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SEISMOLOGICAL SERIES OF THE EARTH PHYSICS BRANCH

No. 65

CANADIAN EARTHQUAKES–1967

A.E. Stevens, W.G. Milne,
R.J. Wetmiller and G. Leblanc

Seismological Service of Canada
DEPARTMENT OF ENERGY, MINES AND RESOURCES

Ottawa, Canada 1973

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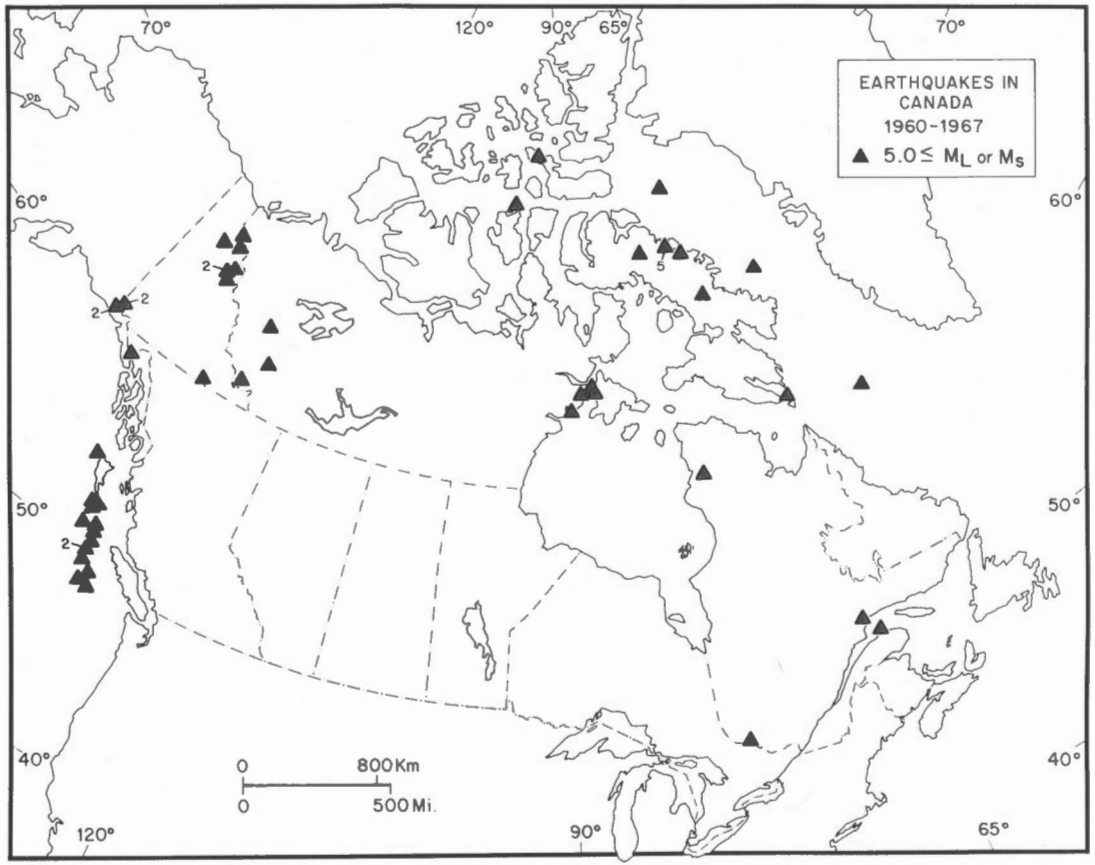

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CANADIAN EARTHQUAKES - 1967

I. Introduction

This catalogue continues the annual lists of earthquakes in Canada, as prepared by the Earth Physics Branch. The papers in this series are enumerated in Appendix 2. The continuing purpose of this series is to catalogue all known earthquakes in Canada and any related seismic activity in adjacent areas. The preparation and format of the 1967 catalogue follow those of the 1966 catalogue (Stevens *et al.*, 1972). Western Region events have been analyzed by Milne; events in the remaining regions have been studied by the other three authors.

Earthquakes are listed in chronological order for each of the four regions of Canada as shown in Figure 5. The Eastern, Arctic, Western and Central Regions are covered in Tables 1, 2, 3 and 4, respectively, which follow the appendices. Subsections of the first three tables contain the earthquakes located outside Canada. The regions are not defined by political boundaries. Thus, Figure 5 indicates that Alaskan earthquakes are found in both the Western and Arctic Regions; Quebec and the Labrador Sea are divided between the Eastern and Arctic Regions.

The extension of Canadian regions offshore and into neighbouring countries is made for two reasons. Earthquakes near the international boundaries may be felt and/or do damage in Canada; thus they must be included in any practical study of Canadian seismicity. Secondly, an understanding of the patterns of Canadian seismicity requires a consideration of the tectonics of neighbouring areas. The southern boundary of the Eastern Region includes a larger section of United States territory than does the Western Region, since the southern limit of related tectonic features is less well defined in the east. The Arctic Region map and table may contain events beyond its boundaries into northern Alaska and Greenland, which have been located with the Canadian network but for which epicentres have not been published by other agencies. Canadian records are not systematically read for all such events.

Numerical estimates of the precision of the latitude and longitude of an epicentre are not given explicitly. Instead, the reliability of an epicentre is indicated by a quality factor in the extreme right-hand column of each table. An 'F' quality indicates a more reliable epicentre, generally ±20' arc in latitude and an equivalent linear distance in longitude. An 'O' quality indicates a less reliable epicentre. Reliable epicentres are plotted as filled circles on the regional maps, while less reliable epicentres are plotted as open circles.

Epicentres for earthquakes in the Eastern, Arctic and Western Regions are plotted on three large maps (Figures 1, 2 and 3) found in the back pocket of this catalogue. No earthquakes were located in the Central Region in 1967. Epicentres for all earthquakes in Canada during 1967 with magnitude $M_L 4$ or greater are shown on one map of Canada (Figure 7). Note that the symbols in Figure 7 denote only the magnitude range and not the reliability of the epicentre.

Comments on some aspects of depth and magnitude determination are made in Appendix 1 following the main text. The magnitudes of earthquakes in Eastern, Central, Arctic and Western Canada from 1960 to 1965 have been reviewed. Revised local magnitudes (M_L) for some events in 1963 and additional values for 1964 and 1965 are included in Appendix 1.

An epicentre map of earthquakes in Canada with magnitude 5 or greater is presented in Figure 4 for the period 1960 to 1967, inclusive. All these earthquakes have been published in the Canadian Earthquakes series listed in Appendix 2. Tables of their epicentres are included in Appendix 3.

Figure 5. The four regions of Canada.

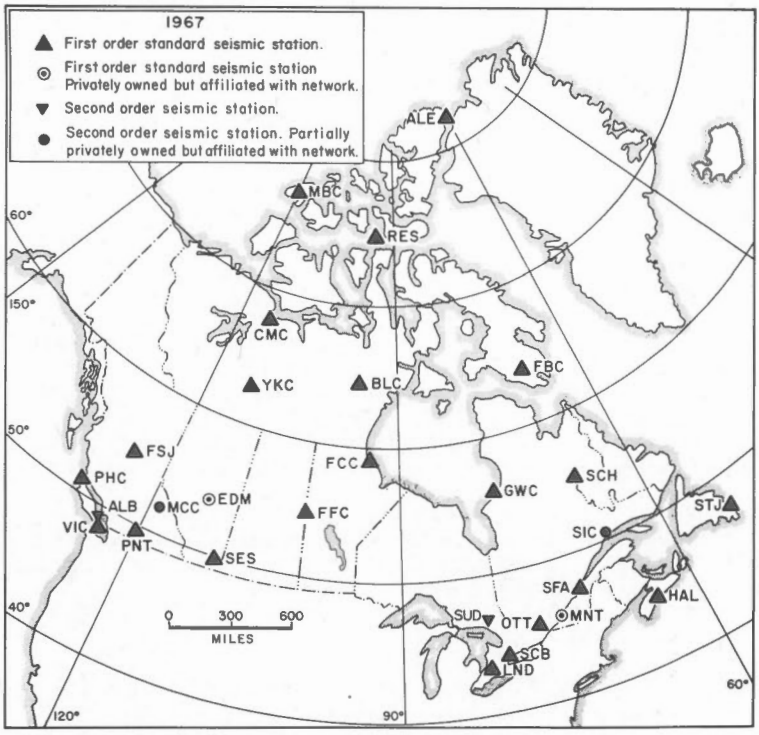

Figure 6. The Canadian Seismograph Network 1967.

II. Canadian Seismograph Network

Figure 6 shows the 28 stations of the Canadian Seismograph Network whose records were used in the preparation of this catalogue. Detailed notes regarding instrumentation and changes in instrument constants, calibrations, etc., can be found in the 1967 *Seismological Bulletin*. The following international code letters are used as station abbreviations:

ALB[1]	Alberni, B.C.	MBC	Mould Bay, N.W.T.
ALE	Alert, N.W.T.	OTT	Ottawa, Ont.
BLC	Baker Lake, N.W.T.	PNT	Penticton, B.C.
CMC	Coppermine, N.W.T.	PHC	Port Hardy, B.C.
EDM	Edmonton, Alta.	RES	Resolute, N.W.T.
FFC	Flin Flon, Man.	STJ	Saint John's, Nfld.
FCC[2]	Fort Churchill, Man.	SCB[4]	Scarborough, Ont.
FSJ	Fort St. James, B.C.	SCH	Schefferville, Que.
FBC	Frobisher, N.W.T.	SIC	Sept-Iles, Que.
GWC	Great Whale River, Que.	SFA	Seven Falls, Que.
HAL	Halifax, N.S.	SUD[5]	Sudbury, Ont.
LND[3]	London, Ont.	SES	Suffield, Alta.
MCC	Mica Creek, B.C.	VIC	Victoria, B.C.
MNT	Montreal, Que.	YKC	Yellowknife, N.W.T.

1 re-commenced operations on March 22, 1967
2 commenced operations on June 24, 1967
3 ceased operations on May 31, 1967
4 intermittent operation during 1967
5 commenced operations on November 22, 1967

The magnification levels of the short-period seismographs of the Canadian Seismograph Network during 1967 permitted detection of all events of magnitude 4 or greater in most parts of Canada. Where seismograph stations were closely spaced, such as in southwestern British Columbia and the Ottawa-St. Lawrence Valley regions, events of smaller magnitude could be detected. In areas such as the Yukon, northeastern Baffin Island and northwestern British Columbia the smallest detectable magnitude may have been slightly higher. Detection levels in northwestern Ontario and the James Bay region of Ontario and Quebec were improved with the installation of stations at Fort Churchill and Sudbury during 1967.

Readings and seismograms of certain seismograph stations beyond the Canadian borders were used to extend the coverage provided by the Canadian network as detailed in Section IV below.

III. Explosions

Seismographs of the network record many construction and mining blasts each year. Some of these blasts may have an equivalent seismic magnitude $M_L 4$ or more; most are less than 3. Such blasts must be separated from earthquakes so that an accurate knowledge of the natural seismic activity in Canada may be

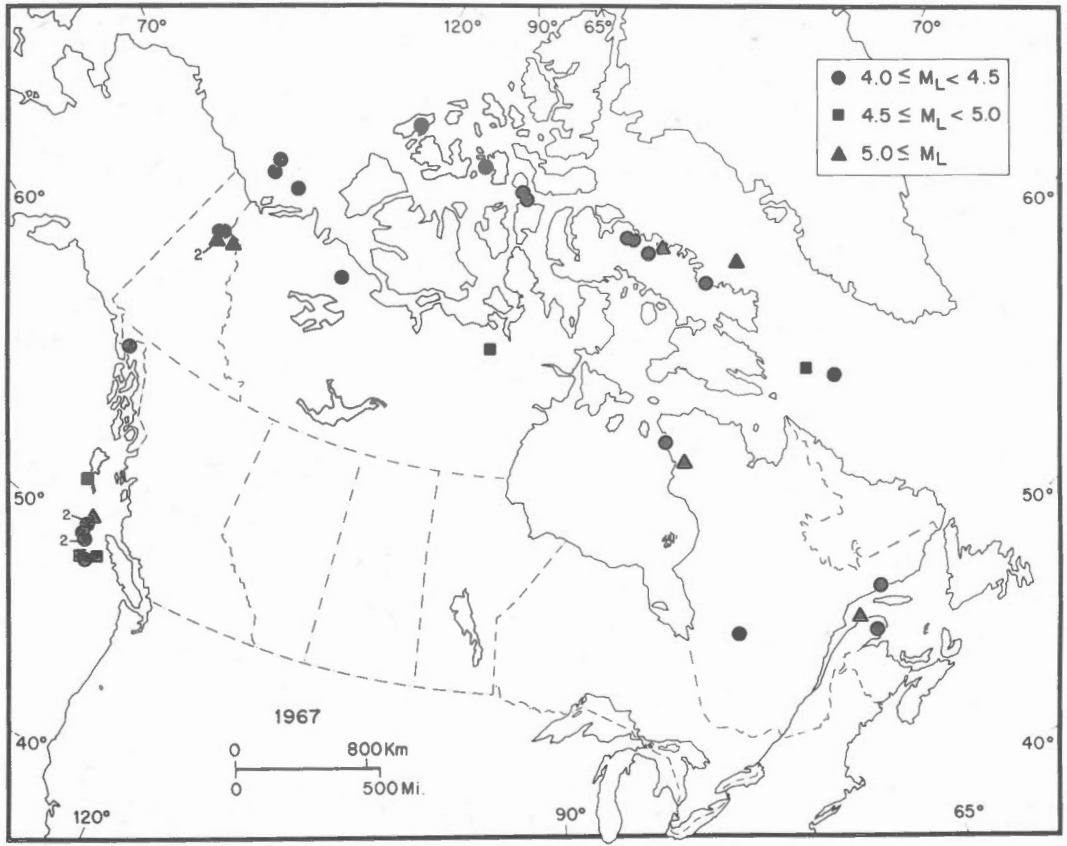

Figure 7. Earthquakes in Canada during 1967 with magnitude M_L4 or greater.

obtained. Blasts from regular sources such as mines and quarries and from construction projects of more than several months' duration are generally easily identifiable and not included in the tables. In some cases, the distinction on seismograms between blasts and earthquakes is very difficult.

The events of 22 Feb. 14h, near Lac Allard, Quebec, and 15 Sept. 06h, northwest of Fort St. James, B.C., are both located near open-pit mines. It was not possible to verify that either was a mining blast. A few of the small unlocated events in the tables may be blasts.

IV. Summary of Seismic Activity for 1967

The seismic activity within each of the four regions during 1967 is discussed below. Five hundred and sixty-seven earthquakes were detected, and 300 of these located. There was no activity detected in the Central Region during 1967.

There were 39 earthquakes of magnitude M_L4 or greater within Canada in 1967: 23 in the Arctic, 11 in the Western, 5 in the Eastern and none in the Central Region. The seven largest events had magnitudes between $M_L5.0$ and 5.3. In Figure 7 a symbol denotes the magnitude of the larger earthquake where two events have nearly the same epicentre.

Six earthquakes were reported felt in Canada in 1967. (See Table 5.) The Modified Mercalli Intensity Scale (1931) is used to classify reports of felt earthquakes when possible. The distances given in the table are measured between the instrumental epicentre and the felt location and give an approximate indication of the area over which the earthquake could have been felt.

TABLE 5

Earthquakes Reported Felt in Canada During 1967

Date and Time (G.M.T.)	Magnitude (M_L)	Epicentral Region	Felt Region
7 March 03:51:08	4.1	Puget Sound U.S.A.	Intensity III in Victoria (60 miles)
8 April 14:49:47	1.0	near Victoria	Felt slightly in Victoria (12 miles)
15 May 13:15:46	0.9	near Victoria	Felt in Victoria (12 miles)
16 May 01:00:38	3.4	near Huntingdon	Felt in Fraser Valley, most strongly near Huntingdon (5 miles), and on Vancouver Island, including Victoria (60 miles)
25 May 23:22:39	4.1	San Juan Islands U.S.A.	Felt on Vancouver Island, including Victoria (30 miles)
30 Sept. 22:39:51	5.3	Lower St. Lawrence	Felt in Mont-Louis (15 miles), Sept-Iles and Clarke City (55 miles), and Rivière-aux-Renards (75 miles)

However, not all felt reports of these six earthquakes and others of comparable magnitude come to the attention of the Earth Physics Branch. Moreover, as Figure 7 indicates, most of the larger earthquakes occur in the sparsely settled areas of Canada. The actual "felt area" depends very markedly on local soil conditions, on the pattern of energy radiation from the focus, and on the population density within about 100 miles of the epicentre, all of which may vary considerably from one earthquake to another.

Earthquakes for each region in Canada are listed chronologically in part A of their respective tables; where applicable, earthquakes in the adjacent United States follow in part B. In the Arctic Region some northern Greenland earthquakes are listed in part C. These tables include all earthquakes from the United States Coast and Geodetic Survey (USCGS, 1967a, 1967b) and International Seismological Centre (ISC, 1967) epicentre lists that occurred within each region, as defined in Figure 5. Epicentres for events outside Canada determined by these two agencies were accepted without change. For such events within Canada, epicentres were usually recomputed using Canadian data and the methods outlined in the appendix to the 1966 catalogue (Stevens *et al.*, 1972).

1. *Eastern Region*

The Eastern Region lies east of 85°W and includes Canada south of 60°N and the United States north of 40°N. Data from Canadian stations for some events in Table 1 were augmented by preliminary bulletin readings and phases read from microfilm records of the New England Seismic Network (Linehan, 1969), comprising seismograph stations Berlin, Caribou, East Machias, Milo and Weston.

Table 1 lists 50 earthquakes of the Eastern Region, 34 in Canada (Table 1A), 15 in the northeastern United States and one in the Atlantic south of Newfoundland (Table 1B). Epicentres of 41 events are plotted in Figure 1, which also shows the Canadian seismograph stations of the Eastern Region. One event in the Labrador Sea near 59°N is plotted on the Arctic Region map; the event south of Newfoundland near 39°N is not plotted. Six of the seven unlocated events were recorded only at Sept-Iles at epicentral distances between 31 and 88 miles and magnitudes M_L1.5 to 2.0. The other unlocated event was 120 miles from Great Whale River (14 Aug.).

The largest earthquakes in eastern Canada in 1967 occurred in northern Quebec (18 Feb., M_L5.1) and the lower St. Lawrence (30 Sept., M_L5.3). Figure 7 shows the five events of the Eastern Region with magnitude M_L4 or greater, all of which occurred in Quebec. As Table 5 (above) indicates, only one earthquake was reported felt in Eastern Canada in 1967.

The most seismic area of the Eastern Region continues to be the lower St. Lawrence Valley with 11 earthquakes located between Quebec City and the Gulf of St. Lawrence. Eight minor events were located in the Laurentians north of Ottawa and Montreal.

2. *Arctic Region*

The Arctic Region lies north of 60°N and extends west into Alaska to 145°W and east into Greenland. Two events west 145°W are included in this catalogue, since they were located by the Canadian network, but epicentres were not published by the USCGS nor the ISC.

The Greenland events in this catalogue were detected by some Canadian stations and 22 of these located with the addition of phases read from daily phase report sheets or microfilm records of the Greenland stations Nord, Godhavn (standard stations) and/or Inge Lehmann ILG (temporary high-gain array). Only two of these events, as noted in Table 2C, were located and published by the USCGS. The stations operated by the Danish Geodetic Institute are plotted in Figure 2 with the Canadian stations of the Arctic Region.

Table 2 lists 222 earthquakes of the Arctic Region, including nine in Alaska (Table 2B) and 27 in Greenland (Table 2C). Epicentres for 118 Arctic events are plotted in Figure 2, along with one event from the Western Region and three from the Eastern Region that were located near 60°N. No earthquakes were reported felt in Canada north of 60°N during 1967.

The 104 unlocated events are analyzed in Tables 6 to 10 as a function of epicentral distance. The probable epicentral region is indicated where possible. The relatively large (47 per cent) proportion of unlocated events recorded at Resolute (Table 10) reflects both the level of seismic activity near Resolute and the higher magnification of its short-period seismographs. The array ILG ceased operation in August 1967. Thus the five distant events at Alert could not be located, although the presence of the L_g phase confirmed that they were in Greenland.

Figure 2 shows that four areas - Baffin Island, the Yukon, northern Hudson Bay and the Resolute area - contain nearly one-half of the earthquakes located in the Canadian Arctic Region during 1967. The largest magnitude event on Baffin Island was M_L5.0 (18 May 20h), in the Yukon 5.1 (2 Apr.) and 5.0 (25 Jan.), near Wager Bay 3.8 (16 May 07h) and near Resolute 4.4 (6 Apr.). The largest events in Canada in the remainder of the Arctic Region were in Davis Strait (5.0, 8 Sept.), the Labrador Sea (4.5, 27 Aug. 18h) and northwest of Baker Lake (4.5, 10 July 02h). An earthquake swarm occurred near Brock Island northeast of Mould Bay between 14 and 29 May. The main shock (M_L3.9, 16 May) was associated with nine foreshocks and nine aftershocks.

Seven earthquakes were located on the east coast of Greenland between 130 and 250 miles south of Nord, six between mid-March and mid-August. The largest shock (M_L5.1, 9 May) was reported felt near the epicentre (see Table 2C).

A swarm of about 75 earthquakes was recorded at Alert on 30 July 67 between 17 and 23h GMT. It was unusual only in that some shocks were large enough to be recorded at the Danish stations ILG and NOR in northern Greenland, permitting location of the epicentral region. Similar swarms have been recorded frequently at ALE with a characteristic S-P interval of 28 seconds and amplitudes just above the noise level, indicating an epicentral distance of about 240 km and magnitudes about M_L2. They have been too small to be detected by the neighbouring Canadian station RES (about 1100 km southwest of ALE) and the Danish station NOR (about 700 km east of ALE, closed in 1972).

From August 66 to August 67 a high-gain short-period array ILG was operated in north-central Greenland about 650 km southeast of ALE. Most of the 30 July 67 swarm recorded at ALE was also recorded at ILG with a characteristic S-P interval of 45 seconds. The S phase of some of the larger events was recorded weakly at NOR. Many of the events were difficult to study in detail due to small P amplitudes and/or overlapping by preceding events, although they all clearly originated from a common focal region. Table 2C includes focal parameters for four of the larger events that were clearly recorded at ALE and ILG. Two epicentres are plotted in Figure 2 to represent the swarm.

TABLE 6

Unlocated Events Recorded at BLC

Δ (miles)	Number	M_L	Remarks
99	1	1.9	—
191-233	2	2.3 to 2.8	One Wager Bay aftershock

TABLE 7

Unlocated Events Recorded at ALE

Δ (miles)	Number	M_L	Remarks
31-37	2	1.3 to 1.6	One possibly SE of Alert
70-80	2	1.8 to 2.4	—
330	1	2.7	Either Ellesmere Island or Greenland
628-1067	5	4.1 to 4.5	Greenland

TABLE 8

Unlocated Events Recorded at FBC

Δ (miles)	Number	M_L	Remarks
78-146	6	1.5 to 2.4	Southern Baffin Island
202-244	3	2.6 to 3.3	One probably Baffin Island
279-331	4	3.0 to 3.3	Two probably Baffin Island, one Davis Strait

TABLE 9

Unlocated Events Recorded at MBC

Δ (miles)	Number	M_L	Remarks
25-30	2	1.7	On or near Prince Patrick Island
48-58	3	1.6 to 2.1	—
58-61	4	1.2 to 2.0	Prince Patrick Island; three foreshocks, one aftershock
75-122	5	1.7 to 2.2	—
130	1	2.1	380 miles from RES
137-149	14	1.7 to 2.4	Brock Island swarm

TABLE 10

Unlocated Events Recorded at RES

Δ (miles)	Number	M_L	Remarks
4-31	15	0.4 to 1.6	On or near Cornwallis Island
35-55	14	0.9 to 1.9	—
76-93	2	1.4 to 1.6	—
103	1	2.4	Cornwallis Island, aftershock
107-111	3	1.5 to 1.8	—
111	1	3.0	Either Bathurst or Devon Island
117-137	4	1.4 to 2.0	—
138-139	2	1.5 to 1.9	Somerset Island
140-156	3	1.6 to 2.0	—
171	1	2.5	East of Resolute
342-406	3	2.5 to 3.1	East of Resolute; one on northern Baffin Island

3. *Western Region*

The Western Region lies west of 113°W and includes Canada and Alaska south of 60°N, Montana, Idaho and Washington north of 48°N, and the Puget Sound area of Washington north of 47°N between 121°W and 126°W. The boundary extends westward into the Pacific Ocean between 48°N and 60°N to include earthquakes that are located along tectonic features from the Juan de Fuca Ridge to Dixon Entrance north of the Queen Charlotte Islands. In the region of the Gulf Islands at the south end of the Strait of Georgia, the true epicentres of some earthquakes that are in the Canadian section of Table 3 may be in the United States, and vice versa. Similarly, some of the unlocated events recorded at VIC or PNT may originate in the United States. Readings from some United States stations, including those at Longmire and Newport, Washington, and Hungry Horse, Montana, were used as additional data in calculating some epicentres in Table 3.

Table 3 lists 295 events of the Western Region, including 23 located in the United States (Table 3B) - two off the coast of southeastern Alaska, 19 in Washington and two in Montana. Epicentres of 139 events are plotted in Figure 3, which also shows the Canadian seismograph stations in the Western Region.

The 156 unlocated events are analyzed in Tables 11 to 16. About 50 per cent of the unlocated events were recorded at Port Hardy (Table 16) and most of them occurred west of Vancouver Island. Some of the larger events recorded at Penticton (Table 15) may originate in the United States and a few may be mine blasts.

About 70 per cent of the events located north of the 49° parallel occurred in the active area west of the British Columbia mainland. Five events, maximum magnitude m_b4.6 (19 Apr.), were located near the Queen Charlotte Islands and 81 events, maximum magnitude M_L5.3 (29 Apr. 00h), were west of Vancouver Island.

A series of earthquakes occurred west of the northern tip of Vancouver Island beginning in mid-August and continuing until mid-September or later. The earthquake of 31 August 19h had a magnitude M_L4.9. Shocks on 27 and 28 August had magnitudes 4.1, 4.2 and 4.3; the remainder were less than 4. Table 3A shows that, between 9 August and 30 September, 46 events were located west of Vancouver Island and 39 unlocated events were recorded at PHC at distances between 96 and 144 miles. The series has been studied by Wetmiller (1971).

One small earthquake occurred on Nootka Island on the west coast of Vancouver Island (23 Oct.). Five events were felt in Victoria (see Table 5). No other events were reported felt in Western Canada during 1967. Six small events occurred east of Mica Creek in November. There were nine other small events in the western Alberta-eastern British Columbia area during the year.

4. *Central Region*

The Central Region lies north of 49°N and south of 60°N and between 85°W and 113°W, which includes Saskatchewan, Manitoba and parts of Alberta and Ontario. No seismic activity was detected in this region during 1967, as indicated in Table 4. The installation of a seismograph station near Churchill in mid-1967 improved the ability of the Canadian network to monitor activity in this region where shocks are apparently infrequent.

V. Revisions

This section contains previously unpublished revisions to epicentres of Canadian earthquakes given in earlier catalogues and other publications. The Canadian earthquake catalogues in which these events may be found are listed in Appendix 2.

TABLE 11

Unlocated Events Recorded at ALB

Δ (miles)	Number	M_L	Remarks
22-30	2	1.1 to 2.1	—
35-39	6	1.7 to 1.9	Probably Texada Island; three recorded also at VIC with Δ about 90 miles
46	1	1.6	—
53	1	2.1	Probably Jervis Inlet foreshock
54	1	2.3	—

TABLE 12

Unlocated Events Recorded at FSJ

Δ (miles)	Number	M_L	Remarks
34-44	3	1.8 to 2.1	—
122-143	3	2.2 to 2.3	22:30 to 00:40 GMT
409	1	3.8	Probably Alaska Panhandle

TABLE 13

Unlocated Events Recorded at VIC

Δ (miles)	Number	M_L	Remarks
11-24	13	0.8 to 2.0	Two felt, three recorded also at ALB
32-37	4	1.5 to 1.7	One recorded also at ALB
45-55	3	1.7 to 2.0	—
70	1	2.3	Recorded also at ALB with Δ = 51 miles
92	1	2.6	—

TABLE 14

Unlocated Events Recorded at MCC

Δ (miles)	Number	M_L	Remarks
30	1	2.0	187 miles from PNT
31-51	5	1.7 to 2.1	Two in early Jan., three in mid-Feb.

TABLE 15

Unlocated Events Recorded at PNT

Δ (miles)	Number	M_L	Remarks
10-42	10	1.0 to 2.6	—
46-61	11	2.0 to 2.6	—
75-79	3	2.3 to 3.0	One aftershock in U.S.A.
130-161	3	2.8 to 3.8	—

TABLE 16

Unlocated Events Recorded at PHC

Δ (miles)	Number	M_L	Remarks
9-10	2	1.4 to 2.5	23h GMT
39-52	5	1.8 to 3.0	One event west of Vancouver Island
65-77	5	2.5 to 3.1	One event west of Vancouver Island
91-144	67	2.3 to 3.7	Most events probably west of Vancouver Island
184-204	4	3.3 to 3.7	Three events recorded at ALB or FSJ

1. Eastern Region

The following two 1967 events located by the LASA Centre, M.I.T., and published by the ISC, were recorded at OTT and MNT but are considered to be mine blasts near Timagami, Ontario, and not earthquakes.

21 Jan. 17 41 04 ISC vol. 4, no. 2, event 228

18 Mar. 17 49 40 ISC vol. 4, vo. 4, event 679

In 1965 the event of 6 Mar. 21h should be deleted completely from Table I and Figure 1.

Typographical errors in the times of the following three earthquakes should be corrected as follows:

1960 - 9 July 07^h39^m corrected from 07^h34^m

1965 - 15 Sept. 17^h corrected from 15^h

1965 - 14 Nov. 04^h11^m corrected from 04^h12^m

2. Arctic Region

The following two events of magnitude m_b4 located by the LASA Centre, M.I.T. and published by the ISC for 1967 were not recorded by the closest Canadian stations. Hence, both events probably did not occur within Canada.

21 Feb. 13 36 17 ISC vol. 4, no. 3, event 592
N.W.T. - not recorded at RES, BLC

3 Apr. 01 08 32 ISC vol. 4, no. 5, event 74
Arctic Ocean - not recorded at ALE, MBC

A third event, 12 May 01 47 04 (ISC vol. 4, no. 6, event 399), located by the LASA Centre near the Yukon-Alaska border was not recorded at CMC nor YKC. The published magnitude of $m_b3.9$, combined with the epicentral location, places the event at the detection limit of these two stations. The stated coordinates coincide with an open-pit asbestos mine at Clinton Creek, Yukon.

The following comments are made on certain earthquakes of the Arctic Region in the period 1960 to 1965.

1960 - 5 Mar. This unlocated earthquake recorded at RES ($\Delta \approx 700$ km) was also recorded at Thule, Greenland, at an epicentral distance Δ of about 550 km (USCGS, 1960). Thus the epicentre was either on northern Baffin Island or Ellesmere Island.

1960 - 6 Sept. The earthquake was located by the USCGS and coordinates published in their Preliminary Determination of Epicenters. The magnitude $M_L5.5$ was estimated from the seismograms of RES with Δ = 1160 km.

1961 - 15 Aug. Smith assigned the coordinates of Whitehorse to this earthquake since it was reported felt there. However, the USCGS has published the following instrumentally-determined location, which is preferred (USCGS, 1961) and which moves the event from the Arctic to the Western Region.

15 Aug. 12 25 59 59.1N, 136.9W (no USCGS magnitude)

These coordinates place the event on the B.C.-Alaska border west of Haines. Whitehorse lies about 120 miles northeast. The magnitude, $M_L5.3$, was calculated by Smith from data of RES ($\Delta \approx 2500$ km).

1961 - 10 Nov. 22^h. This event was misplotted on the Arctic map and should be shown further north by $1\frac{1}{4}$ degrees.

1961 - 25 Dec. The epicentre was located by Smith with data from three Canadian stations. A re-examination of the arrival times indicates a poorly defined epicentre. Thus, the following epicentre determined by the USCGS (1961) is preferred: The magnitude M_L5.1 determined from Canadian data is retained.

25 Dec. 19 58 29 63.9N, 89.3W (no USCGS magnitude)

1962 - 15 July. The latitude and longitude values were interchanged in Table II and the event misplotted on the Arctic Region map. The epicentre was located at 72.9°N±1.5°, 68.4°W±2.5°.

1962 - 20 Aug. This earthquake was not plotted on the Arctic Region map.

1962 - 26 Oct. and 2 Dec. The epicentres of both earthquakes lie in the Labrador Sea, not in Davis Strait.

1963 - 8 Mar. 00^h. The epicentre was located by Smith with Canadian network data. The USCGS epicentre with depth restricted to 33 km was very similar. Rothé (1969) gives a magnitude M_s5.3-5.8, as compared with M_L5.7 averaged from eight Canadian stations.

The following earthquake should be added to the 1963 catalogue.

1963 - 31 May 11 09 03 61.5N, 140.6W (no magnitude)
Southern Yukon-Alaska border (USCGS, 1963)

The next two events were located by the USCGS (1963), as published in the Canadian catalogue with magnitudes, denoted CGS, being body-wave magnitudes m_b. M_s magnitudes have been published, as follows:

17 June m_b5.4, M_s5¼-5½ (PAL), M_s6 (Rothé, 1969)

27 June m_b4.6, M_s4¾ (PAL - in BCIS, 1963), M_s5.3-5.8 (Rothé, 1969)

Note that the m_b magnitude of the second shock was given as 4.6 on the card in the Preliminary Determination of Epicenters, but increased to 5.9 in the final published bulletin (USCGS, 1963). However, a comparison of Canadian seismograms for the two shocks clearly indicates that the second shock was smaller than the first, which is also indicated by the relative M_s values.

1963 - 28 Aug. There was a typographical error in the magnitude, which should be M_L4.7 and not 6.0 as published.

1963 - 4 Sept. 13^h32^m. Epicentral data for the main shock of the Baffin Island series was taken from the USCGS Preliminary Determination of Epicenters. Data in their final bulletin were similar with m_b increased from 5.9 to 6.1, and M_s6¼-6½ (PAL) added.

Smith's unpublished notes state that the RCMP reported the earthquake felt at Clyde River and Cape Christian on the east coast of Baffin Island, which are about 100 miles southeast of the epicentre. The event was misplotted on the Arctic Region map and should be shown one degree further north. A focal mechanism solution has been published by Sykes (1970) showing normal faulting on either a shallow or steeply-dipping plane striking east-west.

The magnitudes of 14 of the 42 published aftershocks have been reduced, as discussed in Appendix 1. The time of the aftershock of 9 Sept. should be 22^h 33^m, instead of 22^h 23^m.

1963 - 18 Sept. 22^h. An epicentre has been published by the USCGS which is about 80 miles northeast of Smith's epicentre. The latter is preferred since it better satisfies the near station data.

1963 - 25 Sept. The longitude is 106°20'W not 106.2°W.

1963 - 1 Oct. Two typographical errors should be corrected. The longitude uncertainty is 1.7° not 1°7'; the magnitude is M_L4.1 not 4.7.

1963 - 12 Oct. 02 46 48 71.6N, 73.0W m_b4.1 Baffin Island. This earthquake located by the USCGS was listed in the Canadian catalogue among the unlocated aftershocks of the Baffin Island series.

1963 - 15 Oct. The published epicentre was taken from the USCGS Preliminary Determination of Epicenters. The following epicentral data are preferred, which were published in their final bulletin (USCGS, 1963) and which move the event from the Arctic to the Western Region.

15 Oct. 07 26 09 59.0N, 136.8W (Alaska-B.C. border, west of Haines) m_b4.3. Felt at Juneau (100 miles southeast).

1963 - 4 Dec. 06^h29^m and 05 Dec. 03^h. Smith's unpublished notes state that these two earthquakes recorded only at CMC and not at other stations were probably in the Yukon.

1963 - 9 Dec. 09h. The longitude uncertainty is one degree and not 30 minutes.

1963 - 29 Dec. Smith's unpublished notes state that this earthquake recorded only at FBC and not at other stations probably occurred in Davis Strait since no L_g was recorded at FBC.

In 1964 no earthquakes of magnitude greater than 4.6 are listed in the Arctic Region of the Canadian catalogue. Although most magnitudes are on the M_L scale, 13 of the larger events are on the m_b scale since their focal parameters were taken from the ISC catalogue (1964). Appendix 1 presents M_L values for eight of the 13 events; five M_L values lie between 5.0 and 5.6.

Three typographical errors should be corrected as follows:

1964 - 1 Feb. 16h, not 2 Feb.
1964 - 22 Feb. 05h - m_b 4.1, not 4.3
1964 - 25 April - M_L 4.2, not 3.5

In 1965 the 16 events recorded at 102 to 117 miles from YKC are blasts from Pine Point, N.W.T. and should be omitted from the catalogue. The following typographical errors should be corrected.

1965 - 4 Jan. 20h. Longitude 135°18' not 08'
1965 - 17 Mar. 18h. Longitude 96°15' not 95°15'
1965 - 16 Apr. Longitude 135°36' not 30'
1965 - 4 Oct. 22h, 26 Oct., 04 Nov. All latitudes 65°36', not 30'.

1965 - 26 Oct. The value of the magnitude m_b5.7 published by the USCGS (1965) would appear to be a typographical error as the log (A/T) values in the ISC (1965) would indicate an average value of m_b4, which would appear more reasonable when compared with Canadian data.

Appendix 1 presents m_b and M_L magnitudes for several of the larger earthquakes of 1965.

3. *Western Region*

The following three earthquakes located by the USCGS (1960) and recorded by some Canadian stations should be added to the 1960 catalogue.

1960 - 5 Aug. 08 45 31 50.7N, 130.3W (no magnitude). West of Vancouver Island.
1960 - 12 Aug. 16 25 20 50.6N, 129.6W (no magnitude). West of Vancouver Island.

1960 - 30 Sept. 06 35 09 49.4N, 129.7W $M_s 5\frac{1}{4}$. West of Vancouver Island.

Two earthquakes and four magnitudes should be added to the 1961 catalogue, one epicentre moved from west of Vancouver Island to northwestern Oregon and one epicentre moved from the Arctic to the Western Region list (USCGS, 1961).

1961 - 17 Jan. 04 23 36 59.0N, 135.9W (no magnitude). Alaska-B.C. border, west of Haines.

1961 - 1 Feb. 00^h36^m $M_L 3.9$, USCGS gives $M_s 5\frac{1}{2}$.
1961 - 25 May 04 59 25 49.3N, 128.7W (no magnitude). West of Vancouver Island.
1961 - 15 Aug. See Section V.2 above.
1961 - 19 Aug. 04 56 24 44.7N, 122.5W $M_s 4.5$ northwestern Oregon. Minor damage. (This earthquake had been located west of Vancouver Island by Milne. The USCGS epicentre is preferred.)
1961 - 18 Sept. 02h $M_s 4\frac{3}{4}$-5.
1961 - 29 Oct. 09h $M_L 4.8$, USCGS gives $M_s 5\frac{3}{4}$.

1961 - 29 Oct. 14h 47^m $M_L 3.8$, USCGS gives $M_s 4\frac{3}{4}$-5.

The following typographical error should be corrected.

1962 - 24 May 04^h, corrected from 01^h.

Note that earthquake epicentres without an assigned magnitude were not plotted on the 1960 to 1962 Western Region epicentre maps. The actual frequency of located events was somewhat greater than the maps indicate, particularly west and northwest of Vancouver Island and near the Alaska-B.C. border.

The following corrections and additions should be made to the 1963 catalogue:

1963 - 12 July 06^h. 109 miles from Port Hardy, not Penticton. The USCGS (1963) has published the following epicentre:
06 54 44 50.1N, 129.8W $m_b 4.0$. West of Vancouver Island.

1963 - 2 Sept. 13 30 04, corrected from 13 32 27.
The epicentral data are from the USCGS (1963).

1963 - 9 Sept. 05 18 37 49.8N, 130.0W $m_b 3.2$. West of Vancouver Island. (Milne has listed this event as an unlocated aftershock recorded at Port Hardy.)

The magnitudes of most of the larger events in the 1964 catalogue are body-wave magnitudes. The following additions should be made to the 1964 list (USCGS, 1964).

1964 - 30 April 04 01 26 59.0N, 137.8W $m_b 4.3$
Alaska-B.C. border near Cape Fairweather.

1964 - 13 June 23 23 04 59.2N, 136.8W $m_b 4.2$
Alaska-B.C. border, west of Haines

1964 - 3 Sept. $M_L 3.9$, $m_b 5.0$

1964 - 1 Oct. $M_L 4.1$, $m_b 5.3$ and $M_s 4\frac{3}{4}$

The following corrections should be made to the 1965 and 1966 catalogues.

1965 - 27 July 16^h. Latitude 59.4^oN, corrected from 59.9.

1965 - 2 Sept. 18^h and 21^h27^m. Epicentres and magnitudes (m_b) by the USCGS (1965).

1966 - 7 Feb. 08^h48^m, corrected from 08^h49^m.

4. *Central Region*

In "Canadian Earthquakes - 1966" (Stevens *et al.*, 1972), Section V.3 discussed the probable location of a large earthquake in 1909, said by some American seismologists to be in southern Saskatchewan and by Canadian seismologists to be in North Dakota or Montana.

It is interesting to note that a minor earthquake ($m_b \approx 4$) occurred in southern Saskatchewan on 26 July, 1972 at 03:58 GMT. It was felt over a radius of 20 miles and was well recorded by the Canadian seismograph network. A smaller shock occurred in the same region in 1968. These three events will be discussed in a forthcoming publication (Horner, Stevens and Hasegawa, 1973).

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APPENDIX 1

DEPTH AND MAGNITUDE DETERMINATION

Depth

The foci of most earthquakes in Canada have been located within the crust, i.e., at depths less than 50 km and often assumed about 20 km. A more precise knowledge of the focal depth of Canadian earthquakes is desirable for several reasons. In estimating seismic risk for a given magnitude event, shallower shocks are expected to be more damaging over a given area than deeper ones. In seeking to understand the probable causes of earthquakes in Canada and relations to regional tectonics, better estimates of focal depth would be helpful.

Depths have been published for some events in the Canadian earthquake catalogues. Many have been based on refracted arrivals at a single station. However, as pointed out in the appendix of the 1966 catalogue (Stevens *et al.*, 1972), the numerical value given for a focal depth is uncertain by ±10 km and should be taken to indicate only upper-, middle- or lower-crustal depth. In fact, the depth may be uncertain by more than 10 km, since the method used to estimate depth depends markedly on the assumed average crustal thickness, as discussed below.

For a given earthquake, the depth in general has been calculated from the arrival times at one station of direct and refracted waves, as outlined in the 1966 catalogue. Focal depth h has been calculated from the equation

$$h = 2T + \frac{v_1 v_2}{(v_2^2 - v_1^2)^{\frac{1}{2}}} \left(\frac{\Delta}{v_2} - P_n + H\right)$$

where T is the crustal thickness, assumed constant, under the epicentre and recording station; v_1 and v_2 are the direct and refracted P-wave velocities; P_n is the refracted wave arrival time; Δ and H are the epicentral distance and origin time, respectively, calculated from direct P- and S-wave arrival times. (A similar equation is used for S-wave data.)

It is easily seen that $\delta h = 2\delta T$. That is, when the actual mean crustal thickness is greater or less than the assumed mean thickness by 5 km, which may frequently be true, then the actual depth is 10 km greater or less, respectively, than the calculated value. The calculated depth varies also with changes in velocities and uncertainties in arrival times. However, the dependence on crustal thickness is perhaps the most noteworthy. It suggests that depth cannot be estimated reliably from only refracted arrivals in areas where the crustal thickness is not well known and that depth determination from arrival times should be restricted to those earthquakes, unfortunately few, for which direct P and S arrivals are measurable at several stations within 100 km of the epicentre.

Depths determined by the USCGS or ISC and published in the Canadian catalogues have been determined from teleseismic P first arrival data and not from the above equation. However, their depths in most cases are also uncertain by at least ±10 km.

Magnitudes

Introduction

Magnitudes of local earthquakes are usually computed on the Richter local magnitude scale (M_L). The scale was defined for earthquakes in California recorded at distances up to 600 km. It has been extrapolated to longer distances for use when near-station data are lacking. As mentioned in the 1966 catalogue (Stevens *et al.*, 1972), the Richter M_L scale may give values that are too large when amplitudes are measured at epicentral distances beyond 1500 km. However, this effect may be masked by amplitude variations due to the source radiation pattern and ground amplification at the recording station. It may be masked also by lack of magnitude values for a given event at distances under 600 km for comparison with values at larger distances. Body- and surface-wave magnitudes (m_b, M_S) may be computed from amplitudes measured at distances less than 15°, but are seldom considered reliable unless additional terms are included in the magnitude equations to allow for the effects of shorter distances. (Small magnitude events do not give measurable amplitudes for m_b and M_S.)

All published M_L magnitudes in the 1966 catalogue were based on data recorded at epicentral distances less than 1500 km. The same restriction has been applied to the 1967 data. No distance restriction was placed on M_L values prior to the 1966 catalogue. All available stations were used in computing an (arithmetic) average M_L for each event. Few events of the Western Region have been recorded and/or analyzed at distances beyond 1500 km. However, many events in the other three regions are recorded at large distances due to the efficient propagation of the L_g phase and the relatively high magnifications at the northern seismograph stations.

Published M_L magnitudes for all located events in the Eastern, Central and Arctic Regions in the period 1960 to 1965 were reviewed to see which magnitudes would be significantly changed when data at distances beyond 1500 km were omitted. It should be noted that only magnitude-distance and not ground amplitude-distance data were reviewed. The late W.E.T. Smith had maintained a detailed data file on each earthquake listed in his catalogues of the Eastern, Central and Arctic Regions. This included epicentral distance and magnitude at each station used in computing an average magnitude for the event. Thus, it was not necessary to re-examine the original seismograms.

Eastern Region 1960-1965

In 1960, 1961 and 1963 no amplitude data had been used from stations at epicentral distances beyond 900, 900 and 1400 km, respectively. In 1962 and 1965 the maximum distance was 1200 km with only three exceptions for which the recomputed mean M_L either decreased by 0.1 unit or remained unchanged from the published value. In 1964 the maximum distance was 900 km, with one exception for which the mean M_L decreased by 0.2 unit when amplitude data beyond 1500 km were excluded. Hence, the originally published magnitudes for all events in the Eastern Region from 1960 to 1965 were retained without revision.

Scarborough Magnitudes

It has been observed that M_L magnitudes computed for events recorded at Scarborough (SCB) are consistently higher than at other stations, often one unit higher, even when epicentral distances are much less than 1500 km. This effect appears independent of epicentral location and is not caused by errors in seismograph calibration.

SCB is not located on or near bedrock. The vault is built on glacial till interlayered with river-deposited sand to a depth of several hundred feet. This material appears to amplify the ground vibrations considerably, resulting in relatively large computed M_L magnitudes. Therefore, no M_L values from SCB have been used in determining the average magnitude of events in the Eastern Region in 1967.

Central Region 1964-1965

No events were located in the Central Region in 1960 to 1963. The single event of 1964 had no amplitudes measured beyond 1000 km. The three located events of 1965 had amplitude measurements from only one station beyond 1500 km. Its deletion reduced one published magnitude by 0.1 unit; the other two were unchanged. No magnitudes were revised for published Central Region events in 1964 and 1965.

Arctic Region 1960-1965

In the Arctic Region few events were located in 1960 and 1961 as Resolute was the only Canadian seismograph station north of 60°N latitude until late September 1961. The largest epicentral distances were under 1200 km for all events reported in the 1960 catalogue. In the 1961 catalogue only one of the unlocated events was recorded at a distance greater than 1300 km. Two of the events located with Canadian data were recorded at distances of 1750 and 2175 km as well as at distances under 1500 km. Deletion of magnitude values for stations at the larger distances reduced the mean magnitudes by 0.2 unit or less. One event (15 Aug.) near the Alaska-B.C. border was located by the USCGS, which implies its magnitude was greater than 5 as smaller events in northern Canada could not be located by the USCGS before the mid-1960's. The published M_L of 5.3 was calculated from Resolute data only with $\Delta \approx 2500$ km.

In 1962 the largest distance for unlocated events was 1300 km. For located events amplitude data were used at distances up to 2100 km. Deletion of data beyond 1500 km reduced each mean magnitude by 0.2 unit or less.

In the 1963 earthquake catalogue it is convenient to consider first the events not associated with the Baffin Island earthquake series beginning on 4 Sept. The maximum epicentral distance for unlocated events was 820 km. For the located events deletion of amplitude measurements for distances beyond 1500 km reduces the published mean magnitudes by 0.3 unit or less. Therefore, published magnitudes for Arctic Region events from 1960 to 1962 plus most of 1963 were not revised.

Some reductions in M_L values are required for the Baffin Island series. Smith noted in the 1963 catalogue (p. 12) that the calibration of the short-period east-west seismograph at Frobisher was somewhat uncertain. However, only two aftershocks (5 Dec. and 15 Dec. 01^h) had magnitudes determined with FBC east-west amplitudes.

For three aftershocks (4 Sept. 21^h20^m, 4 Sept. 21^h41^m, 6 Sept. 01^h), Smith published two magnitudes - m_b determined by the USCGS and M_L determined from Canadian data. The m_b values were 4.1, 4.4 and 4.4, respectively; the M_L values were 5.7, 5.8 and 5.8, respectively. On page 434 of the 1963 *Seismological Bulletin*, Smith made the following comment on the magnitudes of these three Baffin Island events: "It is felt that the M_L magnitudes found at Ottawa are in general too large - possibly because the nearest station is more than 800 km from the epicentres." An examination of magnitudes calculated by Smith for individual stations reveals that the relatively high mean M_L values are caused by data from stations LND, MNT and OTT at 3000 km from the epicentre where the individual values are about one magnitude unit greater than values at much shorter distances. When the mean M_L is recalculated from data with $\Delta < 1500$ km, then the mean magnitudes become 4.9, 5.1 and 5.2, respectively.

Mean magnitudes were recomputed for all events of the Baffin Island series omitting amplitude data from stations at distances beyond 1500 km. Table A-1 presents revised magnitudes for the 14 aftershocks for which the decrease was more than 0.2 unit from the originally published value. With this revision the Baffin Island series consisted of the main shock (4 Sept.) of magnitude 6 to $6\frac{1}{2}$, four aftershocks with magnitudes 5.0 to 5.2, 14 aftershocks with magnitudes 4.5 to 4.9 and the remaining 24 with magnitudes 3.6 to 4.4. No foreshocks were detected, although FBC, the closest station ($\Delta \approx 800$ km), only began operation on 21 August.

TABLE A-1

Revised Magnitudes for the 1963 Baffin Island Series

Date	Time (h:m)	Revised M_L	Original M_L
Sept. 04	14:21	4.4	4.8
04	15:14	4.1	4.5
04	15:26	4.4	5.1
04	19:57	4.7	5.1
04	21:20	4.9	5.7
04	21:41	5.1	5.8
04	22:15	4.5	5.0
04	23:03	4.7	5.0
05	22:26	4.5	4.8
06	01:46	5.2	5.8
06	05:55	4.0	4.6
07	03:03	4.7	5.0
08	15:38	4.3	4.8
09	22:33	4.1	4.6

In addition to the m_b and M_L values given above for the three aftershocks on 4 and 6 Sept., m_b and M_L values are available for the aftershock of 12 Oct. (m_b4.1, M_L5.0) and another Baffin Island earthquake of 18 Sept. 22^h (m_b3.9, M_L5.1).

In 1964 and 1965 epicentral distances for unlocated events were less than 1000 and 1200 km, respectively. For events located with Canadian data, magnitude changes are 0.3 unit or less when amplitude data are restricted to distances less than 1500 km, with one exception in 1964 where the change is 0.4 but data are few.

As mentioned above in Section V, apparently only relatively small earthquakes occurred in 1964. However, two magnitude scales were used in the catalogue - M_L from Canadian data for most events and m_b from the ISC catalogue for 13 of the larger events that were not located with Canadian data. In comparing the relative seismic activity of different years and different areas it is better to use one magnitude scale whenever possible. In theory M_L, m_b and M_s can be related to each other so that one can be calculated from the measured value of another. In practice these relations are not always satisfied when measured values are available on two or three of the magnitude scales since frequently insufficient amplitude data are available to average out effects of the source and station.

Table A-2 lists the 13 earthquakes of the Arctic Region in 1964 whose published focal parameters were taken from the ISC catalogue. Smith's files contained M_L amplitude data for eight of these events. The mean M_L values were determined at epicentral distances less than 1500 km. Except for the earthquake of 15 June, this restriction reduced the mean magnitude by 0.2 unit or less. The M_L values may be no better than those of m_b to characterize the size of these earthquakes. However, they do permit a more uniform comparison with other events whose magnitudes are on the M_L scale.

TABLE A-2

Measured m_b and M_L Values for some 1964 Arctic Region Events

Date	m_b	M_L	Location
24 Jan. 05^h	4.1	5.0	Mackenzie Valley
22 Feb. 05^h	4.1	—	Central Yukon
23 Mar.	4.1	4.1	Arctic Ocean
03 Apr. 20^h	4.2	—	Southern Yukon-Alaska border
08 Apr.	4.2	—	Southern Yukon-Alaska border
14 May	4.4	5.6	Roes Welcome Sound
18 May	4.1	5.1	Barrow Strait
15 June	4.1	5.6	Off Southern Baffin Island
18 July	3.8	—	Southern Yukon-Alaska border
24 July	4.0	4.4	Arctic Ocean
27 Aug.	4.1	5.2	Northern Yukon
24 Sept.	4.2	—	Southern Yukon
08 Dec.	3.7	4.5	Northern Yukon

In 1965 Smith published ISC (Jan. to June) or USCGS (July to Dec.) focal parameters including m_b for 14 events and added M_L for comparison in eight of these. Table A-3 summarizes these magnitudes including three additional M_L values (denoted by parentheses) contained in Smith's data file and two events located by Smith for which m_b was also available. Restriction of amplitude data to 1500 km or less changes only two values, reducing them by 0.3 unit or less. The large M_L value for the first event on 27 June is due in part to the relatively large period of 1.5 seconds associated with the maximum L_g amplitudes.

This review of magnitudes of Arctic Region events in the Canadian earthquake catalogues of 1960 to 1965 has reduced the M_L magnitudes of some Baffin Island events of 1963 and added M_L values for some larger events of 1964. No other changes were made in published M_L values in the Eastern, Central or Arctic Regions. The additional details provided above may be useful later if the maximum distance for M_L is subsequently changed from 1500 km to a lesser value. It should be emphasized again that ground amplitude-distance relations were not examined in this magnitude-distance review.

Western Region 1960-1965

The magnitudes published in the catalogues of Western Region events from 1960 to May 1963 were calculated on the M_L scale, except for the three M_S 6 events in 1960, one M_S 5 event on 8 Sept. 1961 and one M_S 5¾ on 2 June 1962. Section V.3 above gives some additional M_S values.

From June 1963 onwards, the USCGS published m_b values for most earthquakes. (Formerly it published M_S magnitudes only for some of the larger earthquakes.) Milne did not distinguish between M_L, M_S and m_b values in his published epicentre lists, although most values were M_L. Tables A-4 to A-6 contain all the Western Region events of 1963 to 1965 for which both m_b and M_L values have been published.

TABLE A-3

Measured m_b and M_L Values for some 1965 Arctic Region Events

Date	m_b	M_L	Location
04 Jan. 20^h	4.5	5.3	Northern Yukon
20 Jan.	4.0	4.9	Northern Yukon
12 Feb.	3.8	-	Central Yukon
16 Apr.	3.5	(4.5)	Northern Yukon
27 June 11^h08^m	5.1	6.1	Yukon-Alaska border
27 June 11^h24^m	4.6	(5.3)	Yukon-Alaska border
27 June 15^h	4.2	-	Yukon-Alaska border
26 July	4.0	4.5	Ellesmere Island, NWT
10 Aug. 08^h	4.2	4.8	Labrador Sea
11 Sept.	4.1	4.5	Central Yukon
04 Oct. 22^h	4.6	-	Central Yukon
05 Oct. 00^h	5.2	5.5	Central Yukon
14 Oct. 10^h	4.2	5.6	Northern Baffin Island
26 Oct.	5.7*	4.8	Central Yukon
04 Nov.	3.9	4.4	Central Yukon
23 Dec.	5.8	(6.3)	Yukon-Alaska border

*ISC m_b4

TABLE A-4

Measured m_b and M_L Values for some 1964 Western Region Events

Date	m_b	M_L	Location
31 Jan.	4.2	4.1	Coast Mountains, B.C. mainland
24 Mar.	4.2	3.7	West of Cape Scott, Vancouver Island
3 Aug.	4.2	4.9	North coast, Queen Charlotte Islands
3 Sept.	5.0	3.9	West of Cape Scott, Vancouver Island
1 Oct.	5.3	4.1	West of Estevan Point, Vancouver Island

TABLE A-5

Measured m_b and M_L Values for some 1963 Western Region Events

Date	m_b	M_L	Location
14 June	4.4	3.9	West of Vancouver Island
16 June	5.1	4.3	
12 July 06^h	4.0	2.8	
12 July 12^h23^m	4.5	4.6	
12 July 12^h52^m	4.0	4.5	
18 July	4.8	4.6	
01 Sept. 15^h	4.1	4.0	
02 Sept. 13^h27^m	4.6	4.6	
02 Sept. 13^h30^m	4.4	-	
03 Sept.	3.9	4.0	
09 Sept. 05^h	3.2	2.8	
17 Sept.	4.0	4.0	
15 Dec.	4.0	4.0	
23 June 13^h11^m	4.5	4.0	Northwest of Vancouver Island
24 June 10^h	4.0	4.1	Northwest of Vancouver Island
02 Sept. 03^h	3.7	4.2	Queen Charlotte Sound
04 Oct.	4.4	4.4	West of Washington
05 Oct. 11^h	4.3	4.3	West of Washington
05 Oct. 18^h	3.9	3.9	South of Queen Charlottes
02 Dec. 06^h52^m	3.9	4.7	North of Queen Charlottes
02 Dec. 06^h57^m	3.6	4.5	North of Queen Charlottes
22 Dec.	4.3	3.7	East of Seattle, Washington

NOTE added in press

The magnitudes denoted by M_L in the present text, tables and maps were calculated from Richter's 1935 equation for epicentral distances up to 600 km and from an extrapolation of his scale for distances from 600 to 1500 km. Magnitudes, for earthquakes in eastern and northern Canada, calculated from the Richter M_L scale and its extrapolation are generally $\frac{1}{2}$ to 1 unit higher than magnitudes m_b, M_s assigned from teleseismic data. An example of this effect can be clearly seen in Tables A-2 and A-3 of Appendix 1 and Tables A-7 and A-8 of Appendix 3.

Other research conducted here and elsewhere, in parallel with the catalogue preparation, demonstrates clearly that the use of Richter's scale designed for California and, in particular, the use of its extrapolation beyond 600 km can yield apparently large magnitude values when applied outside California.

Until the attenuation relations are determined which are necessary to calculate better magnitudes for those events in Canada for which teleseismic m_b or M_s cannot be obtained, it is not possible at present to give alternate magnitude values. Accordingly, the M_L values presented in this catalogue should only be used in further calculations with due caution. It is hoped that in a future publication adjusted magnitude values can be presented.

27 June, 1973

APPENDIX 2

CATALOGUES OF CANADIAN EARTHQUAKES TO 1967

The list below, which contains all published Canadian earthquake catalogues to the end of 1967, summarizes the sources of basic epicentral data for Canadian earthquakes. The list does not include reports on individual large earthquakes, special studies of certain earthquake sequences, analyses of seismicity patterns and the like. References to many of these reports will be found in the bibliographies of individual catalogues.

The catalogues are listed chronologically by year and region as indicated by the headings. Revisions to published epicentres are normally published in later catalogues.

Eastern Canada 1534-1959

Smith, W.E.T. 1962 (reprinted 1972). Earthquakes of Eastern Canada and adjacent areas 1534-1927. *Pub. Dom. Obs.* Ottawa, 26, 271-301.

Smith, W.E.T. 1966 (reprinted 1969). Earthquakes of Eastern Canada and adjacent areas 1928-1959. *Pub. Dom. Obs.* Ottawa, 32, 87-121.

Western Canada 1841-1959

*Milne, W.G. 1956 (reprinted 1964). Seismic activity in Canada, west of the 113th meridian 1841-1951. *Pub. Dom. Obs.* Ottawa, 18, 119-146.

Milne, W.G. and F. Lombardo. 1953 (reprinted 1967). Canadian west coast earthquakes, 1951. *Pub. Dom. Obs.* Ottawa, 16, 81-89.

Milne, W.G. 1953 (reprinted 1967). Canadian west coast earthquakes, 1952. *Pub. Dom. Obs.* Ottawa, 16, 313-325.

*Milne, W.G. 1955 (reprinted 1967). Canadian west coast earthquakes, 1953. *Pub. Dom. Obs.* Ottawa, 16, 393-401.

*Milne, W.G. 1955 (reprinted 1967). Canadian west coast earthquakes, 1954. *Pub. Dom. Obs.* Ottawa, 18, 47-58.

*Milne, W.G. and K.A. Lucas. 1961. Seismic activity in Western Canada 1955 to 1959 inclusive. *Pub. Dom. Obs.* Ottawa, 26, 3-23.

Arctic Canada 1899-1959

Meidler, S.S. 1962 (reprinted 1973). Seismic activity in the Canadian Arctic 1899-1955. *Seism. Series Dom. Obs.* 1961-3, 1-9.

Smith, W.E.T. 1961. Earthquakes of the Canadian Arctic 1956-1959. *Seism. Series Dom. Obs.* 1961-2, 1-9.

Canadian Earthquakes 1960-1967

Milne, W.G. and W.E.T. Smith. 1961 (reprinted 1964 and 1973). Canadian earthquakes - 1960. *Seism. Series Dom. Obs.* 1960-2, 1-23.

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* Additions and alterations to events in these catalogues are included in: Milne, W.G. 1963. Seismicity of Western Canada. Bol. Bibl. Geof. y Ocean. Amer. 3, 17-40 (Contrib. Dom. Obs., Vol. 5, No. 13).

Milne, W.G. and W.E.T. Smith. 1962. Canadian earthquakes - 1961. *Seism. Series Dom. Obs.* 1961-4, 1-24.

Milne, W.G. and W.E.T. Smith. 1963. Canadian earthquakes - 1962. *Seism. Series Dom. Obs.* 1962-2, 1-22.

Milne, W.G. and W.E.T. Smith. 1966. Canadian earthquakes - 1963. *Seism. Series Dom. Obs.* 1963-4, 1-30.

Smith, W.E.T. and W.G. Milne. 1969. Canadian earthquakes - 1964. *Seism. Series Dom. Obs.* 1964-2, 1-28.

Smith, W.E.T. and W.G. Milne. 1970. Canadian earthquakes - 1965. *Seism. Series Dom. Obs.* 1965-2, 1-38.

Stevens, A.E., W.G. Milne, R.J. Wetmiller and R.B. Horner. 1972. Canadian earthquakes - 1966. *Seism. Series Earth Physics Branch*, no. 62, 1-55.

Stevens, A.E., W.G. Milne, R.J. Wetmiller and G. Leblanc. 1973. Canadian earthquakes - 1967. *Seism. Series Earth Physics Branch*, no. 65, 1-65.

APPENDIX 3

EARTHQUAKES OF MAGNITUDE 5 AND GREATER, 1960-1967

Magnitude 5 is often considered the threshold of significant damage caused by earthquakes, although the actual damage is influenced by the distance from the focus as well as local soil conditions and structural properties of buildings. It is convenient therefore to have tables and maps for these larger events separate from those showing all magnitudes.

Other publications have contained cumulative epicentre maps for Eastern Canada from 1534 to 1959 (Smith, 1966), for Western Canada from 1850 to 1959 (Milne and Lucas, 1961), for Arctic Canada 1899 to 1955 (Meidler, 1962) and 1956 to 1959 (Smith, 1961). For all three regions, maps of earthquakes of magnitude 5 and greater in the period 1899 to 1964 are found in Whitham *et al.* (1970). The maps in this latter paper were based on both historical and instrumental data. Some of the larger shocks prior to 1960 were listed in a table at the end of the paper.

Figure 4 (facing page 1) and Tables A-7 to A-9 of this appendix show the earthquakes of magnitude at least 5 in the period 1960 to 1967 that occurred in Canada in the Eastern, Arctic and Western Regions. No earthquakes of these magnitudes occurred in the Central Region in this period. Data have been taken from catalogues of the Canadian Earthquakes series with changes where necessary for the magnitude revisions discussed in Appendix 1 and for typographical errors.

All earthquakes with Richter magnitudes M_L or $M_s \geq 5.0$ were selected from the catalogues. The tables include for comparison body- and surface-wave magnitudes m_b and M_s, where these have been published by either the USCGS or ISC. All magnitudes in the Eastern and all but two in the Arctic Region were determined on the M_L scale. Magnitudes for eight of the Western Region shocks are m_b or M_s only while seven are M_L. On the average an uncertainty of ±0.5 unit should be associated with all values of magnitude.

Where epicentres have been also determined by the USCGS or ISC, these data are included for comparison. USCGS data are taken from the final Seismological Bulletin of the appropriate year. The letters USCGS or ISC beneath the year indicate that all epicentral data, except M_L, are from that agency.

The uncertainties in latitude and longitude are indicated where known. (Since meridians of longitude converge towards the poles, the uncertainty in longitude at high latitudes appears much larger than that in latitude when expressed in minutes of arc.) The uncertainties associated with ISC-determined epicentres are apparently small since they represent one standard deviation in the travel-time residuals. The true uncertainties are more likely to be at least 10 or 20 minutes of arc.

Eastern Canada

Table A-7 indicates that three of the four M_L5 earthquakes in Eastern Canada were reported felt and that maps depicting the "felt areas" are given in the catalogues for the 1961 and 1964 events. No aftershocks were detected, although two foreshocks ($M_L3.3$ and 3.9) occurred during the hour preceding the Deep River earthquake and one foreshock ($M_L3.8$) occurred one week prior to the Lac Couture shock. However at the time of the 1961 and 1967 earthquakes, the Canadian seismograph network was not capable of detecting shocks near those three epicentres with M_L less than about $3\frac{1}{2}$. In the Deep River area in 1964 events as small as M_L3 could have been located. The limited data available suggest that in Eastern Canada foreshock or aftershock activity associated with earthquakes of magnitude 5 is generally at least two units of magnitude smaller than the main shock.

Earthquakes above magnitude 5 are sufficiently infrequent in Eastern Canada that the eight-year interval of Table A-7 cannot indicate all the areas where such shocks may be expected. Figure 1 in Whitham *et al.* (1970) spanning the period 1534 to 1965 is more representative of seismic activity in Eastern Canada.

Northern Canada

Few events in Table A-8 have been reported felt and no isoseismal maps are available. Some of the events have occurred at times and in areas where the detection of foreshocks or aftershocks with M_L less than 5 was impossible. Epicentre lists from 1964 onwards suggest that the larger earthquakes in most of Northern Canada are associated occasionally with foreshocks and more frequently with aftershocks, the largest of which is often only one magnitude unit smaller than the main event. Despite the short time interval the seismic activity represented in Table A-8 is characteristic of longer term activity.

Western Canada

Three of the earthquakes in Table A-9 have been reported felt, but no isoseismal maps are available. Except for one shock on the Alaska-B.C. border, the activity is confined to the area west of the British Columbia mainland. Aftershock sequences are common. The eight-year span of Table A-9 does not show that minor and occasionally moderate shocks have, in fact, occurred on Vancouver Island and in the interior of British Columbia.

References

Whitham, K., W.G. Milne and W.E.T. Smith. 1970. The new seismic zoning map for Canada 1970 edition. *Canadian Underwriter*, June 15.

Detailed references to the earthquake catalogues cited may be found in Appendix 2.

TABLE A-7

Earthquakes in Eastern Canada 1960-1967 with Magnitude 5 and Greater

Year	Date and Time (GMT)	Latitude (N) Longitude (W)	Magnitude	Location
1961	5 July 22 43 44	50°15'±15' 66°41'±10'	M_L5.0	Near Sept-Iles, Quebec (felt - map)
(Not located by USCGS)				
1964	8 Jan. 10 04 31	46°14'±10' 77°32'±15'	M_L5.0	Western Quebec, near Deep River, Ontario (felt - map)
(USCGS 10:04:32, 46.1N, 77.7W, m_b3.8)				
1967	18 Feb. 10 10 57	59°50'±20' 76°10'±40'	M_L5.1	Near Lac Couture, northern Quebec
(USCGS 10:10:52, 59.7N, 75.9W, m_b4.0)				
1967	30 Sept. 22 39 51	49°29'±10' 65°47'±10'	M_L5.3	Lower St. Lawrence River, Quebec (felt)
(USCGS 22:39:53, 49.1N, 66.2W, m_b4.2)				

TABLE A-8

Earthquakes in Northern Canada 1960-1967 with Magnitude 5 and Greater

Year	Date and Time (GMT)	Latitude (N) Longitude (W)	Magnitude	Location
1960	6 Sept. 21 24 26	64°48' 86°24'	M_L5.5	Southampton Island, northern Hudson Bay, NWT
(USCGS-epicentre, no magnitude)				
1961	10 Nov. 22 43 29	62°30'±1° 124°24'±1°30'	M_L5.0	South of Wrigley, Mackenzie Valley, NWT
(USCGS 22:43:25, 62.6N, 125.0W, no magnitude)				
1961	25 Dec. 19 58 29	63°54' 89°18'	M_L5.1	Near Roes Welcome Sound, northern Hudson Bay, NWT
(USCGS-epicentre, no magnitude)				
1962	26 Oct. 10 29 20	60°48'±1° 57°30'±2°	M_L5.0	Labrador Sea
(Not located by USCGS)				
1963	8 Mar. 00 14 16	76°36'±15' 94°20'±1°	M_L5.7	Northwestern Devon Island, NWT
(USCGS 00:14:16, 76.7N, 94.9W, no magnitude)				
1963 USCGS	17 June 18 32 14	60°30' 140°48'	m_b5.4 M_S5¼-5½ (PAL)	Southern Yukon-Alaska border

TABLE A-8 (cont'd)

Earthquakes in Northern Canada 1960-1967 with Magnitude 5 and Greater

Year	Date and Time (GMT)	Latitude (N) Longitude (W)	Magnitude	Location
1963 USCGS	4 Sept. 13 32 12	71°18' 73°06'	m_b6.1 $6\frac{1}{4}$-$6\frac{1}{2}M_s$(PAS) M_s6(BRK) $6\frac{1}{4}$-$6\frac{1}{2}M_s$(PAL)	Baffin Island west of Cape Adair (main shock), (felt at Clyde River and Cape Christian)
1963 (Not located by USCGS)	4 Sept. 14 05 13		M_L5.0	Baffin Island, west of Cape Adair (aftershock)
1963 USCGS	4 Sept. 21 41 01	71°36' 73°30'	M_L5.1 m_b4.4	Baffin Island, west of Cape Adair (aftershock)
1963 USCGS	6 Sept. 01 46 13	71°30' 73°00'	M_L5.2 m_b4.4	Baffin Island, west of Cape Adair (aftershock)
1963 (USCGS 22:31:23, 69.3N, 67.8W, m_b3.9)	18 Sept. 22 31 27	68°30'±19' 70°05'±45'	M_L5.1	Baffin Island, west of Cape Hooper
1963 USCGS	12 Oct. 02 46 48	71°36' 73°00'	M_L5.0 m_b4.1	Baffin Island, west of Cape Adair (aftershock)
1964 ISC	24 Jan. 05 31 31	64°19'±04' 126°18'±16'	(M_L5.0) m_b4.1	North of Wrigley, Mackenzie Valley, NWT
1964 ISC	14 May 13 52 14	65°07'±04' 86°48'±09'	(M_L5.6) m_b4.4	Roes Welcome Sound, northern Hudson Bay, NWT
1964 ISC	18 May 01 04 31	74°15'±05' 97°54'±21'	(M_L5.1) m_b4.1	Barrow Strait, NWT
1964 ISC	15 June 22 53 06	62°07'±04' 65°00'±20'	(M_L5.6) m_b4.1	Frobisher Bay, southern Baffin Island
1964 ISC	27 Aug. 09 53 51	65°26'±03' 133°24'±10'	(M_L5.2) m_b4.1	Northern Yukon
1965 ISC	4 Jan. 20 48 58	67°08'±03' 135°18'±13'	M_L5.3 m_b4.5	Northern Yukon
1965 ISC	27 June 11 08 56	60°17'±01' 141°08'±04'	M_L6.1 m_b5.1	Southern Yukon-Alaska border
1965 ISC	27 June 11 24 48	60°18'±02' 141°00'±07'	(M_L5.3) m_b4.6	Southern Yukon-Alaska border (aftershock)
1965 (Not located by USCGS)	4 Oct. 11 08 23	65°18' 134°00'	M_L5.0	Northern Yukon (foreshock)
1965 USCGS	5 Oct. 00 17 14	65°18' 134°00'	M_L5.5 m_b5.2	Northern Yukon

TABLE A-8 (cont'd)

Earthquakes in Northern Canada 1960-1967 with Magnitude 5 and Greater

Year	Date and Time (GMT)	Latitude (N) Longitude (W)	Magnitude	Location
1965	14 Oct. 10 38 27	$71^{o}20'\pm19'$ $77^{o}10'\pm1^{o}$	$M_L5.6$	Northern Baffin Island
(USCGS 10:38:23, 72.3N, 75.1W, $m_b4.2$)				
1965 USCGS	23 Dec. 20 47 36	$60^{o}36'$ $140^{o}42'$	($M_L6.3$) $m_b5.8$	Southern Yukon-Alaska border
1966	2 Jan. 11 51 46	$74^{o}10'\pm20'$ $71^{o}00'\pm 1^{o}$	$M_L5.1$	Baffin Bay
(USCGS 11:51:49, 74.3N, 71.3W, $m_b4.7$)				
1966	22 Mar. 22 10 03	$64^{o}45'\pm40'$ $88^{o}00'\pm1^{o}30'$	$M_L5.1$	West of Roes Welcome Sound, northern Hudson Bay, NWT
(Not located by USCGS)				
1966	26 Mar. 02 32 31	$65^{o}00'\pm40'$ $133^{o}30'\pm 2^{o}$	$M_L5.0$	Northern Yukon
(Not located by USCGS)				
1966	5 Apr. 14 32 25	$61^{o}10'\pm50'$ $126^{o}00'\pm1^{o}20'$	$M_L5.0$	Southern Yukon-NWT border
(USCGS 14:32:26, 61.8N, 126.8W, $m_b4.1$)				
1966	28 Dec. 02 36 27	$60^{o}10'\pm40'$ $129^{o}30'\pm1^{o}30'$	$M_L5.0$	Near Watson Lake, southern Yukon (felt)
(USCGS 02:36:39, 60.5N, 126.5W, $m_b3.6$)				
1967	25 Jan. 03 58 13	$66^{o}40'\pm25'$ $134^{o}45'\pm45'$	$M_L5.0$	Northern Yukon
(USCGS 03:58:08, 66.3N, 135.6W, $m_b4.2$)				
1967	2 Apr. 15 18 59	$66^{o}20'\pm30'$ $136^{o}40'\pm45'$	$M_L5.1$	Northern Yukon
(USCGS 15:19:10, 66.6N, 136.1W, $m_b4.5$)				
1967	18 May 20 56 44	$70^{o}50'\pm20'$ $71^{o}10'\pm40'$	$M_L5.0$	Baffin Island, south of Cape Adair
(USCGS 20:56:40, 71.1N. 70.8W, $m_b4.9$)				
1967	8 Sept. 14 43 41	$68^{o}40'\pm10'$ $62^{o}00'\pm10'$	$M_L5.0$	Davis Strait
(USCGS 14:43:34, 70.1N, 62.1W, $m_b4.2$)				

TABLE A-9

Earthquakes in Western Canada 1960-1967 with Magnitude 5 and Greater

Year	Date and Time (GMT)	Latitude (N) Longitude (W)	Magnitude	Location
1960 USCGS	4 July 04 28 33	52° ±30' 131°30'±45'	$M_s 6\frac{1}{2}-6\frac{3}{4}$	South of Cape St. James, Queen Charlotte Islands (felt)
1960 USCGS	4 July 13 10 05	52° ±30' 131° ±45'	$M_s 6$	Aftershock (felt)
1960 USCGS	30 Sept. 06 35 09	49°24' 129°42'	$M_s 5\frac{1}{4}$	West of Vancouver Island
1960	1 Dec. 20 49 46	48°30'±06' 129°06'±06'		West of Vancouver Island
(USCGS 20:49:46, 49.0N, 129.3W, $M_s 6$)				
1961 USCGS	1 Feb. 00 35 57	50°18' 129°54'	$M_L 3.9$ $M_s 5\frac{1}{2}$	West of Vancouver Island
1961	15 Aug. 12 25 59	59°06' 136°54'	$M_L 5.3$	Alaska-B.C. border, west of Haines (felt at Whitehorse, Yukon, 120 miles northeast)
(USCGS - epicentre, no magnitude)				
1961 USCGS	8 Sept. 04 52 09	51°42' 131°18'	$M_s 5$	South of Cape St. James, Queen Charlotte Islands
1961 USCGS	29 Oct. 09 12 16	49°00' 128°42'	$M_L 4.8$ $M_s 5\frac{3}{4}$	West of Vancouver Island
1962 USCGS	2 June 12 26 11	49°54' 129°42'	$M_s 5\frac{3}{4}$	West of Vancouver Island
1964 USCGS	31 Mar. 09 01 30	50°48' 130°12'	$m_b 5.6$ $M_s 6$ (PAS) $M_s 6-6\frac{1}{4}$ (BRK) $M_s 6\frac{1}{2}-6\frac{3}{4}$ (PAL)	West of Cape Scott, Vancouver Island
1965 USCGS	2 Sept. 21 27 17	48°24'±30' 128°12'±45'	$m_b 5.0$	West of Vancouver Island
1966	7 Feb. 08 48 23	50°54'±30' 131°12'±30'	$M_L 5.0$	West of Vancouver Island
(USCGS 08:48:35, 51.2N, 130.0W, $m_b 4.9$)				
1966	30 Mar. 12 39 56	49°48'±18' 129°54'±18'	$M_L 5.1$	West of Vancover Island
(USCGS 12:40:01, 49.8N, 129.7W, $m_b 5.3$)				
1966	17 Apr. 16 46 47	54°06'±30' 133°36'±30'	$M_L 5.0$	West of Cape Knox, Queen Charlotte Islands
(USCGS 16:46:51, 54.2N, 133.5W, $m_b 4.6$)				
1967	29 Apr. 00 04 42	51°06'±15' 130°06'±15'	$M_L 5.3$	Northwest of Cape Scott, Vancouver Island
(USCGS 00:04:42, 51.2N, 130.4W, $m_b 5.1$)				

TABLE 1

EARTHQUAKES IN EASTERN CANADA AND ADJACENT AREAS
1967

(ALL TIMES ARE GMT)
(M OR ML = MAGNITUDE)
(F=FILLED, O=OPEN CIRCLE ON EPICENTRE MAPS)

A. CANADIAN EPICENTRES

JAN 25 05 04 59. 47 15 N, 66 45 W, ML=2.2 O
NW NEW BRUNSWICK, 10 MILES SOUTH OF MOUNT CARLETON

JAN 25 22 17 03. 88 MILES FROM SIC ML=2.0
LOWER ST LAWRENCE VALLEY QUEBEC. EITHER 49 40N, 68 30W OR
49 00N, 67 20W. (NOT PLOTTED)

JAN 26 17 04 07. 31 MILES FROM SIC ML=1.8
LOWER ST. LAWRENCE VALLEY QUEBEC

FEB 9 18 04 26. 59 40 N, 76 40 W, ML=3.8 F
NORTHERN QUEBEC SOUTHWEST OF LAC COUTURE
FORESHOCK OF EVENT OF 18 FEB 10H
PLOTTED ALSO ON ARCTIC REGION MAP

FEB 18 10 10 57. 59 50 N, 76 10 W, ML=5.1 F
MAIN SHOCK, NORTHERN QUEBEC SOUTHWEST OF LAC COUTURE
PLOTTED ALSO ON ARCTIC REGION MAP. MB=4.0 (USCGS)

FEB 21 00 53 57. 52 00 N, 81 20 W, ML=3.9 F
SW SHORE OF JAMES BAY, 20 MILES SOUTH OF FT ALBANY ONTARIO

FEB 22 14 21 55. 50 30 N, 63 20 W, ML=4.2 F
LAC ALLARD QUEBEC, NORTH SHORE OF LOWER ST. LAWRENCE RIVER

FEB 27 04 12 56. 49 10 N, 66 00 W, ML=2.3 F
SOUTH SHORE ST LAWRENCE, 26 MILES NW OF MURDOCKVILLE QUEBEC

MAR 14 01 49 05. 46 10 N, 67 20 W, ML=2.0 F
10 MILES EAST OF WOODSTOCK, NEW BRUNSWICK

MAR 22 04 00 15. 73 MILES FROM SIC ML=1.5
LOWER ST. LAWRENCE VALLEY QUEBEC

APR 8 05 21 23. 45 50 N, 73 45 W, ML=1.7 F
22 MILES NORTH OF MONTREAL QUEBEC

MAY 11 11 00 15. 47 25 N, 70 15 W, ML=1.8 O
ST. LAWRENCE RIVER EAST OF BAIE-ST-PAUL QUEBEC

JUN 11 01 49 39. 46 35 N, 75 02 W, ML=3.7 F
20 MILES EAST OF MONT-LAURIER QUEBEC

JUL 8 02 44 20. 47 00 N, 76 05 W, ML=2.5 F
NORTH OF THE BASKATONG RESERVOIR QUEBEC

JUL 9 06 40 57. 46 10 N, 74 40 W, ML=2.2 F
SOUTHWEST OF MONT-TREMBLANT QUEBEC

JUL 9 11 59 25. 46 55 N, 76 00 W, ML=2.4 F
NORTH OF THE BASKATONG RESERVOIR QUEBEC

JUL 12 06 32 48. 46 10 N, 75 25 W, ML=2.5 F
10 MILES NE OF NOTRE-DAME-DU-LAUS QUEBEC

JUL 26 19 48 09. 45 MILES FROM SIC ML=1.9
LOWER ST. LAWRENCE VALLEY QUEBEC

AUG 5 08 08 32. 48 34 N, 64 58 W, ML=4.0 F
35 MILES SOUTHEAST OF MURDOCKVILLE QUEBEC

AUG 7 09 09 12. 46 06 N, 75 25 W, ML=2.2 F
8 MILES EAST OF NOTRE-DAME-DU-LAUS QUEBEC

AUG 8 07 22 28. 46 53 N, 70 38 W, ML=1.8 F
SOUTH SHORE OF ST. LAWRENCE, 26 MILES EAST OF QUEBEC CITY

AUG 10 02 47 42. 46 01 N, 74 45 W, ML=2.2 F
SOUTH OF MONT-TREMBLANT QUEBEC

AUG 13 19 07 19. 46 52 N, 70 15 W, ML=2.4 F
SOUTH SHORE OF ST. LAWRENCE, 50 MILES EAST OF QUEBEC CITY

AUG 14 09 40 12. 120 MILES FROM GWC ML=2.2

SEP 17 01 19 38. 50 40 N, 75 15 W, ML=4.4 O
65 MILES NW OF CHAPAIS QUEBEC, WEST OF LAKE MISTASSINI

SEP 23 16 27 55. 46 56 N, 70 42 W, ML=3.4 F
SOUTH SHORE OF ST. LAWRENCE, 25 MILES EAST OF QUEBEC CITY

SEP 30 22 39 51. 49 29 N, 65 47 W, ML=5.3 F
LOWER ST. LAWRENCE RIVER, QUEBEC. FELT IN SEPT-ILES AND
CLARKE CITY ON THE NORTH SHORE AND IN MONT-LOUIS AND
RIVIERE-AUX-RENARDS ON THE SOUTH SHORE. MB=4.2 (USCGS)

OCT 25 03 29 25. 50 10 N, 63 35 W, ML=3.2 F
GULF OF ST. LAWRENCE, NORTH OF ANTICOSTI ISLAND
FORESHOCK OF EVENT OF 25 OCT 07H

OCT 25 07 05 31. 50 09 N, 63 31 W, ML=3.4 F
GULF OF ST. LAWRENCE, NORTH OF ANTICOSTI ISLAND

NOV 2 03 35 38. 52 12 N, 58 24 W, ML=3.4 O
110 MILES SOUTHEAST OF GOOSE BAY LABRADOR

NOV 9 14 24 42. 47 26 N, 70 09 W, ML=2.5 O
ST. LAWRENCE RIVER EAST OF BAIE-ST-PAUL QUEBEC

NOV 21 06 26 23. 78 MILES FROM SIC ML=1.7
LOWER ST. LAWRENCE VALLEY QUEBEC

NOV 22 21 34 40. 58 MILES FROM SIC ML=1.6
LOWER ST. LAWRENCE VALLEY QUEBEC

DEC 27 03 16 43. 58 45 N, 59 15 W, ML=3.8 O
LABRADOR SEA, 125 MILES EAST OF HEBRON LABRADOR
PLOTTED ON ARCTIC REGION MAP

B. UNITED STATES EPICENTRES

JAN 9 07 51 26. 39 30 N, 54 20 W, ML=4.5 O
ATLANTIC OCEAN, 575 MILES SOUTH OF ST. JOHN,S NEWFOUNDLAND
OFF MAP, NOT PLOTTED

JAN 11 19 00 30. 44 45 N, 72 35 W, ML=1.9 F
20 MILES NORTH OF MOUNTPELIER VERMONT

JAN 26 04 10 36. 44 37 N, 70 52 W, ML=2.1 F
20 MILES NORTH OF BERLIN NEW HAMPSHIRE

FEB 2 13 40 09. 41 24 N, 71 24 W, M=2.4 (WES) O
SOUTH OF PROVIDENCE RHODE ISLAND
FELT OVER NARRAGANSETT BAY AREA WITH MAXIMUM INTENSITY V

MAR 11 23 39 14. 45 10 N, 67 20 W, ML=2.1 F
MAINE-NEW BRUNSWICK BORDER NEAR MILLTOWN NEW BRUNSWICK

APR 28 12 23 32. 46 18 N, 67 54 W, M=2.5 DEPTH=14 KM (WES) O
MAINE-NEW BRUNSWICK BORDER, 20 MILES NW OF WOODSTOCK N.B.
FELT AT MONTICELLO, MAINE WITH MAXIMUM INTENSITY IV

MAY 14 20 23 52. 44 55 N, 73 55 W, ML=2.3 O
45 MILES SOUTH OF MONTREAL QUEBEC, NEAR CANADA-U.S. BORDER

MAY 15 22 47 12. 42 18 N, 69 54 W, ML=3.2 F
ATLANTIC OCEAN, 20 MILES NORTHEAST OF PROVINCETOWN MASS

JUN 13 19 08 54. 42 54 N, 78 12 W, M=3.9 DEPTH= 5 KM (USCGS) F
NEW YORK STATE, 30 MILES EAST OF BUFFALO
SLIGHT DAMAGE IN ATTICA AND ALABAMA NEW YORK
FELT GENERALLY OVER AN AREA OF 3000 SQUARE MILES
MAXIMUM INTENSITY VI NEAR EPICENTRE

JUL 1 16 05 40. 44 23 N, 69 52 W, M=3.8 (WES) O
WESTERN MAINE. MAIN SHOCK. MAXIMUM INTENSITY V. THIS EVENT
WAS ASSOCIATED WITH AT LEAST 4 FORESHOCKS (14.09,15.33,
15.55,16.00) AND 2 AFTERSHOCKS (16.11,16.19)

TABLE 2

EARTHQUAKES IN ARCTIC CANADA AND ADJACENT AREAS
1967

(ALL TIMES ARE GMT)
(M OR ML = MAGNITUDE)
(F=FILLED, O=OPEN CIRCLE ON EPICENTRE MAPS)

A. CANADIAN EPICENTRES

JAN 4 07 10 45. 47 MILES FROM RES ML=1.6

JAN 9 05 50 54. 75 MILES FROM MBC ML=2.2

JAN 11 03 46 55 76 00 N, 72 00 W, ML=3.6 O
NORTHERN BAFFIN BAY

JAN 16 13 05 16. 68 00 N, 68 40 W, ML=3.4 O
BAFFIN ISLAND, 45 MILES SOUTHWEST OF CAPE HOOPER

JAN 16 19 51 03. 53 MILES FROM MBC ML=2.1

JAN 17 19 29 00. 70 50 N, 73 30 W, ML=4.0 O
NORTHEASTERN BAFFIN ISLAND, WEST OF CAPE ADAIR

JAN 18 22 57 16. 66 10 N, 136 20 W, ML=4.3 O
NORTHERN YUKON, NORTH OF PEEL RIVER

JAN 20 04 33 10. 65 00 N, 87 30 W, ML=3.2 O
WAGER BAY NWT

JAN 20 18 00 28. 78 45 N, 100 00 W, ML=3.1 O
ELLEF RINGNES ISLAND NWT

JAN 21 22 24 33. 75 50 N, 95 00 W, ML=3.8 F
NORTH OF CORNWALLIS ISLAND, 75 MILES NORTH OF RESOLUTE NWT

JAN 22 15 25 49. 103 MILES FROM RES ML=2.4
CORNWALLIS ISLAND NWT. AFTERSHOCK OF EVENT OF 21 JAN 22H

JAN 24 21 16 43. 14 MILES FROM RES ML=1.1
PROBABLY CORNWALLIS ISLAND. FORESHOCK OF 12 FEB 15H

JAN 25 03 58 13. 66 40 N, 134 45 W, ML=5.0 O
NORTHERN YUKON, PEEL RIVER, 40 MILES SOUTH OF FT MCPHERSON
USCGS EPICENTRE 66.4N 135.5W H=03 58 13 DEPTH=33KM MB=4.1

JAN 26 14 39 02. 64 40 N, 86 50 W, ML=3.2 O
ROES WELCOME SOUND, 60 MILES SOUTHEAST OF WAGER BAY NWT

JAN 26 14 44 45. 65 00 N, 125 00 W, ML=2.6 O
MACKENZIE VALLEY, NEAR FORT NORMAN NWT

JAN 27 06 31 02. 65 00 N, 86 40 W, ML=3.1 O
ROES WELCOME SOUND,SOUTHEAST OF WAGER BAY NWT

JAN 30 10 53 35. 75 15 N, 110 00 W, ML=2.6 O
MELVILLE ISLAND NWT

JAN 31 21 11 43. 58 MILES FROM MBC ML=1.6

FEB 3 03 29 47. 38 MILES FROM RES ML=1.9

FEB 12 10 28 58. 71 40 N, 137 00 W, ML=4.2 F
BEAUFORT SEA, 230 MILES NORTH OF INUVIK NWT

FEB 12 15 40 07. 74 45 N, 94 00 W, ML=4.3 F
CORNWALLIS ISLAND, EAST OF RESOLUTE NWT

FEB 13 00 20 25. 14 MILES FROM RES ML=0.8
PROBABLY CORNWALLIS ISLAND. AFTERSHOCK OF 12 FEB 15H

FEB 14 04 28 02. 14 MILES FROM RES ML=1.1
PROBABLY CORNWALLIS ISLAND. AFTERSHOCK OF 12 FEB 15H

FEB 16 05 49 43. 85 15 N, 74 00 W, ML=2.8 O
ARCTIC OCEAN, NORTH OF ELLESMERE ISLAND NWT

FEB 16 13 15 36. 140 MILES FROM RES ML=2.0

FEB 18 03 44 43. 85 MILES FROM MBC ML=1.8

FEB 21 01 45 40. 35 MILES FROM RES ML=1.9

FEB 22 19 28 11. 4 MILES FROM RES ML=0.6
ON OR NEAR CORNWALLIS ISLAND NWT

FEB 23 01 11 57. 68 50 N, 123 10 W, ML=3.4 F
210 MILES NORTHWEST OF COPPERMINE NWT, SOUTH OF DARNLEY BAY

MAR 11 20 35 35. 46 MILES FROM RES ML=1.4

MAR 18 16 14 16. 117 MILES FROM RES ML=1.5

MAR 20 12 37 57. 39 MILES FROM RES ML=1.8

MAR 20 14 29 16. 107 MILES FROM RES ML=1.8

MAR 21 08 48 13. 71 40 N, 75 40 W, ML=4.0 F
BAFFIN ISLAND, NEAR COUTTS INLET, SOUTH OF CAPE MACCULLOCH

MAR 26 06 56 24. 156 MILES FROM RES ML=1.6

MAR 30 18 22 27. 65 05 N, 133 20 W, ML=3.8 F
MACKENZIE MOUNTAINS, YUKON-NWT BORDER

MAR 31 20 48 28. 71 00 N, 131 50 W, ML=4.4 F
BEAUFORT SEA, 205 MILES NORTH OF INUVIK NWT

APR 2 15 18 59. 66 20 N, 136 40 W, ML=5.1 O
NORTHERN YUKON, NORTH OF PEEL RIVER
USCGS EPICENTRE 66.6N 136.1W H=15 19 10 DEPTH=33KM MB=4.5

APR 5 15 53 55. 111 MILES FROM RES ML=1.6

APR 5 21 33 36. 110 MILES FROM RES ML=1.5

APR 6 18 59 15. 74 25 N, 93 15 W, ML=4.4 O
BARROW STRAIT, SOUTHEAST OF RESOLUTE NWT

APR 13 02 54 06. 61 30 N, 115 30 W, ML=2.4 O
NEAR WESTERN SHORE OF GREAT SLAVE LAKE NWT

APR 13 06 42 48. 22 MILES FROM RES ML=1.3
ON OR NEAR CORNWALLIS ISLAND NWT

APR 13 08 44 46. 66 45 N, 137 20 W, ML=4.0 O
NORTHERN YUKON, NORTH OF PEEL RIVER

APR 13 12 57 58. 45 MILES FROM RES ML=1.3

APR 14 12 42 42. 74 30 N, 93 30 W, ML=1.9 F
BARROW STRAIT SE OF RESOLUTE NWT. AFTERSHOCK OF 6 APR 18H

APR 15 07 33 14. 75 00 N, 108 50 W, ML=3.8 O
MELVILLE ISLAND, NEAR BRIDPORT INLET NWT

APR 15 13 37 22. 66 30 N, 91 00 W, ML=3.4 O
NORTHWEST OF WAGER BAY NWT

APR 15 22 21 04. 71 00 N, 136 20 W, ML=4.0 O
BEAUFORT SEA, 195 MILES NORTH OF INUVIK NWT

APR 16 05 27 08. 71 32 N, 86 10 W, ML=3.6 O
NORTHWESTERN BAFFIN ISLAND, WEST OF ADMIRALTY INLET

APR 17 05 29 57. 171 MILES FROM RES ML=2.5
POSSIBLY EAST OF RESOLUTE NWT

APR 17 11 31 58. 68 25 N, 68 10 W, ML=3.8 O
BAFFIN ISLAND, WEST OF CAPE HOOPER

APR 18 08 27 09. 71 48 N, 76 30 W, ML=4.3 O
BAFFIN ISLAND, NEAR COUTTS INLET SW OF CAPE MACCULLOCH

APR 18 19 36 47. 116 MILES FROM FBC ML=2.4
SOUTHERN BAFFIN ISLAND

APR 19 13 57 21. 76 45 N, 107 10 W, ML=3.0 F
NORTH OF MELVILLE ISLAND, EAST OF CAPE GEORGE RICHARDS NWT

APR 20 03 36 53. 65 50 N, 96 00 W, ML=2.8 F
110 MILES NORTH OF BAKER LAKE NWT

APR 23 13 17 20. 80 MILES FROM ALE ML=1.8

APR 23 23 47 29. 8 MILES FROM RES ML=0.4
ON OR NEAR CORNWALLIS ISLAND NWT

APR 26 00 51 06. 62 13 N, 115 20 W, ML=2.6 F
27 MILES SOUTHWEST OF YELLOWKNIFE NWT

APR 30 07 58 54. 14 MILES FROM RES ML=1.1
ON OR NEAR CORNWALLIS ISLAND NWT

APR 30 16 12 12. 49 MILES FROM RES ML=1.1

APR 30 20 21 32. 72 10 N, 74 30 W, ML=3.6 O
BAFFIN ISLAND, SOUTHEAST OF CAPE MACCULLOCH

MAY 1 05 28 52. 31 MILES FROM ALE ML=1.6
POSSIBLY SE OF ALERT NEAR CANADA-GREENLAND BORDER

MAY 1 07 05 31. 66 00 N, 136 00 W, ML=3.6 O
NORTHERN YUKON, NEAR PEEL RIVER

MAY 2 19 23 11. 48 MILES FROM MBC ML=1.6

MAY 2 21 54 43. 30 MILES FROM MBC ML=1.7
ON OR NEAR PRINCE PATRICK ISLAND NWT

MAY 13 02 11 13. 37 MILES FROM ALE ML=1.3

MAY 13 03 00 19. 74 15 N, 94 15 W, ML=2.7 F
NORTH COAST SOMERSET ISLAND, 35 MILES SOUTH OF RESOLUTE NWT

MAY 14 18 38 55. 140 MILES FROM MBC ML=1.9
THIS IS THE FIRST EVENT IN A SERIES OF NINE FORESHOCKS
OF THE EARTHQUAKE OF MAY 16 AT 11 HOURS. THE FOCAL REGION
FOR THIS SERIES OF EARTHQUAKES IS LOCATED NEAR
BROCK ISLAND, 135 MILES NORTHEAST OF MOULD BAY NWT

MAY 14 19 23 52. 141 MILES FROM MBC ML=2.4
FORESHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 14 20 39 43. 141 MILES FROM MBC ML=1.9
FORESHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 14 22 57 49. 77 50 N, 114 30 W, ML=3.6 O
BROCK ISLAND NWT
FORESHOCK OF EVENT OF 16 MAY 11H

MAY 14 23 45 11. 143 MILES FROM MBC ML=1.9
FORESHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 15 01 59 08. 143 MILES FROM MBC ML=2.1
FORESHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 15 03 30 23. 143 MILES FROM MBC ML=2.3
FORESHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 15 22 11 56. 145 MILES FROM MBC ML=2.0
FORESHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 16 07 06 10. 65 15 N, 87 40 W, ML=3.8 O
WAGER BAY NWT

MAY 16 09 23 35. 77 55 N, 115 30 W, ML=3.4 F
OFF THE WEST SHORE OF BROCK ISLAND NWT
FORESHOCK OF EVENT OF 16 MAY 11H

MAY 16 11 00 15. 77 30 N, 114 00 W, ML=3.9 F
OFF THE SOUTHWEST SHORE OF BROCK ISLAND NWT. MAIN SHOCK IN
A SERIES OF 19 EARTHQUAKES LOCATED NEAR BROCK ISLAND NWT
USCGS EPICENTRE 77.9N 113.9W H=11 00 13 DEPTH=33KM MB=3.7

MAY 16 12 20 29. 143 MILES FROM MBC ML=1.7
FIRST OF NINE AFTERSHOCKS OF EVENT OF 16 MAY 11H

MAY 16 14 59 56. 137 MILES FROM MBC ML=2.2
AFTERSHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 16 15 40 47. 149 MILES FROM MBC ML=1.8
AFTERSHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 16 16 45 57. 141 MILES FROM MBC ML=2.0
AFTERSHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 16 21 43 39. 147 MILES FROM MBC ML=1.9
AFTERSHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 17 01 04 53. 147 MILES FROM MBC ML=2.3
AFTERSHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 18 17 54 06. 143 MILES FROM MBC ML=1.7
AFTERSHOCK OF EVENT OF 16 MAY 11H. NEAR BROCK ISLAND NWT

MAY 18 20 56 44. 70 50 N, 71 10 W, ML=5.0 F
NORTHEASTERN BAFFIN ISLAND, SOUTH OF CAPE ADAIR
USCGS EPICENTRE 71.1N 70.8W H=20 56 40 DEPTH=33KM MB=4.9

MAY 20 02 15 38. 77 40 N, 113 50 W, ML=3.4 O
OFF THE SOUTHEAST SHORE OF BROCK ISLAND NWT
AFTERSHOCK OF EVENT OF 16 MAY 11H

MAY 23 10 40 03. 65 05 N, 87 15 W, ML=3.7 O
WAGER BAY NWT

MAY 24 22 58 34. 83 10 N, 71 30 W, ML=2.1 O
NORTH SHORE OF ELLESMERE ISLAND NWT

MAY 28 00 10 22. 300 MILES FROM FBC ML=3.3
PROBABLY BAFFIN ISLAND

MAY 29 03 36 21. 77 55 N, 114 00 W, ML=2.9 F
NORTHEAST SHORE OF BROCK ISLAND NWT
AFTERSHOCK OF EVENT OF 16 MAY 11H

MAY 29 20 34 39. 64 17 N, 74 50 W, ML=3.6 F
OFF SOUTHERN BAFFIN ISLAND, EAST OF CAPE DORSET NWT

MAY 31 00 33 21. 74 35 N, 94 00 W, ML=3.2 F
BARROW STRAIT 17 MILES SOUTHEAST OF RESOLUTE NWT

MAY 31 17 44 18. 74 10 N, 93 10 W, ML=3.1 F
NORTH COAST OF SOMERSET ISLAND 50 MILES SE OF RESOLUTE NWT

JUN 1 20 18 13. 26 MILES FROM RES ML=1.6
ON OR NEAR CORNWALLIS ISLAND NWT

JUN 1 23 01 47. 29 MILES FROM RES ML=1.5
ON OR NEAR CORNWALLIS ISLAND NWT

JUN 6 16 38 53. 27 MILES FROM RES ML=0.8
ON OR NEAR CORNWALLIS ISLAND NWT

JUN 7 01 35 51. 42 MILES FROM RES ML=1.9

JUN 11 08 33 47. 75 30 N, 98 00 W, ML=2.8 F
BATHURST ISLAND NWT

JUN 11 23 16 34. 66 45 N, 90 40 W, ML=3.2 F
NORTHWEST OF WAGER BAY NWT

JUN 12 05 57 13. 233 MILES FROM BLC ML=2.8
NW OF WAGER BAY NWT. AFTERSHOCK OF EVENT OF 11 JUNE 23H

JUN 12 14 18 21. 139 MILES FROM RES ML=1.9
PROBABLY FORESHOCK OF EVENT OF 17 JUNE 02H. SOMERSET ISLAND

JUN 17 02 10 18. 72 35 N, 93 30 W, ML=3.1 O
SOMERSET ISLAND NWT

JUN 18 10 37 42. 78 MILES FROM FBC ML=1.6
SOUTHERN BAFFIN ISLAND

JUN 18 21 12 41. 93 MILES FROM RES ML=1.6

JUN 20 14 00 33. 61 10 N, 77 55 W, ML=4.1 F
SOUTH OF KOVIC BAY, NORTHWESTERN QUEBEC

JUN 29 07 23 59. 38 MILES FROM RES ML=1.5

JUL 1 12 59 49. 27 MILES FROM RES ML=1.1
ON OR NEAR CORNWALLIS ISLAND NWT

JUL 6 22 58 58. 61 50 N, 78 30 W, ML=3.5 F
KOVIC BAY NORTHWESTERN QUEBEC

JUL 10 02 49 50. 66 30 N, 97 50 W, ML=4.5 O
FRANKLIN LAKE, 155 MILES NORTHWEST OF BAKER LAKE NWT

JUL 10 18 32 34. 111 MILES FROM RES ML=3.0
EITHER BATHURST ISLAND OR DEVON ISLAND NWT. (NOT PLOTTED)

JUL 11 01 15 39. 156 MILES FROM RES ML=2.0

JUL 14 04 13 22. 76 25 N, 94 00 W, ML=2.8 F
GRINNELL PENINSULA, DEVON ISLAND NWT, NORTH OF RESOLUTE

JUL 14 13 08 17. 130 MILES FROM MBC ML=2.1
380 MILES FROM RES. EITHER WEST OF MACKENZIE KING ISLAND
OR SOUTH OF MELVILLE ISLAND. (NOT PLOTTED)

JUL 14 15 20 30. 138 MILES FROM RES ML=1.5
POSSIBLY SOMERSET ISLAND NWT, SOUTH OF RESOLUTE

JUL 17 11 25 10. 68 25 N, 67 10 W, ML=4.3 F
BAFFIN ISLAND, CAPE HOOPER

JUL 30 04 23 55. 78 15 N, 84 00 W, ML=3.2 O
BAUMANN FIORD, SOUTHERN ELLESMERE ISLAND

JUL 30 23 47 08. 72 55 N, 95 50 W, ML=3.6 F
SOMERSET ISLAND NWT

AUG 1 15 59 11. 81 MILES FROM MBC ML=1.7

AUG 4 02 55 23. 81 40 N, 87 30 W, ML=2.6 O
NORTHWESTERN ELLESMERE ISLAND NWT

AUG 6 21 06 07. 29 MILES FROM RES ML=0.7
ON OR NEAR CORNWALLIS ISLAND NWT

AUG 7 08 59 21. 66 40 N, 134 10 W, ML=3.7 O
PEEL RIVER YUKON TERRITORY

AUG 11 22 11 04. 76 MILES FROM RES ML=1.4

AUG 16 15 06 24. 59 MILES FROM MBC ML=2.0
PRINCE PATRICK ISLAND NWT. FORESHOCK OF EVENT OF 19 AUG 11H

AUG 16 19 20 29. 61 MILES FROM MBC ML=1.8
PRINCE PATRICK ISLAND NWT. FORESHOCK OF EVENT OF 19 AUG 11H

AUG 16 22 23 30. 58 MILES FROM MBC ML=1.5
PRINCE PATRICK ISLAND NWT. FORESHOCK OF EVENT OF 19 AUG 11H

AUG 18 10 38 00. 64 45 N, 134 20 W, ML=3.8 F
MACKENZIE MOUNTAINS YUKON TERRITORY

AUG 19 11 12 01. 76 55 N, 117 45 W, ML=4.2 F
PRINCE PATRICK ISLAND NWT. MAIN SHOCK

AUG 19 16 20 29. 61 MILES FROM MBC ML=1.2
PRINCE PATRICK ISLAND. AFTERSHOCK OF EVENT OF 19 AUG 11H

AUG 20 10 43 19. 279 MILES FROM FBC ML=3.1

AUG 20 14 17 06. 130 MILES FROM FBC ML=1.9
SOUTHERN BAFFIN ISLAND

AUG 20 15 59 38. 115 MILES FROM FBC ML=1.8
SOUTHERN BAFFIN ISLAND

AUG 21 05 36 22. 55 MILES FROM RES ML=0.9

AUG 21 19 54 18. 25 MILES FROM MBC ML=1.7
ON OR NEAR PRINCE PATRICK ISLAND NWT

AUG 24 06 45 00. 231 MILES FROM FBC ML=2.6

AUG 25 04 39 25. 102 MILES FROM FBC ML=1.5
SOUTHERN BAFFIN ISLAND

AUG 25 11 07 28. 69 35 N, 130 30 W, ML=3.7 F
ESKIMO LAKES NWT, 60 MILES EAST OF TUKTOYAKTUK

AUG 27 18 45 15. 62 10 N, 60 20 W, ML=4.5 F
LABRADOR SEA, 275 MILES SOUTHEAST OF FROBISHER

AUG 27 22 58 48. 17 MILES FROM RES ML=1.4
ON OR NEAR CORNWALLIS ISLAND NWT

AUG 29 12 36 20. 330 MILES FROM ALE ML=2.7
EITHER ELLESMERE ISLAND NWT OR GREENLAND

AUG 30 10 08 17. 122 MILES FROM MBC ML=2.1

AUG 31 05 25 07. 75 45 N, 105 40 W, ML=2.5 F
MELVILLE ISLAND NWT

AUG 31 18 41 59. 146 MILES FROM FBC ML=2.0
SOUTHERN BAFFIN ISLAND

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AUG 31  22 53 56.  74 20 N,  84 45 W,  ML=3.0                          O
        OFF SOUTH COAST OF DEVON ISLAND NWT

SEP  2  02 12 03.   31 MILES FROM RES  ML=0.9
        ON OR NEAR CORNWALLIS ISLAND NWT

SEP  7  06 37 04.  72 20 N,  92 40 W,  ML=2.1                          F
        PRINCE REGENT INLET, 15 MILES SE OF SOMERSET ISLAND NWT

SEP  8  14 43 41.  68 40 N,  62 00 W,  ML=5.0                          F
        DAVIS STRAIT, 125 MILES EAST OF CAPE HOOPER
        USCGS EPICENTRE 70.1N 62.1W H=14 43 34 DEPTH=33KM MB=4.2

SEP 11  15 42 53.   91 MILES FROM MBC  ML=1.7

SEP 14  03 53 23.  331 MILES FROM FBC  ML=3.2
        PROBABLY BAFFIN ISLAND

SEP 14  06 11 41.   70 MILES FROM ALE  ML=2.4

SEP 20  01 16 29.  137 MILES FROM RES  ML=2.0

SEP 20  01 16 44.  134 MILES FROM RES  ML=2.0

SEP 21  15 43 55.  244 MILES FROM FBC  ML=3.3
        PROBABLY BAFFIN ISLAND

SEP 26  12 24 08.  70 55 N,  72 50 W,  ML=3.7                          O
        NORTHEASTERN BAFFIN ISLAND, WEST OF CAPE ADAIR

SEP 28  01 20 18.   45 MILES FROM RES  ML=1.1

SEP 28  01 25 18.   43 MILES FROM RES  ML=1.5

OCT  3  18 23 46.   52 MILES FROM RES  ML=1.7

OCT  4  11 47 53.  406 MILES FROM RES  ML=2.8
        POSSIBLY EAST OF RESOLUTE NWT

OCT  6  18 52 20.  79 00 N,  96 30 W,  ML=3.5                          F
        NORTH OF AMUND RINGNES ISLAND NWT

OCT 10  13 17 04.  74 40 N,  97 40 W,  ML=2.8                          F
        BARROW STRAIT, WEST OF RESOLUTE NWT

OCT 14  12 03 57.  191 MILES FROM BLC  ML=2.3

OCT 17  22 07 13.  364 MILES FROM RES  ML=3.1
        NORTHERN BAFFIN ISLAND NEAR 71N, 82W. (NOT PLOTTED.)

OCT 18  05 48 13.  78 50 N, 101 00 W,  ML=3.0                          F
        ELLEF RINGNES ISLAND NWT, EAST OF ISACHSEN
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OCT 21 13 31 30. 69 40 N, 95 00 W, ML=3.2 O
BOOTHIA PENINSULA NWT

OCT 22 18 06 54. 80 45 N, 112 10 W, ML=3.5 F
ARCTIC OCEAN NORTH OF BORDEN ISLAND NWT

OCT 27 22 34 52. 69 50 N, 136 30 W, ML=3.4 O
MACKENZIE BAY NWT

OCT 30 19 48 36. 75 50 N, 102 00 W, ML=4.4 O
BATHURST ISLAND NWT

OCT 30 20 54 23. 68 10 N, 119 40 W, ML=4.2 F
BLUENOSE LAKE, 120 MILES WEST OF COPPERMINE NWT

OCT 31 08 58 32. 62 25 N, 123 15 W, ML=3.2 O
MACKENZIE VALLEY BETWEEN WRIGLEY AND FORT SIMPSON NWT

NOV 6 09 11 46. 67 10 N, 104 30 W, ML=3.3 O
EAST OF BATHURST INLET NWT

NOV 12 19 11 01. 202 MILES FROM FBC ML=2.7

NOV 15 03 14 15. 61 06 N, 58 00 W, ML=4.3 O
LABRADOR SEA

NOV 22 03 46 27. 19 MILES FROM RES ML=0.9
ON OR NEAR CORNWALLIS ISLAND NWT

NOV 27 14 06 23. 68 10 N, 93 20 W, ML=3.2 F
NORTHEAST OF CHANTREY INLET NWT

DEC 2 20 31 52. 72 55 N, 71 30 W, ML=3.6 F
BAFFIN BAY 78 MILES NORTHEAST OF CAPE MACCULLOCH

DEC 10 10 31 37. 36 MILES FROM RES ML=1.1

DEC 11 12 20 30. 69 25 N, 121 00 W, ML=3.9 F
160 MILES NORTHWEST OF COPPERMINE NWT

DEC 11 17 25 56. 99 MILES FROM BLC ML=1.9

DEC 13 15 29 45. 66 30 N, 92 00 W, ML=2.8 F
NORTHWEST OF WAGER BAY NWT

DEC 19 12 07 40. 79 30 N, 119 40 W, ML=3.4 O
ARCTIC OCEAN 140 MILES NORTH OF PRINCE PATRICK ISLAND NWT

DEC 25 22 50 06. 66 55 N, 136 45 W, ML=4.1 F
NORTHERN YUKON, NORTH OF PEEL RIVER

DEC 27 15 18 53. 342 MILES FROM RES ML=2.5
POSSIBLY EAST OF RESOLUTE NWT

DEC 29 09 14 10. 307 MILES FROM FBC ML=3.0
PROBABLY DAVIS STRAIT

DEC 30 08 12 35. 71 45 N, 61 10 W, ML=3.8 O
BAFFIN BAY

DEC 30 23 29 41. 136 MILES FROM RES ML=1.4

B. UNITED STATES EPICENTRES

MAY 14 08 13 24. 60 18 N, 141 24 W, M=3.6 DEPTH=62 KM (USCGS) O
SOUTHEASTERN ALASKA, NEAR ALASKA-YUKON BORDER

MAY 17 00 33 11. 60 48 N, 143 42 W, M=4.8 DEPTH=15 KM (USCGS) O
SOUTHEASTERN ALASKA

MAY 17 02 27 21. 60 48 N, 143 48 W, M=3.8 DEPTH=33 KM (USCGS) O
SOUTHEASTERN ALASKA

AUG 16 00 37 28. 60 12 N, 144 06 W, M=4.0 DEPTH=33 KM (USCGS) O
SOUTHEASTERN ALASKA

SEP 10 10 59 30. 60 36 N, 143 36 W, M=3.7 DEPTH=33 KM (USCGS) O
SOUTHEASTERN ALASKA

OCT 13 22 33 31. 60 54 N, 144 18 W, DEPTH=33 KM (USCGS) O
SOUTHEASTERN ALASKA

OCT 25 18 51 51. 68 30 N, 152 45 W, ML=4.2 O
BROOKS RANGE, NORTHERN ALASKA

OCT 31 10 59 14. 66 20 N, 147 00 W, ML=4.2 O
YUKON RIVER, NORTHERN ALASKA

NOV 27 04 27 02. 60 18 N, 140 48 W, M=4.6 DEPTH=16 KM (USCGS) O
SOUTHEASTERN ALASKA, ALASKA-YUKON BORDER FELT AT YAKATAGA

C. GREENLAND EPICENTRES

JAN 6 11 04 08. 67 20 N, 37 40 W, ML=3.7 O
SOUTHEASTERN GREENLAND

FEB 10 06 48 28. 80 10 N, 1 00 W, ML=4.2 F
GREENLAND SEA, 190 MILES SOUTHEAST OF NORD

FEB 23 15 48 00. 85 30 N, 5 00 E, ML=3.8 O
ARCTIC OCEAN NORTHEAST OF GREENLAND

MAR 14 09 55 43. 79 15 N, 18 30 W, ML=3.8 O
EAST COAST OF GREENLAND, 170 MILES SOUTH OF NORD

MAR 16 20 04 31. 78 55 N, 19 30 W, ML=4.0 F
EAST COAST OF GREENLAND, 190 MILES SOUTH OF NORD

MAY 9 08 04 16. 79 25 N, 19 30 W, ML=5.1 F
EAST COAST OF GREENLAND, 150 MILES SOUTH OF NORD
VIOLENT SHAKING REPORTED BY PATROL NEAR 79 16N, 19 20W
USCGS EPICENTRE 78.9N 20.8W H=08 04 08 DEPTH=33KM MB=3.9

MAY 31 19 15 13. 79 35 N, 18 20 W, ML=4.2 F
EAST COAST OF GREENLAND, 140 MILES SOUTH OF NORD

JUN 9 01 45 31. 84 35 N, 30 00 W, ML=3.5 O
ARCTIC OCEAN, 230 MILES NORTHWEST OF NORD

JUN 15 06 02 08. 83 10 N, 33 40 W, ML=2.7 F
NORTH COAST OF GREENLAND

JUL 30 18 41 59. 81 25 N, 49 40 W, ML=2.4 F
NORTHERN GREENLAND, 150 MILES EAST OF ALE. SWARM OF 30 JULY

JUL 30 19 19 48. 81 25 N, 49 20 W, ML=2.6 F
NORTHERN GREENLAND. ONE OF THREE LARGEST EVENTS IN SWARM
OF ABOUT 75 EVENTS BETWEEN 17 AND 23H ON 30 JULY

JUL 30 19 32 33. 81 40 N, 49 00 W, ML=2.4 F
NORTHERN GREENLAND, 150 MILES EAST OF ALE. SWARM OF 30 JULY

JUL 30 20 52 46. 81 40 N, 49 00 W, ML=2.5 F
NORTHERN GREENLAND, 150 MILES EAST OF ALE. SWARM OF 30 JULY

AUG 9 18 55 05. 79 20 N, 20 00 W, ML=3.8 F
EAST COAST OF GREENLAND, 160 MILES SOUTH OF NORD

AUG 13 19 02 40. 78 15 N, 21 00 W, ML=4.3 F
EAST COAST OF GREENLAND, 250 MILES SOUTH OF NORD
USCGS EPICENTRE 78.2N 20.1W H=19 02 39 DEPTH=33KM MB=3.7

AUG 22 08 30 13. 75 25 N, 61 00 W, ML=3.5 O
MELVILLE BAY GREENLAND

SEP 10 20 44 28. 828 MILES FROM ALE ML=4.5
GREENLAND NORTH OF 70N

SEP 11 08 35 29. 731 MILES FROM ALE ML=4.3
GREENLAND NORTH OF 72N

SEP 15 04 21 29. 628 MILES FROM ALE ML=4.1
GREENLAND NORTH OF 73N

SEP 17 08 53 48. 82 10 N, 04 30 W, ML=3.6 O
OFF NORTHEASTERN GREENLAND, 130 MILES EAST OF NORD

SEP 25	21 01 48. 737 MILES FROM ALE ML=4.2 GREENLAND NORTH OF 72N	
OCT 9	00 26 26. 81 15 N, 17 00 W, ML=3.8 NORTHERN GREENLAND NEAR NORD	0
OCT 18	11 09 49. 84 45 N, 12 00 W, ML=3.7 ARCTIC OCEAN NORTH OF NORD, GREENLAND	0
OCT 23	08 05 29. 83 30 N, 16 00 W, ML=3.4 ARCTIC OCEAN NORTH OF NORD, GREENLAND	0
NOV 13	15 16 21. 1067 MILES FROM ALE ML=4.5 GREENLAND NORTH OF 67N	
NOV 15	19 58 57. 87 45 N, 05 00 E, ML=3.7 ARCTIC OCEAN NORTH OF GREENLAND	0
DEC 6	06 09 19. 79 40 N, 17 30 W, ML=4.4 EAST COAST OF GREENLAND, 130 MILES SOUTH OF NORD	0

TABLE 3

EARTHQUAKES IN WESTERN CANADA AND ADJACENT AREAS
1967

(ALL TIMES ARE GMT)
(M OR ML = MAGNITUDE)
(F=FILLED, O=OPEN CIRCLE ON EPICENTRE MAPS)

A. CANADIAN EPICENTRES

JAN 2 13 40 11. 42 MILES FROM FSJ ML=1.8

JAN 5 13 21 25. 31 MILES FROM MCC ML=1.8

JAN 8 16 06 20. 39 MILES FROM MCC ML=1.7

JAN 15 16 55 46. 77 MILES FROM PHC ML=3.1
THE EPICENTRE FOR THIS EVENT WAS 382 MILES FROM
FORT ST JAMES, AND WEST OF VANCOJVER ISLAND.

JAN 17 15 27 40. 409 MILES FROM FSJ ML=3.8
PROBABLY NW OF FORT ST JAMES IN THE ALASKA PANHANDLE.

JAN 18 00 08 56. 16 MILES FROM VIC ML=1.1

JAN 18 00 14 14. 44 MILES FROM FSJ ML=1.8

JAN 21 01 35 22. 49 18 N, 127 24 W, ML=2.9 O
WEST OF VANCOUVER ISLAND.

JAN 25 10 01 0. 49 54 N, 129 00 W, ML=2.9 O
WEST OF VANCOUVER ISLAND.

JAN 25 11 40 14. 50 18 N, 129 36 W, ML=2.9 O
WEST OF VANCOUVER ISLAND.

JAN 25 12 44 16. 29 MILES FROM PNT ML=2.6

JAN 25 17 01 15. 112 MILES FROM PHC ML=2.5

JAN 30 22 53 52. 54 48 N, 117 12 W, ML=3.3 O
NW OF EDMONTON, ALBERTA, 15 MILES SOUTH OF VALLEYVIEW.

FEB 2 23 27 7. 53 42 N, 119 36 W, ML=2.8 O
50 MILES NORTHWEST OF MICA CREEK, NEAR ALBERTA-B.C. BORDER.

FEB 5 23 22 0. 10 MILES FROM PHC ML=1.4

FEB 6 03 26 6. 49 24 N, 127 24 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

FEB 6 08 33 56. 52 06 N, 117 54 W, ML=2.6 O
30 MILES EAST OF MICA CREEK, NEAR B.C.-ALBERTA BORDER.

FEB 6 12 55 35. 66 MILES FROM PHC ML=2.8

FEB 10 08 08 26. 161 MILES FROM PNT ML=3.8

FEB 12 21 10 44. 51 50 N, 116 00 W, ML=2.2 0
45 MILES NORTHWEST OF BANFF, ALBERTA.

FEB 13 19 40 8. 43 MILES FROM MCC ML=1.9

FEB 14 06 36 30. 51 MILES FROM MCC ML=2.1

FEB 15 10 37 29. 42 MILES FROM MCC ML=2.1

FEB 16 02 58 34. 49 48 N, 130 06 W, ML=3.8 0
WEST OF VANCOUVER ISLAND.

FEB 16 06 39 19. 106 MILES FROM PHC ML=2.5

FEB 18 09 38 45. 45 MILES FROM VIC ML=2.0

FEB 18 22 32 30. 122 MILES FROM FSJ ML=2.2

FEB 22 17 09 25. 52 24 N, 131 12 W, ML=3.8 0
QUEEN CHARLOTTE ISLANDS.

FEB 24 08 27 38. 50 12 N, 118 36 W, ML=2.7 0
NORTHEAST OF PENTICTON, B.C.

FEB 25 14 41 31. 91 MILES FROM PHC ML=2.6

FEB 27 11 17 36. 92 MILES FROM VIC ML=2.6

FEB 28 04 15 33. 34 MILES FROM FSJ ML=2.1

MAR 3 20 35 47. 42 MILES FROM PNT ML=2.3

MAR 4 13 39 3. 16 MILES FROM PNT ML=1.7

MAR 5 11 11 2. 51 12 N, 129 30 W, ML=3.8 0
NORTHWEST OF VANCOUVER ISLAND.

MAR 6 04 25 51. 14 MILES FROM PNT ML=1.0

MAR 8 18 49 36. 107 MILES FROM PHC ML=2.8

MAR 10 04 13 50. 51 30 N, 131 24 W, ML=3.7 0
THIS EVENT IS 363 MILES FROM FORT ST JAMES, AND
PROBABLY SOUTH OF THE QUEEN CHARLOTTE ISLANDS.

MAR 12 20 46 30. 52 48 N, 116 54 W, ML=2.3 0
50 MILES EAST OF JASPER, ALBERTA.

MAR 23 10 54 7. 110 MILES FROM PHC ML=2.9

MAR 23 10 58 11. 50 00 N, 129 36 W, ML=3.0 O
WEST OF VANCOUVER ISLAND.

MAR 23 13 22 10. 117 MILES FROM PHC ML=2.8

MAR 26 16 13 23. 37 MILES FROM VIC ML=1.6
EVENT IS 70 MILES FROM ALBERNI.

APR 6 11 54 51. 50 MILES FROM PNT ML=2.1

APR 6 12 45 5. 47 MILES FROM PNT ML=2.6

APR 7 04 33 13. 75 MILES FROM PNT ML=2.7

APR 7 05 09 51. 50 18 N, 124 36 W, ML=2.6 F
TOBA INLET REGION, B.C.

APR 8 14 49 47. 12 MILES FROM VIC ML=1.0
FELT SLIGHTLY IN VICTORIA.

APR 9 18 49 32. 49 00 N, 122 24 W, ML=2.0 F
HUNTINGTON AREA, B.C.-WASHINGTON BORDER.

APR 14 21 08 9. 49 00 N, 129 12 W, M=2.4 O
WEST OF VANCOUVER ISLAND.

APR 15 05 35 13. 10 MILES FROM PNT ML=1.5

APR 16 03 08 37. 49 06 N, 130 00 W, M=2.9 O
WEST OF VANCOUVER ISLAND.

APR 16 18 09 21. 48 MILES FROM PNT ML=2.6

APR 16 18 54 3. 48 MILES FROM PNT ML=2.1

APR 16 20 28 18. 50 MILES FROM PNT ML=2.0

APR 17 09 55 41. 49 MILES FROM PNT ML=2.4

APR 19 18 12 31. 52 30 N, 132 06 W, M=4.6 O
WEST OF QUEEN CHARLOTTE ISLANDS.

APR 20 16 29 26. 79 MILES FROM PNT ML=2.3

APR 22 11 10 39. 61 MILES FROM PNT ML=2.5

APR 24 10 05 4. 50 36 N, 129 48 W, ML=4.0 O
WEST OF VANCOUVER ISLAND.

APR 24 10 13 25. 52 MILES FROM PHC ML=2.3

APR 25 01 53 13. 50 48 N, 130 00 W, ML=3.2 O
WEST OF VANCOUVER ISLAND. DEPTH GREATER THAN NORMAL.

APR 26 18 58 54. 50 36 N, 131 00 W, M=2.2 O
WEST OF VANCOUVER ISLAND.

APR 27 01 13 0. 50 42 N, 130 54 W, ML=3.2 O
WEST OF VANCOUVER ISLAND.

APR 27 12 01 23. 24 MILES FROM VIC ML=1.5
THIS EVENT WAS 89 MILES FROM ALBERNI.

APR 29 00 04 42. 51 06 N, 130 06 W, ML=5.3 F
WEST OF VANCOUVER ISLAND.

APR 29 12 02 18. 102 MILES FROM PHC ML=2.7

APR 30 02 44 24. 50 24 N, 129 54 W, ML=3.8 F
WEST OF VANCOUVER ISLAND.

MAY 1 05 53 41. 46 MILES FROM ALB ML=1.6

MAY 3 13 28 55. 44 MILES FROM PHC ML=2.0

MAY 4 23 50 44. 51 24 N, 131 06 W, M=3.3 O
SOUTH OF QUEEN CHARLOTTE ISLANDS.

MAY 5 00 41 49. 143 MILES FROM FSJ ML=2.2

MAY 6 10 12 1. 51 00 N, 126 42 W, ML=2.8 F
SEYMOUR INLET, B.C.

MAY 9 22 33 9. 16 MILES FROM PNT ML=1.6

MAY 10 12 47 38. 50 42 N, 130 12 W, M=2.5 O
WEST OF VANCOUVER ISLAND.

MAY 11 00 27 27. 14 MILES FROM VIC ML=2.0

MAY 14 12 28 21. 50 24 N, 130 48 W, M=2.6 O
WEST OF VANCOUVER ISLAND.

MAY 15 13 15 46. 12 MILES FROM VIC ML=0.9
FELT IN VICTORIA.

MAY 16 01 00 38. 49 00 N, 122 24 W, ML=3.4 F
NEAR HUNTINGTON, B.C.-WASHINGTON BORDER. FELT IN FRASER VALLEY AND ON VANCOUVER ISLAND.

MAY 16 03 16 12. 49 03 N, 122 33 W, ML=3.1 F
HUNTINGTON AREA, B.C.-WASHINGTON BORDER.

MAY 16 20 58 34. 19 MILES FROM VIC ML=1.1

MAY 19 11 48 41. 50 MILES FROM PNT ML=2.0

MAY 19 12 15 2. 47 MILES FROM PNT ML=2.0

MAY 21 04 24 45. 46 MILES FROM PNT ML=2.1

MAY 28 11 42 1. 55 MILES FROM VIC ML=1.7

MAY 30 12 00 32. 114 MILES FROM PHC ML=2.1
THIS EVENT IS 59 MILES FROM ALBERNI, PROBABLY WEST.

JUN 4 03 26 23. 52 12 N, 120 00 W, ML=3.4 O
WEST OF MICA CREEK, B.C.

JUN 4 09 26 2. 151 MILES FROM PNT ML=2.8

JUN 5 06 59 15. 50 18 N, 130 48 W, M=2.1 O
WEST OF VANCOUVER ISLAND.

JUN 5 08 36 44. 49 24 N, 130 24 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

JUN 6 10 47 41. 43 MILES FROM PHC ML=3.0
THIS EVENT WAS 213 MILES FROM VICTORIA AND 159
MILES FROM ALBERNI, AND WEST OF VANCOUVER ISLAND.

JUN 6 17 59 4. 49 24 N, 127 24 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

JUN 17 17 53 6. 102 MILES FROM PHC ML=2.4

JUN 20 11 47 44. 48 54 N, 123 12 W, ML=3.6 F
GULF ISLANDS. FELT IN VICTORIA.

JUN 22 21 04 59. 12 MILES FROM VIC ML=1.1
THIS EVENT WAS 77 MILES FROM ALBERNI, B.C.

JUN 28 16 11 34. 37 MILES FROM ALB ML=1.7

JUN 29 18 56 42. 38 MILES FROM ALB ML=1.7

JUL 7 16 34 52. 33 MILES FROM VIC ML=1.6
PROBABLY ON SOUTHERN VANCOUVER ISLAND.

JUL 7 23 11 42. 39 MILES FROM ALB ML=1.7

JUL 9 17 00 13. 108 MILES FROM PHC ML=2.8

JUL 9 19 06 31. 102 MILES FROM PHC ML=3.3
PROBABLY WEST OF VANCOUVER ISLAND.

JUL 9 19 33 39. 54 MILES FROM ALB ML=2.3

JUL 11 09 31 11. 49 48 N, 123 54 W, ML=2.6 F
JERVIS INLET, B.C.

JUL 12 15 55 41. 50 12 N, 130 30 W, M=2.6 O
WEST OF VANCOUVER ISLAND.

JUL 17 13 50 57. 51 MILES FROM VIC ML=1.8

JUL 19 20 30 59. 35 MILES FROM ALB ML=1.9
THIS EVENT WAS 93 MILES FROM VICTORIA.

JUL 20 07 46 12. 49 12 N, 122 18 W, ML=2.1 F
NORTH OF HUNTINGTON, B.C. DEPTH GREATER THAN NORMAL?

JUL 22 05 43 55. 50 00 N, 129 42 W, ML=2.8 O
WEST OF VANCOUVER ISLAND.

JUL 23 11 00 42. 12 MILES FROM PNT ML=1.5

JUL 24 05 12 56. 50 18 N, 129 42 W, ML=3.5 O
WEST OF VANCOUVER ISLAND.

JUL 26 22 22 6. 15 MILES FROM VIC ML=1.2
THIS EVENT WAS 67 MILES FROM ALBERNI, B.C.

JUL 27 07 46 23. 70 MILES FROM VIC ML=2.3
THIS EVENT WAS 51 MILES FROM ALBERNI, B.C.

AUG 1 13 34 45. 134 MILES FROM PHC ML=2.2

AUG 9 20 15 3. 49 18 N, 129 30 W, ML=3.2 O
THIS IS THE FIRST LOCATED EVENT IN A SWARM WEST OF
VANCOUVER ISLAND DURING AUG AND SEPT 1967.

AUG 10 12 59 56. 144 MILES FROM PHC ML=3.0

AUG 13 15 22 15. 49 06 N, 122 24 W, ML=1.9 O
HUNTINGTON AREA, B.C.-WASHINGTON BORDER.

AUG 17 00 22 20. 49 36 N, 129 12 W, ML=3.4 O
WEST OF VANCOUVER ISLAND.

AUG 19 06 22 15. 130 MILES FROM PNT ML=2.9

AUG 23 23 45 37. 104 MILES FROM PHC ML=2.8

AUG 24 07 03 26. 17 MILES FROM PNT ML=1.8

AUG 24 07 13 34. 17 MILES FROM PNT ML=1.5

AUG 24 08 56 23. 19 MILES FROM PNT ML=1.1

AUG 25 18 55 33. 49 54 N, 129 42 W, ML=2.7 0
WEST OF VANCOUVER ISLAND.

AUG 26 09 49 11. 49 48 N, 124 00 W, ML=1.5 0
JERVIS INLET, B.C.

AUG 27 06 22 37. 139 MILES FROM PHC ML=3.0

AUG 27 06 34 1. 112 MILES FROM PHC ML=2.4

AUG 27 07 03 50. 111 MILES FROM PHC ML=2.5

AUG 27 08 33 42. 49 48 N, 129 36 W, ML=2.9 0
WEST OF VANCOUVER ISLAND.

AUG 27 08 34 40. 49 54 N, 129 42 W, ML=3.1 0
WEST OF VANCOUVER ISLAND.

AUG 27 08 38 44. 111 MILES FROM PHC ML=2.5

AUG 27 09 28 53. 111 MILES FROM PHC ML=2.5

AUG 27 12 00 36. 112 MILES FROM PHC ML=2.7

AUG 27 12 32 17. 109 MILES FROM PHC ML=2.3

AUG 27 12 56 33. 49 54 N, 129 36 W, ML=3.2 0
WEST OF VANCOUVER ISLAND.

AUG 27 13 01 6. 114 MILES FROM PHC ML=2.5

AUG 27 13 12 19. 107 MILES FROM PHC ML=2.8

AUG 27 13 33 7. 49 54 N, 129 36 W, ML=3.0 0
WEST OF VANCOUVER ISLAND.

AUG 27 13 34 51. 50 12 N, 130 00 W, ML=4.3 0
WEST OF VANCOUVER ISLAND.

AUG 27 14 00 23. 102 MILES FROM PHC ML=2.5

AUG 27 14 07 31. 129 MILES FROM PHC ML=2.7

AUG 27 15 17 17. 103 MILES FROM PHC ML=2.3

AUG 27 15 18 38. 50 00 N, 129 42 W, ML=3.1 0
WEST OF VANCOUVER ISLAND.

AUG 27 17 40 12. 49 48 N, 129 36 W, ML=3.6 0
WEST OF VANCOUVER ISLAND.

AUG 27 17 51 54. 49 54 N, 129 42 W, ML=3.8 0
WEST OF VANCOUVER ISLAND.

AUG 27 18 29 5. 50 06 N, 129 48 W, ML=3.9 0
WEST OF VANCOUVER ISLAND.

AUG 27 20 44 22. 96 MILES FROM PHC ML=2.4

AUG 28 04 03 1. 111 MILES FROM PHC ML=2.4

AUG 28 05 55 42. 49 48 N, 129 30 W, ML=3.3 0
WEST OF VANCOUVER ISLAND.

AUG 28 09 20 55. 50 00 N, 129 36 W, ML=2.9 0
WEST OF VANCOUVER ISLAND.

AUG 28 11 32 4. 50 12 N, 129 30 W, M=3.2 0
WEST OF VANCOUVER ISLAND.

AUG 28 11 41 11. 49 54 N, 129 42 W, ML=3.3 0
WEST OF VANCOUVER ISLAND.

AUG 28 11 45 30. 49 36 N, 129 36 W, ML=3.0 0
WEST OF VANCOUVER ISLAND.

AUG 28 11 58 59. 49 48 N, 129 30 W, ML=2.9 0
WEST OF VANCOUVER ISLAND.

AUG 28 12 05 0. 109 MILES FROM PHC ML=2.8

AUG 28 12 06 14. 113 MILES FROM PHC ML=2.8

AUG 28 12 23 3. 49 48 N, 129 48 W, ML=3.1 0
WEST OF VANCOUVER ISLAND.

AUG 28 12 26 51. 50 06 N, 129 36 W, ML=3.2 0
WEST OF VANCOUVER ISLAND.

AUG 28 12 39 12. 49 54 N, 129 36 W, ML=3.5 0
WEST OF VANCOUVER ISLAND.

AUG 28 12 43 50. 49 48 N, 129 30 W, ML=3.1 0
WEST OF VANCOUVER ISLAND.

AUG 28 12 50 0. 49 48 N, 129 36 W, ML=3.1 0
WEST OF VANCOUVER ISLAND.

AUG 28 13 16 35. 49 42 N, 130 30 W, M=3.9 DEPTH=33 KM (ISC) 0
WEST OF VANCOUVER ISLAND.

AUG 28 13 49 40. 49 48 N, 129 42 W, ML=3.8 0
WEST OF VANCOUVER ISLAND.

AUG 28	14 16 55. 114 MILES FROM PHC	ML=2.8	
AUG 28	14 43 35. 49 54 N, 129 42 W, WEST OF VANCOUVER ISLAND.	ML=3.3	O
AUG 28	15 05 47. 111 MILES FROM PHC	ML=2.8	
AUG 28	15 07 9. 50 06 N, 129 42 W, WEST OF VANCOUVER ISLAND.	ML=3.4	O
AUG 28	15 25 49. 50 00 N, 129 36 W, WEST OF VANCOUVER ISLAND.	ML=4.2	O
AUG 28	15 47 23. 109 MILES FROM PHC	ML=2.8	
AUG 28	16 20 4. 50 12 N, 129 42 W, WEST OF VANCOUVER ISLAND.	ML=4.1	O
AUG 28	17 11 53. 49 54 N, 129 42 W, WEST OF VANCOUVER ISLAND.	ML=3.3	O
AUG 28	17 12 9. 112 MILES FROM PHC	ML=3.7	
AUG 28	20 47 45. 49 54 N, 129 42 W, WEST OF VANCOUVER ISLAND.	ML=3.4	O
AUG 28	22 14 57. 107 MILES FROM PHC	ML=2.8	
AUG 28	22 18 13. 108 MILES FROM PHC	ML=2.8	
AUG 29	00 54 33. 49 42 N, 129 48 W, WEST OF VANCOUVER ISLAND.	ML=3.0	O
AUG 29	05 04 43. 49 48 N, 129 30 W, WEST OF VANCOUVER ISLAND.	ML=2.8	O
AUG 29	10 22 23. 107 MILES FROM PHC	ML=2.8	
AUG 29	19 04 23. 49 54 N, 129 36 W, WEST OF VANCOUVER ISLAND.	ML=3.4	O
AUG 29	22 55 46. 109 MILES FROM PHC	ML=3.1	
AUG 29	23 37 39. 49 42 N, 129 48 W, WEST OF VANCOUVER ISLAND.	ML=3.2	O
AUG 30	20 22 14. 50 00 N, 129 36 W, WEST OF VANCOUVER ISLAND.	ML=3.0	O
AUG 31	06 52 18. 50 MILES FROM PHC	ML=2.6	
AUG 31	11 42 48. 49 42 N, 129 24 W, WEST OF VANCOUVER ISLAND.	ML=3.1	O

AUG 31 19 06 44. 49 36 N, 128 00 W, ML=4.9 O
WEST OF VANCOUVER ISLAND.
LARGEST EVENT IN A SWARM DURING AUG AND SEPT 1967.

AUG 31 19 34 14. 112 MILES FROM PHC ML=2.9

SEP 1 13 39 15. 65 MILES FROM PHC ML=2.5

SEP 2 05 21 56. 117 MILES FROM PHC ML=2.6

SEP 2 07 03 27. 138 MILES FROM PHC ML=2.8

SEP 2 23 21 47. 111 MILES FROM PHC ML=2.8

SEP 2 23 45 30. 76 MILES FROM PHC ML=2.5

SEP 2 23 46 47. 49 48 N, 128 30 W, ML=3.2 O
WEST OF VANCOUVER ISLAND.

SEP 8 00 01 12. 130 MILES FROM FSJ ML=2.3

SEP 8 11 56 20. 49 42 N, 129 30 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

SEP 8 23 44 10. 49 48 N, 129 30 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

SEP 9 05 12 57. 116 MILES FROM PHC ML=2.3

SEP 9 06 14 16. 109 MILES FROM PHC ML=2.4

SEP 9 06 20 13. 113 MILES FROM PHC ML=2.8

SEP 9 14 45 33. 49 42 N, 129 24 W, ML=3.6 O
WEST OF VANCOUVER ISLAND.

SEP 11 20 23 32. 107 MILES FROM PHC ML=2.7

SEP 13 12 13 31. 107 MILES FROM PHC ML=3.1
THIS EVENT WAS 267 MILES FROM ALBERNI, B.C.

SEP 14 18 56 17. 16 MILES FROM VIC ML=0.8

SEP 15 06 05 4. 55 18 N, 126 30 W, ML=3.3 O
NORTHWEST OF FORT ST JAMES, B.C.

SEP 17 18 34 25. 77 MILES FROM PHC ML=2.8

SEP 18 01 55 41. 49 06 N, 128 48 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

SEP 19 08 22 7. 118 MILES FROM PHC ML=2.7

SEP 19 23 25 11. 50 30 N, 129 54 W, ML=3.3 O
WEST OF VANCOUVER ISLAND.

SEP 20 06 23 54. 104 MILES FROM PHC ML=2.7

SEP 23 13 11 57. 50 24 N, 130 00 W, ML=3.4 O
WEST OF VANCOUVER ISLAND.

SEP 24 08 41 21. 109 MILES FROM PHC ML=2.5

SEP 25 13 05 22. 104 MILES FROM PHC ML=2.6

SEP 27 16 21 21. 22 MILES FROM ALB ML=1.1

SEP 27 22 00 29. 17 MILES FROM VIC ML=0.9

SEP 28 22 00 0. 50 12 N, 129 42 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

SEP 29 02 40 8. 32 MILES FROM VIC ML=1.7

SEP 30 13 49 5. 35 MILES FROM ALB ML=1.8
THIS EVENT WAS 87 MILES FROM VICTORIA, B.C.

SEP 30 14 56 38. 53 MILES FROM ALB ML=2.1
THIS EVENT WAS 97 MILES FROM VICTORIA, B.C.

OCT 1 12 04 12. 49 36 N, 123 36 W, ML=2.1 O
JERVIS INLET, B.C.

OCT 3 00 37 12. 109 MILES FROM PHC ML=2.8

OCT 4 00 51 7. 111 MILES FROM PHC ML=2.7

OCT 7 02 57 37. 37 MILES FROM ALB ML=1.9
THIS EVENT WAS 90 MILES FROM VICTORIA, B.C.

OCT 9 04 44 26. 37 MILES FROM VIC ML=1.5

OCT 10 16 52 15. 111 MILES FROM PHC ML=2.7

OCT 12 06 49 40. 204 MILES FROM PHC ML=3.7
THIS EVENT WAS 427 MILES FROM ALBERNI, B.C.

OCT 16 10 25 57. 118 MILES FROM PHC ML=2.9

OCT 16 13 27 33. 49 12 N, 129 18 W, ML=4.9 F
WEST OF VANCOUVER ISLAND.

OCT 16 14 12 6. 49 18 N, 129 12 W, ML=3.0 O
WEST OF VANCOUVER ISLAND.

OCT 16 16 57 1. 128 MILES FROM PHC ML=2.2

OCT 16 19 37 14. 49 24 N, 129 30 W, ML=2.8 0
WEST OF VANCOUVER ISLAND.

OCT 16 22 18 37. 124 MILES FROM PHC ML=2.5

OCT 16 23 04 8. 17 MILES FROM VIC ML=1.5

OCT 16 23 45 26. 39 MILES FROM PHC ML=1.8

OCT 17 01 34 22. 125 MILES FROM PHC ML=2.7

OCT 17 04 34 22. 49 30 N, 130 12 W, M=3.4 DEPTH=33 KM (ISC) 0
WEST OF VANCOUVER ISLAND.

OCT 17 08 45 12. 193 MILES FROM PHC ML=3.3
THIS EVENT WAS 479 MILES FROM FORT ST JAMES, B.C.

OCT 17 12 30 34. 201 MILES FROM PHC ML=3.3

OCT 17 14 53 25. 59 12 N, 136 30 W, M=4.2 (USCGS) 0
40 MILES WEST OF HAINES ON ALASKA - B.C. BORDER.
PLOTTED ALSO ON ARCTIC REGION MAP

OCT 18 01 16 43. 109 MILES FROM PHC ML=2.9

OCT 18 01 37 26. 108 MILES FROM PHC ML=3.2

OCT 18 01 43 15. 110 MILES FROM PHC ML=2.9
PROBABLY WEST OF VANCOUVER ISLAND.

OCT 18 02 49 24. 109 MILES FROM PHC ML=2.8

OCT 18 02 55 19. 49 18 N, 129 42 W, ML=3.4 0
WEST OF VANCOUVER ISLAND.

OCT 18 02 59 43. 107 MILES FROM PHC ML=3.0

OCT 18 17 33 7. 109 MILES FROM PHC ML=2.7

OCT 18 21 57 54. 49 06 N, 129 12 W, ML=3.3 0
WEST OF VANCOUVER ISLAND.

OCT 18 23 40 16. 108 MILES FROM PHC ML=2.5

OCT 20 19 41 21. 184 MILES FROM PHC ML=3.4
THIS EVENT WAS 432 MILES FROM ALBERNI AND 469 MILES
FROM FORT ST JAMES. THERE MAY BE 2 EARTHQUAKES AT
NEARLY THE SAME TIME.

OCT 23 07 43 15. 49 42 N, 126 48 W, ML=2.6 0
NOOTKA ISLAND, WEST COAST OF VANCOUVER ISLAND.

NOV 2 05 00 40. 52 00 N, 117 24 W, ML=1.6 O
EAST OF MICA CREEK NEAR B.C.-ALBERTA BORDER.

NOV 2 07 33 28. 52 12 N, 117 42 W, ML=2.0 O
EAST OF MICA CREEK NEAR B.C.-ALBERTA BORDER.

NOV 3 08 42 34. 51 12 N, 131 30 W, ML=2.9 O
SOUTH OF QUEEN CHARLOTTE ISLANDS.

NOV 3 15 57 54. 50 42 N, 130 06 W, ML=4.2 F
WEST OF VANCOUVER ISLAND.

NOV 4 01 49 31. 52 12 N, 117 42 W, ML=2.3 O
EAST OF MICA CREEK NEAR B.C.-ALBERTA BORDER.

NOV 6 23 34 57. 52 42 N, 116 12 W, ML=2.5 O
75 MILES EAST OF JASPER, ALBERTA.

NOV 7 11 00 21. 52 18 N, 118 00 W, ML=1.6 O
NORTHEAST OF MICA CREEK NEAR B.C.-ALBERTA BORDER.

NOV 10 13 47 18. 50 30 N, 129 54 W, ML=3.8 O
WEST OF VANCOUVER ISLAND.

NOV 12 02 23 42. 53 54 N, 117 18 W, ML=3.4 O
NORTHWEST OF EDSON, ALBERTA.

NOV 13 00 31 5. 50 30 N, 129 48 W, ML=3.1 O
WEST OF VANCOUVER ISLAND.

NOV 14 05 00 45. 52 12 N, 117 54 W, ML=2.4 O
EAST OF MICA CREEK NEAR B.C.-ALBERTA BORDER.

NOV 14 10 37 55. 52 12 N, 117 54 W, ML=2.2 O
EAST OF MICA CREEK NEAR B.C.-ALBERTA BORDER.

NOV 15 10 31 41. 52 MILES FROM PNT ML=2.2

NOV 15 11 02 37. 16 MILES FROM VIC ML=1.0

NOV 29 03 18 54. 48 54 N, 123 00 W, ML=2.3 F
GULF ISLANDS AREA.

DEC 1 20 21 46. 11 MILES FROM VIC ML=1.0

DEC 9 04 48 46. 30 MILES FROM MCC ML=2.0
THIS EVENT WAS 187 MILES FROM PENTICTON, B.C.

DEC 9 18 31 40. 49 12 N, 128 42 W, ML=4.0 O
WEST OF VANCOUVER ISLAND.

DEC 12 13 13 4. 50 00 N, 129 12 W, ML=2.6 O
WEST OF VANCOUVER ISLAND.

DEC 13 22 20 36. 50 00 N, 129 48 W, ML=3.9 O
WEST OF VANCOUVER ISLAND.

DEC 13 22 32 20. 124 MILES FROM PHC ML=2.2

DEC 13 23 37 0. 9 MILES FROM PHC ML=2.5

DEC 18 03 02 17. 48 54 N, 128 24 W, ML=3.0 O
WEST OF VANCOUVER ISLAND.

DEC 18 13 24 40. 107 MILES FROM PHC ML=2.6

DEC 26 00 24 8. 30 MILES FROM ALB ML=2.1

8. UNITED STATES EPICENTRES

JAN 18 06 58 20. 47 18 N, 122 36 W, M=3.1 DEPTH=26 KM (USCGS) O
WESTERN WASHINGTON, INTENSITY IV AT SEATTLE AND TACOMA.

MAR 7 03 51 8. 47 42 N, 122 42 W, ML=4.1 F
PUGET SOUND AREA. FELT WITH INTENSITY III IN VICTORIA.

MAR 12 01 16 30. 47 42 N, 122 42 W, ML=3.2 O
PUGET SOUND AREA, U.S.A.

APR 5 02 55 25. 48 12 N, 119 06 W, ML=3.4 O
CENTRAL WASHINGTON, U.S.A.

APR 5 02 57 51. 79 MILES FROM PNT ML=3.0
CENTRAL WASHINGTON, U.S.A. AFTERSHOCK OF 5 APRIL 02.55.

APR 12 00 54 42. 56 12 N, 136 00 W, M=4.4 DEPTH=37 KM (USCGS) F
60 MILES SOUTHWEST OF SITKA, ALASKA. FELT AT SITKA.

APR 20 14 43 4. 48 08 N, 119 21 W, ML=3.2 F
CENTRAL WASHINGTON, WEST OF SPOKANE.

APR 20 15 19 33. 48 12 N, 119 25 W, ML=3.3 F
CENTRAL WASHINGTON, WEST OF SPOKANE.

MAY 8 01 23 50. 47 18 N, 122 36 W, ML=2.3 F
PUGET SOUND AREA, U.S.A.

MAY 25 23 22 39. 48 42 N, 122 48 W, ML=4.1 O
SAN JUAN ISLANDS AREA. FELT ON VANCOUVER ISLAND.

JUN 3 04 56 2. 48 10 N, 119 30 W, ML=3.2 F
CENTRAL WASHINGTON, WEST OF SPOKANE.

JUN 6 17 12 56. 48 12 N, 119 24 W, ML=3.3 O
CENTRAL WASHINGTON, U.S.A.

JUN 6	22 36 7. 48 12 N, 119 00 W, ML=3.2 CENTRAL WASHINGTON,U.S.A.		O
JUL 2	18 18 30. 47 42 N, 119 30 W, ML=3.4 CENTRAL WASHINGTON,U.S.A.		F
JUL 8	21 57 58. 47 42 N, 124 06 W, ML=2.0 WESTERN OLYMPICS, WASHINGTON, U.S.A.		O
JUL 12	17 26 42. 48 00 N, 122 48 W, ML=2.2 ENTRANCE TO PUGET SOUND, U.S.A.		O
AUG 16	08 25 22. 48 00 N, 114 18 W, DEPTH=33 KM FLATHEAD LAKE REGION, NORTHWESTERN MONTANA.	(USCGS)	O
AUG 23	21 12 6. 48 24 N, 113 42 W, M=4.3 DEPTH=10 KM FLATHEAD LAKE REGION, NORTHWESTERN MONTANA.	(USCGS)	O
SEP 6	21 28 16. 48 35 N, 121 45 W, ML=2.1 EAST OF PUGET SOUND, WASHINGTON, U.S.A.		F
SEP 10	11 37 57. 55 00 N, 136 00 W, M=3.4 OFF COAST OF SOUTHEASTERN ALASKA.	(ISC)	O
OCT 26	20 59 36. 47 30 N, 123 42 W, ML=2.4 OLYMPIC PENINSULA, U.S.A.		F
NOV 26	07 41 9. 48 18 N, 124 24 W, ML=1.8 OLYMPIC PENINSULA, U.S.A.		O
DEC 18	21 40 46. 48 24 N, 122 18 W, ML=2.6 PUGET SOUND, U.S.A.		O

TABLE 4

EARTHQUAKES IN CENTRAL CANADA AND ADJACENT AREAS
1967

NO EARTHQUAKES DETECTED IN 1967