'TOO MUCH SNOW'

Well, at least it's official. When the Special Delivery mail containing Musings, IDXD, and DDXD finally reached us after 4 days delay, none slain in the P.O. had hastily scribbled "Too Much Snow" on the envelopes. After three major snowstorms in 4 weeks, the New England region is just beginning to recover. Last week's DX News, dated March 1st, did not go out until the evening of the 3rd because of the storm, we should be back on schedule this week though. We regret the delay last week but it was unavoidable. We have received several comments to the effect that 3rd Class delivery of DX News seems to take twice as long as delivery of the IRC Bulletin. While Boston P.O. has never won a prize for efficiency, bear in mind also that the IRC Bulletin is usually mailed out several days in advance of the date on the bulletin. We even once received an issue here 2 days before "publication date". We will continue to list the actual mailing date for DX News so you may complain directly to Mr. Ephraim Martin, Boston Postmaster, in the event of poor service.

NRC COMPUTER LOG

Lon Berman's computerized log project is under way. He'll be glad to supply full instructions and directions to members who'd like to help with his keypunching. Most universities and quite a few high schools now have keypunch facilities and several of our members have gotten access to them by a little quick talking. If you can help, drop Lon a note; address on back page.

SHOW IT IN PUBLIC

If you've got an item you'd like to show off in DX News, send it along to HQ and we'll run it as promptly as possible. Because not all items will reproduce well, it's best to send along several alternatives. And send along a couple of lines of descriptive text for the caption if you'd like.
Another Denver station is going to be on the air. Please send any related items out with the South American signals on the 1220 spot! Address: Mr. Aurel Holzweg - Radio Station KQB, 250 Fillmore, Denver, Colo. 80202.

DENVER NEWS

To try to get this issue released on time, we are closing out the Brooklyn end of things on Sunday, March 5. Nevertheless, we have a nice, large Musings Section for you this week. In the event of any late items which will have to go into this issue to get to your attention in time, we'll please you up to Watertown, so look elsewhere in this issue for any such late tips. Keep your Musings coming, and keep them full of useful dope - day-time, listing, time, other frequency and date/time of all catches, so they may be of even more interest and possible use to others. We have a separate column for these, and please send them along with your listing, but on a separate sheet of paper, with your name on it, and please, don't forget to tell us why. Thank you, guys!

ERNEST R. COOPER - 830 East 21 Street - Brooklyn, New York - 11226

Three varies, all Denver, 6-11/81, HNW-870 & BHO-990, HNW, HON.

R. Universal, was also in Denver, no other station, no word of any talks. We recommend they verify my report - a million thank you's to my good friend, Oscar! 2/24.

Not too good a morning here. Unr KBW-1035, 3/20, but only 1000 or so, no RV. KBW-1035 was at 8:21, 1000, 800, no RV. KBW-1035, 1810, 325, 4:23, 6:18, 6:35, 8:20.

KBW-1035 was at 1019, 1000, 800, no RV. KBW-1035, 1810, 325, 4:23, 6:18, 6:35, 8:20.

KBW-1035 was at 8:21, 1000, 800, no RV. KBW-1035, 1810, 325, 4:23, 6:18, 6:35, 8:20.

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He told me that in any case they don't deliver it at all. I know I see NN. In January, I was in New York. So I have seen them both in New York. On 1/10 at 10:25, WNYC-1500 Conn. TS at 12:05-12:15:am on WNYC. On 1/3 I had just about the best TA night in my ten years of TAing. I heard all the regulars and added two new ones on VFO. Then at 1:57 I was at 1209 with Prague, for my 50th birthday. They faded out at 1454. 1/27- WNYC-1150 testing at 2:15. On 2/1 WNYC-1000 (cf) at 20:00. 2/11 new WNYC-1050 1500-2000. For a while, on a TA, they were giving out the TA list. The only complaint I have on the new DX EUS. I used to separate the various sections and file according to DX, NOKO, & Mushing. Now it is in booklet format so I can't use that. Sometimes it's a real surprise in the activity. I hope it stays that way.

PAUL KINPOY
2133 Post Davis Street S.E. Washington, D. C. - 20030
To date, two more verifications: v/w WNYC & v/w from CMBK (of 2/18)
I imagine others who heard the list should be writing soon. Latest DX is all foreign. 2/25 WBNR-1260 second week w/cricket gone, first time for me.

P. D. KINPOY
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Paul Kinpoyn
The exact opposite of auroral conditions; what's a Specs? On 2/12 another EISht, me and I went and got this, only to have contributed, 

I did get KOB/CQ/WMID-14201 cool C 2:15. WMTX-770 @ 2:30 wasm't able to get a report. They said it was a "report," but I couldn't hear it. 

I think it best to just be a fortunative combination of sporadic E & good high latitude conditions. Later in the week Richard penned, "The total lack of southern hemisphere stations on 2/24 continued throughout 2/3-2/28. However, the strength of signals, with fine Alaskan and East Coast logging, was lost, with no Alaska and nothing east of Kansas. Prairie Provincees poorer but U.S. midwest still good. Only Pacific station still just week Major-1439, but Asia as far as Cambodia now noted, though not at great strength and with late fade-in. On the whole, rather dull out."

**Geographic activity and auroral zone absorption continue to decline:** The last significant auroral storm occurred on 2/11. The chance of significant TA and IP openings will continue to increase as long as we experience no more large geomagnetic disturbances. The following graph is of the planet, an index of auroral and geomagnetic disturbance. Values of greater than about 20 indicate significant high latitude absorption, recovery takes from 5 to 10 days. 

**International DX Digest**

**Propagation & Features**

Gordon Nelson, 19 irma Ave.

**Watertown, Mass. 02172**
According to the Governor of Pennsylvania, a new 100-kw relay tower is being built at Ehrenfels, PA. The tower will be completed by the end of the year, and the relay is expected to go on the air in early 1975. The Governor also announced that the state plans to continue its support of the relay, which is expected to benefit the local economy by attracting new businesses and creating jobs. (PR)

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Colombia. Radio Tequendama, W2JKE Bogota hrd for the first time IDing at 2303 thru QRM, playing pop mx. (Ohio, Dow, Rep.)

Spain. WWZ San Sebastian at 0155-0203 2/14, excellent with music. Well readable due to heavy QRM.
DOMESTIC DX Digest

domestic contest standings

Don Kaskey, Hotel El Rancho, PO Box 235, West Sacramento, Calif 95691,

1 Stewart Drake, Pa 607 19 Daune Glese, Mo 281
2 Frank Waldron, Md 598 20 Richard Bidle, Mo 270
3 Bob Shaw, Ohio 476 21 Gene Mactoores, Cal 262
4 Bill Miller, Ohio 440 22 Conly, D.C. 250
5 John Freeman, N.J. 425 23 James Hillyer, Colo 229
6 Dave Fishen, Neb 340 24 John Gifford, Ill 224
7 Don Kaskey, Calif 387 25 Jerry Conrad, Fla 223
8 Joel Misch, Mo 300 26 Chuck Morgan, Mo 221
9 Joe Fela, NJ 386 27 Walter LaRocco, Pa 219
10 Randy Kand, Mass 361 28 F. Jack Pajac, Cal 217
11 Dave LaRossa, Mass 355 29 Dave Collins, Ohio 216
12 Clarence Freeman, Cal 332 30 Fred Nordquist, NJ 215
13 David Kulka, Cal 332 31 Dennis Vroom, Cal 210
14 Glenn Hauser, Colo 323 32 Bob Pletchel, Cal 210
15 John Freeman, N.J. 316 33 Larry Van Horn, Tex 206
16 George Sherman, Minn 320 34 Paul Kilroy, DC 205
17 John Cox, Ark 320 35 Bill Oehl, Mo 200
18 Mike Nickam, Oreg 316 36 Bill Nick, Oreg 200
19 Ken Lyons, Okla 302 37 Lynn Brooks, Okla 196
20 Gene LaRossa, Mass 294 38 Bob Jacoby, Cal 194

If you have not entered a DX contest in the past 30 days and have not entered any DX Contest since 1/1/69, you are WERE THE DX CONTEST WINNER! Multiply your score by 10 and send us the result. If you have entered a DX contest in the past 30 days, please multiply your score by 10 and send us the result.

Criteria for DDD reports reports, a brief review of the 1/11 editorial, Deadline for reports is Monday mail, phone tips at 141-300-301 (an unlimited number) of DX logs with at least 1000 km each, but please include start time, date & time in each of your entries. Priority (always open to comments):

1. Changes in HRG logs, FO List, COF List, station numbers, etc.
2. What you consider your best, non-routine, or unusual DX (mark tips as such); 3. Grayward DX; 4. One-time FM; 5. Routine HF; 6. DX reports, daytime DX, DX station, etc.

after hours: midnight to sunrise

+ $30 CKAR-Ont Local hrd 0700 2/18 (Moryl Carson, Sudbury, Ont)
690 KCKA-Hawaii Atop Cuban 2/29 0515-0530+ w/ hand rack & KOMIA off.

Kaskey, Cal

710 WGBI-Pla HR 11 PM (137? kW) w/50kw, day & night; paths: they calibrate antenna current meters, etc. (Paul Hart, Tex)
670 KFQD-Alaska Finally had this season shown Oct 22 at 0115, 1 1/2/69 about the same time
800 WIXC-NC Heard 022L-0230 w/14 kW (Ken Lyons, Akron, N.Y.)
900 WADL-La SM 0200-0200 two weeks in a row. (Hart, Texas)
900 NDG9-Pla HR 022L-0230 at 0535 (WCMX, Miami, Fla)
900 GJNO-ID HR 022L-0230 at 0715 (WCMX, Miami, Fla)
900 CHNO-ID HR 0311 MY 2/27 as possible at now AM now, however only QRM heard later. (Sorensen, Ont)
sunset and evening

550 OHLD-Que
On w/Canadiens Hockey (now does that abbr?) (Ch, no.
Don't we have enough abbreviations? They're a pain. rk)
2/23 2000 & (??) (Edmunds)

560 WJAM-Mia
Clear thru overnight WPLD 2110-15 +/- 2/18. (rJ)

610 WIOD-Mia
Again off w/KF 2117 & 2230 2/18. (Edmunds, NJ)

630 WJAY-Mia
w/SSB thru 2200 & Cuban 2/18 2215. (Edmunds, NJ)

870 WHOU-NY
Finally logged w/WQBS splash 2/25 1750. (rJ)

900 WAPC-Va
State thru GCS & CBS w/ID 2159 2/25 & ever heard in NY.

550 UNID
Who s/off 1730 Feb w/Choral "America" s/off, WMR, WJAX

590 UNID
Rest psn 2100-2130 w/MJ Hockey & WFR religion, not

1000 WLSM-Mias
2/19 s/off 1715 w/HBHD. (Edmunds, NJ)

WIOG-NY 2/19 s/off 1730, after WLBH 1729 s/off. (Edmunds, NJ)

WFOE-Pa
Thru WIOG/WBHD, 1720-1730 2/19. (Edmunds)

WKRX-SC
Atop channel 1731/-3000 s/off 19/19, HR, exc sig. (rJ)

1150 WRHJ-MN
WI/DG unm s/off off ml ml into roll pg 2/23 2215; unm
w/jax 2070-2130, Wk 2050, WJUM, (rJ, Ch. (rk)

1160 NAM-NJ
HR off 1740 2/8/17. (Sorenren, Ch)

1220 GCSS-Que
HR thru W2BG/NOAC/WAR 2/29 1716. (Edmunds)

1230 WJAK-Tenn
HR thru local PCAS fade 005 2/7/A, best graveyarder

1280 WQMS-NM
HR at 1729 2/17. (Sorenren, Ch)

1300 WMBW-Mi
Local ad 1907 2/23. (Hampton, NJ)

1300 KNIT-NB
1/15 at 1800 s/off SSB, (Mishon, Neb)

1360 WJZS-Az
Ann'd on emergency to 0000 2/25 & 2/25. (rk)

WJEP-Ohi
HR at 1001 2/25 between WJEP & WNAV s/off & WNAV z/a
(both nominally 1801). (Edmunds, NJ)

1360 KGLO-Ont
Ont thru 2/27 1932/0/NAV, says Apollo 9 coverage via NAC

sunset and evening

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On w/Canadiens Hockey (now does that abbr?) (Ch, no.
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HR at 1001 2/25 between WJEP & WNAV s/off & WNAV z/a
(both nominally 1801). (Edmunds, NJ)

1360 KGLO-Ont
Ont thru 2/27 1932/0/NAV, says Apollo 9 coverage via NAC
MW SIGNAL PATHS - PART I

G. Nelson

While this feature article is being presented at this particular time because it is felt to be one of the essential bases for the aura and direction finding articles soon to appear in 9R NWWS, much of this information is of interest to the serious DX'er in its own right. As we've continued to research the how's and why's of MW DX, we've long been impressed by the fact that really very little information of the sort useful for MW DXing has appeared in scientific and technical journals. What little MW information has appeared has usually been concerned with studies of "average reception conditions" - which are then used by governmental agencies for the allocation of new stations, etc. But the MW DX'er is of course not interested in "average conditions" - he wants information about unusual conditions that may permit reception of a usually inaudible station or country. For a number of technical and historical reasons that we won't go into now, almost no work has been done on long distance MW reception; this lack is particularly striking when contrasted with the vast amount of research that's been done on short wave propagation.

In this and future articles we will deal with topics of particular interest to the medium wave DX'er. General information on the nature of radio waves, the structure of the ionosphere, and similar topics appears in a vast number of radio textbooks; a list of books containing general information is given at the end of this article. We will try to provide as much general background as necessary in these articles, but our emphasis will be on the aspects of propagation peculiar to medium wave signals.

1. Great Circles and Great Circle Paths

We'll start our discussion of great circle paths by stating our assumption that the earth is perfectly round; in actual practice the slight irregularities in the shape of the earth detected by satellites, etc., are far too small to be significant. A GREAT CIRCLE is the largest circle that can be drawn on the surface of the earth. The equator is a great circle and so are all circles of latitude (but not lines of longitude). Figure 1 illustrates some of the properties of great circles. T and B are two points on the surface of the earth, say the transmitter and receiver sites for example. G is the center of the earth; G is the point exactly opposite to B on the other side of the world (the antipodal point for B). There is only one great circle passing through both G and B and it also passes through T. The line from B to T through the earth passes through G.

All great circles are the same length and are equal to the circumference of the earth, which is 24,901 miles. As long as the points G and T are not antipodal (i.e., on the exact opposite sides of the world), there will be only one great circle. The special case of antipodal transmitters and receivers will be discussed later.
The segment of the great circle through \( R \) and \( Z \) is the **GREAT CIRCLE PATH** between the two points. Note that there are really two great circle paths: the

**SHORT PATH**, and the **LONG PATH** around the back side of the earth. Long path reception on the \( 3.11 \) band is experienced only under very special conditions and when we use the term "great circle path" we will mean the short path unless otherwise stated.

### II. Visualizing Great Circle Paths

When dealing with EM propagation and direction finding it is necessary to think exclusively in terms of great circle paths. Unfortunately this is not quite as simple as it at first appears. Figure 2 shows the problem. All three of the paths shown (Boston-Sinkiang, Boston-Cairo, and Boston-East Africa) are actually great circles. Even though a great circle path is the **shortest distance** between the points, great circles appear as curved lines on ordinary Mercator Projection Flat maps. This is the result of the distortion produced by this type of map; the same distortion makes Greenland appear much larger than it actually is on Mercator maps also. The only great circle path that appears as a straight line on a Mercator map is the one that passes through the North and South Poles. Latitude circles look like straight lines on Mercator maps but these are **not** great circles because (with the exception of the Equator) they do not completely circle the globe.

Figure 3 shows a very simple way to visualize great circle paths using an ordinary world globe and a piece of string. Simply stretch the string taut between the transmitting and receiving sites. The string will be along the great circle path. As long as you are careful to make certain that the string is tight and is following the shortest distance along the surface it will follow a great circle path with considerable accuracy. It pays to sit down with a globe and study the paths from your location to various stations in order to get a "feel" for great circle paths.

### III. Great Circle Initial Bearings

Direction finding consists of measuring the direction of arrival of the signal by taking advantage of the directional properties of receiving antennas. With a simple loop antenna, the direction of arrival of the signal can be determined either by rotating the antenna until the signal is strongest (the peak), or until the signal is weakest (the null). The peaks and nulls of a good loop antenna are exactly at right angles to each other.

Figure 3 shows how the bearing angle is defined. For a particular receiving location, the bearing angle is the angle between due North and the direction of arrival of the signal. The angle is measured clockwise: a signal arriving from North has a bearing of 0°; from the East, 90°; from the South, 180°, etc.
The bearing angles shown above correspond to the paths from Boston shown in Figure 2: 20° to Sikkim, 55° to Cairo, and 90° to East Africa. Stations that lie along the same bearing circle (France and Cairo in Figure 2, for example) are used to be collinear. A single direction finding measurement will not be able to distinguish between these two stations and can only supply one possible location. If a second direction finding bearing can be measured from a different location, the unknown station will be located near the intersection of the two bearing lines. The station will then have been located by triangulation.

IV. Determining Great Circle Bearings

It's often very useful to know the bearing from your location to a particular station, and for direction finding it's essential. The easiest way to get a rough idea of the bearing to a station is to lay out the great circle path using the string-and-globe technique and to measure the angle that the string makes with a small protractor. The protractor's center must be positioned exactly at the receiving site, and the 0° mark must point exactly toward the North Pole. With a bit of care it's possible to measure the bearing in this way within a few degrees on a fair-sized globe.

If you are familiar with elementary trigonometry and the use of logarithms you can calculate the bearing to any desired degree of accuracy using a couple of relatively simple formulas. Only addition and subtraction is needed and with a bit of practice a bearing can be calculated by hand in this way in a couple of minutes. The formulas and an example of their use will be found in the ARRL Antenna Handbook: Likewise in Eddington's American Practical Navigator. If you've got access to a computer, several HAM writers have a FORTRAN version of the program for these calculations; consult HAM EQ for further information.

Or, for a few dollars, you can obtain a long list of bearings from your location to various DX stations run off on a computer for you. Two companies which supply this service are Montgomery Indexing Services, Box 3797, Bethesda, Md. 20014 ($3.00 if you supply your latitude and longitude; $0.25 additional if they have to look it up) and Bearings, 177 Lockhart, Princeton, N.J. 08540 ($1.00; samples for $0.25). Companies like these usually advertise in the ham magazines.

A third way to obtain bearings from your location is to use an ephemeris program. Such a program lists the positions of the planets and the sun for use in direction-finding applications. The problem with this type of map is that the bearings are correct only for the location that the map was drawn for. The familiar "polar projection" centered on the North Pole is an azimuthal projection which gives great circle bearings for anyone who happens to be on the same plate, but it's no help for anybody else unfortunately. There are some azimuthal maps available for certain U.S. cities, however, and if you happen to live near one of these select a place you're really suit The Coast and Geodetic Service in Washington, D.C. has a real beauty centered on New York City for any, and the Naval Hydrographic Office has similar maps centered on Washington, D.C., Cutler, Maine, and Jim Creek, Wash. The ARRL produces one centered on the geographical center of the U.S. (near Yuma, Kansas) and the ARRL Antenna Handbook contains small maps centered on several cities including San Francisco. Check the ham "DX Guides" also.

AUDIO FILTER

Suffering from heterodynes, TVI squeals, and the like? The following very simple audio filter unit will reject audio tones above 2.7 kHz and materially improve the intelligibility of many signals without the necessity of receiver modification. This circuit will be of greatest value for rejection of heterodynes in receivers with relatively poor selectivity; the 4 kHz audio beat between Dakar-764 and WDR will be materially reduced, for example, without reducing the readability of the desired signal. It's also quite useful for reducing the chaos often produced by tone testers.

Even if you're using multiple mechanical filters this audio unit is useful for eliminating audio distortion products generated within the receiver.

PARTS LIST:

2.7 kHz lowpass audio filter; Stock # 321892-1.2, Peer Radio Sales Company, Box 1105, Lima, O. 45802. Price is $1.80, including Parcel Post fee.
2.2 to 500 ohm audio matching transformer; Stock # 3118306, Lafayette Radio Company, Box 83, Syosset, L.I., N. Y. 11791. Price is $2.22 per transformer; add an additional 90¢ for postage (excess will be refunded).

CONSTRUCTION:

This is a very uncrucial circuit and you don't even have to mount the components unless you want to be elegant. Positioning, wire length, and layout are not at all critical.

Note that this circuit has a 3.2 ohm input and output; if your receiver has a 500 ohm output you can forget about the input transformer and can connect the receiver directly to the filter input. Ignore the other terminals on the filter, you may wish to make use of the 5 ohm tap on the output transformer for 8 ohm stereo phones though. This unit will clear up a lot of audio QRM for $1.00, the commercially available equivalent filter will set you back about $20 so it's definitely worthwhile to take advantage of this simple filter from Peer Radio. Two filters can be connected "back to back" for even better performance too.

G. Nelson
I always QSL the QFN. "NB" is surprisingly well known.

When you get tired of fighting the WAs you try for the Ks. As you know, this is the only way to snag Liberia. Now they've moved them to 600 and they might as well've gone off the air as far as DX'ers in North America are concerned. From Admiral Nelson's collection.
I never heard him before on the air. If you live near a
place he interviewed in person, you probably would.

I felt like I had the wrong end of the tube. I
have a record of KOKO-AM in Perry, Iowa. But
I'm not sure I know the name. It is a

My first log was in six days. This was the
best I could do, using the log over for the

I was in KOKO-1505 and 730 AM. I
wasn't sure if I called him or if he
called me. I'm not sure I heard him.

I was in the dark all night. I had to write
a story. For the oldtimer, it was a

I felt KOKO might make it but the two

If you live near a place he interviewed in
person, you probably would. I don't
think the best I could do, using the log
over for the next day.

I was in KOKO-1505 and 730 AM. I
wasn't sure if I called him or if he
called me. I'm not sure I heard him.

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If you live near a place he interviewed in
person, you probably would.
March 8, 1969

CIBA QST - Call Estate 38 (607) - Santo Domingo, Dominican Republic

Hi, Miss. Here I am again so soon. I want to talk about this: As I was not using the loop brought from Boston, do not build this construction where I was here because it stops the signals, and the only thing I could find was the antenna lead-in. I moved it to Haiti where I obtained best results there. It is so good that I could completely eliminate R, ABC & hear instead W1S in 355, also are wonderful. It is much better in Haiti than in Santo Domingo.

Everybody should own one. Here are some future plans. I'm going to the West Indies in May. Antennas are laid on 30/50/140/200.

In the Windward Islands, Castries will move from 150 to 600, Roseau from 605 to 450 and St. George's from 955 to 240, all w/10kW, TX. In Colombia, recently, I have new XE in Bogota on 110 and 108. I have heard DX through W3XQ/FRM, W8/FRM, W9BUX/FRM, W3/FRM, W4/FRM, W5/FRM, W6/FRM, W7/FRM, W8/FRM, W9BUX/FRM. The frequency is covered with local stations and daylight time line is fine. I'll see what I can do in the next one. One person desiring to be an ECC 74, I'm in 1430. It's 19 M.T. Roxy St., Keyport, NJ. He has given me all information about stations in his island. Roy Moore, please send him a copy or anything. As I see everyone has been able to listen to those cricket matches from Jamaica & the Windward Islands except me. Well, see you soon.

Richard R. Wood

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