DXer

NORTHERN CALIFORNIA DX CLUB

NCDXC

Inside

QST Runs 2nd AA6YD Story

by Dave Barton, AF6S

Don't miss the short story "Endurance" by NCDXC member Joe Mastroianna, AA6YD, in the February '92 issue of *QST*.

I won't spoil your pleasure by revealing anything of the plot. Suffice it to say the story is imaginative and Joe develops his plot masterfully. Read it. I think you will enjoy it as much as I did.

"Endurance" is Joe's second *QST* short story. Its publication indicates an editorial slant encompassing areas beyond the technical, operating, and organizational material which has always dominated our hobby. If you like Joe's story, and support the direction *QST* is taking, send *QST's* features editor, Brian Battles, WS1O, a little note. (Many complain; few compliment.)

In the September '91 DXer, I ran one of Joe's early writing efforts, a fine humor piece titled "Becoming a DXer." It's worth digging out and rereading.

Coming Soon:

- Livermore Swap Meet: 1st Sunday of month, 7 A.M. to noon. Contact N7TVE.
- International DX Convention: April 16–18 at the Visalia Holiday Inn. Contact K6ITL.

Dayton Hamvention

Thinking of attending the world's biggest ham convention this year? It takes place the weekend after Visalia, April 23–25. Advance registration deadline is April 2. Call 513/454-1456 or fax 513/890-5464.

The deadline for flea market space is February 1. The flea market phone numbers are: 513/454-1880 and 513/767-1107.

Visalia Pre-registration Deadline Soon

by "Knock" Knochenhauer, K6ITL

Jerry, W8MEP has lined up outstanding speakers for the 1993 International DX Convention, so you won't want to miss their presentations.

The pre-registration deadline for the April 16–18 event is March 15, and only those who pre-register qualify for the pre-registration prize—no ifs, ands or buts!

Louese, KA6ING, will mail you a pre-registration form if you contact her on W6TI or by DX Packet Cluster or telephone.

We're repeating the Western Barbecue-in-the-Park, by popular demand. Be sure to pre-register for it too, because we must guarantee the number of participants several weeks in advance. And don't forget to include the amount for the barbecue in your check.

Please help welcome the many out-of-area DXers coming to the convention—especially "first timers." Every NCDXC member can be a roving goodwill ambassador. Dave, KI6WF, who heads our welcoming committee, would like your help. "First timers" will receive a distinctive badge or ribbon, so they will be easy to spot. Introduce yourself and help them find their way around.

We'll have QSL checking again this year, but the number of cards per person is limited to 110 this time. If you need more than 110 cards checked, send them to Newington.

Tom, K6TS, and the other members of the raffle crew (W6TEX, KA6DXY, and W6MKM) will need help getting the tickets into everyone's hands. The raffle is what keeps the convention solvent, so lend a hand.

Al, W4RIM, assured me we'll have a great prize list. If you can get some prizes and he hasn't contacted you yet, give him a call.

Lou, K6TMB, once again is expected to do a fine job directing the Hospitality Hours.

On-site registration, chaired by Ron, W6VG, will begin Friday at noon.

The convention begins at 4 P.M. Friday, with a welcome by Visalia's city fathers. A special presentation on DXCC history will begin at 4:15.

After that is Hospitality Hour, sponsored by NCDXC and *The DX Bulletin*, and the barbecue at 7. Exhibits will be open from 1 P.M. Friday.

Ralph, AG6Q, the DX Convention Golf Tournament organizer, encourages wannabe and real golfers to contact him early for a starting spot.

N O R T H E R N
C A L I F O R N I A
D X C L U B

Club Officers:
President: Bob Artigo, KN6J
Vice President: George Allan, WA6O
Secretary: Garry Shapiro, NI6T
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DXer:
Editor: Dave Barton, AF6S
14842 Nelson Way
San Jose, CA 95124
(or via DXPSN)

Printing, Mailing: Ron Panton, W6VG
Art Consultant: Kenneth R. Barton
DX Ladder: Larry Bloom, KD6XY
2520 Heather Lane
San Bruno, CA 94066
(or via DXPSN)

Membership Data: John Cronin Jr., K6LLK

Club Repeater, W6TI/R, (147.36+)
Trustee: Bob Vallio, W6RGG
Comm. Chairman: Ralph Hunt, AG6Q
Club simplex: 147.54 (suggested)
Thurs. Net QTR: 8 p.m. local time.
Net Manager: Ralph Hunt, AG6Q
DX News: Dave Pugatch, KI6WF
Propagation: Al Lotze, W6RQ
Contest News: Rich Hudgins, WX6M
Westlink: Craig Smith, N6ITW
Swap Shop: Ben Deovlet, W6FDU
933 Robin Lane
Campbell, CA, 95008
408-374-0372
QSL Information: Mac McHenry, W6BSY

W6TI DX Bulletins:
W6TI Station Trustee Bob Vallio, W6RGG, transmits DX information at 2:00 zulu every Monday (Sunday evening local time) on both 7.016 and 14.002 MHz.

Club address: Box 608
Menlo Park, CA
94026-0608

The DXer is published Monthly by the Northern California DX Club and sent to all club members.

Board of Directors Meeting

The board did not meet in January.

General Meeting

NCDXC President Bob, KN6J, opened the January 8 meeting at Harry's Hoffbrau in Mountain View. Bob could not stay, so Vice President George, WA6O, presided after he left.

- Pictures taken at the Christmas Party were on display (See Alex, KI6EZ, at the February meeting about obtaining copies).
- Mark Murrell (a young man who is an intrepid traveller and a great photographer, but not a ham) presented a slide and sound show of his travels in China. Mark went to China's far west, where few Westerners have been allowed since World War II, and he lived primitively. (There is no Sechuan Hilton.)
- A second reading was held for Glenn, W6OTC, who was voted into membership. Happy, W7SW/IØ, and Ray, N6NBB, were reinstated.
- There was no new business.

Roster Changes

Stacey L. (Ace) Jansen, **N3AHA**
W: 408/752-4258

Jon E. Casamajor, **KN6EL** (was NØDJJ)
(upgrade from General to Extra Class)
Jon's address and phone numbers remain unchanged, as follows:
24 Graceland Ct.
Chico, CA 95926
H: 916/891-8817
W: 916/893-5599

Robert R. (Bob) Artigo, **KN6J**
W: 408/345-1397

Michael S. Wood, **N6MVE**
has upgraded to Extra Class.

George A. Allan, **WA6O**
668 Chemeketa Drive
San Jose, CA 95123
H: 408/225-2368
W: 415/967-4610

E.D. Jellison, **N6OSF**
H: 415/854-5397

Garry R. Shapiro, **NI6T**
Delete work phone.

New Member

M. Glenn (Glenn) Vinson, **W6OTC**, Extra
36 Presidio Terrace
San Francisco, CA 94118
H: 415/751-7640
W: 415/986-1300

Reinstatements

Raymond J. (Ray) Minehan, **N6NBB**, Extra
34 Thunderbird Drive
Novato, CA 94949
H: 415/883-2329
W: 415/576-3422

Happy Scotty Martin, **W7SW/IØ**, Extra
int. 9, Via Cervino
3 Rome, Italy 00141
H: (396) 89-63-41
B: (396) 89-63-41

While Happy is cruising the Pacific, send his mail c/o Ralph Rathjen, 7847 S.W. 11th Avenue, Portland, OR 97219-4303.

Barbed Wire Antenna

by Gary Hartley, K4HTV

When I heard someone on 2 meters pondering whether he could use a barbed wire fence as an antenna, it reminded me of my experience a few years back.

My longwire antenna was attached to the gable of the house. What a lightning strike in July of 1956 did to our home and to Dad's old tomcat is another story but, to put it simply, Dad threatened loss of life, limb, and all radio gear "If you ever put another antenna on the house!" Actually, he agreed I could have a lead-in, but only if I removed it from the house each night.

The only tree that might support an antenna was 60 feet away from my room, but the lower corner of our 12-acre pasture fence was nearby. My 450-Ohm feedline was long enough to reach it, so I connected one lead to the top strand of barbed wire and the other to the bottom strand (We poor folk could only afford two-strand fences, but Mom explained the problem to our two milk cows and they were sympathetic; they never tried to escape).

Well, it wouldn't load, so I took a couple of big variable capacitors (condensers then, Sonny), mounted them under a dishpan, and, with the help of a Viking Matchbox, loaded that fence. It worked best on 40-meter CW, but I worked 75, 20, 15, and 10 meters too.

Toward summer's end, one of the cows went dry. Dad blamed it on my transmitting on the fence. He figured the cow must have touched the fence while I was on the air and gotten udderly zapped (My apologies to Gary—too good to pass up—*ed.*). He sold the cow and made me take down my dishpan tuning unit.

That ended my barbed wire fence antenna experiment, but I didn't care. It was time to go off to college anyway.

So if you have a handy barbed wire fence nearby, try it as an antenna. Just be careful not to zap any cows.

from the January '93 Watauga ARC (Boon, NC) 'Watauga Wavelength"—KC4WCK Editor

1992 ARRL DX Contest Results

by Rich, WX6M

Category	Phone Winner	CW Winner
Single-op, all-band	KA6BIM	K6PU
Single-band	WX6M (10M)	W6BSY (15M)
QRP	no entries	
Single-op, assisted	N6CCL	N3AHA
Multi-op, single XMTR	no entries	
2-XMTR, multi-op	no entries	
Unlimited	no entries	
800 k-Point Award	no qualifier	1 qualifier—K6PU
800 k-Point Mixed Award	no qualifier	

The David Baker Memorial Plaque furnished by CQ Magazine to be awarded at the banquet was paid for by NCDXC.

Contest Awards

by Rich, WX6M

The NCDXC did it again—came in fourth, beaten only by East Coast clubs. Congratulations are due all who participated and donated their scores.

I would like to thank Ace, N3AHA, for compiling the club score and sending it to the ARRL. Also, Dick, WB6WKM, deserves special thanks for handling the 1992 Club Marathon and for getting the plaques made for Visalia. The following is a list of those who donated scores to the club. Those with an asterisk will receive awards at Visalia.

CW:

Call	Score	Class
K6PU*	801,360	S
K6PJY	691,500	S
AE6Y	579,264	S
W6NKR	311,472	S
K6MA	233,640	S
N6JM	219,024	S
AA6QY	172,992	S
W6WB	136,059	S
W6FAH	122,460	S
KA6BIM	66,906	S
K6RQ	46,041	S
K6LRN	44,892	S
WW6D	17,850	S
K6DR	4,374	S
WZ6Z*	117,552	S—40m
W6BSY*	199,881	S—15m
N6IP	683,253	SA
W6BIP	339,810	SA
K6FO	293,700	SA
WA6AUE	231,336	SA
W6OAT	186,930	SA
W6ISQ	140,187	SA
K6OZL	102,765	SA
WA8LLY/6	24,102	SA
AJ6V	1,953	SA

Phone:

Call	Score	Class
KA6BIM*	622,908	S
K6HNZ	600,000	S
AA6KX	408,177	S
N6JM	267,720	S
K6ITL	212,910	S
K6MA	182,490	S
NG6X	77568	S
WB6KJE	74,796	S
W6FAH	71,508	S
K6DR	55,212	S
KG6AM	3,441	S
K6LRN*	4,680	S—20m
W6BSY*	278,304	S—15m
WX6M*	307,455	S—10m
K6RQ	126,096	S—10m
KA6ING (N/T)	46,968	SA
N6CCL*	550,179	SA
N6TV	535,788	SA
W6BIP	267,072	SA
N6IP	205,155	SA
K6FO	192,720	SA
WA8LLY/6	64,260	SA
K6PJY	40,050	SA
WA6AUE	19,656	SA
W6HXW	18,216	SA
W6OAT	10,971	SA

New DXCC Countries and Other DX News

by John Kanode, N4MM

The ARRL Awards Committee voted November 24, 1992 to add Crotia (9A), Slovenia (S5), and Bosnia-Hercegovina (4N4, YU4) to the DXCC Countries List. Croatia and Slovenia contacts on or after June 24, 1991 count, as do Bosnia-Hercegovina contacts on or after October 15, 1991 and cards are already being accepted.

The DX Advisory Committee recommendation to add Macedonia (4N5, YU5) remains under study.

Accepted for DXCC Credit

These operations now count:
D2/F6BLQ, D2CW, D2FGC, ET3BC, ET3YL, JT1/K7HDK, KP5/NØTG, PYØTSN, S21ZC, S79CW, TA/DK7PE, AHØG/TF/P, TU4EF, VS6/DK7PE, ZB2/IKØFVC, and ZS9/DK7PE.

Upcoming DXpeditions

Navassa, KP1/W5IJU: Mar. 26–Apr. 3

Eritrea Next?

Carl and Martha Henson have petitioned the DXAC to add Eritrea to the DXCC Countries List. Eritrea separated from Ethiopia recently. Once it was a separate U.N. mandate, which did count as a DXCC country, but it was deleted after Ethiopia absorbed it in 1962.

Moldavia Joins ITU

The Republic of Moldavia has been admitted to the International Telecommunications Union.

HI has new name

The Dominican Republic has become Dominicana, an abbreviation of La Republica Dominicana, its name in Spanish.

QSLs for Romeo's operations:

1SØXV, 1S1RR, 3W7A, 3W1ØØHCM, XV1ØØHCM, and XVØSU: to W4FRU

YAØRR: to W8BLA

ISØRR (Sept. '91): to W8BLA

XYØRR: to LZ/3W3RR

9DØRR: to NT2X

EKØRR/AM, EKØRR/MM, 3W3RR/ etc.: to LZ/3W3RR

AHØM/W1–8, /VE2, /VE3: to ARRL W1 QSL Bureau

The LZ/3W3RR address for QSL cards only: Box 812, Sofia 1000, Bulgaria.

Letters to Romeo may be sent to Box 308, Moscow 103009, Russia.

New bureau addresses:

9A: HRS, Box 564, 41000 Zagreb, Crotia

S5: ZRS, Box 180, 61001 Ljubljana, Slovenia

4N5, YU5: Sojuz na Radioamateritena Makedonija, Box 14, 91001 Skopje, Macedonia

What Ever Happened to the Electronics Museum?

by Sy Stein, WA6ROM

You probably know that the Perham Foundation won its legal battle with Foothill College, packed up all its artifacts, exhibits, books, pictures, papers, furniture, etc., and deposited most of it in a huge building provided free-of-charge by John Sobrato of Cupertino, a builder and commercial property owner.

When Mr. Sobrato found a paying tenant, he was kind enough to allow the Foundation to move everything into another of his buildings, but that location is also temporary. Mr. Sobrato plans to either demolish the building and replace it with a modern structure, or sell it.

What was the Perham Foundation doing while all this was happening? They were preparing presentations to various local agencies that conceivably could host the new Museum of Electronics.

So far, we have identified five candidate organizations. The prime contender is San Jose's fine new history museum in Kelly Park, near the confluence of Highways 101 and 280/680. This museum is well-landscaped, with cobblestone and brick streets, old-fashioned street lights, quaint fire hydrants, streetcar tracks—with rebuilt streetcars running on them—and historic buildings that have been moved to the site.

We understand that the San Jose City Council will consider a letter of intent regarding a contract between the city and the Perham Foundation at either its January or February meeting.

Another good candidate is the San Francisco Exploratorium. This great "hands-on" museum, which plans to expand onto the grounds of the Presidio, might be a good match for the Electronics Museum if we can arrange to keep our independence. The foundation is not likely to repeat the mistake it made with Foothill College—turning over its possessions for a promise and, in so doing, losing control.

The Perham Foundation Board of Directors deemed the other three prospects unsuitable. They were either too expensive to develop or afforded poor access. The attempt to purchase the Los Altos railroad station failed, for instance, because others bid the price too high.

The foundation intends to keep its friends in the Amateur Radio community informed of events as they develop, as this is an ongoing saga.

We are now planning for the future and feedback, positive or constructively critical, is most welcome How can we best serve local and other ham interests? Classes? What kind? Shop facilities? Displays? A library? Please send your comments to Walter Serniuk, K6HQE, 7555 De Foe Drive, Cupertino 95014, or call Walt at 408/252-0531.

from the January '93 Silicon Valley Emergency Communications System 'Repeater'—Don Gaubatz, W6GJF Editor

The Mystery of Ham Radio

by Happy Martin, W7SW/IØ

Here I am in the Pacific Ocean on the border of the East China Sea between Japan and Taiwan. I'm having fun meeting new friends on twenty-meter CW, when I hear a weak signal with a BV prefix. My words cannot express the feelings I experienced when I pulled out the call: BV2A.

Tim Chen was the first ham in Taiwan and he was the only BV for many years. I had worked him more than once when I lived in California and had met him and even operated his station (as BV2B) back in 1986.

What a guy ... a gentle person with a quick wit and never a critical word ... (Sorry, my brain is in Italian now, because of my wonderful Italian YL, but if you think my English is poor, you should hear my broken Italiano!). Anyway, Tim is one of the greatest persons I've met. He showed me how he enjoys every single QSO.

His pileups always seem huge and endless, but he never seemed to be in a hurry to "use the pileup" for his gratification, and he never thought it necessary to prove he could "run 'em at a good rate."

He always gives his name and he always gives whoever he works a word or two before he explains that many others are calling and he'd like to give them a chance to get in his log. Then he tells them he appreciated the QSO and would be happy to QSL. When people send too much return postage, Tim always surprises them by sending back the excess. That's real, old-fashioned ham spirit!

I remember discussing philosophy with Tim. I remember thinking that if I could replace my critical thinking with Tim's non-judgemental attitude, how peaceful and joyful I might become. Maybe I could focus on what's good and beautiful, and learn to overlook the 4 or 5 percent that isn't so wonderful. What a world I would then perceive.

Murphy gave me only 3-3-9 copy of my old friend's signal that day, but Murphy couldn't diminish my memory of that outstanding gentleman. He's such an excellent example of someone who has found a way to truly live his philosophy.

Isn't ham radio great? It has lots of mysteries, yet it is amazing how quickly the radio brings back the good old memories. Changing my thinking processes is taking years but I'm feeling better about it all the time.

Marathon: Contest Software for the Mac

by David Hubbard, WD4IEH

Entering the current contest season, I faced a dilemma. I wanted to use computer logging, but my only computer is a Macintosh—which I used for everything but contest logging. I couldn't justify buying a DOS computer just for contest logging.

Fortunately, Kevin Krueger, NØIOS, has written a contest program for the Mac called Marathon. I bought a copy and gave it a test drive during the CW Sweepstakes.

The current release of Marathon supports ten contests, including CQWW, ARRL DX, and the Sweepstakes, and it has most of the standard features contesters have come to expect (real-time duping, check partial, etc.). NØIOS has also included a CW interface, a computer-to-rig interface, and maintainable country and prefix lists.

There are also neat things the operator can do with Marathon. Being built around the Macintosh graphical user interface, Marathon has pop-up windows that are scrollable and size-adjustable. If you don't like the size, shape, or position of a window, you can change it just by dragging with the mouse. You can also stack windows in any order—handy in the Sweepstakes when I wanted to leave the multiplier checklist visible.

The scrollable packet window means you can still review spots that have been pushed off the screen. It holds over 8,000 characters—useful when DX spots are coming in a tidal wave during a contest. Once you select a spot, a keystroke moves the DX station's callsign into the log-entry window. Frequency and mode are also grabbed when the computer-to-rig interface is active.

The 48-page user's manual provides complete instructions for updating Marathon's country/prefix list. Marathon calculates beam headings and distances automatically too.

For those who think the operating table is crowded enough without adding a mouse, Marathon allows access to almost all functions with keystrokes.

There are a few rough edges. The CW interface won't directly key the rig. You need an ASCII-CW interface, such as the AEA MorseMan or PK-232. And unlike CT, Marathon does not filter needed multipliers from the packet window. This wasn't an issue in the Sweepstakes, but would make it unsatisfactory for serious packet-assisted DX contesting. Marathon also lacks a "super-check" partial look-up.

So I don't rate the program as equal to CT. But I like it a lot. It does give Mac users a contest logging program with most of the features of CT. If you own a Mac, Marathon is worth considering.

from the January '93 Texas DX Society 'The Bullsheet'—W5ASP Editor and, originally, from the Potomac Valley Radio Club's 'PVRC Newsletter'

"My hustand's on the roof ... Oh wait! Here he comes now!"

Is Horizontal Polarization Always Best?

Shedding light on an old Issue and finding useful exceptions to venerable rules

by David M. Barton, AF6S

Introduction

Every DXer knows big antennas crack pileups with ease and to "hang 'em high." But what's the trade-off? If a local height ordinance limits you to 60 feet, how much gain does your 20-meter antenna need for the same pileup-cracking wallop as a tribander at 90 feet?

If you live in tall timber, should you string dipoles in the trees at 120 feet or put up a 60-foot tower with a tribander on top? Suppose you don't have tall trees and you can't have a tower. Should you put a ground-plane vertical on the roof or a 30-foot-high dipole?

DXers have always faced such questions, yet the literature generally gives anecdotes rather than the numeric performance comparisons you need to make decisions. The main reason has been the extreme difficulty of testing alternatives with enough accuracy to be meaningful.

Today's personal computers and sophisticated antenna modeling software provide a way. Using Mininec, you can predict the performance of almost any antenna made of thin "wires"—a description that fits most high-frequency antennas.

Using Mininec, you can predict the performance of almost any antenna made of thin "wires"—a description that fits most high-frequency antennas.

But if you have a compelling interest in antennas, be warned; modeling can be addictive. It seems no matter how many variations of something you try, another idea always beckons; it's enough to keep you away from the rig, even when juicy DX is announced on packet.

Mininec lets you test old truisms. One, that verticals "have a low radiation angle," has always bothered me. I've tried verticals, with poor results except on 80 and 160 meters, and I was aware that ground reflection losses are the reason verticals don't perform like those curves in the old ARRL Antenna Handbook. But before I got Mininec, I couldn't easily put numbers to such generalities.

Modeling Antennas

Using Mininec, I compared vertically polarized antennas with horizontal ones. The graphs that resulted offer a factual basis for choosing among DX antenna and tower combinations, given budget and height restrictions.

The modeling used Brian Beezley's (K6STI) MNC 4.26 version of Mininec and assumed a flat, uniform ground reflection zone. The nearest and farthest ground reflection points depend on the antenna height and the range of takeoff angles of interest. For 1 to 15 degrees, the range for DXing, and for heights of 30 to 120 feet, the reflection zone ranges from 110 to almost 7,000 feet away.

Real ground is neither flat nor electrically uniform, so the modeling cannot be exact. Keep this in mind when gains of compared antennas come within a dB or two of each other. Such small differences deserve skepticism. On the other hand, dramatic differences should be accepted as valid.

To avoid showing a huge number of pattern plots, I transferred MN's numbers into Excel, a spreadsheet program that allowed me to put results for an entire set of antennas on a single plot.

To further reduce the clutter, I plotted gains from 1 to 15 degrees only—where "the DX is"—rather than over the full 180 degrees plotted by MN.

DX Signals

Multi-hop signals almost always arrive at low angles. And when more than one "propagation mode" exists, the lowest-angle mode generally provides the lowest path attenuation, producing the strongest signals.

DXers often speak of "radiation angle," the elevation angle at which an antenna's pattern peaks. An antenna's "radiation angle" depends mostly on its height, and any antenna's performance is best when a path's takeoff angle is the same as its "radiation angle." But the term is misleading. RF leaves your antenna at *all* the elevation angles in its pattern—not just at a singular "radiation angle." Most transmitted energy is wasted; the guy at the other end hears only the signal that leaves your antenna at the takeoff angle

To further reduce the clutter, I plotted gains from 1 to 15 degrees only—where "the DX is"

the propagation modes selects (it's the same with the azimuth angle, but that's another story). So you can't tell which of two antennas will work better by comparing radiation angles; you *can* tell by comparing gains over a likely range of angles—all of them low, for long-haul paths.

Charged regions, like the ionosphere, rotate the polarization of high-frequency signals passing through them. The result is to randomize DX signal polarization, making all (linear) polarizations equally likely at the receiver. The only reason to favor one polarization over another is the effect of the reflection zone in front of the antenna.

Grounds For Investigation

We'll use three reflection-zone models: seawater (dielectric constant 80, conductivity 5,000 milli-Siemens), MN's standard soil model (dielectric constant 13, conductivity 5 mS), and a typical "poor ground" model (dielectric constant 4, conductivity 1 mS).

Over perfect ground, the gain of a dipole peaks at 6 dBd (dBd is gain relative to a dipole in free space). Any real ground reduces the reflection gain by absorbing some of the reflected energy and by twisting the reflection's phase. A vertical's perfect-ground "radiation angle" is zero, whereas a horizontal has a first "lobe" at an angle set by height in wavelengths. Imperfect ground can destroy a vertical's low-angle performance, but it can also allow a horizontal antenna to

Fig. 1: Dipoles vs. Half-Wave Vertical at 14 MHz over Seawater

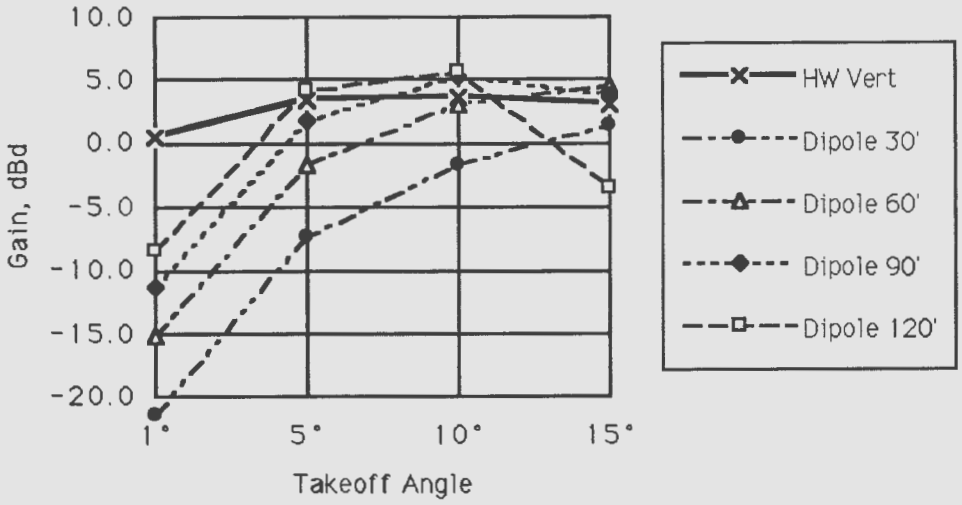


Fig. 2: Dipoles vs. Half-Wave Vertical at 14 MHz over Standard Soil

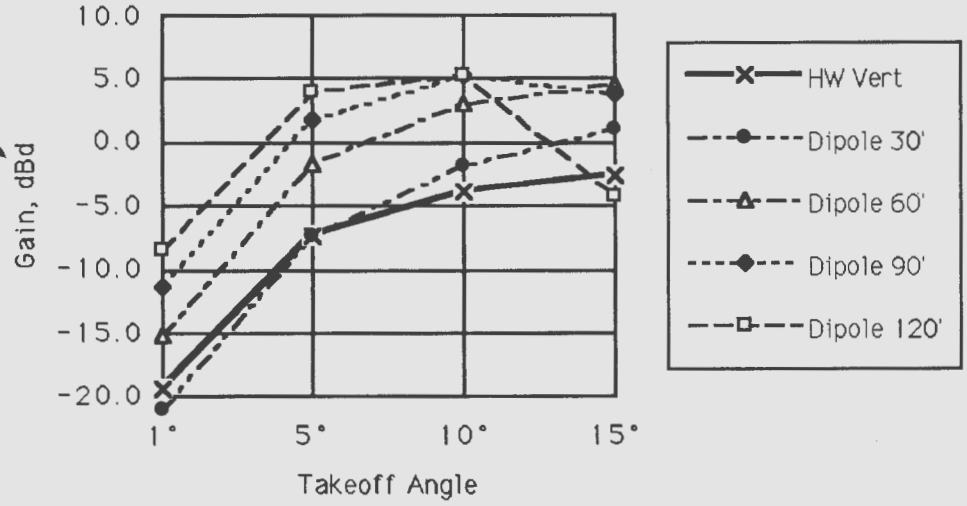
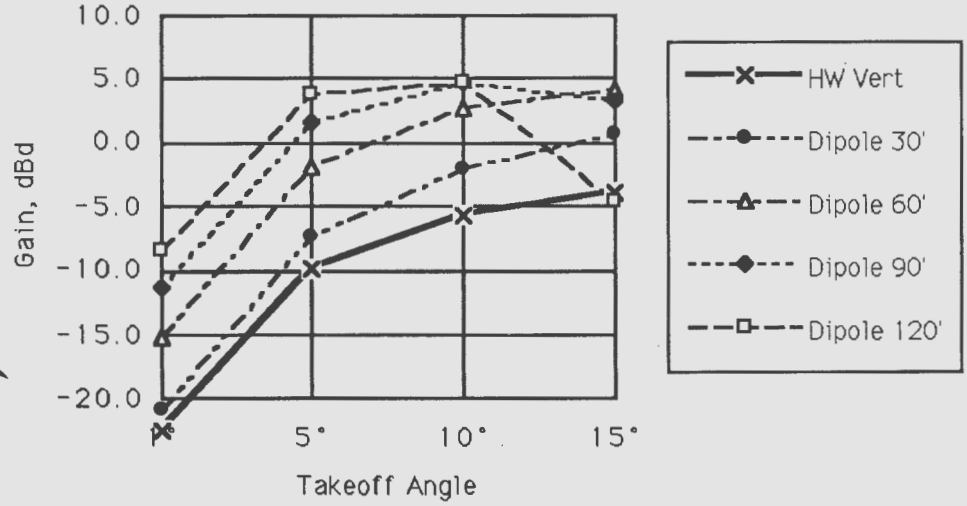


Fig. 3: Dipoles vs. Half-Wave Vertical at 14 MHz over Poor Soil



produce a signal at the horizon—where a perfect ground produces a perfect null.

Comparisons on Three Bands

On 20 meters we'll compare a half-wave vertical dipole centered 18 feet above the ground to a horizontal half-wave dipole at various heights. On 80 meters, we'll compare half-wave dipoles to a ground-plane vertical with its base up 12.5 feet and with four horizontal quarter-wave radials 90 degrees apart.

You can predict the performance of a gain antenna from the graphs by adding the antenna's free-space gain (in dBd) to the curve of a dipole at the same height. For a small triband yagi, assume about 6 dBd gain.

Data in figures 1–6 are plotted in 5-degree increments except for the 1-degree point. The 10-meter graphs, figures 7–9, have 2 and 3 degree increments. Such coarse plotting causes the graphs to miss detail, especially in the 120-foot dipole's pattern, but they serve well enough for comparison purposes. The gain scale is absolute and consistent in figures 1–9, so you can compare results directly.

Over Seawater

Figure 1 charts the 20-meter antennas over seawater. At one degree, the vertical beats even the 120-foot dipole by 9 dB, but at 5 degrees it's a draw. At 10 degrees the vertical outperforms the 30 and 60-foot dipoles and at 15 degrees all but the 120-foot dipole are similar.

Moral: put verticals on your yacht and anywhere with a seawater reflection zone.

Average Ground

Figure 2 shows the same antennas over average soil on 20 meters. Here the vertical antenna's performance is markedly off; at 1 degree it's in the bush leagues with the 30-foot dipole. And notice: the horizontal antennas perform almost as well as over seawater. Horizontals are clear winners at 60 feet and above, just as the folklore says, but a vertical is a reasonable alternative to a 30-foot dipole. However, the gain of a roof-top tribander would give it the edge over any vertical—even a complex and difficult-to-steer "four-square" phased array.

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Fig. 4: Dipoles vs. Ground-Plane Vertical at 3.5 MHz Over Seawater

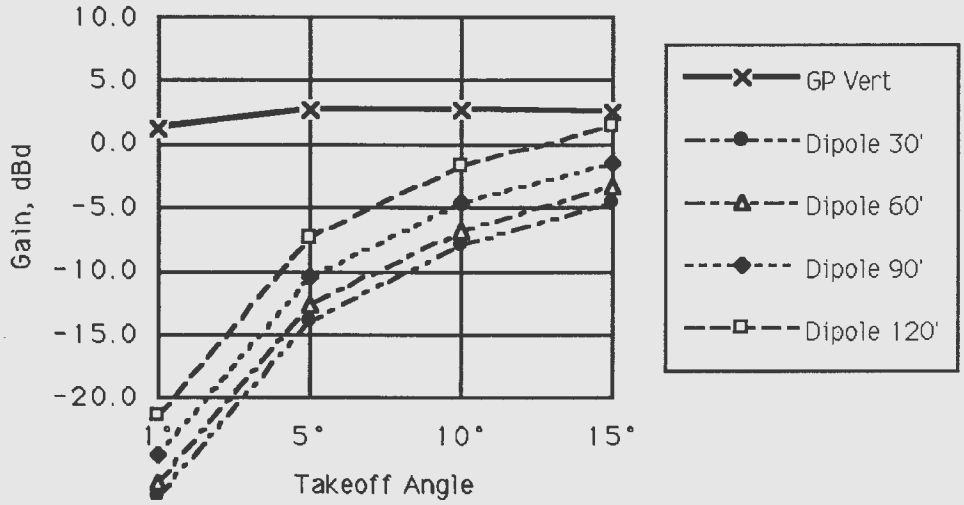


Fig. 5: Dipoles vs. Ground-Plane Vertical at 3.5 MHz Over Standard Soil

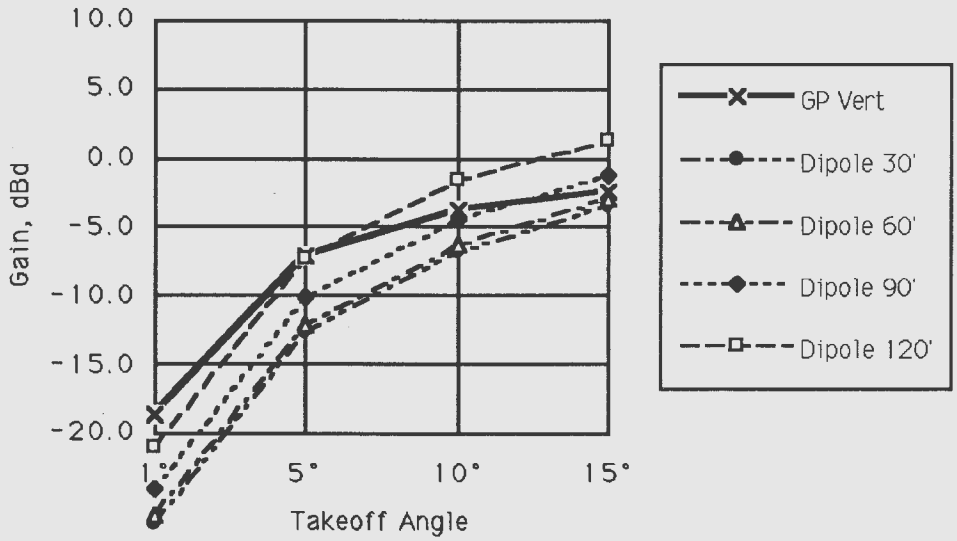
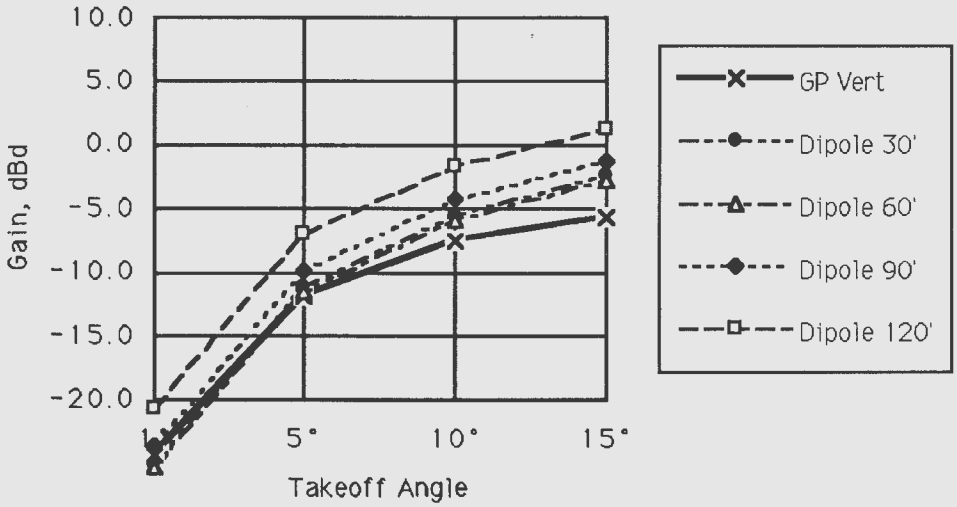


Fig. 6: Dipoles vs. Ground-Plane Vertical at 3.5 MHz Over Poor Soil



Poor Soil Case

Now look at the poor soil case, figure 3. The vertical loses to the horizontal dipole at all heights, even 30 feet—except where the too-high 120-foot dipole pattern heads for its null above 15 degrees.

20-Meter Choices

How much gain does a 60-foot horizontal antenna need for par with a tribander at 90 feet? Over average ground, figure 2 shows a 4-dB advantage for the 90-foot antenna at 1 and 5 degrees, a 2-dB advantage at 10 degrees, and a toss-up at 15 degrees.

Let's award the 90-foot antenna a long-haul DX advantage of 3 dB—close to the difference between a tribander and a big monobander.

A dipole at 120 feet, over average ground, beats a 60-foot dipole by 7 dB at 1 and 5 degrees. At 10 degrees the high dipole wins by 2 dB, but at 15 degrees the high one "loses by a null" (low dipole humor). Overall, long-haul DXing favors the high dipole by about the gain of a tribander.

80 Meters

On 80 meters, the dipole 120 feet high performs like the 30 footer on 20 meters (Both are one-half wavelength high). Fortunately, most of the DXers you compete with have the same problem. Figures 4–6 show how a ground-plane vertical stacks up against the dipoles on 80 meters.

In figure 4, over seawater, the vertical outperforms the 120-foot-high dipole by 22 dB at 1 degree, by 10 dB at 5 degrees, and by 5 dB at 10 degrees. But the two are comparable at 15 degrees. The spread among the dipoles—about 7 dB advantage for 120 feet over 30 feet—stays constant.

Over standard soil, the 120-foot dipole equals the vertical at 5 degrees. At higher angles the dipole wins, but the vertical has a 2-dB edge at 1 degree.

Over poor soil the vertical degrades further, but at low angles it still plays all but the 120-foot dipole to a draw.

Oddly, the 30 and 60-foot dipoles over both standard and poor soil perform almost identically—about 5 dB worse than the 120-foot dipole.

Ten Meters

On ten meters over seawater, figure 7, the vertical plays cat and mouse with the dipoles. It outperforms them all at 1 degree and swamps the 30-footer up to 10 degrees.

Over standard soil, a dipole is always better, except in the pattern nulls that occur when dipoles get too high.

Over poor soil, the vertical degrades further, and even the 30-foot dipole betters it—at all angles.

The best height for a 10-meter horizontally polarized antenna seems to be about 60 feet, where it has a broad lobe centered at 8 degrees.

DXpedition Antennas

Figures 1, 4, and 7 strongly suggest vertically polarized antennas for DXpeditions sites overlooking seawater. To minimize weight and size, most DXpeditioners carry TV-style push-up masts, a practice which rules out rotary beams higher than 30 feet, although trees or existing structures sometimes allow putting wire antennas up 50 feet or higher. Vertical polarization avoids the need for height.

On 20 through 10 meters, a tribander could be mounted with its elements vertical—just high enough to keep the element tips two feet or so above the ground.

A vertically polarized yagi presents design problems, but none that can't be overcome. A metal mast might destroy the pattern, so the mast should be of fiberglass, bamboo, or wood. Routing the feedline down the mast might cause the same problem. Some vertically polarized VHF yagis feature a boom extended behind the reflector— both for mounting and to keep the feedline out of the antenna's active area.

Whether horizontal or vertical, mounting an antenna low causes detuning. Pre-trip adjustments are the answer, and Mininec can show the amount of correction needed.

Near-field ground reflections could induce current in a metal boom, affecting the patterns, but this too can be modeled in Mininec. If it proves to be a problem, a fiberglass or wooden boom is the solution.

In the comparisons that follow, 6-dBd-gain yagis are assumed for 20 through 10

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Fig. 7: Dipoles vs. Ground-Plane Vertical at 28 MHz Over Seawater

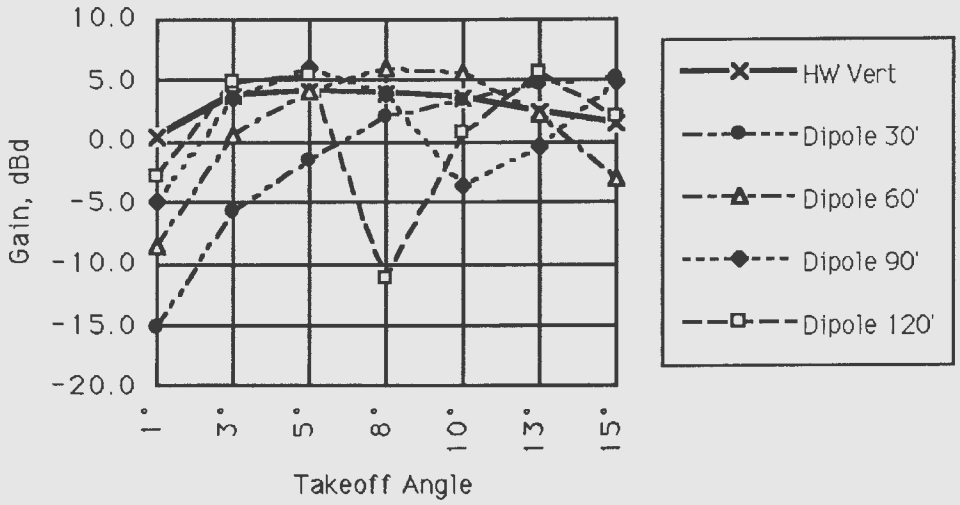


Fig. 8: Dipoles vs. Ground-Plane Vertical at 28 MHz Over Standard Soil

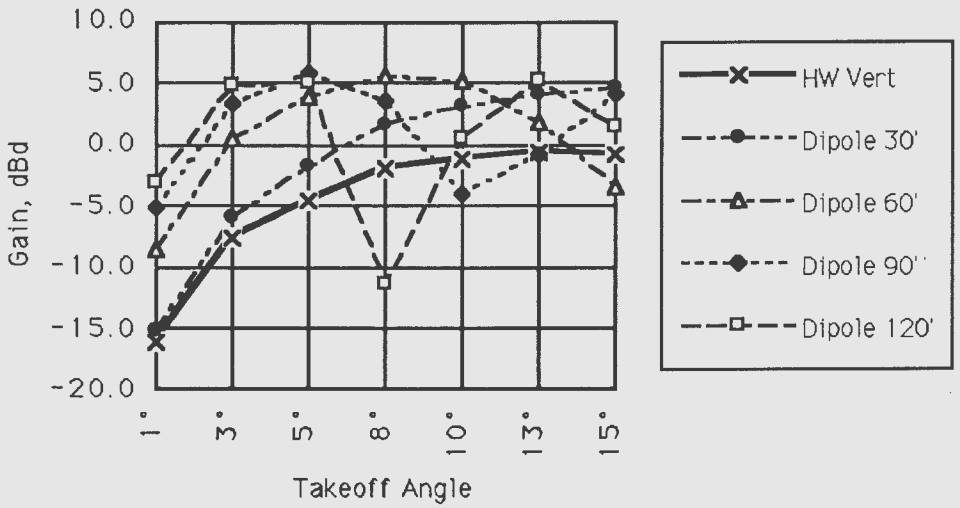


Fig. 9: Dipoles vs. Ground-Plane Vertical at 28 MHz Over Poor Soil

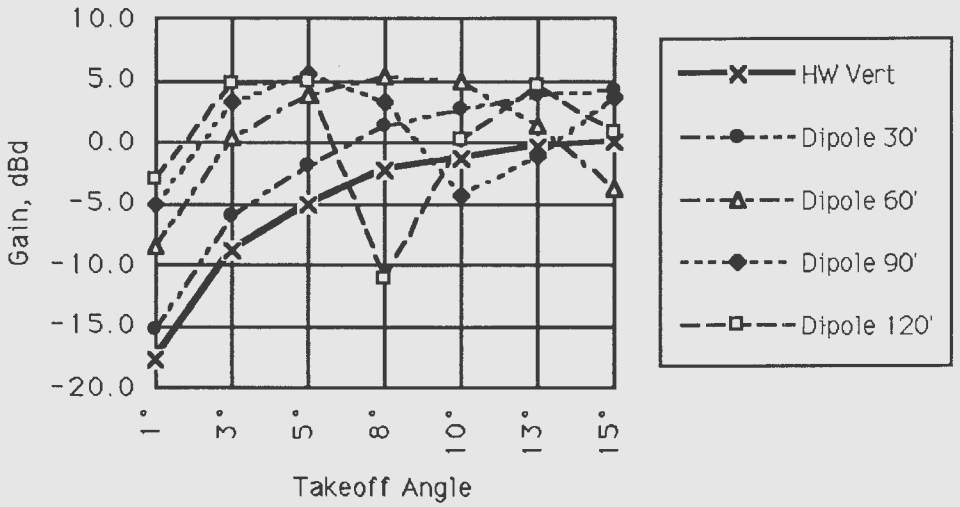


Fig. 10: DXpedition Antennas at 5-degree Takeoff Angle over Seawater

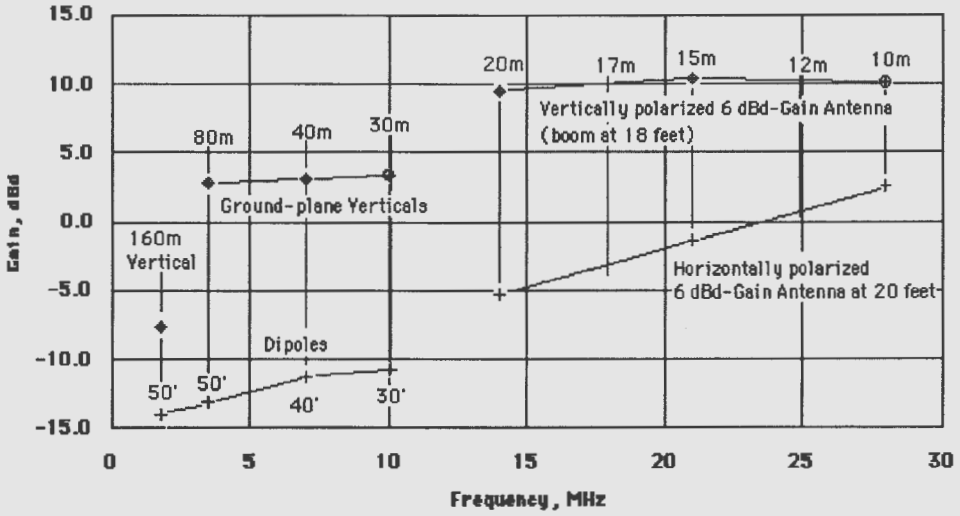


Fig.11: DXpedition Antennas at 10-degree Takeoff Angle over Seawater

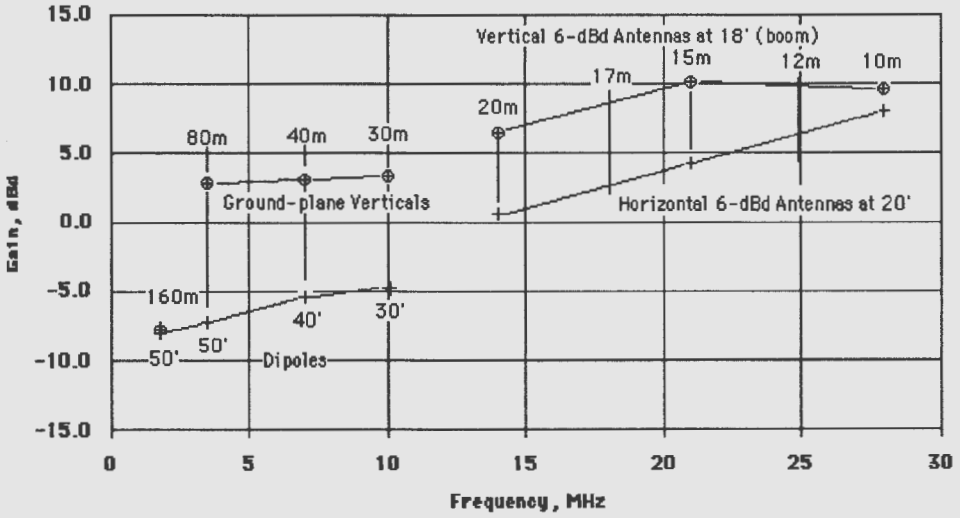
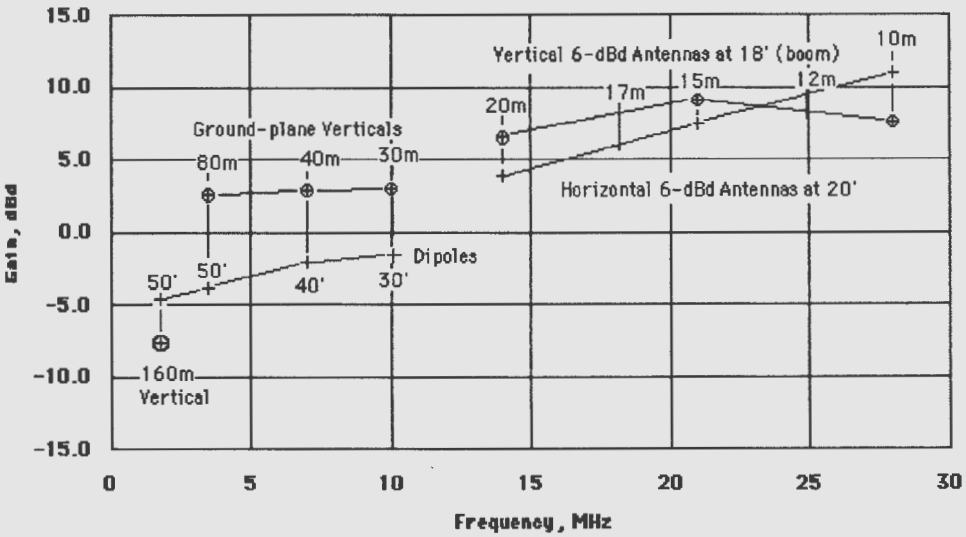


Fig. 12: DXpedition Antennas at 15-degree Takeoff Angle over Seawater



meters—whether vertical or horizontal. The horizontal yagis are up 20 feet and the booms of the vertical yagis are 18 feet high (Height for a vertical yagi isn't critical until it puts a pattern null in the elevation-angle range of interest).

On 80 through 30 meters, full-sized quarter-wave ground-plane verticals are modeled, as before. But a commercial multiband trap vertical should give similar results. (90-percent efficiency loses .5 dB. At that efficiency, one KW of RF means 100 Watts lost heating the antenna—mostly the loading coil. So if the coil doesn't melt down, efficiency must be better than 90 percent. The broader pattern of a short radiator might lose another 0.5 dB at low angles. So assuming that a trap vertical is 1 dB worse than the full-sized vertical modeled will put you "in the ballpark.")

A beach location may allow an efficient direct ground. Ideally a grounded vertical should be mounted on a pier or some other structure over the water.

Any sizable metal object (old oil drum, etc.) in the water should do for a ground. Of course ground-lead length more than a few percent of a wavelength will upset tuning severely. A long horizontal ground lead will "try" to radiate too; it may affect the pattern and it may be lossy.

On 160 meters, full-sized radials aren't usually practical and might be too low to be effective, so I modeled a grounded antenna. It seemed reasonable to allow for combined ground and coil losses by making the efficiency 10 percent. The model has a 40-foot-high radiator with a loading coil in the center. I adjusted inductance for resonance and coil resistance for the 10-percent efficiency figure.

The 160-meter dipole model is full sized but only 50 feet high.

Comparing DXpedition Antennas

Figures 10, 11, and 12 compare horizontal DXpedition antennas to verticals over seawater. Unlike figures 1–9, these graphs cover *all* the high-frequency bands. But to reduce clutter, they compare just two antennas on each band. Each graph compares gains at a different takeoff angle.

For a takeoff angle of 5-degrees, figure 10 shows the verticals winning on every band—even 160, despite the dipole's 10-dB efficiency advantage. On 80 through 30 meters, the verticals average a whopping 14 dB margin over the dipoles. On 20 meters the vertical yagi betters its horizontal twin by 15 dB, but its edge diminishes to around 7 dB on ten meters.

Figure 11 plots the same antennas at 10 degrees, again over seawater. Here the 160-meter antennas are a wash. (No, not awash, that's too punny for a serious article in which the technical facts alone suffice to tide you over.) The verticals win again on all the other bands, though it's close on ten meters.

At 15 degrees, figure 12, the dipole wins by 3 dB on 160 meters, but ground-plane verticals beat dipoles by about 5 dB on 80 through 30 meters. (Dipoles do better at 15 degrees, in the stretch.)

For the yagis at 15 degrees, it's a photo finish. The vertical yagi wins by a nose (3-dB) on 20 meters, but the horizontal one leaps ahead 4 dB on 10. The reason is height, of course, and I'm not horsing around. The horizontal antennas are too low, but hey, that's what we see on the coral sand of many a Pacific island QSL card picture.

Conclusion

The 10-dB average difference going vertical could provide on 20 meters what a linear provides. Think about all the weight you could save on that next island-hop—the linear, the bigger generator, and the extra fuel. Know anyone who sells 2-inch fiberglass tubing?

Treasurer's Report

by Melissa Thomas, AA6TD

Checking Account Activity:

November 30 EOM Balance		$5375.27
Receipts	$2111.75	
Expenditures	$3875.33	
December 31 EOM Balance		$3611.69

Savings Account Activity:

(Life membership fund)

Eureka Bank CD 11/13/92	$10,475.33
Eureka Bank 11/24/92	$15,669.95
Repeater Fund:	$ 2,070.36

Letters from Members

Msg #278 From: AE6Y Date: 6-Jan 0544Z
(via DX Packet Cluster)
Subj: lawyer bashing

Hi Dave,
I know it's tough to come up with new material for the DXer each month, but I must say I resent articles such as "Attorney Hunting, Texas Style" in [the January '93] issue. I talked to you at a meeting about this once before, after you ran lawyer jokes.

While humor is fine in the DXer, gratuitous humor at the expense of one group of people is completely inappropriate. I didn't join the club expecting to have to wince when I read its magazine.

By the way, do you appreciate the irony that the same issue had the obituary of Vern Howard, who was only able to have a tower because of the superb efforts of lawyers such as W6OAT in defending his rights?

Anyway, I'd certainly appreciate it if you would find some new target for your barbs or, better yet, publish articles that don't depend for their humor on lambasting any one group or another.

Tnx., 73
Andy

Msg #381 From: AE6Y Date: 8-Jan 0403Z
Subj: Re bash

Hi, Dave. Thanks for your nice reply to my message. It's fine to run it as a letter, if you like. You should add W6SZNre Uncle Vern's antenna problems (if other ham/attorneys that worked on it, please include them too).

If I were in your place as editor, I would to try to talk someone into writing a regular column (or maybe have two or three guys share it).

I would also try to get some technical articles, such as equipment reviews, comments on DX logging software, surveys of antennas used by members, etc. How about a geography lesson on the Yugoslav republics, Slovakia, or the Czech Republic?

73,
Andy

Msg #384 From: AE6Y Date: 8-Jan 0544Z
Subj: articles

Dave, I'll think about a tower article, particularly once my own tower issue is played out (I put up a 65 foot Rohn 55 tower, N6BT-style, legally. But neighbors are unhappy anyway).

Re lack of support: that's surprising considering so many members of the club are retired. One would think one or more that would love to write in their spare time. Oh well, the editor's life is a tough one.

Do you know Adlai Stevenson's definition that an editor is one who separates the wheat from the chaff and prints the chaff? (can't use that in the DXer, since I told it to W6ISQ and Jack ran it in the Jug last year, hi.).

73, Andy

The Jug, the newsletter of the Northern California Contest Club, is ably edited by Jack, W6ISQ, and Maggie, KC6NFE, Troster. Jack and I sometimes swipe each other's material—knowing that some members of each club are not members of the other. Anyway, anything as good as that Stevenson quote bears repeating. Andy's ideas are good. Any columnist wannabes out there? One-time article writers?—ed.)

DXer

P. O. BOX 608
MENLO PARK, CA
94026-0608 USA

FIRST CLASS

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