Francis McDonough W3PMV
1226 Clairhaven St.
Pittsburgh 5, Pa.

The TV* Antenna

A Compact full size 20 Meter Beam with increase in height bonus

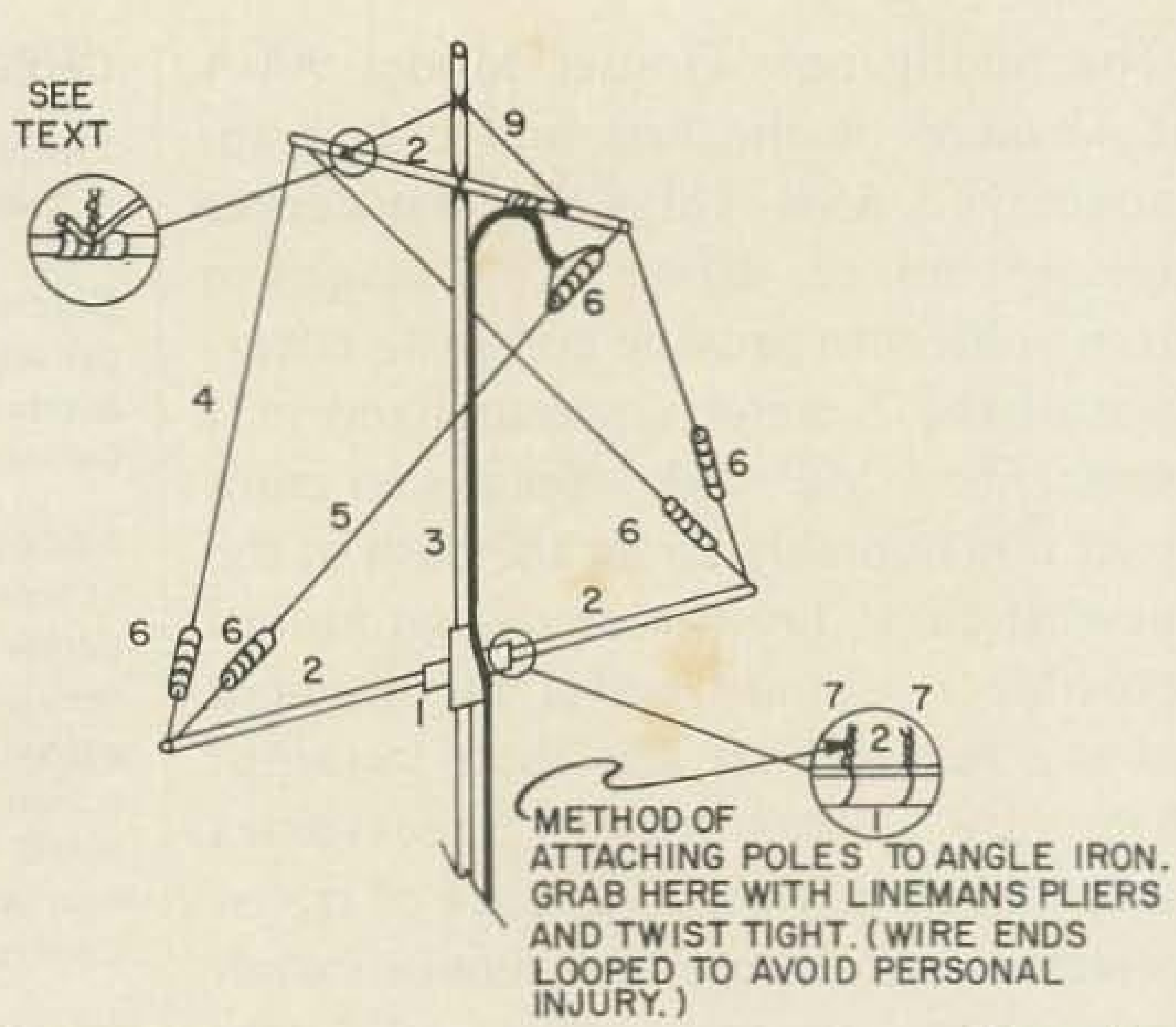
Have you just not quite enough antenna space? Do you desire a higher antenna without the added weight and expense of a taller tower or mast? Are utility lines, trees, etc. an obstruction to propagation? This antenna may possibly be a solution.

A glance at the sketches A and B will show that 33 feet of wire can be accommodated within a 24 ft span by raising the center approximately 12 ft, giving an average height increase of 6 ft. Horizontal separation of antenna, parasitic by 12 ft at the centers, and bringing the ends in closer, creates an average spacing of 6 ft, approximately .1 wave at 14 mc.

Construction

A hole is drilled in the center of each piece of angle iron to accommodate a one quarter inch (or larger) diameter nut and bolt. The pieces of angle are placed back to back to form the "X" and bolted tight. Additional support is not essential because when the antenna elements are mounted and secured, it will stabilize the array. Two horizontal 12 ft poles are then secured to one section of angle iron using galvanized iron wire as clamps, three clamps for each pole. The poles should first be wrapped with a layer of friction tape where the wires go around. The vertical 15 ft pole is then mounted to the angle using five clamps of iron wire, and when it is secure, the last 12 ft pole is lashed (at its center) to it (horizontally) three feet down from the top, but at right angles to the bottom hori-

* T shape structure; inverted V elements.



Front view

Top view

Oblique view

1. 2 pc angle iron (1" stock) ea 2 ft long (1/16" thick)
2. 3 12 ft bamboo poles
3. 1 15 ft bamboo pole
4. 35 ft #14 copper wire (ref.)
5. 33 ft #14 copper wire (ant.)
6. 5 small insulators
7. Galv iron wire (guy wire)
8. Misc pc #14 copper wire
9. Plastic clothes line 7 or 8 ft.
10. Roll friction tape
11. ½" or 5/16" nut ang bolt ½" long

zontal poles. Here again a layer of tape is used over the poles, and several pieces of galvanized iron wire wrapped around, criss-crossed to secure well.

A support strut of plastic clothesline is used to prevent the sag of the top horizontal pole caused by the weight of the antenna and coaxial line. Tie a knot at each end of the plastic line, lay it along the pole (center of line at center of pole), wrap friction tape around line and pole at the knot, then secure with a piece of wire wrapped around on top of the layer of friction tape (per top insert sketch 3). Do this at each end of the line. The center portion of the line is wrapped with a layer of friction tape, and raised enough to keep the pole straight; secure line to vertical pole using a piece of wire.

Now to mount the antenna and reflector: With the structure placed so the horizontal top pole's heavier end up attach the center of the 35 ft reflector element to the end of the pole on the ground by means of a loop of copper wire tightly wrapped and twisted, then attach the ends of the reflector element to the ends of the horizontal poles at the base of the structure lying on the ground in similar manner. (Wrap tape over ends of poles wherever wires are attached).

Flop the array over and secure the center of the antenna element to the thick end of the upper pole, and ends of antenna to lower poles. (Similar manner as reflector).

The antenna and reflector end insulators are actually secured about a foot in from the ends and the element ends are left "hanging." Short pieces of wire or plastic line may be used as end supports from the insulators to the poles.

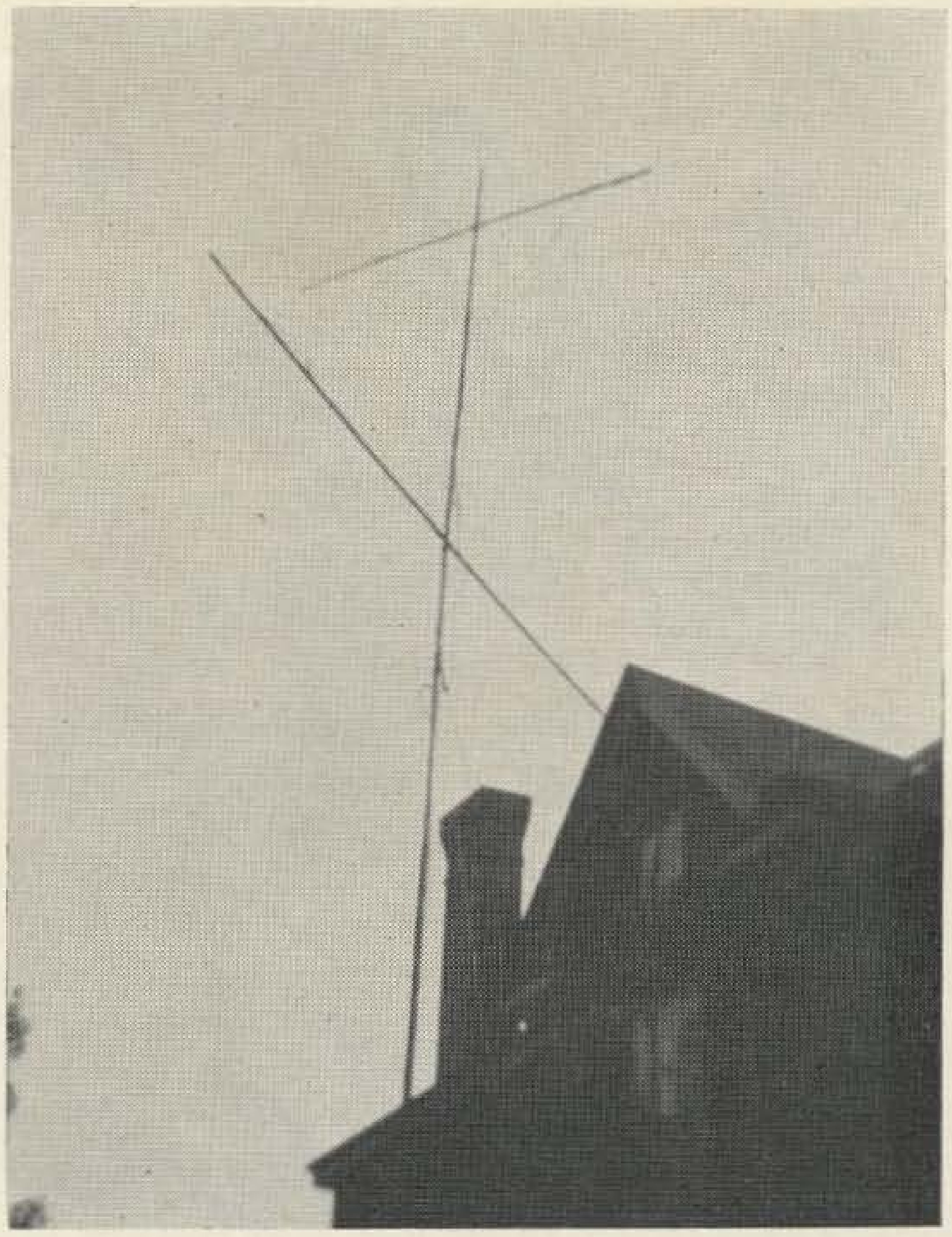
Connect coaxial feed line (50 ohms) to center of antenna, tape along poles where convenient.

The array is secured to a one inch pipe, top section of the mast* by means of five clamps, consisting of two sturdy 1½ inch hose clamps and three galvanized wire clamps, first wrapping the mast with some friction tape, so that when the angle and mast are clamped tight, the chance of wind twist is nil.

I recommend painting the iron and using linseed oil on the poles for greater durability. If desired, fiberglass rod arms may be substituted for the horizontal poles, and heavy wall aluminum tubing for the vertical pole. A standard TV antenna rotator may be used for remote control.

Results speak for themselves. DX stations QSO'd on 20 Meters were ET3AD, VQ8BL

* Dec 59 QST page 28 "Fold Over Mast"



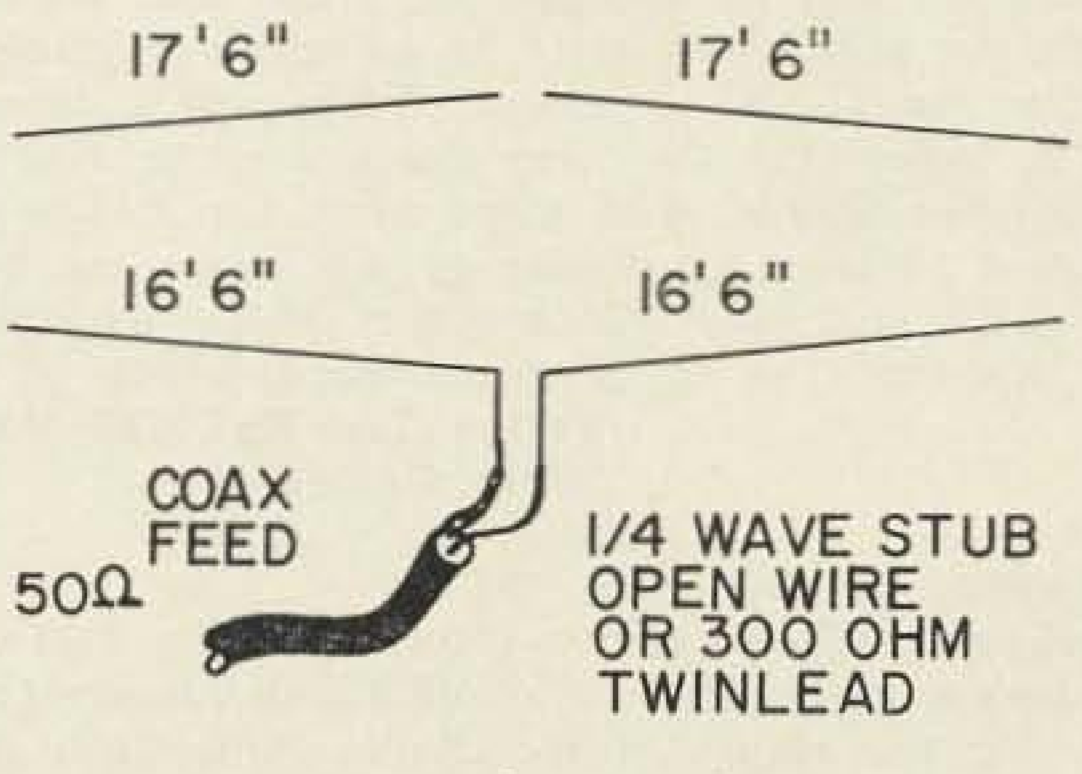
AC4NC KC4USN * YS1MS * W5NAX/EAØ * VQ9HBA VR3L KS6AM UM8FZ 5U7AD ZL4GA JA7AD CN8MB 6Ø1MT UAØKID VK5ZL and dozens of Europeans and So. Americans. (from July 61 to July 62 running 300 watts to homebrew xmtr, average city location) The SWR is 2:1 at 14,000 and 1.3:1 at 14,300 kcs.

The front to back and side ratios are not what one would obtain if a horizontal antenna were used, as there is an amount of vertical polarization present, but the major lobe is higher above the ground than would be obtained using a regular beam or ground plane antenna atop a 35 ft mast, which was the main purpose of this project.

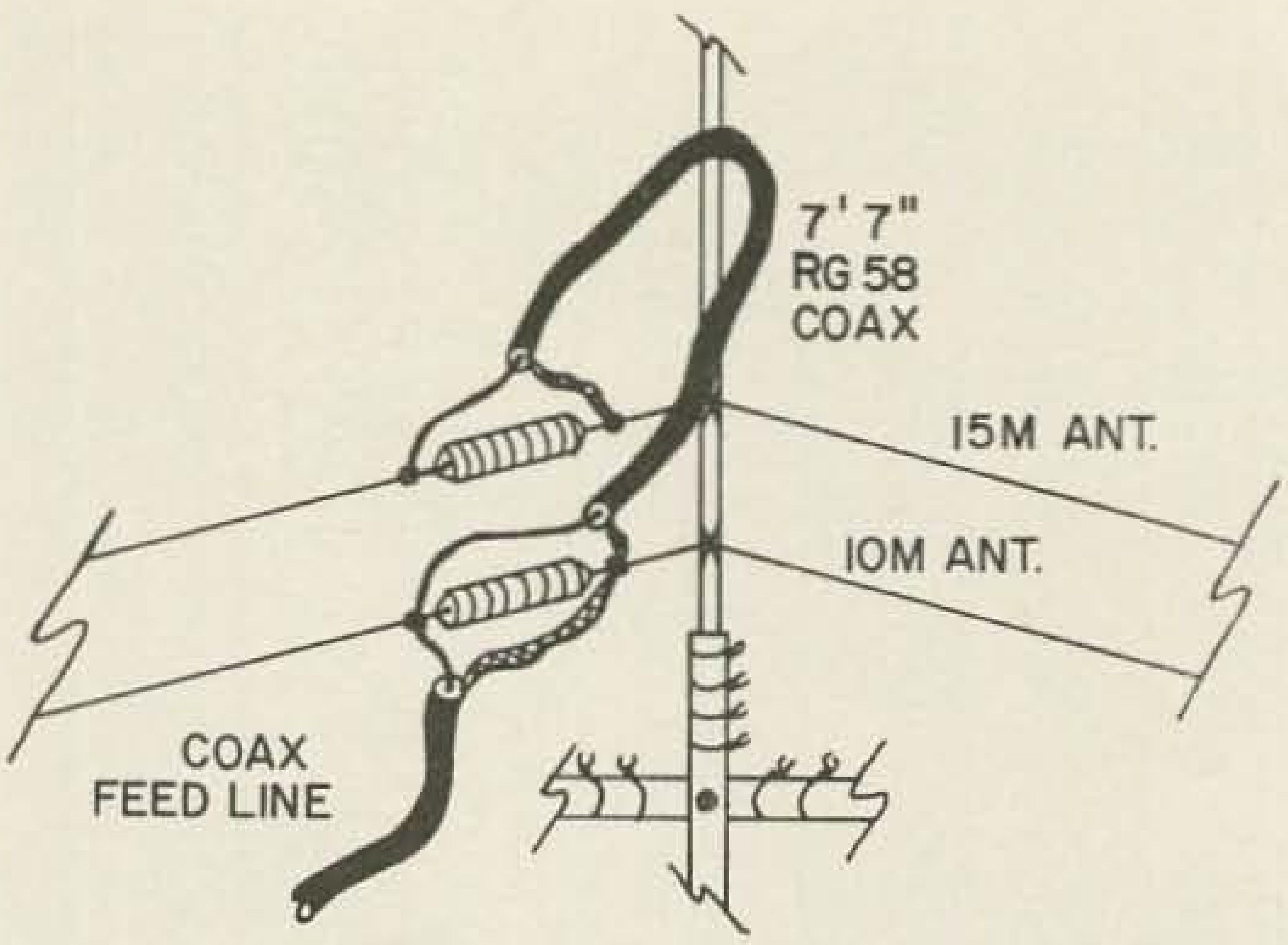
Adding 10 and 15 Meter dipole antennas

Desiring to operate also on the 10 and 15

* SSB



2 ½ waves in phase driven elements
2 refectors (one behind each driven element)



meter bands, the author included antennas for these bands on the same structure used for the "Compact 20 Meter Beam."

The center of the 15 meter dipole is mounted to the vertical bamboo pole about a foot above the angle iron, the ends secured near the ends of the horizontal lower poles. The 10 meter dipole is spaced six inches below the 15 meter antenna by means of a half dozen or so feeder spreaders. Dimensions are 22 ft and 16 ft 6 in of #16 copper wire for the 15 and 10 meter bands, respectively.

Feeding both antennas is accomplished at the centers by means of a single coax line (RG58) and a decoupling stub of 7 ft and 7 in RG58/AU between the antennas. (Without the stub, the SWR is not satisfactory). It is important that the feed line goes to the 10 meter antenna *first,* then the short coax stub feeds the 15 meter antenna. The stub is folded up and secured against the vertical pole with friction tape.

On-the-air-results indicate normal and satisfactory performance. DX is worked when 15 meters is open, and occasional 10 meter operation results in solid local and short skip QSO's.

Other Possibilities

An idea which occured while building the 20 meter beam was the possibility of converting it to a 10 meter four element beam. Collinear driven elements, (two half waves in phase merely by disconnecting the center coax feed, inserting a quarter wave stub of 300 ohm twinlead for 10 meters (6'6" considering the velocity factor) and feed the coax to the bottom of the stub.)

The 20 meter reflector could be opened at the center and it would then become two half wave 10 meter reflectors. The author experimented with this arrangement, making swr check which turned out very satisfactorily, almost 1:1 on 10 meters. However, being primarily interested in 20 meters and DX, the 4 element 10 meter beam was forgotten due to current band DX conditions. But here may be some food for thought for some of the VHF enthusiasts who may desire to "homebrew" antennas by altering the dimensions to suit the band desired.

I'd be interested to hear from anyone who may string up the 2 element 20 meter beam and 4 element 10 meter beam on the same framework. Also, if anyone goes to the extent to make field strength measurements of the 20 meter antenna alone and makes a graph indicating the actual radiation pattern, I'd be interested in the results.

. . . W3PNV

Letters

Dear Wayne,

I have been keeping up with the various controversies in 73 and QST. I suppose I don't have to tell you to keep up the good work and keep needling the QST-boys, they need it! This new "incentive licensing" is a double cross if there ever was one. You mentioned that there is a danger that we might lose portions of our ham frequencies. I would like to go one step farther and say that practically speaking 40 and 80 are one big mess and are lost out in the Pacific area. 20 meters is going also. I might add a plug for the U. S. operator. Whenever I tune to 20 meter CW invariably the nice clean, smooth CW signals come from the States. The same goes for AM and SSB. If you want to hear lousy signals just come out here and get an earful and you will wonder where the QST-boys got the idea that the U. S. hams are a bunch of lids.

Father Ted K9TXM/VK9TG
New Guinea

Dear Wayne,

I have been following the growth of the IoAR and I hope it does a good job as the ARRL did many years ago in defending the rights of the Radio Amateurs. It seems they are getting out of hand and needs to be controlled as the F. C. C. did need to many years ago! Enclosed find $10 for the membership (I hope they accept foreign members).

I know how things can get when they are out of control as I live in a country where that has happened. Simply there is no control on the radio amateurs. They can run up to ten kilowatts P. E. P. and they are not controlled or put off the air. Most AM hams run 1.5 kw and sometimes twice that. At least 30% of the hams do not know how to tune their transmitter because they can get a license by just filling a petition to the office that gives the licenses. There is not examination to take (neither written nor code).

To point out how well this office of "Control de Radio" works there is a broadcast station whose assigned frequency is 825 kc plus or minus 20 cps and that station is operating on 822 kc, 3 kc lower. The office has received reports of the change of frequency from an F.C.C. monitoring station and the broadcast station was advised ten months ago of the "small" discrimination of their operatng frequency but they are still on 822 kc and advertising "Radio Titania, 825 kc"!

On the ham vhf bands, the only thing you can hear is commercial stations (some with ham calls). Most of them are used to communicate with farms or with taxis. There are more than 20 of these on six meters and many more in the two meter band.

Either too much control or too little, as here, in Costa Rica, is bad as you can see therefore I hope the IoAR does a good job.

TI2NA, Eric Roy
San Jose, Costa Rica