

DESIGN, CONSTRUCTION, FACT, AND EVEN SOME FICTION

This and That

This month's CQ column ranges across the board with a wide variety of antenna topics, including followup on previous antenna column features. We believe you'll find this an interesting presentation that touches on many bases.

Last month in our "Reader Report" feature we used some incoming mail as a point of departure to present a variety of antenna and tower construction ideas. We also made note of some correspondence that took us to task for some advice we provided in the column, and we presented a simple but useful Quad antenna design program for the popular Vic-20 personal computer.

This month we will provide some additional information received from WB3GXV on his interesting tower which we profiled in last month's issue, and we'll take a second look at the Windom antenna. We also will make mention of a simple shirt-pocket "J-Pole" for 2 meters, highlight some new antenna products, and take note of the Ham Pet Users Group (HAMPUG) and its activities.

First, a followup on the WB3GXV tower described in last month's CQ.

More on the WB3GXV Tower

In last month's column we described Ed Long, WB3GXV's rock-solid roll-over tower, on which he installed a Quad built from an earlier published CQ article (April 1982). Ed passed along some additional information to us about the Quad's construction details; these were received too late to insert conveniently in the previous column, so we will summarize them here. The essentials of Ed's addenda are as follows:

1. *Background on the tower.* Having decided to build the Quad and wanting a tower that was easy to erect, of sturdy construction, and safe, too, he decided that the only reasonable way to assemble the antenna was to have the tower in a horizontal position about 15 feet above ground. This prompted him to design a hinge arrangement secured to the side of a Rohn 25 G tower (but with no holes drilled in tower members). The tower proper is made up of five 10 foot sections of Rohn 25 G and one 8 foot section of Rohn

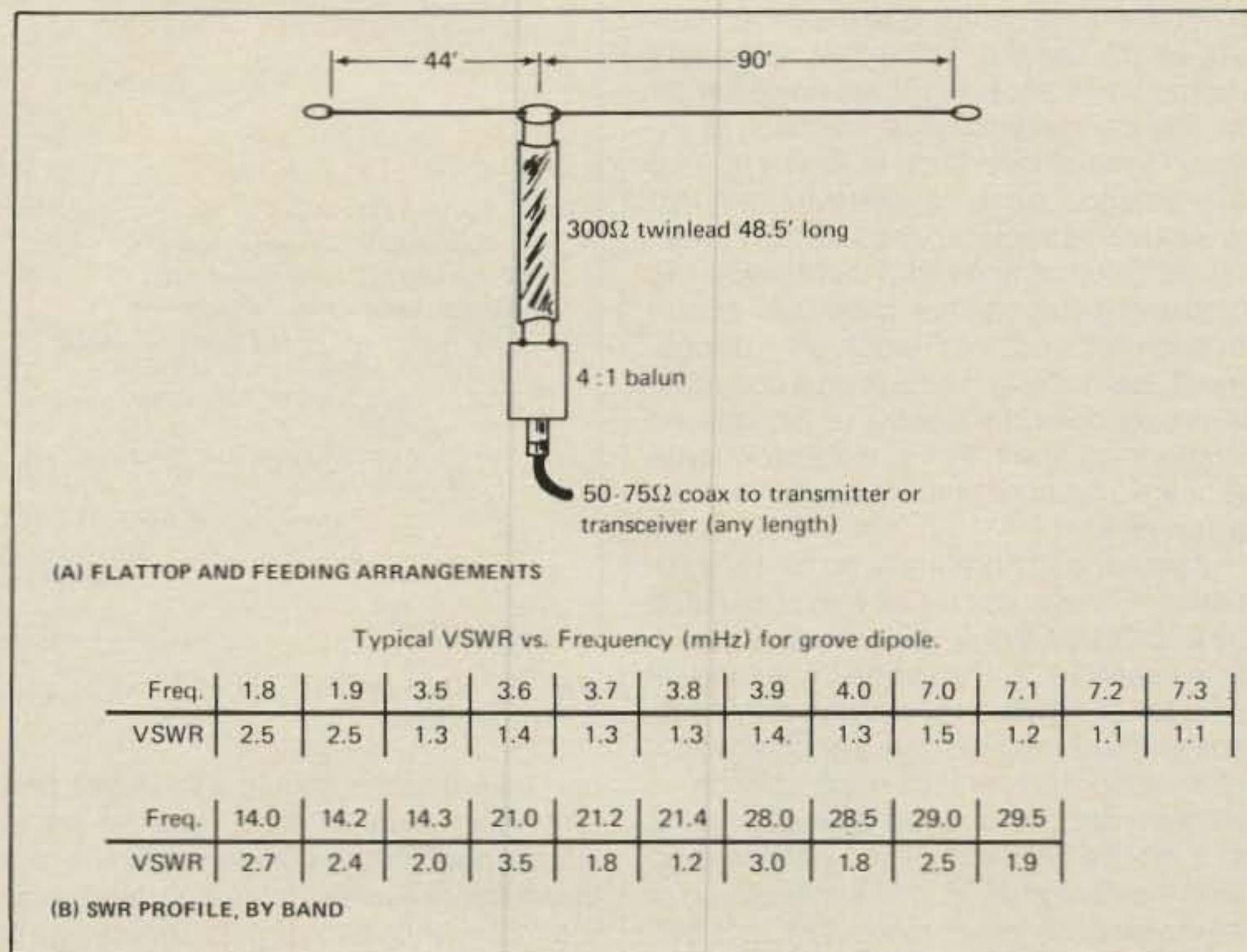


Fig. 1— Modified Windom for 15 meters. (Source: Monitoring Times, May-June 1983.)

HD-73. In the horizontal down position the tower rests in a cradle made of 4 x 4 timber 15 feet long. The timber is bolted to an angle iron secured in a concrete base. The top of the cradle has a 2 x 4 which forms a "tee" on which the tower rests (see photo series in last month's column).

2. *Cost.* The cost of materials going into the tower, exclusive of the Rohn sections and guying, approximated \$425. The direct costs totaled \$385, including:

a. Two winches rated at 2,000 lbs., with handbrake, and having a gear ratio of 12.5:1—\$98.

b. Miscellaneous structural steel, pipe, and aluminum—\$88.

c. Steel cable and miscellaneous fittings—\$117.

d. Cement, gravel, and sand—\$60.

e. Hardwood for the hinge pad and treated wood for the cradle—\$22.

3. *Dimensions.* The roll-over tower is 58 feet from the base to the top of the Rohn tower, with an additional 10 foot mast up to the hub of the quad. (The assembly has been in place for more than a year with no wind-load problems, despite wind gusts to 55 m.p.h.)

Ed believes that the level of detail and overall outline presented is adequate for

the reader to adapt the tower to his own desired situation. Conversely, if the tower height requirement is under, say, 40 feet, he sees no need for many of the structural braces, the A-frame locking bar, and the backup winch. However, for those interested in the design, Ed is willing to provide sketches. His address is 9801 Watts Branch Dr., Rockville, MD 20850.

The Windom Revisited

An h.f. antenna that waxes and wanes in popularity, but one that never truly "dies," I have found, is the venerable Windom. The original design was appropriately named after the amateur, Loren Windom, W8GZ, who developed it and wrote it up for publication in the 1930s. Not seen much in its original "off-centered Hertz" configuration, the antenna is simply a half-wave flattop (at the lowest operating frequency) which is fed at a point about 15% from the center with a singlewire feeder of convenient length. However, contemporary versions substitute 300-600 ohm twinlead or openwire line for the singlewire feeder.

The nominal 300-600 ohm feedpoint impedance of the Windom allows a fairly good match to twinlead and openwire line on all even harmonically related bands.

317 Poplar Drive, Millbrook, AL 36054

Getting good results is little problem on 80, 40, 20, and 10 meters with the even-order relationships involved. A typical flattop dimension is about 137 feet, with the feeder tapped at a point 20.5 feet (15%) off center. If 80 meter operation isn't important, an antenna length of 68 feet can be used to work 40, 20, and 10 meters; in this case, the feeder is tapped at a point about 10 feet off center.

The Windom normally doesn't do much for the amateur who wants to operate on 15 meters, since the necessary harmonic relationship does not exist on 15. The solution usually envisioned to enable 15 meter operation is simply to feed the antenna as a randomwire against ground. This requires the use of a wide-range antenna tuner that can handle the high input impedance expected at the transmitter end. With such an arrangement, feeder length becomes a consideration, as does the quality of the ground system; too often, "r.f. in the shack" type problems are encountered with such an arrangement.

Another and potentially far better solution to 15 meter operation was postulated by Bob Grove, WA4PYQ. He was primarily in search of an "all band" coax-fed dipole for shortwave monitoring purposes, but which also would give a good account of itself on transmitting, especially on 15 meters. Bob did a good deal of pruning and on-the-air testing, and he came up with the design of fig. 1A. It makes use of an empirically determined 134 foot flattop which is fed through a relatively short (48.5 foot) 300 ohm matching section and a 4:1 balun transformer, with coax of any convenient length being used for the main run to the hamshack.

Bob reported good results with the antenna in the May-June 83 issue of *The Monitoring Times*, his in-house Grove Enterprises publication, and at his forum at the 1983 Atlanta HamFestival. S.w.r. does run a little high at a few points (for example, 3.5:1 at 21.0 MHz, 2.7:1 at 14.0 MHz, 2.5:1 at 29.0 MHz, and 2.5:1 on 160 meters—a "bonus" band). However, the figures cited are extremes, and don't look greatly different from s.w.r. figures which might be encountered using an ordinary dipole on band edges. Fig. 1B depicts the s.w.r. figures Bob found on each band, 160 through 10 meters.

We would like to learn of the results obtained with this antenna, especially on 15 meters. Also, would anyone care to scale down the modified Windom to half-size dimensions, sporting 22 and 45 foot legs? We'd like to hear of results with the mini-Windom, too.

The 2-Meter Shirt-Pocket J-Pole

We've written before about the good performance and low cost of the so-called J-pole antenna for omnidirectional v.h.f. and u.h.f. work. Fig. 2 shows a sketch of a handy "shirt pocket" 2 meter version of the J-pole antenna. This type of

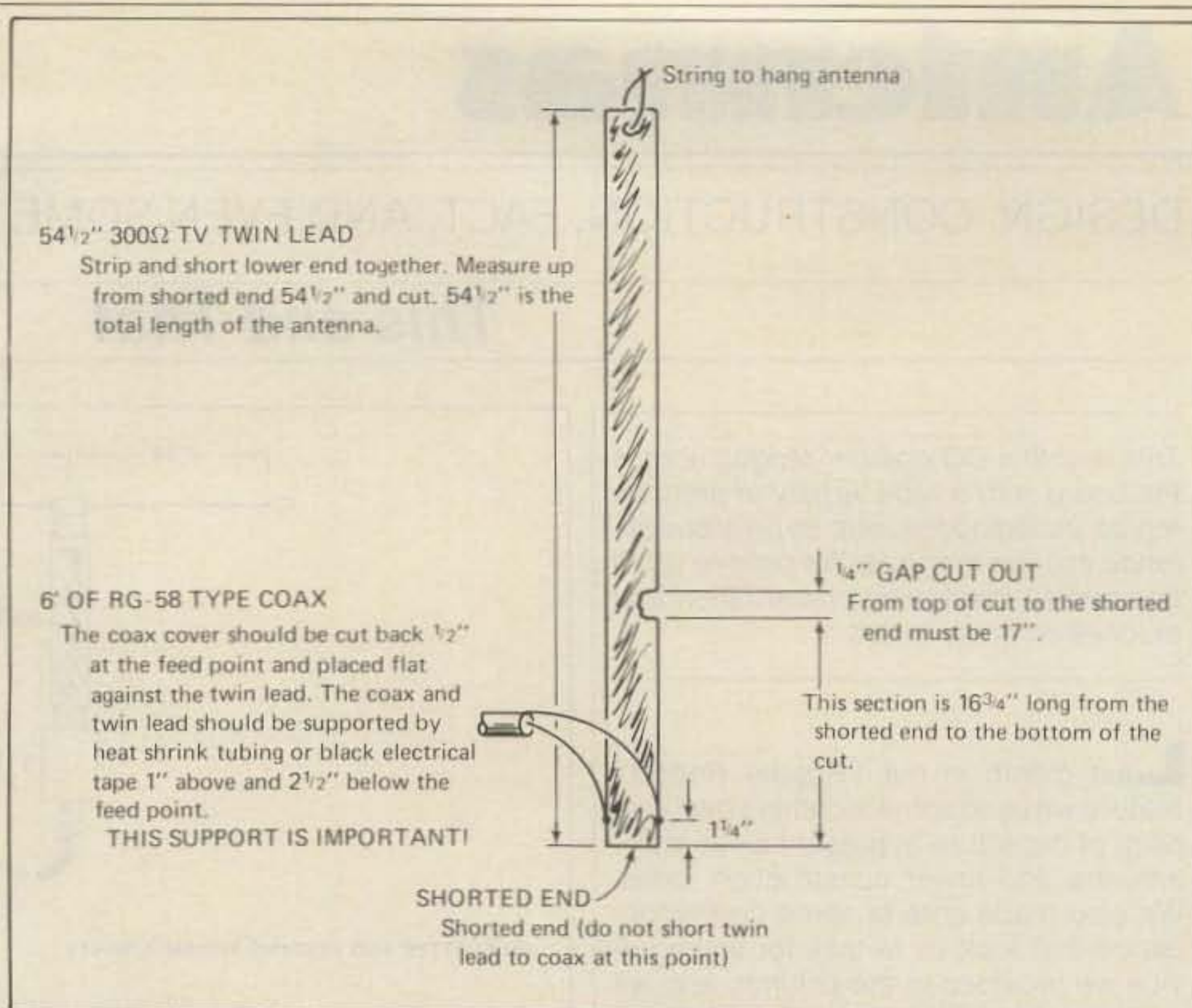


Fig. 2— Shirt-pocket J-pole 2 meter antenna. (Source: Top of the Rock, June 1983.)

portable antenna should give better performance than a short quarter-wavelength, back-of-the-rig whip or similar antenna for casual portable operation—as in a motel while on the road. This design is by Dwaine, K15A, and I saw it in the June 1983 issue of *Top of the Rock*, the journal of the Alford Memorial Radio Club, as submitted to the *Rock* by Dave, KA4HMG.

A little background on the J-pole is in order here. It's an antenna that has been in and out of popularity since the 1930s as a very simple, inexpensive, and easily constructed resonant antenna for v.h.f. and u.h.f. use. In its "first-class" incarnation, such as for business, police, and fire applications, it is normally constructed from parallel lengths of aluminum tubing supported at the bottom where the matching stub is located. A distinct advantage of this antenna is that despite its relatively great length, a "Slim-Jim" appearance results, as no radials are required for proper operation.

In most quick-and-dirty ham versions, designed for windowsill, attic, and other tucked out-of-the-way situations, the antenna is simply constructed out of a length of TV-type 300 ohm twinlead and tacked, stapled, or tied at the top to a beam or other support. It can be fed in one of several ways, but the most convenient feed is by 50–75 ohm coax through the built-in quarter-wave matching section, which is made from the lower portion of the twinlead itself. (Note the way the coax is attached to the mounting section; in practice, the feeder attachment point may have to be varied slightly for best operation and lowest s.w.r.)

The dimensions shown in fig. 2 should work well for 2 meter operation, and they may be proportionalized for operation on other v.h.f. and u.h.f. bands. To keep antenna operation from being upset, try to keep it as far away as possible from interior wiring and large metal objects. Feeder length should not be critical.

One advantage of the J-pole, of course, is that the antenna and its feedline form an integral unit, which is flexible and can easily be stuffed into a suitcase or pocket. The whole thing can also be rolled up and packed along with the transceiver in its carrying case or box, or carried in the glove compartment of an automobile. Expect performance to be much better than that of a quarter-wave antenna, but slightly inferior to that of a 5/8-wavelength ground plane.

More From WD4BUM

Several months ago, while perusing the "good deals" in the Atlanta Ham Festival fleamarket, George Shira, WD4BUM, flaged me down. George has a small business in Anderson, South Carolina, where he manufactures a variety of h.f. and v.h.f./u.h.f. mobile antennas, mounts, and accessories. I had mentioned his products in a previous column (*CQ*, April 1982), and he wanted to show me a new three-band magnetic-mount mobile antenna he was putting on the market.

The antenna is designed for operation on the 144, 220, and 445 MHz bands. It consists of two interchangeable stainless steel rods (one for quarter-wavelength operation on 220 MHz, the other for either quarter-wave operation on 144 MHz or

three-quarter-wave operation on 445 MHz) and a standard mobile mount, plus a length of coax. With this arrangement it is possible to change operation from 2 to $\frac{3}{4}$ meters without leaving the vehicle. A quick change of rods is required for a switch to 220 MHz operation. No traps or gimmicks are involved, which at these frequencies can lead to losses and high s.w.r. problems.

According to George, the antenna operates over the bulk of the three bands with an s.w.r. of less than 1.5 to 1. The antenna is priced at \$14.95 with a choice of PL-259 or BNC connector; the latter connector is recommended for 445 MHz operation.

An inexpensive product that George sells in considerable quantities and that he provides as a "freebie" with any magnetic antenna or mount is a little 4 inch diameter vinyl cutout which can be placed under the mag mount in order to protect the automobile paint job from marring. The adhesive-backed vinyl sticks easily to metal surfaces, and it also may be razor-trimmed and affixed to the bottom of the mount instead, should one be concerned with the possibility of the adhesive baking onto the paint surface. The vinyl protectors should not significantly affect antenna performance, as adequate coupling should exist between the mount and the metal car surface. The protectors are available from WD4BUM for 25 cents. His address is: RFD 7, Box 1011, Anderson, SC 29624.

HamPUG: Ham PET Users Group

With the increasing use of personal computers (PCs) in the ham shack, it was inevitable that specialized computer users would form their own "users groups" to swap technical and product information, as well as special-purpose software. One such group is the HAMPUG, or Ham PET Users Group, which is made up of hams who use the PET and other Commodore computers.

A "coordinator" for the HAMPUG, which is casually organized, is Clark L. Stewart, W8TN, 104 Henrietta St., Ravenswood, WV 26164. In a recent note he advised that there is no particular person handling the exchange of programs for the group. However, interested Commodore computer users may wish to check into the 40 meter net on 7.156 MHz at about 1300 UTC on Saturdays, or into the 20 meter net on 14.240 MHz on Sundays at 1700 UTC. Clark also advises that Don, WD0CHW, is quite active with ham radio programming for the Commodore 64, while Bob, WA2YNT, is similarly active with the Vic-20.

In addition to the HAMPUG, we understand that an Ontario-based Vic-20 ham net is active on Monday evenings on 3760 kHz. Net manager is Joe Cain, VE3ANJ, and net control is Bill Melhuish, VE3AOY. Be flexible on the time; I have it as 8:30 p.m. EDT as this is written.

We'd like to hear of other users groups having a distinct ham radio flavor, not only for the Commodore/PET series, but for other popular PCs.

CQ Back Issues and Articles

We often receive requests for back issues of CQ which contain referenced antennas column articles, as well as copies of individual columns alone. We normally keep only a couple of personal copies of the magazine for our files, and thus are unable to furnish whole issues. Often, a reader will request copies of an entire series of Antennas column articles, such as the seven-month-long "Antenna Accessories for the Ham Shack" series. While we can usually help out with a xerox copy of a column here and there, we ask that you try first to obtain the article locally from another amateur, or from a local library, as many of the latter receive CQ. Next best is to order the particular issue in which the article is found from the CQ offices. Back issues or copies of articles are usually available directly from CQ at \$2 each—a good deal. These issues can be obtained by writing to CQ at 76 North Broadway, Hicksville, NY 11801 and enclosing a check or money order with the request.

If you need a particular antennas column or article for your files or a project and for some reason you can't obtain it otherwise, I can furnish you with a copy. Figuring copying costs at about 25 cents

per page and an average of 4 pages per monthly column, then adding in a fudge factor for postage, about \$1.25 per article or column should do it. IRCs would be appreciated from overseas readers.

Wrap-up

We hope you've enjoyed this month's potpourri of antenna topics. These have included more details on the WB3GXV tower, some ideas on construction of Windom and J-Pole antennas, and mention of the HAMPUG nets, plus assorted odds and ends. Next month we'll present several additional antenna topics of current interest. 73, Karl, W8FX

Bibliography

Grove, Robert B., WA4PYQ. "The Grove All-Band Dipole," *Monitoring Times*, May-June 1983.

Staff article, "Multiband Antennas—How Not to be Trapped," 73, March 1975.

Stanley, J.A. *Ham Antenna Construction Projects*, Howard W. Sams & Co., Inc., Indianapolis, 1969.

Thurber, Karl T., Jr., W8FX. Antennas column (untitled), CQ, November 1981. (Description of the "J" as a monitoring antenna for v.h.f./u.h.f.)

Thurber, Karl T., Jr., W8FX. "The Windom and its Close Cousins," in the Antennas column, CQ, January 1981.

Top of the Rock, bulletin of the Alford Memorial Radio Club, Stone Mountain, Georgia, Vol. 1, No. 6, June 1983.

Addenda

Add these to the list of the amateur software sources which we published in the October 1983 antennas column, page 105. Again, our apologies to any ham software source we did not include, either in this listing or in the original October 1983 "amateur software sources" listing.

VIC/CBM-64/TRS-80

Base 2 Systems
2534 Nebraska St.
Saginaw, MI 48601

VIC

Journal/20
P.O. Box 1149
Van Alstyne, TX 75095

VIC/PET/CBM-64

Amateur Accessories
6 Harvest Ct., RD7
Flemington, NJ 08822

Apple/VIC

HRA Electronics
P.O. Box 571
Hoodsport, WA 98548

Apple

Bob Jackson
Box 57304
Webster, TX 77598

TRS-80

Edward W. Sleight, K4SB
3496 Velma Dr., S.W.
Powder Springs, GA 30073

IBM-PC

Micro Electronic Systems
19 Annette Park Dr.
Bozeman, MT 59715

VIC/CBM-64/PET/Apple/IBM-PC

Flynn's Business Services
P.O. Box 903
Mountain View, CA 94043

Various Computers

AMSAT Software Exchange
Box 27
Washington, DC 20044

Various Computers

EGE, Inc.
13646 Jefferson Davis Hwy.
Woodbridge, VA 22191

Various Computers

Long's Electronics
2700 Crestwood Blvd.
Birmingham, AL 35210

VIC/CBM-64/PET

Procast
P.O. Box 682
Millersville, MD 21108

VIC/CBM-64

G. Delano
2400 Hubert
Bakersfield, CA 93308

VIC/CBM-64

Electronic Put-Ons
7805 N. E. 147th Ave.
Vancouver, WA 98662

TI99/4A

John A. Pierce, WA3RSK
5720 East Pine Drive
Riverdale, MD 20737

CBM-64

Dennis Oliver, N7BCU
20909 S. Ferguson Rd.
Oregon City, OR 97045

VIC/CBM-64

USEFUL Software
P.O. Box 115
Lake Elmo, MN 55042

Various Computers

Mark Electronics
17589 Birch
Romulus, MI 48174

Printer Configuration Programs

Down and Out Software
33 Storm Drive
Holtsville, NY 11742

TRS-80

CYNWYN
4791 Broadway, Suite 2F
New York, NY 10034

VIC/CBM-64

FoxTango Corporation
Box 15944C
W. Palm Beach, FL 33416