

DX NEWS

The Magazine of the National Radio Club



VOLUME 40

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NUMBER 15

"Enclosed is a \$13 check for renewal of NRC membership
Incidentally, the coming year is my 40th with the NRC!"
(Sid Steele, Illinois)

IN THIS ISSUE...

Midday Skywave DX in Europe - 1972 - Bengt Ericson & Gordon Nelson
Skyline Blockage - Father Jack Pejza
Skyline Blockage - Sources of Uncertainty in Calculated Arrival Angles -
Gordon Nelson

NEW MEMBERS THIS WEEK...

*Raymond Baron, 732 Franklin St., Trenton, NJ 08610
*Stan Polak, Jr., R. 255 Swetland St., Duryea, Pa. 18642
*Andrew Hagen, 4760 Chuck, Memphis, Tenn. 38118
*Rolland Lindblade, 1017 90th St., Apt 2, Omaha, Neb. 68114
*Dan Sheedy, Box 31, Encinitas, Ca. 92024 (Rejoins)
*Mike Riordan, 1596 Oramas Rd., Santa Barbara, Ca. 93103
*Frederick Baker, 14350 SW 284th St., Leisure City, Fla. 33030

Welcome to the Club, people; why not introduce yourself in a Musing?

NOTES FROM HQ...

Space limitations prevented us from running GPN's second article on the influence of Fresnel diffraction on horizon blockage scheduled for this issue; it'll appear week after next. No one has bothered to evaluate the diffraction equations for horizon blockage on the MW band before to the best of our knowledge and the results are absolutely fascinating... *** The new Domestic Log is running ahead of schedule; the contributions of Bundy and Callarman have been received and Bill Bailey has taken care of part of the Canadian alphabetization; Chuck Rossier is finishing it up. Remember we are now accepting advance orders on the new DOMESTIC LOG at a special discount rate of \$4.50 (Book Rate; add 75¢ for First Class mail); the new Log will be mailed out in the same order as advance purchases are made. Target date remains March 15th. *** Longtime Publishing Committee member Ray Moore, presently serving as NRC Treasurer, has written a fine article on the design of communications receivers for strong signal reception; many of the points he makes are of concern to the advanced MW DX'er and you will find the article in the latest issue of Ham Radio magazine on your newsstand. *** After assuring us that they had them in stock and accepting our money, the new Kokusai mechanical filter distributor informs us that our order cannot be filled for several weeks. We've complained directly to Kokusai about this delay but it probably won't do any good. We'll mail them out immediately when they arrive. **Fifteen of the 25 units we have ordered have already been spoken for so if you're interested you'd better move fast... Price is \$15 for members.**

GPN & BGK

SPECIALS

Mon.	Feb. 25	KSYL	970	Alexandria, Louisiana	1,000	U-1	1:10 - 1:25	NRC
	26	WCPE	1600	Chesapeake, Virginia	1,000	D-1	2:00- 2:30	NRC
	26	WKEM	1600	Dover, Delaware	500/1,000	U-2	2:30 - 3:30	NRC
	26	KLEB	1600	Golden Meadow, Louisiana	1,000	D-3	3:30 - 4:00	NRC
	26	WDEL	1150	Wilmington, Delaware	5,000	U-4	3:30 - 4:58	NRC
	26	WLBH	1600	Sag Harbor, L.I., N.Y.	500	D-1	4:00 - 4:30	NRC
Thu.	Feb. 22	WLIB	1190	New York, New York	10,000	D-3	12:15 -	INCA
Mon.	Mar. 5	WACK	1420	Newark, New York	500	D-1	12:01 - 1:00	INCA
	5	MYSTERY!	860	MYSTERY!	MYSTERY!	MYSTERY!	2:00 - 3:00	NRC
Mon.	Mar. 12	KXJK	990	Furruet City, Arkansas	5,000	D-1	4:00 - 4:30	INCA
Mon.	Mar. 26	KSYL	970	Alexandria, Louisiana	1,000	U-1	1:10 - 1:25	NRC
	26	WFLB	900	Philadelphia, Penna.	1,000	D-1	5:15 - 5:30	INCA
Mon.	Apr. 2	WJAB	1440	Westbrook, Maine	5,000	D-1	12:01 - 1:00	INCA
	2	WRAE	1510	Dover, New Jersey	10,000/500	U-4	2:00 -	WRNE
Mon.	Apr. 9	WXCL	1350	Peoria, Illinois	1,000	U-4	2:00 -	WRNE
Mon.	-----	TICJ	675	San Jose, Costa Rica	15,000	U-1	2:00 - 5:00	NRC
Mon.	-----	WCEB	1390	Charlotte, Michigan	5,000	D-3	All Morning	INCA

INCA listed WAMB-860 for a TEST on Mon, Feb. 12, 2:00-2:30 a.m. This of course has not passed, but this is a WEEKLY regular frequency check for their auxiliary transmitter. Their C.E., Mr. Milford Flack, wants reports to WAMB, 1811 Boulevard of the Allies, Pittsburgh, Pennsylvania, 15219. Info from INCA's Brian Cartwright.

KHYL-970. This friendly station wants reports, and a good friend of DEERs, Mr. Tom Gates, is back in radio after an absence of about four years, as KHYL's night announcer. He runs their monthly frequency check with cycle tones and periodic IDs. This is the address for your reception reports: Tom Gates - KHYL Test - Box 1431 - Pineville, La. 71360. E.R.Cooper & S. Swartz.

WLIB-1190. This is a frequency check, and we don't know the style of modulation used. WLIB will be on. Reports go to WLIB, 310 Lenox Avenue at 125th Street, New York, N.Y. 10027. Info from INCA's Budd Bailey.

*****AND NOW THE NBC BIG 1600 KILOCYCLE PROLOG!*****
 W@P-K...this station gets out WDEL! On their last TEST they were heard in N.J., Montreal, Wis., Chicago, Florida, W. Va. & Ohio, etc. This, with WREL, KATZ, & KIAK on! WCEK is an Easy-Listening Music station, so look for that type of music, and maybe some cycle tones and Morse Code IDs, and voice & jingle IDs. Mr. E. Payne, Owner/President of WCEK was formerly General Manager of WINS-1010, NYC, leaving there in Summer, '68. Send reports to Mr. C. Payne, Owner/President, WCEK, 500 East Liberty Street, Chesapeake, Virginia, 23324. Infor from NRC's Jim Poterba.

WKEM. This TEST will be mostly two-toned cycle tones, a few records, and frequent IDs. This TEST will be with DAY pattern, which is 500 watts, non-directional. We hope, of course, for silence from WREL. Send your reports to Mr. Rich Omborg, Chief Engineer, WKEM, Box 533, Dover, Delaware, 19901. Reports must include return postage for veries! Info DAVE SCHMIDT

KLEB. NRC Member Bob Carole, Chief Engineer here, will come on at 3:25 EST to give DEERs a chance to give them a comparative report between their signal and that of WQEN which'll sign off at 3:30. They'll be using country & western music, and cycle tones, and many IDs. Pre-paid phone calls will be welcome, at 504-475-5141. Send those reports to Robert Carole, KLEB, 1842 Henry Street, Golden Meadow, Louisiana, 70357.

WDEL-1150. Another NRC member, the well-known and well-liked Joseph Jones, Chief Engineer here, is giving us his annual DE wing-ding this morning. They will use "Big Band" music, cycle tones, and dial tones, and many IDs. Something DIFFERENT! Your WDEL veries will come to you NOTICED! (next page, please)

(WDEL, con'd) Joe has attended N.R.C. Conventions, last time, in BOSTON in '68, where all in attendance came to know him as a real DE friend. WDEL has been a DEER's friend, too, for some four-or-more decades! 'Tis a tough channel with all those Canadians on all night, but give Joe a real hard try! Info from DAVE SCHMIDT

WING-1600. Back to the 1600 whirl-a-gig now. We have not had a word from NRCer and WING General Manager Paul Sidney, so we don't really expect WING to show, but give a listen just in case.

HEARD SINCE LAST ISSUE: 1590 EBBQ DE-SUNU.
 WATCH FOR DATE FOR A DE FROM Radio Sonora-TLJC early in March, says NRCer ANGEL GARCIA, by telephone.

STEVE KENNEDY - 2766 Lyle Street - Sarasota, Florida - 33577
 Newly from the land of Condominiums and Hirises, and Politicos. CX here are like that of a see-saw, up & down. I wish it would git flat cold and these old snowbirds would git out of here an' go to Ran Schots' place in Miami - la ha. By the way I'm from Sarasota, but I've lived in Alahas, love that state. Anyhoo, the hours I have to work are so bad I am thinking on taking up an offer to git back into radio. It's a funny thing, once it gits in yer blood, it won't get out. Same for DEING. Speakin about DEING, QSLs received; KOPY-1070 Tex., KYW-1060 Pa., WTEK-1000 Fla., WTOP-1080 Fla., WYOO-600 La., WKKO-860 Fla., WCI-1350 Fla., WYAN-1340 Fla., WYAB-790 Va. This brings the totals to 201 verifications since 2/22/64, when I started DEING. The loop I described in my last Muse has had some response, I have had a few requests for more info about it. Plans are available for 50¢ to cover Xeroxing and postage. Anyone interested write to above address. There are ten pages info on this loop. It's easy to build and works like a charm! I wonder who out there collects old time radio programs? I have several of "The Shadow" "Y sinns One" "Escape" "Ocean Komet" "The Lone Ranger" and "Suspense." If anyone collects these & is willin to swap other programs for these, let us know. I'll dub any one you want for another program. Also, I am in the market for antique radios. I had an Atwater-Kent model 70 while I lived in Bay Minette, Ala. at WCKA. My, I hated to part with it, but it was too big to ship by bus or car. It will surprise what I will pay for a good antique radio IF IT WORKS. Well, I have renewed for the third year and am lookin forward to those great technical articles. By the way, down here in Fla., you have about the worst location in the U.S. for DEING NCR especially if you can't understand SS. The dial is covered with Cubans & Mexicans & they don't speak no English, only five or four of 'em. Does anyone want to be a translator? I have started a log and I became effective 1/1/73 & as this Muse is written the totals are 272 stations logged. I'm going for 350 before Spring. By the way if you want to hear Sarasota up best bet is WKKY-930. Good DE & C U all.

ERNEST R. COOPER - 438 East 21 - Carrier Route 56 - Brooklyn, N. Y. - 11226
 Veries don't come no more (sadbooks, I'm a-talkin' like Steve Kennedy, above!) Only DE date was W@ 1/29, and this is what we hold: On 1190K, R. Cordillera was extra-strong today, while locals WQEN-710 & WABO-770 were off all AM. So was the R. Progreso network of Cuba. On 690, WAFPE was 5-9-plus, seems incredible on their night pattern, but it was RE programming - kiddy music, @ 8m. On 1030, WJEN-1030, Cal, was fighting XEQR and even winning a couple of rounds, so we got a report on his - I hope it's HIER - only the R.C.N. IDs heard. I thought I had Dave Gleason's WERC-DE @ 3:58, but was floored by the 4m announcement that it was Ed-Eff-Dee! And in the clear, alas - sorry, Dave. R. Paradise noted on DE @ 4:27, so most s/on around 4 a.m. WDEL-900, umm, strong all AM. That very weak DE on 710 there again this week, & @ 4:30, an EE & an SS w/NX - the SS turned out to be relaying WDAQ - R. Reloj, so must be WJTB, Ponce. Was the DE WGM 75? They had their OC on as usual, with every-ten-minute IDs as Storer Radio. R. Mammambo-740 still s/on @ 4 a.m. with Venezuelan National Anthem, and is an IPC, howling WQIB over every time. That one, and the two R. Embos outlets (570 & 670) have to be best bets for that Republic! As of 2/1/73, WBN is still MoR, but coming soon, c/v! I wrote WREL's C.E. also trying to get that hoped-for silent time on Monday Feb. 26 - again, no answer! I respectfully ask all you REAL DEERs out there to drop them a "Please" card on behalf of the NRC, and WCEK, WQEN, & KLEB. C U N 7.

MUSINGS OF THE MEMBERS EDITED BY **ERNIE COOPER**
 438 E 21 St. — CARRIER ROUTE 56 — BROOKLYN NEW YORK — 11226

JAMES E. CRITCHFIELD - 1504 Glenwood Drive - San Diego, California - 92103
 Between 12/12 & 1/22 reception reports have been sent to KNOE-540 for DK Special 12/18; to KHAC-1300 for f/c on 12/27; to KDDA-1560 for DK TEST 1/8; to KOVE-1330 for f/c on 1/10; to KCAS-1050 for RS 7 to 7:36 Friday 1/12; to KCIW-1330 for RS 9-9:48 Sat. 1/13; to KPOK-1330 for last of daily schedule from 3:43-3:58 Sun. 1/14; & finally to CBS-1550 for s/on program from 5 to 5:28 PM 1/21. Verifications have been received from KRKT-990, Cricket Radio, for RT on 12/1; KHAC-1300 for 12/26 f/c; KCIW-1330 & KPOK-1330 as above. The first three were v/As, & the fourth a v/q with KPOJ crossed out and "Formerly KALE" on the card. KALE heard in 1935, in Nebraska. KBRQ-1590, Ventura, Cal. was first heard @ 3:01 Wed. 1/3, a call change from KUDU. They might have changed earlier, but not checked. KAZA-1290 Gilroy, Cal. ended SS program w/its s/off in EE @ 8:15pm 1/10. KUMI-1450 Great Falls, Mont. & KVOP-1400 Plainview, Tex. were heard on r/cs 1/15. KPUR-1440 had a TT even with nearby KPRO on r/c 1/22. TTs only were heard at times listed for KIKW-1590 KIMS-1480 & KPIN-1340 1/22. KEMI-1440 Topeka had a loud RT, Idm @ 4:55am EST 1/22, #521 on [REDACTED] KOKA-1550 Shreveport, La. came on @ 5:28, covering CBS PM 1/22. Sorry to report that none of the MSP pests were caught off this week. That brings my report up to date. Best wishes to all.

BILL FELDE - 8708 Contee Road - Apt. 14 - Laurel, Maryland - 20810
 All DK continues to be netted @ SSS here w/nothing very spectacular added since last time. 1/8- WAEZ-1010 N.C. 5:10-5:14 w/Five O'Clock Report for South Central Oil Co., Ided @ 5:15 and faded. WFIV-1080 5:35-5:42pm way atop w/c/v, many call mentions, & spot for Ocala County restaurant. WBAL stop got them @ s/off time. WGOV-950 Ga. 5:55-6pm w/WN mx & PSA; Ided just before the hour and then gone w/power/pattern switch. WDAL-1330 Miss. 6:15pm atop w/tail end of s/off w/81B; not enough for tape. HIAZ-921a Santiago, D.R. w/mx & R. Santiago ID 7:15-7:25pm, bothered by WNY-810 splash, believe it or not. 1/9- WILD-1270 5pm in middle of s/off; has FM promo & no anthem; not new here, but needed for tape. 1/13- WIKR-1190 N.C. 5:29-5:30pm good level equal to WAVE v/s/off; uses "Till We Meet Again" for anthem; this for tape. WLET-1420 Ga. 5:45pm atop w/s/off; promo for FM 105.1 & mention of 500w PSA. WIZO-1380 Tenn. 5:58 s/off amid QRM w/FM promo; uses SFR. YVLL-570 Caracas 7:50-8:01pm w/"a traves de R. Rumbos y su gran cadena nacional" ID & then into sporting event coverage; Chicago & Havana both strangely missing this PM. WFUL-1130 Fla. 5:58pm 1/14 o/u WMAA w/s/off; very little WDEM. WLLX-1550 La. 6:30pm atop w/s/off; WPSC a problem here when CBS isn't. 1/15- WWTG-1580 Ga. 5:48pm w/jingle & s/off. 1/17- WBLR-1430 S.C. 5:45-5:46 w/end of s/off read by Becky Klarr; this one really dominated w/no sign of semi-local WMAV. 1/19- WACA-1570 N.C. 5:28pm peaking briefly w/s/off under stronger UNLD. 1/20- WRGA-1470 Ga. 5:47pm above WEAH bothers w/spot for Elnoe Drug Stores & promo for the WRGA Dog of the Year contest; then into Ga. WX. Now do you have a geomagnetic storm after solar activity has been low & very low for eight consecutive days, as happened on 1/20? (I dunno, Bill, but better wear your rubbers -ERC)

ROY H. MILLAR - Box 508 - Everett, Washington - 98201
 Hello! The third week of '73 netted only one new logging, but what a logging! 1/17- WLLS-1385 Eniwetok, Marshall Is. logged 4:08-4:59am s/off for my most distant 250w. (if such is borne out) even excelling my previous best catch of that power, FES-Misawa, Japan. Only verified catch that would be better on an MPW basis would be my 42R of "a little over 300w. ERP" of era 1954. I will be anxiously looking for reply to my detailed tape of this reception! 73. (Great catch, Roy! Congratulations! -ERC)

STAN MOSS - Route 3 - Bradford, Massachusetts - 01830
 1/3- C/v on 1330 @ 4:30pm turned out to be CHOO in the clear this PM w/no WPMJ QRM & WFEL weak when EM-1 pushed northward. With the pattern shown in the Pattern Book they're still in like a bomb. Um, but did I ever fight for them on their AM show a couple years back! R. Paradise-1265 now on RS w/religious speakers. HJZ-917 R. Espain in @ 6pm & on but fluttery & no report possible as mx was US rr. Verie, a little indefinite - but a friendly letter from WTKQ, one of my "25 Nearest Unverified", so now WMSW goes on the Wanted list as #25. WMSW still nearest unverified @ 49 miles & WLEW nearest unheard @ 115. With WMSW sold to Globe Trotters (WVON, etc.) no doubt ni more c/v there. WLEW also sold but I can't tell from new ownership list if any changes due as it's a new outfit who has several other purchases waiting FCC OK (WLEW on AM) & none being run by them yet. 1/4- E. Nordsee-1367 in w/tremendous signal 1:30am for semi-annual report - trying PP/c this trip. Christmas card from Radiolandia - a really friendly station. FM, stations from E. Ont. & Central Que. in w/fabulous signals. Plessisville pushing the S-meter & CJPR Brockville sobbing 1450 after WLEW faded 4:35, so I went to 610 & taped 610K to 6:45. From 6 on, CQMG equal to WGR - a longish type & letter sent. Verie, WTKQ WTSO & WSKW. WSKW another of my "25 Nearest Unverified" at 160 miles so WPMJ @ 250 goes on the list. WSKW included promotional items for WSKW & sister station WYOS-FM. 1/6- WSVY-1450 heard but only up for one minute @ 3pm - channel taken by WMTQ/WRED tonight - nearest unheard now WLEW-1400. 1/8- WTKX-1330 testing w/WBOT QRM. WFSM-1260 testing 2:30. WHEW-620 now AN MM. 1340, Asbestos Que., CIAL I hope - full ID on hour before NK & following lists all five on net - CKLD/CYDA/CKPL/CKPL (Plessisville) (90% sure of this call) & CIAL-1340 strong @/as but average signal fourth of five here w/CFDA weakest & CKPL best. WCLS-1590 noted 4:30am. CKCO-1320 already on RS @ 4:35. CH already on 990 @ 4:45. 1/10- WSAW-1000 Va. 5:05-5:12pm when CKEM abruptly took over, QRM by a c/v. No verie last year on short test so another try. Verie, a welcome one from WKEN w/QM leaves two in Delaware.

CHRIS LUCAS - 407 Elmwood Avenue - Ithaca, New York - 14850
 Only a little DK done this past week. 1/16- WAGL-1560 S.C. @ 4:02pm. I've noted WAGL many afternoons u/o WQXR around 3:30-3:45 at which time they cut power. No trace of WADD-1560 here. 1/17- Nice reception of WHBL-1330 Wis. @ 5:35 pm o/u WEAW, o/WFBC, w/N.Y.C. absent. An UNID cut power @ 5:45, & an UNID s/off @ 6 I seem to recall, all on 1330. R. Paradise-1265 heard well @ 8:16pm. 1/19- WHYP-1530 Pa. @ 5:02 o/u WTHM. 1/20- WKLV-1440 Va. @ 5:07pm, WKCY-1300 Va. made it past WFBP @ 5:09pm. CKTS-900 @ 7pm. MM 1/22- I heard "CKLD" on 1400, & since I believe CKFL-1400 is // -CKLD-1230 I logged it as CKFL-1400 lac Magantic, Que. for graveyard #66. Language was FF, time was 12:51am. WEAH-1390 Va. @ 1:10; u/WFBP. I also had a tester on 1390 around 1 w/an ID, but all I caught was "North Carolina" as I was rotating the loop at tge time, & had them nulled when the calls and city were given. I'll keep this short as I've got lots of other work to do. 73.

Bob Menn -- Hialeah.
 This is my second Musing. I haven't logged too many because of the terrific Christmas overtime & also the many Cubans all over the dial. Most of those I've logged were early morning stations & those just signing on. WCTT Ky. @ 5, WOLA Wis. @ 6, WACL Ga. @ 5, WRCK Ill., CJSS CJRW WBBM Wis. @ 6, WSPB Ga. @ 6, WJWB Fla. @ 8, WHIZ O. @ 7, R. Juventud, Venezuela, 3. Perhaps one of the experts in CA & SA can give me a clue on a good mx station on about 1240 that IDs as "la Rio del Oro - Musica". Also another on/about 1310 and also on 1250 that IDs as R. Exemplar, or something similar. Usually they are picked up after 2:30 a.m. I hope I have more later on. Until then, 73s fellas. (I omitted your address, Bob, at your request - wcn't you double space at mine, please? -ERC)

AS THEY SAY IN THE SUMMER IN WORCESTER, MASS.: "WAAB" - WEATHER ASPECTS ALWAYS BEAUTIFUL" - in The Bay State! So, come one, come all, to BOSTON for the Labor Day Weekend N.R.C. Convention - Aug. 31, Sept. 1-2-3! Don't miss out on the FUN!

JIM HAYES - 9 Henry Street - Wilkes-Barre, Pennsylvania - 18702
DK CX are good but I haven't gotten any new catches lately. I am still waiting for verifications from WLEF-1420, WFLI-1540 & WCFB-1580. 1/7- WFLI-1580 Ga. heard 7:00am. 1/20- Chicago & other Western 50kws in at good level at

4:40pm. I thought this might be a good chance to clean up on some long-absent Western daytimers but so such local Va. & D.C. were making it in as usual. 7pm, WJMS-1370 Va. in IAC. 5:29, WMLB-1480 Va. on s/off. 5:31, WKO-1480 Fair Bluff N.C. in at good level w/s/off "wishing you a pleasant and restful evening". This is a new station for the log. In strong, w/c/WSAN, an UNID-68 w/song "Happy Birthday to You" in strong, w/c/WSAN @ 7:40pm. MM 1/22- 12:23am, WKID-1340 N.J. really comes in like a ton of bricks here. 12:27, WTEL-1490 Mass. in good w/ traffic watch prog. 12:53am, UNID tester w/rr w/c/WYFL-1350, 1:03am. WJMS-1460 Fla. on s/off. 2:15, WGHG-570 R.L. o/WJMS w/rr. 2:22am, WJMS-560 Mass. s/w/c of talk & rr. 2:23, WJMS-570 O. in very weak. 2:32, CKCY-920 Ont. w/rr. 2:44, WJMS-1480 Ga. "The Dynamic Sound of WJMS." Also WLEF-1480 Va. mixing in. 2:49, CPQO-1440 Ont. Did WJMS-920 Fla. change calls to WMLI? I believe I heard that call @ 2:30 this morning. (They changed WJMS a year ago, Jim, to "WMLI"- for MELbourne - ERC) 1/23- 2:20am, WABC-770 off w/an SS playing American rr. Cuban-670 way over w/EZ listening, a parallel station on 690 was all alone @ 3am. 466 heard now.

WES BOYD - WHOT - Youngstown, Ohio - 44505
DK kinda poor last several weeks due to equipment troubles that are mostly taken care of now. Noted: WJMS-1450 N.C. on 2-2:30 on 12/28 w/EKB remote from Hawaii. Sunrise of 1/5 nice w/WMLK-1560 Ky, KSWN-940 Mo. & WPHB-1260 Pa. all within 20 minutes between 6 & 6:20am. 1/8 saw CPNB-550 (R. Atlantic) o/KTSA in place of WJMS TEST. KJMS-980 finally 2:27-2:31am. 1/15 found WOR-710 off but nttin' there. WSLV-1110 Tenn. on ET 1:32-1:44am. WRAO-1530 Ala. ETNG 2:39-2:46 am. KRIS-1190 in u/KLIP etc. all AM. WJMS-580 w/c/v all AM so he & KRIS may have gone MSP. WFTX-1470 TEST only fair but CW IDs were great. ID from WJDK-620 on OC @ 4:05am. 1/17 saw WJMS-1450 Pa. w/c/v from 1:37 till 2 s/off. 1/18 found TT on 1:50 from 2:33 to 2:58am. One ID finally @ 2:57 as WJMS, Miss. I called & 'tis monthly r/c; third Thursday, 12:15 to 12:30 CST & sometimes on longer for testing. (Isn't it 1:15-1:30 CST & 2:15-2:30 EST, Wes? -ERC) 1/22 gave WPAE-1400 on 2:03 to 2:06, then gone. 1860 from 1:30 till past 2:30 only WJMS/WJMS so maybe the WJMS 12-3am MM SP does exist. WJMS-1500 on ET 2:30 till 2:35. WJMS-1460 w/c/v 3:41-4:05 so is back on MM. ET from KJMS-1500 Mo. 3:31-3:40 w/rr. No sign of WJMS-740, only SBRS & KJMS, so off AM? MoR on 1320 past 3am has gotta be KJMS. Someone else w/talk stuff there plus (I think) WVOJ w/c/v. WJMS s/off @ 2:05. WJMS-290 on ET 2am w/daytime facilities. WJMS-690 killing 690 @ 4:30 so it had to be a non-DA test. WJMS-980 all AM so maybe MSP. WJMS-850, WJMS-1280 & WJMS-790 all great after 5am so possible 5am s/ons. WJMS-840 now off SAs due to tele-talk stuff from KSL rest of the week. Wasn't on @ 5am 1/21, a SM.

RON MUSCO - 16 Chestnut Drive - Windsor, Connecticut - 06095
Overtime at work has severely cut down my DXing & letter writing. I'm presently working on the jet fuel control for the Harpoon missile. I'll be 31 in February, married, with two boys. I have been DXing off & on since 1962. When I say off & on that's what I mean - nothing heard in '65, eight in '66, 15 in '67. I have been fairly active since 1970 now that I've got a loop. DK: 1/1- WJMS-1450 4-4:10pm w/WJMS nulled for N.J. #17. PFC-1220 @ 4:33pm but no ID heard. WJMS-1110 4:47-4:59 w/WJMS QRM, mention of FM, religion programming for Pa. #59. 1/7- The new R. Paradise-1265 pinning the S-meter 10-11:04pm s/off. Requests aired along w/ religious messages, easily split off from WJMS-1270. 1/8- WJMS-1550 finally 1:12-1:30am w/s-8 signal. Question: Who was testing on 1560 @ 1:36 ID, but I missed it? New state in KJMS-1560 3-3:26 weak w/unq QRM. 1/22- CX seemed bad w/only three testers heard. Two different on 790, 12:18-12:32 but no IDs. WJMS u/WJMS w/TT, phone no., address, so maybe PoP 12:40-12:45 timeout. And WJMS-1450 w/announced r/c 12:55-1 end, weak but readable. Veries in: v/q- WJMS WJMS WJMS. v/1- WJMS WJMS WJMS. v/r- KATZ WJMS CKAC. And WKOK v/1 w/no f/up after 16 months. WJMS-1230 holds the record at over two years. 73.

REMEMBER REMEMBER ABOUT THE BOSTON TEA PARTY? COME TO THE BOSTON WHEE PARTY!

Deadlines: Fridays of each week; DX phone: 201-838-5721.
Receptions:

- 540 VENEZUELA. YVOV, R. Perija, Rosario 0235, 1/27 hrd weak w/ID not good enough for tape amidst lengthy commentary by man. (Edmunds, NJ)
- 584 FRANCE. probably Marseille new FI outlet 1/31, 0610 w/ talking in FF way over RNE, poss. nx. (Taylor, NJ)
- **620 ECUADOR. Emisoras Gran Colombia, Quito will be on with 10 kw. soon, if not already. Licensed to 615, but will probably use 620. (David F. Gleason, Birmingham, Ala.) (Welcome!)
- 650 COLOMBIA. Bogota, HJJX, Emisoras Montserrate 0800 1/15 weak w/MoR mx at 0750, SS ID 0800. WSM w/ET at 5 kw. easily nulled. (Richard Allen, Okla.)
- *660 ECUADOR. R. Carrousel, Guayaquil. Has been, as reported, on with 10 kw. Actually, it has been operating with about 7600 watts to preserve final tubes. It can be used to check 805. If the 805 sounds like 660, 805 is the HC. Both have identical formats. (Gleason, Ala.)
- 660 DOMINICAN REPUBLIC. HIAM, R. Quisqueyana, Santiago s/on 0930 after at least 25 minutes of OC; possibly used NA at s/on, had some chimes much like HJMS-570. Surprising w/XERPMP looped for only 2 kw. power. (Poterba, Pa.) (Nice catch!)
- **660 ECUADOR. R. Omega, Quito. A New operation of the on and off station here will be on shortly. Block programming, 10 kw. There is a change of name in the works, too. (Gleason, Ala.)
- **680 ECUADOR. HCJB, Quito has purchased the assets of Radio Xavier in Quito, and will move to this frequency with 30 kw. to avoid severe Radio Sutatenza interference on 700. (Gleason, Ala.)
- 700 VENEZUELA. YVMH, Maracaibo 0300 1/26 atop channel w/lengthy "R. Popular" ID sequence by man, woman, then SID. HJCY not heard. (Edmunds, NJ)
- 730 COLOMBIA. HJCU, R. Tricolor, Bogota 1/26 0301 strangely atop channel w/ID, no sign of usual Cuban mess. First time logged here. (Edmunds, NJ)
- 735 ECUADOR. Radio Melodia, Quito. Power is 10 kw. Station owner is very prone to exaggeration. (Transmitter is a 10 kw. Contel made in Miami by Cuban refugees). Reports may be sent to the address listed in WRTVH for Radio Nacional Espejo-1310 in Quito. Owner is Gerardo Erborich. A notorious non-verie operation. (Gleason, Ala.)
- 750 COLOMBIA. Medellin, HJDK, LV de Antioquia 1/22 fair w/rr mx at 0640, CARACOL ID in SS 0700. WSB off. (Allen, Okla.)
- *800 MEXICO. XELO, Ciudad Juarez, Chih., "Radio 80" now with AN rr mx format. (Allen, Okla.)
- **805 ECUADOR. UNID listed here is possibly HCFV1, Canal Tropical (same "radio") in Quito, which I returned to 805 from 810 in May of '72. Power is just short of 1 kw., and it also uses the slogans of "la onda ochenta" and "Nucleo Radion", the latter a reference to the group owner of the station. Reports may be sent to Mary Lou Parra de Hay, G.M., Box A-57, Quito. (Gleason, Ala.)
- 820.9 DOMINICAN REPUBLIC. HIAZ, Santiago 1/26, 0317 hrd w/extremely raucous het against HJED/WBAP. Pgm mostly lite male vocals. No ID hrd; loop says HI, per WBF report. (Edmunds, NJ)

**1215

GILBERT & ELLICE ISLANDS. VSZ1 Tarawa 1/16, 0930, some patches of audio surfacing. (Matt Edwards, NJ)(Congrats, Matt)-CUBA. CMDN, "R. Internacional", Havana 1/26, 0345 w/50's rock, indigenous mx, some lite MoR, very muddy audio in speaking. Bearing 220, format had me almost convinced of TGMS until ID hrd 0345. (Edmunds, NJ)(Listed CMBL per RFS Cuban listed) @1/26, tune-in 0340 w/mx to 0400 ID, mx headlines to 0403, then more mx. Good sig w/annoying het from WWL easily chopped off thru use of AM gating function on SSB adaptor tied into HQ150. Obviously auroral condx that have persisted at least 4-5 days after this logging. (Sundstrom, NJ) CUBA. CMDN, Guantanamo weak w/Latin mx //720 0710 1/22. WWL off. (Allen, Okla.)

ECUADOR. Radio Colon, now 10 kw., is changing its name to Radio Amazonas and is under new ownership. (Gleason, Ala.) ECUADOR. HCDE2, R. Ifesa, Guayaquil 1/16 0230-0300 SS MoR vocals, up-tempo MoR w/EE lyrics. (Edwards, NJ) MEXICO. On 2000 kHz., 1/30 1316 SS ad for Selecciones for February (Reader's Digest); not R. Mil, so one of two or so other Mexicans. (Hauser, Texas)(Only XEFV, Cd. Juarez listed my references, Glenn.-ed)

HUNGARY. New station 1/16 hrd w/nonstop mx until 1400Z, then Hungarian svc. (Bengt Ericson, Sweden in ARC "MV-EK" 1/22) unID. Probably East Germany tune-in 2256 1/3, male ann in Balkan tongue; played NA for s/off 2258. After s/off, Morocco was at good level on freq w/TC, AA lang and mx. NA played was in common (4/4) time, while Greek NA I Have is in 3/4 time. East Germany dominated freq later. WTH does not denote break in continuity. NA taped but still unID. (Bailey, Mass.)(Bill-how about sending dub of tape? Any format R-to-R, cassette-ed)

GUATEMALA? TGRS? On 2200 kHz. 1/30 1234-1242 f/out SS mx, anmts, TCs, vy weak; maybe R. Superior, Escuintla hrd last season. (Hauser, Texas)

GUATEMALA. TGVR. Gene Martin's unID is LV de la Costa Sur, Retalhuleu, hrd well here 1/29 1041 promoting 1,130 minutes of alegria per day (that's 18h50m, perhaps extended to 18h55m now, hi-gh) ID, 1043 5-min fast TC, overtalkative DJ talks through entire cuts. (Hauser, Texas)(Tnx ID Glenn! My unID also-ed)

GUATEMALA. TGRL, R. Recuerdo, Quetzaltenango on 2341x, 1/30 0409-0430 ID, distorted marimba mx. (Hauser, Texas)(just can't play those marimbas straight anymore, eh?-ed) unID. Probably Int'l Waters; 1/4, 0025 used old Radio Caroline format; EE male ann., rr mx, 0045 ann, spoke of "open windows" f/by 2 singers w/guitar. 0051 band w/flute solo in jazzed-up Baroque tune; severe fading at times - seemed to change pwr at 0100. (Bailey, Mass.)(Caroline rptd here in ARC/Sweden-ed) MOROCCO. Casablanca B 1/4 0020 good lvl in AA, typical chanting, then tuned lower to 1186 item. (Bailey, Mass.)

USSR. New DF 1050 to Kharkov, Rostov? (Ericson, Sweden as rptd in V22 ARC "MV-EK") VENEZUELA. Caracas, YVOZ, R. Tiempo weak: 1/14 0015-0840 w/MoR mx, frequent TCs. WOAI off. (Allen, Okla.)

NICARAGUA. YNKB, RFS' unID. 1/29 1003 SS, ranchera mx; 1008 talk abt terremoto 1013 TC for 6:14, "hora oficial de Nicaragua", 1032 TC for 4, ads for Pepsi and Orange Crush distrib, cigarillo jingle, Ron Tropical (an oblique ref to RFS??-gh), then TC for 5:35. Ancr either can't tell time or had too much ron; ID: "YNKB, R. Ondas del Calan, 1210 onda larga, transmitimos desde Juigalpa, ... Not R. Ondas de Chontalenas as in WRB reprint in WV; fair sig, seemed closer to 1215 than 1214 or 1216. (Hauser, Tex)(Tnx, Glenn! I must have mis-IDed YSS relay rptd here, or perhaps it also exists?-ed)

***1367

ANGOLA?? 1/29 0030-0102 carrier cut - carrier only hrd, bearing 102 - a 2-3 Hz SAH noted and after carrier cut at 0102 a weaker carrier left on freq, too weak to take bearing. (Ray Moore, Mass.)(Angola entirely possible-let's watch this one, gangli-ed)

*1475

unID. 1/18, 2210 w/high-pitched woman's voice in unrecognized lang, bearing 10-15 average of 25 bearings;fade characteristics similar to Urumchi-1525. (Taylor, NJ)

*1517

INT'L. WATERS. R. Caroline closed down here 12/29/72 to move to 1187 kHz. (ARC "MV-EK", 1/22/73)

1525

PRC. Urumchi 1/27 2315 w/choral mx, revolutionary style, little talking, mx in CC, talk in RR; 2230 on 1/30, talk in RR; IS, ID 2300 1/31; 1/18 IS 2300, suddenly very strong 2300+ in RR, patt change?? (Taylor, NJ)

1537-5

HONDURAS. On 3075, R. Comercial 1/23 0025 FMY overmod, ID, phone, jingles at every break;0229 ID, unhrd on fund. (Hauser, Texas)

*1546

UNITED KINGDOM. Radio Bristol; tune-in 0109 EE male ann w/ads (steady at 10db.), 0115 "Finger Bustin'" ala Jimmy Dorsey; 0121 "Ain't She Sweet" up-tempo w/brass, woodwinds and rhythm section; MoR format, then @ 0137 EE male pronounced "Radio (one syllable) Bristol ---- BBC" 0138 alto singer in sad song w/bells, guitar and bass. Report sent. (Bailey, Mass)(Nice!-ed)

**1550

@England fair-good w/MoR mx, some vocal, some inst, male anc 0525, 1/31, some kind of ID 0530, missed, nützen! (Taylor, NJ) GUATEMALA. On 3100, Cadena Azul 1/29 1054 fast-beat mx 1101 net ID, affiliate list, jingle; probable fundamental. (Hauser, TX)

Many thanks to these supporters! Please don't let down now! How about some more 6-page IDXD's? You send 'em - I'll type 'em.

- Richard Allen, Billings, Okla.; (4) Pioneer SX300T, unampl. 2' loop
- Bill Bailey, Holden, Mass. (5) R390A, HR060, 2' loop, 6 Bev. ant.
- Russ Edmunds, Parsippany, N.J. (5) HQ180, 4' NRC loop, 2' loop
- Matt Edwards, Rockaway, N.J. (2)
- David F. Gleason, Birmingham, Ala. (7)
- Glenn Hauser, Von Ormy, Texas (7) HQ160, 560' LW NW/SE
- Ray Moore, Walpole, Mass. (1) Homebrew 9 tubes, 2 FET, 9 diodes, 40" loop w/DIGFET preamp., 250' LW
- Jim Poterba, Yardley, Pa. (1) HQ200, SM1
- Tom Sundstrom, Willingboro, N.J. (1) HQ150, SM2
- Page Taylor, Butler, N.J. (4) SX130, 4' NRC loop

PRESSTIME FLASH! In a call to HQ taken by Sam the answering machine earlier today Ron Schatz informs that he has made a positive identification of the Paraguayan on 645 kHz and that it is definitely not R. Caaguazu as previously announced by Geoff Trower and it is also not "Encarnacion" as Schatz has contended to date. For reasons that are not clear he refuses to give us the ID unless we call him back later tonight. Since this will be after presstime, the membership will have to wait until next week to find out. HQ

844

*868

870

**920

946

1000

*1016

1043

1100

*1135

1170

**1186

1187

**1196

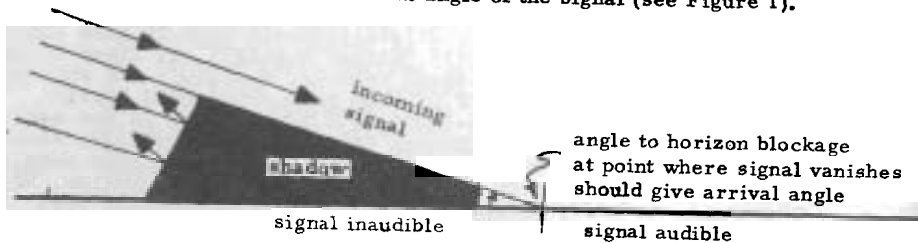
1200

SKYLINE BLOCKAGE - Sources of Uncertainty in the Calculated Angle of Arrival for MW Signal Paths

*Gordon P. Nelson

A number of MW DX'ers have prepared horizon blockage maps in an attempt to predict and explain the influence of local terrain on MW DX reception and to account for differences in reception patterns experienced in different locations.^{1,2} The author has done considerable work on this problem - both experimental and theoretical - although with a somewhat different motivation...

Many interesting and puzzling problems in MW DX reception might be solved if we only had an accurate method to measure the angle of arrival (above the horizon) of various rare DX signals. At least in principle we could then trace the signal back through the various reflecting layers all the way to the transmitter; the information thus gained would be a great help in explaining and predicting MW DX reception. The techniques used to measure signal arrival angle on high frequency signals are impractical on the broadcast band because of the impossibly large antenna dimensions required by broadcast band wavelengths.³ We had therefore hoped to make use of horizon blockage to provide us with a measure of the signal arrival angle; by moving a receiver closer and closer to a mountain of known height we had hoped to observe a sudden drop in signal strength as the incoming signal was blocked by the mountain. The horizon blockage angle at this point would then give us the arrival angle of the signal (see Figure 1).



Two separate classes of problems were anticipated and confirmed by later experiments: (1) The geometrical uncertainties in the calculated arrival angles for different propagation modes as described in this article and (2) The effect of Fresnel diffraction on MW signals (discussed in an article elsewhere in DX NEWS).⁴ While the former difficulties can be handled fairly well with the limiting ray technique to be discussed, the latter problem - proved so intractable we were eventually forced to abandon the project. We strongly suggest that anyone interested in pursuing horizon blockage studies on the broadcast band consider these problems carefully.

Any potential usefulness of a horizon blockage map obviously depends greatly upon the accuracy of the calculated signal arrival angles; these same angles are important in auroral blockage studies also. Until someone succeeds in developing an accurate method for measuring arrival angles for MW signals, this vital factor must be calculated on the basis of assumed layer heights and propagation modes. The following complications arise in connection with the calculation of MW signal arrival angles.

1. Variability of effective reflection height.

Use of a single standard "textbook" value for the assumed signal reflection height

is unrealistic and readily leads to highly misleading results. The author has examined quite a number of ionograms⁵ showing measured reflection heights of MW signals and has observed actual F2 layer reflections ranging from a low of about 260 kilometers to a high of about 400 kilometers.^{6,7} Thus a more realistic value of F2 reflection height is 330 km with a possible variation of ± 70 km. This normal variation in reflection height can significantly affect calculations of both arrival angle and maximum skip distance. Consider the 3212 mile path from Boston to Lisbon. If we assume the lowest likely value of F2 reflection height - 260 km - the first possible F2 path will consist of 3 skips and the arrival angle will be 13.2° . If instead we assume reflections from a height of 330 km, the path still requires 3 F2 skips but the arrival angle is now 17.2° . If we admit the possibility of reflections from as high as 400 kilometers, the corresponding angle for a 3 skip path is 21° . But if the F2 reflection height is as high as 400 km, the signal can also make it in only two skips - with an arrival angle of 10.5° .

The importance of taking into account the possible extremes of reflection height variation should now be obvious: not only will the calculated angles of expected signal arrival be affected, but normal height fluctuations may permit propagation by other modes (in this case the two F2 skip path possible when the F2 is near the top of its range).

Propagation via the nighttime E layers (see next section) is also subject to variation in effective reflection height. Based upon ionogram measurements, we suggest a realistic value of E layer reflection height of 105 km, with a possible variation of ± 10 km.⁷

Therefore instead of a single calculation with one assumed layer height, the computation should be done a number of times: once assuming the lower limit of reflection height and once assuming the highest for each reflection on the path. Instead of a single value of arrival angle, this approach gives several possible values - each of which is physically realizable on the basis of known variation in layer height. The highest and lowest of these values are the limiting rays - the extreme values we might expect given all possible combinations of possible layer heights.

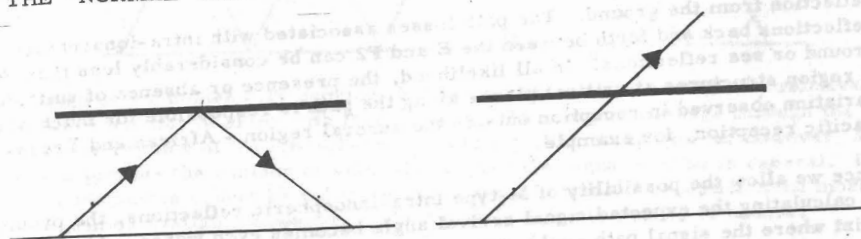
In our work on auroral screening,⁸ we commonly use the lowest limiting ray angle to decide whether a particular signal can just barely skim in under the auroral absorption layer; for horizon blockage studies one would presumably use the highest limiting ray to decide whether or not the horizon would be blocked.

2. The "M" propagation modes.

For our purposes, at least two different types of E region reflecting layers may exist at night on the MW band. Propagation via the E layer is quite common at night on MW frequencies and must be taken into account when possible propagation modes are being considered.

One type is the so-called "normal night E layer". Highly variable and of unknown origin, the night E layer behaves in a simple manner for MW signals: as long as the signal frequency is below the critical frequency of the layer, the E layer behaves like a perfect mirror and reflects all signals back down to Earth. Above the critical frequency, though, the layer is perfectly transparent and signals will pass through it as if it were not present and continue up to the F2 layer for reflection. The critical frequency of the night E often falls somewhere within the broadcast band and is likely to be responsible for much of the variation in reception on

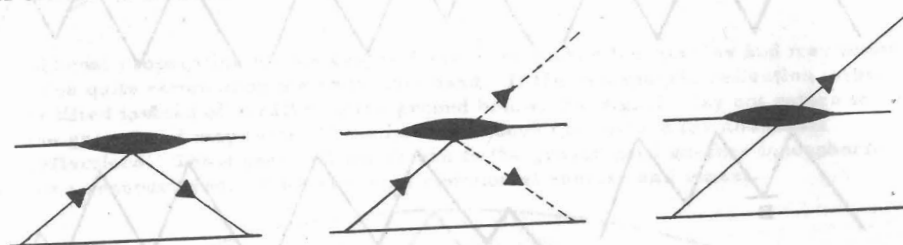
THE "NORMAL" NIGHT E:



If the signal frequency is below the critical frequency for the layer, total reflection takes place.

For signals above the critical frequency, the night E layer is perfectly transparent; MW signals will pass through to the F2 layer.

SPORADIC E LAYERS:



Signals below the sporadic E blanketing frequency are reflected completely.

Signals on frequencies above the blanketing frequency but below the critical frequency are partially reflected and partially transmitted through to the F2 layer.

Signals on frequencies above the sporadic E critical frequency can pass through unaffected.

The night E layer exists primarily in moderate-to-high latitudes and behaves much like the classical daytime E layer. It covers a wide geographical area and is relatively uniform on any particular night. Sporadic E by contrast is quite patchy and cloud-like; it changes from minute-to-minute and exhibits rapid drifts with speeds as great as 250 miles per hour. Much of the short-term variation in MW propagation (minute-to-minute and hour-to-hour) is probably the result of sporadic E. The important layer frequencies such as the sporadic E blanketing frequency, and the critical frequencies commonly fall in the middle of the band thus making many of these night E effects highly frequency selective.

12 different frequencies on any particular night. The critical frequency of the layer varies considerably with location and time. This type of layer is primarily an auroral zone structure and is most important in higher latitudes; during geomagnetic/auroral disturbances, however, it extends southward over North America and Europe even further than the auroral absorption zone does.⁹

The second common source of night E reflection is the sporadic E layer. While DX'ers normally think of sporadic E as a high frequency phenomenon important only for VHF DX, it is extremely common on the MW band and is one of the most important factors controlling MW DX reception. As its name suggests, the sporadic E layer is sporadic, highly unpredictable, and varies with time and location.¹⁰ The sporadic E layer affects MW signals at night in a somewhat different manner than the "normal" night E does. Below one particular frequency, called the sporadic E blanketing frequency, all signals are completely reflected back to the ground and cannot reach the F2 region - that is, they are blanketed by the sporadic E. On frequencies above the blanketing frequency, the sporadic E layer is only partially reflecting - part of the signal is reflected back to the ground and part passes through to reach the F2 layer. As the signal frequency is increased above the blanketing frequency, an increasingly large fraction of the signal passes through the layer until the sporadic E critical frequency is reached, above which the layer becomes perfectly transparent. The primary differences in behavior between the normal night E and the sporadic E are twofold: sporadic E exhibits a "translucent" quality for signals between the blanketing frequency and the critical frequency, and the sporadic E is "patchier" and more subject to rapid changes. Both the blanketing and critical frequencies may fall in the middle of the broadcast band on many nights and this probably accounts for much of the hour-to-hour and night-to-night variation in reception conditions. Both the geographical location and frequency behavior of night sporadic E may change rapidly with time (as may reception conditions on the broadcast band!).

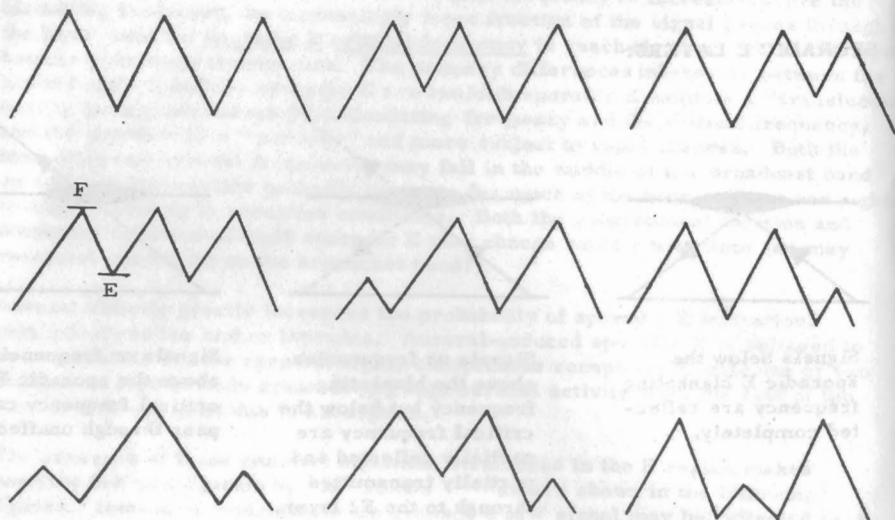
Auroral activity greatly increases the probability of sporadic E formation, particularly in the higher latitudes. Auroral-induced sporadic E is believed to be responsible for the rare but highly conspicuous receptions of only one or two stations in high latitude areas during high auroral activity when the rest of the band is entirely quiet due to absorption.⁸

The presence of these common nighttime structures in the E region makes possible MW propagation by "M" modes as are shown in the following figures. Instead of returning to the ground, a MW signal may be reflected back upward from the night E layer for another F2 reflection. Because of the geographical variability of the night E layer, one part of the path may have a significant amount of E while another part may have none. In addition to producing M-type reflections, night E reflection can prevent a down-coming signal from reaching the receiver site or prevent a sky wave signal from reaching the F2 region - this latter is called E blanketing.

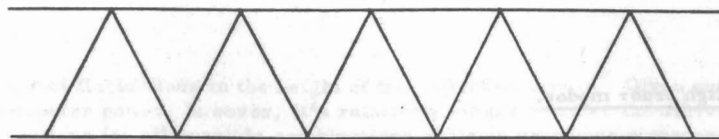
After 10 years of active international DX'ing with the best equipment available and much study of ionospheric research data, the author believes that many very long distance exceptional catches such as TA's on the West Coast and South and East Africans on the East Coast of North America take place by means of intermediate M-type reflections back and forth between the E and F2 regions without the signal being subjected to the scattering and attenuation resulting from

reflection from the ground. The path losses associated with intra-ionospheric reflections back and forth between the E and F2 can be considerably less than for ground or sea reflections!" In all likelihood, the presence or absence of suitable E region structures at critical places along the path is responsible for much of the variation observed in reception outside the auroral region - African and Trans-Pacific reception, for example.

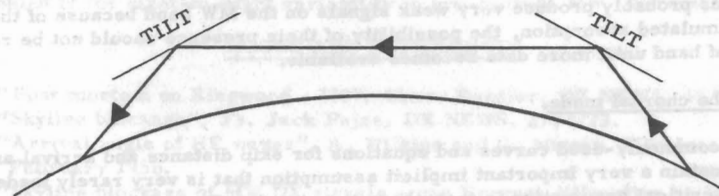
Once we allow the possibility of M-type intra-ionospheric reflections, the problem of calculating the expected signal arrival angle becomes even worse. At each point where the signal path could pass through the E region, we have to admit the possibility of an effective E reflection there. In the case of our Boston to Lisbon path, for example, we have to enlarge our catalog of likely possible paths to include several likely M-type paths as shown in the figures.



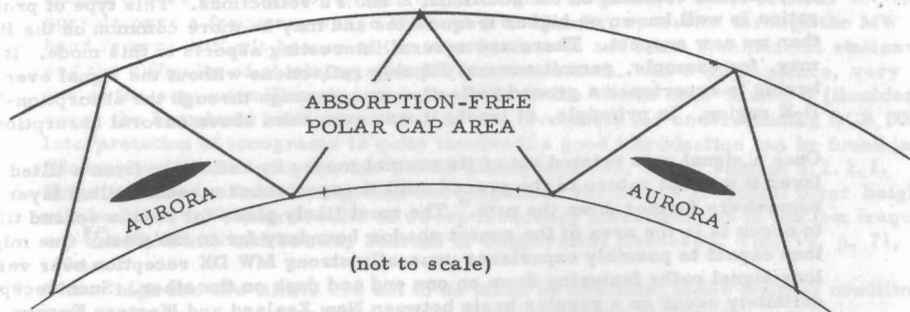
For each possible path mode we consider likely, we must calculate the final signal arrival angle. Since the reflection height can vary at each place of reflection within the limits discussed earlier, we must calculate all possible arrival angles resulting from all likely modes, with both high and low values of height at each reflection point. This means several dozen calculations for each distant station of interest but, since we cannot identify the reflection layers or heights in advance, we must consider each one as a very real possibility to support propagation. As before, each mode and height set will produce an arrival angle; of all the angles so produced, there will be a highest one and a lowest one - the limiting rays.¹² If the researcher is to be certain that his arrival angle calculations are physically meaningful, he must evaluate all possible likely paths and layer heights. Simple models are fine for getting a feel for what's going on but they seldom describe or predict rare and unusual receptions!



High order modes may provide skywave propagation by means of a relatively large number of skips with large angles. Each signal passage through the lower regions of the ionosphere will add significant absorption, however, and the greater the number of skips the weaker the signal will be in general. High order modes cannot be ruled out completely in MW DX reception until more data becomes available however. The Earth is actually round, of course.



Chordal propagation modes are well known on higher frequencies and may prove to be quite common on the broadcast band. If the ionospheric reflection layer is tilted instead of parallel to the ground below, the signal may not return to the ground and may instead continue high above the surface for additional reflections. The signal will not return to the ground until another ionospheric tilt is encountered. Tilts are most common at sunrise and sunset.



Transauroral propagation of MW signals is a very complex subject. Reception of the Chinese Sinkiang transmitter on 1525 kHz (8 megawatt ERP in this direction!) has been definitely noted on the East Coast of North America during periods of auroral activity high enough to provide complete absorption for all other TA signals. The most likely path for these receptions involves the chordal mode: these receptions take place near the time of dusk at the receiver site and dawn in China - the conditions most likely to produce the necessary complementary tilt angles for the chordal mode. A second class of possible paths exists by virtue of the absorption-free polar cap region; during all types of auroral disturbances excepting those of the "PCA" variety there is a large circular region centered on the magnetic pole devoid of auroral absorption. As shown above, paths which skip over the auroral absorption and through the polar cap area may possibly exist. (Not to scale)

3. High order modes.

Each reflection and each passage through the D and E regions will weaken a MW signal. In general, the fewer the total number of reflections, the stronger the signal will be. Propagation through the base of the E layer may produce enhanced absorption, as will reflection from the ground. High order propagation modes - such as 7 or 8 F2 skips over a short distance - have been observed on high frequencies.¹⁷ There is no data for the broadcast band, however, on this subject, and it may prove more important than we now realize. If and when we are able to measure MW signal arrival angles, the question of high order multiple reflections at steep angles will be resolved very quickly. While such reception modes probably produce very weak signals on the MW band because of the total accumulated absorption, the possibility of their presence should not be rejected out of hand until more data becomes available.

4. The chordal mode.

The commonly-used curves and equations for skip distance and arrival angle all contain a very important implicit assumption that is very rarely made clear. This critical assumption is that where the signal reflection takes place, the ionospheric reflection layer is parallel to the ground beneath it. Ordinarily this is a very good assumption but it can be demonstrably incorrect in two special cases: around the sunrise and sunset shadow boundaries. Approaching dawn and dusk frequently produce a slight tilting in the ionosphere and this can produce a very interesting type of propagation called the chordal mode.^{3,14} If the F2 reflection region is tilted slightly in the proper direction by only a few degrees relative to the ground below, a MW signal on a low angle path may not return to ground and may instead continue on for additional E and F2 reflections. This type of propagation is well known on higher frequencies and may be more common on the BCB than we now suspect. There are several interesting aspects to this mode. It may, for example, permit several F2 skip reflections without the signal ever having to experience a ground reflection or a passage through the absorption-laden D-E region. In principle, at least, it may even skim above auroral absorption.

Once a signal gets twisted out of its normal modes by reflection from a tilted layer it will not return to the ground until it experiences a second tilted layer somewhere further down the path.¹⁵ The most likely place for such a second tilt to occur is in the area of the sunset shadow boundary far to the west.^{17,18} One might then expect to possibly experience unusually strong MW DX reception over very long signal paths featuring dawn on one end and dusk on the other. Such receptions definitely occur on a regular basis between New Zealand and Western Europe - DX receptions over paths substantially in excess of half a great circle path are quite common there and may well be the result of chordal mode propagation. Close to home, the very anomalous and intriguing receptions of Sinkiang-1525 made during periods of high auroral activity by the author and several other members this season when all other Transatlantics were inaudible may be the result of this rare propagation mode - although several other explanations are also possible.¹⁶

CONCLUSIONS. Whatever the application, prediction of the arrival angle of a MW DX signal is not a simple matter. A variety of different propagation modes exist for each signal path, and many involve intermediate intra-ionospheric reflections between the E and F2 layers. For each possible propagation mode, there remains an additional uncertainty in the calculated arrival angle due to the

normal fluctuations in the height of the reflection layers.¹⁹ Given sufficient computer power, however, it's relatively simple to solve the arrival angle equations for all possible combinations of likely propagation modes and layer heights in order to arrive at the highest and lowest likely arrival angles. These are the so-called limiting rays.²⁰ In addition, a number of more obscure propagation modes may be at work on the MW band: higher order modes consisting of relatively many reflections at steep angles, and the chordal mode which may permit unusual receptions over paths which feature dusk at one end and dawn on the other. Much of the variation experienced on the MW band - be it by frequency, geographical area, or time - in DX reception is due to sporadic E. While not commonly thought of as a MW effect, sporadic E is likely to be responsible for much of the night-to-night variability in low-latitude MW DX reception.

NOTES AND REFERENCES

1. "Post mortem on Ringwood - '70", Chas. Rossier, DX NEWS, 10/10/70.
2. "Skyline blockage", Fr. Jack Pejza, DX NEWS, 2/14/73.
3. "Arrival angle of HF waves", A. Wilkins and C. Minnis, Wireless Engineer, February 1956.
4. "Skyline blockage of MW DX signals - can Fresnel diffraction be ignored?", G. Nelson, DX NEWS, 2/28/73.
5. The ionogram is the filmed record from the basic tool of ionospheric research, the ionospheric sounder. In this technique a ground-based research station transmits a pulse of radio energy beamed directly overhead and measures the time for the echo to return - thus providing a measure of the height of the reflecting layer. The height of the reflection is displayed on an oscilloscope and the frequency is changed slightly and the process repeated - the result being a filmed record of reflection height versus signal frequency. Most of these sounders operate over a frequency range of about 3 to 30 MHz; operation through the MW band is very difficult because of the interference to and from commercial stations, and the difficulty of obtaining a proper antenna match. As a consequence, very few of the several million ionograms on file at the World Data Center A (Boulder) cover the broadcast band; those that do are invaluable for understanding BCB DX. Interpretation of ionograms is quite involved; a good introduction can be found in "Ionospheric radio propagation", NBS Monograph #80, 1965, section 3.2.2.1.
6. Some readily available ionograms showing these variations in typical layer heights will be found in "Some results of sweep frequency investigations in the low frequency band", Watts and Brown, Journal of Geophysical Research, Vol. 59, p. 71, 1954.
7. These high and low limits are not to be taken as absolute; under unusual conditions even more atypical values may occur. See preceding reference.
8. "Geographical patterns in BCB reception during periods of high auroral activity", G. Nelson, DX NEWS, 8/21/71.
9. See USRI "Handbook of ionogram interpretation", Piggott and Rawer, Elsevier, 1961.
10. "Solar cycle variation of blanketing sporadic E", Reddy and Matsushita, Journal of Geophysical Research, 3/1/68.
11. "Effects of polarization on a medium-frequency sky-wave signal, including the case of multihop paths", Phillips, et al., Proceedings of the IEE, Vol. 112, January 1965.
12. If there was ever an ideal job for a computer, working out all of the possible angles to determine the limiting rays may be it... No humans need apply.
13. "Long distance one-hop ionospheric radio propagation", Muldrew and Maliphant, Journal of Geophysical Research, May 1962.

14. "Lateral deviation of radio waves reflected at the ionosphere", W. Ross, Dept. Scientific and Industrial Research, Special Report #19, London, 1949.
15. "The influence of chordal paths on signals propagating to the near antipode of an HF radio transmitter", G. Bold, IEEE Trans. Antennas and Propagation, Nov. 1972.
16. While chordal modes are probably the most likely origin of the anomalous Sinkiang-1525 receptions, several other possible explanations are also physically realizable. Since the Polar Cap region inside the auroral oval is relatively free of significant absorption during all but disturbances of the "PCA" variety, multiskip propagation through this clear area may be possible for certain highly limited combinations of distance and orientation.
17. "Propagation of HF radio waves to long distances", F. Kift, Proceedings of the IEE, 1960, p. 127.
18. "Effective tilts of the ionosphere at places about 1000 km apart", H. Whale, Proceedings of the Physical Society of London, Vol. 69, 3B, 1955.
19. While we've consistently talked about the "reflection" of MW signals from the ionosphere, the actual mechanism is more similar to refraction. The only full and complete description of what happens to a MW signal in the ionosphere is given by a full wave solution to the magnetoionic equations. See "Magnetoionic theory and its applications to the ionosphere", J.A. Ratcliffe, Cambridge University Press, 1962.
20. M-type propagation modes are relatively difficult to solve for arrival angle. The path must be broken up into a number of segments each involving a trigonometric function of the arrival angle; the sum of the terms equals the distance between the transmitter and receiver and this type of equation can only be solved with the approximation techniques suitable to computers.

Continued from page 35 ...

occasionally produce what are at least theoretically stable paths in and near the oval region under conditions of moderate auroral disturbance. (h) Chordal modes and those involving m-type intra-ionospheric reflections between the F2 and E region structures commonly found in auroral areas are perfectly possible at least in theory for certain physically realizable precipitation energy spectra. Field aligned horizontal electron density gradients in the region of the auroral oval can also produce slight but measurable tilts of the sort conducive to chordal modes. (i) The possibility that magnetoionic effects may come into play under rare conditions in the context of auroral disturbances cannot be discounted out-of-hand; in particular the possibility of mode coupling to permit penetration of E region structures cannot be ignored. **** These are just a few of the complexities which must be considered in connection with MW auroral effects. We have a great deal of data on many of these interesting topics plus some preliminary solutions to some of these propagation problems; this information will continue to appear here in DX NEWS.

(Gordon Nelson)

* Bengt Ericson

After reading "The Limits of Daytime DX" I spent some hours around noon on December 10th to see how far we could hear European stations from our location here in Southern Sweden. (Results are plotted on the accompanying map - GPN)

Midday DX is my great new interest up here. I have logged several new European stations then and details will be published in MV-EKO and DX NEWS. I check the daytime conditions every day on my car radio when driving home (3 km) for lunch. If Luxembourg-1439, Saar-1421, BBC-1457 and Radio Nordsee-1367 are booming in then I know that I have to check carefully and take preparations for a long lunch!

Last midsummer I heard the 10 kw Yugoslav station at Kragujevec near Belgrade on 962 kHz at 1815 local time, when the sun was 60° in the sky here and 45° in Yugoslavia. I think there is a lot of research to be done in this field and will report all of our discoveries to DX NEWS.

My FET altazimuth loop is really great. Thomas Nilsson, an Arctic member and a radio expert (one of the best we have), measured the output of the loop and found the value better than a Beverage-antenna 1 or 2 wavelengths long. With my loop I nulled SWF on 1016 and got ONLY signal from Venice and a new Hungarian/CSSR-station. The combination of the gain from the FET loop, plus the tilt-nulling and midday DX is giving us a new dimension in MW DX'ing over here.

I have also tested a Space Magnet ferrite loop SM-2 Delux Model together with a modified altazimuth loop from DX NEWS plans - 40 x 40 inches with 7 windings. You can't even compare them. The nulling and signal strength of the FET loop is in a class by itself - much, much better. On the SM-2 you can't get a deep enough null. This ferrite loop is nothing for us here in Europe.

(Some comments and observations from GPN...)

We've plotted all of Bengt's midday DX catches on the following map of Europe; most of the stations he's considered to be midday DX catches are the relatively low-powered stations in the 1100 mile range. The agreement of his observations on the maximum range of midday reception with ours is so good that it's probably fortuitous... It is perhaps significant to note that the European DX'ers have substantially more powerful stations to work with during the midday period than we have here in North America; while we're limited to 50,000 watt Midwest stations on the fringe of the apparent midday skip limit, the Swedes have such powerhouses as the megawatt Libyan on 1124, etc. Yet despite the vastly greater power of the European and North African stations, the evidence to date suggests that midday reception is restricted to the same 1100 mile limit that we observe here. As we have suggested in our recent article on midday DX, this limit is determined by the 60 kilometer effective upper limit for the midday density-gradient partial reflections.

The furthest limit of Bengt's midday receptions falls along the same radius we observe here with the possible exception of one reception - the France Inter Varieties station on 1493 kHz. Several outlets on the channel are in parallel and he didn't get a positive ID on his logging. The likely candidates are Bayonne with 4 kw (substantially beyond the 1100 mile ring), and Brest with 1 kw (well within the range); the remaining stations on the channel are Mighty 50 watt Giants within the ring. Based on our observations

of maximum range here, plus the rest of Bengt's data, we suspect he had the Lyon outlet rather than Bayonne.

We look forward to receiving more reports from Europe on midday DX. The European DX'ers are in a good position to give us this data: they've got the most powerful skywaves in the world, they're mostly in the same geomagnetic/auroral region as we are here, and their higher latitudes will give somewhat lower quantities of D region absorption.



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SKYLINE BLOCKAGE

Father Jack Pejza

One problem which sometimes faces DXers is that of signal blockage. High mountains or tall buildings can block signal paths, thus making DXing in certain directions very difficult. I faced this problem when I was DXing from Ojai, California, at a site about 700 feet above sea level, but in a valley surrounded by mountains up to 6000 feet high less than ten miles away. Fortunately it was a quiet location, and weaker signals could be heard there than in my present location in San Diego.

In this article I will show how you can figure out why particular stations which everyone else is hearing might not be heard by you, or why you can hear some station which you don't think you should.

In general, radio signals leave a transmitter at an angle close to the ground in order to travel as far as possible. The closer a signal path is to the vertical, the further it has to travel into the ionospheric layer in order to be refracted back to earth. Since it must travel further, it will also be absorbed more. On the other hand, a wave leaving the transmitter at a low angle will barely enter the ionospheric layer before it is refracted back to earth. (Figure 1)

If the earth were an infinitely long flat surface with a flat ionosphere above it, a wave leaving the ground would bounce back and forth between ionosphere and ground. A wave at a very small angle would travel an extremely long distance. Each reflection of the wave from the ground would cause a certain amount of energy to be lost; the same would be true for each refraction from the ionosphere. Consequently, a signal gets weaker as it travels further and makes more bounces. If two possible paths exist for a signal, the one which has the smaller number of skips ordinarily will retain more of its energy and bring a stronger signal to the receiver. (Figure 2)

On the curved earth, skip distances increase also as the angle of the signal decreases. However, with a round earth, there is a maximum skip distance. When the angle of the wave is 0°, the signal comes in right along the horizon. (Figure 3a). Most stations, however, do not lie at exactly the proper distance for such an occurrence. Instead, they are at some other distance, and the signal arrives at the receiver at some other angle (Figure 3b). From geometric considerations, the following relationship can be derived between the angle at the center of the earth (which is related to the distance along the earth's surface), the height of the ionospheric layer, and the angle at which the signal arrives at the receiver:

$$\alpha = \sin^{-1} \left(\frac{(H + R)\cos \theta - R}{\sqrt{R(R + H)(1 - \cos \theta)}} \right)$$

where R is the radius of the earth, θ is the angle at the center of the earth, and H is the height of the layer.

The following algorithm can be used to figure out at what angle a signal will arrive at the receiver site. A table of sines and cosines of angles is needed, as is some means of finding out square roots (a slide rule will do).

D = Distance in statute miles between transmitter and receiver.

N = 2 if D is less than 2400 miles

4 if D is between 2400 and 4800 miles

6 if D is between 4800 and 7200 miles

8 if D is between 7200 and 9600 miles

V1 = D/N

V2 = V1 x 0.0144

V3 = cos V2

V4 = 1 - V3

V5 = 6680 x V3

$$\begin{aligned}
 V_6 &= V_5 - 6380, \\
 V_7 &= 0.85 \times 10^8 \times V_4 \\
 V_8 &= \sqrt{V_7} \\
 V_9 &= V_6/V_8 \\
 \alpha &= \sin^{-1}(V_9); \text{ i.e., the angle whose sine is } V_9
 \end{aligned}$$

The above algorithm applies to F-skip. For E-skip, the same procedure is used, with the following substitutions:

$$\begin{aligned}
 N &= 2 \text{ if } D \text{ is less than 1380 miles} \\
 &= 4 \text{ if } D \text{ is between 1380 and 2760 miles} \\
 &= 6 \text{ if } D \text{ is between 2760 and 4140 miles} \\
 V_5 &= 6480 \times V_3 \\
 V_8 &= 0.825 \times 10^8 \times V_4
 \end{aligned}$$

In these calculations, it is presumed that the F layer is at a height of 300 kilometers above the surface, and the E-layer at 100 kilometers. These values are not quite correct for every path. As mentioned above, a wave travelling at a steeper angle will penetrate further into the layer. However, for simplicity, the values above are presumed.

Examples: San Diego to Mexico City

1-F skip	2-E skip
D = 1435 miles	D = 1435 miles
N = 2	N = 4
V1 = 718	V1 = 359
V2 = 10.3°	V2 = 5.18°
V3 = .9839	V3 = .9959
V4 = .0161	V4 = .0041
V5 = 6560	V5 = 6450
V6 = 180	V6 = 70
V7 = 1.37 x 10 ⁶	V7 = 33.8 x 10 ⁴
V8 = 1.17 x 10 ³	V8 = 5.81 x 10 ²
V9 = .156	V9 = .124
$\alpha = 9^\circ$	$\alpha = 7^\circ 7'$

In the example, the E-layer wave arrives at a smaller angle than the F layer. This will not always be the case. It is also possible to figure out in many cases, other modes which might be operating, such as 2-F or 3-E. Figure 4 is a chart showing possible propagation modes existing at different distances.

Now to get down to the problem at hand. A mountain on the horizon will block out waves approaching at a low angle if it is tall enough, or close enough, to form an angle larger than that of the approaching wave. For nearby hills, a simple approximation that the earth is flat can be used. (Figure 5). In this case, $\tan \beta = H/D$, where H is the height of the hill and D is the distance away from you. Both H and D must be expressed in the same units--feet, yards, miles, etc.

For hills or mountains which are farther away, it is necessary to take the curvature of the earth into consideration. In this case, the bottom of the mountain will be hidden by the horizon, and the mountain will not subtend the same angle as it would if it were up close. To figure out the apparent height of the mountain, a relationship from Bowditch's *American Practical Navigator*, relating the height of an observer above sea level and the distance to the horizon, will be used. In Figure 6, E represents your elevation above sea level; H represents the height of the mountain above sea level, and D is the distance in miles between you and the mountain.

The apparent height of the mountain will be $H - H_2$, where H_2 is the part of the mountain hidden by the horizon. Once the apparent height H_3 is figured out, then the angle of blockage can be approximated by the method used above.

The following algorithm can be used to figure out the angle of blockage. A trig table of tangents of angles is needed.

E = Your elevation above sea level in feet
 H = Height of the mountain above sea level, in feet
 D = Distance to mountain in miles

1. Look up E in Table 1, call the corresponding value of d D1.
2. Compare D and D1. If D is larger than D1, then go to step 7. If D is smaller than D1, go on to step 3.
3. $D_3 = d \times 5280$.
4. $H_3 = H - E$
5. $T = H_3/D_3$
6. Look up T in tangent table; find corresponding value of β
7. $D_2 = D - D_1$
8. Look up D_2 in Table 1, find corresponding value of H_2
9. $H_3 = H - H_2$
10. $D_3 = D \times 5280$
11. $T = H_3/D_3$
12. Same as step 6.

Once you have figured out the angles that are blocked by your local terrain and the angles of the incoming signals, it is easy to prepare a chart showing your horizon and the location of incoming signals in relationship to it. Figure 7 is a chart which I recently prepared for my previous location in Ojai. (My horizon is pretty clear here in San Diego, so only signals coming in at the very lowest angles would be blocked in a couple directions.)

Notice that in several cases (Emerald, Australia, for instance), the signal arriving from the third F-layer skip is blocked, but the signal arriving from the fourth F-layer comes in over the local terrain. That means that I could pick up the signal, but much weaker than someone sitting on a hilltop overlooking the Pacific. Fourth skip signals from Europe would have arrived above the mountains, but probably would have been so weakened by that extra skip in the auroral zone that they would not have gotten above the background noise. In fact, the only TA noted in Ojai was BBC-1214. Either a fourth skip did get through on that occasion, or my calculations of the angle of blockage and/or 3F skip angle are slightly inaccurate.

As can be noted from the chart, the only really clear portion of the horizon was to the Southwest. Experience bears this out. In the two years or so I DXed in Ojai, five or six Zedders were definitely logged and verified, whereas almost no Asiatic stations were even tentatively heard.

Havana poses an interesting problem. As can be seen, the only really clear path is by means of 3rd skip E-layer. Someone better versed in propagation might be able to say whether such a mode is possible, or whether it is more likely that second skip F-layer reception, at about 12° above the horizon, would be more probable.

I hope that these charts and algorithms will interest a few into doing some research into their blockage problems. If so, I hope to see the results published in the bulletins so that others can learn from our common problems.

FIG. 1

When a wave falls obliquely on an atmosphere containing charged particles whose concentration increases upwards, the top (A) of the wave front travels more rapidly than the bottom (B) so that the wave swings over and is reflected. A wave arriving more steeply must travel higher to find enough charged particles to reflect it.

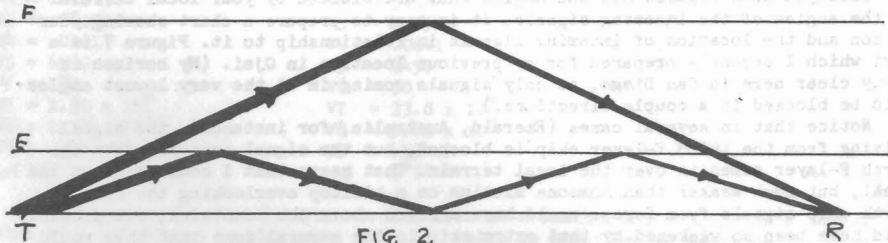
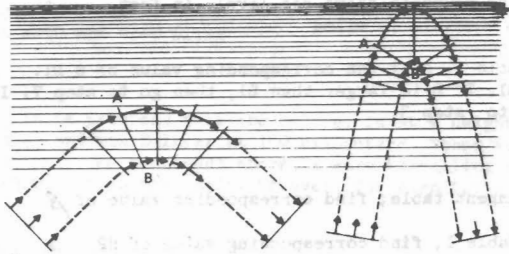


FIG. 2

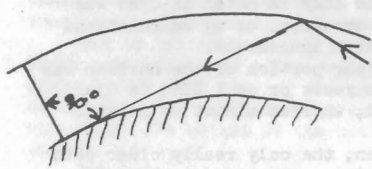


FIG. 3a

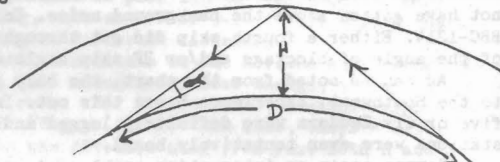
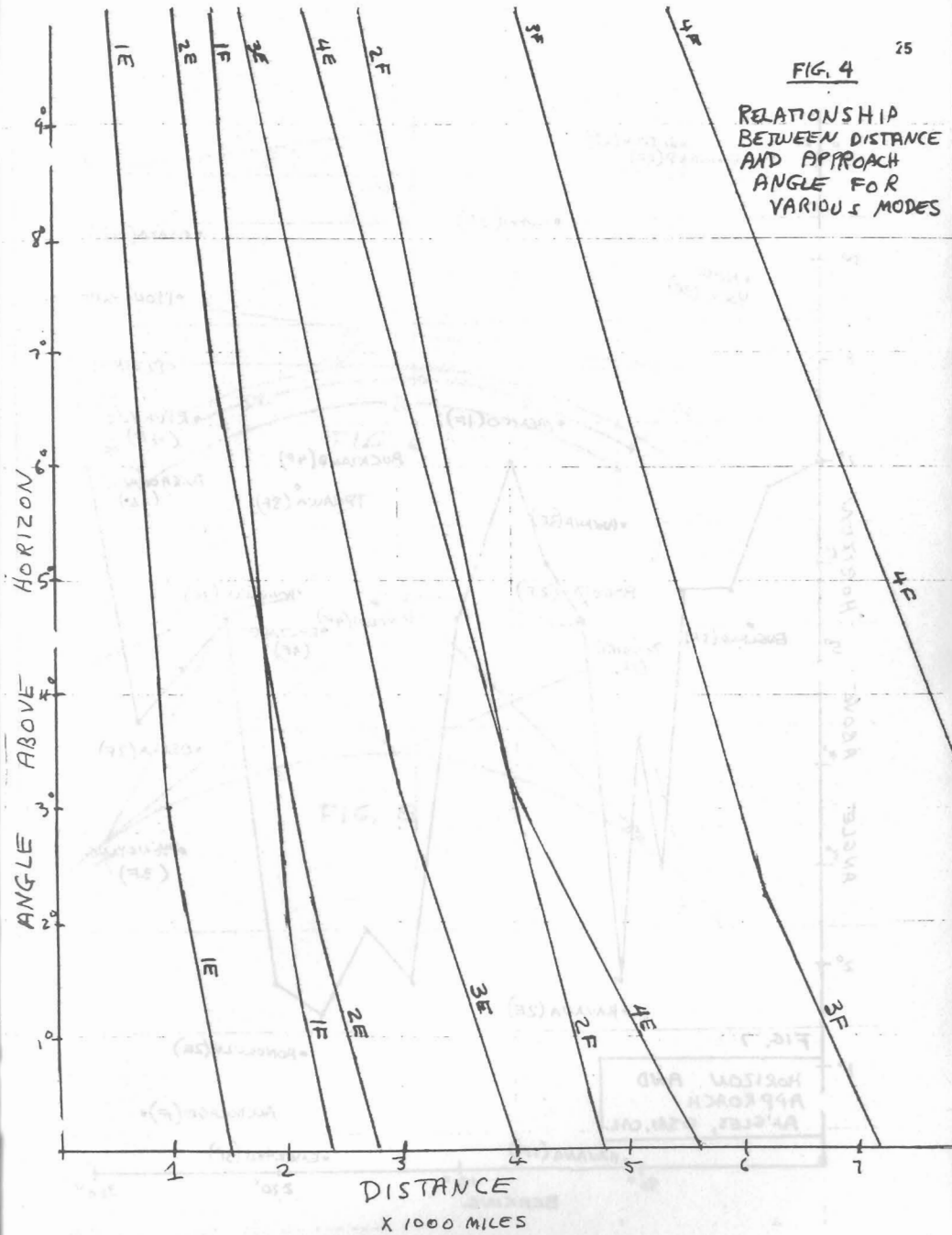


FIG. 3b

FIG. 4

RELATIONSHIP BETWEEN DISTANCE AND APPROACH ANGLE FOR VARIOUS MODES



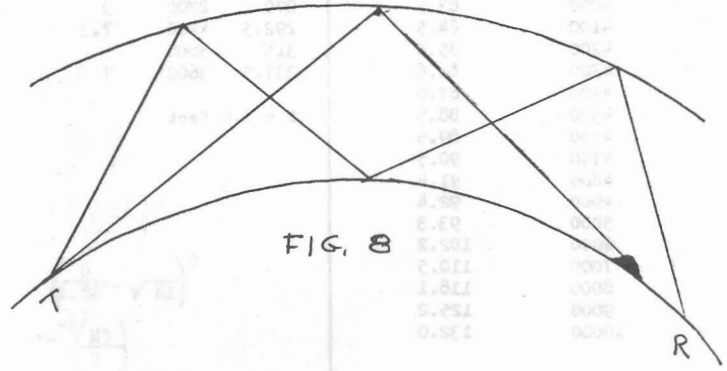
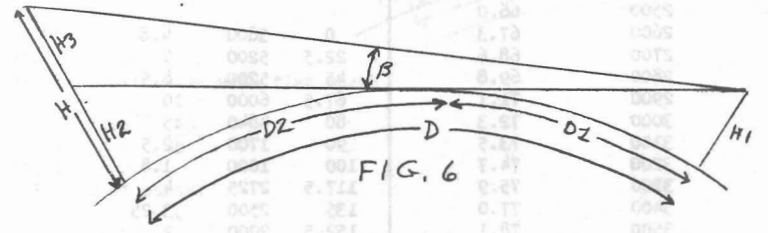
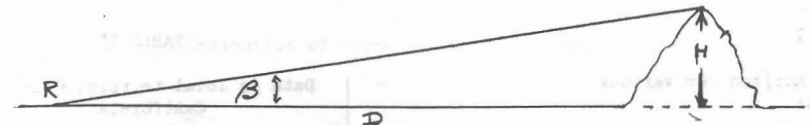
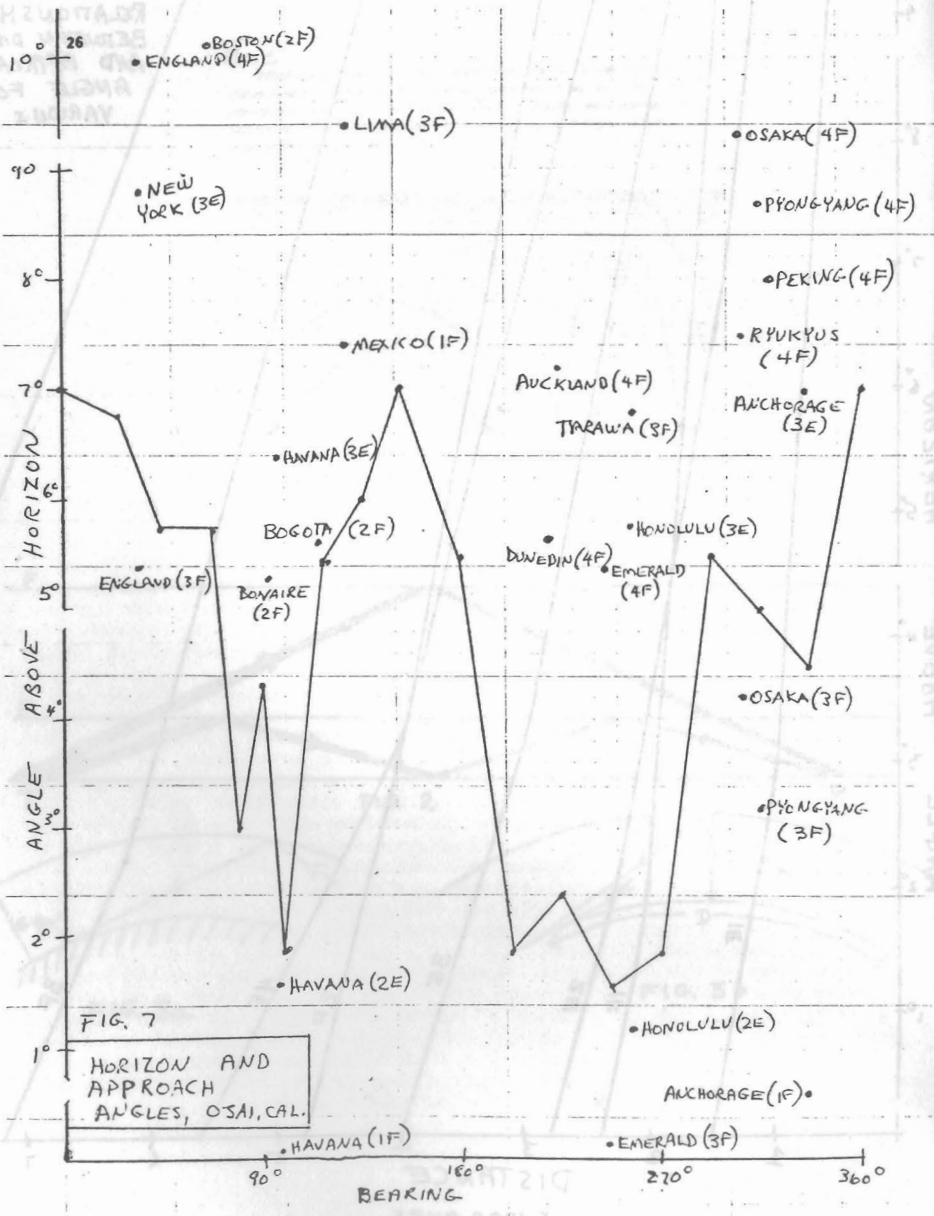


TABLE I

Distance to horizon for various heights

Height, feet	Distance, miles	Height, feet	Distance, miles
50	9.3	2400	64.7
100	13.2	2500	66.0
150	16.2	2600	67.3
200	18.7	2700	68.6
250	20.9	2800	69.8
300	19.9	2900	71.1
350	24.7	3000	72.3
400	26.4	3100	73.5
450	28.0	3200	74.7
500	29.5	3300	75.9
550	31.0	3400	77.0
600	32.3	3500	78.1
650	33.6	3600	79.2
700	34.9	3700	80.3
750	36.2	3800	81.4
800	37.3	3900	82.4
850	38.5	4000	83.5
900	39.6	4100	84.5
950	40.7	4200	85.6
1000	41.7	4300	86.6
1100	43.8	4400	87.6
1200	45.6	4500	88.5
1300	47.6	4600	89.5
1400	49.4	4700	90.5
1500	51.1	4800	91.4
1600	52.8	4900	92.4
1700	54.4	5000	93.3
1800	56.0	6000	102.2
1900	57.5	7000	110.5
2000	59.0	8000	118.1
2100	60.5	9000	125.2
2200	61.9	10000	132.0
2300	63.3		

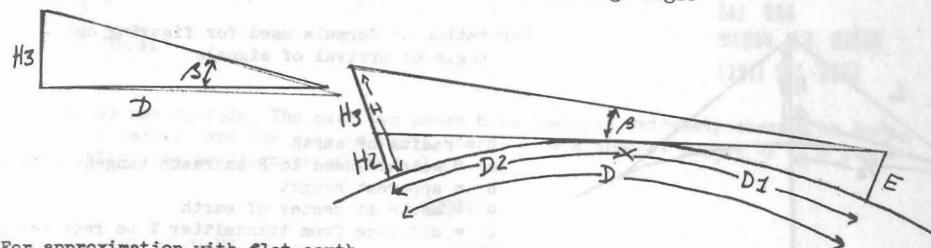
TABLE II

Data on local terrain, Ojai, California

Bearing, degrees	Height, feet	Distance, miles	
	0	3800	4.8
	22.5	5200	7
	45	5200	8.5
	67.5	6000	10
	80	4840	15
	90	1700	2.5
	100	1000	1.8
	117.5	2725	4
	135	2500	3.25
	152.5	2000	2
	180	2000	2.5
	202.5	1200	3
	225	850	0.7
	247.5	1800	7.5
	270	2200	9
	292.5	4400	7.3
	315	3000	5
	337.5	3600	7

E = 700 feet

Derivation of formula used for blockage angle



For approximation with flat earth,

$$\beta = \tan^{-1} \frac{H_3}{D}$$

For curved earth,

$$H_3 = H - H_2$$

$$D_2 = D - D_1$$

$$D_1 = 1.32 \sqrt{H_1}, \text{ where } D \text{ is in miles and } H_1 \text{ is in feet}$$

$$D_2 = 1.32 \sqrt{H_2}$$

$$H_2 = \left(\frac{D_2}{1.32} \right)^2$$

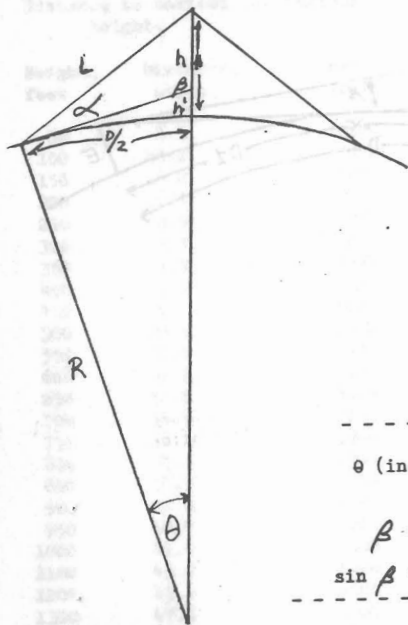
$$H_3 = H - \left(\frac{D_2}{1.32} \right)^2$$

$$H_3 = H - \left(\frac{D - D_1}{1.32} \right)^2$$

$$H_3 = H - \left(\frac{D}{1.32} - \sqrt{H_1} \right)^2$$

$$\beta = \tan^{-1} \left(\frac{H_3}{D} \right)$$

Derivation of formula used for figuring out angle of arrival of signals



R = radius of earth
 h' = height added to R to reach tangent line AJ
 h = apparent height
 θ = angle at center of earth
 D = distance from transmitter T to receiver A

From law of sines, $\frac{L}{\sin \beta} = \frac{h}{\sin \alpha}$,

$$\sin \alpha = \frac{h \sin \beta}{L} \quad (\text{Equation 1})$$

$$\theta \text{ (in radians)} = \frac{D}{2R}$$

$$\beta = 90 + \theta$$

$$\sin \beta = \cos \theta \quad (\text{Equation 2})$$

$$h = H - h'$$

$$\cos \theta = \frac{R}{R+h'}$$

$$h' = \frac{R}{\cos \theta} - R$$

$$h = H + R - \frac{R}{\cos \theta} \quad (\text{Equation 3})$$

from law of cosines, $L^2 = R^2 + (R+H)^2 - 2R(R+H)\cos \theta$

$$L^2 = 2R(R+H)(1 - \cos \theta) \quad (\text{Equation 4})$$

Substituting Equations 2, 3 and 4 into Equation 1, we get

$$\alpha = \sin^{-1} \left(\frac{(H+R - R/\cos \theta) \cos \theta}{\sqrt{2R(R+H)(1 - \cos \theta)}} \right) = \sin^{-1} \left(\frac{(H+R)\cos \theta - R}{\sqrt{2R(R+H)(1 - \cos \theta)}} \right)$$

DOMESTIC X IGEST



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Greetings again, folk. The past two weeks have featured extremely strange cx here in North Jersey, and for more on that, there'll be a special report by PT & yours truly after the regularness of the column....

changes

- + 1140 WCJW-NY (Warsaw) CP is on (IRCA)
- + 1190 KEX -OR NET: Ai
- + 1240 KWJB-AZ CP is on
- + 1310 WHEP-AL NET: M
- + 1450 KOKO-MO NET: M
- + 1510 WKAO-FL NET: M (CP, not yet on as far as we know)

r/c's

JANUARY: 3rd MM: KXEO-1340, WDIC-1430, KXLR-1150; 3rd TU: WGTN-1400, WHOL-1600, WEHH-1590, WVNA-1590; 3rd FM: WCDL-1440, WFOY-1240, WMNS-1360, WBBK-1260; 4th TU: WSGO-1440; 4th TH: WDWS-1400, WHIY-1530, WTCB-990; 4th FM: KGVL-1400, KSIW-1450, KPOS-1370; 4th SA: KBIZ-1240, WPTN-1550; LAST MM: WCBG-1590.

THE C.R.T.C. has approved a new AM net, Le Reseau Telemedia, consisting of stations CKAC-730, CHLN-550, CHLT-630, CKCH-970, A11 P.Q..

sunset & evening

- 680 KWKA-NM Copied 1855-1900 1/21, good at first, lost sig 1900, but no pattern switch involved. Called, pattern is along a line 107° so is not only hard for me to hear, but will be for most all DXers. Sked 0700(0900)-0300, CBS net., add: Box 926. (PKH)
- 810 WMTS-TN Very strong, mixing w/WGY, w/spots for Murphreesboro area 1731 1/22 (JMP)
- 860 WKKO-FL S/off anct suddenly atop channel L&C w/ no SSB 1746 1/29(RjE)
- 900 WSWN-FL S/off 1744 up o/noise, garble, etc. 1/25 (dm)
- WCOR-TN Atop channel w/promo for 97.3 FM, several Ids to s/off 1800 1/29 (RjE)
- WCRY-GA Hrd w/ s/off w/vocal SSB u/WGOK, etc., 1743 1/30 (RjE)
- WGOK-AL Hrd w/ soul mx, promo, ad 1748. Later weak ID ending nx 1804 1/30 (RjE)
- WATV-AL Hrd ending CBS nx into local nx 1755, w/ID 1/30 (RjE)
- WKAJ-NY A most-wanted hrd w/SID in mx pgm u/WFLN 1724 2/1 (RjE)
- unID Hrd w/ CBS nx logo 1817 1/30, w/ anct & ID phonetically eq. to WNOK, announcing some sort of annual social function co-sponsored by stn, then another CBS logo 1818. WGOK & WATV already off, no W-calls listed on then. Help?? (RjE)
- 980 WONE-OH Vy strong atop usually dominant WILK-WTRY-WRC w/ c&w and many area spots, new here 1715 1/28 (JMP) ** You don't hear 'em on AN NSP ??? -RjE
- 1050 KFMJ-OK S/off copied 1829 1/17. Should be easy but for XEG.. (PKH)
- 1070 WAPI-AL Good 1755-1800 b4 CBA build-up. Suddenly disappeared 1800, pattern-power change?? This 1/24 (JO) ** Yup - RjE
- WHYZ-SC Hrd vy wk u/ unusually strong CBA w/ s/off anct 1745 1/31(RjE)
- WCIR-WV Fairly good w/ s/off, atop all else, surprised me, 1730 1/25 (JMP)

- 1090 KNWS-IA Copied s/off 1830 1/21, weak but no problems (PKH)
 1190 WAVS-FL Hrd 1/27 w/ cruise ad out of Port Everglades 1843, then mx, then s/off 1845 clear w/no WOWO. Uses slogan "Radio Waves", new here (TRS)
- 1220 CJSS-ON In very well w/ rr, no WGAR, sx to 1720, then rr. 1/26 (JMP)
 1250 CBOF-ON In well w/ CBC FF net, several FF IDs 1728 onwards 1/26, new here atop WTAE/WTMA (JMP)
 WTMA-SC Quickie ID 1711 1/22 then into rr (dm)
 1270 WUOK-MD Vy good and alone w/spots for Cumberland area & some rr, 1/24 1729 (JMP)
 1280 WYAL-NC Really surprised me atop WADO (superpest here and most bothersome NYC NSPer) w/ s/off 15 mins ahead of legal time heard 1700 1/29. (JMP)
- WIBB-GA Hrd 1732 1/22 w/ad for used car dealer @ 2nd & Palm (dm) (JMP)
 1290 WHKY-NC Alone w/ c&w 1720 1/23, really strong, dominating usual WKNE
 WBBS-NC Just above channel w/promo mentioning Jacksonville & Box AM, their listed QTH, 1/23 1707 (JMP)
- 1330 WDAL-MS Hrd w/ s/off 1814 1/23, 1815 1/24, 1816 1/25. Wonder if they think they're following the SS, hi (dm) ** Red sails and all, no doubt - RJE
 WRIE-PA DJ screaming o/garble gave calls, beautiful, 1817 1/24 (dm)
 KVOL-LA W/ mentions of La wx 1817 1/25 (dm)
 1370 WTTS-IN Into mx 2300 1/25 w/local WSPD rather weak and nulled (dm)
 1390 WISK-GA Uses "Be Still and Know" b4 s/off, hrd 1758 w/WHMA 1/22 (dm)
 1410 WRIS-VA Hrd w/ s/off 1725 1/23 (dm)
 WYMB-SC Mention of "Clarendon City Radio" in s/off 1729 1/23 (dm)
 ** Manning, S.C. is Clarendon City ??? -RJE
 WRMN-IL S/off starts w/DJ yelling "It's sundown and now WRMN..." hrd 1743 1/23 (dm)
- unID Looped s/sw playing country gospel mx 1755 1/24, ad for what sounds on tape like "Fulbright's in downtown Lint City; clothing store. There is no Lint City in U.S. or Canada (** NO KIDDING, DAN -RJE) and no "Fulbright's" w/a phone number in the directory of all stns. on 1410 (** You have all of them? -RJE). This is going to drive me crazy 'til I find out who it is. (dm) ** If it hasn't already, hi. Seriously, (if that sort of thing is possible) if 1410 can sport a town calling itself the Clarendon City, why not one calling itself the Lint City, for some reason which currently escapes me. After all, Syracuse, N.Y. is the Salt City.... -RJE
- 1520 WSLT-NJ Hrd 1/28 s/off 1659 finally thru WKBW and relatively good at that. Many yrs of trying, but WKBW, WTHE, WCHE made it impossible even though fairly close. (TRS)
- 1550 WLUX-LA S/off 1/27 1830 dug out of noise on tape replay. Better 1/28 same time. (TRS)
- 1540 KGLA-LA CST TC & rr 1/24, pretty good, considering cx on 1/24 (dm)
 1570 WSSA-GA Noted w/ c&w then s/off 1731 1/24 (dm)
 1580 KWED-TX S/off 1859 in mud; caught a few words & timin, so called stn, who played s/off cart & lo and behold, it matched my tape perfectly. 1/27, no SSB (dm)

midnight to sunrise

- 680 WPTF-NC This much-wanted copied 0600 1/14. At 0730, ID was a complete statement of the type usually used for s/on or s/off, so a very nice tape. (PKH)
 710 CJRN-ON Hrd 1/29 noted first time this freq. w/WOR off or OCing 0103-0125 w/ ID & hockey scores. Even decent thru WOR OC 0110-20 & o/LA hets on freq. (TRS)
 Hrd w/. WOR off w/MOR, sx 0120-25 1/29 (RJE)

- 710 KEEL-LA Hrd o/u CJRN w/WOR off & OC'ing w/ phone-talk format, 0105-0110 1/29. (RJE)
 840 WMOB-AL Testing again w/DT 0130-0145 1/22, all we can be sure of is that they test some MMs, hi (PKH)
 900 WSWN-FL Pulsed TTs, ID 0106 1/22 anncg. test. (PKH)
 910 KCJB-ND Testing again MM 1/22 0115, nice sig, good IDs (PKH)
 WDOR-WI Good sig 0700 1/20 for new one. Local CBO not on yet. Was looking for CKLY, but no luck. (JO)
- *** 920 WMPL-MI Noted 0025 w/unlisted f/c, w/annots about every 45 secs., 1/17. Off 0030, V/1 sez monthly 0000-0030 3rd WM. (JS)
 WMEL-FL Noted AN 1/29 w/Top 40, atop freq. all AN, smashing pest CKCY (JS)
 WMNI-OH ET-TT noted 0230-0310+ 1/29, announced as 1973 PoP (JS)
 960 WERC-AL Noted 1/29 u/CKWS w/ several annots 0050+. Later good check 0350 on NRC TEST, but completely wiped out by unID SS 0400 s/on. Poor modulation on SS made ID impossible. (TRS)
 980 CKNW-BC Mixing most of AM 1/15 w/KFWB, unusually weak. Good copy at CKRM-SA times, CKNW usually dominant, but lousy IDs prevent tape claim of either one. "RM radio 98", etc... Burrnn! (PKH)
- ** 1000 KKIM-NM Test noted from b4 0215 to t/out 0219 1/15, not 4th MM, but times are right. (PKH)
 1090 KTGO-ND TEST not hrd again 1/22, did it run ?? (PKH)
 Tentative here 0315-30 1/29, TT periods of specific lengths, i.e. 30, 60 secs., several annots hrd, one ment. new studios and one possible call on tape. XEPRS was solid & lo-freq. het that lives on 1090 didn't help. (JS)
 TENTATIVE, mostly TT hrd here by TRS & Foxy 1/29 (TRS, Foxy)
- 1330 WHBL-WI Alone on freq. 0700 1/20, no sign of WHOT (JO)
 1360 WSAI-OH Hrd w/ ET-TT, sounded like PoP, as w/varying TT 1/29 0120 t/in -0145 t/out. 0143 ID. (RJE)
- 1370 WDEF-TN Copied 0500 s/on 1/22. Copied also on 12/28, but mis-IDed then as WTTS (PKH)
 1380 WAOK-GA Noted on b4 0500 1/22. Anybody know new s/on time ?? If this is regular, all chance for WAMS test is gone. (PKH)
 WTVR-VA Hrd 1/28 w/ c&w mx 0450+0500, ID, nx, good sig., new w/WBNX off. (TRS) ** Anybody know when MM s/on is or if NSP?? Hrd c&w here 0230-ish 1/29, unID -RJE
 unID Hrd 0600 1/28 w/ religious message, 0603 mx, 0610 approx. into c&w mx, call sounded like WTFE. Closest thing I could come up with is WGSE, for new CP in New Bern, N.C. Are they on?? (TRS) ** Maybe the new nighttime operation of WDAT, Ormond Beach, FL. ?? -RJE
- 1400 WHIH-VA Hrd 1/28 w/ nx, wx 0400-35, into mx, SID 0439. NN-oriented pgmg. Consistently atop thru 0445 (TRS)
 1410 KAHL-NE Testing again 1/15, ID and off 0224. (PKH)
 + KRIG-TX On AN 1/22, confirmed by phone, sked is NSP. Daily SP rptd, b4 was real, but no longer. (PKH)
- 1440 WOHN-VA Hrd o/uWKLW and others w/ID 0631 1/27 (dm)
 ** 1450 KRZY-NM F/c hrd and anncd as regular 0230-0245 1/15. Suggest listing this as regular 3rd MM as hrd here b4. Sked still NSP (PKH)
- 1460 unID TT here w/ no breaks or IDs 1/29 0115 t/in-0210 t/out. o/ unID c&w and WAXC w/ OC-ET. (RJE)
 1520 WITO-OH Doing very well w/WKBW on OC & TT. In most of AM 1/29, on tip from Schmidt, while talking to him day b4. (JMP)
 1550 WDLR-OH 0800 s/on w/SSB u/CBE hrd 1/23. Much-wanted one has very big null towards Toledo for CBE. (dm) (RJE)
 1580 KLOU-LA Hrd w/ exc. sig atop channel w/rr, soul, for tape 0125 1/29
 1590 WCSL-NC Hrd 0603 s/on after SSB, into nx, then maybe into c&w, not sure. hrd 1/27 (dm)

1610 WYBH-PA (Pirate) Hrd 1/21, noted w/fairly good carrier, but relatively lo audio. Readability difficult, noted 0130-0200 LD. Believe in NE Phila. Not hrd following weekend. (TRS) ** As some will remember this one hrd, taped in North NJ by PT & myself last Spring. -RjE

CONTRIBUTORS:

Tom Sundstrom (TRS) - Willingboro, N.J. ; HQ-150, SM2; DX-150A & LW
 Dan Myers (dm) - Toledo, Ohio ; HQ-180A & 3' box loop
 Jim Poterba (JMP) - Yardley, Pa. ; HQ=200 & SM1
 Paul K. Hart (PKH) - Ft. Worth, Tx.; Rebuilt SX-28A w/MF w/ 4' altaz loop;
 Fisher 90T, SM1.
 Jerry Osborne (JO) - Ottawa, Ontario, CANADA; SX-133 & SM1
 Jerry Starr (JS) - Youngstown, Ohio; HQ-180A & 4' altaz loop
 R. J. Edmunds (RjE) - Wayne, N.J. ; HQ-150 w/ 4' FET altaz loop; Fisher 100T w/
 2' altaz amplified loop.

And now, for that extra section on the wierd cx. I note from tips and comments in the stuff above that Poterba, Sundstrom are experiencing this sort of thing too, so at least Page & I arent hearing things, hi....

...propagation... propagation... propagation... propagation...

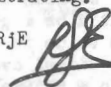
Cx started off in the classical auroral sense 1/19, with what seemed to be a far greater absorption than was warranted by an A index which barely got above 20. Cx became more classically auroral up to about 1/26, but with two major exceptions: The ambient noise levels were vastly greater than they traditionally are for the values of A_p noted, and that some unknown effect made direct on-finding appear to be useless except on locals. All that was encountered was noise on most channels except for bearings of 190-230° and 10-50°, but stations hrd did not usually lie in these bearing areas. This was noted by Page, Steve Bohac, and myself. A call to Boulder 1/25 during a resurgence of classic aurora cx (still with the above two exceptions) yielded a K=3 reading and the notation that it had been 3 during the previous period, and 4 the period before. This calculates to an A_{eq} of anywhere from 15 to 27, dependent on the other periods, and I settled on a rough guesstimate of 21, despite the fact that cx appeared to be indicative of an index of twice that. Then the outbreaks of apparent sporadic E propagation which have become a regular event during most auroras over the past 10 months (it never used to be a major factor here - Canadians were just gone during aurorae, with occasional individual exceptions) were noted, starting 1/25. By 1/28, things had progressed from strange to worse, and the cx which will shortly be documented are those which prevailed at least thru 2/3, and are evident in Poterba's and Sundstrom's loggings as well. These cx were noted at any time from late sunset to midnight and later on the nites of 1/29, 30, 31, 2/1, 2 by either PT or RjE or both: Good to excellent reception, not apparently sporadic E on S-meter, signals rock-solid and consistent, from the following areas Chicoutimi, Bridgewater (NS), Hamilton (ON), Moncton, Boston, Springfield (MA), Hartford, St. Pierre, Providence, Sherbrooke, Grand Falls, Edmundston, Worcester and St. Johns. Likewise excellent signals were noted from Columbus, Ga., Miami, New Orleans, Ft. Worth and San Antonio, as well as an unID FFC on 1240. Signals from Baltimore, Buffalo, Montreal, Windsor and Toronto were poor but generally audible. Signals from Wheeling, Richmond, Atlanta, Chicago, Cleveland, Pittsburgh, Ft. Wayne, Cincinnati, Louisville, Nashville, and St. Louis were gone, as were those from many intermediate locations. Notable exceptions were only two: reception from Charlotte and Washington, D.C. were still excellent, though the latter might possibly have been groundwave propagation.

... propagation ...

To further confuse us, TAs were in, and generally in well. High and low-latitude paths were in, with good audio on 1602, 1594, 1586, 1578, 1554, 1538 (Senegal), 1475, 1466, 1439, 1421, 1394, 1367, 1358, 1295, 1268 (G), 1205, 1169 (Port. & Ger.), 1196, 1061, 1034, 1007 Spain, 989, 854 and the Moroccans on 818, 701, 863. Carriers were noted from 1088 (BBC), 899, 845, 836 (Spain), and 683. To add insult to injury, Urumchi on 1525 was good throughout the period.

This leads us to a very limited number of conclusions: 1) some other factor than auroral absorption is responsible for these receptions and non-receptions (we note that wx conditions have been truly strange as well, with regular variations from 3 days of very low temperatures to 2 of very high temperatures within the stated period); 2) Some sort of strange auroral event the likes of which we've never seen which might cause a massive shift of the auroral zone southward, which is highly unlikely; 3) Some sort of massive flaw in our prevailing auroral theory. We here in New Jersey do not have sufficient info nor sufficient background to evaluate these phenomena, and suggest that perhaps GPN may. We expect that others among you may have noticed some strange cx, and suggest that you forward any observations to HQ. Of the three possibilities above, we currently tend to favor the first or some variation thereof, although we cannot discount completely the other two, nor can we state that we haven't neglected something. Suffice it to say, the matter is both enormously interesting and enormously frustrating.

73s RjE



At least one more likely possibility exists: 4) The model for MW auroral effects that you are using is greatly oversimplified. Auroral and magnetospheric effects are among the most interesting but complex problems in contemporary geophysics. Quite a number of factors above and beyond those we have had time to describe here in DX News must be taken into account; for example, (a) The diagrams showing the location of the auroral absorption zone which we have made available to Russ are based upon the Starkov-Feldstein model oval - a statistical model. The statistical aspects of this model must not be underestimated. (b) The Starkov-Feldstein model ovals of auroral location provide accurate statistical descriptions of the electron precipitation region only since they are based upon spectrophotometric data only. (c) MW absorption effects are noticeable far from the edge of the S. - F. oval because they are due to the non-visual proton auroral precipitation region located to the south and north of the electron precipitation region. (d) You neglect to consider the effect of auroral substorms and other effects of relatively limited geographical extent which may produce local increases in regional indices such as A_{FR} . (e) While regional indices are the only ones readily available right away, they are definitely not the best ones for our purposes. The planetary indices A_p and k_p essentially average the geomagnetic disturbance over many stations throughout the world, thus effectively smoothing out relatively local disturbances. (f) The S. - F. ovals are expressed in terms of the best index for our purposes: the Q index. The Q is the only geomagnetic disturbance index expressly designed to measure the degree and intensity of precipitation of charged particles into the auroral oval. While indices such as the k and A measure the disturbance to the entire magnetic field vector, the Q measures only the horizontal disturbances; since particle precipitation in the auroral zone is an electric current, the precipitation-induced disturbance field is horizontal. (g) You do not take into account the possibility of TA propagation modes involving auroral-induced night E and sporadic E layers; such structures, taken in conjunction with the geomagnetic time dependence of the auroral oval (the "rotation" of the oval), may

(continued on page 18)

DAN MYERS - 2650 104th Street - Toledo, Ohio - 43611 419-726-4348

Greetings, NRc's - 33 new stations this week, making my Jan. total as of 1/28 140 new stations, with total heard up to 1,166. That also is 367 new ones this season. Spending all my free time DXing is sure paying off, hi. DX: 1/22-1:43am, WAPA w/"en wah-pah" ID & rr on 680; 5:11pm much-wanted WDMA-1250 popped in for quick ID then return to rr; 5:32 I heard ad for "Smith & Smith Used Cars, Second at Palm". Irifound through phone co. it is in Macon, so WBBB-1280 logged; 5:58 s/off of WISK-1390 Americas heard - they use "Be Still & Know" program before s/off announcement. 1/23- Much-wanted WDLR-1550 s/on @ 8 w/SSB; they have extremely deep null pointed straight at me (for CBE). S/off on 1410: WRIB WDMB & WRMN, 5:25 5:29 & 5:44pm. 6:14, WDAL-1330 Meridian s/off heard next two nights also. 1/24- WSSA-1570 w/c/w & s/off 5:31pm; then surprise as KGLA-1540 Gretna (one of the hardest stations in the world to find; they're hidden in the middle of a forest!) in w/CST TC & rr @ 6:13pm. 1/25- 1:14am, WROZ-1400 w/c/w; WDMB WHLY & WTCC on r/cs. 5:44pm, WSWN-900 s/off; 6:11 KEWP-1380 N. Little Rock s/off followed by umn WINK, & KVOL-130 w/mentions of Ia. WX. 11pm, WSPD-1370 nulled & WPTS-1370 Ind. heard going into NX & ID. 1/26- KVVL-1400 & KSIW-1450 r/cs which aren't a bad way to start out a morning; then I hear TT u/WSPD; noticing KPOS Tex. is sked for r/c, I quick-like call WSPD & ask announcer for five seconds of dead air after next record so I can get KPOS to live ID. He said OK, so I called KPOS & when guy answered phone, there was TT in background (up goes blood pressure, hi). I explained the situation to him, & he said to give him a cue. Up comes dead air, I cued him & bingo! Absolutely perfect ID. I may be able to do this again, so check all r/cs on 1370 & hope for some dead air. It'd be a good idea to listen for whole duration of listed time 'cuz I'd only ask him to do it once during time period. 10:15pm w/Frank Merrill, George Greene & Gary Siegel over, WBEL-1380 w/nice ID. 1/27- KBIZ-1240 r/c WPTN-1550 r/c; WHKP-1450 in @ 5:59am w/c/w & announcer who must have liked dead air WCSL-1590 s/on 6:03 w/SSB; WOHN-1440 w/umn WKLV ID 6:31; 6:59pm, KWED-1580 s/off & taped. I called today, got him to play their s/off cart & 'twas they. 1/28- slight Aurora - nice ID from Radiolandia-1160 2am; 2:32 R. Tropical-HJFV-1040. CX continue to deteriorate. I hope Feb. will bring better CX. 30, so 73s & best DX.

ALAN MERRIMAN - Box 6 - Fairfax, Virginia - 22030

No Musing for two months but DX hasn't been that exciting. December never has been a good month for me & this one no exception. And January didn't improve any. Veries have come in from Rabat-818 PJCC-855 TLJC-675 YND-675 HJQA-1000 Guyana-560 CFGO WGFA KUOM WPNS, KIM WMLP WMM WAPI WCVH WKST WCHL WERC WHII WEKR & last but not least after six years of trying, KGMO-1550 finally came through w/a nice v/l. Here is what little domestic DX I've managed in the past two months. 12/6- WPNS-1080 w/ET/TT/mx @ 12:13am. 12/11- WMM-1090 noted all morning on TEST. 12/12- WELN-1410 noted w/f/c-TT 12:30-12:36 s/off. WREN-1600 noted w/ET/DT @ 12:45. 12/18- WCHV-1260 noted on DX @ 3:04. WEKR-1240 well heard @ 3:32 on ID. 1/8- WNGW-550 noted @ 2:50 and various other times during the morning on their DX but heavily QRMed. 1/15- WERC-960 logged for call change @ 2:16. (Love those call letters! -ERC) 1/18- WHII-1570 noted w/f/c 2106-2:29 w/DT, heavy QR, frequent IDs. WJOB-1080 noted 2:46-2:59 w/f/c-ID, ID every 1 1/2 minutes or so. 1/29- RTGO-1090 not heard & I doubt they were on. Possible KCHY-1530 u/KFEK but no definite ID. ERC, that OC on 1090 that you mentioned in 1/24 DX NEWS was also noted here. It was there for the better part of the week but I have no idea who it was

JACK BUCKLEY > 5149 Monte Verde Place - San Fernando, California - 90004

Greetings all! DX has been great lately. 1/17- KCMO-570 @ mid-night. 1/18- KKUA-690 @ 10:13pm, KWEI-1260 @ 11:25pm, KSXP-1500 @ 12:05am. 1/23- WIBC-1070 @ 7am, KZKR-1540 @ 7:25. All these times are ELT, and so were the ones in my last Musing. With the Christmas bonus I was able to buy the family Christmas presents and myself an SPR-4 without going bankrupt. It really works great. Thanks to all of you who recommended it. Latest veries: KPFA KBEX KEPO KISW KNOB KMET KLSN KUOW KNOE.

LITTLE MARY, FROM BOSTON MASS - STOOD IN THE WATER - UP TO HER KNEES. IT DOESN'T RHYME - BUT WAIT TILL THE TIDE COMES IN! AND - WAIT TILL THE DXERS COME MARCHING INTO MASS. - FOR THEIR LABOR DAY FIESTA! AUGUST 31, & SEPTEMBER 1, 2, & 3.

JIM POTERBA - 949 Queens Drive - Yardley, Pennsylvania - 19061

Greetings. Quite a bit of DX done lately, CX seemingly quite good. DX: 1/14 PM- WSYB-1380 pattern/power change @ 5. 1/15 AM: HJXX-570 1:33, KMIA-1530 r/c 1:45, CJBK-1290 for call change; 2:57, unID s/off (SS) on 710 w/Taps; cheap American c/w & rr before. I'm sending dupe of tape to Page Taylor for translation. 5:30pm, CBI-1140 killing WRVA. 1/17- 5:11pm, CKCW-1220 atop; 5:37 WNG-680 "Ring" atop there. 1/19- 7:15am WFO-1530 s/on u/WCKY as I left the house; 5:15pm WBSM-1110 s/off. 1/20- 4:58pm, WPM-1390 atop; 5:29 WSKK-1600 w/s/off; 5:35 WMT-1520 doing very well w/MoR. 1/21- 6:32am, WQXL-1470 w/ID, WMM-1260 7am (Russ Edmunds, eat your heart out, hi @ERC) 5:45pm, CHAM-1280 o/WADO. 1/22- 1:30am, WCHV-1260 w/AN phone show; 5:30pm, WETS-810 o/WGY. 1/23- 5:07pm, WBSB-1290 nicely atop WKNE. 5:20, WHKY-1290 atop. 1/24- WUOK-1270 5:20pm. 1/25- 5:30pm, WCIR-1070 s/off, 10pm, HJAN-720 doing well behind Cuban. 1/26- 5:20pm, CJSS-1220, 5:28pm, CBOF-1250 very nicely atop channel. 1/28- 6:15am, long-wanted WIRE-1430 w/sports for Central Indiana, CMKG-1059.3 strong all AM. Veries lately: WRIC WKAQ WNEC (signed by Murray the K) HJXX-650 KNBR WZAP WACE WDOG WZAN WRYM WJW WZEE HJEW KLIF WMPM WMTW WJMA WKLX WFLB WTTT WNSC WBLU WPMO WYOU KIRI WTTT WCWC. Glad to see HQ has MFs in now. I think I'll pick one up sometime in the future. Nice article by Ron Schatz on selectivity and selectivity devices, etc. I hope "Paradise" on 1260 is going to verie - been a month now w/no reply yet. Oh well, there's always ZIZ-555. (Been two years there, Jim -ERC) The WERC TEST is really a great offer by a great DXer - collect phone calls, and even prizes - better than the WBAT-1400 ones last year). That seems all for now, so 73s.

STAN MORSS - Route 3 - Bradford, Massachusetts - 01830

1/13- CKLB-1350 in about 5-m w/WSLR QRM - normally it's CHOV in that direction. 5:45pm found my FF powerhouse on 1550 - ID @ 6 as "R. Canada International" and "Ici Radio Canada". I still can't figure this for CBAG. 1/15- WCDU-1580 in very strong o/CBJ to 1:30am, an outlaw with "humor" giving jokes and comments about Kennedys and Mary Jo Kopechne. They must be very close as they pushed needle over just like a 10kw local. SS @ 1:31 on 1375 very distorted. Rome-1331 fair but WCRB TT made it tough. KYW-1060 AM this AM. KKIM-1000 2:13am a week early on f/c to 2:25, Albuquerque, QRM by R. Mil & R. Miramar. FF on 1240 @ 3:11. Who? IS10-1030 Radio del Plata in o/XBR @ 3:29am & on w/"Panorama". WBTX TEST in well over mess @ 3:40. WJVA-1580 @ 4am. WKFE-1550 s/on @ 4. CBD-1110 s/on @ 4:30 in the clear. PM, working on 1400, WLLH weak spot had c/w @ 5:50 - And a WSLB Ogdensburg N.Y. ID @ 6 while looking for WLLN. 1/18- WCDU-1580 still fighting CBJ 6pm, talking about equipment & mentioning names of DXers, CBJ winning today. 1/19- FF o/WKBA/CBE @ 5:25pm again. 1/22- WGMF-1500 Watkins Glen N.Y. testing @ 1:30, new here & leaving 11 to go to complete N.Y. providing current reports answer. WHEK-1560 ET 2:15. WAMO-860 ET 2:35. CFJR-1450 RS 2:56am covering 1450. C KPL-1400 AN topping the net this AM w/CKTL-CJAL-1271-CFDA in that order & CKLD not audible. WZAR with weird ET 3:40. PM, WIXE-1140 peaking for part of s/off @ 6 but not enough for a report. 1/23 PM- WBRI-1500 in u/WTOP @ 5:52 for several items, um. To 1400 looking for WLLN but WLLH weak spot had FF & WBLR until WLLH put on "Jesus Christ Super-Star" and that covered things up. No WCDU heard tonight. 1/24- WVOV-1000 in o/u WCFL to 6pm when WCFL took over. Reported. 1/26- A weird anthem on 1475 @ 5:14 & then off, fair signal, but Igot there too late for any voice. Maritimes area strong - CBI/CBI atop 1110/1140 & FF on 1550 topping channel. WEGP in strong but no sign of CKIM as usual. Verie, WAVS.

ANDREW P. HUGG - 16 Lake Breeze Avenue - Pointe Claire 700, Quebec

I don't have too much DX to report, but I still exist. The only new logging is a report to WQQW-1590 on 1/26. I have heard R. Paradise-1265 and FWI-1367, but not enough to report. No veries at all. After 12 1/2 years of ECB DX, totals are 1,495 logged & 1,414 veries. 73.

WE WANT TO THANK THE NEWER MEMBERS WHO ARE STARTING TO CHECK INTO MUSINGS REGULARLY, AND WE ALSO WELCOME THE MUSINGS OF THE GUYS WHO'VE BEEN WITH US FOR YEARS. WE DO MISS MANY OF OUR "VETERAN" DXERS WHO HAVE IN PAST YEARS BEEN PROMINENT IN THE PAGES OF DX NEWS. THEIR ABSENCE IS FELT AND RUED HERE. WHERE ARE YOU, OLD BUDDIES? SURELY THE GRAND OLD HOBBY OF DXING IS STILL DEAR TO YOUR HEARTS!

RICHARD C. MAYHEW - 266 Dufferin Road - Valleyfield, Quebec

Greetings fellow DXers. The small DX NEWSes & Ernie's requests for reports has finally forced me to report. I joined WRC last March, so I guess it was about time anyway. As for a small intro, I'm 18, I go to Dawson College in Montreal, & I have been DXing since 12/69. Totals: 575 heard, 34 states, seven provinces, 11 countries. Verified log, just over 100 veries. I don't like to verify, just to hear the good catches is enough for me. However, when I really get a goodie, I try to verify it. Best foreign catch is ZEM2-1340 in Bermuda. They were bombing in here last June just after the big floods in East U.S. I didn't get them verified though, I wish I had. I didn't send a report as I don't like to verify that much, especially foreign catches. On another note, I also belong to that other club, IBCA. I joined them first, about a year before I joined WRC. It sure is nice to get two bulletins a week. I DX mainly BCE, but when CX are right, I DX TV. Funny, I get good old Alaska on the boob-tube but when it comes to radio, nothing from that state ever makes it here. Well, on to a little BCB DX. MM 1/15- WROK-1390 heard ETing w/rr ID 1:01am, then back to more rr ET. CKOT-1310 s/cn 2:15 after ET, announced they went off @ 1:30. Is this regular? 1/18, 1490 DX really came in but few IDs pulled out. WTKL usually my 1490 dominant was very weak for a change. WFOR, Me. 1:30am ID, c/v, ID heard again in promo about c/w wk album offer 2:28am, followed by WK. Many other unIDs heard, one sounded like WJML, location given as Johnstown. Is this ex-WARD? 1/19, WKBR-1250 overriding WTAE @ 12:23am w/ID, usually not heard here. Well, that's about all I except I forgot to give my RK. I happen to use a \$30 portable along w/a 75' longwire. Works pretty good. Now everyone else, remember to Miss, Ernie's fingers are just itching to make a few more typos, hi! 73s in 73. (Welcome to the Musings Section, Richard, and do drop in often! -ERC)

LAURENT GAGNON - 994 Fourth Avenue - Quebec 3, Quebec

1/3 was another good evening for the S. XIZ-555 St. Kitts heard again near 10pm. Paramaribo-725 good signal. E. Tirana-1394 @ 12:10am w/woman speaking. German good enough on 1586 but no signal from France, G.B. or Morocco. 1/5- A little opening of TAs between 6 & 7pm. Germany-1586 6:10 w/good signal, CBR2-1034 Lisbon 6:20 also good. Morocco-935 6:30 poor & Dakar-764 6:40-7 fair to good. R. Libertad-600 Barranquilla heard @ 9:30 on top of Cuba w/CFCF nulled. R. Popular-700 Maracaibo, was also IDed @ 10pm with loud and pompous announcements. 1/7- 6:35-7pm, R. Senegal, Dakar, women with BX @ 6:55, s/off @ 7 & saying in FF "until tomorrow @ 6am." HNE-854 Murcia, Spain, a new one @ 7:15pm & good for ten minutes. R. Carabes-840 @ 7:15 in FF, good enough w/WBAS barely audible. At 7:35 JBC-750 Ft. Galina, Jamaica in EE w/WEB not audible. Montego Bay-700 Jamaica from 7:45 to 8pm, nothing from WLE. At 8:30, R. Victoria-925 Aruba, & @ 9pm, the German on 1586. 1/8- Clear WX, 15° below zero. HNE-683 Madrid, fair @ 6:20pm. At 9:50, R. Rimbos-670 Caracas w/Emisora Venezuela, I&C. 10pm, R. Popular-700 in Maracaibo. 10:10, Emisora Unidas-720 Barranquilla. 11:15, HLJB-830 IDed as R. HLJB, Santo Domingo, & @ 11:30, the Dominican Republic station again on 1600. In DX NEWS of 1/15 the station mentioned by Chris Lucas on P. 8 at Quebec on 1060 is CJRP, instead of old call letters CJLR. Next 15 days I will be on SW.

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Things are looking a bit better on the home front here, & a couple of projects related to the house & to the DXing hobby have been completed. On the latter subject, I finally located an appropriate switch to wire up a switching arrangement for bi-aural reception, as described in Moore's DX NEWS article of 10/20/72, imputing the HQ-150 and newly-acquired Realistic DX-150A. After polarizing the speaker wires coming from the HQ-150, as its audio level was being reduced whenever the DX-150A was attached to the switching box, the unit worked well. Also I got around to adding a tape recorder jack to the hot side of the volume control in the DX-150A; I'm surprised at the relatively low level of output available for the tape recorder. No matter though as I just crank up the level control on the tape recorder - and it is still better than trying to tape after the volume control. On the subject of DXing, in the last two weeks the level of activity has decreased somewhat, but I've noticed what seems to be a power reduction and/or antenna change on R. Paradise-1265. From the strong signal strengths noted in the

first week of January to now (c. 1-22), the signals have been relatively poor over a number of days/times at this time. I wonder if there's been a change? And finally, despite WLB-1490 Atlantic City being ordered off the air by 12/29, it was still on the air noted when I was in Atlantic County on business 1/16, & it can be heard here daytimes u/WBCB Levittown, Pa. with the latter nulled. 73.

CURTIS D. ENGBERG - 80 Concord Road - Wayland, Massachusetts - 01778

No TA signals noted here the past month, so I've concentrated on picking up a few domestics and other goodies. 12/29- WJBO-1590 s/off @ 5:15pm a good catch under semi-locals WSMW/WQQW? 1/150 WFAA-570 w/BX @ 3am o/u an unID for my first reception of them since they left 820. 1/21- WGRA-1100 s/off @ 5pm umm, but always nice to hear a 250w blasting like a local. I switched to 1110 & j. just missed two s/off as MA in/out with itself. CBD ID after Maritime CX @ 5:10. Then a real strange one on 1200 from about 5:25 on, all alone looping NW/SE w/records & EE talk between times about places in the Far West. Too early for WOAI, & rock-steady signal though not strong. I didn't catch any ID in 25 minutes, but then all of a sudden it was swamped by an enormous R. Tiempo signal. A quick check then showed ZIK booming in, 4VEC all alone on 830, SRS high, etc. I believe the unID signal was just what it sounded like in retrospect, an AFRES stations, Roosevelt Roads, P.R. Why I didn't have my tape recorder on, only a stupid DXer would know, hi! Actually it was probably because I was sneaking a listen while in bed with the London flu (even that's TA these days, hi!) 1/22- Looking for Ernie's Brazilian, all I could dig out u/R. Mil-1000 was an ROW ID that sounded like R. Colombiana. At 2:30am I got a R. Uno ID on 660. That eve I heard WJVA-1580 s/off @ 5:45. 1/23- Following Stan Morris' tip I caught WQIZ-810 s/off @ 5:30, but no trace of WETS. I also caught 6pm s/off of WROK-690 u/looped CBF/WROK splash. I have finally decided I've spent enough years DXing with cheap equipment (my two RK-es, an Echophone & an WC-125 cost me a combined total of \$12) & have started doing some serious looking. I looked at an SP-600, but it didn't speak nicely to me in the demo. I tried a used SWA which seemed to have plenty of poop & no doubt about dial accuracy, but of course it lacks a lot of the nice DXing features. I might have bought it anyway, but found too much cross-mod on BCB. At least two signals evident on all clean daytime frequencies like 1160 & 1200. Does anyone have enough familiarity to know if this is typical of the SW-A? I can't find any place around that handles new ones for a better demo. I'll keep looking, there's no real hurry after 30-odd years of DXing, hi!

CHRIS LUCAS - 407 Elmwood Avenue - Ithaca, New York - 14850

DX continued at a rather slow pace this past week, until 1/29 @ SSS when many stations were logged as I seemed to be on the right frequency at the right time. DX: 1/23- WCNW-1560 O. @ 3:40pm u/WQXR, CJBR-900 Que. @ 5:31pm. 1/25- WVCW-1290 W.Va. @ 12:54am, WMPM-1270 N.C. @ 5:18pm, WLBK-1270 Pa. @ 5:29pm. 1/26- WBUX-1570 Pa. @ 5:01pm s/off, CKCW-1220 N.B. @ 5:29pm. 1/29- ZFB1-960 Bermuda #1 @ 2:29am, CHNS-960 N.S. @ 3:07am. WERC not heard, although around 2:25am I thought I heard something that sounded like WERC, but this well before TEST was to begin. No go on KTGO-1090 either; just IAs & hets. A couple rr oldies were heard at times during KTGO TEST time, but no voice or anything else made it through, so I don't know who it was. SSS 1/29- WAVL-910 Pa. @ 4:58 s/off (15 minutes early according to SRS/SSS Maps). WJWL-900 Del. @ 4:59 s/off, WIND-900 Md. @ 5:03pm s/BX, nice signal well o/CBDL, WIAS-910 N.C. @ 5:13 s/off, WIAM-900 N.C. @ 5:14 s/off, WAFB-900 Va. also 5:14 s/off; WJCW-910 Tenn. @ 5:29pm. WTM-920 N.J. @ 6pm o/looped semi-local WKRT-920. Total loggings now 666, 66 of which are graveyards. Signals were fairly weak this SSS, & I was straining to hear these stations amidst terrible TVI. In fact, I often get louder TV squeals from some set outside this building than I do from my own which is located 1 1/2' from my rig & about 6' from my loop. Someone's TV is sure radiating a lot of signal. By the time you read this, NYC should have its very own c/w station in the form of WBN-1050, which is reportedly changing from MoR to c/w. I hope it doesn't distract Ernie from his DXing, hi.

YOU FROM SAN JACINTO - TRADE IN YOUR PINTO! GO GET YOU AN AUSTIN - AND DRIVE IT TO BOSTON! LABOR DAY WEEKEND!