The All-Band Dipoler

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About the only antenna I have never tried in my nearly 25 years in amateur radio is the extremely broadband "Uni-directional-Logarithmically Periodic Antenna" produced by *Collins Radio Co.* This is about the "newest" communications antenna that I know of. Belonging to the logarithmically periodic class of antennas for which the radiation patterns and input impedance are essentially independent of frequency, it obviates the need for several structures to cover a full range of frequencies. For example, one antenna would cover 6.5 to 60 megacycles with an average gain of 8*db* over an isotropic antenna. If it were not for the price, the antenna will no doubt find its way into the backyards of the serious ham. Of course, it is built to handle a peak power of 50KW—and the average ham would find it a little cumbersome to handle—along with the price of from $12,000 to $15,000.

Now I would be mighty satisfied with one of these fine antennas but not having the money or a 50KW transmitter, I, like thousands of other hams must settle for much less. And this is what I have done.

Upon setting up a station at a new location—and the latest, here in France is no exception—I usually fall back on the good old reliable dipole antenna.

Going through all the books I could lay my hands on, I searched for design data relative to broadband antennas and came up with the usual information which has changed relatively little during the last decade.

After about two weeks of experimentation I came up with an antenna (or configuration of antennas) which works exceptionally fine tied to a low power transmitter such as the *Ranger, Viking II* or *Apache.*

The antenna itself is simple and requires neither elaborate calculations (except length) or special equipment. However, for best results in a given direction, the antenna should be oriented so that its center is "pointed" toward the area in which one is most interested.

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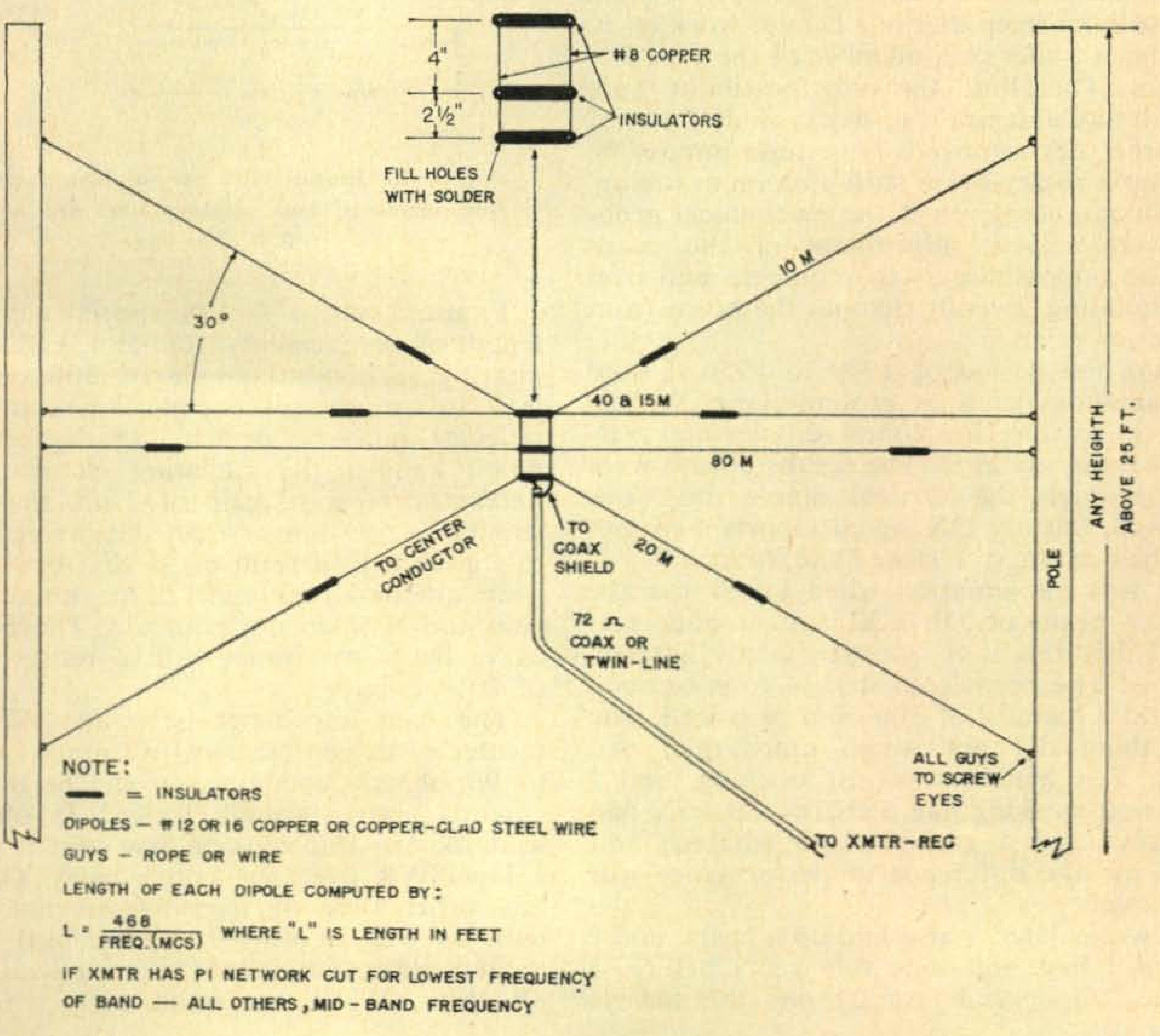

frequency movement is available with the broadband quad. There is ample forward gain, averaging 10 *db* over the band, which represents an increase in radiated power of 10 times. A 30 watt transmitter with a quad will far outperform a 150 or 200 watt transmitter using a dipole. The directional characteristics of the antenna help considerably in reducing unwanted QRM.

The actual signal reports which I have received from foreign stations ranging in distance from 3,000 to 11,000 miles away have more than justified the construction of the antenna. These reports have ranged from 10 to 20 *db* better than a ground plane antenna previously in use at my station. DX becomes a pleasure rather than a rat race competition with the kilowatt stations.

I feel that this antenna is a worthwhile project for anyone interested in improving his signal on any high frequency.

I would like to thank Erwin Lodwig K2ODS, my father, for his cooperation in helping me prepare this article. ■

DIPOLE [*from page 41*]

Impedance matching is no problem because either 72 ohm coaxial cable or 72 ohm twin-lead line will do.

I tried various configurations of the dipoles (including those shown in amateur radio handbooks) and came up with the one shown in fig. 1. I found this configuration to give me the *best overall* on-the-air results. Reflectors were tried too but their construction was not worth the effort.

Referring to fig. 1, you will see that there is one dipole for each band except the 15 meter band. The antenna cut for 40 meters operates exceptionally well on 15. All dipoles (connected in parallel) are cut for mid-band operation and are ½ wavelength long.

Construction of the three insulator divider is not difficult. The insulators are arranged as shown using number 8 copper wire. The 40 and 80 meter dipoles are first attached to their insulators in the regular manner and then the separator wires are inserted. Solder is then poured into the insulator holes (with the bottoms blocked). The resultant connection is sturdy and electrically excellent. (Remember to tin all wires before pouring the solder into the holes!)

Coax cable connection is easily accomplished by using a medium to heavy piece of braid (shield) which is wrapped and soldered to the coaxial shield. The braid is then soldered to one side of the copper thru-wire. The center connection is simply brought up to the other side of the center separator and soldered. Plastic tape is used to seal off the end and to prevent moisture from accumulating between the coax shield and the center conductor.

The overall bandwidth of this antenna is quite surprising. (Perhaps it possesses some of the characteristics of the folded dipole which is noted for having better bandwidth.)

My Dipoler is oriented on the Eastcoast of the USA and I consistently receive good reports with only 40 to 50 watts input.

I am mighty satisfied with this antenna on 10, 15, 20, 40 and 80 meters. I am sure you will be too if you put it together as I have outlined here. Listen for F7FE, the signal will convince you! ■

FEEDER SYSTEM [*from page 40*]

System Measurements

Operation of the antenna system as a whole may be checked by placing a SWR meter in series with the 75 ohm coaxial line to the transmitter. The instrument must be capable of operation with a line having this nominal impedance value. In general, the matching system is capable of a better-than 2/1 SWR at the extremities of an amateur band, with better than 1.5/1 SWR at the resonant frequency of the antenna. The system has produced SWR values of 1.2/1 or so with the antenna at resonance when employed with various commercial antennas having split dipole elements. ■

21 MC BEAM [*from page 37*]

Once the antenna resonance is established near 21.15 *mc*, the shorting bar may be removed, the excess stub wire is cut off and the wires of the matching transformer are soldered to the stub at point A-B. The antenna is now properly tuned, and may be placed in the final operating position.

Using the Lazy-Quad Antenna

The radiation pattern of this simple beam antenna is at right angles to the long wires of the array. Since the pattern is bidirectional it is only necessary to turn the antenna through a half-circle to obtain world wide coverage. The actual direction to distant points is often deceptive, and the use of a "great circle map"[1] to plot antenna headings is highly desirable. For maximum results the antenna should be employed for reception as well as transmission, and the use of an "antenna change-over" relay or switch to disconnect the feed system from the transmitter and connect it to the receiver is highly recommended.

Erected well in the clear, this simple antenna will provide many hours of QRM-free contacts and is a worth-while addition to any 21 *mc* amateur station. ■

[1] Six great circle maps covering the entire world from the U. S. A. may be found in the "Better Shortwave Reception" Handbook, obtainable from Radio Publications, Inc., Wilton, Conn. ($2.85 plus 15¢ postage), or from your local radio dealer.