"My sincerest thanks for a job well done! DX NEWS is a tremendous source of BCB info & continues to improve every issue." (Prof. S. D. Squibb, U. N. C.)

IN THIS ISSUE...
- DX From the Twilight Zone - Phil Sullivan
- Foreign Contest Results - Russ Edmunds
- Geographical Patterns in BCB DX Reception During Periods of High Auroral Activity - Gordon Nelson
- Final Convention Information - Don Kaskey

NEW NRC MEMBERS THIS ISSUE...
- *Kenneth H. David, Hilo, Hawaii
- *Dave Christensen, Seattle, Washington
- *Floyd B. Walker, Fort Wayne, Indiana
- *Mrs. E. B. Roach, Auckland, New Zealand
- *Robert E. Garrett, Binghamton, New York
- *Ellis Hart, Fairfield, Ohio
- *Ja. Markiewicz, Winnipeg, Ontario

Welcome to the NRC, gentlemen, we hope to be reading of DX activities often here in DX NEWS!

RENEWALS...
- Squibb...
- Roys...
- Oldfield...
- Coleman...
- Reh...
- Slater...
- Rattay...
- Reser...
- Shannon...
- Eddie...
- Ham...
- Rader...
- Hunt...
- Jacoby...
- Gray...
- Rugg...
- Hardester...
- Breville...
- Myers...
- Romstadt...
- Moore...
- Bloomberg...
- Merriman...

APOLOGIES TO THE IRCA CONVENTION COMMITTEE
During the confusion of getting out DXN last issue we inadvertently neglected to run the invitation from the IRCA ConComm for the NRC membership to attend their Toledo Convention. This was strictly an oversight on our part; a call from Dan Myers alerted us and, since the current issue would be too late to be of use, we did the next best thing and sent off a set of our NRC mailing labels to be used in mailing IRCA Convention info to our membership. We sincerely apologize for any trouble our oversight may have caused.
PEND ALONG WITH THE P.O...

We're still awaiting final word on our Second Class permit. **Things are still more than a bit confused in Washington**... those who read the Times know that one of the first items of new business before the new Postal Service is a complete revamping of Second Class service. The magazine publishers are screaming but it probably won't do much good... Readers of 73 Magazine noted that they've raised their rates from $6.00 to $10.00 in anticipation of the increased Second Class postage rates... You'll be seeing a lot more of that, we predict...

FM STATION ATLAS IS PUBLISHED...

The country's top TV-FM DX club. World TV-FM DX Association, has just published an atlas of US and Canadian FM station information for all DX'ers.

If you ever DX FM, buy one and put it next to your NRC Logs... Available for $2.00 from WTVFMDXA, P.O. Box 5001-NR, Milwaukee, Wis. 53204. Enclose 25¢ for a 15 page introduction to FM DX complete with predictions; another quarter will give you a sample of their bulletin too! They also say there will be a TV log coming out soon; we'll let you know here in DXN.

THE INCREDIBLE MAP BOOK PROJECT!

The man asked a couple of issues ago what we could do to top the NRC LA and Domestic Logs... It, fine folks, will the NRC BROADCAST BAND PATTERN BOOK, now being compiled. Those who've seen one of the very few existing commercial pattern books at Conventions or DX gatherings know that they're incredibly useful but impossible to obtain. The NRC Pattern Book will consist of large legal sized 8-1/2" x 13" maps for each BCB channel showing the directional patterns, both day and night, for all the stations on the channel. **Together with several pages of articles on patterns from Paul Hart and a set of auroral maps from GPN, the Pattern Book will run about 70 pages long...** We'll bind it with a GBC comb same as in the NRC Logs and will sell it on a reserved basis to the NRC membership as we did the LA Log. **Price will probably be in the $4-5 range; it's impossible to tell this early.** This project is headed by Ernie Wesolowski in Omaha (see Musings for his address); other workers on the project include Paul Hart, Jerry Starr, Wes Boyd, Russ Edmunds, and GPN. **IF YOU WISH TO RESERVE A COPY OF THE PATTERN BOOK YOU MUST SEND US A NOTE TO THAT EFFECT OR YOU RISK LOSING OUT!**

THANK YOU, ELECTRON MAGAZINE!

Said ELECTRON, Canada's largest electronics magazine in its March issue: "NATIONAL RADIO CLUB. This club has just got to be the best organized one, covering any segment of our hobby's attractions that you are apt to run across... IF YOU HAVE ANY INTEREST AT ALL IN THE BCB... WRITE THEM!"
### 1970-71 FOREIGN CONTEST RESULTS

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**Note:** "n/e" denotes no entries.

**PRIZES:** Contest rules were altered slightly to allow each entrant two prizes instead of original one, due to large number of no-shows.

| Total entries: 62 | Total entry fees: $31.00 | Total prizes due: $30.50 | Mgnt. Costs: $50 |

If anyone else desires to manage a foreign contest for 1971-72, please contact me immediately, as I have plans drawn up for one or can give suggestions. If no takers by convention time, I'll be glad to serve as manager again next year, but I also won't mind handing over the reins.

**MYTHOS CEZAR OBJIO PLEASE CONTACT ME AS TO HOW TO SEND YOU PRIZE MONEY AND TO WHERE!**
ERNST J. WISEMAN - 1116 Pasadena Avenue - Omaha, Nebraska - 68107

We had a wonderful time on vacation this July with the

highlight at Cape Kennedy. Our family was given a private tour with a NASA
guide. On the way down I really came in on old verihold, CERN-1390 WSMX-790 WTA-1400 WVFO-1010, and how about this one, fellow? NWSG-510
for that 1969 Hurricane. Camille Emergency broadcast would not be seen for
anyone that I know of.

Then WVFO-1400, now WBBN; WIU-1390, WIU-1390, WBBN-860
& WBBN-1390 after three wfe reports failed. Some of these reports go back to
1960. Two others I called didn't show up last night. I will not be in S.P. but
will arrive in Toledo on 8/8. The OM idea is in the wind again. See more info
on this elsewhere in DX Country. Music Country is #1. (Not in N.Y.C. alas -ENC)

CAROLYN WILDER - 10831 Kentucky Road - St. Louis, Missouri - 63128

Hi gang! Contrary to popular demand I am well and living in
the wonderful St. Louis hi-state area, home of sourthern corn leaf blight and the
St. L. LAX. Not much DX here on AM due to FM, broadcasting, that is. I'm now
working at WCM-PM, 102-9, Columbus, Ill. (a beautiful Illinois home town). We
are considering St. Louis since our XR is four miles from the St. Louis Brewery Arch.
If any of you fellow FM DXers get CWARE FM it'll tell you.

Send then to my home address or to the station with my name on it so it gets to the
very department (me, myself, and I). On the AM scene, I went to Rolla, Mo.,
home of the best engineering school W of the Mississippi and saw KGW-AM-FM and
KCTV & passed WHNT on R-56 in Sullivan, Mo. More DX next time. 73. (They'd
make terrific DX TESTS for NRC, hi -ENC)

CONCERNING CONVENTIONS OF CERTAIN DIMENSIONS:

WORLDWIDE TV-FM DX ASSOCIATION. This will be in
Lansing, Michigan, at the University Inn Motel. It will be on 8/14-15, and info can be got to us from the NNB
Bulletin and the IRCB publication. NRRC says info may be had from Box 5001, Milwau-
aukee, Wis. 53204, and IRCB gives the address at: Roger Brown - 1617 Lincoln,
East Lansing, Mich. 48823.

IRCB CONVENTION. Send your registration for attendance at this annual event to
Jim Myers - 2600 14th Street - Toledo, Ohio, 43613. It's for the weekend which comes two weekends ahead of our convention, or to be more specific, August 20-22.
There are tours of WPTO and W7ATO, possibly W2OHO also, and a possible side trip to
Detroit & Windsor to visit WJR & WCHW, and W2XW. Perhaps there is more info
on this elsewhere in this issue, from our Bobcat group.

"AN" SITUATION

ALL ON: W6 M W S Mo, Ang, NH
1430 W N J R SPU, on Mns.
890 W C B S A NR; WSP.
1500 W O K J SPU, NY
1400 W O C EX-WH, NN, AN-6

REMEmBER, a DX TEST r/c from W6SS-290, West Yellowstone, Montana, on 8/27, 8pm
August 27, from 5:45 to 6:15 pm, E.D.T., for IRCB. This is quarterly
always on the 27th - next TEST on Saturday, November 27th.

WEST SACRAMENTO beckons to all - we have all read what a wonderful time can be had
at the El Rancho Hotel-Motel in this famous DX city! Don Kaskey will be hoping for
a big turnout. There are more details elsewhere in this issue certainly,
but let this merely serve as a reminder that Labor Day weekend is coming on the
not-so-distant horizon even as you read this! Act now and get in on the
fun - and find out (if they'll tell you, that is) what ERBA means. And at this
NRC Convention, there be DXers when you have never met before! That's guaranteed!
And there will be some of fun, you can bet on that. Pack up your bag and
head for West Sacramento! Read those details up ahead somewhere!

SUGGESTION: How about someone who subscribes to "BROADCASTING" writing a letter
to their letters column, explaining Monday Morning DX and trying to gain some co-
operation from some of the stations which are making it so difficult? - ENC

KEN ORSCHUK - 1543 Olive Road - Homewood, Illinois - 60438

Hi again. I just got my portable radio fixed 7/28, and decided to put it to the test. My seventh 1000 watt station, WAIU, Peru, Ind. 7/20-7/4pm 7/26
two over two other 's. Driving south on the Dan Ryan WY in Chi-
too, I picked up WKNX-1210 Mich. 9:05-9:15 w/KUOU Oahu-Philippines' game. Three
other catches to note: WMJX Mackenson, Mich. 7/10 11:15-noon; WXYT Milwaukee 9:10-
9:25pm 7/20 and first Tulsa skip of season, 7/22 on 1170, Oiler vs. Wichita BS for
2 1/2 hours @ 9:35pm, then back to WWY. On 1130, WSMX-Cinc. 50w 7/30 at 8:30,
then WPXI on 1170. Through the 1st part of 8/2 on KUOU w/ WY, NK, Last Fall - now I get a weak WY N.C. signal. (Last
year KFAB was non-directional after a storm knocked out their towers - ENC) I'm still
trying to find new signals daily, on the portable or car radio. I've got to go now, deadline today '73 till August.

JAY MURLEY - 1733 Candlestick - Newport Beach, California - 92660

Eastern DXers wandering out to West Sac a few days early, with sight-
seeings prior to the Convention, are most welcome to check in! Office phone in L.A. is 213-388-1271, home is 714-948-2921. In any case,
I have some others that are planning to be in the Ramada Inn, St.
Louis, MO. 's 790 AF. I've just heard a well and living in
bi-state area, W of the Mississippi and saw
43613. My CB has been on H-66 in Sullivan MO. More DX next time. 73.

KEVIN SINCLAIR - 2132 White Street - Belmont, Massachusetts - 02179

The OC that sometimes runs AN on 900 appears to be CKBH, Sher-
brooke, Que. 7/22-1230 RI. Finally heard, good signal w/917 show & ID @
3:00pm, an eight-year holihout. I've now heard all RI. Try that, Deloremo!
2795 on 1170 for a big DX at 2:05pm. I was given @ 5:15, Test consisted mostly of OR.
MM 7/24 found a strong pirate on 1650 @ 9am, this may be the same
worker, N.Y. operation again. He was playing light clx ex (that's a real switch) &
his audio was excellent. He rambled on about how he detected rr & inspi41 Top-4
ENC, are you in the pirate radio business? Good DX. (New, George - just that
word "Pirate" is distressful to a MRF fan! - ENC)

ERNST R. COOPER - 438 East 21 Street - Brooklyn, New York - 11235

Not much going on here in the DX hobby - Mondays are getting
like any other day of the week, thanks to AN going NSP, one by one.
like W2OHO-860, a W6HO-860, W6HO-860, a W6HO-860. I've tried most of
those, but they've been extremely noisy. MM 6/7, someone on 1370 on 6/6-7, ID @ 1:15.
Local W6SS-290, R-56, is very good w/ 00 mostly @ 1:50. 6/7 - I looked for r/c on W6SS-1280 now, anybody know how to make this work? MM 6/6-7, Dark EER on 1280 w/ no announcements, 1350-
W6SS-1280, on P@ 1:15, W6SS-1280 stop w/SS-HOL 1:10-30. W6SS-1280 heard s/off
6/15. Local W6SS-970 noted -rr. I heard a "hi" on 1450, gave what sounded like
like poor keying on CW, = letters sounding like AN. Find out what this was? MM 7/12 - I finally heard W6SS-1390 on r/e rwt w/SS/KSPS w/ WTP already out. MM 10:50 was not on FS but had OK on 1:00, W6SS-1400 was noted silent @ 12:00. MM 10:50 was on top @ 12:00, s/off-23. W6SS WMA-160 seemed OK but W6SS was silent for about 11 days, but I had the chance to talk to the W6SS-1280 heard OK in July, W6SS & WMA. They came back on Thursday 7/
on MM 8/2, 9:00. MM 8/2- The AN situation deteriorated here, but
was newly returned to the air, on W6SS, plus the CBC network with
Apollo-15 coverage, plus W6SS-970, possibly for the same reason, as they weren't
Hi-ing but had light rr. I heard a mixture of ZDR & Venezuelan on 1100, both
seemingly ANing - gone were the two former holders of this channel, the two
Colombian Rejojo. That's it - see you in August.
Greetings from Chesapeake L.A.
It seems to be OK, South India's. For Lars Page's station is Radio Qly; let's go & it should prove a lot.
The western North Carolina's Cranberry It will be interesting to see how it is.
Libreville has been recently positively identified by both Page & Page tends to this one is listed as a low
Fadewhich is about 0518; programming in French with lots of West African music.
Be very careful with this one; as the season advances there will be here & more audio there from Nice, also in French. Check the SW parallel on 4777 kHz if you're having trouble IDing this one. Gabon was logged as Page's 94th country on MW; #123 for the Editor.

*OTHER SUMMER AFRICANS. Both Page and the Editor had very good signals from Nigeria on 1088 kHz about 4 weeks ago on MM; Page also got them on 1585 the same night. Try for this one around 0430 s/on. Page also reports hearing West African music on 1434 around 0500; this is very likely Barnakal MAAT which was widely heard several years ago. Page's station is on an hour early for Mall's published schedule, which is something new... Taylor also reports a real newie - an African on 1578. The carrier appears around 0550 and an IS has been noted at 0600. This one is listed as a low powered station in the IVORY COAST; this one really bears watching!

SAUDI ARABIA. Jibba is now operating on 1183 with high power; this replaces 647 kHz. (Editor)

URUGUAY. Radio Oriental's new high powered transmitter on 770 is operating with 135 kw according to the station. It does not ID as "WABC", however, and it'll require a good auroral night to make it to the East Coast. It might be heard on the West Coast before dawn however...

BRAZIL. The Europeans report hearing split-frequency Brazilians on 1468 and 1472 kHz; anybody hear them here? (SDKK)

PHILIPPINES. DZHH, the Philippine Air Force Time Station is now operating on 1570 with 10 kw. This one has been operating illegally since May 1970 but just got a license. This is probably the unid station recently heard in New Zealand thought to be Norfolk Island. (Lars Ryden, visiting Philippines)

FIJI. Sigatoka on 1210 and Laka on 680 are due on the air soon. (SDCX)

INDIA. South India's most powerful station is to go on the air at Alleppey, Karala on July 17th; freq unknown so far. (Editor)

Due to circumstances beyond our control, Foxy's IDXD section will not appear this issue. Watch for it next time.
One popular type of BCB DXing, and one that is generally at its peak in late summer and fall involves the reception of sound waves that occur around the times of sunrise and sunset, when either the receiver or transmitter is in daylight. This article is intended for the DXer to help him better understand why he hears certain stations during these times and show him some tricks to aid him in finding the DX stations.

The first point to be covered is: "Why this time of year?" Basically, there are four main reasons: 1) It is during the months around the equinoxes that the times of SR and SS are most rapidly changing, resulting in the greatest discrepancy between the actual and FCC defined average times for these events. 2) Sunset tends to occur at a convenient time in the afternoon for those returning home from work or school. 3) Daytime ionization levels are getting less due to shorter days and lower solar altitude - this generally improves reception. 4) This is the traditional time of the year for W5 DXers to resume their hobby again after a summer of better things to do than listen to distant thunderstorms.

What about the kinds of stations that can be logged by this type of DXing - what can you expect to hear at SR or SS that may be difficult or impossible at other times? Basically it can be said that these times give some of the best chances for logging domestic stations, especially in the 2500 to 3000 mile range and some quasi-domestic stations that greatly reduce power and/or reach at night, e.g., W5SE-B10 (50000/5000 and W51-1070 50000/1000) as far away as 2000 miles. Also certain classes of foreign stations may be heard best during this period.

Which are the best frequencies for SR and SS DXing? Most BCB channels will yield one or two possibilities at SR or SS - the best frequencies seem to be the regional and Canadian clear channels with a lot of U.S. daytimers - the author has had rather good results on 540, 790, 1370, 1500 and 1600. Particularly where the dominant station is in the midwest certain U.S. clear channels also give good results, e.g., 1700 which gives good reception of W5BO, WRK 1220, W5AS on all along the BC before W5BO fades in.

When is the best time to listen for sunrise skip (SRS) and sunset skip (SSS) signals? If you answer "at sunrise and sunset" you are only half right - there is more to it. Consider figure 1 which shows a typical curve of SR/SS times for moderate northern latitudes for August thru November. (It is plotted for 42°30'N, 71°45'W - Leominster, Mass.). The discrepancy referred to above between the actual and average times for SR and SS comes about as follows: The FCC requires many stations to make such changes in operation at SR and SS - sign on or off, change power and/or pattern. However, rather than have the stations follow the minute by minute changes in these times the FCC requires that the changes in operation be made at "uniform sunrise and sunset times (for) each month". This uniform time is the actual SR or SS time on the 15th of the month in 1946 in the center of the city of license, rounded to the nearest quarter hour. Fortunately SR and SS times have not changed much in the last 25 years and the transmitter is usually near enough to the center of the city for our purposes here. Refering again to figure 1, we see that SS in Leominster on September 15 occurs at 1756 EST (note: all times in this article are EST unless otherwise noted). So the FCC defined SS a/o time for W5MS would be 1800 for all of September. On 9/1, actual SS in Leominster is at 1845 so when W5MS is at 1800 that time is still 23 minutes of daylight to go - not a very good time to try and hear it. But come the end of the month things change - on 9/30 SS in Leominster is 1732 so on that date W5MS is on for 28 minutes after the sun has set and should be heard several hundred miles away. 2:15 PM on 10/1 is a good time if local QRM and other factors permit. On the next day, October 1, the a/o will come at 1760 - again making reception very unlikely.

The above is presented as an example to show the basic principle of twilight DXing: during the fall it is the last week and so each week that will bring the best reception. The first week of a month is usually a lost cause for SR/SS DXing while the middle of a month is sort of so-so, good for some stations, bad for others depending on how much rounding off had to be done to get an even quarter hour for their s/on and a/o times. It should now be obvious that during the spring, when sunrise is getting earlier and sunset later every day, that the last week of the months of February, March, April and May are the times to listen at SR and SS.

So what's the best way to go about SR/SS DXing? If you are a beginner and have yet to try much of this type of DXing I would suggest purchasing a receiver on a likely channel and starting about 15 minutes before your own local SS listen as stations fade in and local SS occurs at their transmitter (approximately - the actual fade-in time depends on other factors too) and then sign off a few minutes later to be replaced by another station fading in - on a good channel as many as 6 stations may be heard, one right after another. For SR DX start 1-1.5 hours before your local SR and listen as stations sign on and then fade out shortly thereafter.

After you've gained some experience with twilight DXing it is time to start a more systematic approach and try for the stations that you pass up the first time. The thing to decide is which is better for a particular station, SRS or SSS? Generally if the station is west of you SS will be the time, if east then SR. The next thing to do is determine the FCC defined SR or SS at the station. If you are fortunate enough to be able to obtain a set of SR/SS maps for the U.S. (published a few years ago by Ernie Wereszczak) you need only do it - compute it from the definition with the aid of Table 1.
Table 1 gives the local mean time (LMT) of SR and SS at various latitudes for the 15th of the fall months. The FCC defined SR and SS times are found as follows: 1) Determine the latitude and longitude for the city the station is in. 2) Using the latitude and the month in question, go to Table 1 and find the LMT or SR or SS, interpolating if necessary. 3) Correct for longitude by adding the quantity: (4 min/deg)(West longitude - 75°) - note that this quantity will be negative if the city is east of 75°W. 4) Round off to the nearest quarter hour, the result will be in EST. For example: FCC SR for Evansville, Ind. for October - 1) Evansville is at (approx.) 87°W, 38°30'N. 2) Interpolating in table 1 we get 0608 LMT for 38° on October 15. 3) The longitude correction is: (4 min/deg)(87°30'-75°) = (4 min/deg)(12.5 deg) = 50 min giving 0658 EST. 4) Rounding off we get 0700 EST as the FCC SR in Evansville, Ind. for October.

To find the time of actual SR or SS on a particular date follow steps 1-3 above. For dates on either side of the date in question then interpolate linearly to find the actual time. Continuing with the above example, SR in Evansville on 11/15 is 0730 so on 10/31 to 11/15 be between 10/31(16/31)(12.5)*60 = 0714. All of which means that a DXer in the Midwest wanting to hear WIKY should try between 0700 and 0714 on October 31.

The above techniques can also be used to determine when the QRM from certain stations will be gone, thus allowing a better prediction of DX possibilities.

Two other, more complete, tables of LMT of SR and SS are available and can be used in lieu of table 1; they are: The Nautical Almanac (available from the Superintendent of Documents, Washington, D.C. 20402 for $4.00) and a set of tables published in DX News 4/26/69 (available from your friendly NRC reprint service).

What about foreign twilight DX? While this type of DX is primarily useful for logging domestics, certain foreign stations can also be heard at such times. One such group are the stations in the Lesser Antilles where in the fall and winter months SS comes at 1630-1645, about the same time as in New York and New England despite about 10° difference in longitude. This may make reception of stations like ORTF-640 Guadeloupe possible before any QRM fades in. (SS in Havana comes about 1 hour after Guadeloupe). Other stations to try for on the EC would be ZDK-1100, WWV-1060 and ZBY-780. DXers in the west might expect to hear some Central American stations at this time of the year at SS.

The times of SR and SS are good times to add many otherwise difficult catches to your log—hopefully the above help you better understand and take advantages of the quirks that make twilight DX possible.

I. Introduction

More so than on any other band, DX reception on medium-wave frequencies is greatly influenced by auroral storms and disturbances. For many years MW DX'ers have used the informal term "auroral" to describe peculiar nighttime which feature highly enhanced MW reception from the Southern U.S. and Caribbean areas, together with an almost complete loss of signals from stations to the north, west, and east. During an extreme "auroral night" DX'ers in some areas have even reported a complete loss of all signals except those from nearby locals and, strangely enough, a few otherwise rarely heard stations in the Deep South and Caribbean. Following the onset of a severe auroral disturbance, MW DX conditions can deteriorate so rapidly, in fact, that many a DX'er (this author included) has been fooled into switching off his receiver and giving up for the night in the mistaken belief that a tube had burned out!

In the previous DX NEWS articles describing our research into the relationship between auroral/geomagnetic activity and Trans-Atlantic MW reception, we briefly touched on this striking and very characteristic pattern in domestic reception and explained that it was due to the southward spread of the "auroral zone". In this article we will explore in more detail just how auroral/geomagnetic activity produces the "auroral conditions" so important to the domestic DX'er, and show how the DX'er can actually take advantage of the aurora to add otherwise impossible-to-hear catches to his log. As we shall explain, the aurora is a manifestation of the origin of "auroral" MW conditions, we'll compare the predictions of our theory with several hundred reported receptions (and nonreceptions) made by NRC members during the major auroral storm of March 7-24, 1969. In addition we'll compare the location and behavior of the auroral zone as determined by the reported receptions and our theory with related ionospheric measurements made the same night by the U.S. Air Force's network of satellite and ground-based research stations.

We believe, based upon several years of research and experimentation, that we now understand enough about the effects of the aurora on MW reception to explain and, to a certain extent, even predict MW reception patterns during auroral/geomagnetic storms. Now that WWV's hourly geophysical broadcasts can bring the DX'er an almost immediate measure of the aurora on his location, and behavior of the auroral zone as determined by the reported auroral/geomagnetic activity, it's become possible for the DX'er to use auroral information to actually guide him in his DXing. To this end we will explain how the DX'er can prepare maps like Figure 1 for his own location to aid in logging and identifying stations during auroral disturbances.

A full technical version of this article will appear in the Journal of Geophysical Research sometime next year.
II. A Model to Explain "Auroral Conditions"

As we indicated in our previous articles here in DX NEWS, the fundamental cause of "auroral conditions" is the unusual southward expansion of the auroral absorption zone from its normal location far to the north of the United States. The strong absorption experienced by a medium-wave signal passing through the auroral zone is due to the presence of large numbers of auroral electrons; these electrons are produced by the collision of highly energetic charged particles with the upper atmosphere. These charged particles fall or "precipitate" along the lines of the Earth's magnetic field which extend from the Earth's surface far into space.

During periods of low solar and geomagnetic activity (as during the years of sunspot minimum) this charged particle precipitation is limited to a slight "drizzle" of low energy particles falling from the Van Allen radiation belts into the classical "Auroral Zone" in the Far North.

Following certain types of explosive disturbances on the Sun, a shockwave of highly energetic solar particles may result in severe deformations of the Earth's magnetic field. In connection with such a magnetic disturbance particles with greatly increased energy begin to precipitate into the atmosphere and, due to their additional energy, they may fall along magnetic field lines far to the south of their usual quiet paths. The first equations relating the energy of a falling charged particle to its final path along the Earth's field were worked out around the turn of this Century; since then they've been studied and verified in great detail. Readers interested in more details should consult the references cited at the end of this article; in the meantime we'll give the following basic rule to be taken on faith:

The more energy a charged particle carries (i.e., the greater its speed), the further to the south it can fall along lines of the Earth's magnetic field.

For any particular particle energy, the line defining the southward limit of precipitation should theoretically be a line of geomagnetic latitude on the ground. Due to the eccentric shape of the Earth's magnetic field (recall that the North Magnetic Pole is located some 980 miles from the geographical Pole), a line of geomagnetic latitude does not follow a line of geographical latitude.

Figure 2 shows several lines of geomagnetic latitude for North America. The heavier an auroral disturbance the more energy the falling particles will carry and the further to the south the auroral absorption will extend. Note that the eccentric shape of the Earth's magnetic field means the precipitation zone extends farthest to the south along the Eastern Seaboard. Thus, while Richmond, Virginia is on the same geographical latitude as San Francisco, as far as the aurora is concerned it's on about the same geomagnetic latitude as Seattle! Along the West Coast the zone is so much farther to the north that many WC DX'ers never really get to experience the full glory of a massive auroral upset...
Figure 2. From its normal location in the Far North, the auroral absorption zone expands and moves southward with increasing auroral/geomagnetic activity. Here we have shown the location of the auroral absorption zone for moderate, high, and very high levels of disturbance. (The curves are the intersections of three values of Gustaffson's 1970 corrected geomagnetic latitude with the 60 kilometer level).

It's most important to appreciate the fact that simply knowing the exact location of the southern edge of the absorption zone is not sufficient by itself to determine just which stations will be absorbed by the aurora at a particular DX'er's location. This is because even the most powerful auroral particles falling into the atmosphere rarely penetrate to depths within about 35 miles above the surface of the Earth. Below that level there is no significant MW absorption.

Were the auroral absorption to extend all the way down to the surface of the Earth, the job of determining just which signal paths would or would not suffer from auroral zone absorption would be trivial: any great circle signal path from transmitter to receiver passing north of the edge of the zone would be absorbed, period!

But the presence of the "clear" region underneath the auroral absorption means that it is possible for some signals to skim in under the auroral absorption at low angles and thus reach the receiver unscathed.

Therefore we need to know something else besides the actual location of the auroral zone before we can say whether or not a particular signal path will be absorbed or not - and this is where the auroral control point comes in. The auroral control point relates the angles of possible signal arrival to the location of the auroral zone, thus taking into account the possibility that a signal may skim under the aurora through the absorption-free region.

Since the auroral control point is really the key to understanding "auroral conditions", we'll try to make it as clear as possible. While it's easy to visualize with the aid of a three dimensional model, unfortunately we'll have to limit ourselves to two dimensions in Figure 3 since that's all our printer can handle...

Beyond the range of a MW station's groundwave signal (a few hundred miles typically; roughly the daytime range of the station), all reception takes place by means of skywave signals reflected back to Earth from the reflecting layers of the ionosphere.

MW signals are reflected from two levels at night during an auroral disturbance: the nighttime E layer at a height of about 110 kilometers (about 68 miles), and the nighttime F2 layer at a height of about 400 kilometers (about 250 miles). Because all ionospheric heights are expressed in kilometers by long tradition, we'll stick to convention; this will make cross reference to other articles and texts much less confusing. Furthermore the layer heights which we will use may seem a bit high in comparison to the values commonly used in the standard textbooks and references; this is because these layers move to higher-than-normal levels during a major auroral disturbance. The actual reflection heights are routinely measured 24-hours a day by the Air Force using a special type of ionospheric radar called an ionosonde; the values which we will use in this article are actual height levels measured from a site near Boston on 3/24/69.)
Figure 3. The top figure shows a typical skywave signal being reflected back to Earth from the ionosphere and arriving at the receiving site. The point below the intersection of the signal path and the level of lowest auroral absorption (60 kilometers here) is the AURORAL CONTROL POINT. As long as the auroral absorption is located north of the ACP the signal will not have to pass through the auroral absorption even though the absorption is overhead at the transmitter location. If the auroral zone moves south far enough to reach the ACP, however, the signal will intersect the auroral absorption layer and be greatly weakened if not completely wiped out.

The exact location of the ACP depends upon the separation between the transmitter and receiver as well as the height of the ionospheric layer responsible for the signal reflection. Under normal auroral conditions the ACP may be as much as 500 miles south of the northern end of the signal path (the transmitter and receiver could have been interchanged in the drawing above).

Figure 3a shows a typical skywave signal path with a single reflection from one of the ionospheric reflection layers we've just mentioned. The lowest height of significant auroral absorption (which we'll take to be 60 kilometers) is indicated by a dotted line. THE AURORAL CONTROL POINT FOR THIS PATH IS THEN THE POINT ON THE GROUND DIRECTLY BELOW THE INTERSECTION OF THE SIGNAL PATH WITH THE HEIGHT OF THE LOWEST EFFECTIVE AURORAL ABSORPTION.

In the first drawing the general level of auroral activity is low and the auroral absorption zone is located to the north of the auroral control point for this particular path. [We'll abbreviate auroral control point to ACP from hence to conserve space] Thus, even though one end of the signal path is actually located underneath the auroral absorption, the signal path is nevertheless unaffected by the aurora because the skywave arrives at a low enough angle to pass under the absorption.

In the next drawing the auroral activity has increased and the absorption zone has moved southward. Since the absorption now extends south of the ACP, the signal must pass through the auroral absorption and will be greatly weakened if not totally wiped out.

The paramount importance of the auroral control point should then be obvious: if the ACP for a particular signal path is located south of the southern edge of the auroral zone, transmission along that path will not be affected by the aurora. If on the other hand the absorption extends far enough south to reach the ACP, the signal will be subject to auroral absorption. It's then clear why just looking at the location of the auroral absorption zone on a map like Figure 2 will give the DX'er only a limited idea of which stations will or will not be absorbed by the aurora - the possibility of low-angle paths under the auroral absorption is neglected! The ACP must be known in addition to the location of the absorption zone if the fate of a particular signal is to be predicted.

Let's take a real signal path as an example, say the path from KMOX in St. Louis to Boston. The length of this path, measured along the ground, comes to about 995 miles; for the possible skywave reflection from the F2 layer at 400 kilometers a quick calculation on the computer shows that the signal will arrive at Boston at an angle of 22° above the horizon and that the ACP is located some 86 miles down the path from Boston. On a particular "auroral" night we'll then expect KMOX's F2 skywave to audible and unaffected by the aurora unless the auroral absorption extends as far south as the ACP, which is located near Hartford, Connecticut.

As we indicated earlier, nighttime reception may also occur as the result of reflection from the night E layer at 110 kilometers. Substituting this height into the equation gives an arrival angle of 4° and an ACP located 322 miles down the path from Boston. The ACP for the E-layer reflection is thus in a different place than the one for the F2-layer signal.

Since the E-layer ACP for this path is located south of the F2 ACP, southward auroral expansion will first black out the F2 signal; then, if it advances as far south as the E-layer ACP, the E-layer
reflection will go also. In this case the E-layer ACP is the
most southerly of the auroral control points for the various
reflection heights which may contribute to the reception of KMOX
in Boston. Once the aurora has gone as far south as the E-layer
ACP in this case, KMOX's signal must suffer auroral absorption *
since all possible skywave reflections must traverse the aurora.

Because of the basic difficulty of identifying the type of
reflection responsible for any particular reception (the night E
layer is not always present), we'll take the most southerly of the
possible ACP's to be the limiting auroral control point (LACP).

While we may not know for certain which reflection layer is
involved in a particular reception, by locating the ACP's for all
possible reflection modes and then selecting the one furthest to the
south we can be certain that all possible paths are closed if
the absorption extends as far south as the LACP.

In summary then our model to explain auroral-produced patterns
in MW DX reception is built upon the following assumptions:

1. Auroral-induced absorption may be located as low as 60 km
during high levels of auroral/geomagnetic activity. Below
this height there is no appreciable absorption.

2. Nighttime MW propagation during auroral disturbances may
take place via reflection from the night E-layer at 110
kilometers, the night auroral F2 layer at 400 kilometers,
or both.

3. MW signals passing through the auroral absorption layer will
be very greatly reduced in strength if not totally absorbed.

4. For purposes of simplicity we will assume that the south edge
of the absorption zone is very sharply defined, that is, that
signals which just graze the auroral absorption zone will
experience full absorption.

5. Effective reciprocity exists on these signal paths, that is,
the transmitter and receiver sites may be interchanged
without any difference in the path absorption caused by the
aurora.

6. For any particular level of auroral/geomagnetic activity,
the southern edge of the absorption zone will lie along a
line of constant geomagnetic latitude.

[* For long signal paths the possibility of propagation by means
of "multiple hop" reflections must be taken into account. For the
sample KMOX-Boston path the multihop ACP's would all be located
north of the respective single-hop points; the LACP is still the
one for the one E-layer hop. For the March 25-24, 1969 data to
be presented in the next section we have included double skips
in the determination of the LACP's.]

Based upon these assumptions, for any particular transmitter
and receiver site we may then calculate the location of the auroral
control point for the reception resulting from reflection from
layers at any particular height. The auroral control point which
is located furthest to the south is the limiting auroral control
point (LACP). If the auroral absorption zone is located south of
the signal path for a particular reception path the signal must be
subject to auroral absorption since all propagation modes must pass
through the absorption layer by virtue of the path geometry.

The LACP locations given in the next section were calculated
on the computer with the equations given in Appendix 1 of this
article. We have also presented several graphs in Appendix 2
which will enable the DX'er to determine the same information for
signals heard at his location without the necessity of actually
evaluating the equations.

III. The Great Aurora of March 25-24, 1969

In order to test our theory we have carefully gathered together
all of the reception information reported in DX NEWS and DX MONITOR
for the night in question. In many ways that particular auroral
disturbance was ideal for studying auroral effects on the broadcast
band. The disturbance spanned a Sunday night and Monday morning
which had been preceded by a period of excellent MW DX conditions.
Some outstanding domestic receptions were noted on the Sunday
morning before the attack and quite a few members were prepared
for an excellent Monday morning. The auroral storm hit very
suddenly and hard during the daylight hours on Sunday the 23rd and
persisted at a high level until about noon on Monday. Thus the
entire darkness period on that date in North America featured
extreme "auroral conditions". This was the morning of the KMAM-15
DX Special and many members tried for that particular test.

Beginning with sunset DX on Sunday night it was obvious that
we were in the grip of a very severe disturbance. Bill Alisauskas
in New Jersey reported many remarkable loggings of stations in the
Kentucky-Tennessee area shortly after sunset, and the author in
Boston logged the only Transatlantic of the period, Dakar-764, at
1835 EST. During the evening and MM hours quite a number of
DX'ers tried listening but gave up in the belief their receivers
were acting up. Those who stuck it out reported quite a number of
unusual receptions, mostly from stations to the south; most imports
for us, many members made note of the absence of many of the static
which are normally well heard such as the 50 kw NSP'ers. And,
strangely, Pat Martin in Oregon reported reception from at least
40 Australian and New Zealand stations that MM!

East Coast DX'ers reported a general absence of the regular
powerhouses such as WPTV, CBM, KDKA, WOWO, etc. Many otherwise
rarely heard outlets in North Carolina, Virginia, Mississippi, and
other Deep South states were heard on the East Coast that night,
though, and the KMAM (Butler, Mo.) Test was widely heard.

On the West Coast the big EC 50 kw'ers like WBEZ, WCRS, and KDKA
were completely gone, as were all but a handful of Canadians. The
regular Midwest stations like WJR and WCCO were heard weakly on the West Coast, if at all, but the Texans, New Mexicans, Cubans, andMexicans were in well. Jay Murley (Newport, Ca.) heard WPTF in Raleigh, N.C., and Don Kaskey logged WIBW in Topeka from West Sacramento. Latin Americans, especially the Cubans, Colombians, and Venezuelans were heard throughout most of North America except in a few locations far to the north. John Hoogerheide in Marquette, Michigan reported that only a handful of stations were audible the entire period, and that the entire band above 900 kHz was dead after midnight. John happened to be in a very important position that night by virtue of his northern location, and several of his brief receptions made before midnight are of considerable scientific interest, as is Waldon's reception of WPOP, Connecticut from New Jersey. We'll get back to these receptions later.

How do the receptions (and prominent nonreceptions) of that period compare with those expected on the basis of our model? While a general tendency for southern stations and paths is evident at a glance, many of the reported receptions are not so obvious. Should Northam have been able to hear Billings from Portland, Ore.? Could 40 DU stations have made it to Oregon even though WJR and WCCO were inaudible? And, most important of all, where was the auroral absorption located that night?

Figure 4 shows the calculated LACP for each of the receptions reported during the darkness hours from sunset on the 23rd until sunrise on the 24th. The map was made as follows. Each of the stations positively heard (tentatives have been eliminated) by the 40-plus DX'ers who supplied information was first checked against our transmitter antenna pattern book to eliminate receptions which could have been due to groundwave (this eliminated receptions of WABC in Philadelphia, etc.). The LACP was then calculated for each reception and its location plotted on the map as a dot. Our criteria for including receptions was conservative; if the DX'er reported even very weak reception compared to normal we still counted it as a reception even though there was obviously some auroral absorption.

Where do we expect these points to fall on the map? Remember the significance of the LACP: if the auroral absorption is south of the LACP for the path in question, skyswves on that path must be subjected to auroral absorption. Therefore, if a particular path was open on that night, the auroral absorption zone must have been located north of the LACP at the time of reception. If the assumptions of the model are correct, we expect the northmost LACP's on the map to fall along a line of geomagnetic latitude which will then locate the approximate edge of the auroral absorption zone on that night!

The heavy line on Figure 4 is such a line of geomagnetic latitude (56° geomagnetic); it will be seen that the agreement is quite good. The author's reception of Dakar-764 should indeed have been possible, but TA's on higher paths should have been gone (they were). Mike Northam's reception of Billings should have been free of auroral absorption, as well as Pat Martin's 40 DU stations. The receptions from the West Coast of WCCO and WJR should have been marginal, since the LACP's for those paths should have been right on the edge of the zone (all reported very poor signals). The 5 brief receptions shown by stars were the result of a very special and rare propagation mode; these receptions will be discussed later.
Figure 6. On this special map used for USAF auroral research, lines of geomagnetic latitude appear as circles centered on the heavy black dot near the top of the map. The first of the heavy black circles represents our determination of the southern edge of the auroral zone on March 23-24, 1969. The second heavy curve is lower limit of the possible zone location as we have determined from the LACP's for nonreceptions; our best determination of the southern edge of the zone on that night is then somewhere between these two heavy curves, probably nearer the top one rather than the bottom one (see text for details). The curve running between ours is the location of the zone as determined by the OV-18 orbiting research satellite.
What about the reported nonreceptions; can we get any useful information from them? In Figure 5 we have plotted the LACP’s for the nonreceptions reported that night; these were regularly heard stations whose absence was conspicuous enough to make note of. Note that these points also fall along a line of geomagnetic latitude, though one further south than in Figure 4 (52.5°). The significance of the LACP’s for the nonreceptions is a bit more complex than in the case of receptions. They are the points south of which the aurora will knock out all possible reception modes. Since at least some of the nonreceptions presumably resulted from the absorption at ACP’s north of the LACP without propagation on the lower-angle paths, the zone defined by the nonreception LACP’s is probably somewhat south of the location of the actual absorption zone.

Where then was the zone exactly on that night? Well, we can’t tell exactly because we can’t be sure of the reflection heights for the actual signals; furthermore the southern edge obviously has a somewhat "fuzzy" edge as shown by the WC WR and WCCO marginal receptions. Our best determination of the location of the south edge of the zone over the entire course of the darkness hours is that it was perhaps a bit south of 55° and likely north of 52.5°. In all likehood the actual edge moved a bit during the evening; we’ll return to this point.

Figure 6 is a map showing our determination of the absorption zone once again. This is a very special map projection used in auroral research; lines of geomagnetic latitude look like circles - which does decidedly odd things to the geographical projection. We have indicated where we think the zone was located as determined by the MW DX data; the third curve represents the actual measured southern limit of the precipitating particles that night as observed by the OV-18 research satellite which was overhead during the auroral storm. The OV-18 was in a polar orbit and was counting the number of highly energetic protons precipitating during the disturbance. The cutoff limit for 2 Mev protons seen by OV-18 corresponds to the curve in Figure 6; note that it falls right between the upper and lower limits which we determined. In addition to supplying independent confirmation of our determination of the location of the zone the OV-18 measurements suggest that it might not be necessary to spend $18 million orbiting a satellite to locate the edge of the auroral zone...

In summary then, it would indeed appear that our model to explain "auroral conditions" in MW DX reception is supported by the reception reported during one particular auroral disturbance. For the DX'er it means the possibility of predicting which areas will or will not be audible for a particular level of auroral activity - thus aiding greatly in listening decisions, etc. From the point of view, it means it may well be practical to use MW reception data to provide scientific information on the location of the auroral zone of a sort that is presently difficult to obtain.

IV. Reception by Auroral "Sporadic E"

The seemingly impossible receptions indicated by stars on Figure 4 are of particular interest. While the rest of the band was effectively completely dead, Hoogerheide was surprised to note several unexpected strong signals prior to midnight. CKCV-1280, a 5 kw station in Quebec was heard at 2230; CKBL-1230, 5 kw in Matane, Quebec at 2240; CFLV-1370, 5 kw in Vallyfield, Quebec at 2300; WTTS, 500 watts in Bloomington, Indiana at 2300; and CFGT-1270, 1 kw, in St. Joseph, Quebec at 2310. After a period of brief strong reception, the band again went thoroughly dead again. These odd short-term receptions are shown with stars at the LACP’s on Figure 4. One similar peculiar additional reception was reported at about the same time; WPOP, 5 kw in Hartford, Conn. was noted briefly at 0000 on 1410 kHz by Frank Waldron in New Jersey; it too rates a star on Figure 4. These 6 receptions have several things in common; all occurred at about the same time; the frequencies are not too different; powers are in the low-to-medium range; and all of these receptions were from areas not heard during the rest of the auroral period.

We can discount the possibility of a temporary northward retreat of the auroral zone right away; had this been the case there would have been hundreds of additional paths opened for DX'er's over a wide area of the Northeast. If the zone had gone back as far north as the LACP’s for the Hoogerheide receptions from 2230 to 0000, the band would have returned pretty much to normal for all of us; in fact it didn't. What then could produce just a handful of receptions during a restricted period of time in a somewhat limited geographical area? In order to answer this question we will have to examine more carefully the evolution of this particular storm. The following graph shows the disturbance to the Earth's magnetic field produced by precipitating particles above Weston, Mass. (data courtesy U.S. Air Force). Note that the storm began about noon
Roadside Radio?
Since most automobiles are equipped with AM receivers, the Los Angeles Department of Airports wants to use a low-power transmitter to advise motorists of parking, space, weather, airport, and similar information at the L.A. International Airport. The FCC granted permission for a 30-day test involving a 10-watt AM transmitter operating on 550 kHz along a section of the Century Blvd. approach to the airport.

(From 7/9 BM&R)

Germans Converting Russian Trawlers

COLOGNE, Germany, July 11 (AP)—East German dockyards are converting Soviet trawlers into pirate radio stations to operate in the North Sea and the Mediterranean, a west German newspaper said today.

Rudolph Am Sonntag from Cologne said the Russian trawlers, converted in Baltic Sea ports, "will stay maneuverable to make it more difficult to locate their positions."

It added that their programs are designed to "bother Western nations."

Radio asks Red sailor defection

It provoked this transcription: 'the American sailor and admiral turned him back. They have been punished for the blunder and dismissed from their posts. The American people, press and President were informed. The recent Moskva Incident was immediately reported to the Secretary of the White House and to the Immigration and Naturalization Service."

"The President requests the United States policy of encouraging political asylum. Free men who jumped from an East German ship near Florida have been granted asylum."

Radio plans list of VD defectors

BIRMINGHAM, England—Radio Birmingham, one of Britain's new local stations, plans to broadcast case numbers and descriptions of venereal disease patients who have failed to report back to their local clinics for treatment.

Manager Jack Johnson said any listeners who protested would be told that VD was "an increasing factor in the life of this country, and that the station regarded it a duty to help the health authorities."

Radio station at Rochdale found legal

Charges against two Rochdale College residents of illegally operating a radio station were dropped yesterday by Judge Josephine Addison, who described the case as "small but significant."

Michael Lennox and Paul Murgan were charged with establishing and maintaining a radio station without a license after a Royal Commission officer and a Department of Communications inspector searched their equipment in a sixth-floor Rochdale apartment on March 4. Judge Addison held that broadcasts from the station, which began last November, were intended for Rochdale residents only and not for the general public.

He likened the station's operation to the use of an intercommunication system in a private home.

Charges

790 KEGN-BA CP: 5000 U1

850 WJWA-MN CP is on

1070 KDIT-XS CP is on (W.A. Jeffery)

1140 CP - NA

1190 KAYQ-MD CP is on (W.A.)

1220 WZIC-LT CP: 1000/500 04 (6/3)

1270 WJAC-WI DELET

1340 KVIG-TX CP: 1000/250 U1 (6/9)

1370 KPRG-MZ CP: 1000/250 U1. This apparently a re-assignment of previously deleted facility.

1380 KRD-SD CP: 1000/250 U1. This apparently a re-assignment of previously deleted facility.

1390 KJRO-CJ CP is on air again.
have to set up more wave-traps for those freqs, if spurs persisted, He also asked if any other anomalies in their signal were reported to him at the station as he heard them, so there is still hope, hl. As to the ARR of convention fans, he says that there are already some 26 frequencies wave-trapped for spurs but that they still need more, hl, I'll second that, I also asked him to check the XR logs for malfunctions the 1st Al Harriman had arm on 1154A. If PM 8/2 shows spurs still there, another call will be in order, hl. Now back on to DX:

midnight to sunrise

570 UNID Hrd w/ cl mx u/WCA, mulled 0600-0600 7/6, not WFAA or WNL. (Rico D'Arrigo, Phn. Ph.) # No idea, except maybe atlantic.

580 CKAP-DC Hrd testing w/ DT b4 u/7729 6/12 (ED) ((Youngstown)

900 WLSF-KY clm & local spots 0642-1248 vell u/WNL-WN (West Boyd, Oh.)

1000 WAPX-VA TT 0655-0720 6/28 at CIN & (Boyd)

1200 WLL-JA Wall u/WNL-WXN 0715-0730 6/18 (Boyd)

1250 Hrd 0600-0610 u/WNL-MX (mail instr. standards, no ID's, but assume WNL playing again, (Boyd)

940 WCPO-ME ID-00 w/ ID 0640 7/20 (Page Taylor, Butler, N.J.)

950 WBOC-MD S/off 0008 w/ SBS, off air 0011 o/MPR (Boyd)

WFIR-VA MM SF seems to be 0600-0500, 6/21 was 3rd week so new.

VOLL-TT 0600 w/ ID 0600 7/2 (ED)

WPMX-KY c/w mx, local spots 0624-34, wall u/WNL-MX (Boyd)

1070 WAPL-AL TT 0625-0630 c/w WNL-WXN but no signals, hl 6/27 (Boyd)

1150 WCMN-1N S/on SBS mx, top 40 0648-30-0510, no sig of usual WNL, maybe a new WNL show? (Boyd)

1290 KOZA-TX Picked out ID in h5 0600 6/19 (Paul K. Hart, Ft. Worth, Tx)

1270 WXML-ME Note off 0000-0500 6/21 (Boyd)

WLBK-PA Hrd w/mx, 06 0500-0512 vell u/WFXJ, CIB. (Boyd)

WVK-PA Top 40, promo, ID, local spots 0655-0702 c/WN-MX for great tapes, thought was off (Boyd) # Seems many of the spots, now on mx are going back to top 40 whilst WNL will hate it, I wish they'd use it, I much prefer the top 40, hl- RJE

760 UNID Hrd in WNL's null 0705 (ED) (Ph)

1280 KLCN-OK Coped 0610 7/8 and again 0627 7/13 for a newie only 200 ml. away (Hart)

1300 WSTB-SC clm mx, local spots, PBA's etc, 0631-30 0/WNL-WXN 6/26

WMMN-1N Wall c/WNL-WXN 0635-0710 w/ clm & clm (Boyd) -this 6/18,

WMTH-NH Wall c/WNL-WXN 0609-06 w/ clm & local spots 6/18 (Boyd)

+ 1320 WJAB-PA S/off SBS 0200 6/28, change SP. (Boyd)

+ 1340 KSEK-AS Coped w/ off 0300 7/12 (Hart)

+ KSEK-AS Coped 3 ID's betw. 0200 & 0400 7/12, now NSP per stn (Hart) u/ Cincy Reds BB 0045-0105, ran PBA's in place of spots, way too much WBQ's splash to ID 7/24 (Boyd)

1380 WTVR-VA Got short log 0110-0115 w/ Coke spot local PBA, jx wall u/WAKK KXK etc. 7/24 (Hart)

+ 1400 KTVF-VA Hrd wk ID 0305 than SBS 0310 6/28, SP per stn is 0300-0600, (Boyd)

+ KTUE-E Hrd w/ off 0400 6/28 (Hart)

+ KXJX TX Hrd c/w ID 0600 6/20, since per stn is 0600(0700)-0200(0100)

+ 1430, WNL-NC Hrd w/ 0105 off u/WNL-MX 6/15 (Boyd)

WIL-MO Testing daytime facilities 0405-0415 MAR & standards only on 7 0406-0411 30 w/ WIRE-WL 6/21 (Boyd)

+ 1430 KANG-NC Coped ID 0300 7/1, now NSP per stn. (Hart) ** out there 130 ml. is nothing anyway - hi - my closest unheard is 55 ml.

+ 1480 WDKC-NC Hrd 0013-0120 w/ standards, big bands, 1400's mx, many IDs testing 130 & .5 kv XRS on 7/24 (Boyd)

NOTES AND STUFF: WNL's spurs on 680 & 960 really got nasty around mid-month, so, after Bill Allmuthes & Page called and got nowhere, I lied a bit to get to the right man, who told me their modulation monitor was shot, and it's been replaced, Spur 7/25, 960 7/26 was spurs still there, but much diminished and no longer audible on car mx. He (Wynn Lloyd) said he expected that even so they'd
CE Harold Parnham of WNN-1460 writes last 3/2 was 6/23 (no time stated) next will be 9/23. Get times from him soon. Also, I logged their last one 3/28... is quarterly at time of monitoring oo, he says... dates are regular from all lists, hh.

AN FREEZE LIFT BERN: New AW's will be granted only in special cases, and emphasis will be placed on improvements in existing services, and service to ethnic minorities. (Note earlier comments on WNN-1430, which, as of 4/1-2 is now AN 28.)

Per same source but 2/71 issue, CTHC will now permit 4-watt private stations on 1450 kHz. Approved application was for 2 yrs. on an experimental basis only.

Theses for now, so 73 until next time - REX

ONE major change in format for next season is effective this issue: that is the listing of n/ct by months heard. WINTER always will be the inclusion of all PHONE material in the AM (AM-CH) section. The PM section, formerly BR & Day DX will be only for DXING IX, DAYTIME will be deleted (unusually, of course) as 2000 KET thru 1600 KET. Also, in the absence of sufficient items for the "AM" section, "Sunset & Evening" items of 2000 KET later will be jumped in with the AM listings for convenience of both the editor and, hopefully, the users of BERN. Your editor still welcomes any helpful comments or suggestions with regard to format, etc. of this column - REX

Paul K. Harpy - 2105 Mose - Fort Worth, Texas - 76112

This has been a very different Summer season so far. Usually the BERN fills apart here after the first of April, with the noise levels reaching ear-splitting proportions, and signals fade into non-existence. This year's results were decent through the first of May. I had 19 new logs in the month of April, and copied KFOR-1330 on 5/2 for my second Oregon log in six weeks, and three for May without result. Subsequent logs in May include WBN-1370 5/11, KLRT-1350 5/16 and KEA-1300 5/17. During the latter half of May and the first half of June, signals here were very weak, with the usual high noise levels. About mid-June the noise decreased & I was able to log KEA-1250 & KEA-1300 on 6/19. A real basher 6/28, logging KCKJ-1680 (RB), KTBN-1400 testing, KEA-1400 6/17 & KFTP-1400 on 6/18. All the while WNN & KPNR were available on the remaining activities. I don't do much monitoring any longer, r.f. levels very high, so no need to waste the effort.

Long-distance logging does seem impossible; it takes until about Jan 1 for KEA-1270 to squeak up to a readable level while during the Winter they are usually at least 10 6/9 by then. Shorter range stuff though (about 600 miles or less) is reasonable, especially E, S, or W. No harmful signals are very prevalent now, mostly NEQ's and static like the famous "Green River" label helps to clear the trouble. Listening is mostly for fun and to break the dinnertime boredom because of the din in the winter. So far in July, I have KEA-1270 on 7/11, KCKJ-1290 on 7/8 & KEA-1260 on 7/9. Most of this is from tape monitors, and many nights thunderstorms make any results impossible. On the other hand, the residual noise here has been reasonable and if it stays down, I will be able to do some more serious DXing this Summer. Details on these logs and phone calls about skeds and tests are in BERN.

Harry Helms - 115 West Liberty Street - Fort Mill, South Carolina - 29715

Greetings folk. It's been quite a while since I last shipped out in Missouri, due to presence of school work and a leisurely vacation. However, my school year will be easier and will allow for more DXing time. Current gear is a Hallcrafters SX-110 and 100' of longwire, although I plan to upgrade this shortly. Current plans for Summer DX include a go in the Electronics Illustrated contest. I try to keep the contest is hopelessly biased in favor of amateurs, but at least it gives me an excuse to get all the more DX from stations I've neglected. I'll have to pick up those continental points on SXB, KEC, etc. However, the winner will spend enough in postage alone to effectively wipe out any monetary gain from the contest. Re-intro time: I'm on my way to DEC, recent vacation to the University of North Carolina from U. of GA. I have been DXing since 7/63 & am an ISCA member and former editor of the Special Features section. Other interests include writing, music, and detective work on postmarks. If school doesn't interfere, I hope to see everyone at Toledo for the ISCA confab. Maybe the Contest will allow me to log some reportable DX for next season.

Bill Coleman - Box 2718 - Raleigh, North Carolina - 27602

Recent verifications from 4WEN-1015, WMZ-1550 Daily, Tewa, Christmas, 6/21, 8-9pm EST. in 1105, probably just another Cuban station. WBN-1020, Garner, N.C. 24715. Identified as the "2400 KET" one by letter. In any case, the winner will spend enough in postage alone to effectively wipe out any monetary gain from the contest. Re-intro time: I'm on my way to DEC, recent vacation to the University of North Carolina from U. of GA. I have been DXing since 7/63 & am an ISCA member and former editor of the Special Features section. Other interests include writing, music, and detective work on postmarks. If school doesn't interfere, I hope to see everyone at Toledo for the ISCA confab. Maybe the Contest will allow me to log some reportable DX for next season.

Greg Hardison - 17600 Orca Drive - Granada Hills, California - 91344

7/5. DX recently has been unbelievable here, at least for me, thanks to a borrowed Hallcrafters SX-76 RX. The first night, I picked up an unId signal of continuous at 1115k, possibly Bologna. That was 6/20. Also, KGK-730 picked up 6/21 at 7:13. Signal was 8-9, 6/20 brought KFRR-790 @ 6/21/1130: 6/30/1130 @ 8/21/1130. As for the other DX up here, there is a winner at 7:13, the same RX: Fortaleza, 1115w v/excellent reception, two ID's, a 15 minute drive to the next stop. I'm coming in like a local. Also, two Texas Panhandle stations, KFRR-1330 & KGK-1350 at 7:37 & 7:47 respectively. I now have an idea what real DX is like, I would also like to mention a recent Memorial Day visit to New station KEM in San Francisco. Too no chance for Italy on WC in summer, Greg, suggest it was WNP, Nicaragua.

GPN
The scene shifts to

1:11 (WJXN-1550) now on WOJU-1550. It's been since their 1954.

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1930s.
I have a 37. I went darn to Albuquerque 900, I'm still though, hope to hear Newfoundland this Winter, except to interested in on Newfoundland. Note:

BRUCE WINKLIMAN - Route 1 - Ellinwood, Kansas - 67526

Congratulations to the people who did the work on the LA Log. I just received mine and it's a fantastic piece of work. DX has been coming in at a pretty good pace since last Note when the noise level dropped to somewhat acceptable levels for this time of year. This Note now my 37th station report and the position of NWD-1380 @ 11:25pm on 7/8. Other DX to report: 6/20- NW-1140 C 12:26pm.

MORRIS SORENSEN - Box 245 - Jalsa, Ontario

Please note my new address - I moved here from Renshaw on 7/2.

For the never-mocking members, who don't know me, perhaps a re-intro is in order. I'm 26 years old and a graduate of Laurentian University (B.A. in History) 5/70 and

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1. They are still in contact with the NE Florida area and have reports of a DX separator operating there.
2. DX is in contact with W2XQK and has heard reports of rice separator operating in the NE.
3. DX is also in contact with W2XQK and has heard reports of a DX separator operating in the NE.
4. DX is in contact with W2XQK and has heard reports of a DX separator operating in the NE.
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