

DXer

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



ARRL Opposes "Quiet Zone"

The League has opposed a Petition for Rulemaking filed in November 1992 by Cornell University.

Cornell operates the Arecibo Observatory for the National Science Foundation. Cornell wants all applicants for new communications facilities and modification of existing facilities in Puerto Rico or the surrounding U.S. islands to provide written notification to the Arecibo Observatory.

The observatory would then determine whether a proposed installation threatens interference to the radio astronomy facility. The observatory would have twenty days to determine whether to oppose an amateur radio repeater or automatic beacon station installation or modification.

When it receives an opposition, the FCC would "review the objections and take appropriate action."

No technical criteria were proposed for the evaluation, the League noted, nor is "appropriate action" defined.

The League, noting its support for the work at Arecibo, said, "The League does not dispute the need to protect the observatory from interference ... and, to the extent consistent with reasonable, efficient operation of radio stations operating in their own allocations, the observatory should be accommodated in conducting [its] experiments.

"However, the research should not disrupt mature communications systems in a populated area, nor deter or inhibit the modification of communications facilities with newer technologies.

"Nor should a valuable emergency communications system in a hurricane-

susceptible area be restricted, based on an [undefined] ... fear of possible future interference."

The League said the petition fails to address degree of protection, makes no distinction about what radio services might be sources of interference, and does not admit that planned Arecibo antenna upgrades will *reduce* received interference.

"Though it is impossible to determine from the petition," the League said, amateur repeater and beacon facilities are not likely to cause interference to the observatory.

The League also pointed out that the observatory is exposed to radio transmissions from shipboard stations in the Caribbean.

The League suggested Cornell work with local repeater groups and frequency coordinators to obtain information concerning amateur repeaters.

"If there is a role for the Commission in the protection of the Arecibo Observatory, it comes into play only after the parties have attempted to resolve actual, harmful interference problems themselves.

"Cornell has much to gain from a cooperative approach to interference resolution with the amateur community, as opposed to the adversarial procedure suggested in the petition," the League said. "The League suggests the Observatory view the Amateur Radio Service as an ally, and utilize its volunteer resources in a cooperative manner."

from the March 10, 1993 issue of "The ARRL Letter"

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Luck

People always call it luck when you've acted more sensibly than they have.

—Anne Tyler

June Meeting

The June 11 meeting will be held at Harry's Hoffbrau in Palo Alto, starting at 7. June meeting activities will include election of club officers.

Members who wish to participate in mutual attitude adjustment sessions arrive as early as 6. No information on the June meeting program was available at DXer press time.

The bar at Harry's now closes at 8 and the manager has asked that we vacate the premises by 10.



"No matter what the project he's working on is supposed to be, it ends up being a light dimmer."

**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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 Director: Ralph Hunt, AG6Q
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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.

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General Meeting

The meeting took place at Harry's Hoffbrau in Palo Alto. Bob, KN6J, presided over the first half, but George, WA6O, took over after the break.

- The meeting convened at 7:11 P.M. with guests being introduced.
- Brad Wyatt, K6WR, reported on FCC and ARRL.
- Jim Maxwell, W6CF, spoke on the recent DXAC issues.
- KN6J reminded the club of the upcoming election of officers in June, and urged all to attend the June 11 meeting. He said the nominating committee is working on a slate of officers (but of course, nominations can also be made from the floor).
- KN6J turned the meeting over to Knock, K61TL, who showed his well-edited video tape of "Project IRMA"—a terrific production by W6CF, W6OAT, *et al* for the Sunday breakfast at Visalia.
- Ron, W6VG, read new membership applications:
 First readings for Mark Hansen, KI7N; Allen Citragno, WA6GIN; and Robert Brown, YB2ARO.
- One second reading for Sandy Lynch, WA6BXH. Sandy received approval by voice vote of those present and was welcomed to NCDXC membership.
- Second readings were rescheduled for Bill Hamlin, K6UO, whose sponsors, KN6J and N6ST were not present; and Tim Coad, NU6S, whose sponsors, K6TMB and N6TV, were also absent.

Roster Changes

New Member:

Sandy Lynch, WA6BXH (E)
 3310 Lochinvar #58
 Santa Clara, CA 95051-5119
 H: 408/296-2984



"Just as I suspected. You are powerless without the manual."
from the February '93 Clearwater (FL) ARS "Clearwater Connection"—N4WAK Editor

Call Not Into ...

© 1993 David M. Barton, AF6S

Call not into the heedless sky's expanse,
When no poxes stain the solar face.
Rage, rage against the dying of the bands.

Scarce sunspots make few earthly ions dance,
Unfueling every high-band DX race.
Call not into the heedless sky's expanse.

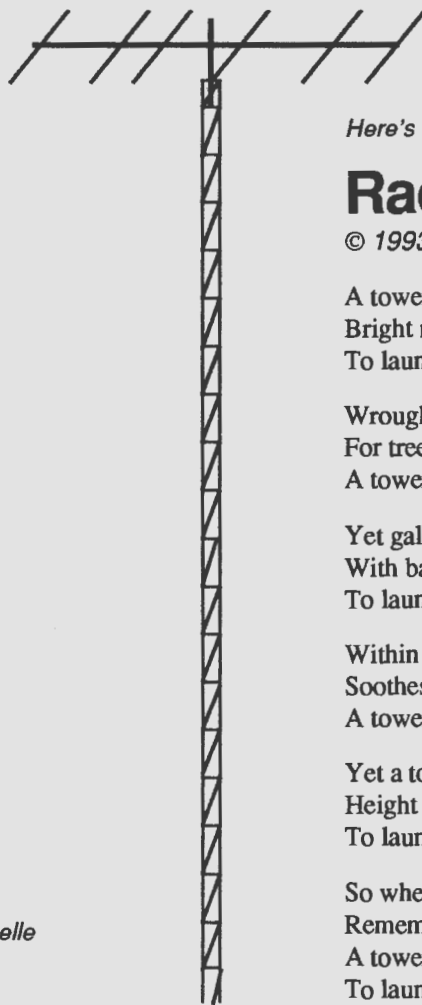
MUF a signal needs for any chance,
Else wireless waves slip on out into space.
Rage, rage against the dying of the bands.

Eleven solar cycle years advance,
Before another peak takes last one's place.
Call not into the heedless sky's expanse.

We know the sun's exalted insouciance
Puts our trifling hobby in its place.
Rage, rage against the dying of the bands.

For no antenna, no extravagance,
Can overcome a slothful solar pace.
Call not into the heedless sky's expanse;
Rage, rage against the dying of the bands.

*Here's hoping Dylan Thomas—whose famous villanelle
"Do not go gently into that good night" this poem
parodies—doesn't roll over in his grave.*



Here's one that's not a parody:

Radio Tower

© 1993 David M. Barton, AF6S

A tower's only claim is on the sky.
Bright metal tubes it lofts—in form Yagi,
To launch and gather signals on the fly.

Wrought as the hand of man will try,
For trees like these no tear you'll ever see.
A tower's only claim is on the sky.

Yet gales press their gusty forces nigh;
With banshee wail, they wreck ability
To launch and gather signals on the fly.

Within a living tree a lullaby
Soothes small nestlings in their nutty glee.
A tower's only claim is on the sky.

Yet a tower stands in pride, stands high;
Height that gives low radiation *phi*,
To launch and gather signals on the fly.

So when a wireless tower you walk by,
Remember, if or not a ham you be;
A tower's only claim is on the sky,
To launch and gather signals on the fly.

More Random Dits

Almost Too Sick

Q: Why did the Davidians commit suicide?

A: To keep up with the Joneses.

America

is the only place a chair can entertain a motion from the floor to table a discussion.

Data Dross (digital slag)

Q: Are Macintosh mice sticky?

A: No, but they sure are GUI.

Experience is a hard teacher.

She gives the test first,
then the lesson.

*From the May '93 Delaware-Lehigh Valley
ARC "W2OK Corral"—Clarence Snyder,
W3PYF, Editor*

Thankless

Being head of state is a thankless job.

—*Bokassa I, former Emporer of the Central
African Republic—while on trial for
infanticide, cannibalism, and torture.*

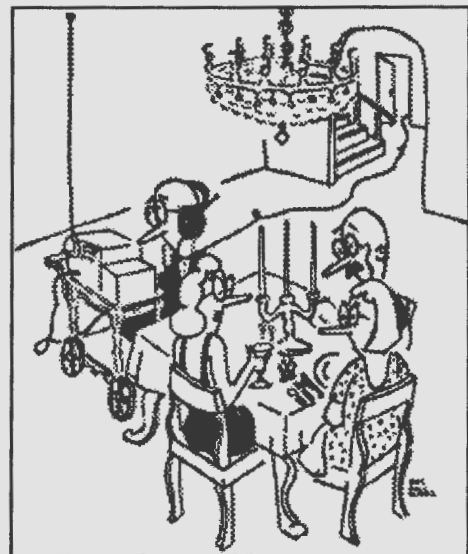
Skiing combines outdoor fun with knocking
down trees with your face. —*Dave Barry*

Fishing is a delusion entirely surrounded by
liars in old clothes.

—*Don Marquis (1878-1937)*
(seems a bit like DXers—ed.)

Success

The Lord gave us two ends—one to sit on
and one to think with. Success depends on
which we use the most. —*Ann Landers*



**"It's only fair. I had it for the YLRL
Phone Party."**—*original source unknown*

International DX Convention Highlights

by "Knock" Knochenhauer, K6ITL

With the theme "The Changing World Of DX," the 44th International DX Convention introduced innovative and, some said, radical elements.

There was nothing radical about the opening ceremony, in which Peter Carey,

Visalia Mayor, presented NCDXC President Bob Artigo, KN6J, the keys to the city.

The DX Magazine and Ham Radio Outlet provided relaxing hospitality hours, and more than 160 DXers and their friends and family enjoyed the Western barbecue.

First-time attendees were not overlooked; they enjoyed a no-host Saturday breakfast

buffet, and received blue ribbons so others could recognize them as newcomers. As a result of our newcomer welcoming committee's success, it may become another International DX Convention tradition.

Attendees discovered exotic forms of DXing—in Jimmy (W6JKV) Treybig's slide show on EME DXing from exotic spots, for instance. Jimmy showed near-National Geographic-quality slides.

Then Ted, KA6W, described 160-meter DXing challenges and showed how low-cost software, simple antennas, and ordinary equipment can produce excellent results for the DXer who understands low-band propagation effects.

Russ, K6KLY, presented slides on VHF DXing, another radical DXing mode, according to some. He persuaded his audience to include VHF and UHF in the pantheon of "The Changing World of DX."

The informal "How To Do Your Own DXpedition" workshop brought 200 DXers together to exchange ideas on where and when to go, what to take, how to get a license, briefcase QRP DXing, and more.

Chod, VP2ML, presented his crystal-ball scenario of DXing in the 21st century. He described an automated station that can find and work a new country, log the contact, then send and receive confirmation—while its owner sleeps or works. Cracking pileups isn't a problem; the DXpedition station's computer singles out the needy and only contacts them. Farfetched? No, given the pace of technology. Fun? Who knows?

Sunday morning, after everyone negotiated the line for the marvelous breakfast buffet, they witnessed the unveiling of the NCDXF's Project IRMA—The DX Truth-O-Meter developed in his secret Silicon Valley laboratory by Professor Hieze A. Lyre. With flashing lights, strobes, sirens and klaxons, IRMA can tell truth from fable. It operates by measuring skin resistance, rapid eye movements, pulse, and respiration of the, ah, subject.

Rusty, W6OAT, used IRMA to interrogate Bob Ferrero, W6RJ. Rusty asked whether Bob ever used four Alpha 87s in push-pull parallel on 80 Meters, and why he

Convention Chairman's Report

by "Knock" Knochenhauer, K6ITL

The 44th International DX Convention is history. Attendees noted the record-breaking crowd and the great job NCDXC members did. It was my pleasure to watch our team run everything smoothly from day one.

Nearly 700 DXers with 245 family members, guests, and friends, nearly burst the Holiday Inn's seams.

Led by Larry and Louese Bloom, KD6XY and KA6ING, pre-registration, early publicity, and financing went without a hitch. Ron, W6VG, and his on-site registration crew made sure everyone got his or her registration packet. They signed up a record number who didn't beat the pre-registration deadline too.

Gerry, W8MEP, took on the difficult task of lining up speakers whose material met the convention theme, "The Changing World of DX." All went well, despite last-minute glitches.

Al, W4RIM, handled the demanding job of obtaining door prizes and signing up exhibitors.

Tom, K6TS, and his crew achieved an all-time raffle-ticket sales record.

And what would a DX convention be without the hospitality hours? Thanks to Lou, K6TMB, Ham Radio Outlet, and *The DX Magazine*, this year's was the best ever.

Dave, KI6WF, spearheaded "The Howdy Bunch," who gave first-timers a warm welcome.

But for the tireless efforts of Linda, WB6OMD, non-ham YLs would have missed the fine self-defense and Western line-dancing classes. Promoting the convention to Visalia city officials and business people, Linda also gave amateur radio, and the convention, unprecedented and favorable publicity.

Few could have known the who, what, when, and where had Steve, N6ST, not transformed last-minute hen scratchings into an outstanding program in the short time after his return from a trip to Europe.

Always a ready helper, Hal, N6AN, applied imagination and craft to signage, title plates, posters, and such—vital to a convention. Last-second changes did not prevent him from finishing everything in advance of need.

How do you thank a person who handled the minutiae of the convention patch, and made the barbecue in the park so successful? Steve, W6MKM, also handled some of the convention's most ticklish transactions.

A great many other NCDXC members contributed as well. Roughly sixty-six of you volunteered to sell raffle tickets, or to serve on the welcoming committee, a forum panel, or in behind-the-scenes work. It was a splendid turnout.


I want to thank every member who contributed to the success of the 44th International DX Convention. You made it the best one yet.



depends on W2NQ/7's responses from far-away stations unheard by anyone else.

Another truth emerged; Lance Ginner, W6GSJ, a W6CF co-worker, is the real IRMA designer and builder. (Videotapes of the presentation are available from K6ITL for club showings or personal use.)

The NCDXC presented a Special Achievement Award to Al Lotze, W6RQ, in appreciation of his propagation studies. As Bob, KN6J, noted in his presentation, "Al presents technical phenomena in layman's terms, with the desire that club members gain a better understanding of propagation and how it affects our ... hobby of DXing." K6ITL accepted the award for Al, who couldn't be present.

Bob, W6RGG, presented the NCDXC's DXer of the Year award to Knock, K6ITL, stunning him speechless. "The last time that happened," Knock said, "was when the doctor informed me my wife would have twins." 

Acronyms— For the Nineties

- DINKS: Dual Income, No Kids
- DINKYS: Dual Income, No Kids Yet
- SITKOMS: Single Income, Two Kids, Outrageous Mortgage
- RUMPIES: Rural, Upwardly Mobile Professionals
- YIPPIES: Young, Indicted Professionals
- GREEPIES: Greedy, Rich Executives with Excess Perks
- SINS: Single Income, No Sex
- DINS: Dual Income, No Sex
- NINS: No Income, No Sex
- SNAGS: Sensitive, New-Age Guys
- LOMBARD: Lots Of Money, But A Real Dirtball
- SLUMPIES: Slowly Losing Upward Mobility Professionals
- WOOFIES: Well-Off, Over Fifty
- SICKIES: Single-Income College Kids
- DICKIES: Dual-Income College Kids
- SWINE: Students Wildly Indignant about Nearly Everything
- TWERPS: Those Who Enjoy Roundly Protesting Something
- SCUMIES: Socially Conscious—Unless Money's Involved

Visalia Honors Lloyd and Iris

by "Knock" Knochenhauer, K6ITL

The 44th International DX Convention bestowed a special honor on Lloyd and Iris Colvin, W6KG and W6QL, in recognition of their long-term commitment to DXpeditioning.

Presenting the plaque, Fred Laun, K3ZO, told the audience the Colvins were the first to go on extended DXpeditions—typically for six months or more. Beginning in the western Pacific in 1965, Lloyd and Iris operated from 222 countries using 147 different callsigns.

The plaque reads:

Presented to Lloyd and Iris Colvin, W6KG and W6QL, in appreciation for your many years of DXpeditions for the worldwide DX fraternity, and your outstanding contributions to amateur radio, from The 44th International DX Convention, Visalia, California, April 17, 1993.

As each year's DX season approached, the question, "Where are Lloyd and Iris going?" flooded the DX bands. Well it might; they did it for 28 years.

Rather than stay in "the Hilton," they found "native digs." Some of their experiences were borderline wierd. Constant hall traffic in one small hotel disturbed their sleep. Next morning, when they asked the proprietess if there had been a celebration, she said, "No, and the girls didn't meet their quotas either." The Colvins managed to find a room elsewhere.

On a primitive island in a jungle-surrounded hut, Lloyd wanted a long wire

for 80 and 40 meters. His military experience led him to delegate that responsibility to Iris. He did observe her progress, though—by watching the bamboo tops move as she made her way. Hours later, when she emerged scratched and bleeding, he announced, "It works fine to the north, but we'll have to put up another one for east and west."

So Iris plunged into the jungle again, dragging 300 feet of wire behind. When she finally dragged her weary body from the jungle, she asked asked, "How now?"


"Fine," Lloyd replied, "but the coax to the beam needs replacing, so you'll have to climb up and fix it." We don't know this story's sequel, but assume the Colvins chose future locations with greater care.

Lloyd and Iris liked to shop in the third world's open markets. Once, as she inspected a melon, a small boy snatched her wrist watch from her arm. Seeing the miscreant dart away, Lloyd pursued through dark native quarter alleys, caught the young thief, and forcibly retrieved the watch—ignoring the hue and cry of bystanders.

He returned beaming, holding the watch high for all to see. Iris bent to his ear and whispered, "Lloyd, that's not my watch."

In 1988 disaster struck. Iris broke her hip in a fall and the DX community held its breath. Finally word came that she had undergone surgery, was recovering rapidly, and would soon be back on the air. When she came up a month later from YBØ, the collective sigh of relief seemed to double the F-layer's ionization.

The Colvins, solely at their own expense, gave thousands of DXers new countries. In the process they amassed 250,000 cards, undoubtedly the world's largest QSL collection.

We hope DXers everywhere will join in our salute to Lloyd and Iris Colvin. 

Random Dits

- Q: What you get when you cross Lee Iacocca with an flying mammal?
- A: AUTOEXEC.BAT

Somewhere ... there is defeat for everyone. Some are destroyed by defeat, and some made mean by victory. Greatness lives in one who triumphs equally over defeat and victory.
—John Steinbeck

WATTS Award: Worked All Telephones, Televisions and Stereos (Part 2)

by Harley Licht, WA6ISX

Here is the second part of Harley's article that began in the May '93 DXer.

More Phone RFI

Symptom:

After installing a split-bead filter on a Radio Shack two-line wall phone, the RFI was completely gone with the phone lying on the counter. But back on the wall, the interference returned.

Cure:

A metal wall-plate mounted the phone, and provided connections. When I placed the phone against it, interference increased. When I replaced it with a plastic plate, the problem disappeared. Yet the phone lines were properly grounded. I believe the metal plate induced RF into the phone.

Symptom:

Another neighbor, who has an AT&T two-line phone with auto-dialer, was not amused by my joining her telephone conversations whenever I called a DX station.

Attempts:

Each type filter reduced the RFI, but even both filters in series didn't eliminate the RFI. When I rotated my HF antenna broadside to her house, *that* eliminated the interference.

Cure:

We always overlook the obvious. Reducing the length of cord between the filter and the wall jack helped. A shorter handset "curly-cord" helped even more. These changes reduced the problem to our mutual satisfaction, though they didn't eliminate all interference.

Symptom:

Every time I transmitted, the CD drawer on a small Sony stereo on a shelf above my radio equipment opened or closed. Also, when the drawer was closed, the CD changed tracks.

Attempted Fixes:

I tried split-beads on the speaker wires and reducing their lengths. I put toroids on the AC line and most of the stereo-amplifier inputs. Did you notice the word *most*?

Cure:

This tape deck doesn't have shielded phono jacks. It uses ribbon cable for interconnects. When I slipped a split-bead over that ribbon cable, the problem vanished. It did not return though I removed all other filters and beads.

Other Telephone Notes:

- Filters available from AT&T "Phone Stores"—part number Z100B1—give little improvement.
- You will find a label on most cordless phones saying: *"This cordless telephone ... operates under Part 15 of FCC rules. Privacy of communications may not be ensured when using this phone. Operation is subject to two conditions: It may not interfere with radio communications, and it MUST accept any interference received, including that which may cause undesirable operation."*

TVI Problems

Symptom:

"Herringbone" patterns appeared on Channel 4 during my SSB transmissions. Interference to channel 2 was strong enough to obliterate the raster. Yes, Channel 2 is the weakest major station here, and Channel 4 is second weakest. Apparently the problem was fundamental overload, as rotating the HF antenna broadside to this neighbor's house reduced the interference.

Attempts:

The approaches outlined below usually help, and combinations often work even better. Yet in three cases, no combination eliminated TVI. In one instance the TV

antenna had too little gain for its location. In others, feedlines were dilapidated.

I left the decision—whether to replace or upgrade these antenna systems—with the homeowners, since their adjacent neighbors had little or no TVI.

Cures:

Here are the TVI fixes I applied:

- Winding eight turns of TV coax through a 2.4-inch #43-material toroid placed at the TV's antenna terminal—a "common-mode" filter.
- Placing a high-pass filter right after the toroid. I tried a Radio Shack cheapie, an Ameco filter and an old Drake filter. I put a 75- to 300-Ohm matching transformer on each side of the high-pass filter, creating a "distributed-mode" filter.
- Making a common-mode line filter by winding at least ten turns of the TV's AC line cord through a 2.4-inch ferrite toroid placed close to the TV.
- Adding a conventional AC-line filter at the wall outlet.
- Removing all other equipment between the TV and the antenna—VCR, Nintendo Game, etc.

PSC Electronics in Sunnyvale, CA has the toroids—Fair-rite part number 2643803802. PSC will give you a full-line ferrite catalog for the asking. (The 2.4-inch toroid is also Amidon FT240-43—*ed.*)

Many TVI problems begin at the TV antenna, its feedline, and connectors. In two cases a coax connector had its center conductor smashed or bent over—making little if any contact and possibly shorting.

If the TV's signal is too weak, your signal can overload its front end. A homeowner may have too many "splitters"—which lose the TV signal 3–4 dB apiece.

A good distribution amplifier may help weak-signal cases. The amplifier must have low noise figure and be shielded. If the TVI is from HF operations, get an amplifier that covers only VHF and not UHF too. Try to

continued on page 11

NCDXC Submits Big Scores for ARRL 1993 International DX Contest

by Bob Wolpert, N6IP

I received forty-five logs, for a 28,184,441-point grand total. Forty in-region members made 10,698,776 points. The remaining 17,485,664 points came from just five members operating from DX locations.

ARRL DX CW

Station (Operator)	OSQ	C	Total	Cat	Hours
W6BIP	457	208	285,168	SO	
K6RQ	269	131	105,717	SO	
W6VG	301	97	87,591	SO	
W6WB	236	116	82,128	SO	22
K6DR	263	77	60,753	SO	
N6WCW	104	68	18,360	SO	
N6JM	62	45	8,370	SO	
W6ISQ	77	35	8,085	SO	
N3AHA	719	223	481,011	S/U	
N6IP	690	182	376,740	S/U	26
K6MA	366	199	218,502	S/U	20
KA6BIM	326	160	116,480	SO	
WA8LLY/6	182	107	58,422	S/U	
W6RJ	216	48	31,104	80	
NI6T	232	34	23,562	80	
W6BSY	536	86	138,288	15	
KI6EZ	198	58	34,452	15	
KG6GF (+ AA6Z & WA6HAT)	1616	333	1,614,384	M/S	
<i>Out-of-Area Scores</i>					
ZF2TV (AA6KX)	4,384	309	4,063,968	SO	
W6EEN(KA6SAR)			1,129,257	SO	
P49V (AI6V+W6QHS)	5,590	326	5,467,020	M/S	

ARRL DX Phone

Station (Operator)	OSQ	C	Total	Cat
W6REC	1,084	221	718,029	SO
KA6BIM	720	246	531,360	SO
K6ITL	465	181	252,495	SO
W6BIP	303	167	151,803	SO
K6DR	236	89	63,012	SO
W6ISQ	210	68	42,840	SO
W6WB	134	62	24,924	SO
N6ITY	93	47	13,113	SO
N6JM	75	48	10,800	SO
KG6AM	46	45	6,210	SO
N3AHA	2,012	349	2,105,517	S/U
N6CCL	506	216	327,888	S/U
N6IP	603	129	233,361	S/U
K6MA	414	182	226,044	S/U
WA8LLY/6	347	158	164,478	S/U
WA6AUE	257	141	108,711	S/U
WA6AHF	225	127	85,725	S/U
NI6T	72	52	11,232	S/U
W6RJ	304	68	62,016	80
N6RO	63	63	11,907	40
W6QHS	1,781	123	656,820	15
KI6EZ	1,036	102	317,016	15
W6BSY	823	105	254,307	15
KA6ING	176	69	36,432	10
W6OAT (+ W6RGG)	633	281	533,619	M/S
<i>Out-of-Area Scores</i>				
J76EK (N6EK)	5,664	295	5,012,640	SO
W6EEN (+ K6XC, KA6SAR)			1,812,780	M/S



Great new, tiny mobile rig—Kenwood TS-50—shown at Visalia (actual size) ... wish I had one—ed.

What Antenna Height is Best?

by David M. Barton, AF6S

Jean Harlow said, "You can never be too thin or too rich." Likewise, a DXer might say, "An antenna can never be too big or too high." The former proposition would be difficult for most of us to test, but the latter is amenable to "virtual testing"—by way of computer modeling.

The salient factor in antenna height is its effect on the elevation pattern. For a horizontally polarized antenna over average

Antennas

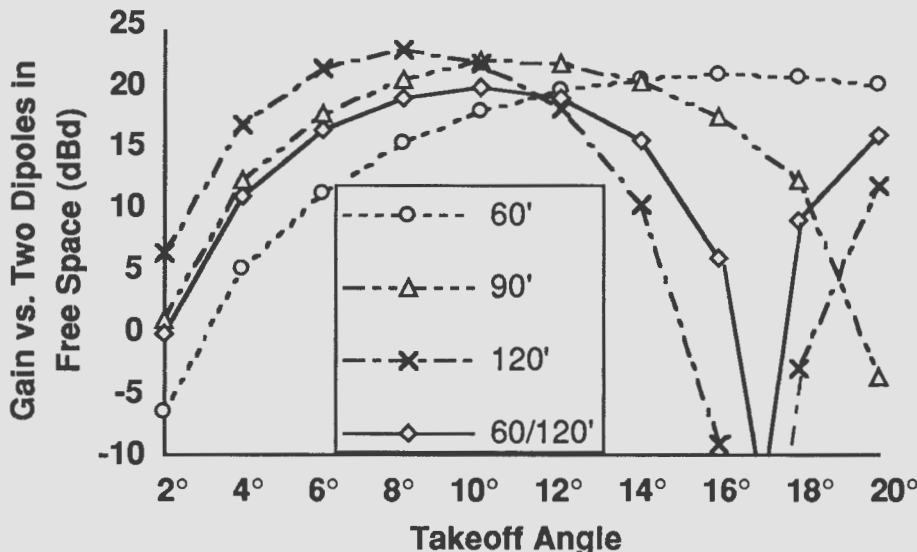
Figure 1 graphs the gains of two antennas in combination, one transmitting and the other receiving—the case for all radio paths. Three of the curves are for equal-height 3-element yagis at 60, 90, and 120 feet on 20 meters. A fourth curve is for one 60-foot yagi and another at 120 feet. In each case, the values plotted are the sums of the gains of both antennas, including the "ground gain" over standard ground (dielectric constant: 13, conductivity: 5 mS), relative to

antenna give an advantage over a low one when the antenna on the other end is low?

Compare the curve for both antennas at 60 feet with that for one at 60 feet the other at 120 feet. Below 12 degrees, the high antenna produces a better signal—by as much as 5 dB in the 4–8 degree range—but above 12 degrees the 60-footer works better. Curiously, the crossover occurs at the same elevation angle when the other guy's antenna is up 120 feet. (diamonds vs. X-marks)

Fig. 1:

Gain vs. Takeoff Angle, Two Horizontal 14 MHz 3-Element Yagis



ground, very little radiation occurs right on the horizon. But at increasing takeoff angles signal strength rises, reaching a peak at an angle that depends on antenna height. At higher-yet angles the signal falls, reaching a null at about twice the angle of that first peak. Antennas many wavelengths high produce multiple peaks and nulls. Also, the higher the antenna, the lower the angle at which the first peak occurs—the so-called "radiation angle." It's best to avoid this term; it implies radiation concentrated at one particular angle rather than spread over a continuum of angles as actually happens.

dipoles in free space. Runs of Brian (K6STI) Beezley's MN4.5 version of Mininec, using a lossless dipole model, provided the values. I added 12 dB to simulate the 6-dB gains of 3-element yagis at both ends of a path.

Notice the variation of the first-peak elevation angle with height: 8 degrees for 120 feet, 11 degrees for 90 feet, and 16 degrees for 60 feet. The pattern null of the 120-foot antenna (and of the 60- and 120-foot yagi combination) are prominent too.

The curve for one yagi at 60 feet and one at 120 answers the old question: Does a high

Propagation:

More than one high-frequency propagation "mode" can coexist along a single path. Over a distance of 6,000 miles, for example, a mode with three F-layer hops of 2,000 miles can coexist with a mode with four 1500-mile F-hops. On forty or eighty meters, E-layer may appear; a 6,000-mile mode could even mix two E-layer hops of 1,000 miles and two 2,000-mile F-hops.

When more than one mode exists, each will have a distinct takeoff angle. If you could measure signal strength for each mode, each would vary uniquely, because each mode's signal experiences different "difficulties" along the way.

The lowest-angle mode usually produces the strongest signal, since fewer hops mean fewer passes through absorbing D- and E-layers, and fewer earth reflections—which can scatter signals.

But low-angle signals travel farther within the D-layer, making D-layer absorption higher at low angles. So on the low-frequency bands, when one end of a path is in sunlight (so significant D-layer absorption occurs), the strongest signal can be a high-angle one.

Figure 2 shows predicted signal strengths for every mode present on 14 MHz between San Jose, California and Novosibirsk, Siberia on May 3, with solar flux of 110. (This 5437-mile path reaches 79 degrees north latitude.) I used Sheldon (W6EL) Shallon's Miniprop Plus to model the path. The values are in dB relative to Miniprop's standard default settings.

Fig. 2:

W6-UA90 14-MHz Short Path Modes at Various Takeoff Angles

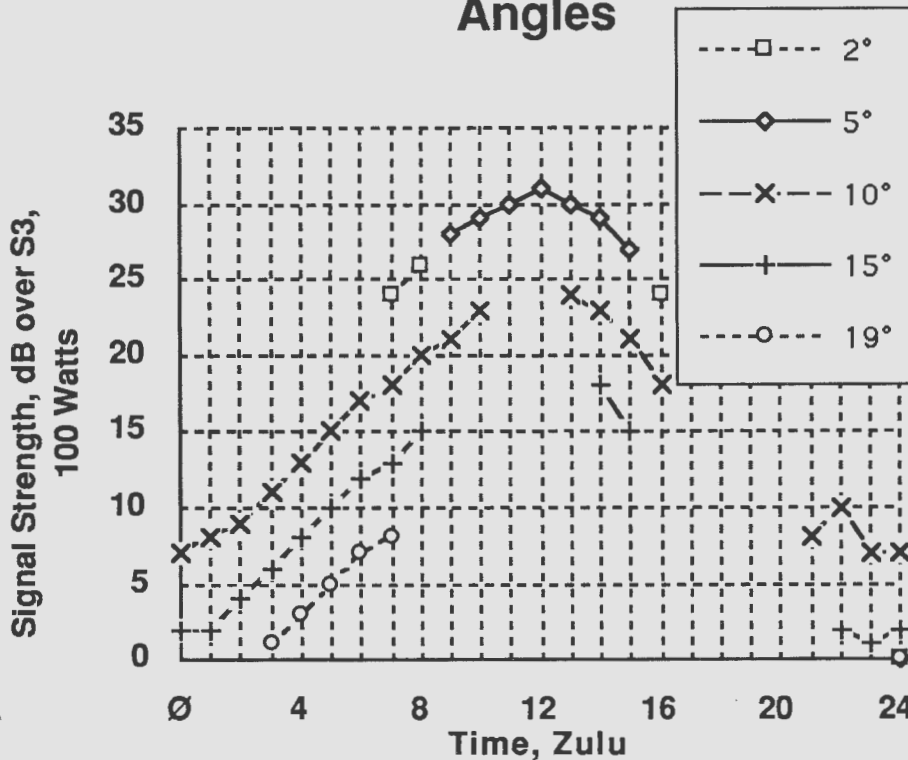
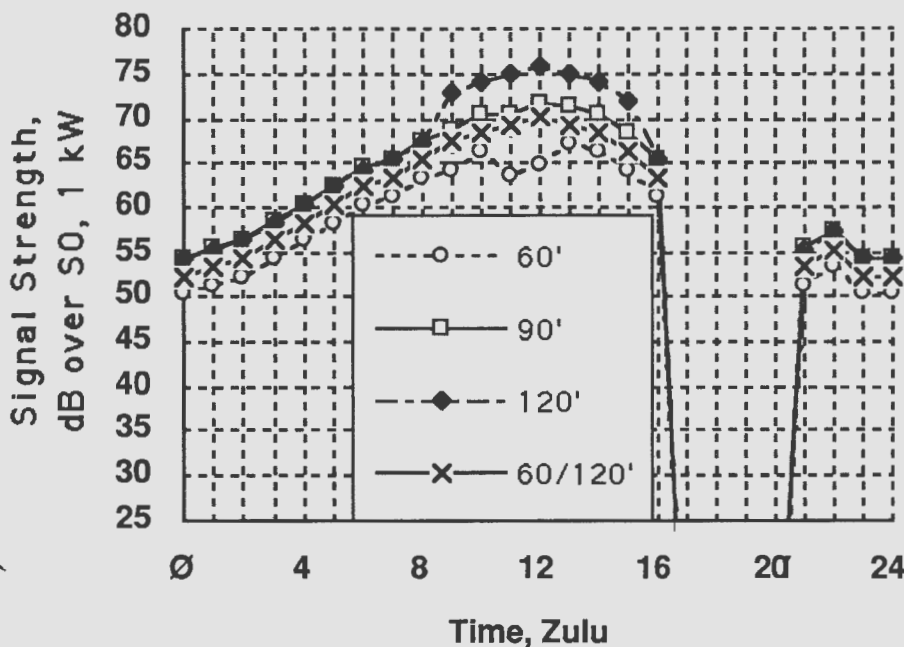


Fig. 3:

W6-UA90 14-MHz Short Path, 3-Element Yagis



Combining Results:

If we could combine the elevation-angle variation of antenna gain with the path mode signal strength data, we could directly compare the performance of various antennas over a path. That would be difficult with real antennas, but the "virtual experiment" is easy.

With Excel (a spreadsheet), I added Miniprop path/mode signal strengths to the MN-predicted antenna-pair gains at various elevation angles, giving a signal strength for each mode. To produce familiar numbers, I increased transmit power to 1 kW and changed the 0-dB reference from S3 to S0. Assuming 5 dB per S-unit, that puts S9 at 45 dB on the graphs.

W6-UA90 SP: Figure 3 shows results for W6-UA90 on May 3, with solar flux at 110. Twenty meters remains open for nineteen hours, from 21 to 16 hours Zulu, with signal strength climbing almost the whole time. The signal peaks just before the gray-line nearly connects San Jose and Novosibirsk at around 13 Zulu.

Notice the effect of antenna height. Two 120-foot antennas produce the best signals, but a *strong* 120-foot advantage exists only during the peak hours of the opening. Amazingly, the 60-foot pair is worse by only 5 dB most of the time, though in the peak hours the high antennas' advantage increases to 10 dB. The combination of a 60- and 120-footer produces signals that neatly split the difference—at all times.

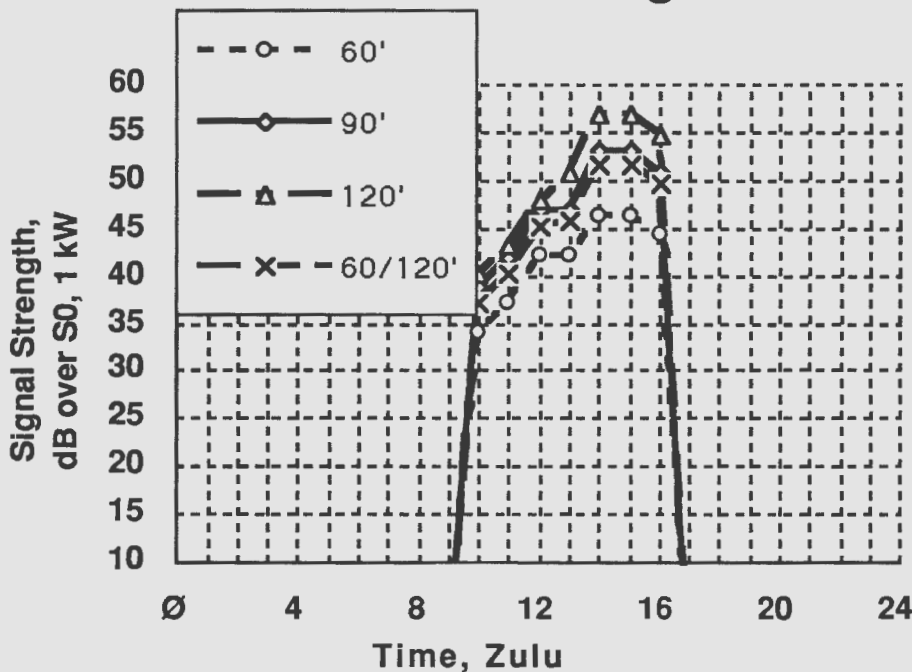
W6-ZS6 via LP: Figure 4 shows results for the long path from San Jose to Johannesburg, Republic of South Africa on the same date, with solar flux of 110. Signal strength rises during most of this opening—from 10 to 16 Zulu, then falls abruptly at the end, as on the W6-UA90 path.

The long path to Joburg is weaker than the short path to Novosibirsk by almost 20 dB. The much greater distance (14,438 miles), with more hops, has more loss. Yet the signals between two 120-foot antennas are better than between 60-footers by no more than on UA90 path.

The sudden "turn-on" and "turn-off" characterizing both of these paths indicate that MUF (maximum usable frequency) is

continued on page 10

Fig. 4: **W6-ZS6 14-MHz Long Path, 3-Element Yagis**



Notice that from 2 to 11 Zulu the low- and high-antenna signals differ by 22 dB! The high-angle modes lack sufficient MUF during the night, so they disappear. Then the low antennas must use the FF mode at 5 degrees, where their performance is poor.

When high-angle modes open, the difference is only about 6 dB. Contrary to the old canard, the 60-foot antenna is never better than the 120-foot one, whether the antenna on the other end is low or at 120 feet. DX paths always seem to favor height.

When rising MUF opens a path, or falling MUF closes it, the signal strength changes abruptly. The lowest-angle mode always has higher MUF than high-angle modes, so the lowest-angle mode always opens first and closes last. Someone with a low antenna may observe gradual openings on paths in total darkness—where absorption isn't a major factor. That's usually a result of the antenna's poor low-angle performance. When higher modes open, the antenna "hears" better, so strength increases.

So heed Jean Harlow's words—well, a DXer's paraphrase of them, anyway—and "hang those 'tennas high!"

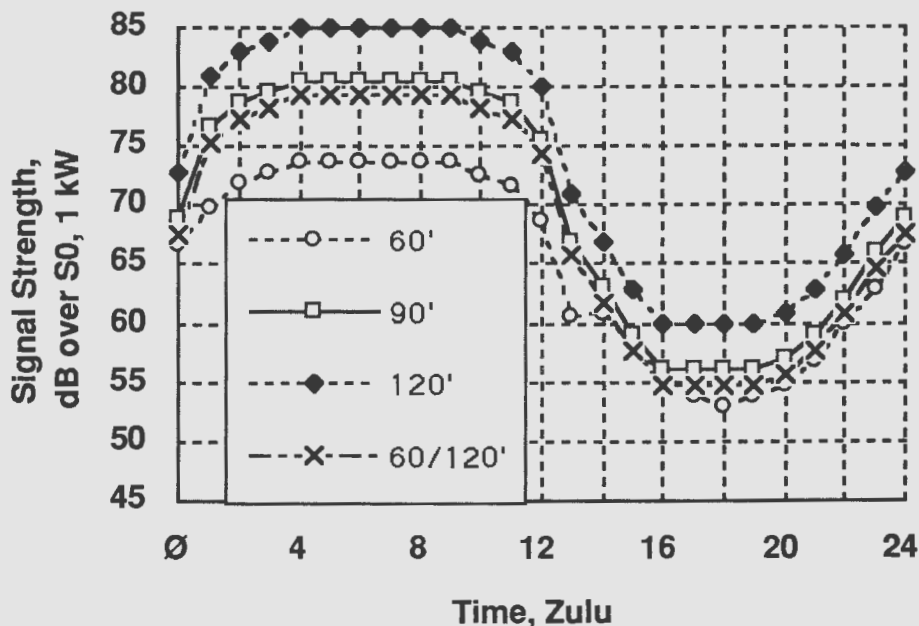
the limiting factor. Changes in D-layer absorption, as the amount and zenith angle of sunlight on the paths varies, cause the more gradual variations that occur during the openings.

Of course the signals could be far weaker. Miniprop cannot account for excess absorption caused by high-energy solar storm particles. The path to Novosibirsk is far more sensitive to these effects than that (long or short) to "Joberg," because the UA90 path reaches as far as 79 north; the highest latitudes the Joberg paths reach are 40 degrees north and 40 degrees south, for short and long path respectively.

W6-P4 via SP: Figure 5 shows the 20-meter path to Curacao, a distance of only 3639 miles, on May 3 again with solar flux of 110. The path has four modes: two F-hops (FF) at 5 degrees, 3F at 13 degrees, 4F at 19 degrees, and 5F at 24 degrees.

Signal strength is best when the whole path is in darkness, from 3 to 10 Zulu, and weakest when sun is high above the middle of the path between 16 and 20 Zulu, because D-layer absorption peaks then.

Fig. 5: **W6-P4 14-MHz Short Path 3-Element Yagis**



So You Think You Have Antenna Problems!

by Kathlyn Griffin Swegart

When Guglielmo Marconi arrived on Cape Cod in 1901 to construct an experimental station, his wireless telegraphy had transmitted across the English Channel and assisted in dramatic sea rescues. He intended to prove it could also carry signals across the Atlantic.

Cape Cod residents were suspicious of his fame and of his fancy ideas, so they refused to sell him land. After much persuasion, Marconi talked a local salvager into parting with eight acres. Then he hired locals to erect 20 towers, using ship masts.

Skeptical neighbors crowded the construction site, shaking their heads and mumbling, "It'll blow down in the first northeaster." On November 25, 1901 a storm did indeed knock Marconi's towers down. He rebuilt, using timbers buried deep in the sand and buttressed the towers with planks and steel cables.

His life was no easier in 1902. Even Thomas Edison declared what Marconi attempted impossible. As the year drew to a close, Marconi worked feverishly, ignoring his neighbors. He hired a local, Charlie Paine, to wait outside the "shack" with his horse so, the second Marconi achieved success, Paine could rush the news to the Wellsfleet telegraph office and thence to the world beyond.

January 18, 1903, was bitterly cold. Paine threw an extra blanket on his horse Diamond, and huddled in his Alaska-wolf coat, waiting as blue sparks made jagged arcs across the sky above him.

Marconi burst out of the station with white telegraph tape drooping from both hands—greetings exchanged by President Theodore Roosevelt and England's King Edward. He had jumped the radio wave 6,000 miles to England and back! Marconi shouted, "Drive like the wind! If your horse falls dead, I'll buy you another!"

"I started off for Wellsfleet as fast as the horse could go—while Marconi could see me," Charlie Paine said, "but I wasn't about to let some agitated outsider tell me what to do. When I got over the dunes, I slowed down. I wasn't going to kill my horse for nobody, famous or not."

Eventually Charlie Paine got the message to the telegraph operator at Wellsfleet. Marconi celebrated with a late-night dinner of goose with gravy.

So, though Marconi's success on Cape Cod paved the way for modern radio communications, it was one of his Cape Cod neighbors who had the last word—or at least controlled how fast the word got out ...

from the Feb. '93 Delaware-Lehigh ARC "W3OK Corral"—Clarence Snyder, W3PYF, Editor, who credits Yankee Magazine

Watts Award from page 6

find one with splitter connectors built in. That improves overall shielding.

The filters inside an amplifier need sharp cutoff to prevent an HF signal overloading the amplifier. Be sure, when you buy an amplifier, you have an understanding you can return it if it doesn't suit your purpose.


I had good luck with Winegard amplifiers, and poor luck with the plastic-cased Radio Shack models. Too much gain can be a problem on the strongest TV stations. Here in Los Altos, I found 16-dB to be the best.

This sounds silly, but make sure your neighbor's TV antenna is pointed at the TV station. I encountered several broadside TV antennas. Of course the signal sometimes reflects from a mountain, giving "long path" the best reception.

Unsolved Mysteries

My worst phone-interference problem was a neighbor who purchased a top-of-the-line Sony combination base-station and cordless phone.

I tried everything on and around that phone, but nothing helped. RF affects both the cordless and base handsets. That unit may never be free of interference. I impressed the owner, though, by showing him the verbiage on the label.

Each RFI problem is unique. Solving it requires trial and error and patience—yours and your neighbor's. 

Met on Net

Bill and Penelope met
On a 2-meter traffic net.

The message he sent her:

"Be a consenter

To dinner at La Poullet."

She said, "Please stay
in your hamshack.

In a minute, I'll give you a callback,

For it can't be just me;

It will have to be three,

I'll go ask my husband, the fullback."

—AF6S (1992)

More random Dits

Overheard: "I was self-employed, but the economy got so bad, I had to let myself go."

—Johnnie Carson

Ideas are like children; no matter how much you like other people's, you can't help thinking your own are the best.

—anonymous

Nostalgia: It's not what it used to be.

To sum up my life, I was born in 1947. I have a wife, a child, a mortgage, two dogs, and gum disease.

—Dave Barry

Vox: A rig feature that is always on when you leave the shack for an hour and your dog has a barking fit.

from the May '93 Delaware-Lehigh Valley ARC "W2OK Corral"—Clarence Snyder, W3PYF, Editor

Genius Stumped

"Of all the things in the universe, the most difficult to understand is the income tax."—Albert Einstein.

Quoted in the December 13, 1992 San Francisco Chronicle

3 - 1 0 6 Election of Officers and Directors at Large

- a. Purpose: To implement Article IVa, sections 2,3,4,5, and 8 of the bylaws.
- b. No later than the April meeting of each year, the president shall appoint a nominating committee of two voting members, who shall agree on a third member of the committee and appoint him.
- c. At the regular June meeting, the nominating committee shall report the names of at least one candidate for each office of the club, and at least two candidates for directors at large, who (1) shall meet the qualifications given in Article IV of the bylaws and (2) shall have been contacted and indicated a willingness to serve in the office if elected, and faithfully discharge its duties.
- d. The president shall then call for any additional nominations from the floor for each office and the two directors at large, singly in successive order, and a voice vote shall then be taken to close nominations. This is followed by a written ballot for each office and each of the directors at large, starting with the president, followed by the office of vice-president, secretary, treasurer and each of the directors at large. Unsuccessful candidates for any office may be nominated for each successive office. There shall be five ballots taken, one for each office, plus one for the directors at large. Exceptions to the use of written ballots may be made when there is only a single nomination for the office. The nomination is closed by a voice vote, and the one nominee shall be declared elected.
- e. All candidates nominated from the floor shall either be present and indicate their willingness to serve and faithfully discharge the duties of the office if elected, or shall have given their written consent to do so, prior to being nominated.
- f. Each ballot shall be collected and canvassed by the secretary and treasurer, with assistance from the vice-president if necessary.
- g. There shall be no proxy voting, and the sum total of all votes cast shall not exceed the number of voting members present at the meeting. A quorum is not required to be present by the bylaws.
- h. The secretary shall communicate the canvass of the ballots to the president, who shall announce the winning candidate and declare him elected for each office. To be elected, a candidate must have a plurality of the votes cast at the meeting.
- i. If no candidate has a plurality of the votes cast, another ballot shall be taken between the two candidates having the greatest number of votes as determined by the canvass. If a tie results, a third ballot shall be taken, and if a tie still exists, the winner shall be determined by lot by the president.
- j. New officers and directors at large take office as of the close of the July meeting each year. Between the June and July meetings, outgoing officers are expected to get their files and papers in shape for turning over to the new officers at the July meeting.

NCDXC DX-LADDER

CALL	HONOR ROLL			DX TOTALS				DX BAND TOTALS					OTHER BANDS				
	MIX	PH.	CW.	MIX	PH.	CW.	RTY	10m	15m	20m	40m	80m	160m	06m	12m	17m	30m
W6CF	327			355	294	185		204	239	306	178	138					
W6OAT	327		323	353	332	343		275	316	340	284	216					
W6XP	327	326		347	344												
WB6CUA	327	326	319	338	334	324		100	100	100	100	96					
W6KH	326			367													
K6MA	326	323	322	357	343	326		258	265	290	222	130		165	190	115	
K6PU	326	326	316	356	346	322		200	200	300	200	100					
K5YY	326	326	325	354	351	332		163	220	343	197	271	166	42			
K6RK	326	317	318	341	331	321		100	100	100	100	100	101				
W6ZKM	325	325		352	352			268	261	290	169	141					
WA6AHF	325	325		347	347		254	100	100	100	100	100					
W4RIM	325			346	341												
W6LQC	325	325		344	344	89		100	100	100	62	93					
N6ST	325			334	305	261		204	233	301	143	76	2		2	2	2
AJ6V	325			334	238	273		153	175	266	139	62	6				
W6FAH	324	321		324	321	288		244	276	314	217	155					
W6BSY	323	323		366	360												
K6RQ	323			362				120	197	310	130	90	5				
W6MUR	323			361													
W6ISQ	323	321	322	355	331	322		285	150	250	315	256					
K6DT	323	322	322	352	336	328		295	315	349	253	162					
W6BJH	323			349	192	313		120	117	187	117	100					
N7NG	323			348				244	273	315	244	163					
W6RJ	323			348				100	100	100	100	100					
K6OZL	323			343				100	100	100	100	100					
W6DU	323		314	342	306	319		229	265	320	166	114					
W6TC	323		320	339		326		252	231	273	263	175	1		110	103	89
K6XT	323			339		160		100	100	100	100	100					120
K5GOE	323			338	329			211	100	100	100	96					
K6XJ	323	323		338	338												
W6GO	323	323	323	336	336	328		290	302	328	291	222	60				
N6JV	323		321	334	320	326		263	252	302	255	208	76		149	179	151
K6LM	323	322	322	331	330	325		100	100	100	100	100	6				
WX6M	323	323		328	328	148		169	169	208	130	111	17				
W6OSP	323			328													
NB6L	323			326	267	242		138	172	250	123	115					
W6HXW		323			323												
W6ZM	322	322		357	352			130	142	317	52	111					
K6WR	322	322		354	354			100	100	100	100	100					
W6KOE		322			341												
W6TEX	322		302	327		306	125	100	100	100	100	100					
WA6SLO		322			324			290	308	323	224	218	6	18	171	132	
WB6ZUC	321		320	329	1	319		188	255	315	168	112					
W6NLG	321	319		326	324	100		100	100	100	26	6					
K6LQA	320			338													
W6DPD	320	320		325	325												
KI6WF	320	320		321	321	113		255	295	317	166	104	3		26	48	2
K6WD	319			333		281		100	100	100	100	65					
K6KLY	319	319		321	315	15		218	198	212	127	107		71			
W6PHF	318			350	336												
N6AN	318			339	288	287		281	281	307	177	118			68	100	41
W8MEP	318			321		141		100	100	100	50	35	1				
WN6R	318	317		318	317	200		215	300	317	155	150					
W6NPFY	317			338	323	300		200	200	200	178	139					
WG6P	317	317		325	325	316	158	205	234	325	223	125	14		20	56	22
WB6WKM	317			321	100	100		100	100	100	100	63					
N6HR	316			337				100	100	100	100	100					56
W6JD	316			333	237	310		108	150	323	193	44					
K6ZX	316			328		312											
K6DC	315			359													
W6QL	315			337	263	69		114	161	201	111	103					
DJ6RX	315			336				215	271	303	227	185					
AG6Q	315			321	309	220		173	222	296	167	143					
W6KG	314			352	290	108		161	193	210	169	105					
KG6GF	314			319				70	120	210	293	170					

NCDXC DX-LADDER

CALL	HONOR ROLL			DX TOTALS				DX BAND TOTALS					OTHER BANDS				
	MIX	PH.	CW.	MIX	PH.	CW.	RTY	10m	15m	20m	40m	80m	160m	06m	12m	17m	30m
W6JZU	312			328				75	115	255	22	12					
K6OJO	312	311		328	327			187	250	309	17	12					
WA6HAT	312			320		243											
K6HHD	312			316	311	23		209	176	223	43	40					
W6TSQ				355				285	300	300	315	257					
W7XA				339				277	298	309	174	137					
W6CTL				338	4	287		214	190	335	94	11					
W6FGD				330	275	289											
N6OJ				329	275	105											
W6AED				325				100	100								
W0YK				322	321	318		290	270	310	230	150	50				
AI6L				321													
KR7Y				320	303	290		170	212	286	154	122					
AF6S				319		311		270	288	303	220	142		109	134	78	
WZ6Z				319	306	233		255	250	304	239	151	14				
WD6EKR					318			214	270	313	109	89					
K6UD				318	306	207		240	244	244	176	147					
WR6R				317	307												
K6ANP				316	199	211		133	144	199	110	105					
NW6P				316													
W6IEG					315			17	33	290	3	3					
WB6GFJ				314	300	70		203	225	285	125	62					
K4UVT				313	249	175		65	112	293	88	24	2			8	
NQ6X				312	309			100	100	100	94	96					
K6LRN				311	217	254		86	133	269	114	40	10				
K6NM				311	220	226		129	149	274	165	36					
N6JM				310	299	256		212	232	277	135	87	17		2	1	5
N6ULU				310		286		129	131	196	110	69					
KG6AM				309	297	214		187	237	267	51	29					
KN6J				309	301	287	245	218	210	200	152	165	108				
K6PKO				308	301			270	175	185	97	112					
K6TMB				308	304	248		215	245	292	140	116					
WB6OTB				307													
W6TUI				306	305	1		109	125	187	125	116					
KD6XY				306	289	54		124	137	226	8	3					
W6YWH					306			130	150	175	160	100					
WA6BSS				290	304	3		134	167	249	58	26					
WB6KJE				304													
NI6T				304	291	286	48	244	267	286	248	167	6		189	216	181
WB6EXW				303				100	100	100	50	11					
N6OC				303	300												
N6GG				301													
AA6MV				300	293	259		183	196	264	127	44					
WB6UOM				300													
AA6YQ				300	262	235		160	166	242	111	45					
WA8LLY				298	285	266		235	248	252	115	20		56	127	93	1
K6FD				296	271												
KN6EL				294	152	260		121	141	163	31	6	1				
KB6Q				294													
K6ZUR				294	85	290		139	189	265	176	79					
K6HNZ					290			209	242	254	125	107					
N6RR				289				116	210	176	129	88					
K6SIK				286	282	140		183	186	262	128	120					
WA6CTA				285		214		135	140	194	61	9	1				
KE6WL				282	254	250		215	237	260	165	59	8				
N6RC				281	129	161	3	25	49	193	24	3					
KK6X				281	227	255											
KG6I				279	262	225	12	182	195	242	139	67	17	10	63	81	42
N6EK				277	225	247		184	219	245	155	54	9				
K6FO				277	185	239		134	164	235	125	102					
AA6AD				271	181	252		109	176	258	54						
W6NA						271		140	190	251	192	109					
K6RUW				270	242	120		100	100	100							
W6TER				269													
N3AHA				268	243	154	1	129	160	194	58	20	3		14		1

NCDXC DX-LADDER

CALL	HONOR ROLL			DX TOTALS				DX BAND TOTALS					OTHER BANDS				
	MIX	PH.	CW.	MIX	PH.	CW.	RTY	10m	15m	20m	40m	80m	160m	06m	12m	17m	30m
K6XC				267	186	219	38	119	164	184	58	9	8		10	24	9
K6XM				267	209	222		163	179	246	144	68					
KA6ING				266	265	91		266						52			
K6KQN				265	260												
WD6EKR/M					259			88	207	160	4	3					
K6PBT				257				143	150	169	66	21		18	37	20	
N6OND				254	202	52		160	124	111	19	3		1	2	2	
WA6TOO				251				58	84	167	6	6					
W6YVK					251			160	198	173	56	42					
NG6X				250													
WA6BYA					249			248						105			
WW6D				248	121	225		84	134	188	93	40					
K6DR				248													
AD6E				245	2	245		117	134	178	116	32	3		3	1	
W6SYL					245												
WA6O				235				89	52	144	3	19					
N4QJ				234	173	148		111	116	122	78	29	3				
WA6OEY				227				71	60	170	20	8					
K6BWV				225	1	224											
KD6GC				225													
W6ROY					221			90	147	150							
N6LTN					213												
AB6EQ				203	193	78		101	48	155	29			11	10	4	
AA6TA				201	200	19	23	91	52	96	1			2	9		
KA6BIM				196	190	59		108	131	141	33	8					
AA6LF					186			93	79	149	10	1					
KC6ESL				185	185			185									
N6VAW				183	166	85		40	34	99	2						
AA6TD				178	95	125		90	55	101	39	3	1				

de Larry, KD6XY (06-93)

Note: We have a new Honor Roll member; K6KLY, Russ, has been confirmed. Congratulations, Russ.

Below is a form which can be used for your next update:

CALL: _____ NAME: _____

NCDXC DX-LADDER

HONOR ROLL:- Mixed: _____ Phone: _____ CW: _____

DX TOTALS:- Mixed: _____ Phone: _____ CW: _____ RTTY: _____

DX BAND TOTALS:- 10m: _____ 15m: _____ 20m: _____ 40m: _____ 80m: _____

OTHER BANDS:- 160m: _____ 6m: _____ 12m: _____ 17m: _____ 30m: _____

NCDXC WAZ-LADDER

ZONES WORKED: Mixed: _____ Phone: _____ CW: _____

WAZ BAND TOTALS:- 10m: _____ 15m: _____ 20m: _____ 40m: _____ 80m: _____

OTHER BANDS:- 160m: _____ 12m: _____ 17m: _____ 30m: _____ 6m: _____

WPX CONTACTS:- Mixed: _____ Phone: _____ CW: _____

(Mail figures to Larry Bloom, KD6XY, to the address listed in the DXer, or send via Packet to KD6XY.)

NCDXC WAZ-LADDER

CALL	WAZ			5 BAND WAZ					OTHER ZONES				PREFIXES			
	MIX	PH.	CW.	10m	15m	20m	40m	80m	160m	12m	17m	30m	06m	MIXED	PHONE	CW.
WG6P	40	40	40	35	36	40	37	31	4	2	6	1				
K6PBT	40															
K6PKO	40	40				40									850	
N4QJ	36			32	30	36	26	17								
W6QL	40	40														
WN6R	40	40	29	29	40	40										
W4RIM	40	40														
W6RJ	40	40														
K6RK	40	40														
W6ROY			39													
K6RQ	40	40	40													
N6RR	40															
DJ6RX	40			40	40	40	40	40								
AF6S	39															
K6SIK	40	40	40	40	40	40	40	40								
WA6SLO		40		40	40	40	35	39	7	37	35		13		1407	
N6ST	40	40														
NI6T	40	40	40	39	40	39	39	36	6	38	39	35				
W6TC	40		40	40	40	40	40	38		22	24	18				
W6TEX	40															
K6TMB	40	40	38	40	40	40	32	28								
WA6TOO	20															
W6TSQ	40			40	40	40	40	40								
W6TUI		40		30	33	40	29	26								
K6UD	40															
WB6UOM	40															
AJ6V	40															
K6WD	40															
KI6WF	40	40	26	39	40	40	29	26	3	14	17	2				
WB6WKM	40	40														
KE6WL	40	39	40	39	40	39	35	21								
K6WR	40	40														
W7XA	40	40		40	40	40	39	36								
K6XC	40	39	39	29	37	38	24	5	8	6	15	6				
K6XM	40															
K6XT	40															
KD6XY	40	40	24	28	34	37	6	2								
KR7Y	40	39	15	39	35	40	34	31								
W6YVK	40															659
K5YY	40	40	40					40	36							
AA6Z	40															
WZ6Z	40	40		39	39	40	39	33								
W6ZKM		40		39	40	40	32	34								
W6ZM	40	40														
K6ZUR			40			40										
K6ZX	40															

de Larry, KD6XY (06-93)

ALINCO

DJ-580T

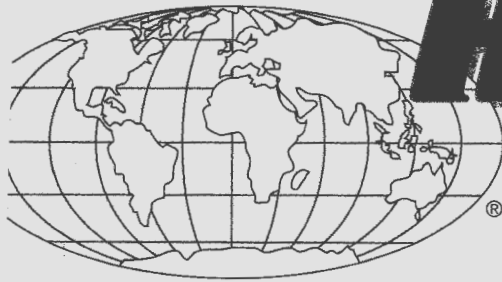
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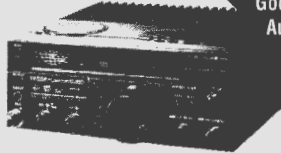
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