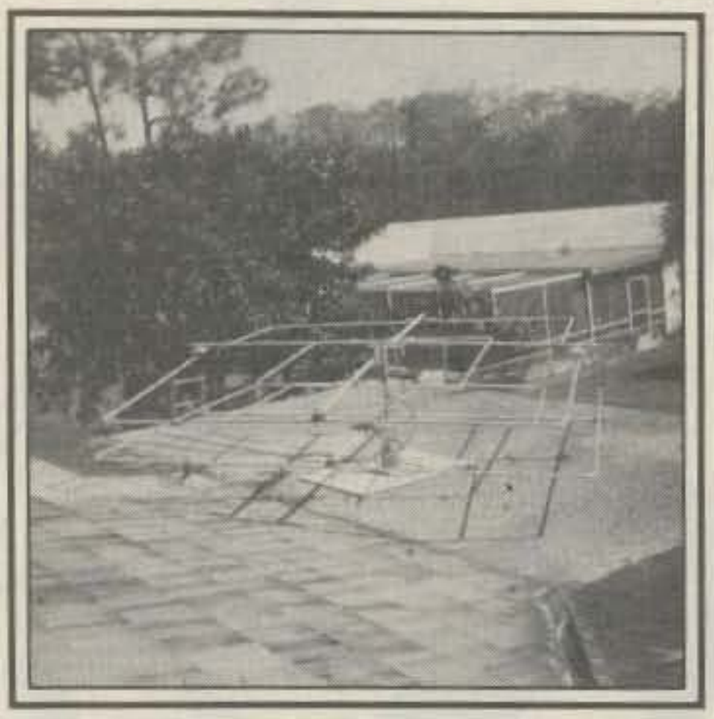
Necessity and ingenuity helped get K4JZB back on the air.

THREE EXPERIMENTAL ANTENNAS FOR 15 METERS

BY ROBERT F. ZIMMER*, K4JZB



The first antenna consisted of 3 elements on 15 and 2 elements on 20 meters. It makes a low profile to the roof.

After moving into a home in a city that forbid any antennas (including TV), the urge to get back on the air became overwhelming. As a result, a vertical antenna was installed in a tree next to the house, and many contacts were made on 21 MHz, c.w. and phone. However, as my real love is working DX, I found I needed a beam to really work the new ones. This presented a real dilemma, as the powers that be would certainly threaten court action if any antenna was discovered. After checking with the neighbors, it was determined that I could possibly mount a small beam on the flat patio roof, as long as the antenna was not over 14 feet high.

Planning began, and the half-wave square loop was constructed, and a semi-square reflector and director was added to it (see fig. 1). It made a very compact beam and worked quite well; over 150 countries were worked with it with only 200 watts PEP input.

It was evident, however, that long-haul DX was not being worked. I simply was not getting the low angle of radiation needed for DX at this low antenna height. More research was indicated, and after securing a load of aluminum tubing, a normal 3-element Yagi was built. It worked well, but I felt that something a little better was needed, so after reading about log-periodic antennas, I decided to try more driven elements in the same band. That did it! When the second driven element was added, the signals took a big jump, and when the third driven element was added, they took another big jump. Since the first antenna element was fed with a gamma match, the second element was also fed with a gamma match, only out of phase as used in the log, and it worked. The third element was also fed this way, and it worked also—no need for split antenna elements. We now have a plumber's delight log-periodic type antenna.

About now I wanted to try tilting the elements forward 30° to 40°, so back to the workbench! As the work progressed, I first tried the effect on a 3-element beam and found that the gain increased, the horizontal beam width decreased, and the front-to-side and front-to-back ratios increased (see fig. 2). This indicated that folding the elements 40° forward is a very worthwhile improvement on the normal Yagi beam. Upon adding the other two driven elements, I now have the finished beam. Driven element No. 1 is 266 inches at 21.4 MHz, No. 2 is 268 inches at 21.2 MHz, and No. 3 is 270 inches at 21.0 MHz. The director is 252 inches and the reflector is 288 inches long. The spacing between the driven elements is 24 inches, director to first DE is 52 inches, and reflector to DE is 78 inches, which

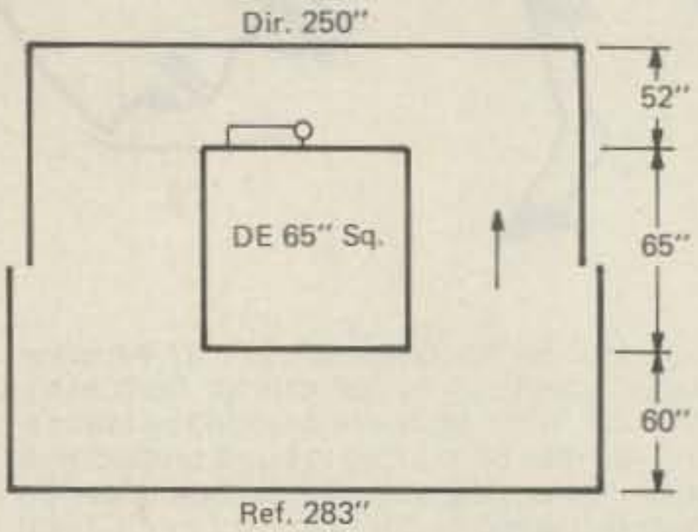
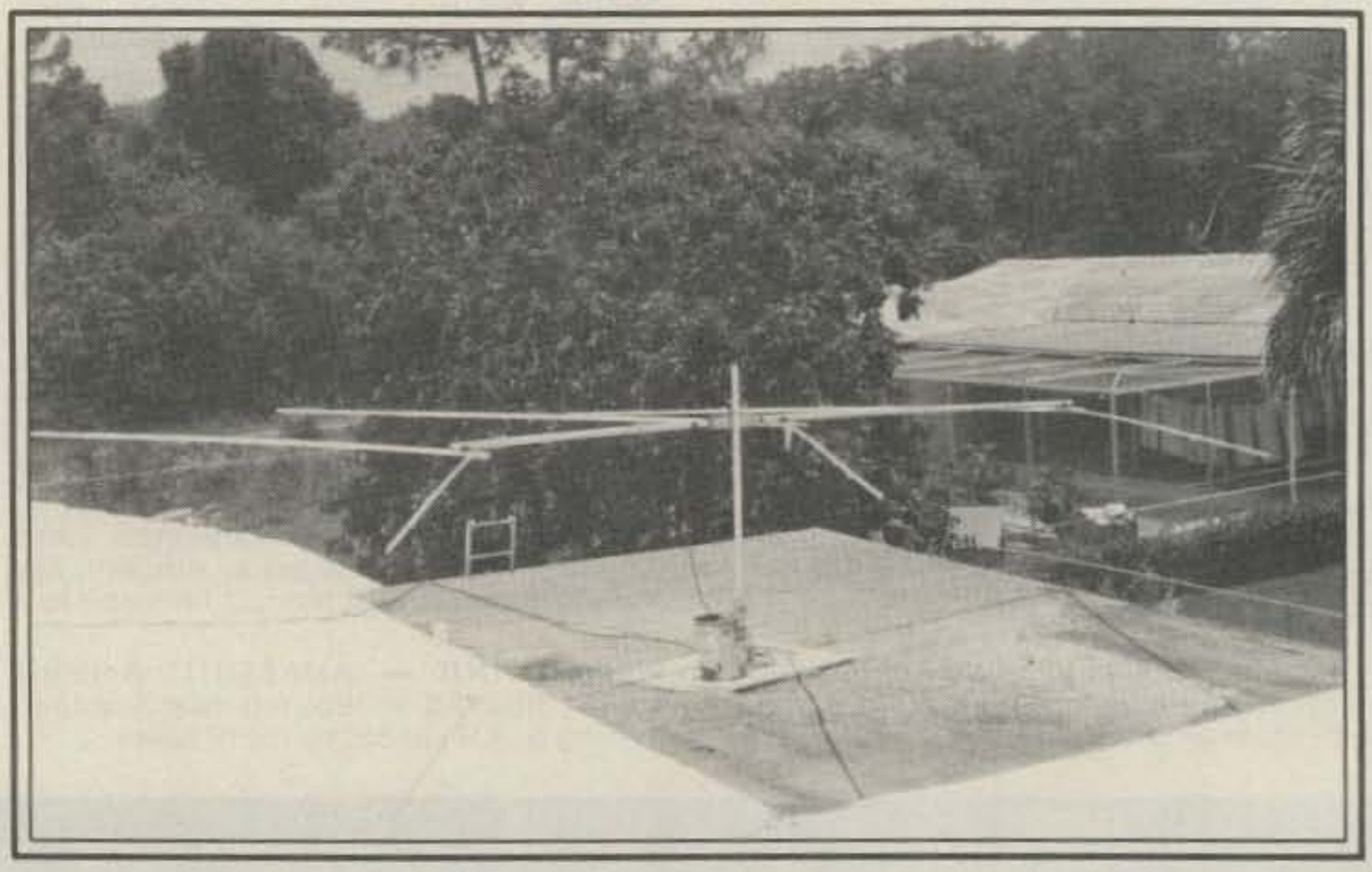


Fig. 1– A half-wave square loop with semi-square reflector and director.



The second antenna features 3 elements on 15 meters at a height of 14 feet. Elements are swept forward at a 40° angle.

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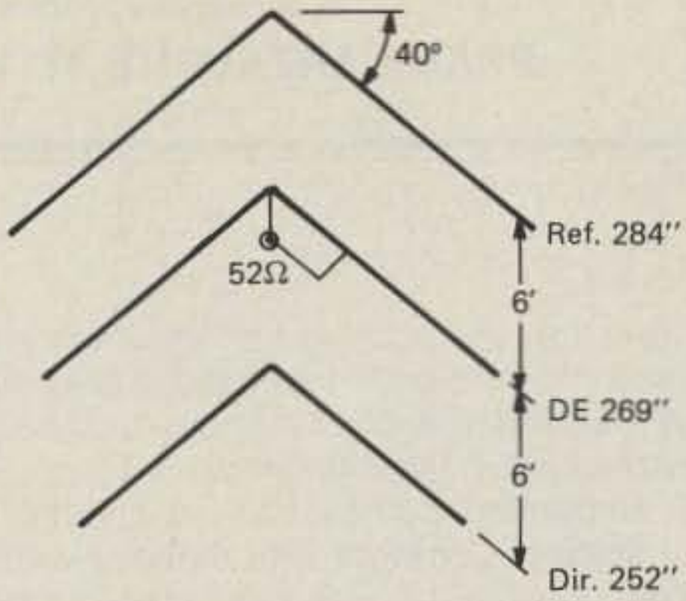


Fig. 2– By tilting the elements forward, gain as well as front-to-back and front-to-side ratios increased. Horizontal beam width decreased.

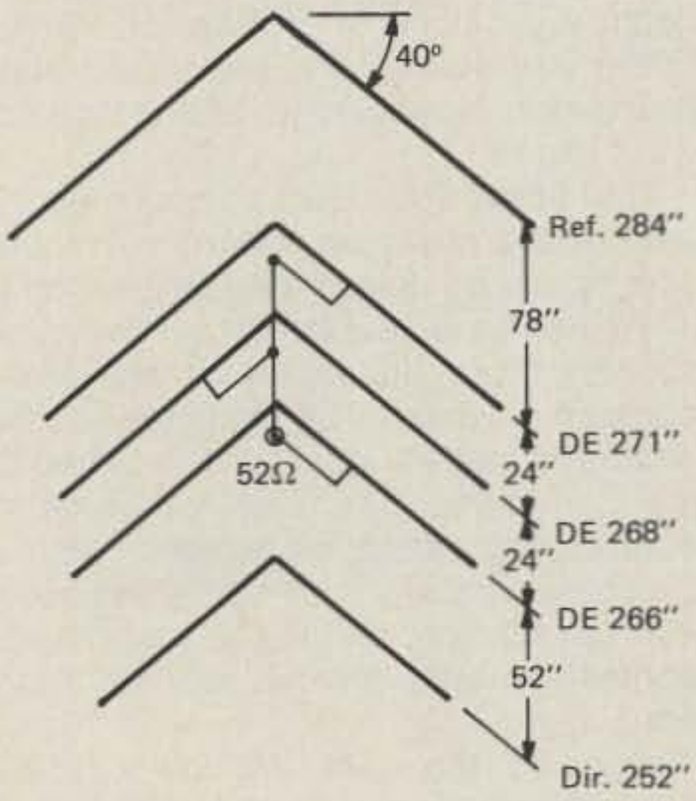


Fig. 3– The completed 5-element beam plan as evolved from experimentation.

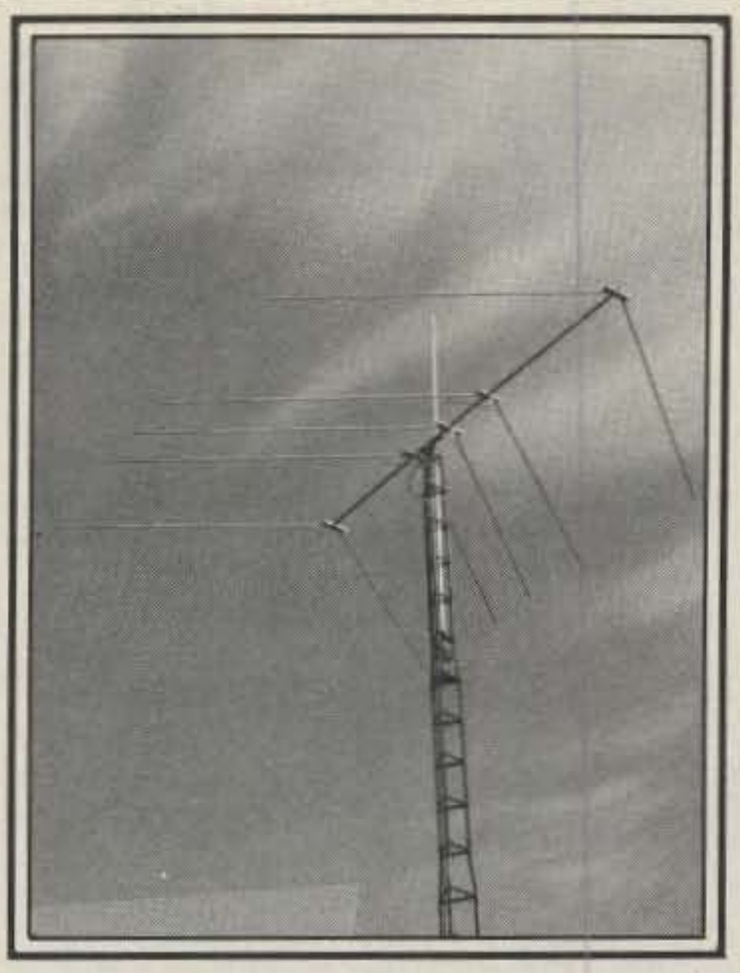
puts a 5-element beam on a 15 foot boom (see fig. 3).

I also tried three reflectors: one 2 feet above the normal one, and one 2 feet below it. The front-to-back ratio was so great that an S-9 signal off the front could not be copied off the back. It was not used in the final antenna because of construction problems, and it made net operation impossible.

Results

With the antena at a 14 foot height, I could now work anything on the band. Reports of loudest signal on the band to the only "W" coming through were common.

After using this antenna for over two years, I moved to my present location, which is a 10½ acre farm. The same antenna is now installed on a 50 foot tower. The results are fantastic, and many reports of pegging the "S" meter are received. Pile-ups are no problem now. As I cannot measure the gain accurately, I can only report what my "S" meter shows. At times I note gain of 15–17 dB, but on long haul it seems to go as high as 25 dB.



The final version as shown in fig. 3 now sits atop my 50 foot tower and has 5 elements on 15 meters.

If this antenna is built as described, don't be too surprised to find that it loads up on 28 MHz and 14 MHz, and one can work DX through pile-ups on these bands also.

One might gather that I am completely sold on this type antenna, and I hope that this article will spark other builders to try it and report their results to me. CQ