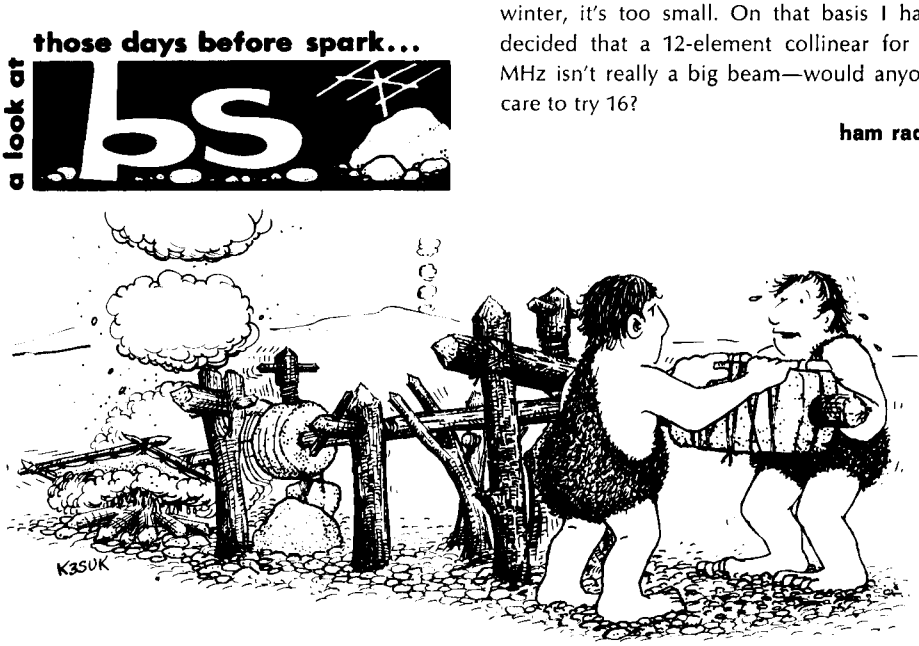
results

The performance of this array has more than exceeded expectations. The beamwidth is about 60° at the 6-dB points, and the front-to-back ratio appears to be near 30 dB. The swr is less than 2:1 over the **entire** six-meter band; from 50 to 51 MHz, swr is negligible.

If there's a signal there, this antenna will capture it. I consistently work stations 300 to 400 miles away and can work over 200 miles anytime with 15 watts of single sideband. I have worked K4GXM (20 miles away) when he was running 1 mW of ssb to a 3-element beam. Scatter signals are very much in evidence on the low end of the band almost anytime, and if the band opens up suddenly, the wide beamwidth of this array means you are more likely to hear signals without careful aiming.

They say if your vhf beams stays up all winter, it's too small. On that basis I have decided that a 12-element collinear for 50 MHz isn't really a big beam—would anyone care to try 16?

ham radio



"How about you taking the "dah" side for awhile?"