JUG

Publication of the Northern California Contest Club

NCCC

Issue 523

December 2015

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NCCC Meeting

Saturday 30th January 2016

Program and Location—TBD

President's Report

Hello KB'ers! Happy Holidays and welcome to the last Jug of the year of 2015.

This has not been the typical year for this great contest club. Our Board declared 2015 a year to adjust to changes and a year for us all to better get to know each other. It has meant a re-energized Jug newsletter, weekend meetings, a summer BBQ, and the best CQP ever…our 50th.

I said it's not been the typical year and, by that, I mean it's been a year of no focus contests. We – the Board – want what you want…..a contest club that wins contests! We didn't want to declare, in April, that the summer NAQP's or the fall Sweepstakes would be the focus contests. We did not want to set us up for failure. We felt that our contest mission had to be well thought out, giving our members plenty of time to prepare. To do that, many have suggested that we need to get to know each other better and to reach out to the membership in a way that makes everyone feel part of the team. The Jug has been a big part of that, along with the summer BBQ and a more relaxed meeting schedule. All of this is a difficult task for a club with over 500 members who live within a 175 mile circle. Again, this is where the Jug plays a big part of keeping all of you informed.

The year, 2016, gets us back to our mission as a contest club, and that means winning contests. Several months ago, we declared the ARRL RTTY Roundup the first MUST WIN of the year and another gavel for the trophy room.

Officers:

President	Bob Hess	W1RH	w1rh@yahoo.com
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CQP Chair	Kevin Rowett	K6TD	k6td@arrl.net
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Northern California Contest Club
Excellence In Amateur Radio Contesting

NCCC Net

Thursday 8 PM

Freq: 3.610 +/-

NCCC

Visit the meetings page of the NCCC website here for details of the next meeting

NCCC Membership Information

If you wish to join NCCC, you must fill out an application for membership, which will be read and voted upon at the next monthly meeting. (PDF application form)

To join, you must reside within club territory which is defined as the maximum of:

- Northern California, anything north of the Tehachapi's up to the Oregon border, and
- A part of north-western Nevada (anything within our ARRL 175-mile radius circle centered at 10 miles North of Auburn on Highway 49).

In the December, 2008, Jug, NCCC President John, K6MM, made this comment:

For the ARRL RTTY Roundup on January 2/3, NCCC is going to "go for it" in this exciting contest. It will be our way for everyone to get focused on a winning strategy for the New Year.

John's comment rang true, as NCCC became the first club ever to win the Unlimited Club category in the 2009 ARRL RTTY Roundup.

With apologizes to those who might have already read this, let me re-quote from an email I sent to the Reflector recently:

- In 2008, NCCC placed 6th in the RTTY Roundup, Medium Club competition, behind PVRC (35 logs), MN Wireless, YCCC, TN Contest Group, and SMC. NCCC submitted 19 logs.

- In 2009, NCCC placed 1st in the RTTY RU Unlimited Club competition, the first club to ever submit more than 50 logs to qualify in the Unlimited category. NCCC submitted 86 logs and was the only club placing in this category. PVRC placed 1st in the Medium Club category, with 37 logs.

- In 2010, NCCC again placed 1st in the RTTY RU Unlimited Club competition and, again, was the only club to place in this category. This time, with 60 logs, 16 fewer than 2009. PVRC placed 1st in the Medium Club competition, with 40 logs.

- In 2011, the Minnesota Wireless Assn rallied their troops and placed 1st in the RTTY RU Unlimited Club competition with 64 logs submitted. NCCC placed second with 52 logs.....8 fewer logs than 2010 and 34 fewer logs than 2009. There were only two clubs in this category. PVRC placed 1st in the Medium Club category, with 37 logs.

- In 2012, NCCC rallied the troops to win 1st place again in the Unlimited Club competition, this time with 73 logs, 21 more logs than 2011. The Minnesota Wireless Assn was the only other club to place in this category, this time submitting 59 logs. PVRC placed 1st in the Medium Club competition, this time with 49 logs.

- In 2013, NCCC again placed 1st in the Unlimited Club competition, with 71 logs submitted. Something changed this year, however. The sleeping giant had been waking up over the past couple of years. PVRC placed second in the category with 52 logs. Again, only two clubs competed in the Unlimited category.

- In 2014, NCCC again placed 1st in the Unlimited Club competition, with 65 logs, but the competition increased. To quote the ARRL article (written by WK6I):

Ever since the big contest clubs realized there was more to life than Sweepstakes, friendly competition between the clubs has helped drive participation in other contests like the Roundup. The rivalry between the Northern California Contest Club and the Potomac Valley Contest Club for the coveted gavel got a little closer with PVRC pulling to within 800,000 points, but the NCCC prevailed, with 65 logs submitted. Meanwhile, the Minnesota Wireless Assn pulled up into the Unlimited Club category this year with an impressive 3rd place score of almost 1.8 million.

- And then there was 2015.....Only one club placed in the Unlimited Club category and that was the Minnesota Wireless Assn, with 56 logs. PVRC won the Medium Club category, with 47 logs. Where was NCCC? In 11 place, Medium Club Category, with 24 logs! In all fairness to the best contest club in the world, I'll note that the RTTY RU was not a focus contest this year, so MLDXCC fired up the troops and placed 6th in the Medium Club category, with 19 logs. If you combined the MLDXCC and NCCC logs, for a total of 43 logs, NCCC would have placed 2nd in the Medium Club category.

So what is going to happen in the 1st weekend of January, 2016? NCCC is going to place 1st in the Unlimited Club competition, back where we belong.

How do we do it?

With logs, lots of logs....at least 80 logs.

We're a contest club and, by definition, that means winning, so let's win this one again. As President, I want to see another gavel in the trophy room. With around 500 members, I know we can come up with 80 logs, but let's not stop there. Show your support to your club and get on the air. The usual guys with large scores will be there but, as I always say, it's the total number of logs that make a difference. I don't care if you make 50 Q's or 2000 Q's, just get on the air and support your club as best you can.

I want to see at least 80 of you in my log, on Sunday night following the contest!

Mark your calendar. January 2-3 is the weekend.

Have questions or need assistance with RTTY? Contact me.

I mentioned the importance of the Jug, as a way of keeping the membership within a vast 175 mile circle in the loop. Do you realize that there are many contest clubs out there that do not have newsletters? I didn't, until I began checking out the websites of some of the other contest clubs. Most that do rarely put out a monthly newsletter.

As a newsletter editor myself, I can't tell you how much I appreciate the efforts of Ian, W6TCP. It's a thankless job, but I'll say it anyway: Thanks, Ian!!

Our January will be on January 31st. We'll be talking contesting in 2016.
Hope to see you there.

Bob W1RH

NCCC Officers would like to wish everyone a Happy New Year 2016 and Happy Contesting !

VP/CC Report

As Bob eloquently put in a recent email to the reflector about our history with RU - we are here to win contests. Clubs like NCCC exist to win contest. We all want to be part of a winning effort. As one of the handful of clubs that has won multiple Unlimited category gavels over the years, NCCC has a tradition and proven ability to win. When we've won it's because the members have pulled together and by sharing, supporting, motivating and sometime cajoling something bigger than each of us individually happens. Let's make something big happen 1800Z January 2, 2016.

In the meantime, let's get our stations ready. Use the NS RTTY for a fast practice sessions. Tune your macros. Try a few new macros. If you need any assistance, reach out to the reflector. We have amazing RTTY talent and resources across NCCC.

We can't let Minnesota Wireless Association take what's rightfully ours!

Looking back, SS was interesting this year. Our goal of promoting the local and medium clubs to win their categories is looking good. We had some great individual performances from club members and kudos to PL259 and MLDXCC for pulling together and putting up strong results. PVRC is the clear unlimited club winner with over 300 logs for both weekends. Amazing performance and something to strive for. I still believe we can win if we commit and choose to. Will we pull together in 2016?

SMC won the 2015 NAQP Club Challenge that our very own N6DE conceived and shepherded for several years. Dean is passing the baton for managing the Challenge to an SMC member. The Club Challenge is a great example of innovation and creativity that still thrives in contesting. Thanks Dean!

Happy Holidays and CU on the air for RTTY Round Up!

73,
Steve
W1SRD

Point Generator Profile

This month, you get to know a bit more about Dave, K6KNS, one of our newest members. Dave has certainly caught the contesting bug. He did 50K in the 2015 Sweepstakes SSB (his first SS), 232K in the 2015 CQ WPX SSB and, of course, gave out that rare Glenn County mult in CQP with a very nice portable operation. Dave also expects to be operating in the 2016 RTTY Roundup.

Name/Call Sign:	Dave Sanders, K6KNS, General
Past Call Signs:	KK6DCU in 2013
Location:	Folsom, CA (Sacramento County)
Antenna System:	I recently put up a K4HEX hex beam replacing a Cushcraft MA5B which is for sale. The hex is mounted on push up mast on my rooftop which puts it at 40 feet. From the mast, I hung a 40 meter inverted V wire antenna.
Future:	I hope to upgrade to Extra by spring so I can pursue DX on portions of the bands I currently cannot use.
In the Shack:	Yaesu FT-DX3000, Ameritron ALS-600, and Palstar AT-500 tuner. I use N3FJP software for general logging and for contests. I love operating outdoors and have a Yaesu FT-991 and Elecraft KX3 for that. I use Buddipole antennas as well as assorted wire setups. I enjoy participating in Summits on The Air.
Previously:	I began as a SWL using an ICOM R75 and a Discone antenna. The idea of having a QSO with a DX station was enticing so I sold the R75 and earned my license. I bought a Yaesu FT-857D for a base rig and for operating outdoors. I have since sold it and now use the FT-991 in it's place.
Career:	I worked mostly in retail after high school and years later, I applied for the Department of Corrections. I got hired as a Correctional Officer in 1985 at the California Medical Facility and when Mule Creek State Prison opened, I transferred there. In 1989, I transferred to Folsom State Prison. I retired in 2009 after 24 years 'on the line'.
Family:	I am currently separated. I was married for 20 years to Karen who I met through a friend from high school. We got married in 1986. She is a Correctional Officer at FSP and has been for 28 years. Working at the same prison as a couple was not a problem. We have two children. Chris is 25 and is a Correctional Officer at FSP. Kayla is 20 and she just began the hiring process to be a Correctional Officer too.
DXCC:	I have worked 128 and confirmed 91 DXCC entities so far.
Favorite Contest:	I'm still fairly new to contesting. My favorite was the ARRL Rookie Roundup 2015. I won 1st place for Call Area 6. I did work as a County Expedition for CQP this year and although I didn't log many, I really enjoyed being outside while operating.

Tips: This tip came from Rich WC6H: Set a goal for yourself. I agree and also make sure to have fun. The long exchange for SS SSB was a great skill builder for me. Contests surely test your hearing, your logging ability, and you're your mental/physical stamina. .

Help the Hobby: If I can help another fellow Ham, I will. Many Elmers have given me much appreciated advice and assistance so I surely want to pay it forward.

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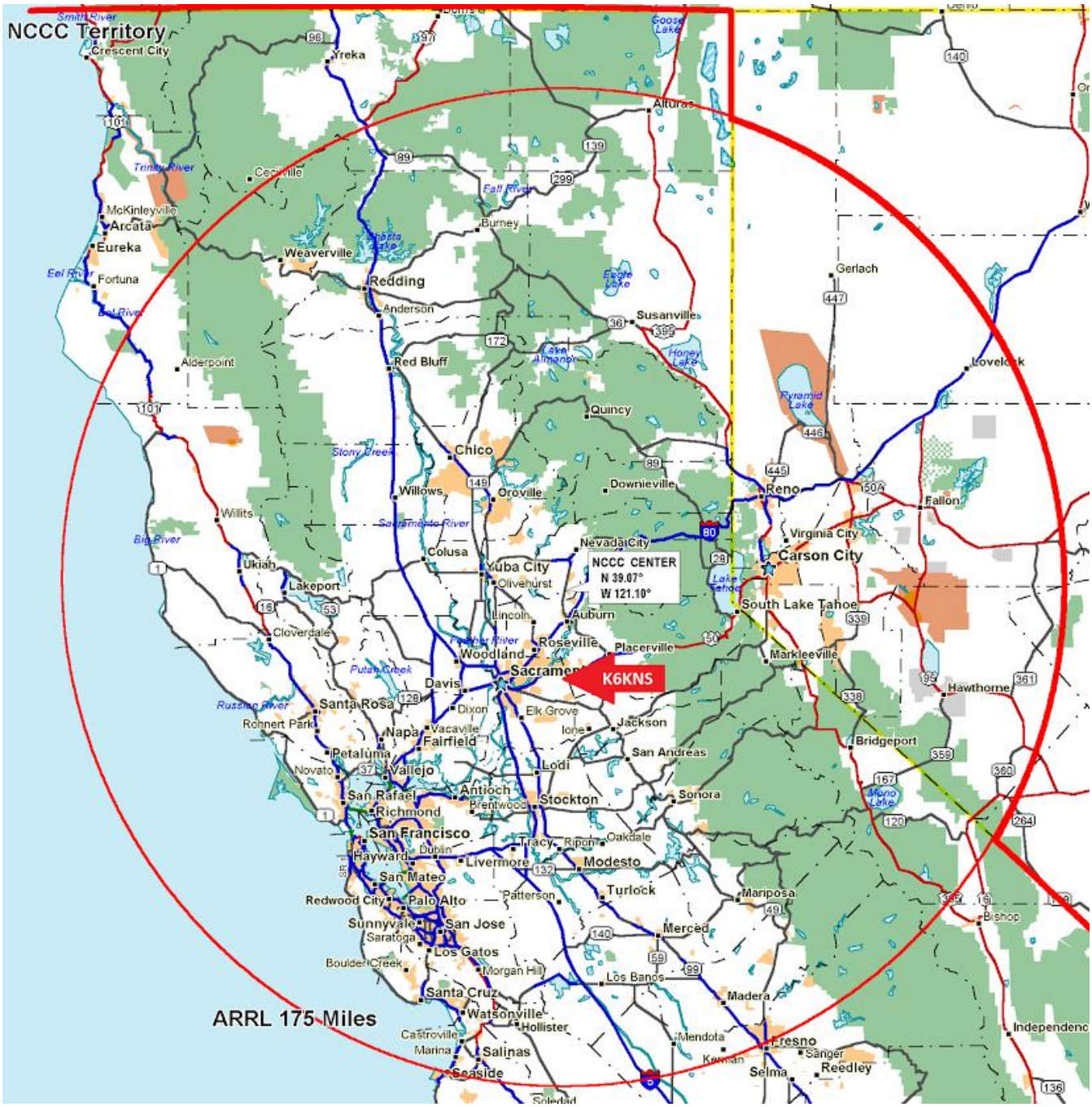
NCCC Changes: As a fairly new member, I can't comment about changes. I do like the enthusiasm being generated by our president as well as many of our club members.

Other Hobbies: I have dabbled in photography since the early 70's. I have lots of photo equipment, all digital now. I also enjoy metal detecting. I recently worked a public park twice and found over 200 clad coins. Haven't struck it rich yet.

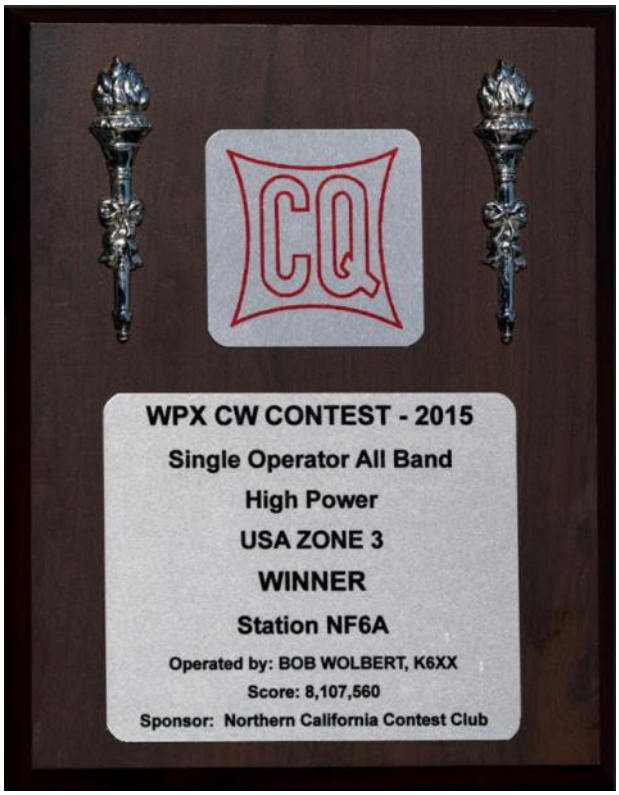

NCCC Territory
ARRL 175 Miles
NCCC CENTER
N 39.07°
W 121.10°
K6KNS
Crescent City
Yreka
Alturas
Cedarville
McKinleyville
Arcata
Eureka
Fortuna
Weaverville
Burney
Redding
Anderson
Susanville
Gerlach
Alderpoint
Red Bluff
Quincy
Chico
Willows
Oroville
Downieville
Reno
Fallon
Willits
Colusa
Nevada City
Virginia City
Carson City
Ukiah
Yuba City
Olivehurst
Lakeport
Lincoln
Auburn
South Lake Tahoe
Cloverdale
Roseville
Placerville
Woodland
Markleeville
Sacramento
Davis
Hawthorne
Santa Rosa
Dixon
Elk Grove
Rohnert Park
Napa
Vacaville
Jackson
Fairfield
Ione
Bridgeport
Petaluma
San Andreas
Novato
Vallejo
Lodi
San Rafael
Antioch
Stockton
Sonora
Richmond
Brentwood
San Francisco
Oakdale
Tracy
Ripon
Hayward
Livermore
Modesto
San Mateo
Turlock
Mariposa
Redwood City
Palo Alto
Patterson
Sunnyvale
San Jose
Merced
Saratoga
Los Gatos
Boulder Creek
Morgan Hill
Los Banos
Madera
Santa Cruz
Watsonville
Hollister
Castroville
Mendota
Fresno
Marina
Salinas
Sanger
Seaside
Selma
Reedley
Bishop

New Lumber—WPX CW Contest—K6XX

Mailman brought my Christmas present early. Thanks to NCCC sponsorship, the Zone 3 plaque for WPX CW 2015 was received and looks great.

Thank you, NCCC, for sponsoring the plaque.

73 de Bob, K6XX



Planning Antenna Systems For the Little Gun Station—Jim K9YC

One of the things I've always enjoyed about ham radio is planning and implementing HF antenna systems, both for my own station and for other hams. Our choices are usually limited by real estate, antenna supports that either exist or can be built, the feasibility of putting antennas on those supports, the cost of various options, and what the neighbors (and the XYL) will tolerate. But that's only part of the equation. The other part is how well various options will meet our objectives. This article is about the second part.

With limited space for antennas and with limited supports, the choice often comes down to an all-band vertical or a horizontal dipole (perhaps in an inverted Vee configuration). And if a vertical, should it be ground-mounted or elevated -- perhaps on the roof of a house or garage? A few summers back, I was re-reading and eventually studying carefully a report by Ward Silver, N0AX, and Steve Morris, K7LXC, on comparative measurements they had done back in 2000 of eight multi-band HF verticals that were representative of what was currently available. Most manufacturers were vague about mounting height, so all were set up at 18 inches over an extensive radial system.

The antennas fell into two distinct groups -- those in the first group were base-fed radiators that approximated an electrical quarter wave, with or without loading coils or traps, while those in the second group were some form of center-fed dipole, again with loading or various matching schemes to achieve multi-band operation. The first group required radials, some of which were integral to the antenna, while those in the second group were advertised as not needing radials.

In his report, Ward speculated that vertical dipoles might have been helped by the radial system, but skirted the issue of mounting height. All of which got me thinking -- what about mounting height? And what about radials for a half-wave antenna? I decided to undertake a serious study of these issues by modeling the two fundamental antenna types in NEC, comparing antennas that were ground-mounted over very good radial systems with the same antenna at mounting heights that the average ham might achieve, and I repeated each model for five different soil conditions representative of the wide range hams around the world are faced with. I presented the result of this work to the Pacificon Antenna Forum in October 2013 with the title, "If Can Put My Multi-band HF Vertical on my Roof, Should I?"

When evaluating any system, the first question to ask is, "What do I want to achieve?" In the case of an antenna system, the related questions are; 1) where are the stations I want to work? 2) at what vertical angles do signals to/from those stations most often propagate? 3) how much local noise is present at my QTH, where are the sources with respect to where I can put my antennas, their directivity, and what is the polarization of the noise? We'll study #1 and #2 first. For domestic contesting from the west coast, a horizontal antenna broadside to about 75 degrees is one good option, and 2-3 elements with that directivity would be even better. And because most of the stations we need to work are in the range of 2,000 - 2,500 miles, good performance at low angles is important.

A domestic contester on the east coast and Midwest faces a very different set of challenges. Population density suggests the need for antennas that are less directional in both the horizontal and vertical plane. Given these realities, I chose to plot the vertical patterns of these antennas for the same soil conditions on the same graph, so that the relative differences are clearly shown. We can't change our soil (except by moving to a new QTH), but we can change the antennas we use and how we install them.

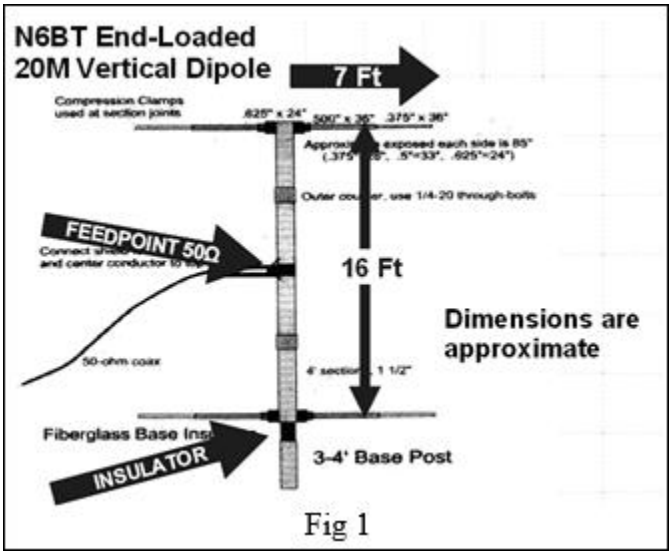


Fig 1

The first antenna modeled was an interesting design by N6BT -- it's an end-loaded center-fed dipole for 20M. The antenna is shown in Fig 1. Most multiband antennas based on center-fed dipoles are shorter than a half wave on 20M, so are loaded in some way to make them resonant. This loaded antenna is very approximately representative of how a typical multi-band vertical dipole would behave on 20M.

Fig 2 compares the vertical radiation of this antenna with its base at 3 ft over Average soil (the black curve), with the same antenna at 20 ft and 33 ft. The cursor is on the 33 Ft curve at 10˚ elevation. The bottom right readout of "3.14 dB Pr Trc" tells us that the antenna at 33 Ft is 3.14dB better at 10˚ elevation than the same antenna with its base 3 ft above ground. [Keep this read-out in mind as you study all the plots in this article.] Figs 4-7 show results of the same analysis for the very poor soil conditions typically present in cities, and the very good soil conditions of Midwest US farm land.

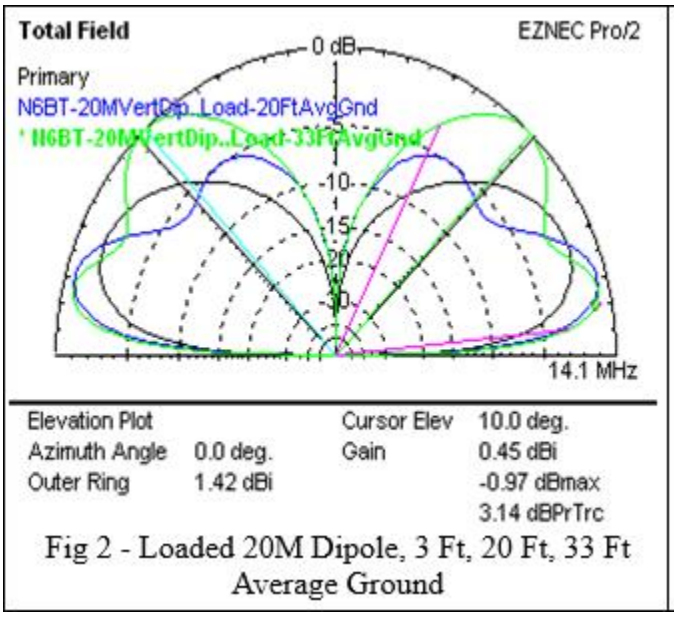


Fig 2 - Loaded 20M Dipole, 3 Ft, 20 Ft, 33 Ft Average Ground

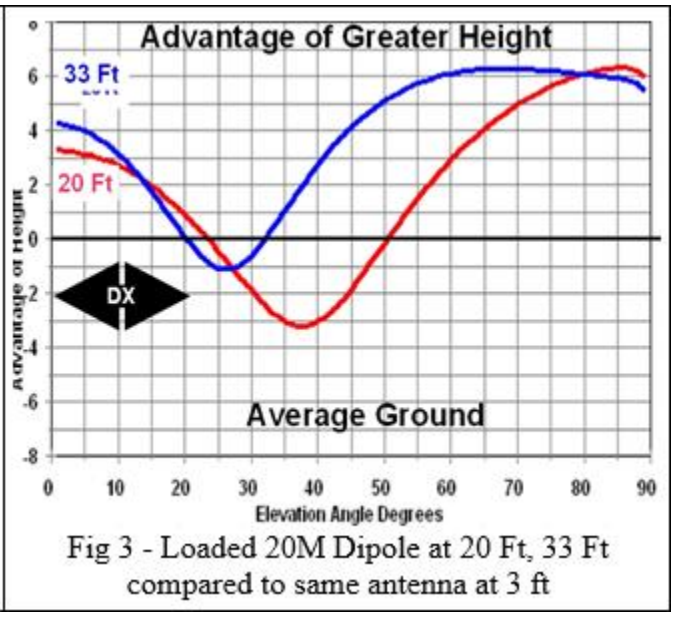


Fig 3 - Loaded 20M Dipole at 20 Ft, 33 Ft compared to same antenna at 3 ft

NEC only plots in polar form, which makes it difficult to see the differences between the results at very low angles where the curves appear to be almost on top of each other. I can see these differences in the NEC display by moving the cursor to various vertical angles, but they don't show up well in the plot. Moving the cursor shows the differences to be significant, but to show them here, I must export NEC's results in tabular form for each modeled condition to a Quattro Pro spreadsheet and re-plot them in linear form. Figs 3, 6, and 7 plot the ***difference*** between the antenna mounted at 20 ft and 33 ft with the antenna at ground level. In other words, they are subtracting the elevated curves from the ground-mounted curve and plotting the difference in dB. It takes a great deal of additional work to generate these plots, so, although they are useful, I didn't spend the many hours to develop them for the remaining analysis. But do keep these views of the data in mind as we study the conventional polar plots Virtually all of these modeled conditions follow the trends of this data set -- that is, the advantage of elevating verticals at 10 degrees is maintained all the way down to 1 degree, and in most cases, increases by a dB or so.

Also throughout most of this analysis, we'll use 10 degrees as a general indicator of the contesting and DX performance of an antenna.

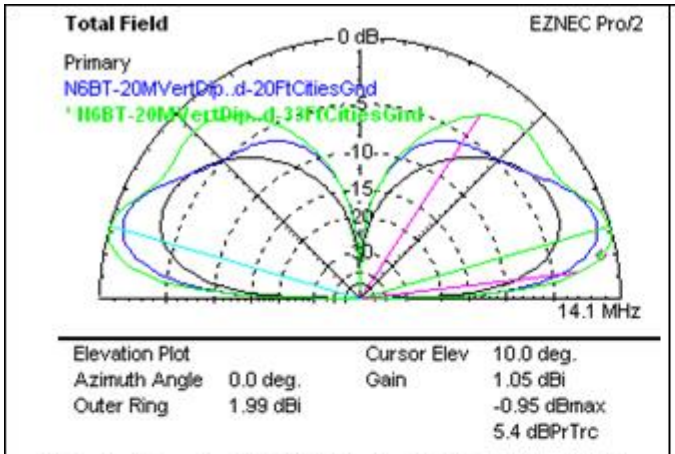


Fig 4 - Loaded 20M Dipole, 3 Ft, 20 Ft, 33 Ft Very Poor Ground (Cities)

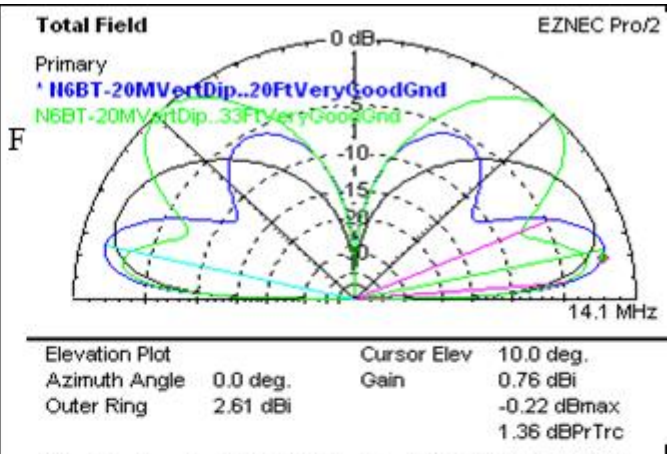


Fig 5 - Loaded 20M Dipole, 3 Ft, 20 Ft, 33 Ft Very Good Ground

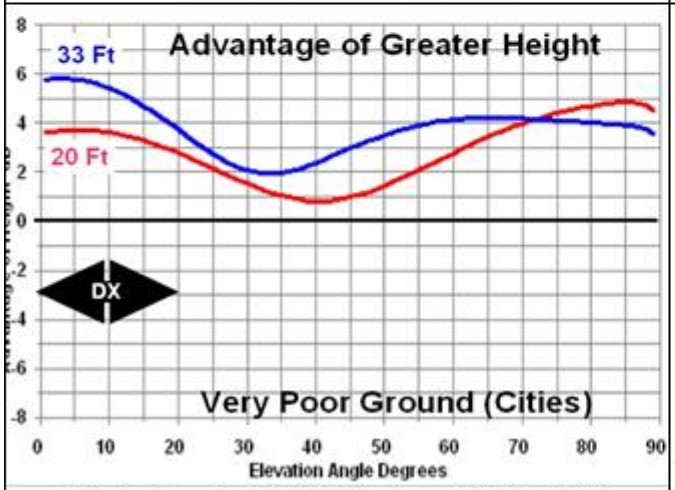


Fig 6 - Loaded 20M Dipole, at 20 Ft, 33 Ft compared to same antenna at 3 ft

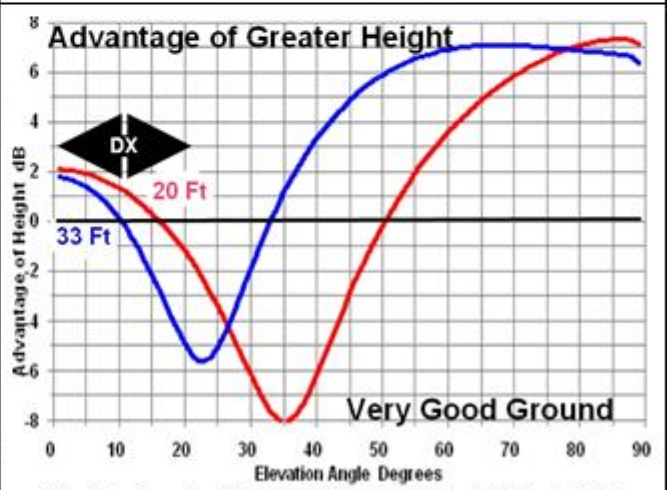


Fig 7 - Loaded 20M Dipole, 3 Ft, 20 Ft, 33 Ft compared to same antenna at 3 ft

We learn several interesting things from these plots. First, for all soil conditions, the low angle performance of this loaded 20M vertical dipole is improved by increased mounting height, and the improvement is greatest for the poorest soil conditions. Indeed, for very poor soil, the higher antenna is the better performer at all wave angles! Second, the vertical pattern breaks down into two lobes, one at low angle and one at an intermediate higher angle. Both the strength of the lobes, and the depth of the dip between the lobes, are most pronounced for the best soil conditions. As I learned from further modeling, the same thing happens with virtually all vertical antennas.

Next, we'll look at a simple quarter-wave vertical under similar conditions. On the ground, it's modeled with 32 radials; at 20 and 33 ft, there are four radials. Both the vertical element and the elevated radials are 3/4-in aluminum. Figs 8, 9, and 10 show that this antenna responds as well to being elevated as does the shortened 20M dipole!

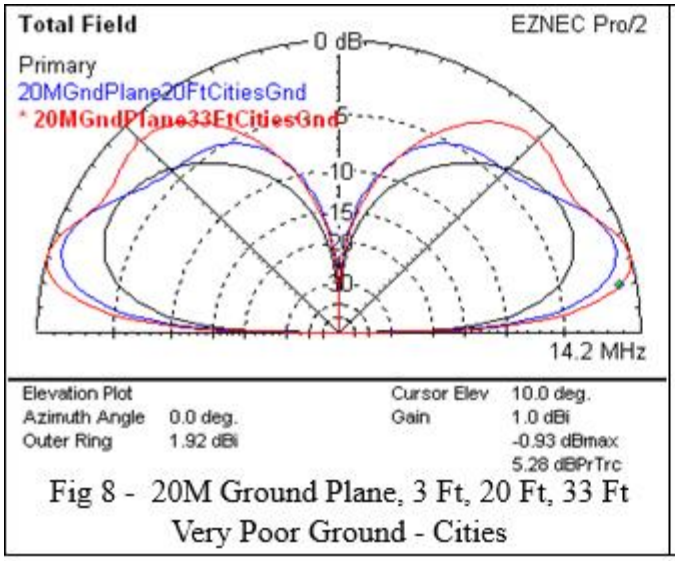


Fig 8 - 20M Ground Plane, 3 Ft, 20 Ft, 33 Ft Very Poor Ground - Cities

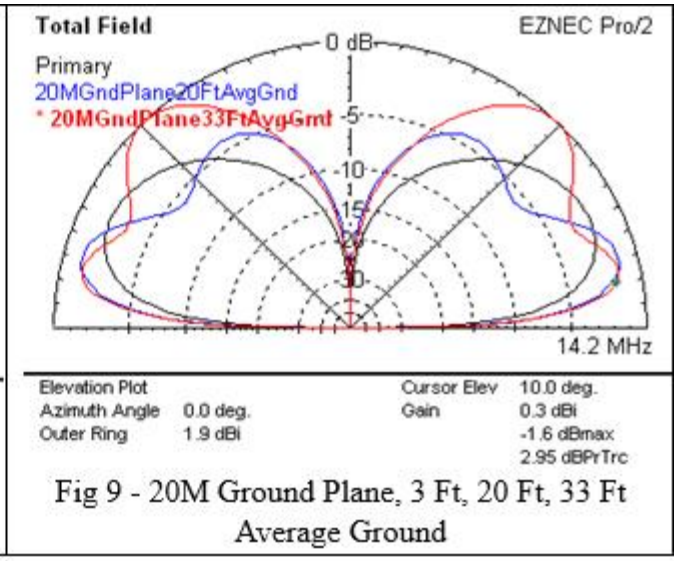


Fig 9 - 20M Ground Plane, 3 Ft, 20 Ft, 33 Ft Average Ground

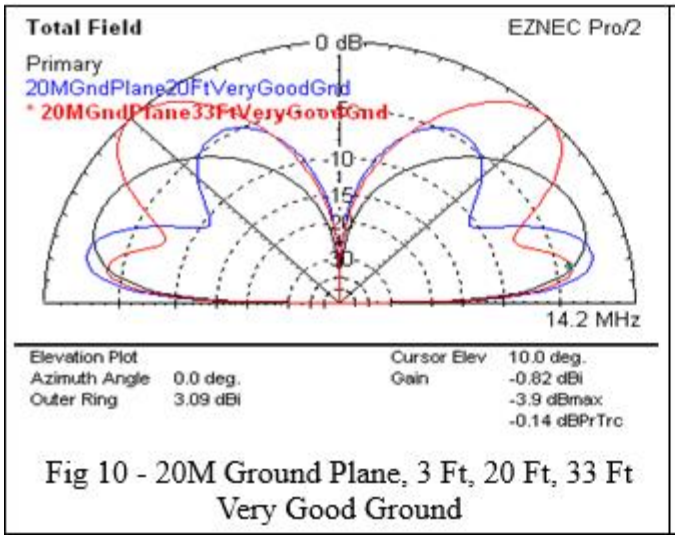


Fig 10 - 20M Ground Plane, 3 Ft, 20 Ft, 33 Ft Very Good Ground

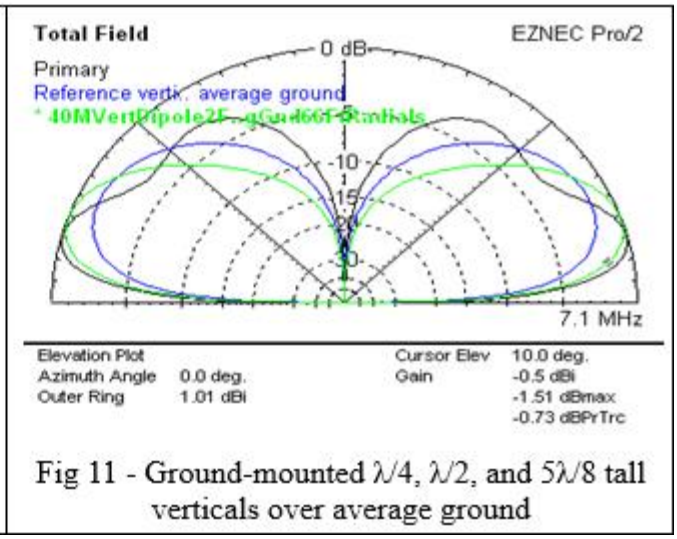


Fig 11 - Ground-mounted λ/4, λ/2, and 5λ/8 tall verticals over average ground

Fig 11 illustrates another important effect of making the vertical radiator longer as a fraction of a wavelength. The rounder, more uniform pattern is the λ/4 ground plane; the λ/2 pattern is smooth with no lobes, but is "flattened" so that energy is more concentrated at lower angles; and 5λ/8 vertical has slightly more low angle radiation, but develops both a high and low angle lobes with a mild null between them. As we will learn later, the differences in these patterns are essentially due to their current distribution. Raising the current maxima by a quarter wave increases low angle radiation by a few dB at the expense of a few dB less at higher angles. Adding another λ/8 improves both high and lower angles. Vertical radiator heights the range of 180 - 210 electrical degrees are quite popular with major AM broadcast stations.

From the above, it's quite reasonable to expect the effects of mounting height to be wavelength dependent, so we'll next study how a 40M ground plane at mounting heights of 33 and 45 ft compares to a ground-mounted vertical with 32 radials. Again, we see almost exactly the same effects as before, differing only by degree -- the benefits are greatest for the poorest ground types, less for very good ground, and greater heights with very good ground produces more pronounced lobes and nulls.

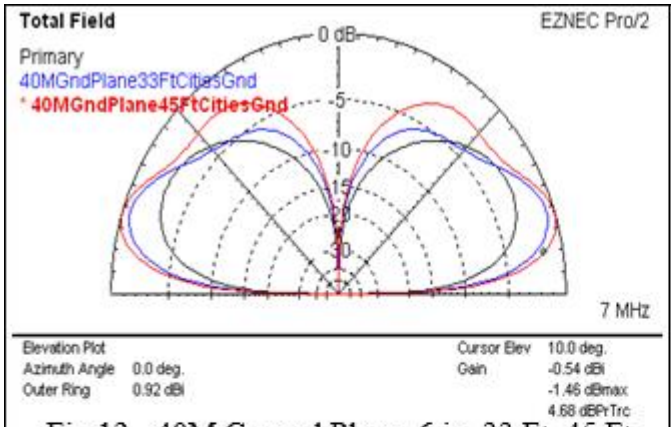


Fig 12 - 40M Ground Plane, 6 in, 33 Ft, 45 Ft Very Poor (Cities) Ground

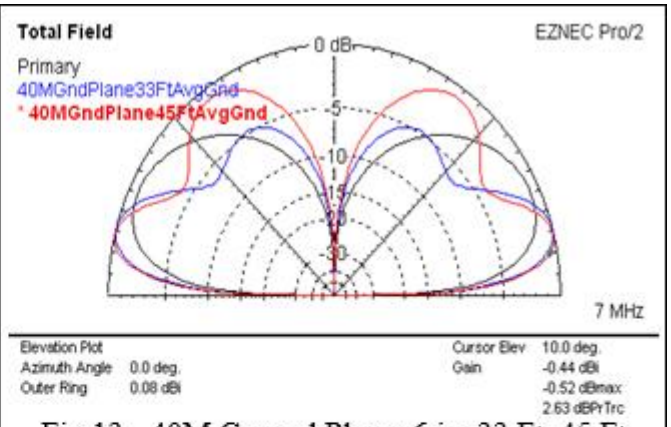


Fig 13 - 40M Ground Plane, 6 in, 33 Ft, 45 Ft Average Ground

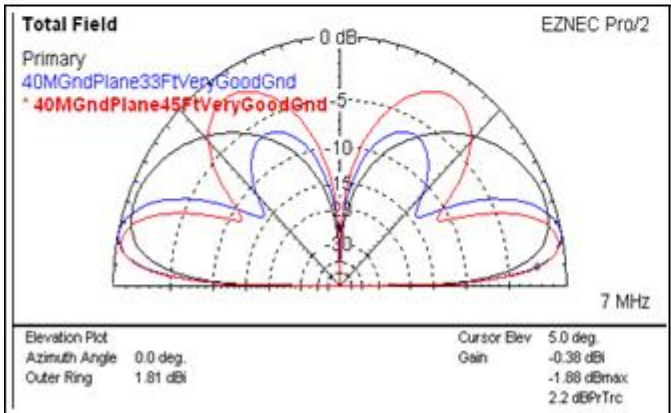


Fig 14 - 40M Ground Plane, 6 in, 33 Ft, 45 Ft Very Good Ground

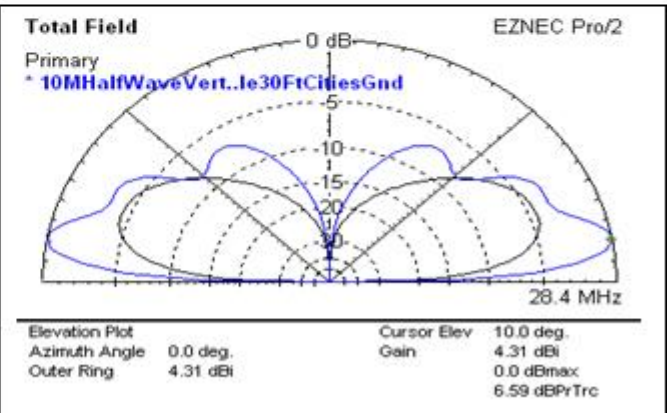


Fig 15 - 10M λ/2 Dipole at 6 in, 33 Ft Very Poor (Cities) Ground

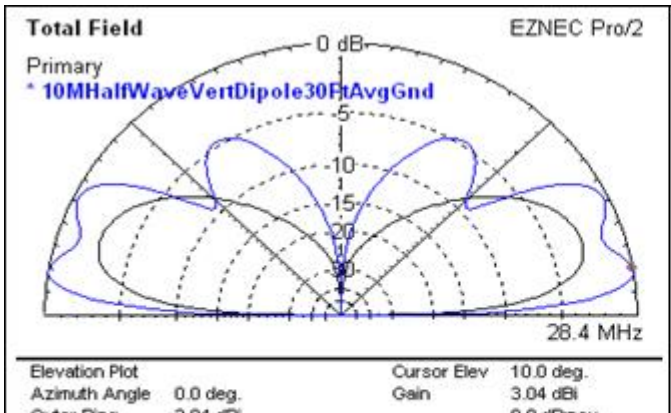


Fig 16 - 10M λ/2 Dipole at 6 in, 33 Ft Average Ground

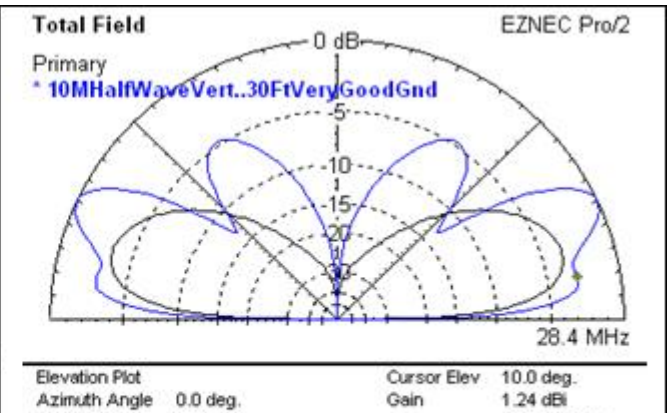


Fig 17 - 10M λ/2 Dipole at 6 in, 33 Ft Very Good Ground

Our next antenna, a 10M vertical λ/2 dipole, is modeled with its base 6 inches above ground, and at 33 ft. Results are shown in Figs 15, 16, and 17. Here, elevating the antenna is a major improvement for all ground types, and for almost all vertical angles.

Next, I studied the issue of radials for a half-wave antenna. It's a commonly held belief that half wave antennas do not need radials, but a search of ARRL technical publications will find statements to the contrary (ON4UN book, for example). I modeled a half-wave centerfed 20M dipole built with 3/4-in diameter Al tubing, mounted 1 ft above ground, with and without 32 half-wavelength radials.

Radials are laid on the ground and are connected only to each other in a star configuration. Results are shown in Figs 18-20. Increased radiation is greatest for the poorest soil and for higher vertical angles.

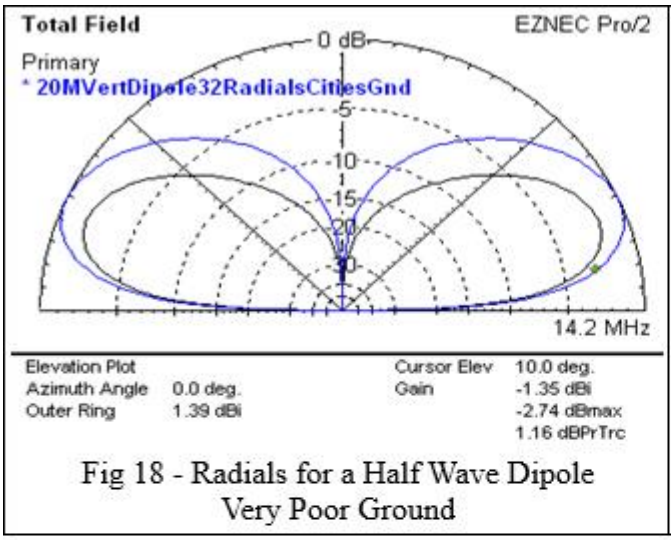


Fig 18 - Radials for a Half Wave Dipole Very Poor Ground

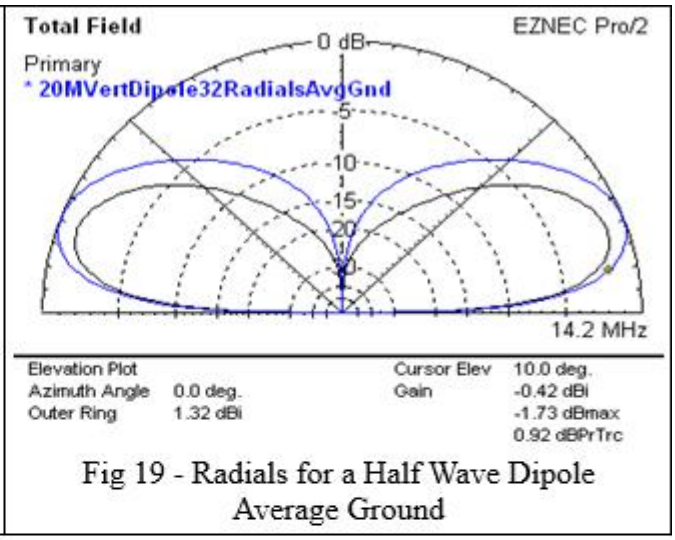


Fig 19 - Radials for a Half Wave Dipole Average Ground

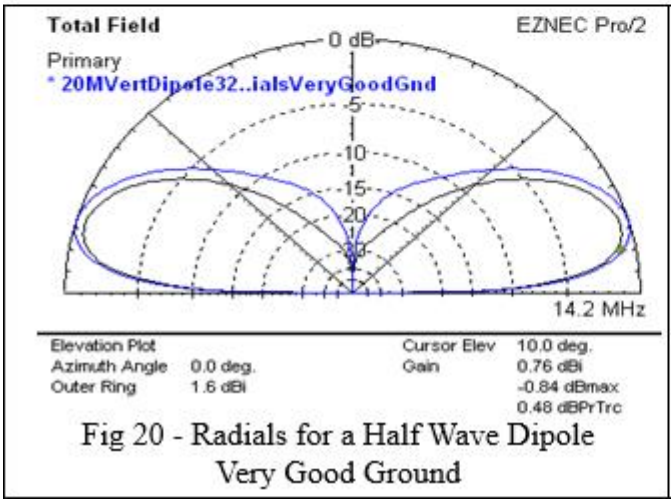


Fig 20 - Radials for a Half Wave Dipole Very Good Ground

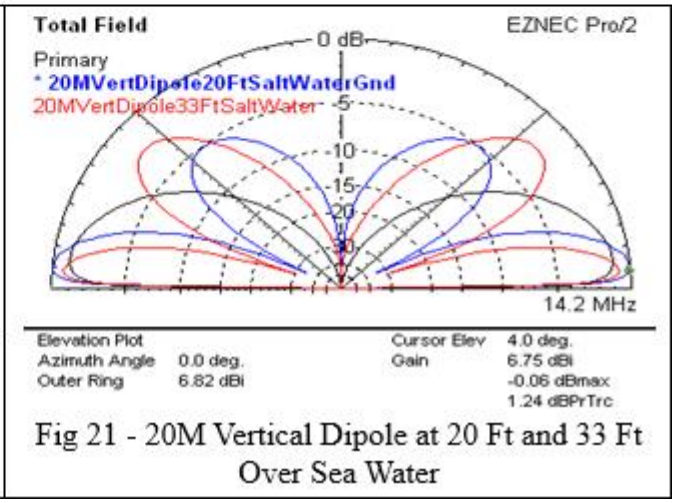


Fig 21 - 20M Vertical Dipole at 20 Ft and 33 Ft Over Sea Water

We're now in a position to summarize the results of our study. 1) A vertical antenna mounted above ground in the range of λ/4 - λ will generally outperform the same antenna mounted in close proximity to the earth. 2) Improvement will be greatest for the poorest soil conditions. 3) Improvements will be greatest at low radiation angles. 4) At heights above about λ/4, lobes and nulls develop in the vertical pattern that are most pronounced with very good soil. 5) In general, there is little benefit to increased mounting height of antennas over sea water. The result of Fig 21 is typical -- while low angle radiation increases by a dB or so, lobing at high angles becomes more pronounced with increased mounting height.

The next question is, why do vertical antennas work this way? As I see it, there are three primary effects, the first two of which are included in the model. 1) Fields produced by vertical antennas, including their radials, induce currents in the lossy earth. These losses are greatest when the antenna is near the ground, and decrease the overall strength of the radiated signal. As the antenna is elevated, these losses are reduced, because the EM field, and the resulting current, are being returned to the antenna (the radials or the other half of the dipole) rather than to lossy earth. 2) The EM field radiated by the antenna hits the earth at some distance from the antenna, is reflected by the earth, and the two wavefronts, direct and reflected, add to produce the vertical pattern. At vertical angles where they are most nearly in phase, they add to increase the signal strength, and at ver-

tical angles where they are close to 180 degrees out of phase they produce a null. Lobes are strongest, and nulls are deepest, when the direct and reflected waves are more nearly equal in amplitude at the 0 and 180 degree phase angles. 3) The horizontal and vertical pattern of any antenna is distorted by surrounding conductors -- often called "ground clutter," and additional losses may be introduced. This effect is difficult to model, and no attempt was made to do so, but it's safe to assume that it is reduced by elevating the antenna.

Elevating Verticals -- the Practical Side As noted earlier, multi-band HF verticals tend to fall into two generic types -- base-fed verticals that require radials, and center-fed verticals that do not. When ground-mounted, many radials are required, but length is not critical -- 32 λ/4 radials laying on the ground is generally within a dB or so of optimum. Radials serve to "shield" the fields produced by the antenna from the lossy earth, and they carry the antenna's return current. The return current divides approximately equally between the radials, and losses equal to I^2R are induced. The more radials, the lower the loss, because power is current squared. Also, the fewer the number of radials, the less likely the current will be equally distributed, which also increases the loss.

When radials are elevated, fewer radials are needed to equalize the current, and the increased height reduces coupling to the lossy earth. Four λ/4 radials are sufficient for verticals at least λ/8 above ground, and modeling suggests that two λ/4 radials per band are within a dB or so of optimum for multi-band verticals if those radials are distributed radially around the feedpoint. But that's still a lot of radials, so elevating a base-fed multiband vertical is a non-trivial effort.

Center-fed verticals are far easier to elevate because they do work without radials, and because elevating them reduces ground losses to the extent that radials have little effect. Some examples of center-fed multi-band verticals are the Gap Titan, Force 12 V3 and ZR3, HyGain AV620, AV640, and AV680, Cushcraft R6, R8, R9.

End-fed verticals can be mounted on towers with little effect on their performance as long as they have radials. End-fed verticals do not work well when mounted on towers without radials using the tower as a counterpoise -- the tower becomes part of the antenna and seriously degrades the vertical pattern.

Centerfed dipoles mounted on towers present a special problem. They must be insulated from the tower, but the feedline must come down the tower, and the capacitance between the feedline and the tower couples it to the tower. In addition, good practice for lightning protection of the feedline calls for the feedline to be bonded to the tower at top and bottom, which also couples the antenna to the tower. With this coupling, the antenna is vastly different from its original design, and its performance is likely to be poor.

Losses in Multiband Antennas My models are for fundamental antenna types, where losses are minimal. The various engineering techniques used to create a multiband antenna often add loss, whether due to the resistance of traps or increased current in matching sections. The radiation efficiency of any antenna is limited by the simple voltage division between the radiation resistance, R_R, (good resistance that accounts for radiated power) and series loss resistance (conductor resistance plus ground resistance). Radiation resistance increases with physical length as a fraction of a wavelength; R_R is about 37 Ω for a λ/4 antenna, but falls to about 7 ohms for a λ/8 radiator. We must keep these factors in mind when comparing one antenna to another, and these efficiency differences are essentially what the N0AX/K7LXC tests were measuring.

And there's yet another factor at play -- when an antenna is physically short as a fraction of a wavelength, the current must be increased (by means of a matching network) to maintain the same radiated power, and the increased current increases losses. This means that short antennas can benefit even more from being mounted higher because the coupling of the increased current to lossy earth is reduced. Figs 22 and 23 show the extreme case -- a 4 ft tall center-fed dipole on 20M at heights of six inches and at 30 ft. Most multiband antennas will be subject to this factor -- that is, they may

benefit a bit more from being elevated than suggested by my models of near-ideal antennas.

Reduced Losses and Impedance Matching It's well known that many antenna designs "use" the ground loss component of the feedpoint impedance to bring that impedance closer to 50 ohms, so when losses are reduced by elevating the feedpoint, the SWR may rise a bit. Not to worry -- the small additional loss in the line due to mismatch is much less than the efficiency gained from elevating the antenna. Smart hams also know that the most important reason to use big coax is to reduce loss. This is especially important when running low power or with a compromised antenna system. Indeed, the only good reason for using small coax is to minimize visibility from neighbors (or an XYL) with an attitude!

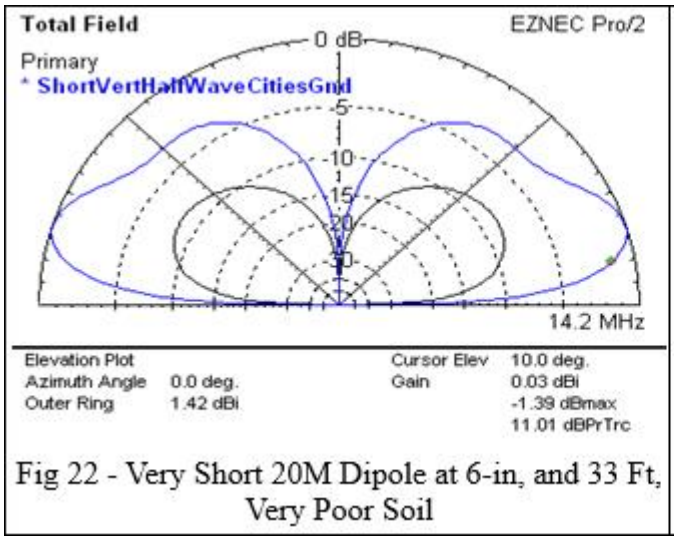


Fig 22 - Very Short 20M Dipole at 6-in, and 33 Ft, Very Poor Soil

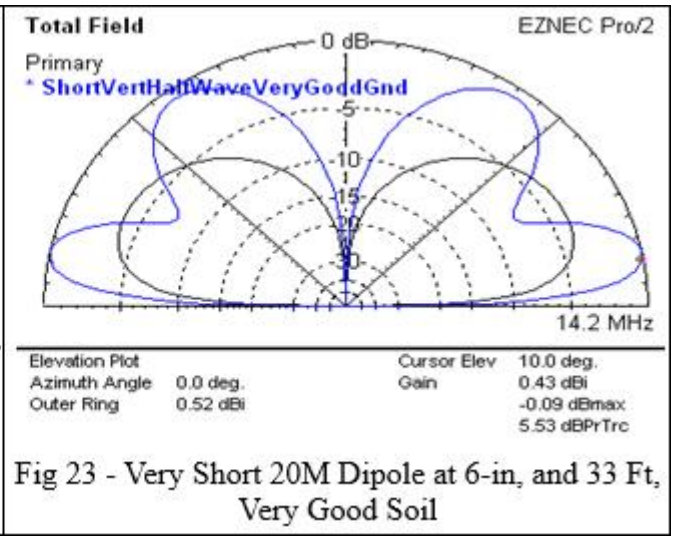


Fig 23 - Very Short 20M Dipole at 6-in, and 33 Ft, Very Good Soil

Comparing Verticals with Horizontal Dipoles

Now that we know a bit more about what can be done by elevating a vertical, the obvious question is, how do these verticals compare with a conventional horizontal half-wave dipole? We'll begin by studying the effect of ground quality on a horizontal dipole for 40M. Fig 24 shows that at low vertical angles the difference is negligible -- only 0.6 dB difference between the best and worst soil types, and an improvement of about 2 dB for the best soil at NVIS.

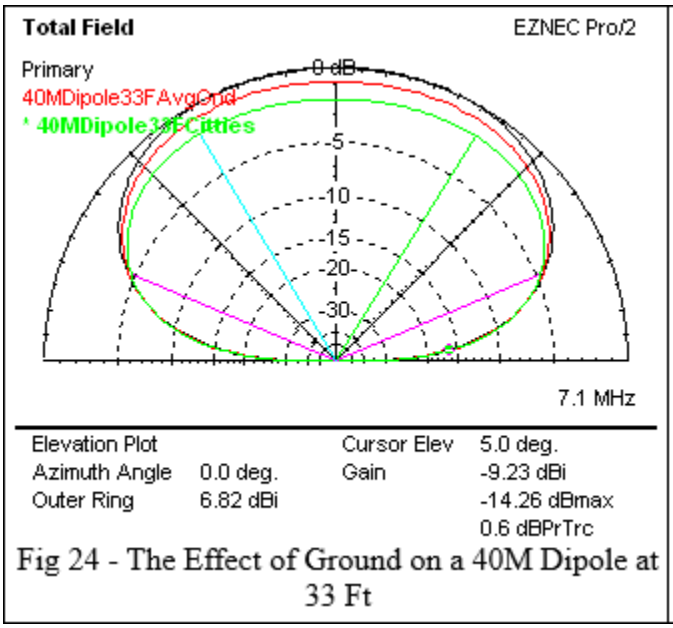


Fig 24 - The Effect of Ground on a 40M Dipole at 33 Ft

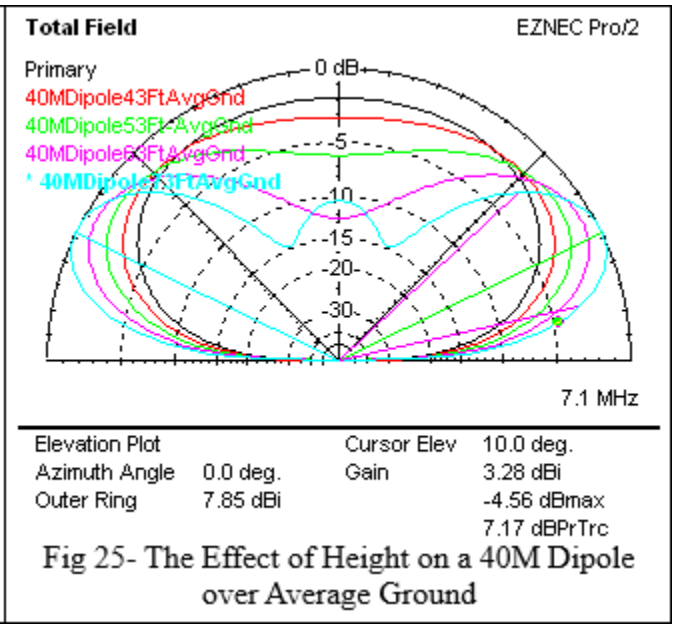


Fig 25- The Effect of Height on a 40M Dipole over Average Ground

Height of Horizontal Antennas The most important characteristic of a horizontal antenna is its height above ground. Fig 25 compares the vertical pattern of a 40M dipole at heights of 33 Ft, 43 Ft, 53 Ft, 63 Ft, and 73 Ft. As the antenna is raised, high angle radiation is suppressed and low angle radiation is enhanced. For most contesting, a higher dipole is a much better performer! Fig 25 can be scaled by wavelength -- that is, to predict behavior of a 20M dipole, divide heights by 2, for 80M, multiply by 2.

Now we're ready to compare verticals and dipoles at mounting heights that are practical for many hams, even on small lots. Figs 26-28 compare a horizontal 40M dipole at 33 Ft with a simple 40M ground plane at 6 inches and at 33 Ft. For all three soil types, the vertical at 33 ft outperforms the horizontal dipole at low angles, at the sacrifice of high angle radiation, ***in the main lobe of the dipole***! Off the ends of the dipole the advantage of the vertical at low angles is even greater.

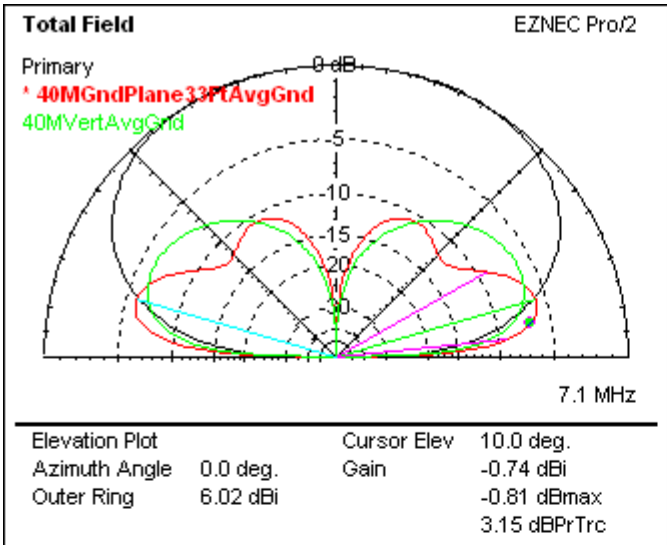


Fig 26 - 40M Horizontal Dipole at 33 Ft, Average Ground, as Compared to λ/4 Vertical at 33 Ft and 6 inches

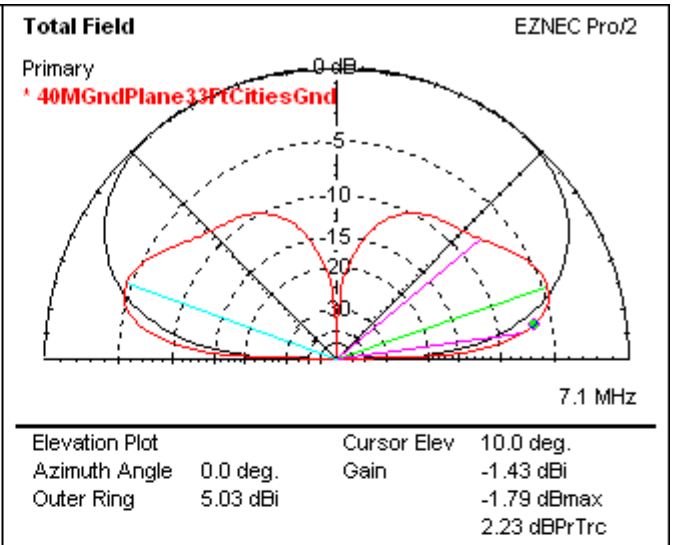


Fig 27 - 40M Horizontal Dipole at 33 Ft, Very Poor (Cities) Ground, as Compared to λ/4 Vertical at 33 Ft

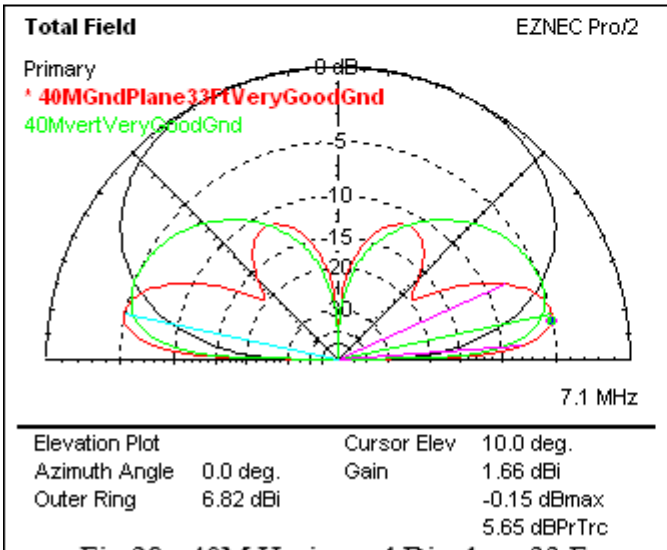


Fig 28 - 40M Horizontal Dipole at 33 Ft Compared to λ/4 Vertical at 33 Ft and 6 inches, Very Good Ground,

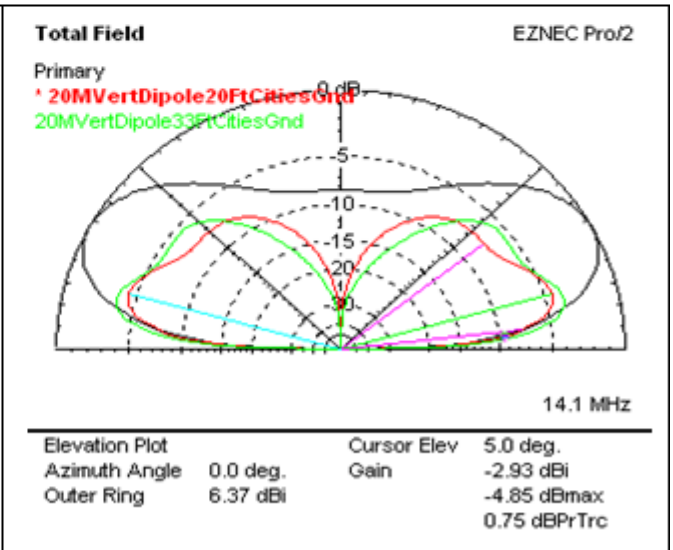


Fig 29 - 20M Horizontal Dipole at 33 Ft, Compared to λ/2 Vertical Dipole at 20 Ft and 33 Ft, Very Poor (Cities) Ground

Figs 29-31 compare a 20M horizontal dipole at 33 ft to vertical dipoles with their base at 20 ft and 33 ft for three soil types. The verticals have a slight advantage at low angles, up to about 10 degrees, depending on soil type. Again, this is broadside to the horizontal dipole -- off axis of that, the vertical has a greater advantage. Note also that the high angle radiation of the vertical dipole doesn't fall off as much as for the 40M antenna. Again, remember that these models are for near ideal antennas -- the efficiency of practical multiband antennas reduces their performance by a dB or two.

What About a Small Beam? To estimate its performance, add 4 dB to the advantage of a horizontal antenna for a small beam without traps at the same height (only 2-3 dB if there are traps). And remember that its directivity can reduce noise and QRM, so it may help us hear the weak ones. For a simple 2-element vertical array, add 3 dB over the performance of a single vertical.

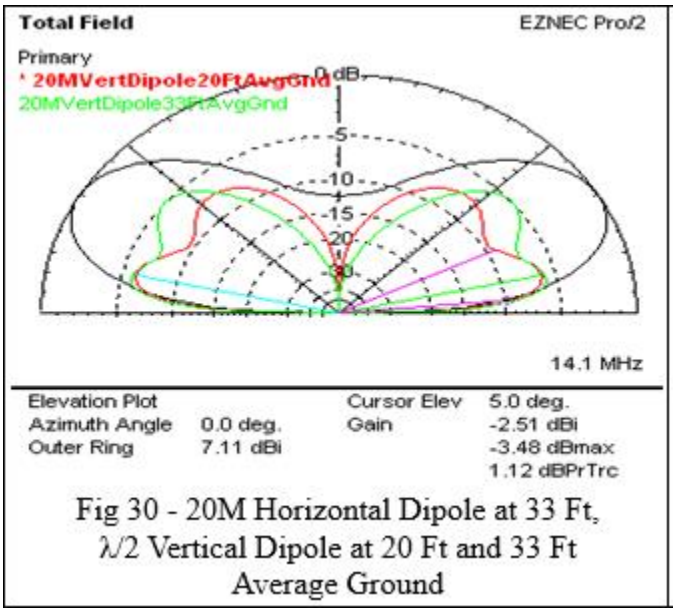


Fig 30 - 20M Horizontal Dipole at 33 Ft, λ/2 Vertical Dipole at 20 Ft and 33 Ft Average Ground

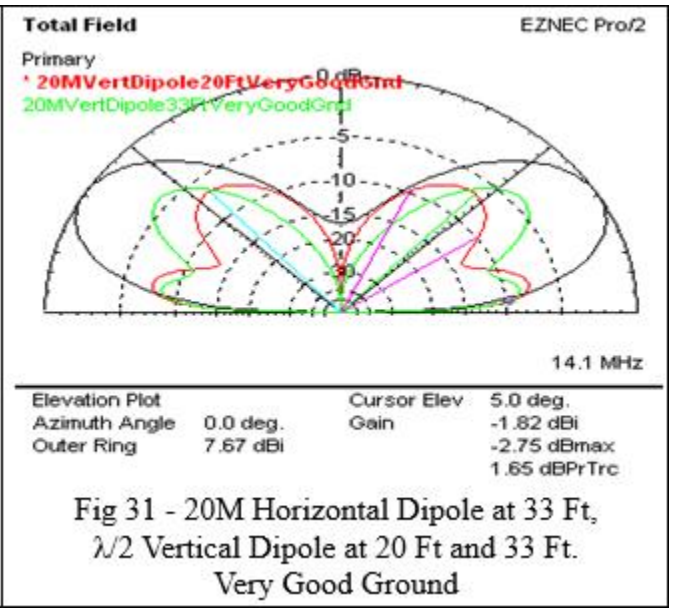


Fig 31 - 20M Horizontal Dipole at 33 Ft, λ/2 Vertical Dipole at 20 Ft and 33 Ft. Very Good Ground

Getting Practical -- Where Can I Put Antennas?

Now that we have a good idea about how various antennas perform, we're back to where we began. We can start looking at the possibilities that our real estate (and the attitudes of XYL and neighbors) permit. What do we have for skyhooks? Can we launch a rope into a tree to support one end of a dipole? Will a building support one end of an antenna? Can we safely mount a multiband vertical on the roof of our home or garage? Can we route a feedline from the proposed location to the shack? How close would the proposed antenna be to noise sources? To our neighbor's living room entertainment system? What are the best orientations for horizontal dipoles based on where the QSOs are? Do I need much high angle radiation?

Finis

If we want to break it into two parts: Optional paragraph to add before "Comparing Verticals with Horizontal Dipoles"

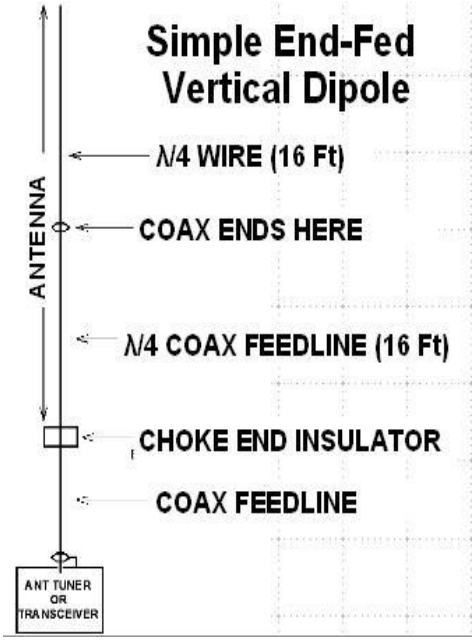
This completes our study of vertical antennas and mounting height. Next time we'll study how these verticals compare with a horizontal dipole.

References: "HF Vertical Performance- Test Methods and Results," H. Ward Silver (N0AX) and Steve Morris, K7LXC, Champion Radio Products, 2000

Collected tutorials by Rudy Severns, N6LF. http://www.antennasbyn6lf.com/

Experimental Confirmation of Modeling

All of the work presented here is the result of modeling --none of these antennas have been rigged and measured on a testing range, and doing so is far outside the capabilities of all but the wealthiest hams. There was, however, one real world experiment with varying the height of a half-wave vertical dipole for 20M. My neighbor, Glen Brown, W6GJB, built and rigged the dipole from a pulley roughly 75 ft above ground and about 15 ft from one of his redwoods. The dipole is based on my design, which I came up with after seeing something similar that N6LF had published. Rudy used a simple "coil of coax" to act as the end insulator; I refined the design to make it independed of feedline length by using a high impedance common mode choke wound on a #31 ferrite core. This small choke is enough for 100W. Two in series are required for high power. Our tests were done at 3W wth Glen's KX3 as the transmitter and my K3 as the calibrated voltmeter. We're 5 miles apart, the terrain is quite irregular, and soil quality is very poor. The antenna models at 75 ohms, and was fed with RG59.



Signal strength measurements were made with the dipole center at ground level and the feedline laying on the ground to form a quarter-wave vertical with a single radial; then with the choke 6-inches above ground level, forming a half-wave dipole with its base 6-inches ground level; then with the dipole raised in 10 ft increments to a maximum height of 40 ft above ground. My RX antenna

was a 20M vertical with two radials laying on the ground.

Results are shown below.

Height of Choke	Received Signal Strength
Center insulator on ground	- 4 dB
6 inches (Zero Reference)	0 dB
10 Ft	0.5 dB
20 Ft	3.2 dB
30 Ft	6.5 dB
40 Ft	9.5 dB

Look for Part 2 in a future edition of the JUG!

Jim K9YC

Northern California Contest Club Reflector—Guidelines

This reflector is devoted to the discussion of contesting.

This includes contests, station building, dxpeditions, technical questions, contesting questions, amateur radio equipment wants/sales, score posting, amateur radio meetings/conventions, and membership achievements.

This does not include personal attacks, politics, or off-subject posts which will be considered a violation of the Guidelines.

Violations may result in removal of the violator from the reflector and possibly from club membership in good standing.

TUBE OF THE MONTH

Visit the museum at N6JV.com

Norm N6JV

F-328A

In the 1920s, the ham community was small and everyone knew who the “big guns” were. Dxing was popular, but the equipment was mostly home made especially for the higher short waves. QST would run stories about working Europe from W6 on 40 meters. Don Wallace, 6AM, was one of the most famous DXers of the day. When Don’s old triode (a UV206) was getting soft, he contacted 6EX in the San Francisco area. 6EX ran the National Radio Co. who made rectifiers and did some tube rebuilding. Don was sent a Federal F-328A that may have been rebuilt and an arc rectifier to power it. Don constructed a water jacket to cool the tube and had rubber hoses for tap water input. The output ran outside onto the driveway. The circuit was a Hartley oscillator and when conditions were good, the water came out steaming. This tube had a dissipation of 5 KW and there was much speculation as to the output power. I believe this rig was the origin of the expression “A California kilowatt”. The tube was damaged in the big earthquake of 1933 and was retired. About 45 years ago, I met W6AM at a convention and the conversation led to the water-cooled tube of 1927 that seemed to be one of Don’s favorite yarns.

California QSO Party

G O L D R U S H —T E A M

K6O - San Luis Obispo

W6TK, N6WS, KA3DRR, K6YR, W6SL, W6SZG

The Central Coast station, W6TK, was kindly invited by the NCCC to participate in the Goldrush CQP. Dick, W6TK, invited a few of the local contesters to participate in the event. Bill, N6WS, Scot, KA3DRR, John, W6SL and Dick, W6TK made up the K6O Goldrush Team. We all enjoyed operating and participating in the Goldrush CQP event. W6SZG dropped in for moral support on Saturday afternoon…moral support is always an important element.

John, W6SL, served as chief cook, since, Liz, W6TK's XYL, was off visiting her sisters…wonder why? Liz has been a great and faithful support for all our 38 years of marriage and would have been front-center if family matters hadn't called! But W6SL did a great job keeping us well fed and nourished! Thanks John.

W6TK was able to get the 4 Element SteppIR modified with a 2nd element for 40 mtrs in late August, prior to the contest. This was a great 1st trip out for the new antenna configuration and it seemed to help our 40 Mtr effort. It was a fun opportunity and time shared by these four Central Coast contesters/dxers and we thank NCCC for the continuing work to make CQP the best State QSO Party.

Final raw results at K6O/W6TK was 2059Q's, 57 mults; 293,208 points; 1041 CW Q's, and 1033 SSB Q's. (15 dupes along the way!)

W6SZG lending support to KA3DRR in the "op chair"

W6TK in the "hot chair" on CW

N6WS getting the call right!

W6SL finishing up!

KA3DRR in the “chair” while John, W6SL(left) and Bill, N6WS plan the way ahead!

73’s,
Dick – W6TK

K6O - San Luis Obispo

GOLDRUSH—TEAM

N6L - Los Angeles

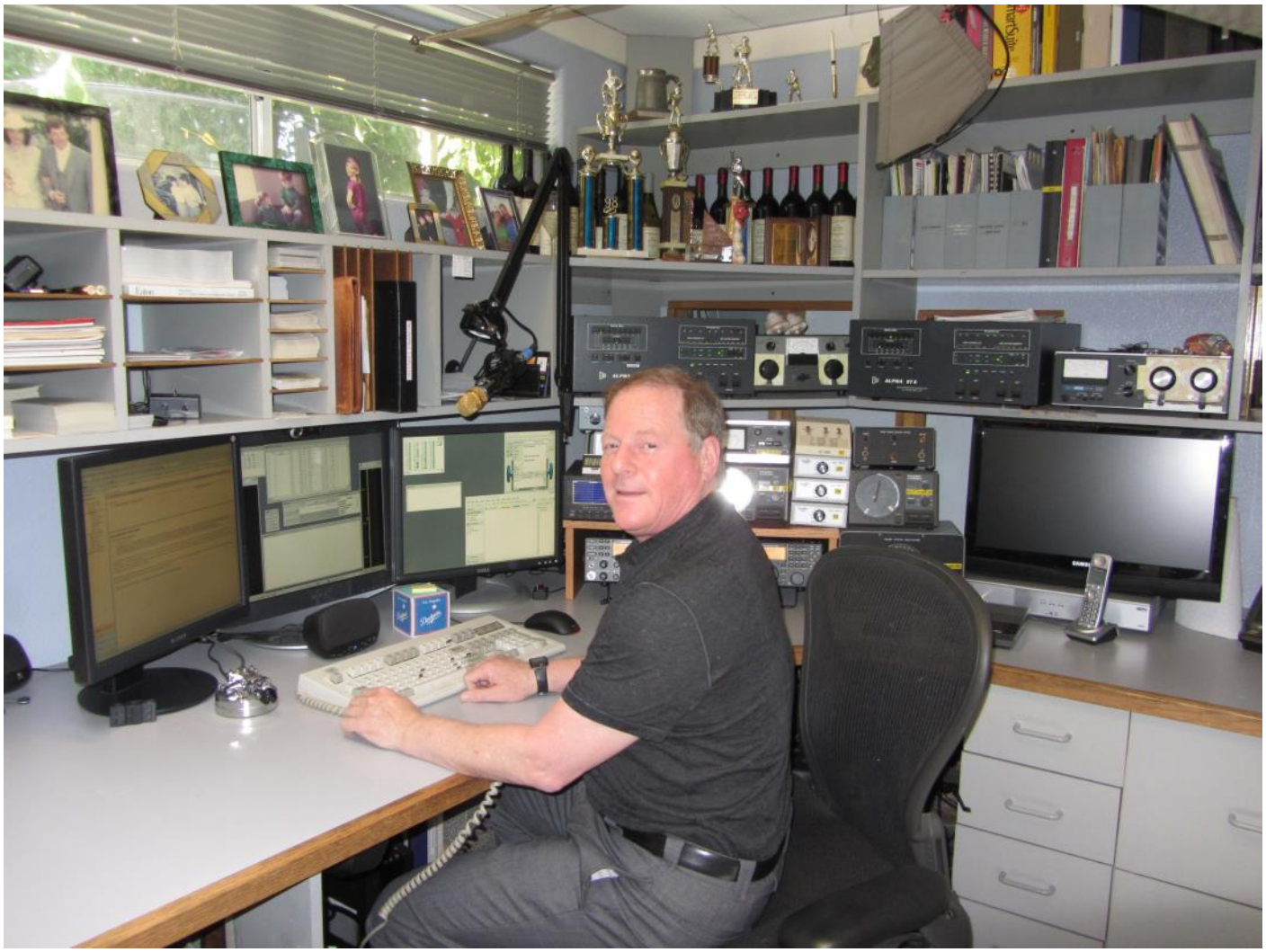
K6LA

I was happily surprised to receive an email asking if I would be interested in being one of the 1 x 1 GOLD RUSH stations as I had never used a special event 1 x 1 call before. I was a little disappointed that I couldn't be K6L given I am K6LA, but understood that K6L had been used for years in CQP by a multi-op.

The station here is on a 45' x 145' city lot in West Los Angeles. I probably have more aluminum per square foot than anybody. My small lot has a 72' motorized tower with a 2 element shorty 80 meter yagi, a 3 element shorty 40 meter and two stacked 4 element 20 meter yagis. I also have a 20' tower on the roof of my two story home with two phased 4 element 15 & 5 element 10 meter yagis each which share a boom. I shunt feed the motorized tower for 160 meters. Inside I have two Elecraft K3s with P3s and Alpha 87A amplifiers.

During the contest there were no visits from Murphy. I was surprised that I wound up down around 400 QSOs from last year. 10 meters was much better from here last year which accounts for much of the decrease. I also worked a lot less DX than in previous years. I had anticipated that the 1 x 1 and the GOLD RUSH award would generate a lot more QSOs. I also suffered from an increased number of dupes, probably because there was N6L, K6L and W6L.

Nevertheless, it was fun as always. I enjoy mixed mode contests because it seems there is always something to do and it isn't too hard to find a decent frequency.



Ken K6LA

Ken K6LA Antenna Farm

N6L - Los Angeles

California QSO Party

G O L D R U S H —T E A M

W6L - Alpine

K6WX

The e-mail came from Joanna, K6YL, “Kristen, how high is your motivation for CQP this year? I was wondering if you feel like a run for the YL award because Rick and I would totally support you. :-)” Usually I answer e-mail pretty quickly, but this time I had to think for a few days. I typically am part of some M/M operation, and with my squirt gun station at home, just never do SO. So, I had to think. Was I up for some serious fun with few breaks? Being the adventurous type, I decided that it would be fun no matter the outcome. At the time of this writing, I still don’t know about the YL award (I know I didn’t set a new record), but at some level, it doesn’t matter. I had a blast!

As CQP approached, I have to admit to some trepidation. Part of it was the usual pre-contest jitters about equipment, and more particularly for me, how awake I’d be - I have serious issues with sleep and have to be very diligent to make sure during the days leading up to the event that I’ve had

enough sleep to carry me through a contest. But I also found myself constantly reviewing my own plans for how I was going to manage bands and modes to try to maximize my score. Also, I was hoping that I had the stamina for serious non-stop operation.

When I arrived at our main cabin across from Lake Alpine (we also had a tent cabin up the hill available to us) on Thursday evening, a day after everyone else, I was told that I had missed the snow. Wait, what? Snow! And I missed it. I love snow. Oh well, so it goes, but I wished I was there. It was pretty late, so after a bit of great conversation with the rest of the co-located W6O team (Rick N6DQ, Joanna K6YL, Jack K6JEB, Daniel KJ6SEE, and Harry K4YR - we'd be joined by Andreas N6NU on Friday), I headed to bed to optimize for sleep.

Friday started out with a great pancake breakfast cooked by Joanna. Then it was time to get the rest of the antennas up in the air. They already had one hex beam up on Rick and Joanna's tower trailer at about 60 ft and the 40m / 80m dipole pair strung from the tower across the parking lot. These were for W6L. What remained was what went up in the woods behind the cabin with maximal physical separation. See, the plan was to be able to run same-band and same-mode for both W6O and W6L. We weren't sure it could be done, but Rick and I both put a lot of faith in the Friis transmission equation that models the attenuation one gets from physical separation. As you might expect from the way that power spatial spreading works from the wave equation derived from Maxwell's Equations, the power reduction is proportional 1/R2, where R is the distance between the radiators. It's also proportional to λ2 which means that at higher frequencies the transferred power is significantly less. So, distance is your friend, in addition to aligning nulls and exploiting elevation changes.

We tried to put up another hex beam in the middle of a clearing amongst the trees. Rick valiantly pushed the antenna up, but it pretty quickly hooked itself on pine tree branches, which just seemed planned to trip us up. Hex beams are pretty durable and flexible, and we also assemble them loosely since they won't be up for long. With a lot of discussion and appropriate shaking, we were able to get a tangled mess of wires and stays to finally fall out of the trees. Whew! We put the whole thing back together, found a new spot with more clearance, and finally got it up, but only about 25 feet. We were hoping that would be enough with the terrain falling off. Taking a break, I went back to the cabin and started working some stations using the antenna on the tower trailer with my own call, just for fun. I must have done that for about 30 minutes. Unbeknownst to me, Rick was listening on the other hex beam. He couldn't hear most of the stations that I was working. That was a shocker. Time to rethink the antenna situation. Rick suggested putting up some high dipoles instead. Anything had to be better than that low hex beam.

Daniel, our resident tennis ball launcher expert, shot some lines up really high in the pine trees. We hauled up dipoles (actually double bazookas) for 15m and 20m, while the rest of the team worked on an inverted L for 80m and got the 40m dipole up. These would be the antennas for W6O. With all of that in the air, we made sure all of the stations were ready to go, making a some QSOs on and off, including working CO8LY on the new antennas. We also tested the interference between stations. While it raised the noise floor a bit when the other station was transmitting, it wasn't all that bad. We decided to go with it.

It was beginning to get dark, so that was our cue to get our annual pre-CQP steak dinner at the Lake Alpine Resort's restaurant. It's something we do every year no matter where we are, and it occasionally includes beer being spilt by yours truly! None spilt this time, but plenty of their special hard cider was imbibed by all while we sat by the roaring fire.

In all of the times our team has done a county expedition, we've always missed the practice session the night before the contest. This time we got back in time to participate, but mostly I, at least, just

ended up making a few fun QSOs across the US. My Kent single-lever was slipping on the table, so Daniel came up with a plan using vinyl electrical tape to keep it in place. Bravo! With that in the bag, I brought out a bottle of special Japanese Hibiki whiskey that I brought back from a recent trip to Japan. We all had some of this wonderful libation, and then settled in to bed for an early start.

Breakfast was at oh-dark-thirty, again prepared by Joanna (Thank You!), and we all settled into our operating positions. 9 AM local came and off we went. I started out on 20m SSB which worked pretty well for a couple of ours before I switched to CW. This established a pattern where I would run on one band-mode, do a S&P pass to clean up, then switch modes and do the same again. Then, if CONDX warranted it, I would switch to another band. After 20m, I went to 15m and that was working really well. For a short time I went to 10m and worked a few stations, but propagation wasn't all that good. In general CONDX were a bit iffy. Back to 15m, and then I switched between 15 and 20 while the sun was up. As the day drew to a close, 40m beckoned with some very nice runs and pileups toward late evening. It was about 5 deep for an hour or so on CW. What a rush! I got up to about 130 Qs/hr for a while. Those are the times I live for when contesting.

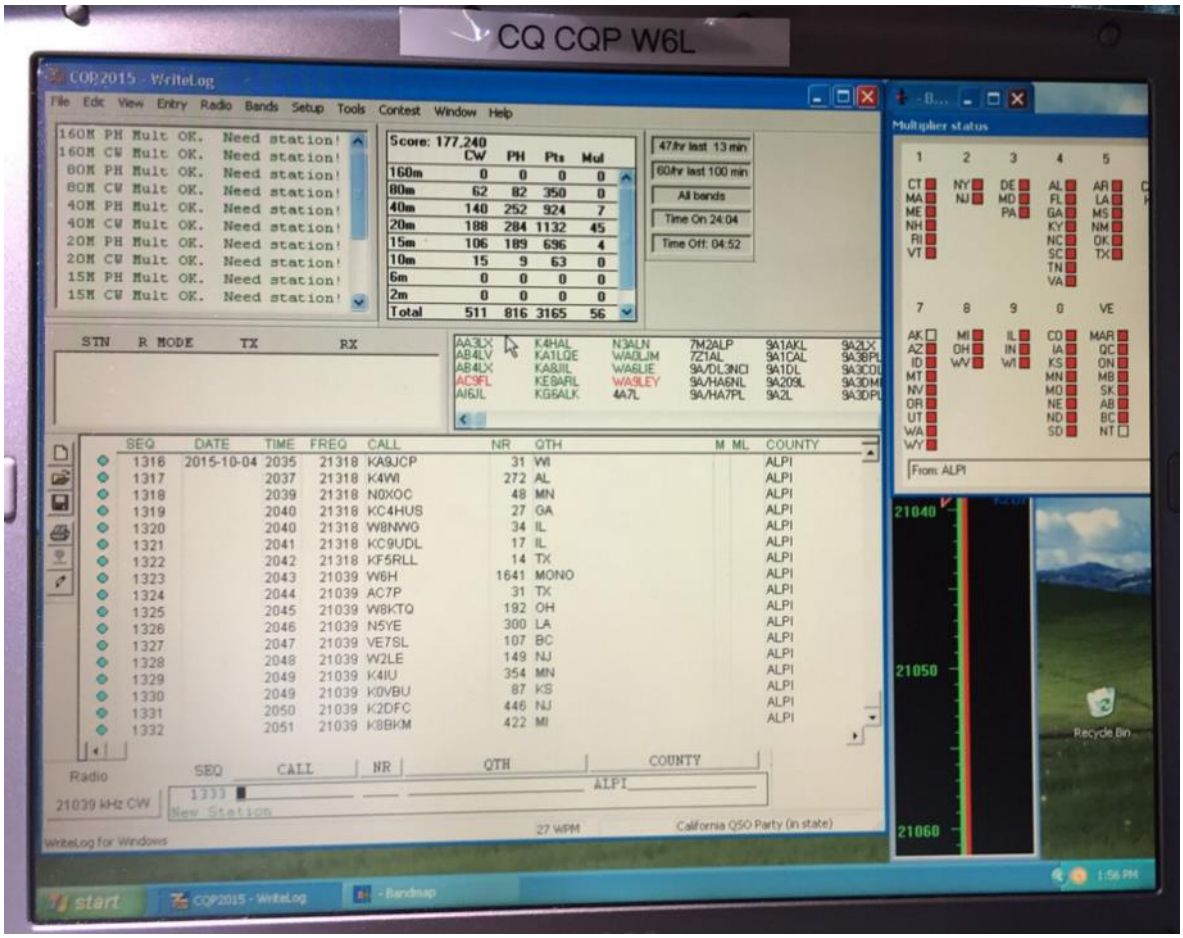
80m was rather less intense, but still gave some good rates. I knew that I had to take a sleep break at some point, since I could only operate 24 our of 30 hours, and I waited for the rates to drop. At about midnight, I put more wood in the stove because Andreas and Jack from team W6O were up at the tent cabin and were probably going to come back frozen. Sure enough, they came back at about 1, and that was when the rates were really slowing for me on both 40m and 80m. I tried for another half hour and then called it quits. With the help of some good sleep drugs, I crashed for about 5 hours.

By 6am I was back at the station hoping for some propagation on 20m. I checked 40 and 80, but didn't find much, working what I heard. 20m opened weakly at about 7 and I started calling CQ. Rates were slow at first, but started ramping up as the sunlight fell on the ionosphere. Before long, things were going along nicely. I worked 20 until it started sounding fished out on both fone and CW. Then up to 15m for more fun. I went up to 10m for a little bit as morning wore on and worked a few, including catching a guy who was looking for ten-ten numbers and having a nice brief chat with him. Then I went back to where the money was. I spent much of the rest of the contest on 15m.

I had missed two mults along the way: Northern Territories and unbelievably Alaska. I figured that NT was a long shot, but I couldn't find KL7 anywhere. About 30 seconds before my 24 hours was up at just before 2 PM, I heard that someone found an Alaska station on 40m, but there was no time left to get over there and set up to work them.

With my part of the contest over, I grabbed my camera and checked out what team W6O was up to. I got some good pictures and then helped Rick get an early start on the teardown.of the nighttime antennas. It was a cold teardown, but with everyone pitching in, everything was down, boxed, and loaded by nightfall.

So, how did I do? My claimed score is 177,240 with 511 Qs on CW and 816 Qs on SSB. The majority of those were split between 20m and 40m. Not record breaking, but not entirely bad either. Propagation was only fair when compared to other years. I don't recall working very many DX stations (prior years have yielded pileups from the UK and other parts of Europe, particularly on 15m). There were definitely times when the rates slowed to a crawl, but there were other times when it was incredibly intense and beyond fun. The best rate I can recall was around 310/hr on SSB.



I want to thank everyone on team W6O. They really made this possible for me. In particular, though, I want to thank Joanna and Rick. They provided the moral support, great station, and even the food (Joanna was always dropping off some fun stuff to much on while I was on the air). It was an unforgettable experience for me. Was it worth it? You bet! CU all in CQP next year.

GOLDRUSH X2 Team **W6O** (N6DQ, K6YL, KJ6SEE, K6JEB, K4YR & N6NU) **W6L** (K6WX)

W6L - Alpine

GOLDRUSH—TEAM

K6L - Alameda

N6WM, NS6T

It was a lot of fun returning to K6LRG to operate as K6L during CQP 2015. Increasingly, Chris N6WM operates K6LRG remotely, and it has been at least a year since NS6T has operated from K6LRG. However for CQP 2015, we were both on site for the event. We had the extra challenge of evading a bull that was in the pastures surrounding K6LRG.

We had two objectives coming into CQP:

1. Establish a new ALAM M/S HP record with wiggle room. - Done.
2. Do a KB job as one of the stations that put the L in GOLD RUSH and to hand out the L to lots of folks. - Done.

We got to 57 multipliers fairly quickly, but like most, we had trouble finding anyone from NT. Thankfully, we got a call from VE8NSD on Sunday to complete our sweep. Thanks!

For the most part, the station performed excellently. However, we had a bit of a scare when we experienced a power failure in part of the station during high winds on the hill. It can be difficult to manage keeping the CW qso rhythm during such events, but we managed. We could actually see thunderstorms rolling through miles to the north.

Some minor bugs with the station but the GU74's in the Alpha 99 kept on truckin and overall stuff held together.

Thanks for all the QSO's. We had a great time and it was nice to be back in the chair for the 2015/16 season!

73 and seeya next time

For Team K6L@K6LRG

Chris N6WM

Tom NS6T

K6LRG Antenna Farm !

K6L - Alameda

Contesting from the West Coast – Musings on West Coast relevant contests by N6WM

(Opinions are specifically those of the author and do not represent any official statement of the NCCC)

Greetings fellow contesters. Well December is behind us, we have learned 160m was pretty good, 10 meters is fading, a couple of the local small clubs seem to have done a bang up job in Sweepstakes and CQWW CW is in the books.

The contest season marches forward.. lets see what's in store for the west coasters this month

News flash! We have a major Focus contest month.

ARRL RTTY Roundup - 1800Z, Jan 2 to 2400Z, Jan 3

Can you imagine this contest when they used teletype machines for this mode? I Think it's safe to say it moves along a bit faster now. Yeee hawww! It's time to rustle up the club for the RTTY roundup. This is a great contest, and perhaps one of the premier RTTY contests out there. With support for SO, SO Unlimited and Multi-single entrants, everyone should find some category to get on the air and diddle! This mode is an awesome way to cut your chops with SO2R, do whatever you can to have some fun and also get team NCCC back in the Winners Circle and bring home the Round up Gavel! Make sure you eat all your vittles, then go out and make some diddles!

North American QSO Party, CW - 1800Z, Jan 9 to 0559Z, Jan 10

A total favorite of many CW operators, this one can be operated at the pace of your choice, but fast paced to be competitive. all low power (unless you exuberantly run high power and turn in a check log… right Hank?). Exchange is Name and state/province/country. We have our ongoing challenge against the other big clubs in the US, and they have been kind of whooping us a little bit. Are we still doing this? Perhaps you would like to have a go at this one this year? Get on an NCCC team.. better yet try and figure out NCCC team assignment politics :-). And when you do you will be next in succession for the NAQP Assignment/flogger job! IMHO the NCJ NAQP awards program could use some work.. so to be sure, the wallpaper for this one is the top ten box in NCJ.

North American QSO Party, SSB - 1800Z, Jan 16 to 0559Z, Jan 17

You did great on cw and now you want to test your SSB skills knowing that you have a log full of everyone's name from "Outlaw AZ" to "Rumplestiltskin" or even the occasional "locust" that you painfully and skillfully copied on CW a couple weeks ago to add to your prefill file. In fact a number of years ago, K6LRG was "DUDE" CA. Playing with exchange names can be one of the fun things about this contest but being too creative could cost you time with fill requests. That's why there are so many "Mike's" and "Bob's". Those are the "all business no fun" names. Unless its actually your name, in which case.. never mind. GL, and have fun!

CQ 160-Meter Contest, CW - 2200Z, Jan 29 to 2200Z, Jan 31

We are not done with 160 meters yet. Since we spent the last 2 160m contests trying to fix our shacks because our sprinkler system was sending smoke signals during ARRL and Stew, CQ has added this one in assuming you are ready for another Top band challenge without RF problems. Simple exchange and the ability to add 1 or 2 countries to your 160m DXCC list is reason enough if conditions are good, and if they aren't, or even better, if your neighbor left their Christmas lights up as the rain promptly invokes an occasional arc… well.. you know the score right? Major west coast skills test.

<CQ Test N6WM > ****L. (oh this could be juicy dx!) <?> ***PL (all right I'm sure this is an EU!) <??> W3LPL (whaaaat? Really? I can barely hear him!) <RR W3LPL 5NN CA> Stat*? (OMG are you kidding me?) <CA CA BK>… you get the picture.

Sigh :-) anyway just kidding. all in good fun. This is what its all about!

GL! This is a great one, have fun on Top Band!

And that's mostly it. Oh and one more thing. VHF contesters don't forget the ARRL January VHF contest. 1900Z, Jan 30 to 0359Z, Feb 1, 2016

I remember a few years ago N6RO was handing out VHF/UHF mults with an HT from the shack! Did he make your log? Most of us have some firepower on 6 Meters so a great option to wrap up another Winter month!

73 and of course, seeya next time

Chris
N6WM

NCCC and Sweepstakes
Bob, W1RH

I've been doing a lot of thinking about NCCC and the ARRL Sweepstakes. For several years, we owned that contest, but our last win, in the Unlimited Club competition was in 2005 – 15 years ago. We won it in 1992, 1993, 1994, and 1995. PVRC won it in the next three years. We took 1999. SMC won it in the years 2000, 2001, and 2002. We won it in 2003, 2004, and 2005.

I've had many discussions via email, at club meetings, in bars, at dinners, and over the phone, with many of our members about this contest. It seems to be OUR contest, but many think we can't now or ever win the unlimited club competition again. Some claim it's because we're growing older and just can get those butt's in the chair for as long as we used to. Some claim that they've lost interest in the contest. Some claim it's simply not winnable from the West Coast, at least in the years of declining sunspots.

Some of these thoughts may hold merit but I can argue against all of them. I can also argue in favor of all of them.

Last year, we saw PL-259 rally their troops to win a gavel in the ARRL Sweepstakes, Local Club category. It's interesting to look at the strategy of winning in the various categories. In the local club category, the club is limited to a total of 10 logs. If you're going to win, those 10 logs need to be BIG scores. PL-259 blindsided the Hoosier DX & Contest Club and the New Mexico Big River Contesters and got the gavel. These guys had a strategy, and it worked. This year, in the absence of any organized NCCC effort in Sweepstakes, PVRC went for another win. A look at the claimed scores shows that they will, indeed, get that gavel again.

As I said, to win in the Local Club category, you need big scores, but only 10 scores total. The Pizza guys really cranked out the numbers. In Phone, it was K6TD with 150K, K6TU with 218K, N6DQ with 119K and N6WM with a huge 263K. In CW, K6MM did 138K, K6MMM did 170K, K6TU did 115K, N6WM did 162K and WA6O was in it with 193K. Absolutely awesome numbers from PL259, showing the SS community how it's done in the Local Club category. Again, these are all claimed scores, but with numbers like these, it sure looks like PL259 will get that gavel again.

Again, in the absence of an organized NCCC effort, and under the leadership of AA6K, with assistance from myself, W1SRD, N6ZFO, and K6LRN, the Mother Lode DX/Contest Club decided to go for a blindside in the Medium Club category. It was a very organized effort to beat the Southern California Contest Club, who won the Medium Club competition in 2014 and, on and off, for many years in the past. In this category, a club can enter a total of 50 logs. That means some big scores but it also means a serious efforts from the smaller stations. With 47 logs submitted on behalf of MLDXCC, it looks like the club has a good chance of winning their first gavel ever….for any ARRL contest. Claimed scores show MLDXCC with a strong lead over SCCC.

Honestly, I really felt that MLDXCC couldn't win it. I just didn't think we could drum up enough interest among the membership, fresh off of the Club's main mission of winning the CQP club competition. I think the club is going to prove me wrong, and here's how they did it:

1 – They got the big guns on the air. K6LRN did a sum total of 209K in CW and Phone. N6RK a sum total of 385K in CW and Phone. N6XI did 129K in CW. N6ZFO, a low

power operator did a sum total of 266K in CW and Phone. W1RH did a sum total of 303K in CW and Phone. W1SRD did a sum total of 381K in CW and Phone. WC6H did a sum total of 487K in CW and Phone. WX6V did a sum total of 159K in CW and Phone.

2 – They got the guys who absolutely hate SS to make serious efforts. A good example is Norm, N6JV, who hadn't participated in SS for years yet scored 103K in CW and 81K in Phone (and this is a guy who we thought didn't own a microphone!)

3 – They got the new members, most of which has never done a contest other than CQP, to give it their best. KR6N did 47K in CW (with a code reader and Skimmer) and 50K in Phone. K6DN did 26K in his first SS Phone. K6KNS did 40K in his first SS Phone. K6LR did 61K in his first SS Phone. K6SCA did a whopping 118K in his first SS Phone. AF6SA did 52K in his first SS Phone. I want to note that all of these guys have joined NCCC in the past couple of years.

4 – They encouraged other SS haters and those with little time to operate to get on and work the members. Notable are W6SR and K6III who took one for the team and made a few critical Q's with club members.

5 – K6MM and W6OAT, both members of PL-259 and MLDXCC helped out both clubs. K6MM's 53K Phone log, for instance, was one of the smaller PL-259 scores and MLDXCC gladly took it. Remember the 10 log limit for the Local Club Category. Likewise, W6OAT had one of the smaller logs that would have hurt the PL259 effort but helped the MLDXCC effort. They helped PL-259 by seeking out those 10 big logs and giving them points.

6 – They got the scores from Tom's W7RN superstation. N6TV did a whopping 222K in SS CW and WX5S was in the chair for SS Phone, with 281K.

7 – MLDCCC did what they always do best. They didn't stop when the contest was over. Log flogging is important. All of the logs got submitted in time and to the right club. I can't say the same about a few of the other clubs competing in the Medium category. I saw at least three 100K plus scores submitted after the deadline. I also saw logs submitted to the wrong club. These were big scores in the competing clubs and their lack of flogging just might contribute to a possible MLDXCC gavel.

There were other heroes in the club, including significant scores from AE6Y, K6BEW, K6CSL, K6DGQ, K6OK, K6ST, KD6WKY, KE6MOANJ6G, NZ6Q, W6BO, W6RKC, WB6BET, WD6EIW, and WK6I.

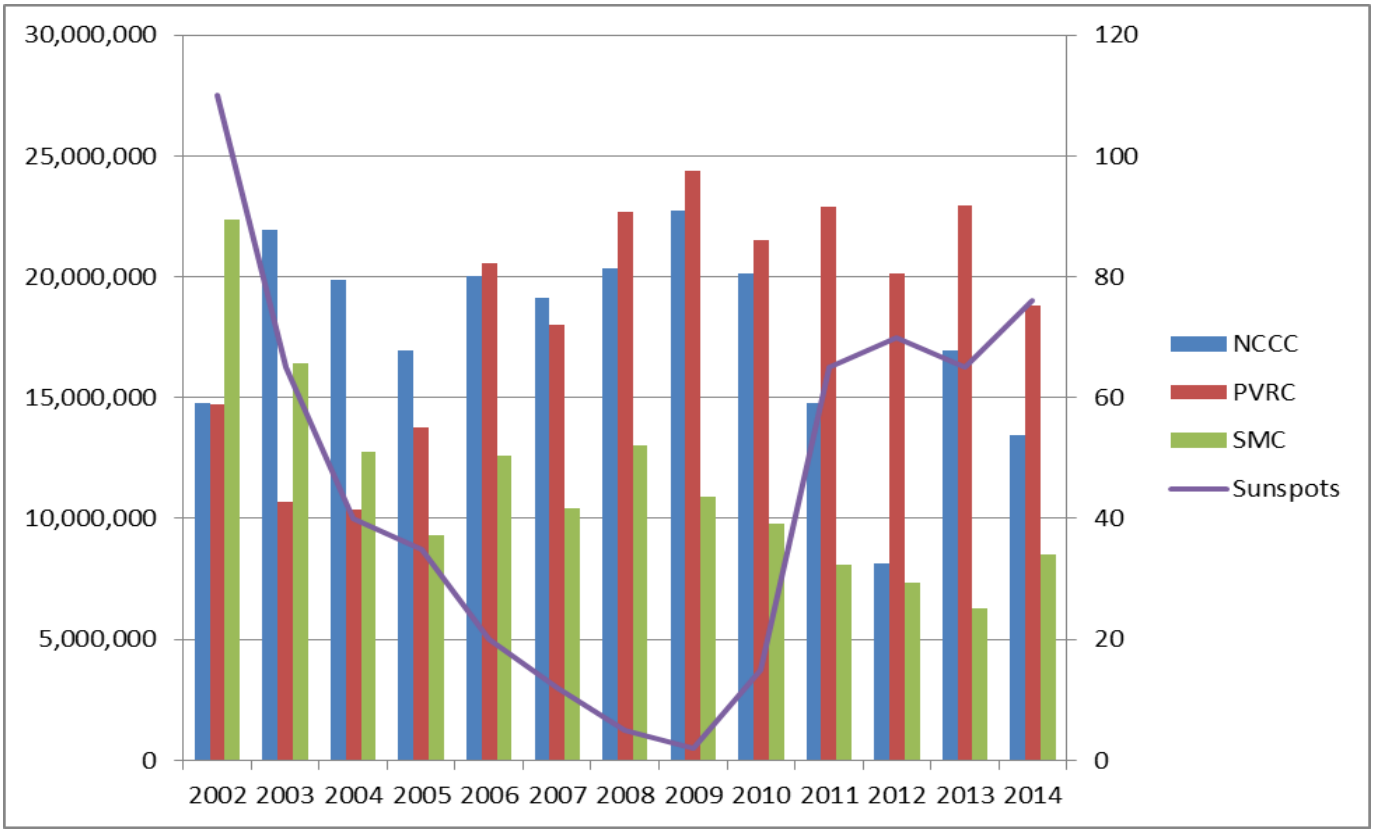
It's pretty clear that MLDXCC's effort was, indeed, organized. The club rallied the troops and it's likely they'll get the gavel. Even, if they don't, I know the club feels good in that it was a fun team effort. I want to emphasize the FUN. I saw it in the reflector comments.

The point I am trying to make, at least to myself, is that both PL-259 and MLDXCC proved that an organized effort to motivate the troops seems to have worked.

Why can't it work for NCCC?

Well, say some, the sunspots are declining.

Take a look at this chart:



While it's true that PVRC won SS in the years of declining sunspots, the overall scores don't seem to have a lot to do with the sunspot numbers. NCCC wins, in 2004 and 2005, are good examples. As far as the sunspot cycle is concerned, 2016 and 2017 should be similar years to 2004 and 2005.

The bottom line here is that we need to make a decision SOON whether or not to go for the SS gavel in 2016. I say soon, because it was my philosophy, in my three years as president of MLDXCC, that the club focus contest (CQP) would be brought up at EVERY meeting, and often on the reflector. We wanted our member to never lose track of the club mission.

I was pretty convinced that SS from the West Coast was simply not winnable. I did feel that we're getting older and I did feel that we're losing interest. I did think that the sunspots were against us. Looking at how PL-259 and MLDXCC has strategized to go for wins in the Local and Medium categories has me re-thinking this whole issue of NCCC and Sweepstakes.

If we go for it, it won't be easy. We will have to really give our 500 or so members good reason to take one for the team….to sit in the chair that extra hour or two, to upgrade their stations, to give up a special weekend or at least spend some time on the air. This year, PVRC submitted 310 logs. SMC had 199 logs. NCCC/MLDXCC/PL-259 had a sum total of 120 logs. That may seem like a serious uphill climb, but, under K6MM's leadership, NCCC submitted 332 logs in 2009. I'm not convinced that we can't do it again this year…..but we need to start now with a decision to either do it in 2016, or let MLDXCC go for what just might be their second gavel.

Most of our Board, including myself, has indicated that they will consider going for a second term of office, especially if we can get some momentum going with the ARRL RTTY Roundup. We need to win this one if, for nothing else, to rebuild confidence in the club. Our effort to get new RTTY operators on the air seems to be working and I'm confident that we will make a serious effort to win the gavel. There's competition out there, however. PVRC and Minnesota Wireless are always in the race.

We'll be spending some time at the January meeting discussing Sweepstakes. Plan on attending. If you want to go for a win in Sweepstakes in the Unlimited Category, you need to convince the Board. I'm beginning to think we can do it, but then I'm always the eternal optimist….

I want to thank Stu, K6TU, for supplying me with much of the data in this article.

COUPLED RESONATOR ANTENNAS

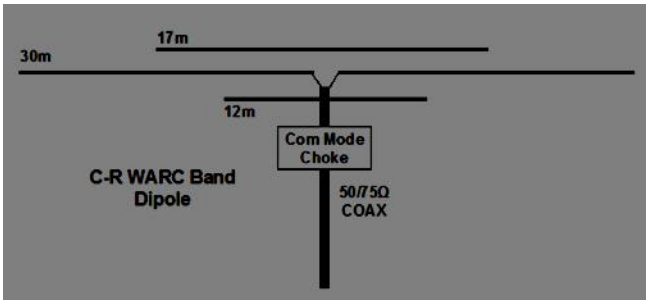
K6DGW

There are many dipole-ish multiband HF antennas … Carolina Windom, G5RV, Double Extended Zepp, Fan, to name a few. All but the fan dipoles require some sort of impedance matching at the transmitter end of the transmission line. All but the fan dipoles have a variety of radiation patterns and some, mainly on bands above the lowest band of the antenna can be complex, often squirting your RF in less that productive directions. Those fed off-center present the usual, although by no means insurmountable, electrical issues.

Fan dipoles [multiple half wave dipoles, all center-fed from a common point] offer the advantage that for each band, the antenna is ½ λ long and offers a predictable radiation pattern. They're also fairly simple mechanically, they are electrically balanced, and offer a good match to 50 or 70 Ω coax. Their major disadvantage is that, for each band, the ½ λ radiator is loaded with non-resonant conductors. This can make them a little touchy to get pruned correctly, more so as the number of bands goes up. Sometimes it's a walk in the park, sometimes not so much.

We used fan dipoles in SE Asia in the 60's, often 2-bands, for day and night network frequencies. Where we had requirements to operate in another network as well [e.g. Army or Marine], we used 3-band fans. In all cases however, they came to us on the mainland pre-tuned for our assigned frequencies by the guys at the maintenance depot in the Philippines and we never went beyond three bands.

There is another design which also offers ½ λ elements on all bands and which effectively makes all the unused elements "disappear" such that they don't affect the currently resonant conductor, making them a snap to get pruned right. They are as simple mechanically as a fan, and are electrically balanced on all bands. Why they do not see more usage by hams has always puzzled me. When the so-called WARC bands appeared in our authorizations in the 80's, I built one for 30, 17, and 12 meters and used it until we finally moved this year.

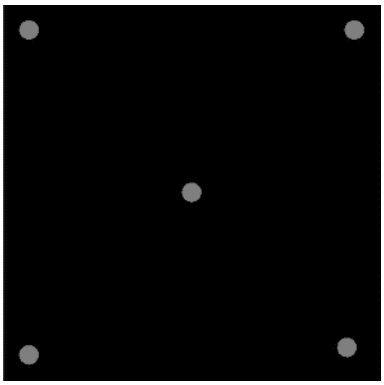


The basic coupled resonator design is depicted below.

Like the fan, it comprises a ½ λ element for each band. The difference is that only the lowest band element is electrically fed. In my case, the other two elements are spaced a short distance from the driven element, and in this case, "a short distance" equates to an inch or two.

When fed 10 MHz RF, the other two elements just disappear. When fed 18 or 24 MHz RF, the coupling between the 30 m driven element and the resonant conductor is very high, similar to a small resonant magnetic loop antenna. Because of the very high coupling, the coax essentially "sees" the resonant element's feed-point impedance. The other two non-resonant elements contribute little if any to that feed-point impedance.

That characteristic also makes pruning the antenna a routine process. You begin with the lowest frequency element and prune it for resonance. The other two elements essentially disappear while doing this. Then, you move up to the next higher element and do likewise. Unlike a fan, this will have almost zero effect on the already-pruned lower frequency element(s). So basically, you just march through the elements in order of increasing frequency, and then install the antenna permanently. I of course went back and checked the lower frequency elements but they were just about the same as when I pruned them. My WARC C-R dipole ended up with total element lengths of 47.0 ft, 26.6 ft, and 19.4 ft.

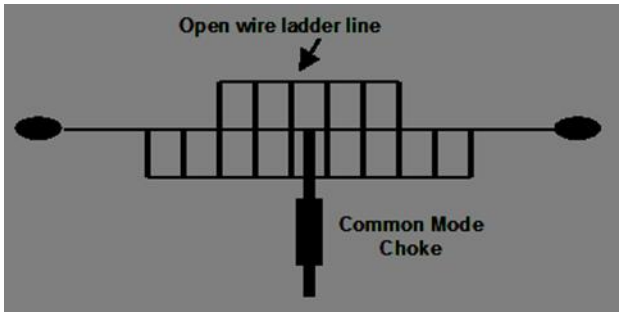


C-R antennas were quite a bit more popular in the later 50's an 60's. I've never built more than a 3-element antenna, but I saw a 5-element one for 80, 40, 20, 15, and 10. It used Bakelite [or maybe phenolic] spacers such as shown on the right, his were originally used for cage dipoles. The 80 meter dipole was through the center and was stronger wire because it supported the whole assembly. Element-to-element spacing was about 2 in.

The WARC bands [which hadn't been invented when I saw this antenna] are not harmonically related and I wondered what the "standard" ham bands of the time, which <u>are</u> harmonically related affected the pruning procedure. Harmonically related elements can have a big effect on the difficulty of pruning a fan.

It turned out that while higher frequency elements did affect the lower ones, requiring some back and forth adjustments, two factors mitigated the problem:

First, the next higher frequency element had by far the most effect on the next lower one. Those higher in frequency seemed to have no or little effect.
The second was that the effects of the higher frequency elements on the lower frequency ones followed a very defined pattern, and once he figured that pattern out, he could just about hit the right point with a slide rule and a tape measure.



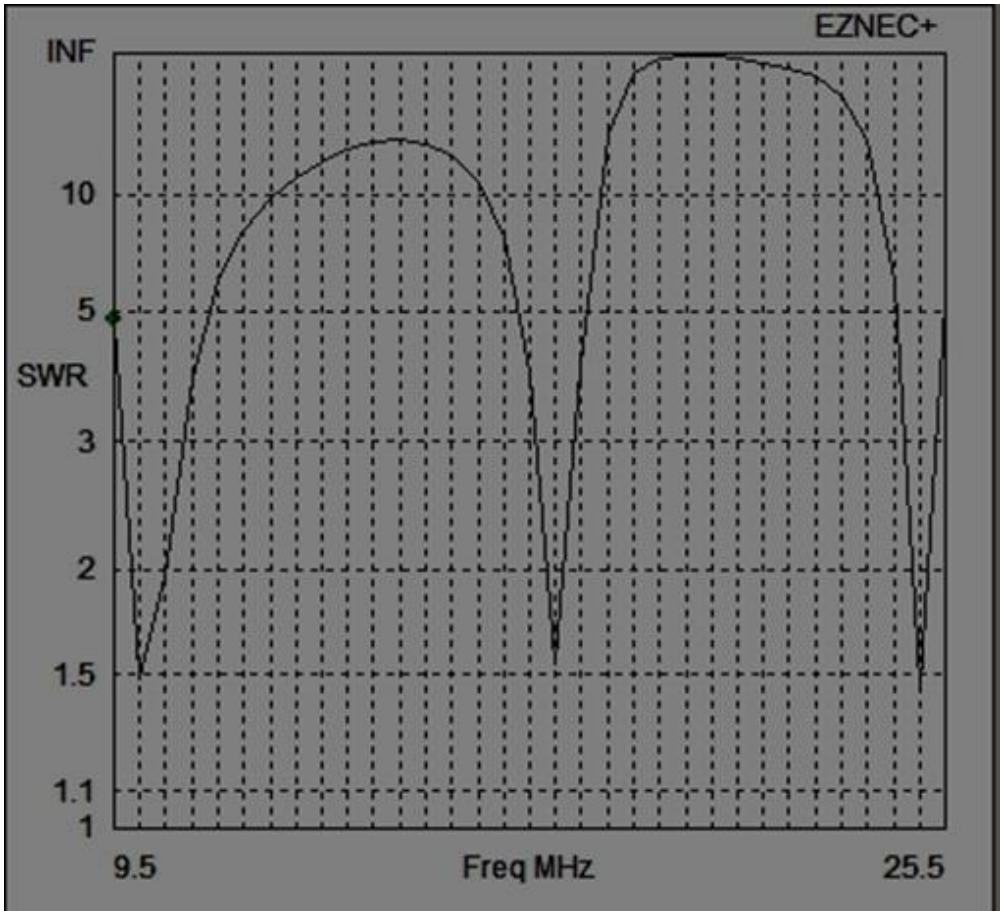
There are some nifty ways to construct a C-R multi-dipole. My scheme is shown below left:

I made it out of 400 Ω open wire line. I cut two lengths for the 17 and 12 m elements, and then tied one wire of each together at each spacer. I used plastic electric fence stand-offs along each spacer to hold them straight. I extended the common center wire on each end to make the 30 m element. This gave me a conductor spacing of between 1.5 and 2 inches, and the whole thing was very light. While the diagram shows the open wire line vertical, it actually hung horizontally when pulled up, with the coax hanging down. Only the center wire is fed.

Pruning it was much easier than I expected, and I spent far more time running into the shack to

check and back out than I did doing the actual pruning. I don't think the MFJ-259 had been invented then but at any rate, I didn't have one.

So how did it work? Well, my analysis and testing was all on the air, and performance was what I expected … fairly high [70'] dipoles on each band radiating E-W. After about 10 years in the air, it developed an intermittent which turned out to be at the feed point, so I fixed that. That was the only time it had been pulled down since I put it up, and it was working fine when I finally pulled it down as we were getting ready to move this last summer.



Not too long ago, right after I'd upgraded to EZNEC-4+, I decided to model it. I wasn't hopeful, NEC-2 is known to struggle with closely spaced conductors. But, thus encouraged, it was a fairly simple model. The radiation patterns, both elevation and azimuth on all three bands look exactly like dipoles.

The SWR scan is at the right. This is pretty much what I observed on the air … the observed in-band SWR's were actually a bit lower [~1.3:1] than shown here which I'll attribute to NEC-2's dislike of close spaced wires since I really don't know where the discrepancy comes from and this is simulation, not reality.

Bandwidth is probably driven by the small wire in the open wire line, and is fairly small, however none of the 3 WARC bands are very wide, especially since I'm rarely found in the phone-image segments, so that turned out to be a non-issue.

I fed mine with 70 Ω coax. 50 Ω would have worked OK too since at the SWR min, the feed-point impedance was between 50 and 80 Ω on all three bands. I just used what I had.

I really don't know why the C-R design sort of languishes in obscurity these days. Excluding the super-stations with stacked monobanders, many average hams on average property with average financial means could benefit from the simplicity of design and adjustment of the Coupled-Resonator antenna.

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A fabulous QTH for the Ham who wants to re-locate to the foothills of the Sierra's. 2900 sq. ft. house on 5 acres. 4 bed 3 bath storybook home, with 500 sq. ft. "granny flat" above garage, perfect for ham station. Includes covered RV storage, barn, storage shed, and 50 ft. Rohn 25 tower. No restrictive HOA's or CC&R's. 360 degree rf view, on top of hill at 1500 ft elevation. Look up MLS 15077535 for further info.

Tnx, and 73. Jim Marshall, K6LR

Contest Calendar– January

AGB New Year Snowball Contest	0000Z-0100Z, Jan 1
NCCC RTTY Sprint	0145Z-0215Z, Jan 1
NCCC Sprint	0230Z-0300Z, Jan 1
SARTG New Year RTTY Contest	0800Z-1100Z, Jan 1
AGCW Happy New Year Contest	0900Z-1200Z, Jan 1
AGCW VHF/UHF Contest	1400Z-1700Z, Jan 1 (144) and 1700Z-1800Z, Jan 1 (432)
QRP ARCI New Years Sprint	1500Z-1800Z, Jan 1
PODXS 070 Club PSKFest	0000Z-2400Z, Jan 2
WW PMC Contest	1200Z, Jan 2 to 1200Z, Jan 3
Original QRP Contest	1500Z, Jan 2 to 1500Z, Jan 3
ARRL RTTY Roundup	1800Z, Jan 2 to 2400Z, Jan 3
EUCW 160m Contest	2000Z-2300Z, Jan 2 and 0400Z-0700Z, Jan 3
Kid's Day Contest	1800Z-2359Z, Jan 3
ARS Spartan Sprint	0200Z-0400Z, Jan 5
QRP Fox Hunt	0200Z-0330Z, Jan 6
Phone Fray	0230Z-0300Z, Jan 6
CWops Mini-CWT Test	1300Z-1400Z, Jan 6 and 1900Z-2000Z, Jan 6 and 0300Z-0400Z, Jan 7
UKEICC 80m Contest	2000Z-2100Z, Jan 6
NCCC RTTY Sprint	0145Z-0215Z, Jan 8
QRP Fox Hunt	0200Z-0330Z, Jan 8
NCCC Sprint Ladder	0230Z-0300Z, Jan 8
Old New Year Contest	0500Z-0900Z, Jan 9
UBA PSK63 Prefix Contest	1200Z, Jan 9 to 1200Z, Jan 10

Contest Calendar– January page 2

SKCC Weekend Sprintathon	1200Z, Jan 10 to 2400Z, Jan 11
North American QSO Party, CW	1800Z, Jan 9 to 0559Z, Jan 10
NRAU-Baltic Contest, SSB	0630Z-0830Z, Jan 10
NRAU-Baltic Contest, CW	0900Z-1100Z, Jan 10
DARC 10-Meter Contest	0900Z-1059Z, Jan 10
Midwinter Contest	1000Z-1400Z, Jan 10
NAQCC CW Sprint	0130Z-0330Z, Jan 13
QRP Fox Hunt	0200Z-0330Z, Jan 13
Phone Fray	0230Z-0300Z, Jan 13
CWops Mini-CWT Test	1300Z-1400Z, Jan 13 and 1900Z-2000Z, Jan 13 and 0300Z-0400Z, Jan 14
AWA Linc Cundall Memorial CW Contest	2300Z, Jan 13 to 2300Z, Jan 14 and 2300Z, Jan 16 to 2300Z, Jan 17
NCCC RTTY Sprint	0145Z-0215Z, Jan 15
QRP Fox Hunt	0200Z-0330Z, Jan 15
NCCC Sprint Ladder	0230Z-0300Z, Jan 15
LZ Open Contest	1800Z-2200Z, Jan 15
Hungarian DX Contest	1200Z, Jan 16 to 1159Z, Jan 17
North American QSO Party, SSB	1800Z, Jan 16 to 0559Z, Jan 17
Feld Hell Sprint	2000Z-2359Z, Jan 16 (EU/AF/MidEast) and 2300Z, Jan 16 to 0259Z, Jan 17 (ENA/SA/Carib) and 0200Z-0559Z, Jan 17 (WNA/AS/OC)
Run for the Bacon QRP Contest	0200Z-0400Z, Jan 18
QRP Fox Hunt	0200Z-0330Z, Jan 20
Phone Fray	0230Z-0300Z, Jan 20
CWops Mini-CWT Test	1300Z-1400Z, Jan 20 and 1900Z-2000Z, Jan 20 and 0300Z-0400Z, Jan 21

Contest Calendar– January page 3

NAQCC CW Sprint	0130Z-0330Z, Jan 21
NCCC RTTY Sprint	0145Z-0215Z, Jan 22
QRP Fox Hunt	0200Z-0330Z, Jan 22
NCCC Sprint Ladder	0230Z-0300Z, Jan 22
Montana QSO Party	0000Z-2400Z, Jan 23
YL-ISSB QSO Party, CW/SSB	0000Z, Jan 23 to 2359Z, Jan 24
UK/EI DX Contest, CW	1200Z, Jan 23 to 1200Z, Jan 24
BARTG RTTY Sprint	1200Z, Jan 23 to 1200Z, Jan 24
WAB 1.8 MHz Phone	1900Z-2300Z, Jan 23
QRP ARCI Fireside SSB Sprint	2000Z-2359Z, Jan 24
SKCC Sprint	0000Z-0200Z, Jan 27
QRP Fox Hunt	0200Z-0330Z, Jan 27
Phone Fray	0230Z-0300Z, Jan 27
CWops Mini-CWT Test	1300Z-1400Z, Jan 27 and 1900Z-2000Z, Jan 27 and 0300Z-0400Z, Jan 28
UKEICC 80m Contest	2000Z-2100Z, Jan 27
NCCC RTTY Sprint	0145Z-0215Z, Jan 29
QRP Fox Hunt	0200Z-0330Z, Jan 29
NCCC Sprint Ladder	0230Z-0300Z, Jan 29
CQ 160-Meter Contest, CW	2200Z, Jan 29 to 2200Z, Jan 31
Feld Hell Sprint	0000Z-2359Z, Jan 30
REF Contest, CW	0600Z, Jan 30 to 1800Z, Jan 31
UBA DX Contest, SSB	1300Z, Jan 30 to 1300Z, Jan 31
Winter Field Day	1700Z, Jan 30 to 1700Z, Jan 31
ARRL January VHF Contest	1900Z, Jan 30 to 0359Z, Feb 1
Classic Exchange, CW	1400Z, Jan 31 to 0800Z, Feb 1 and 1400Z, Feb 2 to 0800Z, Feb 3

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