ham radio TECHNIQUES

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that golden day

Some readers may remember my April column, wherein I mentioned the "black hole" in Amateur Radio, an area of western China between India and the USSR. Known as Xinjiang Province — and void of Radio Amateur activity — it measures some 600 miles in diameter.

But now BY0AA was rumored to be active in Ulumqui! One afternoon around 0100Z, I was tuning around 14,127 kHz when I heard a weak, watery signal working a UA9 station. Could this be . . . ? I closed my eyes — all good DXers know you can hear a weak signal better with your eyes closed — YES! The signal signed BY0AA. This was my chance. No one else was calling . . . the frequency was clear. To avoid alerting the competition, I gave a quick one-by-two: BY0AA DE W6SAI W6SAI K.

The room filled with a golden light. I heard the BY come back to me, but my mind slipped back to the early days of DX when I was a high school lad. The goal of active DXers then was to achieve the near-impossible: WAC (Worked All Continents) on phone!

It wasn't hard from the west coast, because a few Asians were on phone, but their signals never seemed to filter through to the New York area. True, a few DX giants such as W2AZ, W2HUQ, W2IXY, and W4DLH had done the impossible, but never a greenhorn kid running 120 watts into a dipole.

And then on that long-ago golden day, when the big DXers must have been asleep, I worked VU2CQ in Bombay, India on phone. It was truly a shattering experience and one not repeated until I had the thrill of working a station in the elusive "black hole" — Xinjiang province, formerly known as Chinese Turkestan!

Other DXers share the same exciting experience. The *1986 Top Band Annual News Digest* edited by Ivan Payne, VE3INQ, is a revelation. Armed with a good antenna, sufficient power, stamina, and an urge to excel, a group of 160-meter DXers are turning the top band into a replica of 20 meters! According to Ivan's DX log, W8LRL has 203 countries on 160, followed by N4PN and VE1ZZ with 184 and 189, respectively. And G3SZA and PA0HIP both have 39 zones on 160 meters! Now that's real DX!

a wideband 80-meter antenna

The wideband 80-meter antenna is still an elusive concept. The best way of doing the job is to make a "fat" dipole. Some of these designs have been shown in earlier columns. I recently received a note from Frank Geisler, W7IS, who had built various "fat" cage antennas for 80-meter operation. They seemed to work after a fashion, but they were large and unwieldly. They were easy to tangle up during erection and had heavy wind loading.

Searching for a better solution, Frank came up with the antenna shown in **fig. 1**. Very simple, it consists of five dipoles connected in parallel. The complete antenna is only 114 feet long. The short dipoles have a 2-foot separation so that overall spread of the wires is 10 feet. This interesting antenna is easy to get up in the air because only one wire is erected at a time. The top wire is pulled up first, then the other wires are added, one at a time, from top to bottom. Frank used No. 18 wire and cut all the dipoles to the same length. The operating bandwidth is sufficient to cover the range of 3.5 to 4.0 MHz with an SWR of less than 2:1.

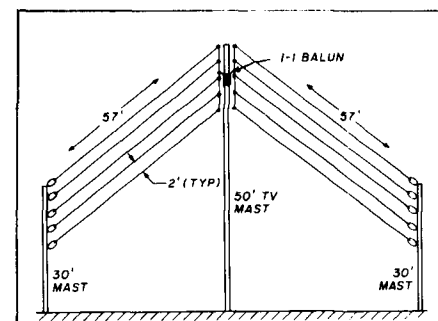

fig. 1. The 80-meter wideband dipole at W7IS.

No spreaders are necessary in this simple antenna. The wires have never tangled — not even in 60-mph winds. The wires attach separately to the center mast and are connected together with a short length of wire. A 1:1 balun is used to match a coax line.

Next, Frank wants to try reducing the number of wires to three, separated by 4 feet. It will be interesting to see if he can maintain operating bandwidth with fewer wires.

a 160-meter discone antenna

W7IS is a stalwart experimenter. He had always wanted to try a discone antenna for 160 meters to achieve vertical polarization with good operating bandwidth (see **fig. 2**). The top disc was assembled from wire and was 90 feet in diameter! The disc was preassembled on the ground and hauled

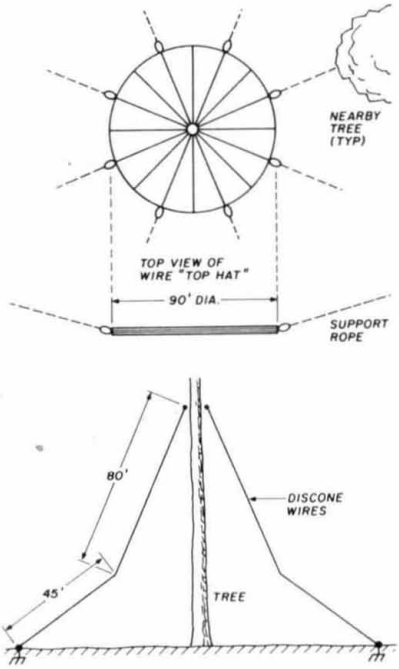

fig. 2. Side view of W7IS 160-meter discone antenna.

into position at the 80-foot level! He used nylon ropes to steady the assembly. The ropes ran to seven nearby trees. Pulleys and weights on each of the ropes allowed the top disc to flex in the wind.

The center support tree was 80 feet high and the discone wires were 130 feet long. The cone wires dropped down to the 10-foot level and then were run along the ground at this level for 45 feet. The natural resonance of the antenna turned out to be 2.1 MHz, so an antenna tuner was used to reach 1.8 MHz.

The last step was to ground the end of each discone wire with an 8-foot rod. All ground rods were tied together. This lowered the resonant frequency of the antenna to 1.8 MHz and dropped the SWR to less than 3:1 over the range of 1.8 to 7 MHz.

Frank states this was a major construction project that required large amounts of No. 12 wire. The antenna has been up for three years and is still in use. He says the antenna is good for DX and illustrates how much better vertical, rather than horizontal, polarization is on 160 meters.

For a simple 160-meter DX antenna, Frank says it's very hard to beat a simple dipole about 80 feet high. The discone is a better antenna, but it's difficult to construct, takes up a lot of wire, and requires plenty of real estate!

the 160-meter beam at PY1RO

The robust signal of Rolf, PY1RO, is well known to all 160-meter DX operators. He's tried various antennas and says that the array shown in **fig. 3** is one of the best. Suspended from a 230-foot tower, the array consists of six half-wave (quad style) loops, equally spaced around the tower. They use two half-loops as a director, two more

half-loops as reflectors, and the remaining loops as a "fat" radiator. The loops are electrically switched in six different directions. Polarization is vertical and a front-to-back ratio of better than 10 dB is noted. Front-to-side ratio is about 15 dB.

The switch box is located at the 16-foot level. Because each of the loops is self-resonant at 1925 kHz, they act as "natural" directors at the low frequency end of the band. The relays add sufficient length to the loops to make them resonant at 1740 kHz to act as reflectors.

Rolf notes that the high tower is a natural attraction for lightning. During a recent storm, he had two direct hits on the tower in the space of two hours. The installation is protected by a lightning arrestor (charge dissipator, or lightning rod) at the top and by six grounds at the bottom. Unfortunately, the coax from tower to station was left

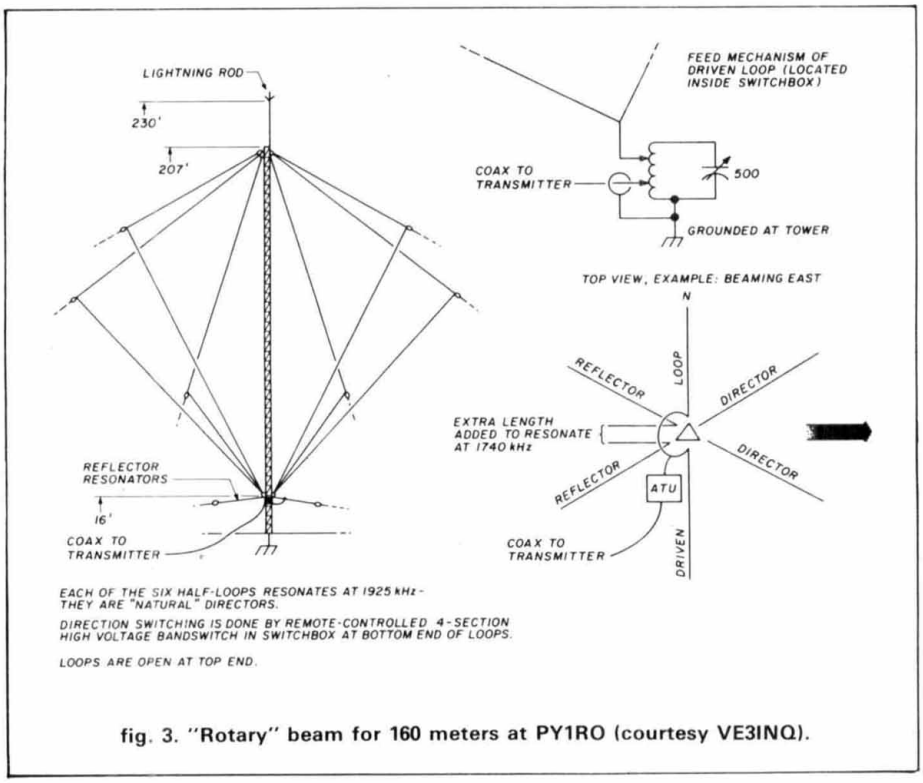

fig. 3. "Rotary" beam for 160 meters at PY1RO (courtesy VE3INQ).