

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



Countries List Additions

by Jim Maxwell, W6CF

I've seen several comments on packet recently regarding the number of countries on the active DXCC list. The present total, 326, comprises the former 323, plus three carved from YU: Croatia, Slovenia, and Bosnia-Herzegovina.

When the DXAC and ARRL Headquarters handle OK-land, the total will jump by one. Whether two new and one deletion, or a single new one, the total will be 327.

The DXAC recommended deleting Abu Ail, but North Korea will add one to the list, if and when Romeo's operation receives the League's blessing. So North Korea may cancel Abu Ail's deletion.

Thus, once the smoke has cleared, the total might be 327. Of course, Abu Ail may not be deleted, and Romeo's operation may not be accepted ...

via DX Packet Spotting Network

Pacemaker Users Beware!

by David M. Barton, AF6S

The Cortland Forum ran a scary story by Maria L. Evans, M.D., KT5Y. She described a fellow ham's "syncopal episode," which occurred the first time he used a new linear amplifier on forty meters.

Later, he had another "spell." He was in his hamshack while his son-in-law transmitted with the linear.

Hearing the details, Dr. Evans made the connection. RFI from the kilowatt caused the pacemaker to misbehave. The ham's former power level, 100 Watts, apparently didn't affect the device.

The ham wisely stopped using his linear, and eventually sold it. He has experienced no pacemaker problem since.

"Knock" Knochenhauer, K6ITL, submitted the article from the Cortland Forum from which this material was gleaned.

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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.
- Foothill Swap Meet: 2nd Saturday, March-to-September, Foothill College.
- Hanford Swap Meet, March 27, Hanford Fraternal Hall. Talk-in on 147.24. Kings ARC sponsors—call Jeff, N6OZG, at 209/582-0972.

ELMER

By Rich Regent, K9GDF



Badger State
Smoke Signals

**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
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 Treasurer: Melissa Thomas, AA6TD
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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.

Unless otherwise noted, NCDXC permits re-use of any article in this publication—provided the DXer and the article's author are credited.

Board of Directors Meeting

The Board met at Harry's Hoffbrau in Mountain View. Present were Bob, KN6J (presiding), AG6Q, KG6AM, NI6T and AA6TT.

The sole topic was finalization of the rewrite of the DXer-of-the-Year rules. Board members offered minor revisions to the version submitted by Hal, N6AN, and approved this final version.

General Meeting

The general meeting was held at Harry's Hoffbrau in Palo Alto. George, WA6O, presided. This was the annual joint meeting with the Northern California Contest Club.

- Harley, WA6ISX gave a presentation on telephone interference from amateur transmitters, and techniques for reducing its effects. Topics discussed in Harley's well-received talk included wiring and ground problems, variations in susceptibility to interference among various available telephone products, and the relative merits of several mitigation techniques. Split-bead ferrites were available at a discount.
- First readings were held for:
 Tim, NU6S; Natalie, WA6QVM; Loyal, W6RMT; Peter, KE6GG; and Larry, AA6VZ.
- There were no second readings and no new business.
- The NCCC held its business meeting in turn.

Roster Changes

Philip F. (Phil) Wight, VS6DR
 3363 Milton Court
 Mountain View, CA 94040-4500
 H: 415/965-7600
 Fax: 415/965-7300

Sanford "San" Hutson, K5YY
 Rt. 6, Box 213C
 Springdale, AR 72764

Robert "Bob" White, W1CW,
 and Ellen White, W1YL
 6607 Flicker Court
 Seffner, FL 33584-2403
 H: 813/654-1456
 Fax: 813/654-6215

The Little Blonde Girl

by Huck Huckabee, AA5BU

The work of a volunteer examiner (VE) is a mixture of joy and sadness. How fine it is to tell a prospective ham, "You passed!" But it's hard to say, "I'm very sorry, but you didn't make it this time."

Once in a while we VEs have a session in which something special happens. One day a pretty little blonde-haired girl came to take her Novice exam. I learned it was her third try, but she had already passed the code—after several attempts.

After she handed in her test, she waited patiently for it to be graded, then smiled and asked if she had passed. Indeed she had! What a joy it was to tell this little lady, "Your license is on the way."

"How long will it take?" she asked.

"Six weeks is typical."

"I hope it comes in four weeks, because then I will still be ten years old."

from the February '93 Austin (TX) ARC 'AARCover'—Steve Means, N5PSW, Editor

Treasurer's Report

by Melissa Thomas, AA6TD

Checking Account Activity:

December 31 EOM Balance	\$3,611.69
Receipts	86.53
Expenditures	1,048.91
January 31 EOM Balance	\$2,649.37

Savings Account Activity:

(Life Membership Fund)

Eureka Bank C.D.	\$10,475.33
Eureka Bank 01/22/93	\$15,746.28
Repeater Fund:	\$2,070.36

Concrete Evidence

by Kim Elmore, N5OP

Back in the seventies I was a "go-fer" in an automotive garage during several summers. The mechanics swore a car battery set on concrete would quickly self-discharge, but *not* one set on wood.

My dad and I challenged them to a ten-dollar bet: we'd place two identical batteries on the floor, one supported by a piece of wood, the other exposed to the "evil concrete." Ten dollars was a fair bit of money in the seventies, but they accepted the wager, saying they knew the "exposed" battery would be dead within a week.

Every day for three weeks we took specific gravity and voltage measurements and graphed the results. Needless to report, we won; the characteristics of the two batteries were indistinguishable.

Mystical tales such as this seem to take on a life of their own. Here we are in the nineties. Yet, if you look in any automotive garage you will see that when mechanics remove a battery they always set it on a piece of wood.

from the February '93 Austin (TX) ARC 'AARCover'—Steve Means, N5PSW, Editor

DXer-of-the-Year Selection Committee Chosen

by Randy Wright, WB6CUA

The DXer-of-the-Year committee meets annually to evaluate NCDXC members and to select the DXer of the Year. This special award recognizes aspects of DXing and service beyond that normally expected of club members.

Members of this year's committee are: "Mac" McHenry, W6BSY; Randy Wright, WB6CUA (Chairman); Eric Edberg, W6DU (a previous DXer of the Year); Bob Vallio, W6RGG (twice DXer of the Year); and Ted Algren, KA6W.

The committee will continue to accept nominations until March 8. The nomination deadline was extended one week this year to allow for completion of the club Bylaws updates now in process.

Any member can obtain a copy of the revised NCDXC Bylaws by contacting any club officer.

So thanks ahead of time for selecting the member you feel most deserves this year's honor and for writing your nomination letter and sending it in. (You can send it directly to me).



ARRL Pacific Division Update

February 1993

by Charles P. McConnell, W6DPD
ARRL Pacific Division Director.

Board Meeting Highlights

The ARRL will ask the FCC to permit automatic control of digital stations in band segments 3,620–3,635; 7,100–7,105; 10,140–10,150; 14,095–14,099.5; 14,100.5–14,112; 18,105–18,110; 21,090–21,100; 24,925–24,930; and 28,120–28,189 kHz.

The Board asked the ARRL Digital Committee to continue studying how to accommodate increasing HF digital activity while protecting amateurs using other modes—and to report in July.

The Board abandoned the idea of changing the name of ARRL.

The Board reaffirmed its position that international Morse code proficiency remain a requirement for licenses with privileges below 30 MHz.

The League will seek formal recognition of amateur radio as a national resource in disasters and technical expertise.

Digital Conference

The Tampa (Florida) Local Area Network will host the 12th ARRL Conference on Digital Communications on Sept. 11, 1993.

SAREX Frequencies

NASA, AMSAT and ARRL agreed the frequencies that will be used in 1993. Shuttle downlink: 145.55 MHz, voice uplink: 144.91, 144.93, 144.94, 144.97 and 144.99 MHz, packet uplink: 144.49 MHz. Remember to listen to both uplink and downlink frequencies before you transmit.

ARRL Membership

Pacific Division grew almost four percent in 1992 to 10,701 members. Thanks to all who recruit for ARRL, especially affiliated clubs. Remember, you can join or renew through any affiliated club and your club receives a commission (\$2 for renewal and \$5 for a new member).

DX-Path Takeoff Angles

How do they vary with time and frequency?

by David M. Barton, AF6S © 1993

Over the years, DXers have believed many things regarding DX paths. Some venerable and dearly held generalities appear not to be based in fact. For instance, "everyone knows" that when a path first opens the takeoff angle is extremely low—a reason the "big guns" with high antennas hear and work the DX first and the "little pistols" must wait patiently for the angle to rise.

Another popular concept has takeoff angle declining as frequency increases, so an 80-meter antenna doesn't "need" a "radiation angle" as low as a 10-meter one. Have you wondered, as I have, how much truth these old sentiments contain?

Before you expend money, time, and brow-sweat putting together an antenna system for DXing, you might wish to understand more about DX signal takeoff angles and how they can be expected to interact with the various antenna systems you might be considering.

Propagation

The *ARRL Antenna Book* gives an overview of "sky-wave" propagation¹, as does the *Radio Handbook*². But to understand a specific path, nothing surpasses MiniProp Plus from W6EL. MiniProp can analyze any path, on any date, with any solar flux level. It scans 80 through 10 meters and produces a table listing probabilities of openings for all hours—short or long-path. MiniProp may surprise an experienced DXer by predicting unexpected openings—that really exist. Contesters could profit by keeping print-outs for paths to Europe, rare zones, or a chart made from MiniProp data, handy at their operating position.

You can scrutinize a path in more detail than needed for operating by selecting "mode searching," then "hops." The table this produces lists estimated signal strength, takeoff angle, number of hops, and even each hop's ionospheric refraction type—E or F-layer for five bands. The program always selects the strongest mode available,

but you can apply constraints to see alternate solutions.

The program can't account for the effects of solar flares and geomagnetic storms, and it doesn't show the skewed paths, such as those involving land, ocean, or aurora scattering, or "tilt" in ionospheric layers.

MiniProp Plus can display a world map with the auroral zones and the great-circle path you have chosen, so you can tell whether the path crosses a polar region—making flare degradation likely.

The path tables display "availability"—MiniProp's way of indicating the likelihood of a path being open. Availability falls whenever operating frequency approaches the MUF (maximum usable frequency) of any hop on a path. When the MUF on every hop is far above an operating frequency, availability approaches 1.00. When the MUF is far below a frequency, low availability numbers appear. This study excluded data for availability under 0.10.

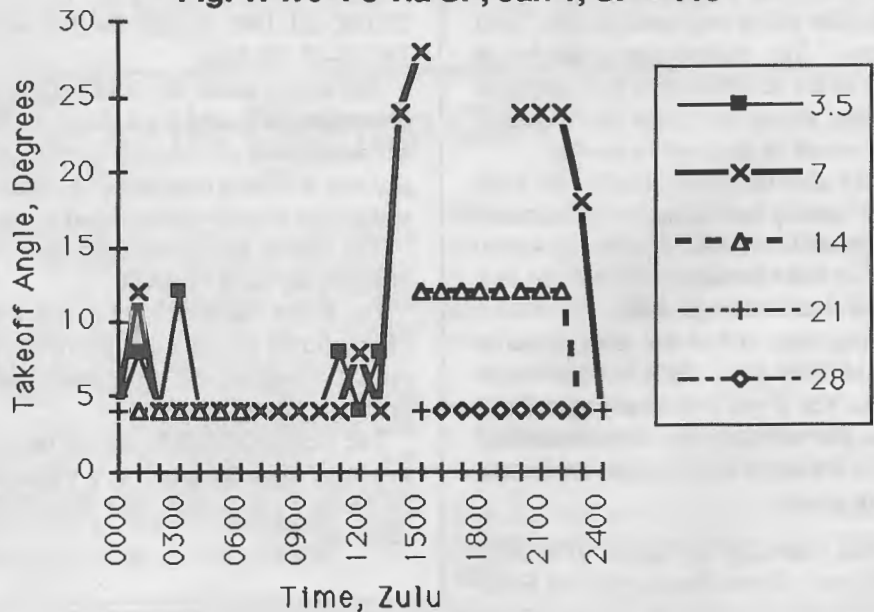
MiniProp—or any other program—can only show the results its algorithmic "model" produces. MiniProp does calculate and then use the MUF and D-layer

absorption for every hop on a path. But real paths don't always conform to computer models. Though much research has gone into the ionospheric models MiniProp uses, and much testing against observations, the chaotic nature of the ionosphere cannot be reproduced from the scant information the program must use as a starting point. Even so, weathermen should do as well with their computer models.

MiniProp's path data can be considered accurate most of the time in predicting takeoff angles—the objective here—because takeoff angle depends on the "effective layer height" at points along a path, the total path distance, and the number of hops. Given layer height, which the program finds internally for each hop, the solution for takeoff angle is just geometry.

The mode with the fewest hops almost always produces the strongest signals, because it experiences fewer transits of the D-layer and fewer earth reflections, both of which are lossy. MiniProp therefore selects the mode with the fewest hops consistent with the minimum takeoff angle constraint, which the user controls.

Fig. 1: W6-PJ via SP, Jan 1, SF = 110



I studied four paths: the 3,700-mile non-polar short path from W6 to PJ (Netherlands Antilles), the 5,800-mile semi-polar short path from W6 to OK (Czech Republic), the 9,700-mile polar short path from W6 to 3B8 (Mauritius), and the 11,900-mile long path to 3B8 (also polar). I used a mid-winter date for PJ, and dates when the gray-line connects for the W6-to-OK and 3B8 paths. For the data in figures 1-3, I set the minimum takeoff-angle constraint to 1.5°—eliminating some 1° paths. I transferred data from MiniProp's "hop" table into Excel, a spreadsheet program, to condense it and to graph takeoff angle vs. time of day for each path.

W6 to PJ, January 1

Figure 1 shows takeoff angle (of the minimum-hops mode consistent with the 1.5° constraint) vs. time on the short path between northern California and Netherlands Antilles on January 1 (MiniProp predicted no long-path openings). The legend abbreviations: 3.5S means signal strength on 3.5 MHz, 3.5A means takeoff angle on 3.5 MHz, etc. Each band has a unique symbol and line style.

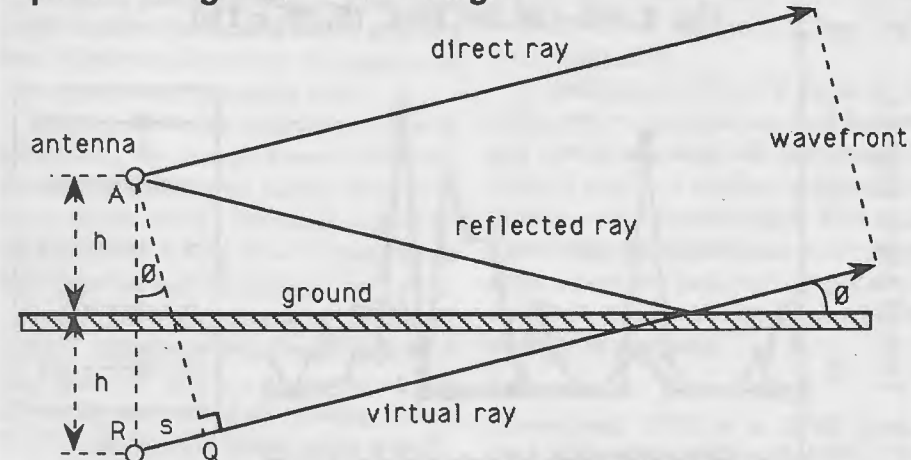
Eighty meters opens at 2300 Zulu with rising signal strength and a takeoff angle of just 4 degrees. Signal strength (not plotted) builds until 0400, when it reaches a plateau that continues until after 1000, then falls. Takeoff angle, initially 4°, oscillates, reaches an 8° peak at 0100 and a 12° peak at 0300. It settles at 4° until 1100, when it oscillates again. When the path fades at 1300, the last takeoff angle is 8°.

The forty-meter path begins at a high 24° at 2000 Zulu, but falls, oscillates, then settles to 4° as signal strength builds. It "spends the night" at 4°, then oscillates and rises steeply, reaching 28° at 1500 as the path closes.

So when does the guy with the low antenna have the best *relative* advantage vis-à-vis the "big gun"? Why, just after the path opens and just before it ends—exactly the opposite of what "everybody knows." In fact, the antenna up 140 feet has a pattern null at 30°. When the takeoff angle rises to 24° and higher, a dipole up 60 feet produces a stronger signal at PJ than that high yagi!

Most of the time the high antenna is better, of course. The guy with the high yagi

Optimum Height vs. Takeoff Angle



reflection of antenna

Peak antenna performance occurs when the direct and ground-reflected rays add in-phase. But the reflected ray travels farther, shifting the reflected ray's phase.

Imagine viewing from a distant point to the right in the sketch, at angle θ above the "horizon." You see a reflection of the antenna in the ground "mirror"—below ground by exactly the antenna height, h .

You are closer to the antenna than to its reflection by s . A, R and Q form a right triangle whose apex angle, θ , is identical to the elevation angle of your viewpoint. The hypotenuse of the triangle is $2 \cdot h$, so:

$$s = 2 \cdot h \cdot \sin(\theta)$$

The extra travel distance shifts the reflected signal's phase by:

$$\Theta_s = 360^\circ \cdot s / \lambda \quad (\text{degrees})$$

But a horizontally polarized radio wave experiences 180° of phase shift upon reflection, so total phase shift is:

$$\Theta = 360^\circ \cdot s / \lambda - 180^\circ$$

The signal is maximum when Θ is zero, so the first peak occurs when $s = \lambda/2$. Substituting $\lambda/2$ for s in the first equation and solving for optimum height gives:

$$h = \lambda / (4 \cdot \sin \theta)$$

Since a vertically polarized wave experiences no phase reversal at reflection, a vertical's nulls occur at angles where a horizontal antenna the same height produces pattern peaks. Thus, you can use the last equation to find the center height of a vertical dipole, or the height of a vertical yagi's boom, for a first null at angle θ .

has all night to work the PJ, while the guy with the low dipole had better make his move at the right time in a contest.

The 20-meter path favors just two takeoff angles. It opens at 1500 at 12°, then falls to 4° at 2300 and stays there until the path closes at 0600.

What height would be best for twenty meters? For a "radiation angle" of 4° (on level ground), an antenna would have to be up 250 feet (see sidebar). A more likely 120 feet produces a 4° signal roughly 4 dB down

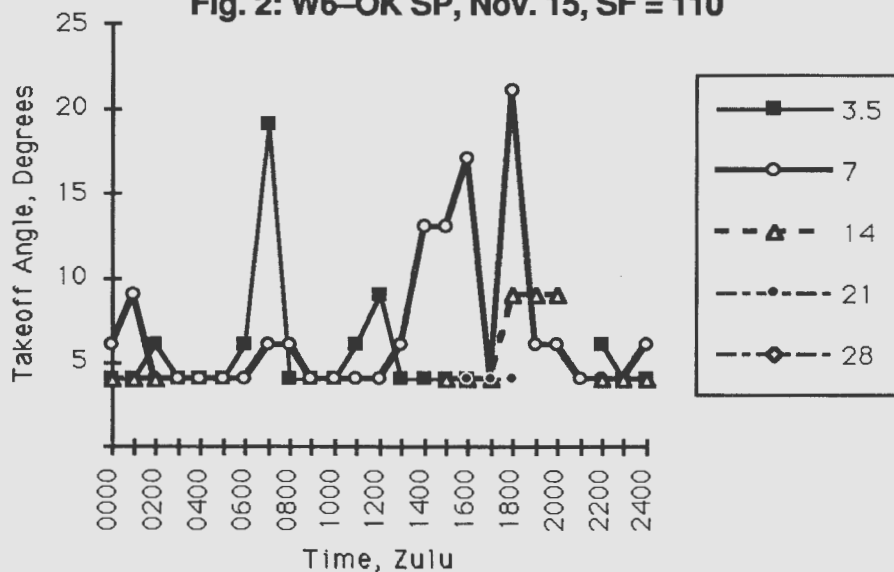
from the 8° pattern peak. But that's still 6 dB better than an identical 60-foot-high antenna³. When the path's takeoff angle is 12° the 120-foot antenna's performance is down 3 dB or so—because it's too high—giving the 60-footer an advantage of about 2 dB. So the high antenna is significantly better, from W6 to PJ, half the time—in conflict with common knowledge. Even when the 60-footer is better, the margin of difference is slim.

continued on page 6

Takeoff Angle

from page 5

Fig. 2: W6-OK SP, Nov. 15, SF = 110



However, caution is warranted over distances as short as the one from W6 to PJ. During the times when the 4° path is best, a 12° path may also be available. The 4° path uses two F-layer hops; the 12° path takes three. But by 2200 Zulu all but the western end of the path is in darkness.

D-layer absorption ends abruptly at sunset, so it affects only the path's first hop. Thus, the difference in signal strength between a two and three-hop path in this instance may be just 5–10 dB, and a low antenna may perform better than shown by "selecting" a higher-angle mode. On twenty meters, an eighty-foot antenna, with its 12° "radiation angle" is competitive to the Caribbean, especially against an antenna at 160 feet (whose first null occurs near 12°).

15 and 10 meters: On these bands the takeoff angle stubbornly sticks at 4°, putting optimum heights at 167 and 125 feet, respectively. Are you surprised? As on twenty meters, lower antennas may excite higher-angle modes and not fare badly. However, MUF decreases as takeoff angle increases, so a higher-angle 10-meter path isn't likely to open when solar flux is as low as 110.

W6 to OK, November 15

Figure 2 shows the results for the short path to central Europe in autumn. (At the low

solar flux used, MiniProp found no long-path openings.)

On 80 meters, four "spikes" occur—when takeoff angle rises above 4°. None last long. The biggest, at 0700, reaches 19°.

Since the elevation pattern peak of a horizontally polarized 80-meter antenna at any practical height is well above 19°, the highest always wins in a contest among

horizontal dipoles. But a vertically polarized antenna might do better, especially if it has a seawater reflection zone.

Forty meters can be open around the clock on this path, though daylight absorption weakens signals between 1700 and 2100. Takeoff angle mostly stays below 10°, but rises to 17° at 1600 and even higher at 1800 (during the period of weakest signals).

On twenty meters the takeoff angle is 4° except from 1800 to 2000, when it rises to 9°. The optimum pattern peak for this path is 6.5 degrees—requiring a height of 155 feet.

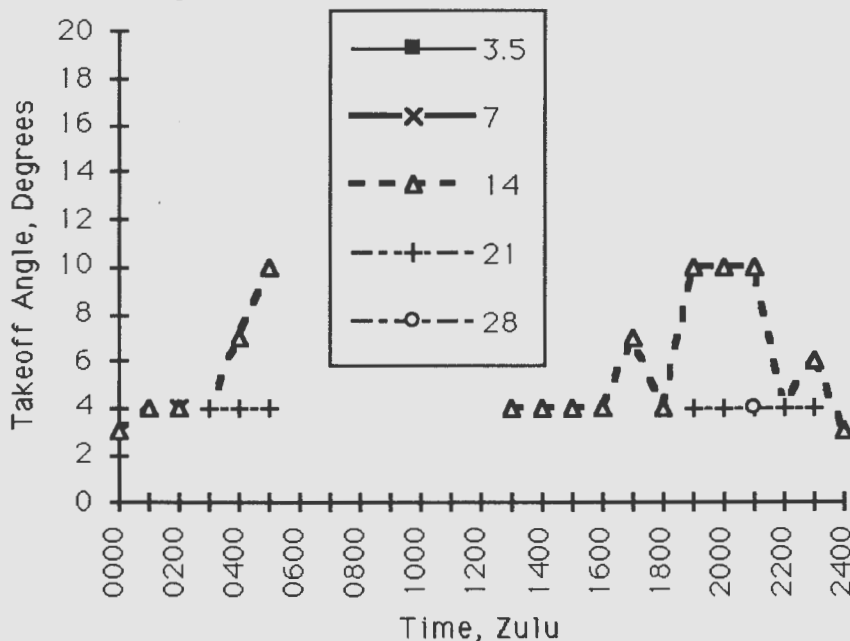
Fifteen meters may open between 1600 and 1800 at 4°, so the 167-foot Caribbean antenna should be brought to bear. No ten-meter openings were predicted, given the low solar flux.

Over the distance from W6 to OK, added loss from more hops might make signals unreadable, especially if any part of the path is in daylight. The higher takeoff angles also require higher MUF than may be available on some of the hops. Generally, as distance increases, openings using higher-angle modes become less likely.

W6 to 3B8 via SP, April 1

Figure 3 shows a weak short-path forty-meter opening at 0200. Takeoff angle is 4°.

Fig. 3: W6-3B8 via SP, April 1, SF = 110



Twenty meters opens at 1300 at 4°. At 1700 takeoff angle oscillates to 10°, but falls back by 0000, when it dips to 3°.

Fifteen meters opens twice: from 0300 to 0500 and from 1900 to 2300. Takeoff angle never budges from 4°.

W6 to 3B8 via LP, April 1

Forty meters opens long-path at 1400 at 10°, but not strongly—as shown in Figure 4.

Twenty-meters is open short path from 0000 to 0500, but long path is better after 0300 and the long-path opening continues until 1600. Short path is stronger again after 1400 and the opening may continue through a weak period until 0000. The long-path takeoff angle never exceeds 6° and is 2° during the extended weak-signal period from 0600 to 1000 zulu. The short-path takeoff angle reaches as high as 10°, but is 4° during the strong periods.

MiniProp shows a possible fifteen-meter long path with signal strength similar to the simultaneous short path opening between 0300 and 0500. The long-path opening continues after the short path closes, lasting until 0700. Long path opens again from 1500 to 1600. Long or short, the takeoff angle sticks at 4°.

Conclusion

Other paths should be tried, to make sure reality confirms predictions and no surprises lurk. Higher and lower solar flux values and other dates should be tried as well.

When a saltwater reflection zone is available, the results favor vertically polarized antennas over too-low horizontal ones on any band. Verticals should be mounted low—to keep their first pattern null well above the highest needed takeoff angle.

Do DX paths always open at low takeoff angles? Apparently not. On 80 and 40, a high takeoff angle can occur at the beginning and end of an opening. When MUF is the limiting factor, rather than D-layer absorption (or something else), paths do tend to open and close at low angles—because MUF always decreases as the incidence angle of a signal with an ionized layer increases. So the old saw works at the higher frequencies, but not necessarily on the low ones.

Takeoff angle on ten and fifteen meters never rose above 4°. Does that lend credence to the idea that takeoff angle declines with increasing frequency? Takeoff angle on 80 and 40 meters frequently dropped to 4°, and when it did, the signals

were strongest—because the low angle meant the fewest hops. The answer? Sometimes it is true, but you can't depend on the old maxim.

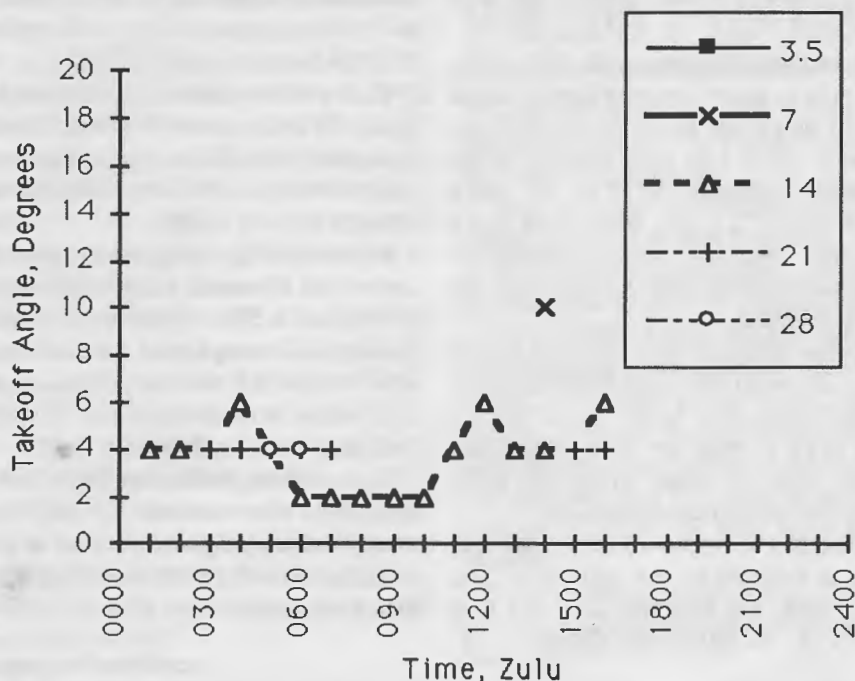
In a subsequent DXer, I'll match the low-angle gain-vs.-elevation angle of horizontal and vertical antennas with the strength-vs.-takeoff angle of available propagation modes—over several paths. This should allow rating the performance of any antenna system over any path, date, etc. If so, any antenna system can be compared to any other in the same way.

References:

- ¹Gerald Hall, K1TD *et al*, *ARRL Antenna Book*, 16th edition (p23-11ff), ARRL, 1991.
- ²William I. Orr, W6SAI, *Radio Handbook*, 23rd edition (p20-13ff), Howard W. Sams & Co., Carmel, Indiana.
- ³David M. Barton, AF6S, "Is Horizontal Polarization Always Best," *DXer*, February 1993.

MiniProp Plus is available from W6EL Software, 11058 Queensland Street, Los Angeles, CA 90034-3029 (unlisted phone).

Fig. 4: W6-3B8 via LP, April 1, SF = 110



Beverage SK

by David M. Barton, AF6S

Harold H. Beverage, ex-W2BML, died January 27 in Stony Brook, New York at age 99. Though not an active ham since the 1920's, Beverage immortalized himself among radio amateurs when he invented the Beverage Wave Antenna for receiving. (He called it the AAVE Antenna.)

He developed the antenna during World War I to aid military communications between the U.S. and Europe. Beverage first described his antenna to hams in the November, 1922 issue of *QST*.

During his long life, Harold Beverage received more than 40 patents. The North Haven (Maine) Historical Society published his biography, *Genius at Riverhead*, by Alberta I. Wallen, in 1988.

sources: ARRL and the Santa Clara Library reference service.

Operating 4U1ITU, or How I Became a DXer

by Omri Serlin, AA6TA

From queries I made via packet prior to my summer-of-'92 European trip, I knew the Geneva International Telecommunications Union station, 4U1ITU, welcomed visiting operators. So I called ITU soon after I arrived in Geneva and managed to get one of the hams. He said he would arrange for a visitor's pass for any time I wished to come.

My pass was waiting for me at the luxurious ITU tower, so I entered the labyrinthine tunnel system underneath the complex—the way to the station. The station isn't in the tower, but on the top floor of a nearby four-story office building.

The station was stacked full of unopened boxes of new ham gear. My host, Mr. David Kaplan, explained. The International Amateur Radio Club, which runs the station, lacks sufficient manpower to test and install donated gear—a "problem" I wish I had!

Dave, who is usually at the shack week-day mornings, gave me a brief introduction to the station. Apart from four fully equipped HF operating positions, the station

contains a busy packet BBS and a number of VHF and UHF transceivers. The antenna farm includes a multiband beam and several small fry, all atop the building.

I selected the most familiar position—the one with a Kenwood TS-940S (which needed repair). Dave reiterated the manpower problem. In compensation, the setup did include a TL-922 linear. Dave showed me how to hold the circuit breaker button depressed while turning on the linear, to keep inrush current from tripping it.

The beam had gotten out of alignment in a recent storm, so there was no way to tell which way it was pointing (Dave said). In any case, the rotor control was out of reach, so I resolved to leave it alone and hope for the best.

After trying unsuccessfully to raise a Maryland ham who was booming in, I decided to strike out on my own. I picked a relatively quiet spot on 20 meters and croaked out a CQ, signing the strange "number four united number one India tango uniform." To my surprise and delight, I was immediately answered by George, GM2CRV, in Glasgow. I had never worked a G-station from my barefoot and vertical antenna setup in California, so this was exciting. George, licensed in 1937, and I had a nice chat.

Not realizing how unusual the 4U1 prefix was, even to some European hams, I tuned up and down the band, catching more leisurely QSOs with what sounded to me like exotic callsigns—SP, Y23, SV, and a bunch more G's. I quit, three hours and a mere nine QSOs later, having enjoyed the experience tremendously. A return visit was clearly indicated.

Another piece of lore I learned is that some European HF hams habitually say "break" when they mean "over," so it's futile to try to break into a QSO by saying "break." (Saying "break" in the U.S. today means you have an emergency—*ed.*)

I arranged to spend an entire day and night in Geneva on my way back, two weeks later. My host this time was Erik Landberg, HB9BHD (ex-SM4CIV, ex-

OD5HU). Erik is the club's QSL manager. This time I was prepared to be the object of a pileup. I picked a quiet spot and called CQ. Then I called "QRZ?" after each contact. I tried to carry out some semblance of a QSO with each station, rather than just giving out signal reports.

One minor incident marred the experience. In the middle of a QSO, a Spanish-speaking ham, who evidently couldn't hear me, suddenly burst on the scene and demanded everyone get off "his frequency." Rather than get into a brawl, I asked everyone to QSY a few kilo-Hertz.

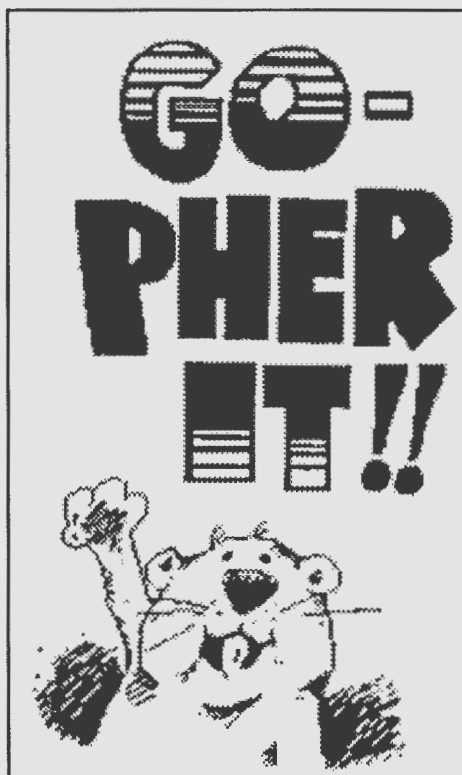
After three hours, my log showed 33 contacts—hardly contest speed, but the fastest pace I had ever maintained! I continued to be fascinated by the strangeness of the callsign prefixes, virtually all of them new to me—CN8, YU, EA, 9H1, LZ, CT1, YO, DL, LA, OM, U, and tons of G's.

I became intoxicated with my new-found status as a desirable contact. After a leisurely diner in a cozy restaurant opposite the Geneva train station, I returned to 4U1ITU. This time my host was the club president, Mr. Capitaine. He explained that the club was out of QSL cards, but that some could be sent to me when they became available. (This promise wasn't kept, despite several reminders, so I printed my own 4U1ITU cards.)

That evening another American ham joined me at the station. We tried to operate concurrently, but RF and audio interference made it difficult. We improvised a shift schedule to avoid conflict.

My one-hour operating session yielded 15 contacts on 15 meters, including two ZS1's, a 5Z4, and a 5B4—apart from the usual Europeans. Prompted by a not-so-subtle flyer posted on the wall, I left a cash contribution in the donation box. I also paid for a year's membership in the IARC.

Next morning, before my flight home, I dropped in once more and operated on 20 meters, working eight contacts in an hour, including two VKs. I left with 65 QSOs and lots of memories.



continued on page 11

The Frequency Police

by Ron Levy, K2AIO

When the Soviet Union disintegrated, an institution that had dominated Russian life, as well as American movies and literature, disappeared. The once-feared ruthless and resourceful KGB ceased to exist.

Or did it? While democratic ideals take root in the C.I.S., the legacy left to hams by the defunct KGB has surfaced as the Frequency Police. The force comprises former KGB agents, but also includes CIA, FBI, and MOSAD officers. The Frequency Police quickly became almost as feared, resourceful, and ruthless as the old KGB, though it tends to be disorganized, undisciplined, uneducated, and rude. They have become an unwelcome part of DXing, especially when a rare or "new" country appears on the bands.

In their clandestine investigations of hams throughout the world, the FP typically discover the exact dates, times, and operating frequencies of DXpeditions before the DXpeditioners themselves know these things. The FP are ready at a moment's notice to block a frequency here, sending meaningless CW characters there, tune up somewhere else, and swish their VFOs across a DXpedition frequency.

Their comments hide their identity, but the comments denigrate any hapless soul who accidentally transmits on a DXpedition frequency. The FP interfere while claiming to be "clearing the frequency." They take courses in name calling and practice it constantly. Their favorite epithet is "lid," and they delight in using foul language to embarrass DX operators or anyone listening on frequency.

Never forget that they intend no signal but their own be heard on a DXpedition frequency, not even that of the DX station.

The FP patrol ham spectra in TS-950's, FT-1000's, and IC-781's—always unmarked and impossible to identify. The FP keep their armaments ready—typically a pair of 4-1000's with 8,000 Volts on the plates and multi-element beams at 150 feet mounted on radar rotators that can slew 40 degrees per second.

The average FP station costs \$50,000—one reason DXers find it so difficult to compete with these "wardens of the spectrum."

Most DXers are honest, hard-working hobbyists who enjoy their DXing. Many save for years to afford a decent station. They are persistent in their search for DX, but courteous. They play by the rules. Yet the Frequency Police instantly chastise them for the smallest errors.

Even when DXers quickly find the right split button, the FP tear into them mercilessly. That's why many a neophyte DXer becomes frustrated and swears never again to chase DX. Who can blame them?

But the DXer isn't stupid. At first he'll just QSY away from the FP. In time, though, he may grow weary of dealing with these agents of fear and move to more sedate sub-hobbies—or leave hamming altogether. Then the FP will have achieved the clear frequencies they covet, but they won't have anyone to torment. Are there Photography Police?

from the February '93 'North Jersey DXA Newsletter'—K2AIO Editor

Last Chance for Visalia Pre-Reg

by "Knock" Knochenhauer, K6ITL

It's the ides of March! You'll miss your chance to preregister for Visalia if you don't get a March 15 postmark.

What will you receive for your registration fee? Two hosted hospitality hours; admission to all programs, technical sessions, and exhibits; a banquet; and the Sunday breakfast buffet, plus a chance at the pre-registration and banquet door prizes.

And don't forget to sign up for Friday's Western Barbecue. It promises to be the best bargain in the history of the convention.

If you can't find a registration form, call Louese, KA6ING, or send her a packet message.

Tempus fugit! If you haven't done it already, mail your pre-registration form and check today!

The P5RS7 Story

by Kan Mizoguchi, JA1BK

P5RS7 was QRV on 40-meter CW December 18, 1992—five days behind schedule. JA1TWP made the first QSO, after which Romeo worked me. I sent out a news release immediately, by fax.

The P5RS7 QTH was a camp near the Russian border. The operators were Romeo, 3W3RR; Oleg, UB4JDM; Mike, UWØMF; Toly, UT3UY; and Oleg Pavlenko.

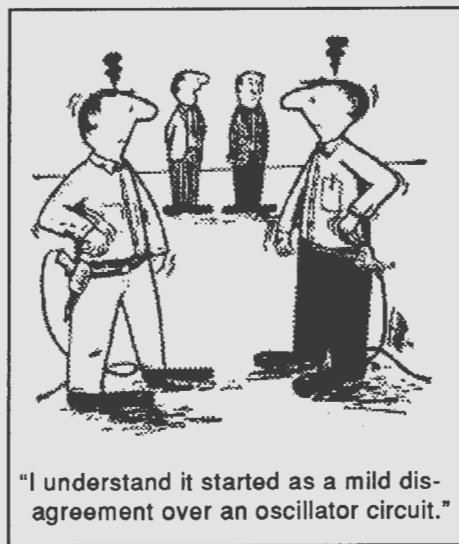
Two stations operated simultaneously, each with a TS-690S. One used an amplifier.

Antennas were ground-plane verticals on 10 and 15 meters and inverted-vees on 20, 40, 80, and 160 meters. All but the 20-meter inverted-vee shared a common feedline.

By the time the operation ended at 1800 zulu January 6, under instructions from Pyongyang, more than 26,000 contacts had been logged. Authorities in Pyongyang inspected the logs on January 7 and released those for 6, 80, and 160 meters to JA1HGY. The other logs will arrive soon.

I would like to express my appreciation for what this team of DXers accomplished under a most difficult situation, and extend my highest respect for their success.

from the February '93 'North Jersey DXA Newsletter'—K2AIO Editor



from the June '92 Mobile Amateur Radio Awards Club 'County Line Road Runner'—KØAYO Editor

From the OPDX Bulletin

From: K6OZL Date: 15-Feb 0152z
 Subj.: The Ohio/Penn DX PacketCluster
 DX Bulletin No. 99, February 15, 1993.
 Editor Ted Mirgliotta, KB8NW
 Provided by BARF-80 (sic—ed.) BBS
 Cleveland, OH on-line at 216/237-8208.

Thanks to the Northern Ohio ARS, Northern Ohio DXA, Ohio/Pennsylvania Packet-Cluster Network, DL1HBT & DXNL, DF4RD, ARRL, DXAC, FK8CP, KP4BJD, K4CEF, Southeastern Cluster Group, OM3EA, KC1WY, K2WR, NT2X, KN4F, ON1AIG, and ESDX.

3Y, Bouvet Island

A message on the public BBSs from UZ9OWD details plans for a trip to Bouvet by noted Russian explorer Fedor Konyukhov. He is in Taiwan outfitting a ship bought specifically for this expedition.

He plans a stop at Easter Island and a two-week stay on Bouvet. Fedor is soliciting operators to accompany him. He says the cost will be about \$3000 (not bad for a trip to two exotic spots). He says he needs more radio gear, but has the license—signed by Anne-Lise Gaardsø on January 5th.

He gave no schedule, but some VK2SG RTTY DX notes said it might be in April or May. The callsign will be 3Y/RØL. According to reports, RØL/MM is active daily on 14.275 around 0800z. Fedor Konyukhov has good credentials. He has

traveled three times to the North Pole—once all alone. He also made a solo around-the-world trip, and claims a solo ascent of “the highest mountain in the world.”

I1HYW will be QSL manager. This information came from UZ9OWD via KB8DB.

D2ACA Conflict and Dispute

Letters sent to several individuals, the DXCC, OPDX and other DX bulletins defended the legitimacy of the D2ACA QSLs. It seems two D2ACA operators are defending the operation and QSLing while the third claims QSLs from the other two are no good. A letter from the two says donations and IRCs were taken from the envelopes but no QSL cards sent. The operators were UT3UY, UT4UM and RT5UY, but we aren't saying which is which until the issues are resolved.

JD1, Minami Torishima

The European Satellite DX-Fund bulletin reports Kuruja (JD1/JG1RMB) is active from Minami Torishima—a new country via satellite. Kuruja will operate until March 10th. Best times are even days (6th, 8th, 10th, etc.) 1500 to 1600z and 2100 to 2300z. QSL via JM1XCW.

JX, Jan Mayen

T.J., JX3EX, has appeared on the 14256 DX Net. He also operates solo on 14204. Listen

between 2130 and 2330z or 1400 to 1600z. QSL via LA6NM.

Romeo, 3W3RR/AHØM/P5RS7

Romeo made a surprise visit to the Yankee Clipper Contest Club meeting in Sturbridge, MA, February 8th. He had the P5RS7 logs, but no cards. The cards are being printed in Japan. QSL via JA1HGY.

Ed Kritsky, NT2X, said documentation for the P5RS7 operation was submitted to the league February 8th. But he commented, “Don't expect a decision before March 31.”

XT, Burkina Faso

Peter, XT2BW, sometimes operates RTTY on 20 meters 2030 to 2130z. QSL via WB2YQH.

ZL7, Chatham Islands

The ARRL DX Bulletin says ZL7AA will be active beginning March 1st for 10 days. QSL via ZL2AR.

FAX your DX Info!

We are currently just in the testing stages, but we are accepting inputs by fax only on Mondays, Wednesdays, and Fridays and only from 0430 to 2030z at 216/237-2816.

Don't dial in on other days or times; the line is not dedicated to the fax. Also, the fax operates only in Class-2 mode.

Heard on the Party Line

by Charley Vorderberg, WØCCT

Great ham optimist: “CQ Tulare, South Dakota ... CQ Tulare, South Dakota ...”

Things daring at twenty are foolish at forty, insane at eighty—years, not meters.

After a visit from the FCC: “Look Ma, no bands.”

Memory is what tells an old ham he had a sked yesterday.

Income tax: a fine for reckless thriving.

Hear about the ham who got two calls because he was schizophrenic?

Life is made up of eating, sleeping, working, waiting for stoplights—and interruptions.

I sure hope they don't raise the standard of living any more; can't afford it now.

Mrs. Revere: “I don't care who's coming, Paul. I need the horse tonight.”

The darkest hour: just before you're overdrawn.

Some DXers *are* egoists, but there's a bright side. They don't talk about other people.

The toughest thing about humility: you can't brag about it.

Unhappy ham gossip: live secret, dead rig.

Sandwich spread: what you get from eating between meals.

The human brain is wonderful. It starts working in the morning and doesn't stop until you get to the ham license examiner.

Old rigs never die, they just trade away.

To get a dipole up an oak tree, you must either climb a tree or wire an acorn.

Alimony is like making payments on a linear after its tubes go soft.

Philosophy is what you know nothing about, but must pass as traffic.

The same ham who shouldn't have been on AM now shouldn't be on packet.



Ham Radio in Ethiopia

by Rudolf Klos, DK7PE

For seventeen years amateur radio was illegal in Ethiopia—except for ET3PG, the club station of the police. But Ethiopia changed after rebels replaced the socialist government.

As of January '93, amateur licences have been granted to five foreign hams and the new government plans to begin licensing Ethiopians soon.

During my stay, from December 22 to 31, 1992, I met Mr. Ghetnet and Mr. Bekele, two officials of the licensing authority, regularly. We included Admase, ET3AR—the first Ethiopian radio amateur, back in 1942—Rolf, HB9CVB, and Sid, G4CTQ, in our meetings when we founded an Ethiopian amateur radio society, as we had planned for some time.

Since training newcomers will be one of the goals of the new club, Sid (future ET3SID) offered to organize a course in amateur radio. They won't be short of participants. Engineers working for the licensing authority and several university students have already applied for the course.

The support of several countries' national amateur radio associations means sufficient instructional material is available, so the course is feasible. But the club lacks even a receiver to demonstrate amateur radio.

That is where individual hams or radio clubs might step in and give their kind help. If they do, it will soon be possible for all of us to contact Ethiopian radio amateurs as we once did—twenty years ago.

put on the DX Packet Spotting Network by Hal, N6AN

House and Antennas Offered

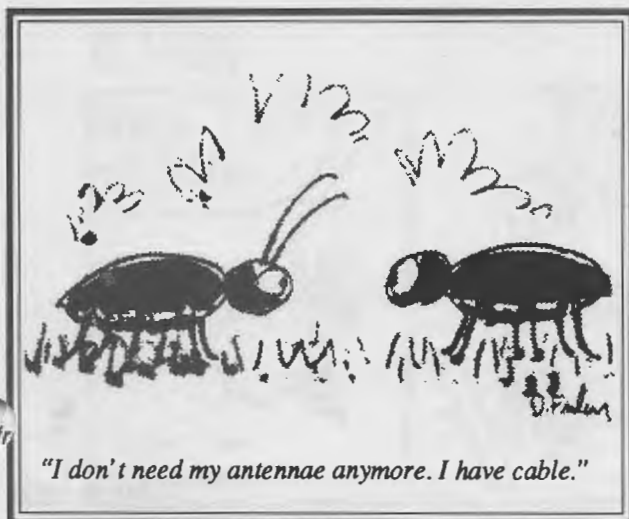
KX6C's attractive Eichler home, in a great neighborhood at 4206 Darlington Court, Palo Alto, is for sale. It has three bedrooms, one bath and a large family room, which serves as the study and ham shack. The house has a remodeled kitchen, copper-pipe radiant heat, a solar hot-water system, and an insulated room with two skylights.

There are new Berber carpets throughout, landscaped front and rear yards with automatic irrigation, and a wood-burning fireplace. The house is on a 6,000 square-

foot corner lot. Excellent schools, including Gunn High, are nearby.

Harry asks \$325,000. His 55-foot Hy-Gain crank-up tower, KLM KT-34A tri-band yagi, and Hy-Gain 40m rotatable dipole are negotiable. If you are interested, you can call 415/424-0153 to leave Harry a message or call David Kucera, his real estate agent, at 415/494-7784.

submitted to the DXer by Harry Makler, KX6C, via DXPSN



Overheard on W6TI/R:

Operator #1: "Has anyone heard the AH on RTTY recently?"

Operator #2: "Which one? I've worked a lot of AH's on RTTY!"

submitted by N16T

Senegal

A 6W6, on packet the call And I, on 80, did need Senegal, But eighty meters here in the West Can be an African's station's test.

For West Coast paths are so much longer, East Coast signals are far stronger. But oh, the signal *that* station put out!— Must have been a kilo-Watt shout.

For though I heard many a call Right on frequency—no "split" at all, I copied his signal most of the time— But always callsigns other than mine.

I tracked the ones who managed to score, Spotting all over for two hours or more. Most of the lucky were east of St. Lou But Texas and Kansas also got through.

For hours nary a seven or six Knew the DXer's moment of bliss. Then, at nine, a barrier leak. Had most easterners gone off to sleep?

First a Phoenix and then Salt Lake Through the multitudes' din did break. At last I heard a callsign dear; AF6S ... out in the clear!

'Tis seldom a "pistol" like me wins a fight, Yet I was first among sixes that night. Outshooting "big guns" in a low-band race— Like winning at poker without any ace.

David M. Barton, AF6S © 1993



Operating 4U1ITU from page 8

The experience sparked my interest in DXing. Within eight months of the trip, I worked 180 countries and confirmed 113.

For information about being a guest operator at 4U1ITU, write:

International ARC
Box 6, CH-1211
Geneve 20, Switzerland.

By the way, you don't need a Swiss reciprocal license to operate 4U1ITU; the station is on UN territory.

This story, which was submitted to the DXer by its author, also ran in the June '92 Worldradio.



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
W6KH	326			367													
K6PU	326	326	316	356	346	322		200	200	300	200	100					
W6XP	326	326		344	344												
N6ST	325			334	305	261		204	233	301	143	76	2		2	2	2
W6BSY	323	323		366	360												
K6RQ	323			362				120	197	310	130	90	5				
W6MUR	323			361													
W6CF	323			355	294	185		204	239	306	178	138					
W6ISQ	323	321	322	355	331	322		285	150	250	315	256					
K6MA	323	321	318	354	340	321		255	265	290	205	131		165	190	115	
K5YY	323	323	322	351	348	329		161	217	341	196	271	166	42			
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					
WA6AHF		323			342		231	100	100	100	100	100					
W6DU	323		314	342	306	319		229	265	320	166	114					
W4RIM	323			342	341												
W6LQC	323	323		341	341	89		100	100	100	62	93					
W6TC	323		320	339		326		252	231	273	263	175	1		110	103	89
K6XT	323			339		160		100	100	100	100	100					120
K6XJ	323	323		338													
K6RK	323			337	329	315		100	100	100	100	100	95				
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
WB6CUA	323	317		331	326	314		100	100	100	100	96					
K6LM	323	322	322	331	330	325		100	100	100	100	100	6				
AJ6V	323			330	235	270		153	174	263	138	62	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												
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					
W6FAH	321	318		321	318	285		239	273	311	213	154					
W6ZKM	320	320		344	344			207	100	100	107	126					
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					
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					
K5GOE	317			330	324			200	100	100	100	91					
W6NPY	317			330	200	265		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
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					
K6DT	312			340	320	293		229	251	328	153	121					
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					

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
W6TSQ				355				285	300	300	315	257					
W6OAT				349	326	332		269	304	333	270	199					
W7XA				339				277	298	309	174	137					
W6CTL				338	4	287		214	190	335	94	11					
W6FGD				330	275	289											
W6JD				330	236	309		108	150	323	193	44					
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					
WR6R				319	307												
AF6S				319		311		270	288	303	220	142		109	134	78	
WD6EKR					318			214	270	313	109	89					
K6UD				318	306	207		240	244	244	176	147					
W6TEX				317		294	121	100	100	100	100	100					
K6ANP				316	199	211		133	144	199	110	105					
K6KLY				316	315	15		218	198	212	127	107		71			
NW6P				316													
W6IEG					315			17	33	290	3	3					
WB6GFJ				314	300	70		203	225	285	125	62					
WZ6Z				314	299	265		218	238	297	228	138	14				
K4UVI				313	249	175		65	112	293	88	24	2			8	
NQ6X				312	309			100	100	100	94	96					
K6NM				311	220	226		129	149	274	165	36					
N6JM				310	299	256		212	232	277	135	87	17		2	1	5
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					
K6LRN				307	210	248		53	127	264	110	38					
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					
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													
WB6KJE				301													
WB6UOM					300												
AA6YQ				300	262	235		160	166	242	111	45					
WA8LLY				298	285	266		235	248	252	115	20		56	127	93	1
N6ULU				297		268		129	131	196	110	69					
K6FD				296	271												
KB6Q				294													
K6ZUR				294	85	290		139	189	265	176	79					
AA6MV				291	285	239		166	180	250	105	23					
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				
N6RC				281	129	161	3	25	49	193	24	3					
KK6X				281	227	255											
N0DJJ				279	148	249		118	135	151	22	2					
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					
KE6WL				274	248	233		210	233	248	147	54	8				
W6NA						271		140	190	251	192	109					
AA6AD				271	181	252		109	176	258	54						
K6RUW				270	242	120		100	100	100							
W6TER				269													
N3AHA				268	243	154	1	129	160	194	58	20	3		14		1

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.
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								
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	28	34								
W6ZM	40	40														
K6ZUR			40			40										

de Larry, KD6XY (03/93)

LADDER NOTES:

There were 37 updates to the DX Ladder since the last published issue and 12 updates to the WAZ Report. In addition, six new members sent in their figures.

Last time I asked for your opinions as to whether the DX Ladder should continue to be sorted by "Honor Roll" or continue as previously done; sorting by Suffix. Overwhelmingly, the majority of members who responded wanted to keep Honor Roll sort. Some of the remarks were: "Yes, I like the format, it's logical", "I like the new format as displayed in the DXer", "Yes, now it is truly a Ladder", "Yes", "Yep", "It was easier to read the other way", "OK", "Good format!", "No", "Yes, very good idea", "Sure, let the Old Timers be proud of their total DX counts", and "I'll be happy no matter how it appears. I will continue sorting by Countries Worked, with Honor Roll being listed first, at least on a temporary basis.

NB6L reports he has finally achieved 5 Band DXCC. Congratulations, Don.

NCDXC ROSTER 2/93

A----- A

NS6 A Duane
 K6 AAL Burley
 W7 ACC Bob
 AA6 AD Bruno
 W6 AED Bud
 WD6 AFC Bill
 K6 AFL Rowland
 SM0 AGD Erik
 N3 AHA Ace
 WA6 AHF Rubin
 W4 AI John
 KG6 AM Dewey
 ZL1 AMO Ron
 N6 AN Hal
 K6 ANP Len
 KJ6 AP Michael
 K6 ASI Bill
 WA6 AUD Cass
 WA6 AUE Jim
 WA6 AVU Hank
 HB9 AW Gerard
 K6 AYA Pat
 KD6 AZ Dave

B----- B

NA6 B Bob
 WM6 B Ed
 OH2 BH Martti
 KA6 BIM Dave
 W6 BIP Bip
 W6 BJH Ted
 JA1 BK Kan
 KD6 BLK Lisa
 K6 BQN Bill
 K6 BR John
 WA6 BSS Bill
 W6 BSY Mac
 W6 BUY Jack
 K6 BWX Dick
 WA6 BYA Bob
 K6 BZS Jan

C----- C

KW6 C Michael
 KX6 C Harry
 NY6 C Greg
 K6 CBL Jack
 N6 CCL Larry
 SM0 CCM Lars
 W6 CF Jim
 W6 CFK Dick
 WB2 CHO Chod
 N6 CM Bob
 W6 CSI Norm
 WA6 CTA Ed
 W6 CTL Bill
 WB6 CUA Randy
 F2 CW Jacques
 W1 CW Bob
 K6 CXT John
 W6 CYX Bob

D----- D

WW6 D Doug
 K6 DC Merle
 WB6 DFX Joe
 N0 DJJ Jon
 K6 DKQ Russ
 W6 DOT Gene
 W6 DPD Chuck
 WB6 DQP George
 K6 DR Tony
 VS6 DR Phil
 K6 DT Ed
 W6 DU Eric
 W6 DUB Mario
 N6 DVR Jim
 KA6 DXY Jim
 N6 DYS Taylor

E----- E

AD6 E Al
 N6 EA Bob
 N6 EK Bob
 WD6 EKR Walt
 W6 EMD Dave
 K0 EOO Dennis
 AB6 EQ Ken
 K1 ER John
 WA6 ERB Bob
 KC6 ESL John
 WB6 EXW Gary
 KI6 EZ Alex

F----- F

NA6 F Don
 W6 FAH Bob
 K6 FD Ray
 KJ6 FD Jeff
 W6 FDU Ben
 W6 FGD Marv
 K6 FO Norm
 W6 FOJ Roy
 KE6 FV Steve
 W6 FWX Kim

G----- G

AA6 G Chuck
 NT6 G Mark
 WX6 G John
 KD6 GC Steve
 KG6 GF Larry
 WB6 GFJ Ross
 N6 GG Rich
 N6 GK Greg
 K6 GNX Bill
 W6 GO Jay
 K5 GOE Woody
 WA5 GTU Joe
 KB6 GV Vince
 KD4 GW Claude

H----- H

WA6 HAN Dean
 WA6 HAT Chris
 K6 HEM Elmer
 K6 HHD Jan
 W6 HIB Bob
 K6 HIH Cliff
 N6 HKX Nadine
 K6 HNZ Ken
 N6 HR Hiller
 W6 HXW Jim

I----- I

KG6 I John
 KM6 ID Bob
 W6 IEG Chuck
 N6 IG Jim
 KH6 IJ Nose
 W6 IKQ Phil
 K6 ILM Elliot
 WA6 IME Lee
 KA6 ING Louese
 N6 IP Bob
 W6 ISQ Jack
 WA6 ISX Harley
 W6 ITH Reg
 K6 ITL Knock
 N6 ITW Craig
 N6 ITY Dennis
 WA6 IUM Ed

J----- J

KN6 J Bob
 KT6 J Joel
 WA6 JCD Bruce
 W6 JD Doug
 KJ6 JF Don
 W6 JHN Al
 WB6 JJJ Bill
 N6 JM John
 WB6 JPY Rich
 N6 JV Norm
 KB6 JXT Todd
 WB6 JXU Roger
 W6 JZU Smitty

K----- K

KN6 K Keith
 AB6 KF Harry
 W6 KG Lloyd
 W6 KH Dick
 WB6 KJE Mike
 K6 KLY Russ
 K6 KM Bill
 W6 KOE Dave
 WB6 KQI Virg
 W6 KQK Andy
 K6 KQN Vince
 AA6 KX Bruce
 W6 KXG Jim

L----- L

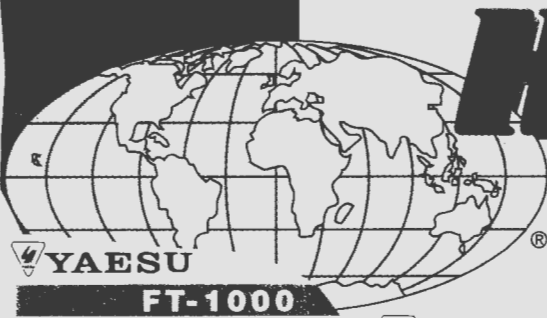
A16 L Jerry
 NB6 L Don
 KJ6 LD Henry
 W6 LD Jack
 AA6 LF Steve
 N6 LFX Jim
 WA6 LKM John
 K6 LLL John
 WA8 LLY Steve
 K6 LM Jim
 W6 LPM Andy
 K6 LQA Bill
 W6 LQC Phil
 K6 LRN Dick
 KB6 LT Nolan
 KE6 LT Gene
 N6 LTN Roland

NCDXC ROSTER 2/93

M----- M WX6 M Rich K6 MA Stan W8 MEP Jerry W6 MKM Steve VP2 ML Chod W6 MSF Carl W6 MTJ Bob W6 MUR Bill AA6 MV Larry N6 MVE Mike KB6 MXH Le KG6 MY Doyle W6 MZQ Walt N----- N KW6 N Ed W6 NA Fred N6 NBB Ray N7 NG Wayne W6 NLG Gordon KB6 NLO Bill K6 NM John KJ6 NN Phil W6 NPY Dave W6 NWS Larry O----- O KC6 O Paul WA6 O George WJ6 O Tommy W6 OAT Rusty N6 OBX Mike N6 OC Cab WA6 OEY Jim WB6 OFM Martin W6 OG Clint WB6 OHH Bob N6 OJ Chuck K6 OJO Steve WB6 OKX Art W6 OL Howard N6 OM John W6 OMR Irv N6 OND Skip N6 OO Claude N6 OSF Gene W6 OSP Bruce KE6 OT Al WB6 OTB Dick W6 OTC Genn K6 OZL Ron K6 OZV John	P----- P NW6 P Tom WG6 P Dennis K6 PBT Chuck AA6 PG Dave W6 PHF Dave AA6 PI Dave KJ6 PJ Larry K6 PJY Daniel K6 PKO Jerry W6 PM Lindy W6 PNV Bob K6 PU Ken AA6 PV Ron W6 PVE Gerry N6 PYI Greg Q----- Q AG6 Q Raplh AK5 Q Mickey KB6 Q Al WB6 QDC Jack W6 QEU Pete W6QHS Dave N4 QJ Paul W6 QKN John W6 QL Iris KK6 QM Barbara WB6 QMD Linda KF6 QO Karl N6 QP Tudor K6 QW Norm AA6 QY Herschel R----- R WN6 R Val WR6 R Al WU7 R Gil N6 RA Tom N6 RC Dick W6 REC Duane W6 RGG Bob W4 RIM Al W6 RJ Bob K6 RK Chuck W6 RMM Don N6 RO Ken W6 ROY Don K6 RQ Frank N6 RQ Bob W6 RQ Al N6 RR Ron K6 RUW Tak W6 RVS Dick DJ6 RX Klaus	S----- S AF6 S Dave NC6 S Ken K7 SA Warren K16 SC Henry DJ6 SI Baldur K6 SIK Bill WA6 SLO Dick K6 SMH Jerry K6 SQL Bill K6 SSJ Bob N6 SSM Bob N6 ST Steve W6 SUJ Pat W7 SW Happy W6 SYL Paul W6 SZN Kip T----- T AA6 T Lloyd AJ6 T Walt K16 T Gary N16 T Gary AA6 TA Omri W6 TC George AA6 TD Melissa N6 TDC Jim W6 TER Gerry W6 TEX Bill WA6 TJM Dave K6 TMB Lou WA6 TOO Harry K6 TS Tom W6 TSQ Sam W6 TT Elvin W6 TUI Bill N6 TV Bob W6 TWRolph KK6 TX Ken U----- U AE6 U Scotty NX7 U Scott W7 UAB Tom K6 UD Stan WB6 UDS Rich K6 UFT Gordon K6 UJG Ron N6 ULU Stan WB6 UOM Emie K16 UT Chuck WA6 UUT Arv K4 UVT Bob K6 UWDMason	V----- V AI6 V Carl AJ6 V Ed WE6 V Jim N6 VAW Marilyn AA6 VB Bob W6 VG Ron KD6 VS Chuck N6 VT Ralph OH5 VT Heimo K6 VX Ray W----- W KA6 W Ted WX6 W Fred W6 WB Bud K6 WC John N6 WCW Marc K6 WD Pres K16 WF Dave N6 WFK Eric W6 WFW Glenn WB6 WKMDick KE6 WL Brian K6 WR Brad N6 WR Armond X----- X KK6 X Jim NG6 X Ron NQ6 X Bob W7 XA Al K6 XC Ron KG6 XF John N6 XG Walt N6 XH Dave N6 XI Rick K6 XJ Perry K6 XM Greg K6 XN Ted W6 XP Stan W6 XR Natan K6 XT Art K6 XV Bob KD6 XY Larry	Y----- Y AE6 Y Andy KR7 Y Hugh K16 YB Charlies AA6 YD Joe WA6 YFD Steve W6 YFW Glenn W6 YHM Don W0 YK Ed W1 YL Ellen K7 YNO Terry AA6 YQ Dave K6 YT Fred W6 YVK Ev W6 YWH Wes K5 YY San Z----- Z NZ6 Z Steve WZ6 Z Howard KE6 ZE Dave W6 ZKM Frank W6 ZM Bill N6 ZPX Krish WB6 ZUC Jo K6 ZUR Chuck K6 ZX Doug
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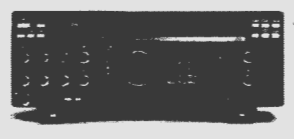
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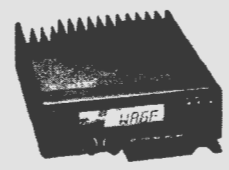
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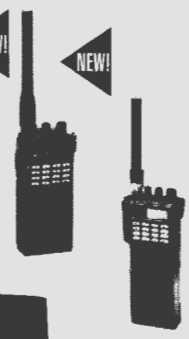
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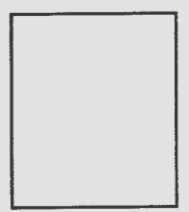
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March 1993