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A 5/8 WAVELENGTH WEATHER BALLOON VERTICAL THAT WORKS!

The antenna described in the June, 1971 issue of *73 did* work, as verified by witnesses and dozens of FB signal reports. To determine *why* it worked, another weather balloon antenna was sent up on July 16. Viewing the antenna from the ground, the answer was in plain sight, for in the gentle breeze, the antenna was on a 20–25 degree slope most of the time. Guying lines were not used on the first antenna, but were suggested as a method of holding the balloon in wind. Hence, the antenna was not a true vertical, but a "sloping longwire" or Hertz. While obviously the transmitter's pi-network was affording a fair match to it, the SWR observed may have been a false reading.

False SWR readings were also noted by an O.T. when using tuners on the transmitter end with extremely long antennas of this type. His article, written twenty-five years ago, will prove to be most interesting reading.[1]

This time, shooting for 5/8 wavelength, which is optimum for the lowest angle radiation from a vertical, I measured off 83 ft of 22 gage enameled wire for operation on 40 meters. A size "E" (22 cu. ft) cylinder of helium, a helium regulator, and an 8 ft diameter weather balloon were acquired.[2]

Helium and regulators are available from your local welding supply house. You *buy* the contents of the helium cylinder; you

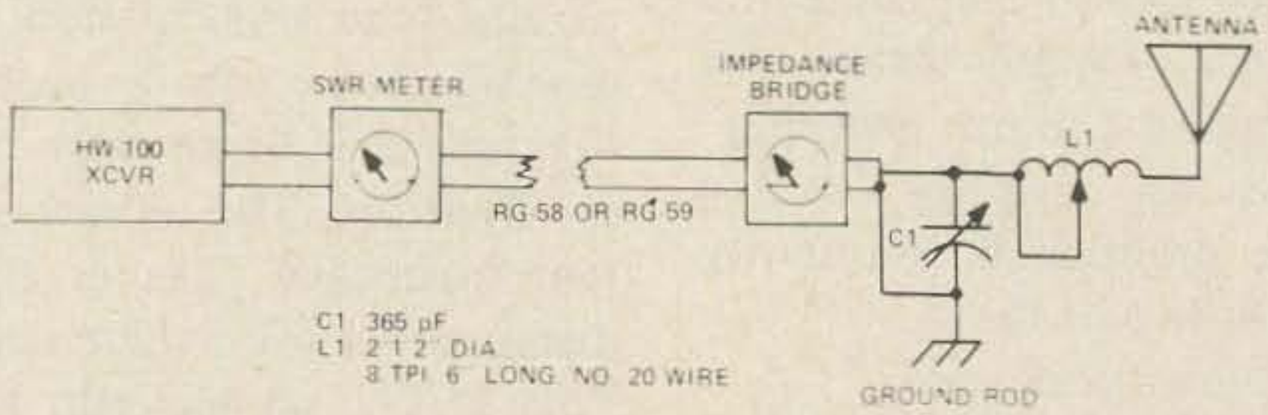

Fig. 1. The equipment setup used to match the 5/8 wavelength vertical. The impedance bridge is not necessary, but saves time by getting the coil tap "in the ball park" quickly. The matching network shown below gives an SWR of 1:1 on 40 meters.

rent the regulator, and put a deposit on it and the cylinder. The deposit is refundable when you return them.

The setup in Fig. 1 was then constructed. The impedance bridge is not necessary but saves time by getting your coil tap "in the ball park" quickly. The particular impedance bridge used here used a grid-dip oscillator for its operation, and thus operating the transmitter was not necessary. If using the impedance bridge in the ARRL handbook, tune up using just enough power to obtain a reading. Set the bridge to 50 ohms or 72 ohms, depending on whether you use RG-58 or RG-59 coax. Using just enough power for a reading on the impedance bridge, run the alligator clip up and down the coil to get a coarse dip on the meter. My coil tap was 4 turns from the antenna side. The 365 pF capacitor is then adjusted for lowest dip with the capacitor approximately half-open.

The impedance meter is then taken out of the circuit and the rig tuned up, again using just enough power to achieve an SWR reading. At this point the SWR read 3:1. This is because the impedance bridge can only read pure resistance accurately and the reactance of the matching network upsets it. A friend stationed in the yard adjusted the capacitor ever so slightly while I motioned through the window, and we had our 1:1 SWR!

We turned up on 40 CW and consecutively worked WB8GBK, WA5UGE, WB9FWJ and W5BYP, receiving 599 reports. Our last QSO was with W3EEK, who gave us a 589. Reason: a 3:1 SWR again.

We ran out back in the dark to find the weather balloon, still fully inflated, sitting on the ground. What brought it down? Dew! The kite string guy wires were soaked with it and quite heavy; for this reason, I recommend lightweight waterproof, floating, fly-fishing line.

With guy wires in place, the balloon vertical will perform satisfactorily on a relatively calm day. However, in stronger winds, the balloon will buffet downward, causing the antenna to become slack and even to touch the ground. For greater reliability, more lift is needed, and hence, more helium. As helium is quite expensive,

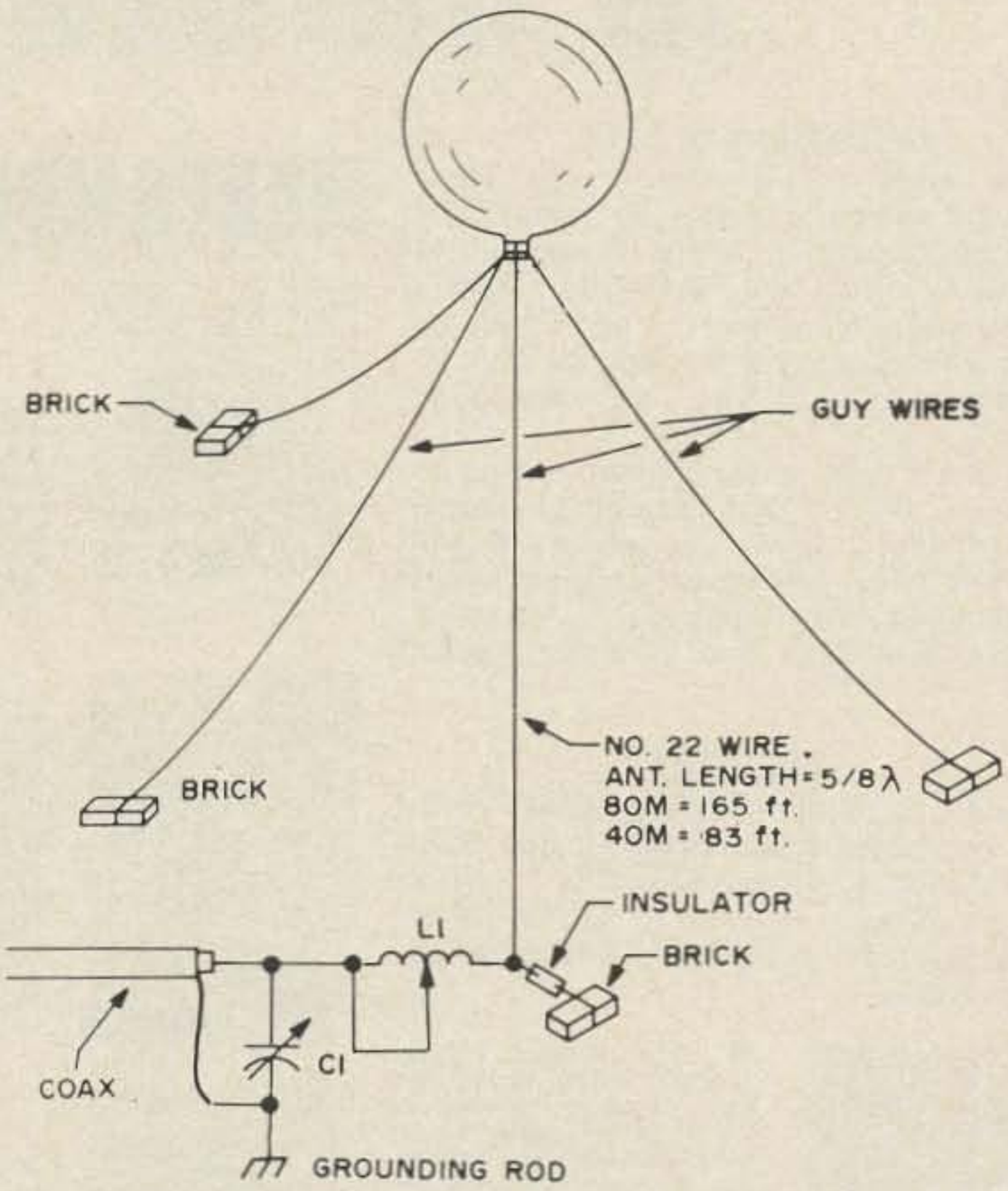

Fig. 2. The 5/8 wavelength weather balloon vertical with base matching network. No ground radials were used, although they could be added to improve performance. C1 – 365 pF receiving type variable; L1 – 2½" dia., 8 T.P.I., 6" long; 40M – 4 turns used.

the alternative then is hydrogen gas. Hydrogen cylinders and regulators are available, but as the cylinder is under great pressure, its use is quite dangerous. A safe alternative is the hydrogen generator kit offered by Fair Radio Sales, which uses lithium hydride in a steel cylinder, and is operated by immersion in water. The firm also sells a balloon inflating tube for use with the cylinder. As their price for the kit is cheaper than a size "E" cylinder of helium (22 cu. ft) and gives more gas volume (approximately 44 cu. ft), it should definitely be explored first, before purchasing helium.[3]

Good luck and good flying! Comments will be appreciated; enclose a stamp.

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1. George Bonadio, "The Balloon Antenna Flies Again," *QST* March, 1947.
2. Eight foot balloon, stock No. 60568, available from Edmund Scientific Co., Barrington, N.J. 08007. $2.00 postpaid.
3. Fair Radio Sales Co., 1016 E. Eureka St., Lima, Ohio 45802. Catalog No. 71, page 31, Hydrogen Generator Kit, #M-315 $6.95. Balloon Inflating Tube, #M-315 $1.50. Shipping weight 8 lbs.