FEEDBACK

THE OFFICIAL NEWSLETTER OF THE

GEORGIAN BAY AMATEUR RADIO CLUB INC.

NOV 1994

Sponsoring

VE3OSR FM REPEATER	146.940- Mhz	BARROW BAY
VE3OST FM REPEATER	145.290- Mhz	OWEN SOUND
VE3GBT FM REPEATER	146.895- Mhz	MARKDALE
VE3IJD PACKET BBS	145.630 Mhz	KEADY

REGULAR EVENTS

GBARC MEETINGS: FOURTH TUESDAY OF EACH MONTH

BREAKFAST MEETINGS: SECOND AND LAST SATURDAY OF EACH MONTH

GBARC INFORMATION: INFORMATION REGARDING MEMBERSHIP SHOULD BE DIRECTED TO TOM VE3NEM 519-371-9499

Minutes of the meeting of October 25 1994

The meeting was opened by president Ken with 20 members present.

The minutes of the last meeting were adopted as printed.

A number of members volunteered to help with communication for the Santa Clause parade on November 19.

Tom VE3TSA mentioned that he is bulletin editor, course coordinator and delegated examiner, and he would like someone to take over some of it. After much discussion on how to make things easier for Tom, Brad VE3RHJ agreed to take over as delegated examiner.

Tom VE3TSA told us a little about the ham course which will start on November 15 and will cost $80 plus $30 for the text books.

Gene VE3IJD has made arangements to take a bus to Guelph to tour the Hammond museum on november 13.

Gene VE3IJD plans to run a one day packet course in January. Changeing the location of breakfast was discussed.

The amateur of the year award winner will be nominated and voted on at the November 22 meeting.

The meeting closed at 8:45 moved by Jack VE3DTS seconded by Cy VE3CC. The 50/50 draw was won by Brad VE3RHJ.....MINUTES TAKEN BY NICK VE3MWU

MEETING PLACE

Our meeting place for the OCTOBER club meeting will be at the **Billy Bishop Airport WEST OF Woodford**....on Hwy 26...editor

JAMBOREE ON THE AIR 1994

On Saturday, October 15th, the Georgian Bay Amateur Radio Club set up a portable station in Owen Sound's Harrison Park, for the benefit of local Boy Scouts who wanted to participate in the annual Jamboree-On-The-Air. We operated HF sideband, 2m packet, and 2m FM from 1 pm to 6:30 pm. One Scout troop (1st Kilsyth) showed up to use our facilities to contact other Scouts, and to learn more about amateur radio.

Many, many thanks go to Gary VE3IOD, Nick VE3MWU, and Aubrey VE3TUQ, who showed up at 11 am to set up the station, stayed the entire day to operate and chat with Scouts, and tore down the station at 6:30 pm. Thanks also to Moe VE3IBI who helped with the setup, Tom VE3TSA who donated two antennas, and Gene VE3IJD for making all of the advance arrangements.

Brad VE3RHJ

CLUB DUES

WELL IT'S THAT TIME OF THE YEAR AGAIN....CLUB DUES ARE NEEDED BEFORE THE END OF THE YEAR GUYS.... THIS KEEPS FEEDBACK COMING EVERY MONTH AND ALL THE OTHER ACTIVITIES GOING FOR ANOTHER YEAR...PLEASE MAKE YOUR REMITTANCE AT ANY CLUB MEETING OR SEND IT DIRECTLY TO:

TOM MERNER RR#4 OWEN SOUND,ON N4K5N6

$20.00 before or on Dec 31st.....$25.00 on Jan 1st or later

AMATEUR OF THE YEAR

THIS YEAR WE WILL BE AWARDING THE AMATEUR OF THE YEAR TROPHY AT THE NOVEMBER MEETING..... **THE AMATEUR OF THE YEAR AWARD IS PRESENTED TO THE CLUB MEMBER WHO HAS PUT CONSIDERABLE EFFORT INTO THE CLUB AND ITS ACTIVITIES AND WHO IS A GOOD EXAMPLE FOR NEW MEMBERS BOTH ON AND OFF THE AIR.**
HERE IS HOW IT WILL WORK....WITH THIS ISSUE OF FEEDBACK, PLEASE FIND ENCLOSED A BALLOT FOR THE "AMATEUR OF THE YEAR" AWARD. PUT THE AMATEURS NAME IN THE SPACE PROVIDED AND GIVE THEM TO THE CLUB SECRETARY (NICK MWU). FROM THE LIST HE MAKES UP HE WILL DO ALL THE NUMBER CRUNCHING AND DETERMINE OUR NEXT AMATEUR OF THE YEAR. NOTICE THAT THERE ARE NO NOMINATIONS AND THERFORE NOTHING TO DECLINE...IF YOU GET THE AWARD...YOU ARE THE LUCKY HAM.....GOOD LUCK TO ALL.....EDITOR

Shunt Feeding Towers for Operation on the Lower Amateur Frequencies

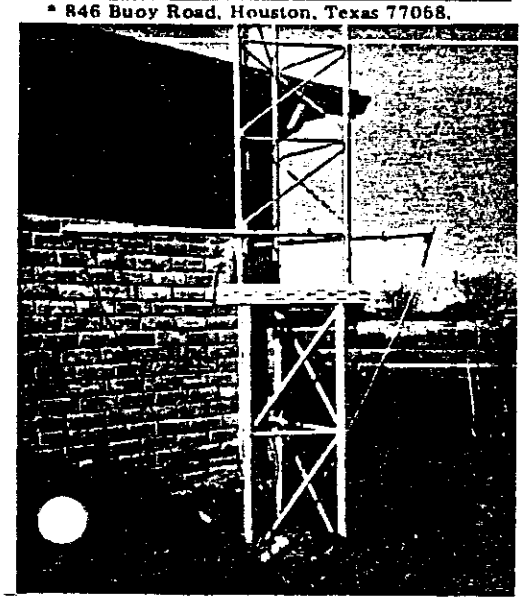
BY EARL W. CUNNINGHAM,* W5RTQ

THE SHUNT-FED VERTICAL ANTENNA has been around for years in many forms, but use of the system for the lower amateur frequencies in connection with tower-and-beam structures has been largely neglected. My interest in verticals developed when, as KL7FRY, in the Aleutian Islands, I noted that the strongest 160-meter signals from the lower 48 states came from vertical antennas. W0VXO in Minneapolis, using a shunt-fed tower, was heard well consistently. Today, as KV4FZ, using a similar method, he has a 160-meter signal known throughout the world. My first use of shunt feed, as W5RTQ, was an immediate success. VK6NK was worked for the first VK6 QSO from this country on 160 in September, 1969. The first W5 160-meter WAC was completed in 1973, by working JA7NI.

Shunt-feeding a tower used to support beam antennas for 14 MHz or higher frequencies has other advantages for the amateur who wants to work all lower bands. If a good ground system is installed, the result may be a very effective antenna for DX work on 80 and 160. The shorter tower installations may work very well on 40 meters, if the effective height above ground is less than 5/8 wavelength. Beyond this height the radiation angle goes higher, and the effectiveness for DX goes down.

The shunt-fed tower is at its best on 160, where a full quarter-wavelength vertical antenna is rarely possible. Almost any tower height can be used. If the beam structure provides some top loading, so much the better – but anything can be made to radiate, if it is fed properly. A self-supporting, aluminum, crank-up, tilt-over tower is used at W5RTQ with a TH6DXX tribander mounted at 70 feet. Measurements showed that the entire structure has about the same properties as a 125-foot vertical. It thus works quite well on 160 and 80 in DX work requiring low-angle radiation. It can also be used on 40, but results are rather poor because of high radiation angle. WB5FKX, with a 37-foot tower and a 21-MHz beam, finds that shunt feed on 40 enables him to work DX that he never knew existed before.

* 846 Buoy Road, Houston, Texas 77068.



Close-up view of the base of the shunt-fed tower, showing the two bottom arms and their insulators.

Preparing the Structure

Usually some work on the tower system must be done before shunt-feeding is tried. Metallic guys should be broken up with insulators. They can be made to simulate top loading, if needed, by judicious placement of the first insulators. Don't over do it; there is no need to "tune the radiator to resonance" in this way. If the tower is fastened to a house at a point more than about one-fourth of the height of the tower, it may be desirable to insulate the tower from the building. Plexiglas sheet, 1/4-inch or more thick, can be bent to any desired shape for this purpose, if it is heated in an oven and bent while hot.

All cables should be taped tightly to the tower, preferably on the inside, and run down to the ground level. It is not necessary to bond shielded cables to the tower electrically, but there should be no exceptions to the down-to-the-ground rule.

No rf problems have developed with rotators, beam traps, or even TV sets where the TV antenna is part of the radiating structure, as is the case at WB5FKX. His only precaution was use of coax on the TV antenna. It would be well to proceed with caution, as every installation could be different in this respect.

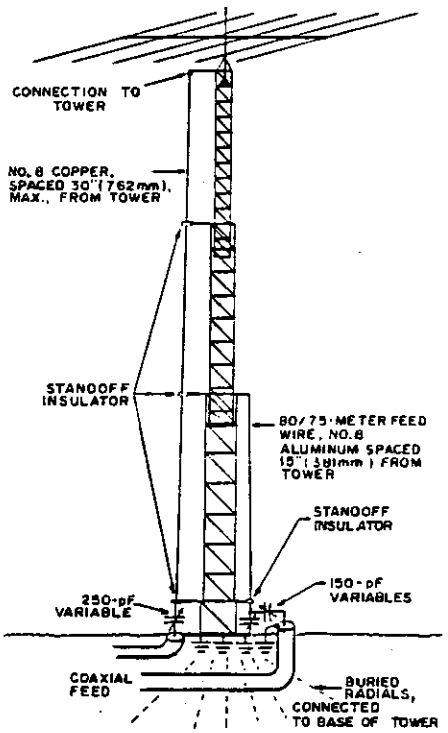


Fig. 1 — Principal details of the shunt-fed tower at W5RTQ. The 160-meter feed, left side, connects to the top of the tower through a horizontal arm of 1-inch diameter aluminum tubing. The other arms have stand-off insulators at their outer ends, made of 1-foot lenghts of plastic water pipe. The connection for 80/75, right, is made similarly, at 28 feet, but two variable capacitors are used, to permit adjustment of matching with large changes in frequency.

Though the effects of ground losses are less severe with the shunt-fed vertical than with the simple quarter-wave antenna, a good system of buried radials is very desirable. The ideal would be 120 radials, each 250 feet long, but fewer and/or shorter ones must often suffice. You can sneak them around corners of houses, along fences or sidewalks, wherever they can be put a few inches under the surface, or even on the earth surface. Aluminum clothesline wire is used extensively at W5RTQ, and it stands up well. Neoprene-covered aluminum wire may be safer in highly acid soils. Contact with the soil is not important. Deep-driven ground rods, and connection to underground copper water pipes, are good, if usable.

Installing the Shunt Feed

Principal details of the shunt-fed tower for 80 and 160 meters are shown in Fig. 1. Rigid rod or tubing can be used for the feed portion, but heavy gauge aluminum or copper wire is easier to work with. Flexible stranded No. 8 copper wire is used for the 160-meter feed at W5RTQ, because when the tower is cranked down, the feed wire must come down with it. Connection is made at the top, 68 feet, through a 4-foot length of aluminum tubing clamped to the top of the tower, horizontally. The wire is clamped to the tubing at the outer end, and runs down vertically through standoff insulators. These are made by fitting 12-inch lengths of PVC plastic water pipe over 3-foot lengths of aluminum tubing. These are clamped to the tower at 15 to 20-foot intervals, with the bottom one about 3 feet above ground.

The lengths given allow for adjustment of the tower-to-wire spacing over a range of about 12 to 36 inches, for impedance matching.

The gamma-match capacitor for 160 is a 250-pF variable with about 1/16-inch plate spacing, which is adequate for the power levels presently authorized. The omega match used for 80 and 75 permits retuning for large excursions in frequency encountered in using both cw and phone on this band. Two capacitors are required, each about 150 pF, with plate spacing of about 3/16 inch, if full power is used. They can be mounted in plastic refrigerator containers for protection against the weather. Use well-insulated knobs to avoid rf burns during the adjustment process.

Separate 50-ohm lines run underground to the station. The shield side of their connectors should be grounded to the base of the tower and to the buried radials as directly as possible.

Tuning Procedure

It is suggested that the 160-meter wire be connected to the top of a structure 75 feet tall or less. Note, from Table I, that the monster at K5PFL was fed at 75 feet above ground. Mount the standoff insulators so as to have a spacing of about 24 inches between wire and tower. Pull the wire taut and clamp it in place at the bottom insulator. Leave a little slack below to permit adjustment of the wire spacing, if necessary.

Adjust the series capacitor in the 160-meter line for minimum reflected power, as indicated on an SWR meter connected between the coax and the connector on the capacitor housing. Make this adjustment at a frequency near the middle of your expected operating range. If a high SWR is indicated, try moving the wire closer to the tower. Just the lower part of the wire need be moved for an indication as to whether reduced spacing is needed. If the SWR drops, move all insulators closer to the tower, and try again. If the SWR goes up, increase the spacing. There will be a practical range of about 12 to 36 inches. If going down to 12 inches does not give a low SWR, try connecting the top a bit farther down the tower. If wide spacing does not make it, the omega match shown for 80-meter work should be tried. No adjustment of spacing is needed with the latter arrangement which may be necessary with short towers or installations having little or no top loading.

The two-capacitor arrangement is also useful for working in more than one 25-kHz segment of the 160-meter band. Tune up on the highest frequency, say 1990 kHz, using the single capacitor, making the settings of wire spacing and connection point permanent for this frequency. To move to the lower frequency, say 1810 kHz, connect the second capacitor into the circuit and adjust it for the new frequency. Switching the second capacitor in and out then allows changing from one segment to the other, with no more than a slight retuning of the first capacitor.

The omega match is recommended for 80-meter operation, because of the wide tuning range required. It was found that the point of connection could be at 28 feet, using a single support at the top of the first tower section. This served as a mount for the second standoff insulator for the 160-meter feed, as well.

A 40-meter feed, not shown, was connected at about 20 feet up, with about 8 inches spacing between wire and tower.

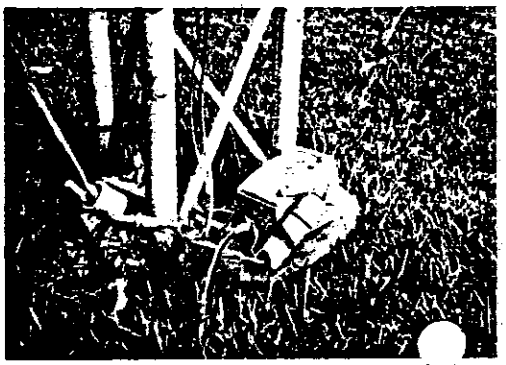
Substituting Fixed-Value Capacitors

Depending on the frequencies used and the matching problems in a given installation, it may be possible to put fixed-value capacitors in place of some or all of the variables shown in Fig. 1, and then switch them remotely, or by hand, when changing frequency. This was done at W5RTQ. The 160-meter gamma capacitor is now a fixed-value, 150-pF type designed for high rf current service. It does not have to be weather-proofed, and it gives a satisfactory match over the small frequency range used on this band.

Two or three similar capacitors connected in series are used in covering the cw and phone frequencies in the 80-meter band. Operation around 3800 kHz requires about 50 pF in the omega (parallel) capacitor, so the three 150-pF units are used in series. Moving to cw operation near 3500 kHz requires about 75 pF, so only two 150-pF capacitors are used in series. The only variable now in the system is the 150-pF capacitor mounted in the plastic refrigerator box at the base of the tower. It is the series or gamma capacitor in the 80-meter feed. Even this could be replaced with a fixed unit, as it has been found unnecessary to adjust it in the course of normal operation of the station, if only small changes in frequency are made in using the two modes.

Because every tower installation is likely to be different from every other one in some respects, the values and dimensions given here may be subject to change, but the general principles should hold. Proof of this was found in the May, 1975, issue of *Ham Radio*,[1] wherein W4OQ describes shunt-feeding in very similar terms. He also presented estimates of the electrical height of various tower-beam combinations that prospective shunt-feed users should find of interest.

It is hoped that this information will inspire others to try shunt-feeding their towers. This method offers an effective way to fire up on the lower frequencies that is useful to many who may have wanted to work these amateur frequencies but have shied away from doing so because of limited antenna space. QST



Though variable capacitors are shown in Fig. 1, they were all replaced with fixed-value units except one, which is inside a plastic box at the tower base.

Table I

Shunt-Feed details for several Towers used on 160 meters

Station	Height of Tower	"Top-Hat" (Beams)	Average Height of Beam	Height of wire-to Tower Connection	Wire-to-tower Spacing	Tuned Value of Gamma Capacitor
W5RTQ	69' (21 M)	TH6DXX	70' (21 M)	68' (20.6 M)	30" (o.75 M)	150 pF
K5PFL	86' (26 M)	Stacked 40,20,15, 10 M beams	95' (28.8 M)	75' 22.7 M)	24" (0.6 M)	125 pF
K4PUZ	64' (19 M)	TH6DXX	66' (20 M)	63' (19 M)	8" (200 MM)	3£0 pF
K8KAS	70' (21 M)	TH6DXX	71' (22.7 M)	68' (19.7 M)	24" (0.6 M)	225 pF
W1CER	50' (15 M)	QST 20-M DX Weasel	55' (16.6 M)	47" (14.2 M)	44" (1.1 M)	400 pF

Another Method of Shunt Feeding Your Tower

AS A SHORT SUPPLEMENT to the other articles in this issue concerning antennas for 160 meters, the following data is offered. The antenna shown in Fig. 1 is used at W1CER for DXing and local work on 160-meter cw. A Rohn 25 tower is used, and it is set in three feet of concrete. A half-size 20-meter, 3-element Yagi (20-meter DX Weasel, *QST* for September, 1974) is mounted approximately 8 feet above the top of the tower. There are no guy wires on the tower: it is bracketed to the eave at 20 feet above ground.

The more radials the better. However, owing to a miser's outlook on the cost of copper wire, and through a tendency toward chronic lassitude, only 11 buried radials are in use at this writing. The average length of the wires is 110 feet, and some are wrapped around the house in a helter-skelter manner.

A gamma feed system is used, based on the recommended dimensions given in *The ARRL Antenna Book* (section on gamma design). A 4-inch diameter gamma rod is called for in the general design approach. Not wanting to use expensive tubing of that diameter, and not trusting the continuity of the joints in low-cost gutter pipe, a cage type of gamma structure was built to approximate a 4-inch diameter feed arm. The details are shown in Fig. 1.

A 1-1/2 inch diameter aluminum pipe serves as a [illegible] arm to support the gamma section. It is affixed to the tower legs by means of U bolts. The outer end of the pipe is hammered flat, drilled, and fitted with a 10-32 screw and nut, to which the upper end of the gamma rod is attached.

A horizontal wire extension is added to the top of the tower to act as a capacitance hat for establishing resonance. It does little by way of radiating. Therefore the polarization of the system is principally vertical. The extender helps to broaden the bandwidth of the antenna. The system was first tuned for operation without the wire extension, and an SWR of 1 was obtained. A short version of a folded unipole was the configuration (a No. 10 wire extended to the top of the tower, and spaced three feet from it). The bandwidth was 10 kHz between the 2.5 to 1 SWR points – hardly adequate for QSYing during contest work. With the configuration illustrated in Fig. 1 the bandwidth is 50 kHz between the 2:1 SWR points. It should be noted that resonance of the system is slightly above the desired operating frequency for a gamma-fed system. In this example the resonance, as checked with a dip meter coupled to a two-turn link placed between the low end of the gamma rod and ground, is 1825 kHz for an optimum operating frequency of 1805 kHz. The extender wire was pruned for that condition.

Adjustment and Results

In theory, if the gamma rod were a solid conductor, a series-tuning capacitor of approxi[illegible] 1000 pF would be necessary to effect an S[illegible] of 1. The value is dependent also on the ground system, which in this case is of substandard character. The value of the capacitor was measured as 560 pF in this example. A three-foot-long homemade capacitor is used at W1CER. It consists of telescoping sections of 1-1/2 and 1-1/4 inch diameter aluminum tubing. The inner tube is wrapped with enough polyethylene sheeting to provide a snug fit between the tubes. Scotch tape is used to keep the sheeting in place. The inner tube is slid into the outer one until an SWR of 1 is obtained; then it is secured in position by wrapping the tubing joint with electrical tape.

In two seasons of more or less "casual" DXing from Newington, CT, 33 countries have been worked and confirmed. All DX stations heard were worked except 9L1JT and PY1RO, both of which were called until the writer's keying fingers were worn down to the first joint of each! The pow[illegible] input amount (dc) was 100 watts.

It is worth stating that the 20-meter bea[illegible] shows no significant effect as a top-loading devic[illegible] No change in SWR could be observed with [illegible] without it on the tower. As is true of all vertic[illegible] antennas on "top band," the noise level on receiv[illegible] is troublesome much of the time. A small receivi[illegible] style loop antenna, or a Beverage antenna, preferable when digging those "weakies" out of th[illegible] noise. Whatever the situation, the system has give[illegible] good performance despite its being physicall[illegible] short. – *W1CER*

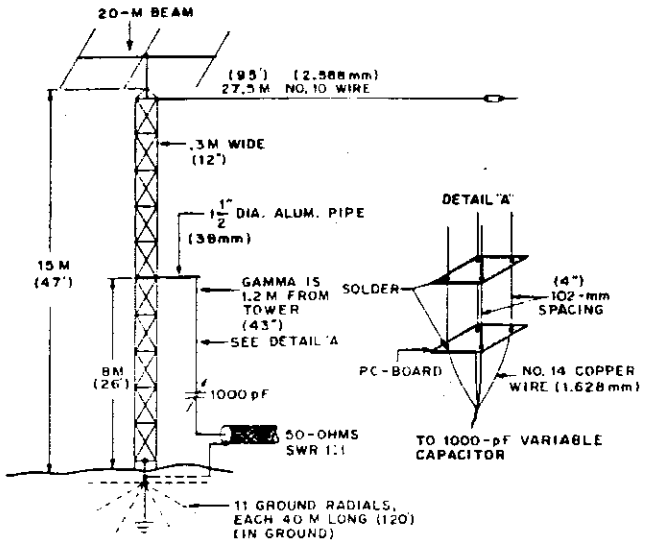
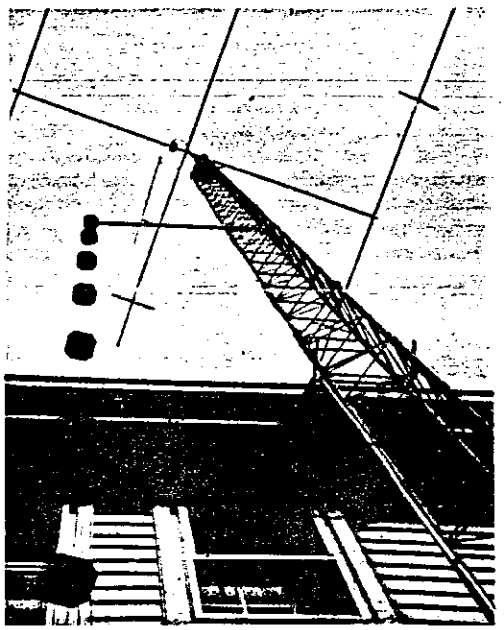
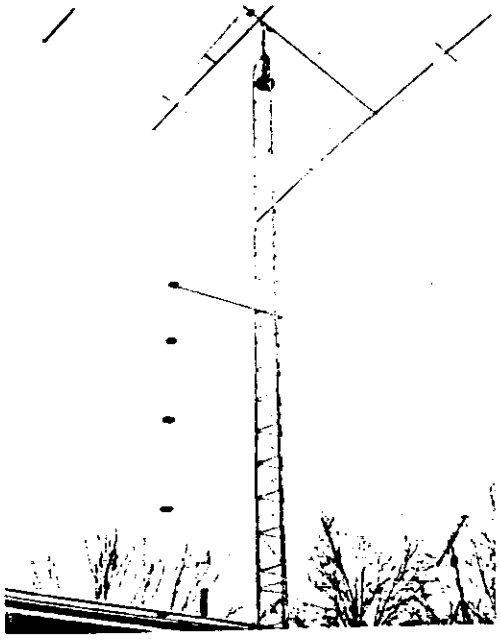


Fig. 1 – Details and dimensions in English and metric for gamma feeding a 50-foot tower as a 160-meter quarter-wavelength vertical antenna. The rotator cable and coaxial feed line for the 20-meter beam is taped to the tower legs and run into the shack from ground level. No rf decoupling networks are necessary.

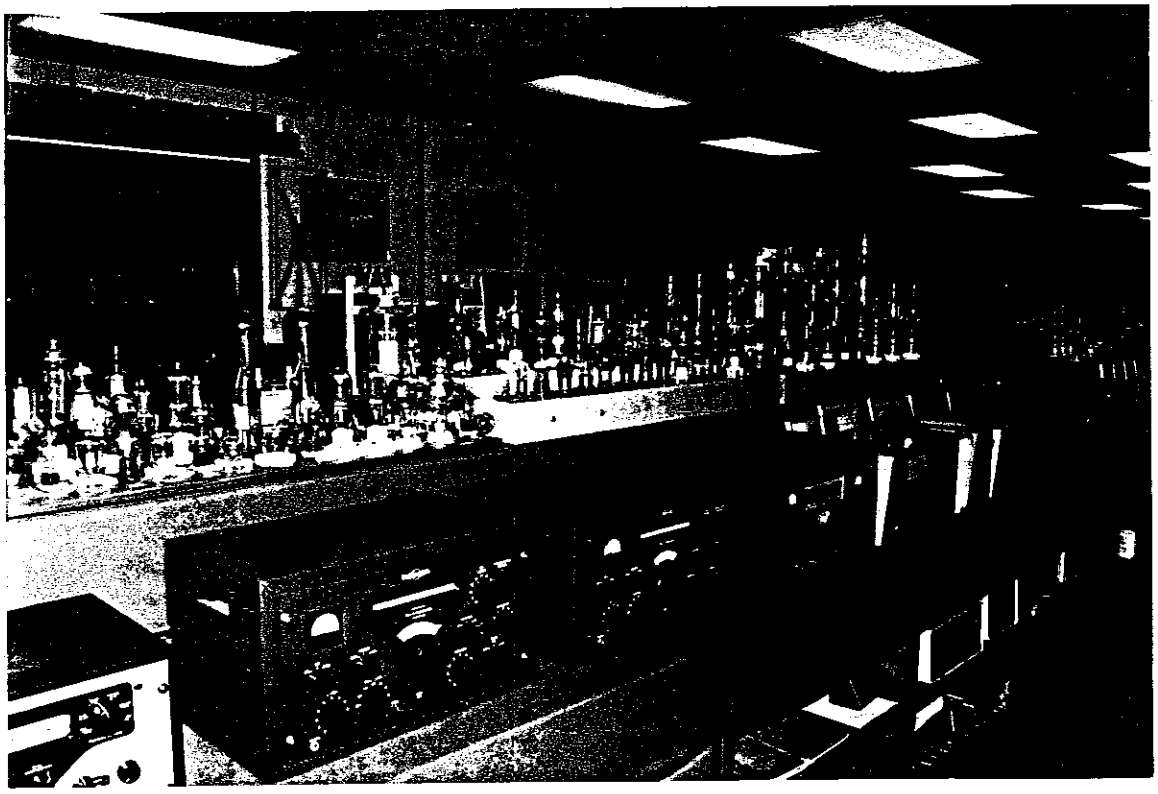


Closeup look at the gamma-feed system for exciting the tower.



View of the gamma-fed short tower for 160 meters. A 3-element, half-size 20-meter beam is mounted atop the tower.

FRED HAMMONDS RADIO MUSEUM IN GUELPH.....FRED IS PICTURED HERE DEMONSTRATING SOME OF HIS EXTENSIVE COLLECTION....PHOTO BY JOHN TXB



Invisible Antennas

BY THEODORE JAY GORDON,* W6RVQ

Possible "Out" for Restricted Areas

SEVERAL months ago I moved into a very fancy neighborhood. All utilities were underground, and there was hardly an antenna to be seen spoiling the virgin purity of the old colonial brick chimneys, and the charming shake-shingle roofed gables of the California modern cottages. "No overhead power lines, quiet locations, no local QRM, ideal QTH," I thought. When I looked at our chimney I saw more than its subtle architectural grace; I saw an ideal mount for my new vertical antenna.

Before the moving men had deposited the last big pasteboard box, I was on the roof delicately balancing 33 feet of telescoped aluminum tubing. I should note here that this was no mean trick, because I first had to convince the XYL that erecting the antenna was more important than unloading the boxes. Next came the radials. Luckily I knew just where my coil of No. 12 copper wire had been packed, so it was only a matter of a few hours until I had four husky radials running from the base of the antenna, which was level with the top of the chimney, to the four corners of the roof.

I was twisting the wire around the last insulator when one of my new neighbors leaned over the fence.

"See you're a ham," he said ominously.

"Well, uhh," I replied with some firmness, shuffling one foot in the gravel on the roof, "Yes, I am." Nobody could bully me.

"You know there's an ordinance about antennas here," he said.

No, I didn't know, and this was a heck of a time to tell me, after I had spent the day stringing radials. Too late now, I figured.

"Well," I said a little sheepishly, "I think I'll just leave it up and see if anybody complains."

He smiled, said, "OK," and went back home.

"Glad to have met you, fellow," I shouted after him.

Fade-in a couple of weeks later. The boxes were almost unpacked, and things had settled down to a routine. But whenever I glanced up at the vertical I had an uneasy feeling, a sense of impending doom. I could see the vigilante committee, axes in hand, storming down the street, bent on wringing my straight and true vertical from its delicate perch on top of the chimney. Something like that can get to a guy. I began hearing noises on the roof at night. "Who's there," I'd shout some nights, scaring half the cats and dogs within the distance of one city block. Clearly something had to be done.

Mobile? Car was too small. Take them to court? I could, I guess, but nobody had complained yet. It was all in my mind. Then I hit on the solution, which I offer here in humanitarian good will to other hams who may be fighting the battle of unsightly wires with neighbors, vigilantes, or recalcitrant XYLs.

I began to experiment with invisible wire.[1] Not really invisible, but thin enough to be invisible from a distance of a few feet. That first weekend I replaced the radials with some lengths of No. 36 plain enameled wire. Let me hasten to point out that the antenna was supported by a TV chimney mount and the radials did not carry any structural load. I discovered several interesting things about using thin wire. First, it's very cheap. A quarter-pound roll of No. 36 wire has over 3000 feet and costs only about 70 cents. It simply cannot be seen at distances greater than 15 feet under normal conditions, even by someone with 20/20 vision. When sunlight reflects from it, an inch or two becomes miraculously visible, a pleasant and short coppery glint against the blue sky. It also breaks very easily.

One of the most difficult aspects of using this wire was remembering where I had anchored it. Several times during the installation of this first set of radials, I walked into and broke elements that I had just fastened to the roof. Once in, the vertical worked as well as before with no detectable difference in s.w.r. or signal levels. The neighbors didn't report in, but I felt I had licked the problem without firing a shot.

Then I discovered that the elements didn't last very long. Something was breaking them. It certainly wasn't the wind, because their wind resistance was very low. I haven't yet found definite proof, but I suspect that the wires were as invisible to birds as to humans.

Following this theory, I decided to go to slightly larger wire. As in all engineering problems, the factors involved delicately balanced each other. I had to go to wire large enough for the birds to see, yet small enough to remain essentially invisible to neighbors. I tried No. 28. Perfect results. Again the wire is very cheap. A half-pound reel has over 1000 feet of wire and costs 85 cents. The wire comes with either of two colors of insulation: clear, so that the wire is actually a bright copper, and dark mahogany. Both seem to be invisible under normal lighting conditions at distances greater than 25 feet. The lighter-colored wire is good for use against a sky background and the darker wire against a roof background. I haven't lost an element yet to the birds. The neighbors are still uncomplaining.

Egg insulators cannot be used with thin wire. The insulators are too heavy, and are very visible. I used ¼-inch Plexiglas rod, cut to a length of about ¾ inch, with 1/32-inch holes drilled in each end to accept the wire.

The use of thin wire in antenna systems need not be confined to radials for vertical antennas. Since my first experiments I've tried dipoles, inverted Vs, and phased arrays. All of these antennas were supported at the feed point, since the elements will not carry the weight of the feed line. At this QTH I used an aluminum pole supported on the chimney to carry the feed line and center insulator. Except for this mast, all parts of all of the antennas have been invisible.

As with any antenna, pruning the element lengths may be necessary after installation. One thing is different when you use invisible wire, however. If you over-prune (and who hasn't) you can stretch the element back to the proper length. In tests, I found that No. 28 wire could be lengthened 1½ inches per foot without danger of breakage. While this characteristic is obviously of advantage in setting up the antenna, it can cause undesired lengthening if the center support moves appreciably in the wind. For this reason the support pole should be rigid, or the elements should be left a little slack when installed.

WANTED

ARTICLES , STORIES, CARTOONS FOR FEEDBACK, THERE ARE STILL PLENTY OF MEMBERS WHO HAVE NOT SENT ME *THEIR* STORY...*EDITOR*

VE3CUV ROSS .. 599-3870

ALL ITEMS ARE 1 OWNER AND MINT CONDITION... WILL NOT BREAK UP GROUPS FOR SEPARATE SALES.

YAESU FT-1000D HF RIG (200WATT) NEW PRICE $5780 ASKING $3900 MD-1 DESK MIKE ,YAESU PHONE PATCH/SPEAKER ,HANDHELD MIKE, SERVICE AND OPERATING MANUALS, STEREO EARPHONES ----------

ICOM IC-24AT DUAL BAND HANDHELD NEW PRICE $971 ASKING $690 BP-85 BATTERY BP-82 BATTERY BOTTOM CAP HM-46 SPEAKER/MIKE AEA HOT ROD ANTENNA BC-72A DESK CHARGER OPERATING MANUAL ----------

FP-12 YEASU POWER SUPPY $150

DRAKE TR-7 HF RIG (100WATT) $2000 PS-7 POWER SUPPLY AND PR-7 FAN, MN-7 TUNER (BANDSWITCHED) AUX-7 BOARD (EXTRA BAND) NOISE BLANKER BOARD ,250 HZ CW FILTER, REMOTE AUX VFO, ALL MANUALS ----------

ICOM IC-2410H DUAL BAND MOBILE (50WATT) $980 LARSEN 144/440 MAG MOUNT SERVICE MANUAL PS-30 POWER SUPPLY ,MOUNTING BRACKET

VIBROPLEX DELUXE BUG $90

VE3BZC ROSS 371-4326

STANDARD WIDTH PRINTER, 24 PIN HEAD OKIDATA MICROLINE 380...$125

VE3TFQ JIM

HF-5B BUTTERNUT BUTTERFLY HF ANTENNA $200

440 MHZ BANDUNIT FOR ICOM 900A (UX-49A) $275

DIAMOND DUPLEXER MX-72N (UHF-VHF) $40

TELEX HI-GAIN 14AVQ HF VERTICAL 40-20-15-10 $75

TELEX 5 ELE 2 MTR BEAM 205B-S $15

35' OF TV TOWER $50

90' OF BELDEN 9913 (BRAND NEW) LOW LOSS $1.25 PER FOOT

JIM ROWE VE3TFQ DURHAM,ONTARIO 1-519-369-6596

GUIDES ON THE AIR

I've been asked by one of the local Girl Guide leaders if our club would be interested in getting involved with the Girl Guide's equivalent of "Jamboree On The Air". Their GOTA is scheduled for Feb. 18th & 19th 1995.

I think they would like to visit someone's shack to make their contacts, not use a portable set-up. I'm not sure about that point but it would sure beat setting up antennas that time of year. They know very little about it because they have never participated before.

If there is any interest, let me know. We can discuss it at the next GBARC club meeting.

73....de Bob VE3LKD